LOUISIANA DEPARTMENT OF

WILDLIFE & FISHERIES

2019-2020 ANNUAL REPORT

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WILDLIFE & FISHERIES
2019-2020 ANNUAL REPORT

The charge of the Louisiana Department of Wildlife and Fisheries is to protect, conserve and replenish the natural resources, wildlife and aquatic life of the state.

Administration for fiscal year 2020-2021

JOHN BEL EDWARDS, GOVERNOR
JACK MONTOUCET, SECRETARY

Robert E. Shadoin, Deputy Secretary
Bryan McClinton, Undersecretary
Patrick Banks, Assistant Secretary
Randy Myers, Assistant Secretary
Scott Longman, Deputy Assistant Secretary

DIVISION ADMINISTRATORS

Col. Chad Hebert, Enforcement
Jason Froeba, Fisheries Research & Development
Kenneth Ribbeck, Wildlife
Buddy Baker, Coastal & Nongame Resources

Commission for fiscal year 2020-2021

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COVER PHOTO: Tchefuncte River Ripples by Margaret Crosby, winner of the Professional Photographer category in the Scenic Rivers 50th Anniversary photo contest

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LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

2019-2020 ANNUAL REPORT

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LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

ORGANIZATIONAL OVERVIEW

OFFICE OF SECRETARY

The Office of Secretary is administered by LDWF's chief administrative officer, who oversees all scientific operations as organized by the Office of Wildlife and the Office of Fisheries. The Secretary also has ultimate authority over the operation of LDWF's fiscal and business matters as administered by the Office of Management and Finance. Support operations of LDWF report directly to the Secretary. These include the Enforcement Division, LDWF's Legal Section and Public Information.

ENFORCEMENT DIVISION

The Law Enforcement Division is responsible for enforcing laws enacted by the Louisiana Legislature, rules and regulations adopted by the Louisiana Wildlife and Fisheries Commission, and federal laws relative to fish and wildlife resources, boating safety, waterways enforcement activities, search and rescue, and homeland security missions.

PUBLIC INFORMATION

The Public information section is responsible for media relations, all print publications (regulation brochures, "The Louisiana Conservationist" magazine, annual report, etc.), the agency website, social media, video production, photography, press conference organization, as well as speech writing and talking points as needed.

LEGAL SECTION

The Legal Section represents the department and the Wildlife and Fisheries Commission in all legal matters involving promulgation, enforcement and administration of the state's fish and game laws and regulations, litigation involving department programs, daily advising and counsel, and drafting of contracts, legal documents and legislation.

OFFICE OF MANAGEMENT & FINANCE

The Office of Management and Finance is directed by the Undersecretary. This unit is responsible for the following functions: human resources, accounting, budget forecasting and control, strategic and operational planning, property control and fleet management, boat registration, motor and boat titling, federal grant reporting, license and permit administration and issuing, fees, taxes and penalties collections.

LICENSING

The Licensing Section administers the issuance of all licenses, harvest tags and most other permits, boat and motor titles and registrations, and is responsible for the collection and deposit of related fees.

PROPERTY CONTROL

The Property Control Section is responsible for LDWF's movable property program, fleet management program, and managing property, marine, general liability, aviation and vehicle insurance claims.

FISCAL

The Fiscal Section is responsible for all financial operations of LDWF.

HUMAN RESOURCES

The Human Resources section handles all matters of employee relations, processes all employee personnel actions, processes all retirement/benefits related actions, develops related policies and procedures, coordinates all training activities for the agency, conducts new employee orientation, administers the performance planning and review program, handles all FMLA related matters and manages the safety program which includes worker's compensation processing.

OFFICE OF WILDLIFE

The Office of Wildlife consists of the Wildlife Division, Coastal & Non-game Resources Division and the Restoration Program.

WILDLIFE DIVISION

The Wildlife Division is responsible for the state's wildlife conservation program and gathering biological data to properly manage wildlife resources.

COASTAL & NONGAME RESOURCES DIVISION

Conservation of coastal wildlife species and their associated habitats, along with statewide responsibility for nongame and threatened and endangered species, mandatory hunter education and training, minerals management, and wetlands conservation through regulatory programs. This is addressed through major programs: Rockefeller Wildlife Refuge; White Lake Wetlands Conservation Area; Wildlife Diversity; Alligator and Furbearer; Hunter Education; Minerals Management; and Habitat Section.

OFFICE OF WILDLIFE (cont.)

RESTORATION PROGRAM

The Restoration Program is responsible for informing and implementing habitat and species restoration projects throughout coastal Louisiana for the benefit of wildlife and fisheries. This program is also responsible for statewide response to oil spills and documenting their impacts to natural resources.

OFFICE OF FISHERIES

The purpose of the Fisheries program is to manage aquatic resources and their habitat, to support the fishing industry, and to provide access, opportunity and understanding of the Louisiana aquatic resources to the state's citizens and others beneficiaries of these sustainable resources. The Office of Fisheries is comprised of two Divisions: Fisheries Management and Fisheries Research and Development. The Fisheries Management Division includes the Marine Fisheries and Inland Fisheries Sections and the Oyster Lease Program. The Fisheries Research and Development Division includes Fisheries Extension, Fisheries Habitat, Fisheries Research and Assessment, and Socioeconomic Research sections.

MARINE FISHERIES

The Marine Fisheries Section is responsible for the monitoring and management of the state's estuarine and nearshore marine fishery resources. This includes both fishery-dependent (recreational and commercial) and fishery-independent monitoring of fish and shellfish populations. Section personnel annually develop recommendations for seasons, harvest limits, and other management measures to ensure sustainable populations.

INLAND FISHERIES

The Inland Fisheries Section is responsible for the monitoring and management of the state's freshwater resources. This includes sportfish population monitoring and management, providing boating access through aquatic vegetation control, as well as sportfish production and stocking through the hatchery system.

OYSTER LEASE PROGRAM

The Oyster Lease Section is responsible for the administration of oyster lease agreements and alternative oyster culture permits, in addition to the collection of revenue generated by these processes. This is done through a Geographic Information System (GIS) that the section manages and maintains.

FISHERIES EXTENSION

Fisheries Extension provides guidance and assistance to Louisiana's valuable commercial and recreational fishing sectors through assistance, education and outreach. The artificial reef program enhances the state's abundant marine resources by developing additional habitat utilizing clean, durable and stable materials.

FISHERIES RESEARCH & ASSESSMENT

The Fisheries Research and Assessment Section is responsible for conducting research on the state's estuarine, marine and inland fishery resources. The section includes the Fisheries Development Group and the Fisheries Research Laboratory on Grand Isle, which, in addition to research, also conducts monitoring of offshore fishery stocks through cooperative sampling programs. The section also includes the Fisheries Stock Assessment Program, responsible for developing modern measures of the health of fish stocks statewide to ensure sustainable populations and estimate effects of regulatory changes, and the Fisheries Habitat/Permitting Group which interacts with all LDWF sections and divisions and state and federal entities in planning and implementation of restoration initiatives for fulfillment of resource recovery agreements from oil spill settlements, reviewing and commenting on regulatory and consistency permit applications, and efforts to conserve and restore fish and wildlife habitat. In addition, the section conducts aquatic nuisance species monitoring and outreach.

A Word from the Secretary

The 2019-20 fiscal year was rolling along like most others as employees of the Louisiana Department of Wildlife and Fisheries continued our important work of managing our state's wildlife, fisheries and the accompanying habitat. But in March of 2020, our lives were radically altered, as was everyone else's, by the COVID-19 pandemic.

It made our work more challenging as we were faced with working remotely and social distanced while at the same time providing the citizens of our state the service for which they have come to expect. I'm proud to say the women and men of our department were up to the task and continue to be.

Just one example was that of our Aquatic Outreach and Education Program, which is designed to educate the public on programs and projects in our Office of Fisheries. Staff reached approximately 14,000 Louisianans in 2019-2020.

When the pandemic curtailed our public availability, our staff had to cancel events and workshops. But they adapted quickly and created virtual opportunities for volunteer instructors and students through extended education, live video presentations and virtual workshops.

That kind of ingenuity was prevalent throughout every section of LDWF. It certainly wasn't easy as there was no previous pandemic roadmap to follow. But we came together, learned how to Zoom and made the best of it.

One positive to come from the pandemic was how many folks in our state either discovered or rediscovered their love of fishing. Fishing license sales skyrocketed during the spring of 2020. In May 2020 alone, LDWF sold 62,568 fishing licenses compared to 38,266 during May of 2019, an increase of 24,302 licenses, an increase of 64 percent. That mirrored trends in March, April and June. We issued in excess of 2 million recreational hunting, fishing, trapping and non-consumptive use licenses and permits sold to more than 800,000 customers, generating in excess of $22 million in revenue in 2019-2020. A total of 57,000 commercial licenses were sold, representing 11,000 commercial fishermen, 5,800 business entities, 890 charter businesses and various permits that generate in excess of $3 million in revenue.

Our Enforcement Division conducted 337,043 patrol hours during the fiscal year on land and 53,015 on water. Agents made 612,655 contacts with the public, the majority of whom were in compliance with state and federal wildlife and fisheries regulations.

Enforcement agents issued 11,615 criminal citations and 3,801 warnings during this period. The most common types of citations were fishing without a license, failure to comply with personal flotation device requirements, not abiding by rules and regulations on wildlife management areas (WMAs) and failure to comply with deer tagging or harvest record regulations.

Being in communication with the public is vital to what we do. That's why in February of 2020, our redesigned and reorganized website launched. The new website is more user friendly, easier to navigate, catalogs our publications and research in a more intuitive manner and allows the agency to feature 'top news' on the homepage. Our new website launched on Feb. 18, 2020. Between launch and June 30, 2020 we had 840,000 users to the site, 1.3 million sessions and 3 million page views.

Our public information staff also vastly improved our social media presence. Facebook remains our strongest social channel and thousands of questions are submitted annually through the messaging function, providing constituents another means of communicating with the department. We had a total of 93,249 Facebook followers and 7,423 Instagram followers during the fiscal year.

Deer hunting remains popular in our state. During the 2019-20 deer season, 173,300 deer hunters harvested an estimated 171,000 white-tailed deer. The estimated number of deer harvested and hunters was derived from the annual mail survey. While, the annual mail survey has been used since 1970, 2020 marked the first year that all surveys were sent via email.

The most recent turkey hunter survey estimated 20,000 turkey hunters harvested approximately 5,600 wild turkeys during the spring of 2020. The estimated hunter numbers increased by approximately 39%, and the estimated harvest increased by approximately 33% from that of 2019. The number of recreational days spent turkey hunting (142,000) was up 56% compared to 2019 (91,200).

Based on federal harvest estimates, 50,000 active duck hunters harvested 573,000 ducks during the 2019-20 season. That is a 37% increase in active hunters and a 13% increase in duck harvest. But it was the second lowest harvest estimate since 1988, the first year of 30-day seasons with three-duck daily bag limits. Per-hunter harvest also declined from 13.9 in 2018-2019 to 11.5 in 2019-2020, the lowest since 1993,

the last year of 30-day seasons with three-duck daily bag limits.

We did some celebrating in 2019-20 despite the pandemic. In December of 2019, the Rockefeller Wildlife Refuge celebrated its celebrated its 100-year anniversary, hosting both the Rockefeller and McIlhenny families as well as governmental and private stake-holders all playing key roles in the success of the refuge.

LDWF began its 50-year celebration of our Natural and Scenic Rivers System during the spring of 2020. Throughout the state, there are approximately 80 streams or stream segments thereof, constituting an estimated 3,100 miles of Louisiana's streams, rivers and bayous that make up the system, administered by LDWF. Among the events was a public photo contest in which amateur, youth and professional photographers could submit photos from one of our Scenic Rivers.

Coastal restoration plays a huge part in LDWF's mission, overseeing the habitat of our state. There are many coastal restoration projects underway in Louisiana and it was a busy time during the 2019-20 year. Perhaps that was best illustrated in the success story from Queen Bess Island, located in Barataria Bay near Grand Isle, during the spring of 2020.

The restoration project gave back more than 30 acres of land to the 37-acre island, a haven for nesting for wading birds and our state's iconic brown pelican. LDWF biologists didn't know exactly how many birds would return after the massive restoration. However, the numbers exceeded their expectations. It was projected that about 1,500 brown pelicans would nest at Queen Bess in the spring of 2020 but the actual number was about 8,000.

Louisiana produces nearly one-quarter of the seafood in the continental United States.

Louisiana comes in second only to Alaska in terms of commercial fishing production and is home to three of the top six commercial fishing ports in the country. In the Gulf of Mexico, 78% of the seafood production comes from Louisiana shrimpers, crabbers, oyster harvesters and fishermen. Nearly 12,000 commercial fishermen and 6,225 seafood dealers/processors and brokers register each year to provide the nation with fresh seafood.

Shrimp are the state's most valuable fishery. In 2019-2020, total shrimp landings measured over 73.8 million pounds (all species combined/heads on weight) and had a dockside value of nearly $107.4 million. Brown shrimp landings in 2019-2020 measured over 12.1 million pounds (heads on weight) with a dockside value of $12.9 million while white shrimp landings in 2019-2020 measured over 61.3 million pounds (heads-on weight) with a dockside value of $94.2 million.

Louisiana regularly leads the nation in the production of oysters and continues to account for 34.4% of the nation's oyster landings. Among Gulf of Mexico states, Louisiana consistently ranks first in landings, accounting for nearly 52% of all oysters landed. For 2019 public oyster reef landings totaled approximately 149,000 pounds and had a dockside value of approximately $1.1 million.

Private oyster reef landings totaled approximately 7.7 million pounds and had a dockside value of approximately $54 million.

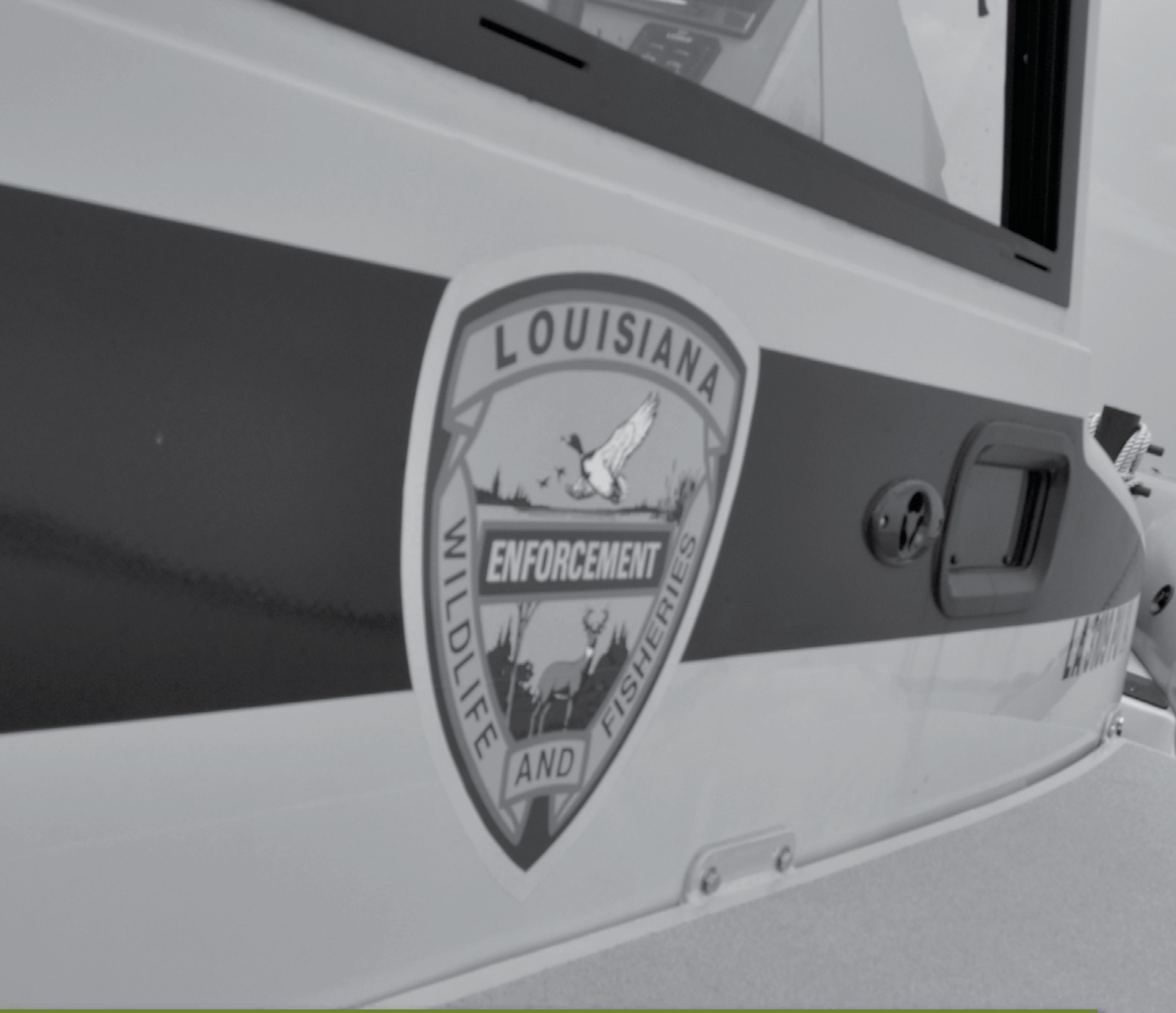
Our LA Creel program monitors recreational fisheries and remains a valuable tool in managing our fisheries resources.

During 2019-2020, fisheries biologists worked a total of 1,583 LA Creel assignments and conducted approximately 11,822 interviews of recreational fishing trips along Louisiana's coast through the LA Creel Program. This resulted in a total of 32,574 anglers being surveyed and 79,212 fish being counted. Using LA Creel data, it was estimated that about 2.3 million recreational angler trips were made.

Battling nuisance aquatic vegetation is one of LDWF's top priorities in our fisheries division. In 2019-2020, herbicides were applied to 45,921 acres of nuisance aquatic vegetation. The majority of these efforts included control of 19,764 acres of water hyacinth, 20,318 acres of giant salvinia, 1,483 acres of alligator weed and 1,019 acres of common salvinia. In addition, approximately 747,871 adult giant salvinia weevils were stocked in water bodies throughout Louisiana.

These are just a few of the highlights of what was a unique year that saw our staff adapt and persevere during the pandemic. The details that follow illustrate more completely what is involved in our agency's natural resource management efforts.

Jack Montoucet, *LDWF Secretary*



Office of Secretary

ENFORCEMENT DIVISION

The Louisiana Department of Wildlife and Fisheries Law Enforcement Division (LDWF-LED) is responsible for enforcing laws enacted by the Louisiana Legislature and federal laws relative to fish and wildlife resources, boating safety, waterways enforcement activities, search and rescue, and homeland security missions.

LDWF-LED is a fully-commissioned statewide law enforcement agency with the primary mission of protecting Louisiana's natural resources and serving the people who utilize them. Beyond the traditional role of ensuring compliance with licensing and harvesting regulations, LDWF-LED also conducts search and rescue missions, enforces boating safety laws, investigates boating crash incidents and hunting accidents, and provides boater education classes for thousands of citizens each year.

The Law Enforcement Division is responsible for enforcing laws as provided for in the:

- Constitution of the State of Louisiana
- Louisiana Revised Statutes
- U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA)/LDWF Law Enforcement - Cooperative Enforcement Agreement - Law Enforcement Services under:
  - Magnuson-Stevens Fishery Conservation and Management Act
  - Endangered Species Act of 1973
  - Marine Mammal Protection Act of 1972
  - Lacey Act
- U.S. Department of Interior, U.S. Fish and Wildlife Service (USFWS)/LDWF Law Enforcement - Memorandum of Agreement - Law Enforcement:
  - Migratory Bird Treaty Act
  - Lacey Act; Migratory Bird Hunting and Conservation Stamp Act
  - Bald and Golden Eagle Protection Act
  - Airborne Hunting Act
  - National Wildlife Refuge System Administrative Act
  - Endangered Species Act
  - Marine Mammal Protection Act
  - Archeological Resources Protection Act
  - African Elephant Conservation Act
  - Antarctic Conservation Act
  - Wild Bird Conservation Act and Recreation Act
- U.S. Coast Guard/LDWF Law Enforcement - Statement of Understanding - Boating Safety Regulations:
  - BWI
  - Public Education and Training
  - Boating Accident Investigations
  - Search and Rescue
  - Regattas and Marine Parades
- Louisiana Department of Health/LDWF Law Enforcement
  - Memorandum of Understanding - Louisiana Shellfish Sanitation Program
  - National Shellfish Sanitation Program

LDWF-LED conducted 337,043 patrol hours in FY 2019-2020: 280,028 on land and 53,015 on water. Agents made 612,655 contacts with the public, the majority of whom were in compliance with state and federal wildlife and fisheries regulations. LDWF-LED agents issued 11,615 criminal citations and 3,801 warnings during this period. The most common types of citations were fishing without a license, failure to comply with personal flotation device requirements, not abiding by rules and regulations on wildlife management areas (WMAs), and failure to comply with deer tagging or harvest record regulations.

ORGANIZATIONAL STRUCTURE & PERSONNEL

LDWF-LED is organized in a paramilitary structure to assure the efficient use of resources, consistent statewide enforcement policy, and an effective, coordinated response to urgent needs. LDWF-LED is commanded by one colonel, the Chief of

FIGURE 1. LDWF Law Enforcement Division Organization Chart during FY 2019-2020

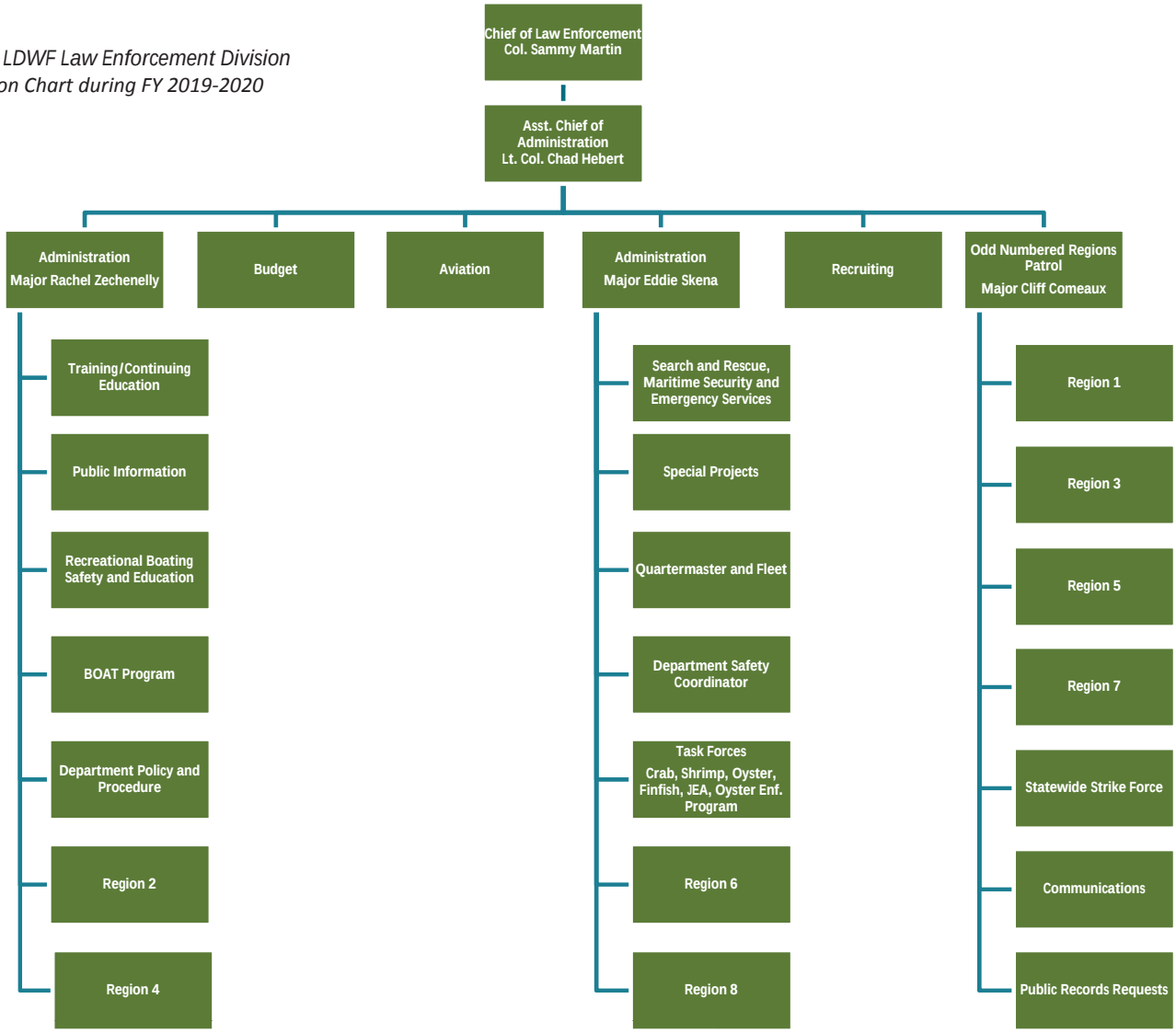


FIGURE 2. Enforcement Division Regions

Enforcement, who reports directly to LDWF's Secretary and oversees administration of the division. Reporting to the colonel is a Lieutenant Colonel. The Lieutenant Colonel serves as assistant chief of administration and patrol. The administration side includes recreational boating safety and education, emergency services, training, support, public information and budget. The patrol side includes all state regional field operations, statewide communications, aviation and recruiting.

There are three majors:

- one over training/continuing education, public information, recreation boating safety and education, NASBLA Boat Operations and Training Program, department policy and procedure, Region 2 and Region 4
- one over the odd-numbered regions, statewide communications section, statewide strike force and public records requests
- one over search and rescue, maritime security, emergency services, special projects, quartermaster and fleet, department safety, representative for the shrimp, crab, oysters, finfish task forces, Joint Enforcement Agreement, Region 6 and Region 8.

The LDWF Enforcement Division is currently headed by Col. Chad Hebert, a 27-year veteran at LDWF. Hebert was promoted to the rank of Colonel in July 2020 (after FY 2019-2020 ended) and replaces Col. Sammy Martin, who announced his retirement in June 2020 after 38 years.

Hebert, from Schriever, has earned numerous awards during his LDWF career. He has twice been honored with the LDWF Meritorious Service Award (2006, 2017), named Statewide LDWF Agent of the Year (2001), Region 9 Agent of the Year (2001) and Outstanding Officer (2001). Named Lt. Colonel in 2018, Hebert helped direct statewide operations and patrols as well as the administrative functions of the Enforcement Division. He also worked with other federal and state enforcement agencies, including USFWS, the Drug Enforcement Agency, Homeland Security, the Louisiana State Police and state attorney generals and judges.

Col. Hebert served as major from February 2017 until his promotion and represented the LDWF Enforcement Division on the Crab Task Force, Oyster Task Force, Shrimp Task Force and Finfish Task force. He also served as an enforcement captain from 2013-2017, an enforcement lieutenant from 2009-2013, an enforcement sergeant from 2005-2009 and an enforcement senior agent from 1994-2005. As a senior agent, in addition to his other honors, he received the Certificate of Valor from the North American Wildlife Officer's Association in 2002. He completed the LDWF Cadet Academy in 1993, earning the high overall achievement award, the high marksmanship award and physical fitness award during the training academy.

Col. Chad Hebert

The Enforcement Division is divided into eight enforcement regions and the statewide strike-force. Each numbered enforcement region is composed of two or three multi-parish districts. Each region is managed by a captain who supervises two or three district supervisors of the lieutenant rank. Regions have between 16-25 agents, depending on regional size, resident population and participant population. Current funding provides a field enforcement staff of two to four agents per parish, according to the nature of wildlife-based activities in the area, the number of people participating, the frequency of their participation and other factors.

Total division head count is 257 positions including 234 enforcement agents, 15 administrative staff, six communications officers and two pilots. The actual number of filled positions (as of July 2020) is 237.

REGIONAL ENFORCEMENT PROGRAMS

Most of the law enforcement activity performed by LDWF-LED is conducted by regional agents. Regional agents work a schedule assigned by their supervisors to address seasonal needs, reported violations, weather conditions and predominant activities. Agents are on-call 24 hours per day and must be willing to change their work hours and locations as circumstances require. Schedules are often changed due to weather and reported violations, and agents are often called out to respond to violations in progress, boating and hunting accidents, and calls for search and rescue.

Agents use a variety of vehicles during land patrols, primarily four-wheel drive trucks and all-terrain vehicles. The primary patrol vessels used during water patrols are outboard bay boats and 19-to-40-foot marine patrol vessels. LDWF-LED also deploys go-devils, airboats, surface river mudboats, bass boats and flatboats.

SPECIALIZED UNITS

The LDWF Enforcement Division contains four specialized units with selected missions or purposes: the Statewide Strike Force; the Maritime Special Response Team; the Aviation Section; and the Oyster Seafood Strike Force. Agents in specialized units have developed specific skills, expertise and knowledge appropriate for their particular operational fields. Agents in specialized units operate in relatively broad geographic areas and may work alongside regional enforcement agents when appropriate.

STATEWIDE STRIKE FORCE

The Statewide Strike Force is assigned to work problem areas statewide. They devote attention to commercial fisheries operations, license fraud and white collar crimes. Violations include smuggling, interstate commerce violations and false reporting and under-reporting of commercial fish harvests. These agents provide regional patrol with additional manpower on WMAs and places of high seasonal utilization, such as Grand Isle and other locations throughout the state. Strike Force agents also assist regional agents with oyster harvest enforcement, which primarily addresses harvesting oysters in closed waters, stealing from oyster leases and state grounds, and oyster size regulations.

MARITIME SPECIAL RESPONSE TEAM

The Maritime Special Response Team cooperative endeavor by LDWF-LED and the Louisiana State Police SWAT team addresses maritime security threats within the state of Louisiana. The team provides a maritime tactical response capability at the state level in order to effectively provide public safety, officer safety, Chemical, Biological, Radiological, Nuclear and High-yield Explosives prevention, and response and tactical support for LDWF's federal, state and local partners.

AVIATION SECTION

The Aviation Section contains two pilots and four total planes which include one Kodiak, one Cessna 210 and two Cessna 206 amphibians. The Aviation Section's aircraft provide a valuable platform for detecting illegal hunting and fishing activities and frequently play a vital life-saving role in search and rescue operations. The Aviation Section also contributes its services to other divisions for biological missions, such as waterfowl counts and the monitoring of commercial fisheries.

LEFT: LDWF MSRT agents are training on the range. RIGHT: LDWF pilots flying one of the three planes used primarily for enforcement efforts.

OYSTER SEAFOOD STRIKE FORCE

The Oyster Seafood Strike Force is assigned to work problem areas on the coast. They devote attention to commercial fisheries with a focus mainly on oysters, license fraud and white collar crimes. Violations include smuggling, interstate commerce violations and false reporting, and under-reporting of commercial fish harvests. Violations pertaining to oysters include harvesting polluted oysters, theft of oysters, illegal tagging, oyster size regulations, and sanitary code violations. The agents are licensed FAA drone pilots. The unit has three drones assigned, which are capable of night or day surveillance. Oyster Seafood Strike Force agents also work with regional agents on coastal patrols.

BOATING SAFETY PROGRAM

With 15,000 miles of tidal coastline, 5,000 miles of navigable waterways, three of the busiest ports in the country, a thriving shipping industry, a large commercial fishing fleet, and over 317,000 registered boats, Louisiana contains many geographic, demographic and economic features that pose special challenges for boating safety enforcement.

LDWF-LED agents made 144,175 public contacts during the course of 33,192 patrol hours dedicated to boating enforcement, education and accident investigation in FY 2019-2020. Of those hours, 23,149 patrol hours were performed in vessels on the water.

The adoption of "Rules of the Road" regulations for boaters has enhanced the enforcement of boating safety regulations and boating under the influence laws. These regulations provide the boating public with clear rules for the manner in which boats are operated and are an important tool in determining fault in boating accidents. The "Rules of the Road" also enhance the ability of agents to address reckless and careless operation of motorboats. In FY 2019-2020, LDWF-LED agents issued 67 citations for careless and reckless operation of a vessel and 126 citations for operating a vessel while intoxicated.

The statewide LDWF-LED boater education course teaches safe, legal and responsible boat operation and is approved by the National Association of State Boating Law Administrators (NASBLA). This program provides a vital outreach to the community and has greatly improved the awareness of and compliance with boating safety practices and regulations in Louisiana.

Agents hold monthly classes in each region for anyone who wishes or is required by Louisiana law to take them. In FY 2019-2020, 9,462 citizens were certified in classroom and online classes. LDWF-LED continues to recruit and train additional volunteer instructors to complement and enhance the efforts of its own agents. Since the inception of the boating safety education course in 2003, LDWF has certified 130,514 students.

LDWF-LED remained committed in marketing and promotion of boating education courses by creating special events and activities for students attending courses.

An agent conducting a field sobriety test on a suspected inebriated boater.

LDWF participated in the NASBLA Operation Dry Water Weekend from July 5-7 in 2019. During the Operation Dry Water weekend, LDWF agents were out in force patrolling state waterways for impaired boat operators. During the weekend, LDWF agents cited nine people for DUI while operating a vessel.

LDWF participated in several national campaigns including "Wear your PFD to work Day" on May 15 and the "Safe Boating Week" in Louisiana from May 16-22. LDWF Enforcement Division agents were out in full force as always during the safe boating week to perform boating safety checks and driving or operating a vessel while intoxicated (DWI) patrols.

The LDWF Enforcement Division had to cancel their annual "Boating Education Lagniappe Day" due to COVID-19 concerns. LDWF has held Lagniappe Day for the past nine years and it consisted of offering a free boating safety class in eight different locations across the state and providing food and drinks, giveaways and door prizes.

SEARCH & RESCUE OPERATIONS

LDWF-LED is responsible for providing and coordinating search and rescue response and maritime security activities for the state. This activity supports the state's goal of hurricane recovery and emergency preparedness by planning, training and coordinating local, state and federal response for search and rescue associated with natural or man-made disasters. Preparedness and efficient execution of search and rescue response events is essential to saving lives and swift recovery efforts. Providing maritime security on our state's waterways is essential to protection of critical infrastructure located in maritime environments throughout Louisiana.

AGENT TRAINING PROGRAM

IN SERVICE TRAINING PROGRAM

The LDWF-LED in-service training program is conducted in three phases and consists of "annual in-service," "spring firearms" and "fall firearms." The in-service training is necessary in order to meet federal and state training requirements and to advance individual officer capability.

Annual in-service is usually around 40 hours and consists of 10 training sessions conducted over a 10-month period. During these sessions, agents receive training in firearms, defensive tactics/use of force, officer survival, legal, first aid and electives. Spring and fall firearms training sessions focus on firearms qualification and training.

At the end of 2019, agents completed their annual and fall/spring firearms in-service training requirements, which consisted of the following:

SPRING/FALL: IN-SERVICE

- Firearms

ANNUAL: IN-SERVICE

- First Aid/Blood Borne Pathogens/CPR for the Professional Rescuer
- Defensive Tactics/DT Scenarios
- MEB (Monadnock Expandable Baton) Retrainer
- Officer Survival w/simunitions/Use of Force with scenarios
- HIATT Tactical Handcuffing
- Firearms (Combat Rifle & Combat Pistol)
- DWI Intox. 9000, Standardized Field Sobriety Testing Wet Lab, Boating Under the Influence (BUI) Seated Test Battery, ARIDE Retrainer (Advanced Roadside Impaired Driving Enforcement)
- Legal Review

FIREARMS

LDWF/LED added one agent to its cadre of firearms instructors. This agent completed the selection, qualification and training process to become a certified LDWF and Peace Officer Standards and Training (POST) firearms instructor. He will be able to provide the other instructors with assistance in providing the required firearms training to all agents and cadets throughout the enforcement division.

DWI

Two agents were certified as Drug Recognition Experts, bringing the LDWF-LED total to 23 Drug Recognition Experts.

LEFT: Lt. Clay Marques participating in "Wear Your Life Jacket to Work Day." RIGHT: Agent teaching boating safety to a class.

LDWF agents Participated in a NASBLA Level 2 Boat Accident Investigation, Reconstruction and Analysis Course.

MARINE LAW ENFORCEMENT TRAINING PROGRAM

At the end of 2019, all agents had completed their annual recertification as Boat Operators for Search and Rescue in the NASBLA, Boat Operations and Training Program. Additionally, we certified seven agents in the NASBLA Tactical Operators Course, seven agents in the NASBLA Boating Accident Investigation Course and five agents in the NASBLA Pursuit and Stop Course.

CRISIS INTERVENTION OR CRITICAL INCIDENT TRAINING

LDWF has four agents trained in Crisis Intervention and Critical Incident as part of the Agents Crisis Team. The Agents Crisis Team team consists of agents who are specially trained as skilled listeners. The objective of Agents Crisis Team is to provide support for law enforcement personnel, and their immediate family, who have experienced a critical incident or traumatic event. A Critical Incident is defined as any incident, action, or event, which has the potential for producing significant emotional trauma that may adversely affect the psychological well-being of law enforcement personnel.

RECRUITING

LDWF created a recruiter position within the enforcement division. The recruiter position focuses on reaching more qualified candidates who have the motivation and interest in becoming an LDWF agent while also diversifying the workforce.

ACADEMY

The LDWF Enforcement Division conducted the hiring process to fill 24 enforcement agent positions in the winter of 2019 and spring of 2020. The LDWF Training Academy Class 33 began their six months of training on March 9, 2020. LDWF had to suspend the academy due to COVID-19 concerns at the end of March. Training resumed on June 1, 2020.

JOINT ENFORCEMENT AGREEMENT

LDWF-LED again entered into a Joint Enforcement Agreement with NOAA's Office for Enforcement. LDWF-LED received approximately $820,626 in FY 2019-2020 to patrol for compliance with federal commercial and recreational fisheries regulations, primarily in the Gulf of Mexico.

Agents on a JEA Patrol in the Gulf of Mexico.

OPERATION GAME THIEF

Louisiana Operation Game Thief, Inc. is a program which provides cash rewards to those providing information leading to the apprehension of wildlife violators. Violations can be reported anonymously by calling a 24-hour toll-free telephone number (1-800-442-2511) or by using LDWF's tip411 program. To use the tip411 program, citizens can text LADWF and their tip to 847411 or download the "LADWF Tips" iPhone or Android apps from the Apple App Store and Google Play free of charge. The hotline and the tip411 program are monitored 24 hours a day by the LDWF Communications Center. Reports are immediately referred to agents for action.

During the 2019 year, Louisiana Operation Game Thief paid out $14,550 in rewards. In 2019 the Louisiana Operation Game Thief board reviewed 38 cases that led to 78 subjects getting cited or arrested and a total of 707 citations issued. From 1984 till the end of 2019 the Louisiana Operation Game Thief board has paid out a total of $432,750 in reward money to informants.

HOMELAND SECURITY

LDWF-LED is an active participant in Louisiana's Homeland Security Plan and represents the state in waterborne emergencies. Through the Governor's Office of Homeland Security and Emergency Preparedness, LDWF-LED is the lead agency for search and rescue operations during natural disasters and maritime security of Louisiana's vital business and government interests along the coast and major rivers. As members of the Governor's Homeland Security Advisory Council and all major port security committees within the state, LDWF-LED agents frequently respond to requests to deploy LDWF marine resources for security concerns. LDWF-LED's specialized training and equipment and its ability to operate throughout the state's vast maze of waterways and wild areas has complemented Louisiana's ability to respond to emergencies on land and water.

Emergency Support Function annual support plan for maritime and port security has been updated. LDWF-LED serves as the primary port and maritime security support partner.

LDWF-LED is a member of the First Responder Committee through the Governor's Office of Homeland Security and Emergency Preparedness which was legislatively created. LDWF-LED's maritime security role coincides as a multi-mission responsibility and further enhances the agency's core mission responsibilities to improve public safety services and protect natural resources and the supporting ecosystem while improving security in the state and nation.

MARITIME SPECIAL RESPONSE TEAM

The LDWF/LED Maritime Special Response Team partners with the Louisiana State Police SWAT team to address maritime security threats within the state of Louisiana. The team provides a maritime tactical response capability at the state level in order to effectively provide public safety, officer safety, and tactical support for LDWF/LEDs federal, state and local partners.

During this period the LDWF/LED Maritime Special Response Team team completed their annual training which consisted of:

- Close Quarter Battle Techniques (CQB)
- Firearms Training
- Security Zone Enforcement Procedures
- Underway Training
- Hostage scenarios
- Large Vessel Training
- Rural Operations and Tactical Tracking
- Water Survival

At the end of 2019, Maritime Special Response Team members had completed their annual recertification as Tactical Operators Course in the NASBLA Boat Operations and Training Program.

PREVENTATIVE RADIOLOGICAL AND NUCLEAR DETECTION

LDWF continues to work with key local, state and federal partners to implement a Preventative Radiological and Nuclear Detection program in the state of Louisiana. Through our partnership with the Domestic Nuclear Detection Office, the state has developed a statewide concept of operations plan, as well as standard operating procedures for individual agency partners. LDWF and Preventative Radiological and Nuclear Detection program partners successfully completed a three-day training exercise as well as a full scale exercise.

ACQUISITIONS

EQUIPMENT:

- 51 replacement Concealed Bullet Proof Vests
- 18 replacement Maritime Special Response Team Tactical Entry Vests
- 5 Gatortail Boat/Motor/Trailer packages
- 6 replacement outboard motors
- 5 surveillance cameras
- 2 Night Track Pro cameras
- 13 replacement computers
- 1 replacement boat trailer
- 39 (4x4) patrol trucks
- 2 Administration SUVs
- 1 custom robotic deer decoy
- 2 Drones

PUBLIC INFORMATION

The LDWF-LED Public Information section does various media and public information related tasks. The public information section handles public emails, Facebook questions, media requests including setting up interviews, and gathering enforcement related information. The public information section also provides footage and photos to media outlets both in-state and nationally.

LDWF-LED issued 108 enforcement related press releases during FY 2019-2020. These press releases were issued to a media contact list via email both state and nationwide. They were also posted on the LDWF website. The press releases ranged from rewards for information on current cases, conviction results, announcements of event and upcoming cadet academies, highlighting important and unusual cases, enforcement division and agent achievements and awards won, and boating safety Information.

LDWF-LED public information also produces videos for both external and internal use. The videos range from public service announcements, cadet recruitment, hunting and boating safety and cadet training.

LEFT: Sgt. Charlie Ferrington (left) Receives the Louisiana Waterfowl Enforcement Officer of the Year award from the Mississippi Flyway Council. RIGHT: Sgt. Mitch Darby (center) received the Louisiana's NASBLA Boating Law Enforcement Officer of the Year for Louisiana.

LDWF ENFORCEMENT NEWS

LDWF AGENT RECEIVES AWARD FOR MIGRATORY GAMEBIRDS ENFORCEMENT

A LDWF-LED agent was honored by the Mississippi Flyway Council at the Sept. 5 Louisiana Wildlife and Fisheries Commission meeting in Baton Rouge.

Sgt. Charlie Ferrington, of Aimwell, received the Louisiana Waterfowl Enforcement Officer of the Year award from the Mississippi Flyway Council. The Mississippi Flyway Council recognizes law enforcement officers from each state who make outstanding contributions to the protection of waterfowl.

Sgt. Ferrington mainly patrols LaSalle Parish and has been an agent since 2005.

Sgt. Ferrington was honored for his participation in numerous illegal waterfowl hunting investigations. His cases have involved hunting migratory game birds over a baited area, using toxic shot to take waterfowl, using a shotgun capable of holding more than three shells and hunting without licenses.

LDWF AGENTS RESCUE TWO OVERDUE BOATERS IN AVOYELLES PARISH

LDWF-LED agents completed a successful search and rescue mission on Nov. 11 in Avoyelles Parish.

Agents were notified around 10 p.m. on Nov. 11 about two overdue boaters on the Red River. Agents immediately responded to the scene to conduct search and rescue operations.

After repeated attempts to contact the overdue boaters by cell phone failed, agents were able to find their location by having LDWF dispatch ping the cell phones.

Agents launched vessels and headed to the location of the cell phones and were able to locate the missing boaters standing on a rock jetty around midnight. Agents loaded the missing boaters into their vessel and brought them back to the landing where family members were waiting.

The missing boaters said their 14-foot aluminum vessel started taking on water and sunk. They were able to swim to the rock jetty to get out of the water.

"This successful search and rescue operation shows the importance of filing a float plan with your loved ones before getting in a vessel," said Major Rachel Zechenelly, the state's boating law administrator. "This could have been a far worse outcome with those missing boaters being stranded overnight in the cold. Thankfully their family notified authorities once they were overdue and our agents were able to find them before hypothermia set in."

LDWF AGENT RECEIVES NATIONAL BOATING SAFETY AWARD AT COMMISSION MEETING

A LDWF-LED agent was awarded the Louisiana's NASBLA "Boating Law Enforcement Officer of the Year" for Louisiana.

Sgt. Mitch Darby, of St. Martinville, received the NASBLA award at the monthly Louisiana Wildlife and Fisheries Commission meeting on Jan. 9 in Baton Rouge.

Sgt. Darby has been an LDWF agent for 20 years and he mainly patrols the waterways in southern Louisiana including Iberia, St. Martin, Lafayette and St. Landry parishes.

"When it comes to boating safety enforcement, education, boating incident investigations, and boating safety outreach, Sgt. Darby stands alone in his assigned region," said Major Rachel Zechenelly, the states boating law administrator. "He has always represented the department well throughout his career with pride and has constantly exhibited a hard work ethic."

Sgt. Darby has distinguished himself by becoming an advanced accident reconstruction agent for his region after attending the level two of the National Boating Accident Investigation Course. He has conducted numerous fatal boating incident investigations and he is sought out by his peers for his knowledge when complex incidents investigations are conducted.

Sgt. Darby is also certified to operate the side scan sonar that assists with search and rescue missions. He is also a NASBLA Boating Program Instructor and a Louisiana Boating Education Course Instructor for the department. Since 2013, he has trained enforcement cadet classes in the NASBLA Boat Crew Member Course and the Boat Operations/Search and Rescue Course.

LDWF AGENTS ARREST HOMER MAN FOR KILLING A BALD EAGLE

LDWF-LED agents arrested a Homer man for allegedly killing a bald eagle and other wildlife crimes in Claiborne Parish. Agents also arrested two other men and cited a juvenile for alleged hunting violations.

Agents arrested Daniel Smith, 18, for violating the Bald Eagle and Golden Eagle Protection Act, illegally taking a Hawk, taking deer during a closed season, hunting from a moving vehicle, taking deer during illegal hours, discharging a firearm from a public road, intentional concealment of wildlife, hunting turkeys during a closed season, criminal mischief and hunting from a public road.

Agents also arrested Jacob E. Lee, 19, of Bernice, Jared I. Lee, 19, of Bernice, and cited a juvenile from Homer, for hunting from a public road, hunting from a moving vehicle, taking deer during illegal hours and discharging a firearm from a public road. Jacob Lee and Jared Lee were also cited for taking deer during a closed season. The juvenile was also cited for intentional concealment of wildlife.

Agents received anonymous tips from two different sources in October and November 2019 that Smith had shot and killed a bald eagle in Claiborne Parish. Agents contacted Smith and he denied the accusation.

Through the course of the investigation agents were able to secure a search warrant for Smith's truck and phone. Agents found a bald eagle feather in Smith's truck on Dec. 13.

On Dec. 14, Smith admitted to agents that he shot and killed the bald eagle in February 2017 off of Colquitt Rd. with a .223 rifle.

Agents also found photos and videos of Smith participating in several illegal activities including some with Jacob Lee, Jared Lee and the juvenile. Agents found evidence that Smith killed a turkey in July 2019, killed a Hawk in November 2018, shot out street lights in July 2019 and harvested three deer at night and dumped them over a bridge in November 2019. Most of these infraction occurred from his vehicle and on public roads.

Smith, Jacob Lee and Jared Lee were arrested and booked into the Claiborne Parish Jail. The juvenile was released back to his parents.

Violating the Bald Eagle and Golden Eagle Protection Act brings up to a $100,000 fine and up to one year in a federal jail.

Taking deer during a closed season, intentional concealment of wildlife, hunting turkeys during a closed season and hunting deer during illegal hours brings a $900 to $950 fine and up to 120 days in jail for each offense. Taking a Hawk carries a $400 to $950 fine and up to 120 days in jail. Criminal mischief carries up to a $500 fine and six months in jail. Hunting from a moving vehicle carries a $250 to $500 fine and up to 90 days in jail. Hunting from a public road brings a $100 to $350 fine and up to 60 days in jail. Discharging a firearm from a public road carries up to a $50 fine and 30 days in jail.

Smith may also face civil restitution totaling up to $9,225 for the replacement value of the illegally taken bald eagle and three deer. Smith, Jacob Lee and Jared Lee also may face civil restitution totaling $1,624 for the replacement value of an illegally taken deer.

PUBLIC INFORMATION

The Public Information Office handles the communication programs for LDWF. These programs cover a variety of communication outlets including publications and brochures, media relations, press releases, social media, audio-video productions, photography, and website development.

SOCIAL MEDIA

LDWF continues to strengthen constituent engagement by leveraging and enhancing its social media platforms and execution. Our constituents are taking a more active role in social media conversations and storytelling today, making our social media outlets one of the key methods of distributing department information. As our Facebook page audience continues to grow, the agency has shifted some of its social media focus to Instagram, to begin building a stronger audience base on this platform. Instagram is a great tool to showcase behind-the-scenes work at the agency that our constituents don't typically get to see. Facebook remains our strongest social channel, and thousands of questions are submitted annually through the messaging function, providing constituents another means of communicating with LDWF.

- Facebook Followers: 93,249
- Instagram Followers: 7,423
- YouTube Subscribers: 1,213
- Twitter Followers: 7,058

PUBLICATIONS

The Public Information staff is responsible for the production of specialized publications, all regulation pamphlets and the annual report. All pre-press functions, including graphic design and final printing approvals are handled by staff in this section.

Specialized publications include any publication not produced on a regular basis. These publications are used for educational, informational and promotional use for conservation management programs and special events.

LOUISIANA CONSERVATIONIST MAGAZINE

Louisiana's longest running outdoor magazine returned to print in the fall of 2016. The "Louisiana Conservationist" had been the long-standing outdoor publication for Louisiana's wildlife and fisheries enthusiasts.

The "Louisiana Conservationist" is a 90-year-old publication that began in 1917 when Lucy Powell Russell became the first female to serve as Secretary of the state's wildlife agency.

The long-term goal of the magazine is to serve as an educational outlet for anyone yearning to know more about Louisiana's outdoors, especially students. The print publication is a product of existing department staff, and available free of charge on a quarterly basis from LDWF field offices across the state. The current issue, and archived issues back to the magazine's inception in 1927 are available at *LAConservationist.wlf.la.gov*.

PHOTOGRAPHY AND AUDIO-VIDEO PRODUCTIONS

The Public Information Office is responsible for the production of specialized audio and video projects, video news releases, media footage requests, and audio recordings of various meetings. The audio and video library consists of more than 2,000 tapes of raw footage available for media and education purposes. Public Information staff is also responsible for department photography needs. Experienced photographers are on staff to help document the numerous department programs featured in LDWF news releases, brochures, posters and the "Louisiana Conservationist" magazine.

The Audio and Video Production staff assisted the department in promoting several programs throughout the year by producing educational videos and video news releases for media distribution and for viewing by the public on LDWF's website and across LDWF social media platforms. Public Information staff handle all video pre- and post-production in-house.

Public Information staff has implemented a digital storage and file sharing system for our large library of videos and photos. This searchable system archives tens of thousands of files, many of which are rare historic images from LDWF's past. Many of our videos are also shared publically on our YouTube channel at *www.youtube.com/user/LAWildlifeFish*.

WEBSITE

The LDWF website was completely redesigned and reorganized during this fiscal period. The new website is more user-friendly, easier to navigate, catalogs our publications and research in a more intuitive manner, and allows the agency to feature 'top news' on the homepage. Our new website launched on February 18, 2020. Between launch and June 30, 2020 we had 840k users to the site, 1.3 million sessions, and 3 million page views.

2019-2020 PUBLIC INFORMATION PROJECTS

PROJECTS FOR OFFICE OF SECRETARY
Overall Projects
News Releases (430 news releases issued for the agency)
Recruitment, Retention and Reactivation of License Holders (strategic planning, grant writing, marketing, etc)
Traveling Library Display (posters, handouts, etc.)
Employee Appreciation Week Activities (print and email materials, hosting events, etc.)
National Hunting & Fishing Day (marketing and print materials)
Website Design (concept, style guide, banners, buttons, etc.)
LDWF Digital Library
Social Media Graphics
COVID-19 Response (signage, social media, etc.)
Brochures/Handouts
License Fee Restructure Handout
Capital Lake Cleanup Flyer
Hunting & Fishing License Fee Infographic Handout
Louisiana Conservationist
Fall 2019
Winter 2019
Spring 2020
Spring 2020
Annual Publications
2018-2019 Annual Report
Videos
LDWF Department Overview – 2020
Life Jacket and Boat Safety PSA

PROJECTS FOR OFFICE OF WILDLIFE
Overall Projects
Trapper Education Promotion Materials (flyers, social media, website, etc.)
Rockefeller 100 Years Celebration (print materials, HQ Display, video, social media, etc.)
Annual Publications/Newsletters
Bluestem Newsletter (Summer 2019)
Wildlife Insider Newsletter (Fall/Winter 2019, Spring/Summer 2020)
2019-2020 Hunting Regulations
2019-2020 Trapping Regulations
2018-2019 Alligator Advisory Committee Annual Report
2018-2019 Fur Advisory Council Annual Report

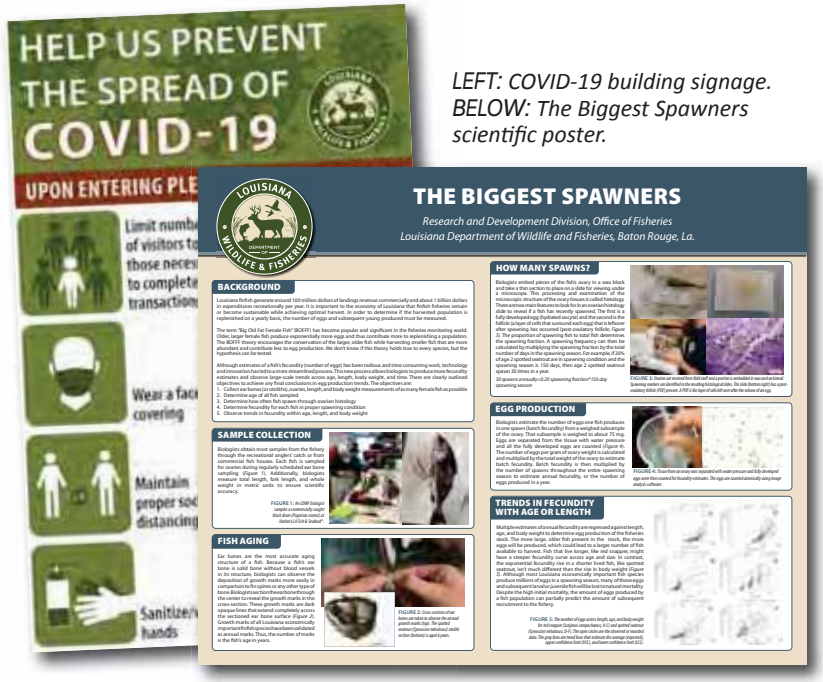
PROJECTS FOR OFFICE OF WILDLIFE (cont.)
Posters/Signs
Elmer's Island Wildlife Refuge Sign
Videos
Whooping Crane Families (2020)
Restoration of Queen Bess Island
Scenic Rivers - Cane Bayou
2020 Duck Stamp Competition
Legal Take of Feral Hogs (Overview, Private Lands, Public Lands & WMAs
Brochures/Handouts
2020 ALAS Sponsorship Flyer
Common Diseases of White-tailed Deer Handout
Your Wildlife Neighbors Handout
Bat Colony Handout
Chronic Wasting Disease - Deer Urine Ban Handout
2019 DMAP Brochure
Real vs Faux Fur Handout
2019 Wildlife Rehab Class Handout
2019 Youth Hunter of the Year Contest Flyer
Miscellaneous
Honey Island Shooting Range Rack Card
Whooping Crane Traveling Display

PROJECTS FOR OFFICE OF FISHERIES
Overall Projects
2020 Big Bass Rodeo Marketing and Print Materials
Get Out & Fish! Marketing Materials (flyers, signs, brochures, etc.)
Posters/Signs
The Biggest Spawners Scientific Poster
Brochures/Handouts
Battle for the Bass Trophy Flyer
Annual Publications
2020 Recreational Fishing Regulations
2020 Commercial Fishing Regulations
Videos
GO&F Kiroli Park - Rainbow Trout Stocking
Fisheries Volunteer Instructor Program (VIP)

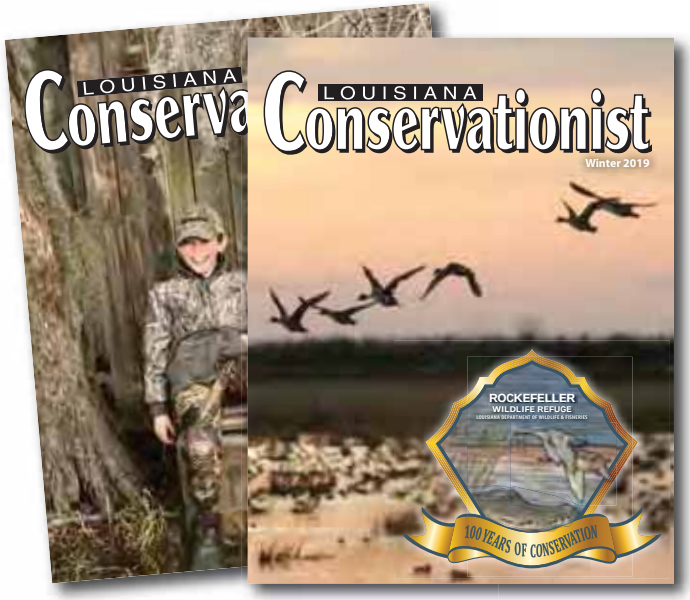
ABOVE (L to R): LDWF Wildlife Rehab Workshop, Hunting & License Fees Infographic and Hunting & Fishing Day flyers.

ABOVE (L to R): 2019-2020 LA Trapping Regulations, Honey Island Shooting Range rack card.

RIGHT: "Wildlife Insider" and "Bluestem" newsletters.

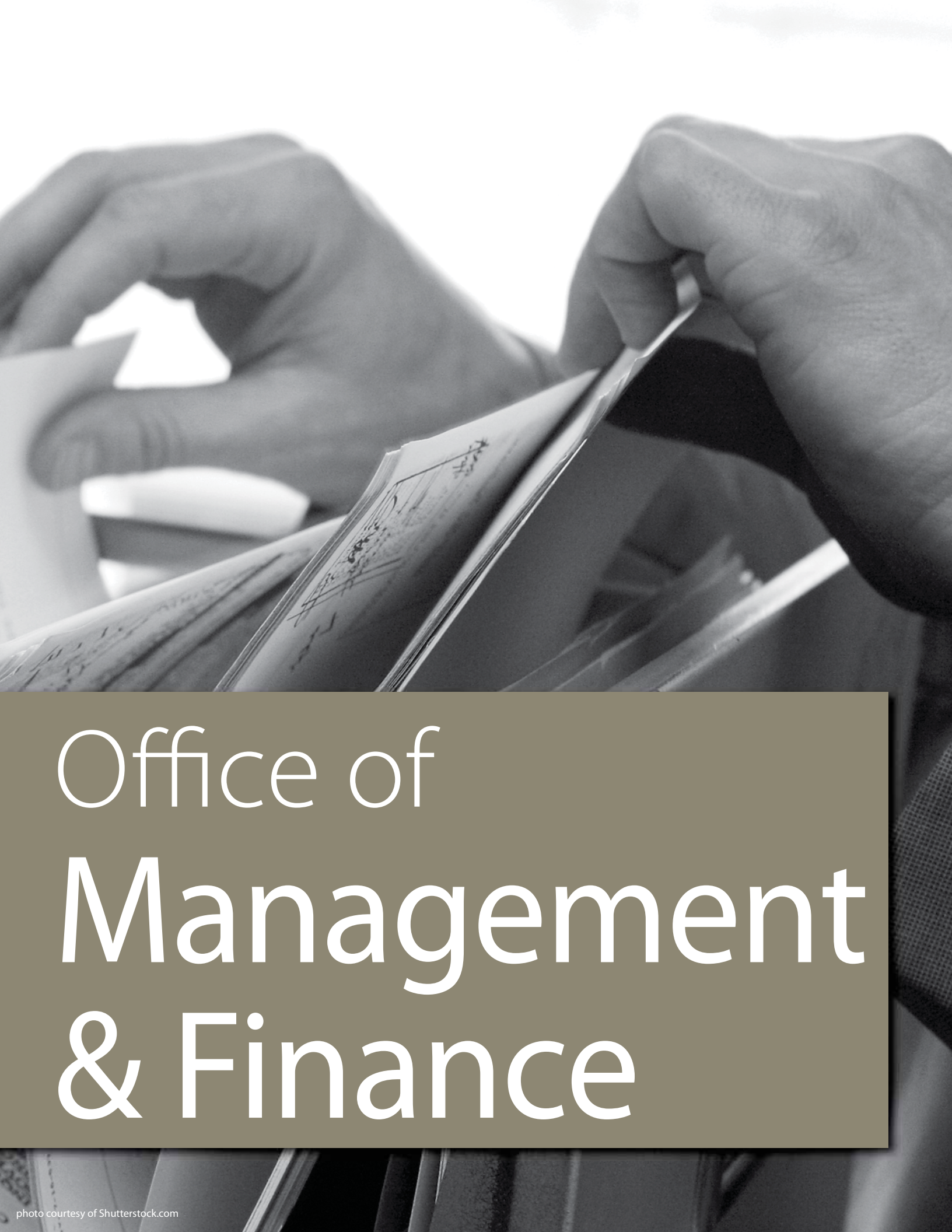


LEFT: COVID-19 building signage. BELOW: The Biggest Spawners scientific poster.



BELOW: Louisiana Conservationist magazine.

LEFT: 2019-2020 LA Hunting Regulations. ABOVE: New LDWF website homepage.



Office of Management & Finance

photo courtesy of Shutterstock.com

LICENSING

The Licensing Section serves as the information hub for more than 1 million customers who operate businesses, fish commercially, recreationally fish and hunt, and use state lands for non-consumptive purposes. The staff provides customers with state, federal and commission laws, rules and regulations that govern fishing, hunting and titling/registration of boats and motors in Louisiana. The Licensing Section handles the issuance of all commercial licenses, boat and motor title and registration services, and various permits; and manages the statewide electronic licensing system providing recreational license availability at more than 700 locations statewide. The Licensing Section continues to evaluate processes and streamline to improve availability and reduce processing time for licenses and boat titles and registrations.

License and boat and motor title/registration activities and related revenue collections are as follows:

- Issued in excess of 2 million recreational hunting, fishing, trapping and non-consumptive use licenses and permits sold to 800,000+ customers, generating in excess of $22 million in revenue. Maintained license records for in excess of 100,000 lifetime licensees.
- 57,000 commercial licenses sold, representing 11,000 commercial fishermen, 5,800 business entities, 890 charter businesses, and various permits that generate in excess of $3 million in revenue.
- 310,000 boat registration/title transactions that generated in excess of $5.1 million in revenue. Maintained boat data in excess of 1 million records - 315,000 of which are actively registered.
- Made available various types of game harvest tags to deer and turkey hunters and oyster tags to oyster fishermen and processors as required by federal and state law - in excess of 3 million.

PROPERTY CONTROL

The Property Control Section is responsible for managing the Louisiana Department of Wildlife and Fisheries' (LDWF) Property, Risk Management Insurance Claims, and Fleet Management programs. The section is staffed with three full-time employees and one student.

PROPERTY CONTROL PROGRAM

During FY 2019-2020 this program certified a moveable property inventory, which consisted of 11,045 items for a total acquisition, cost of $82,310,062.57. Annually, the program is responsible for ensuring that a physical inventory of moveable property is conducted at its locations throughout the state.

FLEET MANAGEMENT PROGRAM

In accordance with state fleet management regulations this section records, approves and processes requests for personal assignment or home storage, daily vehicle usage, vehicle maintenance, and title, registrations and vehicle licenses for LDWF's approximately 600 fleet vehicles and 1,200 other licensed equipment.

RISK MANAGEMENT PROGRAM

The Property Control Section is responsible for filing insurance claims and recovering payment from the Office of Risk Management and third party insurance companies for property damage, automobile physical and liability damage, and wet marine, aviation, boiler and machinery damage. The section is also responsible for filing general liability insurance claims.

Driver's authorization and annual certification for LDWF's approximate 780 employees is also a responsibility of the Property Control section. This process is accomplished in accordance with Office of Risk Management's loss prevention guidelines.

FISCAL

The Fiscal Section staff consists of 13 employees who are responsible for all financial operations of LDWF. The main goals of the Fiscal Section are to achieve compliance with all applicable laws, rules, policies and regulations governing the functions managed, to provide guidance and support, and to provide accurate and timely financial reports, all with exceptional customer service to all interested parties. This section also develops and implements fiscal controls, monitors program spending and provides advice, assistance and training, and standardizes procedures for approximately 800 employees.

The functions include:

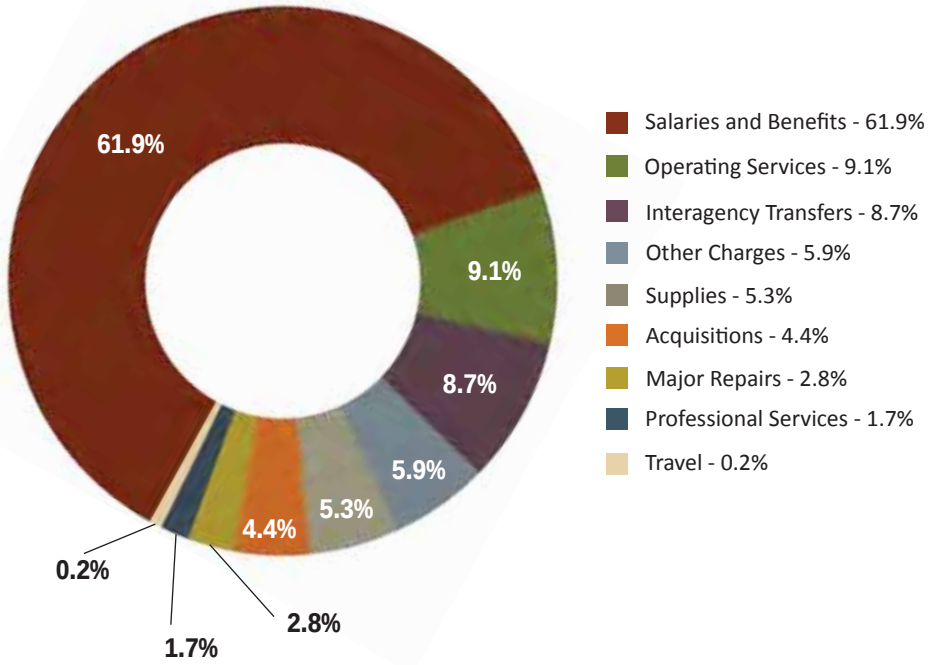
- preparation of the annual operating and capital outlay budgets.
- budget and expenditure control and monitoring.
- federal grant tracking and reporting.
- self-generated and interagency transfer agreement tracking and reporting.
- preparation of annual financial report.
- preparation of all required expenditure and fund financial reports.
- reviewing and processing professional, consulting, title 38 and Memorandum of Understanding contract payments.
- processing of employee purchasing card transactions.
- processing of employee travel reimbursements.
- payment of all vendors.
- receipt and classification of various sources of revenue.
- fund management.
- receipt of civil fines.
- strategic and operational planning.
- reviewing legislation and preparing fiscal notes.
- consulting with internal and external auditors on all financial audits.
- financial management of FEMA projects and other disasters.

During FY 2019-2020, the Fiscal Section staff:

- prepared four agency budgets consisting of five programs totaling $162 million.
- prepared department capital outlay budget totaling $202 million.
- audited and processed 357 contract invoices payments with a total amount payable of $8.4 million.
- processed 8,319 vendor invoice payments.
- audited and processed 10,918 purchasing card transactions.
- audited and processed 493 travel reimbursements.
- processed 372 checks through QuickBooks.
- warranted funds and prepared periodic reports for 144 federal grants.
- warranted funds and prepared periodic reports for 10 self-generated agreements.
- warranted funds and prepared periodic reports for seven interagency agreements.
- deposited $43 million in receipts from various sources on 910 pay in vouchers.

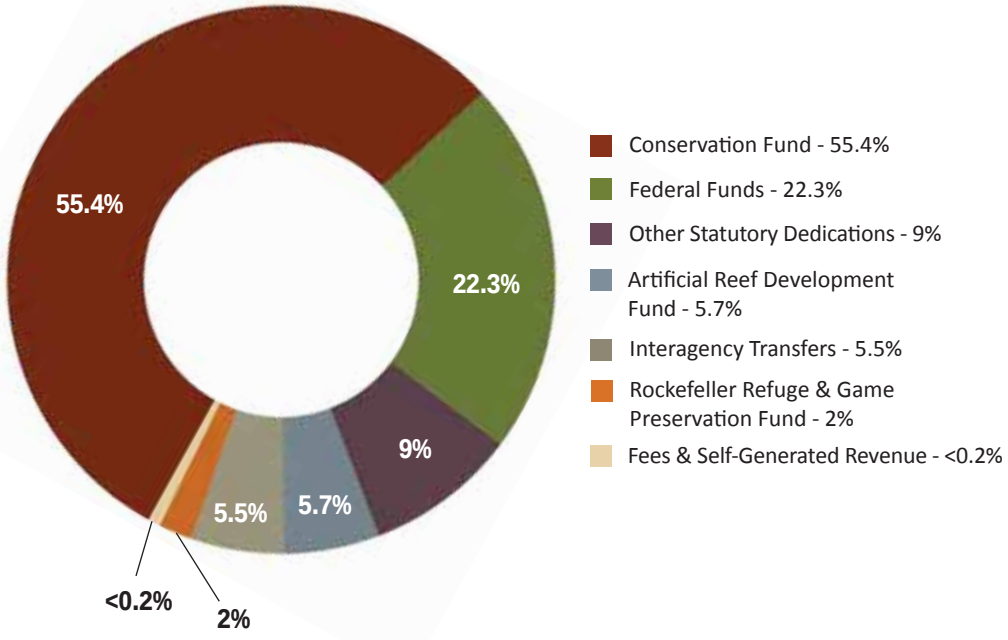
LDWF EXPENDITURES BY CATEGORY (FY 2019-2020)

Total Expenditures: $127,404,662



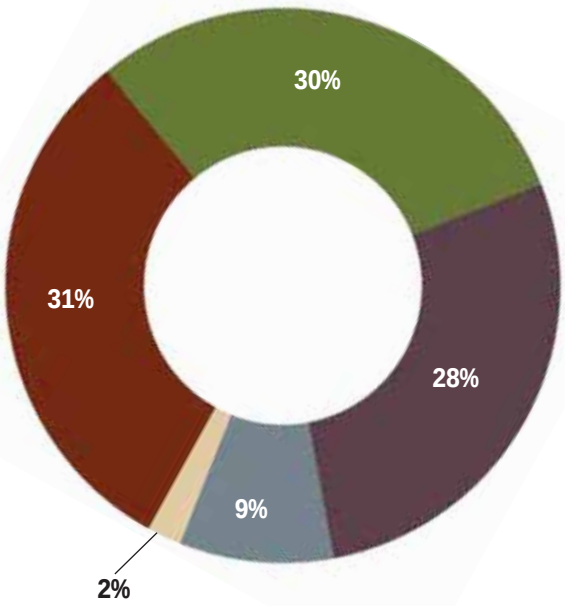
HOW EXPENDITURES WERE FUNDED (FY 2019-2020)

Total Expenditures: $127,404,662



LDWF EXPENDITURES BY PROGRAM (FY 2019-2020)

Total Expenditures: $127,404,662



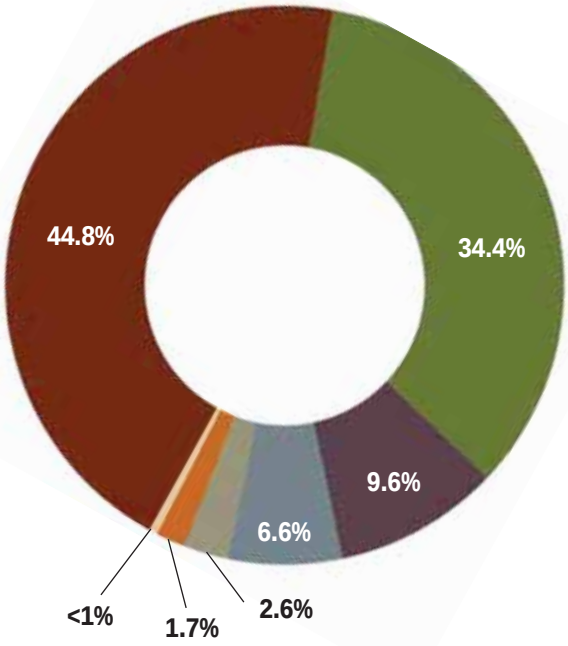
- Office of Fisheries - 31%
- Office of Wildlife - 30%
- Office of Secretary - Enforcement - 28%
- Office of Management & Finance - 9%
- Office of Secretary: Administration - 2%

EXPENDITURES BY CATEGORY	
Salaries and Benefits	78,915,650
Operating Services	11,565,968
Interagency Transfers	11,023,667
Other Charges	7,520,480
Supplies	6,731,987
Acquisitions	5,592,235
Major Repairs	3,616,435
Professional Services	2,159,619
Travel	278,621
TOTAL	*$ 127,404,662*

HOW EXPENDITURES WERE FUNDED	
Conservation Fund	70,527,590
Federal Funds	28,458,283
Other Statutory Dedications	11,406,876
Artificial Reef Development Fund	7,223,630
Interagency Transfers	7,067,390
Rockefeller Refuge & Game Preservation Fund	2,513,710
Fees & Self-Generated Revenue	207,183
State General Fund	0
TOTAL	*$127,404,662*

SOURCES OF REVENUE TO THE CONSERVATION FUND (FY 2019-2020)

Total Revenue: $48,916,685



- Royalties, Rentals, Bonuses on Land and Other Royalties - 44.8%
- Recreational Hunting & Fishing Licenses - 34.4%
- Other Fees (Boat Registration, Survey Fees, etc.) - 9.6%
- Commercial Licenses - 6.6%
- Interest Income - 2.6%
- Miscellaneous - 1.7%
- Seismic Fees Collected by LDNR - <1%

EXPENDITURES BY PROGRAM	
Office of Fisheries	39,395,567
Office of Wildlife	38,555,437
Office of Secretary - Enforcement	35,848,006
Office of Management & Finance	10,938,456
Office of Secretary - Administration	2,667,196
TOTAL	*$127,404,662*

SOURCES OF REVENUE TO THE CONSERVATION FUND	
Royalties, Rentals, Bonuses on Land, and Other Royalties	21,929,483
Recreational Hunting & Fishing Licenses	16,845,579
Other Fees (Boat Registration, Survey Fees, etc.)	4,684,806
Commercial Licenses	3,240,283
Interest Income	1,260,062
Miscellaneous	836,128
Seismic Fees Collected by LDNR	120,344
TOTAL	*$48,916,685*

HUMAN RESOURCES

The Human Resources section originates and leads human resources practices and objectives that provide an employee-oriented, high performance culture emphasizing empowerment, quality, high productivity and standards, goal attainment, and the recruitment and ongoing development of a superior workforce. The Human Resources section is actively involved in developing, organizing and carrying out programs, projects and operations to assist in furthering LDWF's mission and goals. The section works to ensure all programs are in compliance with the Louisiana State Civil Service (SCS) rules and LDWF policies and procedures as well as state and federal laws, regulations and guidelines.

The authorized number of funded positions for LDWF for FY 2019-2020 was 783. LDWF also employs students and other temporary employees throughout the state and has a total of 811 employees statewide.

The Human Resources program areas include:

ORGANIZATIONAL MANAGEMENT

- Maintaining and/or monitoring organizational areas, costing issues, and position authority in the LaGov Human Capital Management system.
- Working with agency administrators to develop and structure organizational units and position reporting relationships.
- Assuring appropriate documentation is maintained for all employees in compliance with record and retention policies.
- Managing the human resources section of the OnBase paperless scanning system.

CLASSIFICATION & COMPENSATION ADMINISTRATION

- Reviewing job specifications and position descriptions and making recommendations for classification and compensation issues.
- Managing the position description process.
- Advising managers and employees regarding the SCS system's classification and compensation, policies, rules and structure.
- Meeting with department heads and SCS staff to address and resolve allocation and/or salary issues.
- Preparing job studies for submission to SCS.

RECRUITING, SELECTION, PLACEMENT

- Advising agency personnel and clients on recruitment and staffing matters.
- Advising section heads, appointing authorities and managers on various appointment types and selection procedures in order to create and maintain a diverse workforce.
- Serving as the LDWF system administrator for the NeoGov (LaCareers) Online Hiring Center.
- Administering the onboarding program which aids new employees in acquiring the necessary knowledge, skills and behaviors to become effective organizational members.
- Facilitating pre-employment drug testing and criminal history checks for all LDWF new employees. Managing the random drug testing process for active employees.

EMPLOYEE ADMINISTRATION

- Managing the notification process for the attainment of permanent status by probational employees and attainment of career progression group eligibility for LDWF employees.
- Developing the LDWF workforce plan and collaborating with LDWF sections to create workforce plans tailored to address specific needs/issues.
- Developing LDWF succession planning procedures.
- Managing and advising requests for unclassified and classified authority. Monitoring appointment contract end dates and requesting extensions.
- Serving as a resource for layoff-related matters and for handling administrative aspects of the layoff process to maintain compliance with the SCS rules.

DISCIPLINE, GRIEVANCES

- Working with management to investigate and address performance and behavioral incidents, grievances, appeals and other personnel matters.
- Managing disciplinary actions, SCS appeals and litigation resulting from employment actions in accordance with SCS rules and federal and state law.

PERFORMANCE EVALUATION SYSTEM

- Administering the Performance Evaluation System including reporting statistics to SCS. Training managers on the effective use of the Performance Evaluation System program and advising managers regarding performance management.

EMPLOYEE RECOGNITION

- Reviewing special pay requests for individuals under SCS rules: Optional Pay Adjustments; Rewards and Recognition; and other available pay mechanisms.

NEW HIRE ORIENTATION, BENEFITS, RETIREMENT

- Developing course materials and providing orientation to all new employees for LDWF.
- Educating and advising managers, section heads and employees on available health and life insurance policies and other programs available.
- Managing all aspects of the Annual Statewide Charitable Contribution Campaign for the LDWF.

- Assisting all active and retired employees for LDWF on all matters relating to retirement benefits.

PAYROLL, TIME ADMINISTRATION

- Conducting time and attendance audits for all LDWF agencies and auxiliaries for compliance with policies and procedures established by LDWF and/or the Office of State Uniform Payroll.
- Serving as the lead time administrator over the other section time keepers. Answering all time entry questions and providing guidance.
- Entering all prior pay period adjustments.

EMPLOYMENT LAWS

- Americans with Disabilities Act, Affirmative Action, Equal Employment Opportunity, Fair Labor Standards Act
- Advising and training employees regarding the applicability and obligations of federal employment laws (Fair Labor Standard Act, Family Medical Leave Act, American's with Disabilities Act, and Title VII) and assisting in the interpretation and administration of those laws. Managing these programs for LDWF and our employees.
- Maintaining updates on federal and state labor law postings. Assisting LDWF sections in maintaining compliance with the Fair Labor Standards Act and other state/federal pay provisions.

FAMILY MEDICAL LEAVE (FMLA)

- Managing FMLA requests including providing and reviewing the required forms, establishing eligibility, approving/denying requests and maintaining quotas.

UNEMPLOYMENT

- Managing the claims made for unemployment by former employees of LDWF and clients.

POLICIES, PROCEDURES, ANNUAL REPORTING

- Developing, recommending, implementing, reviewing, interpreting and revising all LDWF personnel and compensation policies.
- Coordinating the Human Resources Strategic Plan.
- Processing all personnel/payroll actions and various other documents relating to employee status to ensure data integrity and quality assurance are maintained in accordance with SCS rules and regulations, departmental/agency policies and procedures, and federal and state laws.
- Facilitating the annual audits of human resources practices conducted by SCS, the Louisiana State Employee's Retirement System, the Teacher's Retirement System of Louisiana, the Louisiana Legislative Auditors, and the LDWF internal audit section.
- Managing public record requests specific to Human Resources.
- Managing all required human resources reporting (i.e., annual drug testing reporting to the Division of Administration, annual reporting to SCS, annual reporting to the Office of Statewide Reporting and Accounting Policy, annual Affirmative Action reporting, etc.).
- Drafting and maintaining departmental policies.
- Identifying and bringing to the attention of management employee trends which need to be addressed, current developments in labor and employment law which would impact the department, recommending implementation of best Human Resources practices in dealing with all employee matters.

TRAINING AND DEVELOPMENT

- Ensuring employee compliance with training required by law, departmental policies, SCS and Office of Risk Management.
- Monitoring compliance with Minimum Supervisory Training, training required by law and legislation such as Ethics and Sexual Harassment and required Office of Risk Management training such as defensive driving.
- Leading management development and supervisory training by providing training to supervisors and other management personnel beyond that required by the Comprehensive Public Training Program and ensuring that these employees are aware of required training and training resources.

WORKPLACE SAFETY

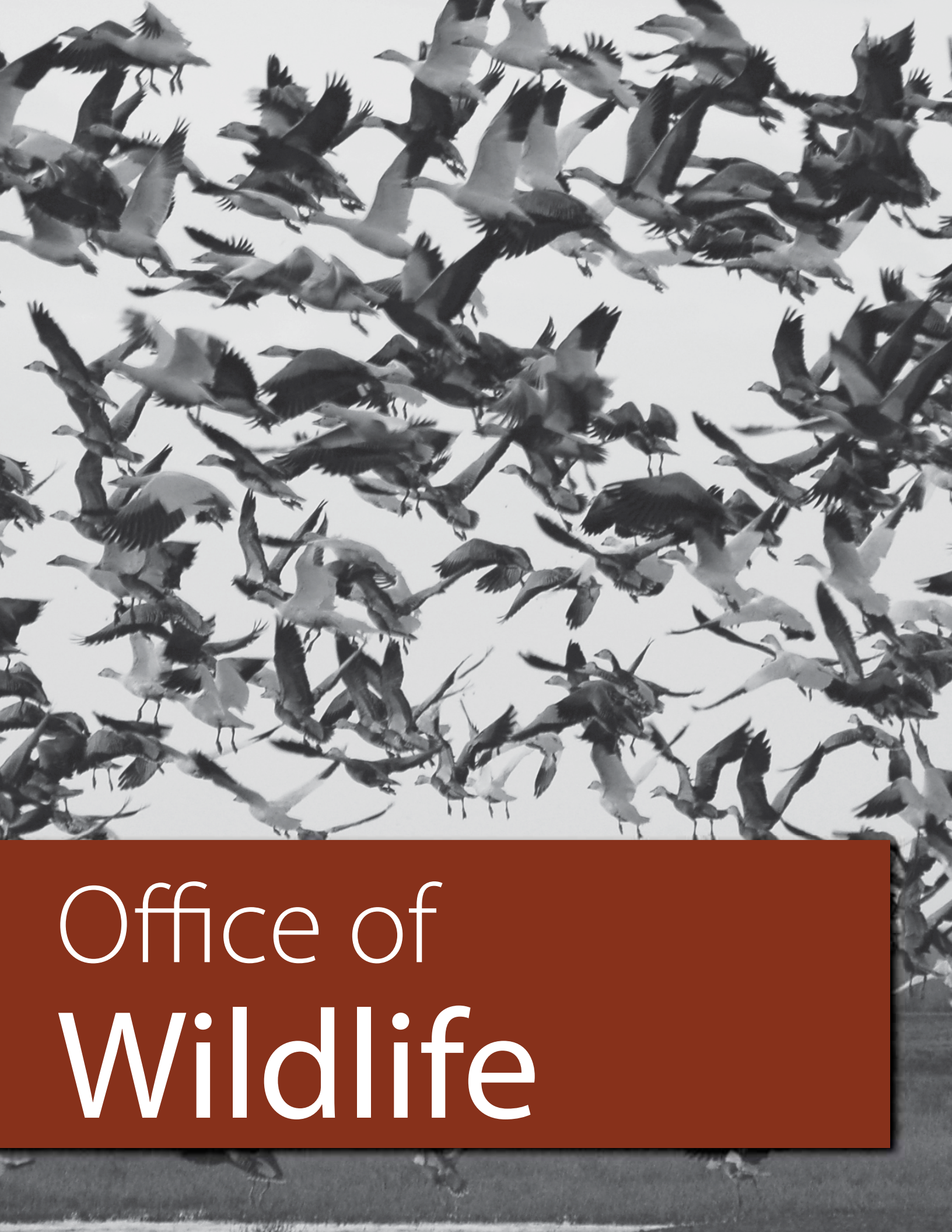
- Leading LDWF's safety program including, but not limited to, preparing Headquarters (non-Enforcement) for annual audits/compliance reviews; preparing quarterly safety meetings, providing assistance to field offices, maintaining-up-to-date Office of Risk Management training records and providing training reminders to employees, as necessary.

WORKER'S COMPENSATION

- Advising employees and coordinating with Office of Risk Management/Sedgwick concerning all issues relating to Workers' Compensation.
- Administering LDWF's Return to Duty policy for employee's suffering on-the-job illness/injury.

The table below highlights of some of the actions that were processed by Human Resources staff in FY 2019-2020. This is not all inclusive list of every action processed.

ACTION PROCESSED	NUMBER
Position Description reviewed and processed	106
Applications received and reviewed	5873
New Hires	104
Retirements	19
Separations	110
Career Progression Group Reallocations	23
Promotions	53
Market Adjustments	724
Permanent Status Actions	31
Miscellaneous Entries	343
Performance Evaluations and Planning Documents Processed	1448
Prior Period Payroll Adjustments	1766



Office of Wildlife

WILDLIFE DIVISION

WILDLIFE RESEARCH

A wide range of research and management work is conducted in order to maintain healthy productive populations of wildlife and to provide wildlife associated recreational opportunities for citizens to enjoy. Louisiana Department of Wildlife and Fisheries (LDWF) staff biologists conduct research and surveys for use in formulating hunting regulations and for development and management of habitat. They present information to the public and develop workshops for LDWF personnel and other agencies. In addition, the staff represents LDWF on state, regional and national committees, providing input to a wide array of public agencies, non-governmental organizations and private industry. The species programs are White-tailed Deer, Webless Migratory Birds, Wild Turkey and Resident Small Game, Waterfowl, Large Carnivore, and Wildlife Disease.

WHITE-TAILED DEER

During the statewide 2019-2020 deer season, 173,300 deer hunters harvested an estimated 171,000* white-tailed deer. The estimated sex ratio of deer harvested was 55% male and 45% female. The estimated number of deer harvested and hunters was derived from the annual mail survey. While, the annual mail survey has been used since 1970, 2020 marked the first year that all surveys were sent via email. Email and mail surveys were utilized the previous three seasons to measure the compatibility between the two methods. **Senior hunters and harvest included in the mail survey.*

Wildlife management areas (WMAs) serve as an important source of biological data while providing the necessary data for independent management of those public areas. LDWF staff collects biological data from deer harvested during the WMA-managed deer hunts through mandatory deer checks at designated weigh stations. WMA hunters harvested 1,390 deer during the WMA-managed deer hunts, which was 36% below the 10-year average. Total WMA managed deer hunt efforts were 13,583. While hunter efforts and harvest was down, the number of efforts to harvest a deer during the managed hunts was 9.8 which is slightly better than the 10-year average. Some of the harvest and participation decline in 2019 can be attributed to the closure of Fort Polk WMA and Peason Ridge WMA due to military training. These two large WMA's contribute more than 4,000 hunter efforts each fall. While this would not have made up for the total decline in participation, it would have reduced the decline from 36% to 18% below the 10-year average.

Mandatory tagging and reporting of deer entered the 12th year in 2019. The reporting system tallied 71,441 deer, a 5% increase from the previous year. The total reported harvest, including WMA-managed hunts and Deer Management Assistance Program (DMAP) lands, was 83,696 deer, up slightly (1%) from the previous year. Reported harvest data is used by LDWF biologists and managers to assess success and deer population parameters by parish. The license reporting system allows managers to collect deer harvest and sex data at the parish and deer area level.

In recent years, white-tailed deer are dealing with more frequent flooding in portions of the state.

DMAP provides detailed statewide harvest information while providing the largest known age sample of physical deer data. The DMAP harvest was 10,865 deer, a 14% decrease from the previous year. Some of this was by design since harvest recommendations were lowered for many of the batture properties as well as properties within the Atchafalaya River Basin. The harvest rate was one deer per 135 acres compared to one deer per 121 acres the previous season. The DMAP harvest sex ratio was 39% male and 61% female. There were 696 clubs/cooperators with 1.5 million acres participating in the program. Enrollment was down slightly from the previous year. Critical habitat data is also collected in the form of browse surveys. A total of 100 browse surveys were conducted on properties enrolled in DMAP during 2019-2020 season, which was the most in the past ten years. Browse availability and utilization is recorded and assessed on the browse survey. These indices provide managers an in depth analysis between available browse resources and utilization on the landscape. DMAP cooperators continue to harvest a high percentage (73%) of 3.5-year-old and older age bucks. That number was good enough to be third best in the nation as reported in the 2019 QDMA Whitetail Report.

Deer harvest information from across the state was evaluated. Harvest data is assessed at the parish, deer management area and statewide level. Deer regulations are influenced by this evaluation. Additional analysis of DMAP and WMA harvest data is included when assessing statewide harvest trends and herd health.

Bucks and gobblers harvested during 2019-2020 meeting minimum qualifications for the Louisiana Big Game Records Recognition Program were documented in the Annual Deer Program Report. A total of 17 bucks meeting the minimum qualification for the recognition program were reported by hunters in 2019-20. In addition, five of the 17 bucks that met the recognition program requirements also qualified for the all-time State Records List.

Two bucks qualified for the Boone and Crockett Record Book and one buck harvested with bow qualified for Pope & Young. The Louisiana Big Game Records Recognition Program and State Records List are available on the LDWF website.

In order to better manage Louisiana's white-tailed deer herd, both university and Deer Program research is conducted. Herd health collections along with disease and parasite investigations continued on both private and public lands. Additional breeding data is also gathered during these collections. Breeding data for over 1,200 deer have been used to assign breeding chronology to all areas of Louisiana. This data has been critical for establishing season time frames within each deer management area. Additional deer research included a meta-analysis entitled, "Seasonal Flooding Effects on Deer in the Mississippi River Batture" by Dr. Philip Jones, et al. Mississippi State University. The meta-analysis of 61 Batture properties in Mississippi and Louisiana was conducted to measure the potential influence of flooding on morphological measurements and demographics of white-tailed deer. Records from 1988-2016 were evaluated from Greenville, Mississippi, south to Baton Rouge, Louisiana. Harvest records of 42,954 does and 3,588 bucks from both states were analyzed to compare influences from seasonal flooding on doe body mass, lactation rates and antler mass of trophy bucks. The flood analysis was divided into three seasons which included winter, spring and summer flooding. The seasonal effects were modeled along with weather and harvest variables. While subtle differences were detected in doe body mass and buck antler mass from seasonal flooding, the significant difference occurred during summer floods when adult female lactation rates dropped by 18%. The meta-analysis was published in the Journal of Wildlife Management in 2019 (The Journal of Wildlife Management 00(0):1–14; 2019; DOI: 10.1002/jwmg.21680).

Data from the publication, "Seasonal Flooding Effects on Deer in the Mississippi River Batture", along with DMAP and harvest data gathered from the Atchafalaya Basin were instrumental in proactively adjusting the number of either-sex days within Deer Area 5 (lower Atchafalaya Basin). The reduction in days was aimed at mitigating the effects of anticipated declines in lactation rates and associated recruitment. Analysis of DMAP data from the region post-season validated those efforts since the predicted declines were at or near anticipated levels.

Chronic wasting disease has been detected in 26 states including our neighboring states. The closest positive was detected in Issaquena County, Mississippi approximately 6 miles east of the Mississippi River. That detection occurred in 2018. Since that time, both Louisiana and Mississippi have conducted extensive testing along the Mississippi River. No positives were detected in Louisiana and only one additional positive was detected in Issaquena county. While prevalence is considered low, the threat remains and both states have implemented regulations aimed at reducing potential spread and introduction.

Banding American woodcock.

LDWF collected 1,142 chronic wasting disease samples in 2019-20 and just over 11,000 since 2002. The bulk of samples are collected from hunter harvested deer but LDWF secured additional samples from roadkills and target deer which include symptomatic deer and pen escapes. Taxidermists also assisted in collecting more than 80 adult buck samples from across Louisiana during the 2019-20 season.

WEBLESS MIGRATORY BIRDS

DOVE

Dove hunting regulations for Louisiana in 2019-2020 were set at 90 days with a bag limit of 15 birds. A survey of resident license holders indicates that approximately 19,800 Louisiana hunters harvested approximately 332,700 doves during the 2019-2020 hunting season. An estimated 6,900 Eurasian collared-doves were also taken. An estimate on the number of white-winged doves taken was not available.

In addition to dove fields on 11 WMAs, LDWF leases property from one private landowner for public hunting. This land is leased for public hunting on opening day only. In 2019, one field totaling 70 acres was leased. During the opening day hunt, 97 hunters participated, bagging 65 doves.

In the spring of 2003, U.S. Fish and Wildlife Service (USFWS) adopted a National Mourning Dove Harvest Management Plan. Determining current harvest rate in each management unit was identified as a key component of the plan. Wildlife Division personnel banded 1,278 doves during July-August 2019 as part of a national effort to provide information needed to develop harvest rate estimates for mourning doves. Another aspect of this study has been the development of production indices from mourning dove wings collected from hunters. A Wildlife Division biologist participated in the annual Mourning Dove Wing Bee held in Missouri. During a three-day period, state and federal biologists from across the country aged more than 40,000 wings.

WOODCOCK

Beginning November 2017, LDWF began a study on hunting-induced mortality of American woodcock. As part of this project, 810 woodcock were banded. This project is ongoing.

LEFT: Longleaf pine regeneration in southwest Louisiana. RIGHT: Wild turkeys using a wildlife opening.

Due to the COVID-19 pandemic, the USFWS did not hold its Annual Woodcock Wing Bee. Instead, biologists were mailed woodcock wings and they aged and sexed woodcock based on wing patterns at their respective domiciles. LDWF had one biologist participate in this Wing Bee. Data derived from aging and sexing about 8,600 woodcock wings were used to develop trend data on woodcock production and hunter success. These data, in combination with breeding bird surveys, are used to develop management strategies for woodcock. Although many people in Louisiana consider woodcock an under-utilized species, Louisiana's harvest of woodcock at one time ranked among the nation's highest. However, the number of woodcock hunters has decreased by over 90% since their peak in the early 1980s. Nonetheless, Louisiana still consistently ranks fourth in the nation for woodcock harvest. A survey of resident license holders indicates that approximately 1,800 Louisiana hunters harvested 8,800 woodcock during the 2019-2020 season.

ANNUAL HUNTER HARVEST SURVEY

Big and small game harvest indices for the 2019-2020 hunting season were obtained through an online survey based on the purchases of basic resident hunting licenses or any other resident license that included the basic resident hunting privileges for 2019-2020. The 2019-2020 Game Harvest Survey was emailed to 9,880 (6% sample of email addresses) residents who had purchased the license for the current year's hunting season (or had a lifetime license). The survey questionnaires were completed and returned by 3,136 individuals before the cutoff date. The estimated harvest and hunter efforts for the 2019-2020 hunting seasons utilized 2,273 responses. The procedures used to calculate the 2019-2020 estimates were the same as those used for the 2018-2019 harvest estimates. The 2019-2020 harvest estimates were extrapolated based on the current year's license sales of 259,513. Hunter numbers reflect those that hunted a species even if they did not bag. No attempt was made to adjust the statistics to compensate for the lack of residents under 16 years old who are not required to purchase a basic license.

WILD TURKEY & RESIDENT SMALL GAME

WILD TURKEY

The most recent turkey hunter survey estimated 20,000 turkey hunters harvested approximately 5600 wild turkeys during the spring of 2020. The estimated hunter numbers increased by approximately 39%, and the estimated harvest increased by approximately 33% from that of 2019. The number of recreational days spent turkey hunting (142,000) was up 56% compared to 2019 (91,200).

A poult production survey was initiated in 1994 to assess annual brood rearing success and monitor long-term production trends. The 2019 Summer Wild Turkey Survey indicates a slight increase in average poult production for the Southeast Loblolly Pine and Atchafalaya and South Mississippi Delta regions and a slight decrease for the North Mississippi Delta region over last year's index. The Northwest Loblolly/Shortleaf/Hardwood and Western Longleaf Pine habitat regions had poult production estimates similar to last year's estimate. Production was below the long-term (1994-present) average in all management regions.

LDWF is involved in several wild turkey research projects. In 2015, a research project was initiated on Peason Ridge WMA and Kisatchie National Forest to study female wild turkey movements and production in relation to habitat improvements. In 2019, this project was extended and expanded to include Washington, Tangipahoa, and St. Helene Parishes in southeast Louisiana This work is being done in conjunction with Louisiana State University (LSU) and the U.S. Forest Service and is scheduled for completion in 2023. LDWF is also engaged in banding gobblers on the Kisatchie National Forest. Banding and subsequent reporting by hunters of banded gobblers provides information needed to estimate wild turkey harvest rates. Collectively 122 wild turkeys were captured and tagged as part of these research projects in 2020.

SMALL GAME

Squirrels and Rabbits

Small game populations and harvests are highly dependent on year to year habitat conditions. As a result, it is common to see more

variation in populations and harvests of small game species when compared to other species from one year to the next. The 2019-2020 harvest survey results indicate that there were approximately 48,000 squirrel hunters in Louisiana, which is a decrease of 8% from 2019-2020. Total harvest estimates also decreased 3.1% to 682,700 squirrels for 2019-2020. The number of rabbit hunters is estimated at 12,300, which is a 15.1% decrease from the previous year. In addition, estimated harvest decreased 28.7% from the previous year to 71,800.

To expand small game hunting opportunity, LDWF has established Small Game Emphasis Areas on the following WMAs: Big Colewa Bayou, Bayou Macon, Bayou Pierre, Boeuf, Dewey Wills, Pomme de Terre, Richard K. Yancey, Russell Sage, Sandy Hollow, Sherburne, Tunica Hills, and Walnut Hill WMAs. Within these WMAs on that portion designated as the Small Game Emphasis Area, small game hunting and training with dogs is allowed for extended periods of time throughout the season and year. Specific dates vary as hunting regulations indicate each year.

LDWF staff continued a research project in Southeast Louisiana assessing home range size and habitat use of Bachman's fox squirrels. In the winter of 2019, LDWF staff deployed 10 GPS/VHF collars on Bachman's Fox Squirrel on two separate study sites in southeast Louisiana. Data collection began with deployment in East Feliciana and Tangipahoa parishes. LDWF staff deployed another seven collars in 2020 and is currently collecting data through next year before a final home range/habitat summary and reports will be developed.

Quail

Statewide fall whistling counts were conducted on five randomly located routes and an additional five routes on LDWF WMAs and the Kisatchie National Forest. All regions continue to exhibit significant long-term (1983-2015) declines in calls per stop. Spring bobwhite surveys were also conducted on the Sandy Hollow WMA, and Kisatchie National Forest. Inferences about population status and habitat conditions were developed based on the results of these surveys during the breeding season.

A survey of resident license holders indicates that approximately 800 Louisiana hunters harvested 1,800 wild quail during the 2019-2020 season. Hunters were also asked about their harvest of pen-raised quail. About 600 hunters harvested an estimated 10,000 pen-raised quail.

LDWF continues to work with its partners to address the decline in bobwhite populations. Habitat development efforts using U.S. Department of Agriculture (USDA) Farm Bill programs and the State Wildlife Grants Program have been implemented to promote management practices such as prescribed burning. LDWF is also partnering with the U.S. Forest Service to assist in habitat management on a Quail Emphasis Area on Kisatchie National Forest to promote and develop quail habitat on approximately 6,000 acres.

WATERFOWL

Louisiana has approximately 3.5 million acres of coastal marsh that winter large and diverse waterfowl populations. Aerial waterfowl inventories of the entire coastal marsh, as well as associated agricultural lands in north central and northeast Louisiana, are conducted each winter.

The November aerial waterfowl survey, consisting of 27 coastal transects and Catahoula Lake provided an estimate that was the third lowest on record since this survey was initiated in 1969 with 1.04 million ducks despite early freezing temperatures and ice-cover through Canada and the northern U.S. south into mid-latitude states of the Mississippi Flyway. In Louisiana, flooding throughout the spring and summer inhibited production of seed-producing annual vegetation and high water levels created poor foraging conditions for dabbling ducks. However, multiple cold fronts spurred migration and falling water levels in coastal marsh improved habitat conditions such that the December estimate increased to 2.6 million, which was only 8% below the long-term average. In January, the estimate fell back to only 2.3 million, the sixth consecutive year that the January estimate had been the same or lower than the December estimate, and the third time in six years that it was 10% below the December estimate. Clearly, the capacity of coastal habitat and Catahoula Lake to retain large number of ducks was compromised by poor hydrologic conditions during the growing season. Estimates were lower than average for all dabbling ducks, especially for normally abundant species such as gadwalls, pintails, and American coots. Conversely, estimates for canvasbacks, ringnecks and scaup, all divers, were well above January averages. A total of 126,000 geese counted in January was less than half the 265,000 counted in November, 17% below the most recent 10-year January average of 151,000.

The special scaup survey, flown on Lakes Maurepas, Pontchartrain and Borgne saw increased estimates from last year in both December and January. The 179,000 scaup estimated in December and 373,000 estimated in January were well above last year's estimates of 135,000 estimated in both months and the most recent 10-year average of 146,000 scaup.

The mid-winter inventory, an expanded aerial survey that encompasses all major waterfowl habitats in the state and coordinated by the USFWS to attain a Flyway wide population estimates, was conducted in early January 2020. The survey indicated 2.8 million ducks and 349,000 geese. This was 12% more ducks than 2019 but 13% below the most recent 10-year average. The goose count was down 43% from 2019 and is 30% below the most recent 10-year average. White-fronted geese, a species of particular importance to Louisiana goose hunters, declined drastically from 82,750 in January 2019, to only 35,200 in 2020.

Based on federal harvest estimates, 50,000 active duck hunters harvested 573,000 ducks during the 2019-20 season. That Is a 37% increase in active hunters and a 13% increase in duck harvest. It was the second lowest harvest estimate since 1988, the first year of 30-day seasons with three-duck daily bag limits. Per-hunter harvest also declined from 13.9 in 2018-2019 to 11.5 in 2019-2020, the lowest since 1993, the last year of 30-day seasons with three-duck daily bag limits. This continued poor harvest was almost certainly due to poor habitat conditions in many habitats from nearly continuous flooding during the growing season, wet conditions in states north of us in the Mississippi Flyway, and poor reproductive success on the breeding grounds despite good wetland conditions at the southern end of the prairie pothole region. Similar to the recent past, federal estimates are inconsistent with LDWF hunting license sales, but hunter-number estimates from the Big and Small Game Survey are very similar, and both overall and per-hunter harvest success had a similar trend. Use of the federal harvest data over LDWF's is necessary because federal data 1) are collected the same way in every state allowing for comparison over states and times which likely index changes in distribution and local abundance, 2) are species specific, and 3) include age-ratios in the harvest which are the most important large-scale index to reproductive success on the breeding grounds. Furthermore, age-ratios in the harvest are one of the few large-scale indices that have correlated to our waterfowl

harvest success. Age-ratios (juvenile to adult) in our duck harvest were around 2.0 during 2010-2014, a period when our hunters were averaging nearly 30 ducks per season, but have recently fallen to below one from 2015-2018 when our hunter success has dropped to an average of 18 ducks per season. The federal-estimated harvest of 572,000 ducks included 27% blue-winged teal, 21% gadwall, 20% green-winged teal, 9% wood ducks, and 4% mallards, northern shovelers, lesser scaup, and ring-necked ducks. Northern pintail, mottled duck, redhead, canvasback, bufflehead, and ruddy ducks comprised the remainder.

Goose hunters in Louisiana harvested 51,400 geese during the 2019-20 hunting season, a 133% increase from the previous year but 7% below the most recent 10-year average. For the second consecutive year, the spring breeding habitat conditions were considered to be below average with a late spring and poor reproductive success. Few juveniles were banded by crews in the Arctic. However, the fall staging survey of white-fronted geese was 1,267,000, a 67% increase from the 2018 estimate, and the three-year average increased to 938,000, well above the 600,000 threshold to maintain liberalized harvest regulations implemented in 2016. White-fronted geese made up 37,200 (or 72%) of the total goose harvest. Snow, Ross' and Canada geese made up the rest of the goose harvest.

NORTH AMERICAN WATERFOWL MANAGEMENT PLAN

Louisiana continues to play an important role in the North American Waterfowl Management Plan (NAWMP) as LDWF maintains ongoing projects and other activities associated with the goals of the NAWMP. For the second consecutive year, prolonged spring flooding during 2019 limited construction and enhancement activities. In FY 2019-2020, North American Wetland Conservation Act (NAWCA) construction projects at Russell Sage and Sherburne WMAs were delayed until fall 2020. The Russell Sage project includes replacing many large dilapidated water control structures and culverts, extensive levee construction, and impoundment dirt-work. The Sherburne project also includes replacing many dilapidated water control structures and culverts, installation of an additional underground water well. Additional un-anticipated levee repairs caused by flooding and wave action are also needed before the NAWCA-funded project can be completed. For the first time in many years, no additional projects have been submitted for funding in the current NAWCA cycle.

Herbicide applications, mowing, disking, and burning were conducted on many WMAs to invigorate wetlands and improve wetland bird habitat. Greater than 1,000 acres on Russell Sage's Pintail Alley, Boeuf's Topan unit, and Sherburne's South Farm were targeted for enhancement activities. Many other WMAs had smaller treatments to enhance habitats and improve public access. Management plans developed by field staff with assistance from program staff are being implemented to improve wetland long-term productivity and use by waterfowl. Management of habitat at Catahoula Lake have been on-hold until a legal dispute over land ownership is settled. The Louisiana Supreme Court has upheld lower court decisions which revert much of Catahoula Lake to private ownership, but boundaries of current ownership have not been established. Planned bulldozer clearing of mature invasive woody vegetation and spraying of younger stands will not be implemented until ownership has been established. Unlike in 2018, a good crop of moist-soil vegetation was established during the late-summer drawdown, and water levels remained within target levels until late-December, creating good habitat for both dabbling and diving ducks.

WOOD DUCKS

During 2019-2020, LDWF banded 2,397 wood ducks, which is 34% fewer than the 3,612 banded last year, which was the highest total since our banding program was established in 1992. Pre-season rocket-netting accounted for 2,088 of the total bandings, and 309 hens were captured in nesting boxes. Prolonged, extensive flooding followed by rapid, unpredictable changes in water levels made trapping conditions difficult in most regions of the state. Continued trapping success in northeast and southwest Louisiana, and continued night-lighting success on southwest National Wildlife Refuges by Rockefeller Refuge staff kept our banding totals well above our quota.

Banding wood ducks.

In addition, 2,832 black-bellied whistling ducks were banded during the winter and spring. This is 5% lower than the 2,983 banded last year but still near our goal of 3,000 per year and maintains the continuous banding of large numbers of black-bellied whistling ducks necessary to build/maintain a recapture database. The NAWMP coordinator continues to adjust the number of banding sites to build a more representative database that may have to depend on recaptures rather than hunter-recoveries to obtain information on movement and survival of these birds and support future harvest management decisions. Because of loss of personnel, effort at Rockefeller was reduced, but we expect that to rebound in future years.

The wood duck nest-box program completed its 31st year in 2020. LDWF personnel maintained only 1,688 boxes in spring 2020 due to extensive flooding for the second consecutive year precluding access and inundating many existing boxes. That is a 4% decline from last year and well below the target level of 2,000 boxes. Replacement of deteriorating boxes and those lost to flooding, as well as relocating both unused boxes and those with high rates of dump-nesting to more suitable habitat will be a larger focus of this program over the next few years. Utilization was monitored at 1,335 boxes, with over 70% being used at some time during the spring. A four-year research project was initiated in February 2020, intensively monitoring 315 of the nest boxes in central Louisiana with a goal of assessing breeding ecology of wood ducks and black-bellied whistling ducks using those boxes. Bi-weekly visits found 300 of those boxes (95.2%) were used by wood ducks, black-bellied whistling ducks, or hooded mergansers at some time during the 2020 nesting season. Preliminary data on clutch size, parasitism, and nest survival are forthcoming.

LARGE CARNIVORE PROGRAM

LARGE CARNIVORE RESEARCH

Of the 16 American black bear subspecies, the Louisiana black bear is the only to have received formal protection under the United States Endangered Species Act; listed as threatened in 1992. Recovery and delisting of the bear occurred in April 2016. Therefore, LDWF's current bear research efforts are mostly targeted at long-term monitoring to collect the critical demographic, genetic and spatial information required to effectively monitor population health. This information will also be used to sustainably manage bear populations into the future.

2019-2020 Bear Research

1. Reproductive Vital Rates -
To collect information on reproductive vital rates, we attempted to conduct den visits across all four bear subpopulations during February and March 2020 to count and mark cubs-of-the-year, and to count yearlings.

2. Survival and Mortality -
To monitor survival and cause-specific mortality, we maintained bears outfitted with VHF or VHF-GPS radio-collars. Using monthly aerial telemetry, we monitored radio-collared bears from all four subpopulations during 2019-2020. We documented mortalities during FY 2019-2020, Most known mortalities are from roadkills.

3. Abundance, Density and Growth -
To estimate abundance and density and monitor temporal changes in population growth, we conducted our 13th consecutive year of non-invasive hair trapping in the Tensas River and Upper Atchafalaya River Basin subpopulations during May through July 2020. Hair snare traps allowed us to collect hair samples. Sampling was extended into areas outside of original core study areas of the Tensas River and Upper Atchafalaya River Basin subpopulations in 2020 to better sample potential bear habitats that may contribute to the overall bear populations. All collected samples were sent to Wildlife Genetics International for microsatellite genotyping at eight to 21 markers, depending on study objectives.

BEAR MANAGEMENT

LDWF personnel responded to human-bear conflict calls from the public and other government agencies. Response varied from technical assistance being provided over the phone to site visits with recommendations provided to reduce conflict and trapping. During FY 2019–2020, we captured nuisance bears to address human-bear conflict issues reported to LDWF, primarily in the West Gulf Coastal Plain subpopulation.

Work continued with the U.S. Geological Survey (USGS) to improve the BearTrak database, and USGS is working to update and add additional features to the online database.

EDUCATION AND OUTREACH

The Large Carnivore Program Manager worked with the Southeast Association of Fish and Wildlife Agencies Large Carnivore Working Group to produce a regional bear website to act as a source of public information to address any and all forms of bear conflict occurring in the southeast. This resource can be used by members of the public to minimize and mitigate bear conflicts; as well as assist communities wishing to engage in a community-based initiative. The BearWise program is now being taken national to be included under the umbrella of the Association of Fish and Wildlife Agencies.

In continuation of our black bear outreach, the majority of efforts conducted in FY 2019-2020 centered on exhibition and presentation of information and displays to schools and other interested groups around the state.

Bear Safety in Mind (St. Mary Parish Program)

Accomplishments during 2019-2020 include:

- Maintained close communications with biologists to assist specific call areas by working with caller reporting the nuisance bear behavior to ensure all bear proofing efforts were being implemented in the area with the nuisance bear problems.
- Daily monitoring of bear proof cans to assist the homeowner or small business with questions, damages and procedures to further bear proof their property and facilities.
- Work closely with Pelican Waste to monitor bear proof cans concerning residential and small business compliance with waste hauler and new procedures for services.
- Assisted residents with repairs for bear proof cans and nuisance bear activities in St. Mary parish.
- The local fabrication shop in St. Mary Parish will be able to provide replacement parts for the bear proof cans.
- Worked with USDA Animal and Plant Health Inspection Service/Wildlife Services and the Patterson Police Department's workshop about nuisance black bear behavior, response methods and how to enforce Patterson Ordinance 2016-02. This is the ordinance establishing regulations and standards for proper use of bear-proof containers.
- Working with St. Mary Parish Officials and Pelican Waste & Debris to establish a maintenance program for the bear

proof garbage cans to ensure prompt response to bear proof can repairs and replacements.

WILDLIFE HEALTH

The statewide Wildlife Disease Program is administered by the state wildlife veterinarian, the assistant state wildlife veterinarian and the wildlife disease biologist.

The Wildlife Disease Program conducted disease surveillance on white-tailed deer. As part of the LDWF herd heath monitoring program, 166 serology samples were collected for serological analysis of bluetongue virus, epizootic hemorrhagic disease virus, Leptospira interrogans, Serologic samples were submitted to Texas A&M Veterinary Medical Diagnostic Laboratory, analysis is pending. In addition, 1211 samples were collected statewide for chronic wasting disease surveillance. Samples were submitted to the Louisiana Animal Disease Diagnostic Laboratory at the LSU School of Veterinary Medicine. No samples tested positive. This brings the total number of wild white-tailed deer tested in Louisiana to 11103 animals since the inception of the program in 2002.

To date, a total of 1,251 and 1,257 feral swine from non-WMA lands have been tested for swine brucellosis and pseudorabies, respectively. Thirty-four (2.71%) were serologically positive for swine brucellosis. One hundred twenty-six (10.02%) were positive for pseudorabies. In addition, 299/557 samples (53.68%) were positive for leptospirosis.

Additional projects included studies of white-nose syndrome surveillance, population monitoring and winter use of transportation structures for bat species, determination of blood parasites in white-tailed deer, overwintering of bluetongue virus and epizootic hemorrhagic disease virus in white-tailed deer; turkey diseases, feral hog stomach contents, feral hog toxicant research, examining the role of wildlife as Leptospira reservoirs, invasive long-horn tick surveillance, and coyote stomach content evaluation.

LAND DEVELOPMENT & MANAGEMENT

FORESTRY PROGRAM

The mission of the Forest Management Program is to improve forest and wildlife habitat on WMAs though sound forest management, reforestation practices, and active forest/wildlife research activities. To this end, LDWF's 490,000 acres of forestland has been certified through the Sustainable Forestry Initiative Program. LDWF completed its third surveillance audit and was found to be in accordance with the requirements of the Sustainable Forestry Initiative Standard 2015-19.

General forest inventories and habitat evaluations were conducted to facilitate the development of management prescriptions for Bayou Macon, Big Lake, Boeuf, Buckhorn, Dewey Wills, Richard K. Yancey, and Russell Sage WMAs.

Harvest preparations including forest inventory, regeneration evaluations, timber marking, GIS map development, timber sale proposal preparations, timber sale development, contract development, and timer contract amendments were conducted on Bayou Macon, Dewey Wills, Grassy Lake, Richard K. Yancey, Russell Sage, and Sandy Hollow WMAs. Harvests to improve wildlife habitat were initiated and/or completed on Dewey Wills WMA.

Chemical treatments of invasive/non-native species, primarily Chinese tallow tree, cogon grass, and trifoliate orange were carried out on Big Lake, Dewey Wills, Grassy Lake, Pomme de Terre, Sandy Hollow, and Spring Bayou WMAs. Herbicide applications to improve habitat through midstory removal were conducted on Sandy Hollow and Sherburne WMAs.

Prescribed burning treatments were conducted on Alexander State Forest, Lake Ramsay, Little River and Sandy Hollow WMAs to promote and improve habitat conditions for fire dependent wildlife and plants.

The annual statewide WMA mast survey was conducted to estimate annual mast production. The survey is used as an indicator of mast availability for wildlife as well as a predictor of small mammal populations. The mast survey is also used to map local abundance which aids in seed collection efforts.

Our reforestation program inventoried and evaluated hardwood plantations on LDWF-owned WMAs as well as private properties. Habitat evaluations and management plans were developed for five bottomland hardwood restoration sites on properties enrolled in the U.S. Department of Agriculture - Natural Resources Conservation Service's (USDA-NRCS) Wetland Reserve Program. Evaluations of state-owned properties include Boeuf, Buckhorn, Pomme de Terre, Richard K. Yancey, and Russell Sage WMAs. Research continued on several ongoing studies investigating seedling survival, sapling development, tree growth and wildlife response to various silvicultural treatments. Our reforestation program restored approximately 30 acres through reforestation on Maurepas Swamp, Pointe-aux-Chenes, and Sandy Hollow WMAs.

Our GIS program continues to update timber sale data, forest inventory, boundaries, prescribed burning, roads, and streams data input relative to our WMA forest management activities. The forestry GIS allows us to monitor, analyze, and evaluate for performance and outcomes of the entire forestry program.

Growth Monitoring Plots were reevaluated on Big Lake and Richard K. Yancey WMAs. These permanent plots aid in monitoring habitat conditions and effects of our forest management program on the habitat components represented on the WMAs.

Other survey and research projects on the WMAs that were supported by Forestry Section staff involved wildlife use of forested habitats and their response to various silvicultural treatments. Forestry Section staff hosted several training and outreach workshops to share research results and management experiences. Continuing education for the Forestry Section staff was practiced through participation at various symposiums, workshops, seminars, research meetings and conferences throughout the year, in and out-of-state.

WILDLIFE MANAGEMENT AREAS

The Wildlife Division of LDWF currently manages over 1.3 million acres in its WMA Program. These areas are distributed across the state and are comprised of a vast array of habitat types. The WMA Program's mission is to deliver conservation priorities to Louisiana's landscape, as well as provide an array of outdoor recreational opportunities to the public. The lands in the program serve to protect, conserve, replenish and manage the wildlife resources occurring on those areas. Habitats within these lands harbor and help conserve a multitude of endangered species such as the red-cockaded woodpecker and gopher tortoise. The majority of these lands are available for the public to utilize in recreational pursuits. Recreational opportunities range from a variety of hunting and fishing, to canoeing, hiking, ATV riding and berry picking. Habitats range from upland pine-hardwood, to cypress tupelo, pine savanna, bottomland hardwood, fresh to brackish marshes, with many globally rare habitat types and plant communities as well. For administrative and management purposes, the WMAs are grouped by region - Hammond, Lafayette, Lake Charles, Pineville, Monroe and Minden regions.

HAMMOND

Wildlife Management Areas
(*Total Acres - 255,934 acres*)

- Biloxi
- Hutchinson Creek
- Joyce
- Lake Ramsey Savannah
- Manchac
- Maurepas Swamp
- Pearl River
- Sandy Hollow
- Tangipahoa Parish School Board
- Tunica Hills

Habitat types on these WMAs include marshes and swamps, natural longleaf and plantation loblolly pine stands, bottomland hardwoods, and rugged loess bluff uplands. The WMAs are managed to provide outdoor recreational opportunities for all user groups. Most of the areas are accessible via extensive road and trail systems that are maintained by LDWF staff, while other areas are accessible mainly by boat.

A total of 51,844 user days were estimated for Hammond WMAs during FY 2019-2020. An alligator season was available on Joyce, Manchac, Maurepas Swamp and Pearl River WMAs with a harvest of 1144 alligators by 16 commercial alligator trappers. Alligator applications were reviewed, and licenses and tags were issued to 54 WMA lottery hunters who filled 135 tags. This lottery hunt is done through an application process, with each hunter selected receiving three tags. This gives the public an opportunity to participate in the alligator harvest program. Alligator egg collections were monitored by Hammond WMA personnel on Joyce, Manchac, Pearl River and Maurepas Swamp WMAs. A total of 17,818 eggs valued at $297,210 were collected.

Hammond WMA personnel maintained existing WMA boundaries, buildings, equipment, roads and trails. Managed public hunts were also conducted on two WMAs. Combined results for managed deer hunts were 453 hunter efforts with a total of 48 deer harvested. On the 10 WMAs managed by the Hammond Office, 373 deer were harvested.

LDWF personnel issued Special Use Permits for oil and gas actives along the vast pipeline infrastructure that traverses several WMAs within the region. These routine maintenance projects were coordinated by staff to allow for efficient access by work crews while also limiting WMA user conflicts. There are several large projects that are impacting Maurepas Swamp that have required interagency coordination. The West Lake Shore Protection Levee and Hope Canal River Reintroduction have similar impact areas. These projects have weekly coordination meetings and LDWF staff works diligently to ensure that construction impacts to the WMA are minimized and that LDWF's wildlife management goals are met.

Through the application of prescribed fire, 1,672 acres of longleaf pine on Sandy Hollow WMA and 796 acres on Lake Ramsay Savannah WMA were managed.

Hammond personnel maintained 125 wood duck boxes. Personnel also participated in the statewide mourning dove banding program, responded to numerous deer and nuisance animal complaints, provided technical assistance to the public, conducted public meetings, and collected white-tailed deer brain and lymph node samples across the region for chronic wasting disease testing.

Feral hogs have become a serious nuisance and ecological threat throughout the state. Aggressive control methods have been used on certain WMAs, such as Pearl River and Tunica Hills, to reduce their numbers. Each year, feral hog blood samples are collected and tested for a variety of diseases.

The Hammond Region Operations program offers assistance to the public in 17 parishes on a variety of wildlife related topics and programs. Biologists conduct data collection for research and disease programs, habitat evaluations, drafted habitat management plans, conducted public outreach, and offered technical assistance with nuisance animal issues. The DMAP program was delivered to 112 cooperators on more than 202,504 acres. In addition, staff participated in several bird banding programs and banded 273 wood ducks, 104 woodcock, and 98 mourning doves. Region Biologists conducted 32 Private Lands site visits offering technical assistance

LEFT: Two year old longleaf seedlings are fire tolerant. RIGHT: Pollinators are critical to environmental health.

on nearly 8400 acres. The Prescribed Burning Initiative provided cost-share assistance to private landowners for the application of prescribed fire on 1534 acres.

LAFAYETTE

Wildlife Management Areas
(*Total Acres - 190,848 acres***)**

- Acadiana Conservation Corridor
- Attakapas
- Elm Hall
- Grassy Lake
- Pomme de Terre
- Richard K. Yancey
- Sherburne
- Spring Bayou
- Thistlethwaite

Habitat types range from backwater bottomland hardwoods interspersed with agricultural lands, and cypress-tupelo swamps to open-water areas. One USFWS refuge (Atchafalaya National Wildlife Refuge) and two U.S. Army Corps of Engineers (USACE) properties (Bayou des Ourses and Shatters Bayou) are managed within the Lafayette region.

Lafayette WMA personnel administer and manage a variety of wildlife-oriented activities. These personnel work in conjunction with and provide technical advice to many different agencies, including USFWS, USACE, Louisiana Department of Natural Resources (LDNR), Louisiana Department of Environmental Quality, USDA, and local parish entities. Lafayette WMA personnel helped deliver alligator and nuisance animal programs and assisted with program projects such as dove and wood duck banding, as well as deer, woodcock, turkey, black bear and nongame research projects.

The WMAs are maintained and managed to provide outdoor recreation opportunities for all user groups, including both consumptive and non-consumptive. WMA personnel performed a variety of development and maintenance functions such as boundary marking, building maintenance, road maintenance, water control structure operation, moist soil management, beaver and other nuisance animal control, farm contract supervision, equipment maintenance, public user data collection, vegetation control, food plot planting, reforestation, and conducting managed hunts.

A total of 119,237 user days were provided on Lafayette WMAs during FY 2019-2020.

Welding up a new gate post on a WMA.

White-tailed deer is the most popular game animal hunted on the Lafayette WMAs. Either-sex deer hunts, with mandatory deer checks were held on the WMAs, with 4,791 user-days recorded and 296 deer harvested. An additional 876 deer were harvested during other either-sex, bucks-only, youth/handicapped, archery and primitive weapons hunts, where self-clearing permits were utilized. Deer hunters totaled 24,137 efforts for the 2019-2020 season. Turkey hunts were held on three WMAs, where six turkeys were harvested by an estimated 227 users. This includes eight youth hunters who participated in the, Sherburne, Spring Bayou and Pomme de Terre WMAs youth lottery hunts. In typical years, guides are provided for the youth turkey hunt on Sherburne WMA. However, this year was unguided due to COVID-19 restrictions and uncertainty. Squirrel and rabbit hunting is also very popular on the ecoregion's bottomland hardwood WMAs, accounting for over 12,750 user days. Waterfowl hunting is very popular as well on Lafayette WMAs in moist soil impoundments, green tree reservoirs, swamps and flooded bottoms. Waterfowl user days totaled over 6,000 for this period. Dove fields are maintained, along with many acres of wildlife openings.

Youth lottery deer and duck hunts were also held on Lafayette WMAs, with great success on these hunts. Sixteen youth waterfowl lottery hunters harvested 78 ducks, for an average of 4.9 ducks per youth hunter. A disabled veteran's waterfowl hunt was held where six disabled veteran's participated and harvested 27 ducks, for an average of 4.5 ducks per hunter. Forty-four youth deer lottery hunters harvested 24 deer on nine hunts. Youth hunters observed many deer on the hunts. The hunts are held in refuge areas set aside for youth, where these youth hunters have a quality hunt and learn about hunting in a safe environment. Four different Physically Challenged Hunter Permit wheelchair hunters on 14 hunts utilized wheelchair-bound waterfowl and deer hunts.

Biologists and technicians maintain and monitor approximately 450 wood duck boxes, conduct pre-season wood duck banding, and collect samples for chronic wasting disease, avian influenza and other disease testing. They also assisted with numerous nuisance animal complaints, illegal captive deer and sick deer complaints. Biologists assisted researchers with ongoing research projects.

Alligator applications were reviewed, and licenses and tags were issued to 104 WMA lottery hunters who filled 312 tags. This lottery hunt is done through an application process, with each hunter selected receiving three tags. This gives the public an opportunity to participate in the alligator harvest program.

There were also six WMA alligator hunters who bid on tags on the WMAs. These hunters filled 220 tags.

Major projects being initiated or completed included:

- North American Wetlands Conservation Act project on Sherburne WMA.
- Bayou des Sots Bridge replaced on Grassy Lake WMA
- Upgrade Spring Bayou WMA Old River Landing

Routine maintenance activities on Lafayette region areas included road grading, culvert replacement, road and trail repairs, drainage improvements, beaver control, boundary work, sign replacement, self-clearing station maintenance, vegetation control, equipment

maintenance, and facility upkeep. Repairs on all WMA roads and trails were made as funding allocations allowed.

COASTAL LAFAYETTE

Wildlife Management Areas
(*Total Acres - 321,411 acres***)**

- Atchafalaya Delta
- Lake Boeuf
- Pass-a-Loutre
- Pointe-aux-Chenes
- Salvador
- Timken

Refuges
(*Total Acres - 93,274 acres***)**

- Marsh Island
- State Wildlife
- St. Tammany
- Isle Dernieres Barrier Islands
- Queen Bess (as of Nov. 7, 2019)

Habitats on these WMAs/refuges are primarily fresh, intermediate and brackish marshes with some agriculture lands, bottomland hardwoods and cypress-tupelo swamp. Most of the WMAs/refuges in this region are only accessible by boat and include two active deltas and three barrier islands. The majority of the Coastal Lafayette WMAs/refuges are owned by LDWF with the remaining acreage under lease. St. Tammany Refuge is managed in cooperation with the USFWS along with Big Branch National Wildlife Refuge.

The Coastal Lafayette Region WMAs/refuges are maintained and managed to ensure optimum habitat conditions as well as provide outdoor recreational opportunities for all user groups. A total of approximately 34,150 user days were estimated for Coastal Lafayette WMAs and refuges during FY 2019-2020 (note user days assessed differently than previous fiscal year). Fishing, crabbing and shrimping make up the majority of the activities on some WMAs/refuges in this region. The most popular consumptive activities include hunting, fishing, crabbing and cast-netting for shrimp. Non-consumptive uses include boating, camping, bird watching and nature photography. To facilitate public use, Coastal Lafayette staff maintained parking lots, docks, bridges, boat ramps and campgrounds as well as posted boundaries and provided public assistance (including emergency assistance to boaters).

Wetland management, enhancement, restoration and protection activities are high priorities on the Coastal Lafayette WMAs/refuges. Staff strive to manage all wetlands on these areas whenever feasible. In general, Coastal Lafayette WMA/refuge wetlands are managed to provide appropriate water levels and conditions (salinity, turbidity, flow) to optimize wetland health and wintering waterfowl conditions, establish/increase desired wetland vegetation and ensure proper habitat conditions for fisheries and other wildlife. Annual wetland management and enhancement activities included water level and salinity management, prescribed burning, species management, vegetative plantings, dredging/beneficial use, etc. There are 12 active management units on three of these WMAs/refuges (Pointe-aux-Chenes WMA, Marsh Island Refuge and State Wildlife Refuge). These management units total approximately 45,000 acres and are managed via 25 water control structures. Staff routinely monitor water quality and conditions and adjust water control structures appropriately to ensure proper management. Staff continue to maintain and repair all water control structures, levees, etc. to ensure these management units function properly. During FY 2019-2020, M&C Oilfield Services began construction on replacing the west structure of the Big Impoundment on Marsh Island Refuge. Once complete, this project will allow us to continue to manage water and salinity levels on nearly 4,400 acres of the Big Impoundment.

Coastal Lafayette staff continued to identify needs and search for funding opportunities to address habitat related work (including coastal restoration) on these WMAs/refuges. Staff work with federal, state and local government agencies (NRCS, U.S. Environmental Protection Agency, USACE, USFWS, Coastal Protection and Restoration Authority), non-governmental organizations (Ducks Unlimited, Restore the Earth), universities and private landowners for assistance with possible projects, partnerships, and funding opportunities to address habitat issues. Staff routinely worked closely with the USACE for maintenance dredging of the lower Mississippi and Atchafalaya Rivers and associated beneficial use of dredge material. Staff continued to work with Restore the Earth on an ongoing effort to restore up to 4,000 acres of cypress swamp on Pointe-aux-Chenes WMA. Coastal Lafayette personnel assist with project field trips and inspections, data collection and research as needed.

Waterfowl are the most popular animal hunted on the Coastal Lafayette WMAs. Coastal Lafayette staff manage wetlands on WMAs/refuges to provide optimum wintering waterfowl habitat conditions. The 2019-2020 waterfowl season was from Nov. 9, 2019 - Jan. 19, 2020 (closed Dec. 9-20) on coastal WMAs. Coastal Lafayette staff conducted hunter participation/harvest surveys on 11 days during the season on three coastal WMAs (Atchafalaya Delta, Pointe-aux-Chenes,and Pass-a-Loutre WMAs). An estimated 2,817 duck hunters visited the WMAs during the survey dates and averaged 1.9 ducks per attempt. Hunters also harvested approximately 781 coots, 142 gallinules, 46 mergansers and approximately two geese during the survey dates. The 2019-2020 teal season was from Sept. 14-29, 2019. Coastal Lafayette staff conducted hunter participation/harvest surveys on four days during the season on the three previously listed WMAs. An estimated 710 teal hunters visited the WMAs this year during the four days that waterfowl bag checks were performed. These hunters harvested an estimated 632 teal for a success of 0.9 teal per hunter effort.

Deer are the second most popular game animal hunted on Coastal Lafayette WMAs. Self-clearing permits and hunter check-in of harvested deer revealed that 1,294 deer hunter user days yielded 87 deer harvested during the 2019-2020 hunting season on Coastal Lafayette WMAs (note hunter efforts calcu-

lated differently than previous fiscal year). This equates to a success of one deer for every 14.9 efforts; this includes 98 efforts and 11 deer harvested during the managed youth lottery hunts on Atchafalaya Delta and Pointe-aux-Chenes WMAs. The majority of the deer hunter user days and deer harvested on coastal WMAs were on Atchafalaya Delta WMA.

Coastal Lafayette staff continue to conduct species management related activities as well as provide assistance as needed to species management programs including research assistance, habitat assessments and updates, surveys, harvest data collection, species updates, waterfowl banding efforts (mottled ducks, black-bellied whistling ducks and gallinules), etc. Personnel regulated and monitored alligator and furbearer harvest activities on the Coastal Lafayette WMAs/refuges. A total of 1,251 alligators and 9,441 nutria were harvested on these WMAs/refuges for FY 2019-2020. Forty WMA lottery alligator hunters harvested 100 alligators. Approximately 70 acres of dove fields were maintained on Pointe-aux-Chenes WMA and many acres of wildlife openings maintained on all WMAs. Feral hog control operations continued via shooting and trapping on Atchafalaya Delta and Pass-a-Loutre WMAs.

Coastal Lafayette Region staff continued to assist LSU AgCenter researchers collect data on the Roseau cane scale on Pass-a-Loutre WMA. Additionally, LDWF continued working with NRCS on the LA-39 planting project with vessel and personnel support for plant survival monitoring on Pass-a-Loutre WMA. The main goal of this project was to evaluate the possibility of planting different species of vegetation in areas impacted by the Roseau cane scale and how those different species were affected by the scale.

Coastal Lafayette Region staff continued working with state and federal partners to develop many recreational use projects with the goal of improving campgrounds and hunter and fishing access on Pass-a-Loutre, Pointe-aux-Chenes and Atchafalaya Delta WMAs. During FY 2019-2020, the recreational use projects on Pass-a-Loutre WMA went to construction with completion expected early in FY 2020-2021.

Personnel also reviewed, commented on and monitored oil and gas production activities, facilities and spills as well as and other easement related activities on all Coastal Lafayette WMAs/refuges.

Additional routine maintenance activities on the Coastal Lafayette region areas included road maintenance, sign replacement, self-clearing permit kiosks maintenance, vegetation control, public user data collection, equipment maintenance, facility/building maintenance, etc.

LAKE CHARLES

Wildlife Management Areas (*Total Acres - 301,195 acres*)

- Clear Creek
- Fort Polk-Vernon
- Marsh Bayou
- Peason Ridge
- Sabine Island
- Walnut Hill
- West Bay

Habitat on these WMAs includes bottomland hardwoods, upland hardwood bottoms, pine plantations, natural pine stands, and mixed pine-hardwoods.

There were a total of 34,705 user days for Lake Charles WMAs during FY 2019-2020. These areas are readily accessible and very popular with the public. Along with public hunting and fishing opportunities, these areas provide many types of non-consumptive outdoor activities. Managed deer hunts were conducted on several of the WMAs to collect accurate information on herd health and hunter success rates. Collectively, managed deer hunts on Lake Charles WMAs resulted in 1,240 hunter efforts accounting for 175 deer harvested. Fort Polk-Vernon WMA and Peason Ridge WMA were closed due to military training.

A youth deer hunt was held on Clear Creek WMA with 104 participants harvesting five deer. Also, a youth/physically challenged hunt was held on West Bay with 301 efforts harvesting 20 deer.

Eight physically challenged wheelchair bound hunting blinds where established on Clear Creek (5) and Fort Polk-Vernon (5) and utilized by the public who otherwise might not have any place to hunt.

Area infrastructure was an important goal during FY 2019-2020 with 151 miles of roadway graded by Lake Charles personnel. In addition, 372 miles of roads and trails were bush hogged on the WMAs; all infrastructure work was conducted as part of the "In-kind Service" agreements between landowners and LDWF for these WMA leases. Another infrastructure responsibility was the marking of WMA boundary lines with a summation of 68 miles completed for this job activity.

Youth-only lottery turkey hunts were held on Clear Creek, Fort Polk-Vernon/Peason Ridge and West Bay WMAs with 22 participants harvesting three gobblers. Historically the Fort Polk-Vernon/Peason Ridge Lottery Youth Turkey hunt was a guided hunt where selected youths were provided food and transportation to a hunting area predetermined by LDWF. These hunts were intended to get young hunters into the field that may not otherwise have an opportunity to hunt. However, due to COVID-19 restrictions, this did not happen this year. Youth hunters and their chaperon hunted without guides, reducing potential exposure to the virus.

Pipeline rights-of-way provide valuable openings and "edge" for wildlife species such as rabbits, songbirds, wild turkeys, and bobwhite quail.

LEFT: Deer blinds with ramps and wide opening allows hunters with physical challenges to safely hunt deer on WMAs.
RIGHT: Biologists and technicians record important deer herd health data at WMA managed hunts.

Mowing roadsides on WMAs is one of many job duties WMA technicians perform on regular basis

Most Lake Charles WMAs were leased to LDWF from private and government entities (Hancock Timber, Roy O. Martin, U.S. Army, U.S. Forest Service, Forest Investments, Calcasieu Parish School Board, Rayonier, and the State of Louisiana) for public use from the landowners. WMA landowners do not receive direct payments for the leases. Instead the owners are compensated through a combination of tax exemptions, road maintenance, mowing, prescribed burning contracts, reduced theft and vandalism (due to regular presence of LDWF staff), as well as public goodwill. To continue these lease areas, LDWF personnel are required to meet and negotiate annual agreements with the landowners. The leases help the landowners and LDWF to properly manage and maintain these properties for wildlife and public recreation.

Prescribed burning was conducted on Marsh Bayou WMA with a total of 117 acres burned and 10 miles of firebreaks installed. This burning operation improved upland habitat for a variety of wildlife species including songbirds, turkey, deer, reptiles, amphibians and small mammals.

Wildlife openings were maintained by mechanical control through fallow disking to allow native forbs and grasses to regrow and agricultural planting of desirable forage totaled 303 acres. Manipulation of certain areas is accomplished to maintain an early successional stage for landowner operations as discussed in adopted lease agreements.

Lake Charles Region WMA personnel participated in a variety of Wildlife Division activities. These include environmental assessments, technical assistance, research, planning, development, management, and alligator and nuisance animal programs. Over 52 wood duck nesting boxes were maintained and monitored by Lake Charles WMA personnel. Routine trapping and banding of wood ducks and mourning doves was conducted on WMAs.

Feral hog control operations continued by shooting and trapping on all WMAs. Several WMAs required the removal of nuisance beavers.

Lake Charles WMA staff assisted with a joint (U.S. Forest Service, U.S. Army and LDWF) turkey project on Peason Ridge WMA. A total of 37 birds were trapped and banded. All hens were fitted with tracking transmitters. The project will continue into the next fiscal year as part of an on-going research program.

Personnel also reviewed and monitored oil and gas production activities and interstate pipeline installations on several Lake Charles WMAs. No new oil and gas exploration occurred on state-owned properties.

Private Lands Program

During FY 2019-20, Lake Charles Region Biologists conducted 64 Private Lands site visits offering technical assistance on more than 111,000 acres. They produced three detailed habitat management plans for landowners, and they fielded 1,159 requests for informa-

Prescribed burning creates early successional habitat beneficial to many wildlife species.

Desirable and diverse herbaceous plant response following prescribed fire in open pine habitat.

Preparing dove field

Site visit with a private landowner to offer wildlife management technical assistance.

tion from the public. Under an agreement with USDA-NRCS, staff conducted 29 Wetland Reserve Easement property inspections to assess conditions and make recommendations for management. They also worked with two private landowners to lease 1,300 acres for public hunting on opening day of dove season.

Lake Charles Region Biologists are also responsible for carrying out activities such as migratory and resident bird surveys and banding, collection of biological data for research, habitat evaluations, disease investigations, nuisance animal response, administration of the alligator program, delivery of the DMAP program to 41 cooperators on more than 106,000 acres, and public outreach via workshops, events and media outlets. Private Lands and WMA staff participated in the wood duck banding program, deploying cannon nets and banding 320 wood ducks, and banded 65 American woodcock on private lands in Beauregard Parish. In addition, Biologists conducted four quail whistle surveys, three dove survey routes, and five deer browse surveys, and assisted with prescribed burning on two prairie remnants totaling more than 500 acres.

PINEVILLE

Wildlife Management Areas (*Total Acres - 98,667 acres*)

- Alexander State Forest
- Camp Beauregard
- Dewey W. Wills
- Elbow Slough
- Little River
- Sabine

The Pineville region is arguably the most ecologically diverse region in the state. If you were to visit all six of the WMAs, you could experience cypress swamps and sloughs, riparian habitat, mature hardwood bottomlands, mixed hardwood and pine uplands, natural and commercial pine timberland, and managed and mature longleaf pine habitat. In the Pineville region, a WMA user could hunt alligators and pick mayhaws in our swamps and bottomlands and later in the season hunt woodcocks or observe the endangered red-cockaded woodpecker in mature longleaf pine habitat. These WMAs are readily accessible and very popular with the public documenting 36,490 user days. Along with public hunting and fishing opportunities, these areas are also utilized for many types of non-consumptive outdoor opportunities; such as scouting, camping, hiking, birding, and nature photography.

Fishing (recreational and commercial) was the number one activity on the WMAs documenting 9,957 user days. White-tailed deer hunting was the most popular hunting activity documenting 9,044 user days and a deer harvest of 641 deer. Squirrel hunting was also very popular with 3,117 user days and 5,647 squirrels harvested. Waterfowl hunters always make a strong showing with 2,618 user days and 3,457 harvested birds.

Managed deer hunts were conducted on several of the WMAs to collect accurate information on herd health and hunter success rates. Collectively, managed deer hunts within the Pineville Region's WMAs resulted in 1886 hunter efforts accounting for 276 deer harvested. During these hunts, WMA biologists collected and submitted 60 blood and 20 chronic wasting disease samples from harvested deer to monitor deer health and disease occurrence.

In addition to the regularly scheduled managed hunts, two lottery physically challenged deer hunts were conducted in the Pineville region - one on Sabine WMA for handicapped citizens and the second on Camp Beauregard WMA for disabled veterans. The Sabine handicapped hunt is conducted in partnership with a local organization known as H.E.L.P (Hunters Enriching the Lives of People). The H.E.L.P organization provides all meals, blinds and equipment, and cleans all harvested game. The Camp Beauregard hunt is conducted in partnership with H.E.L.P, Combat Veteran's motorcycle club, Patriot Riders, and Louisiana National Guard. Participating hunters are provided food and lodging. They also are transported to and from hunting areas, have any harvested game retrieved and cleaned, and provided with any needed physical assistance. These hunts are intended to get people into the field that may not otherwise have an opportunity to hunt. Also, Alexander State Forest WMA has four permanent physically challenged hunting stands for wheelchair-bound, visually impaired and amputee hunters. These hunters are given the opportunity to hunt multiple weekends from permanent LDWF ground blinds that are positioned in a restricted area containing food plots.

Four weekend lottery youth deer hunts occur on Dewey Wills WMA. This hunt is very popular and many youths enjoy the opportunity to harvest their first deer. LDWF staff provide overnight bunking, permanent deer stands overlooking food plots, and game retrieval and cleaning.

While a few of the WMAs in the Pineville region are owned by LDWF, some of the WMAs are leased to LDWF for public use from private landowners (Hancock Timber, Roy O. Martin, Louisiana National Guard, Louisiana Department of Agriculture and Forestry, U.S. Army Corps of Engineers, and LaSalle Parish School Board). Landowners do not receive direct payments for the leases. Instead the owners are compensated through a combination of tax exemptions, road maintenance, mowing, prescribed burning contracts, reduced theft and vandalism (due to regular presence of LDWF staff), as well as public goodwill. To continue these lease areas, LDWF personnel are required to meet and negotiate annual agreements with the landowners. The leases help the landowners and LDWF to properly manage and maintain these properties for wildlife and public recreation.

Biologists observing erosion that needs repair and prevention methods applied.

LDWF staff burned approximately 100 acres on Little River WMA. Also, on Little River WMA, approximate 1.5 miles of firebreaks were created or reconditioned. These burning operations improved upland habitat for a variety of wildlife species including songbirds, turkey, deer, reptiles, red-cockaded woodpeckers, amphibians, and small mammals. The burns help to reduce high density sweetgums and French mulberries that were dominating the understory and reducing plant diversity.

Pineville regional personnel participated in a wide variety of Wildlife Division activities. These include habitat assessments, technical assistance, species research, WRE monitoring, species banding and monitoring, and habitat management. LDWF personnel were also actively involved in road way maintenance, infrastructure upkeep, disease monitoring, managed and lottery deer hunts, black bear population research, public dove hunts, nuisance animal response, National Hunting and Fishing Day, and alligator tag management.

Biological and habitat management work done on the WMAs include dove trapping and banding, wood duck box monitoring and maintenance, wood duck trapping and banding, road side and timber openings mowing, prescribed burning, green tree impoundment flooding, moist soil unit manipulation and flooding, feral hog trapping and removal, wildlife disease sampling, food plot planting, timber thinning and harvesting, and exotic tree spraying and killing.

MONROE

Wildlife Management Areas
(*Total Acres - 138,558 acres***)**

- Bayou Macon
- Ben Lilly
- Big Colewa Bayou
- Big Lake
- Boeuf
- Buckhorn
- Bussey Brake
- Floy Ward McElroy
- Russell Sage
- J.C. Sonny Gilbert

Geese utilizing moist soil field habitat.

Wildlife display at National Hunting and Fishing Day.

The primary habitat type found on Monroe Region WMAs is the Mississippi River Alluvial Valley bottomland hardwood forest, with the exception of J.C. Sonny Gilbert, which provides a unique mixed pine upland hardwoods habitat on the fringe of the Mississippi Alluvial Valley. Several of the WMAs feature reclaimed agricultural lands, which have been reforested with bottomland hardwood forest species. Moist soil management units and greentree reservoirs are managed to provide habitat for waterfowl and other wetland birds.

Monroe WMA biologists and technicians conducted a wide range of activities including research and surveys involving mourning doves, wood ducks, wild turkey, coyotes, shorebirds and white-tailed deer. These included collecting chronic wasting disease and blood samples from deer, disease research in feral swine, as well as waterfowl sampling for disease surveillance. Biologists and area personnel assisted the large carnivore program with bear management activities, including trapping/collaring, den visits, and handled numerous nuisance complaints. Additional effort was expended conducting public meetings, interacting with various constituents to collect concerns and interests about our management activities.

White-tailed deer is the most popular game animal hunted on the Monroe WMAs; 14,917 deer hunter user-days were recorded harvesting 1,164 total deer in the Monroe Region. Wild turkey hunts were held on four WMAs, where 879 users harvested 20 turkeys. Squirrel and rabbit hunting is also very popular on the ecoregion's bottomland hardwood WMAs, accounting for over 4,600 user days. Waterfowl hunting is very popular as well on Monroe WMAs in moist soil impoundments, greentree reservoirs, swamps and flooded bottoms. Waterfowl user days totaled over 6,500 for this period.

Biologists and technicians maintain and monitor over 250 wood duck boxes, conduct pre-season wood duck banding, and collect samples for avian influenza and other disease testing. They also assisted with numerous nuisance animal complaints, illegal captive deer and sick deer complaints. Biologists assisted LSU researchers with ongoing research projects.

Alligator harvest applications were accepted, and licenses and tags were issued to 86 WMA lottery hunters who received 215 tags. This lottery hunt is done through an application process, with each hunter selected receiving three tags. This gives the public an opportunity to participate in the alligator harvest program.

Routine maintenance activities on Monroe region areas included road grading, culvert replacement, road and trail repairs, drainage improvements, beaver control, boundary work, sign replacement, self-clearing station maintenance, vegetation control, equipment maintenance, and facility upkeep. Repairs on all WMA roads and trails were made as funding allocations allowed.

Major projects being initiated or completed include:

- Phase 1 of South Bosco Tract NAWCA project awarded, which include rebuilding levees & replacing structures.

Private Lands Program

During FY 2018-2019, Private Lands Program biologists conducted 32 site visits. They fielded 1,320 requests for information from the public. Under an agreement with USDA-NRCS, Private Lands Program biologists conducted 278 inspections of Wetland Reserve Easement properties to assess conditions and make recommendations for management.

Private Lands Program biologists are also responsible for carrying out activities such as migratory and resident bird surveys and banding, collection of biological data for research, habitat evaluations, disease investigations, nuisance animal response, administration of the alligator program to over 258 license holders, delivery of the DMAP program to over 206 cooperators, and public outreach via workshops and media outlets.

MINDEN

Wildlife Management Areas
(*Total Acres - 45,624 acres***)**

- Bayou Pierre
- Bodcau
- Loggy Bayou
- Soda Lake

Minden Office personnel are responsible for administering all wildlife division activities in northwest Louisiana. The following parishes are covered: Bossier, Bienville, Caddo, Claiborne, DeSoto, Jackson, Lincoln, Red River and Webster. Historically the area's predominant habitat type was shortleaf pine-hickory with large areas of bottomland hardwoods along major drainages. Over the last 75 years, there have been major changes in land use in upland areas. Shortleaf pine - hickory habitat has been almost completely replaced by commercial loblolly pine stands with some areas retaining hardwood components in streamside zones. Improved pastures have replaced scattered areas of cropland. As a result, there is currently much less habitat diversity in the current landscape. Acreages that were once longleaf pine have experienced a similar conversion to commercial pine stands. Large tracts of bottomland hardwoods originally found throughout the Red River drainage are non-existent, having been converted to agricultural use over the last 200 years. Scattered remnant stands of hardwood are still found in small acreages mostly in very low-lying terrain. The Red River provides primary drainage for the area with the Sabine River draining the western most portion of the region. Numerous bayous and lakes are located throughout northwest Louisiana, which provide additional habitat to a variety of wildlife species. Biologists and technicians assigned to the Minden office are assigned to either the WMA or Private Lands sections. However, they all work on a regular basis in cooperation on projects within both sections.

Habitat on the WMAs includes bottomland hardwoods, upland hardwood bottoms, pine plantations, natural pine stands, and mixed pine-hardwoods.

A total of 35,370 user days were estimated for Minden WMAs during FY 2019-2020. These areas are readily accessible and very popular with the public. Along with public hunting and fishing opportunities, these areas provide many types of non-consumptive outdoor activities. Managed deer hunts conducted on Bodcau and Loggy Bayou WMAs collected accurate information on herd health and hunter success rates. Collectively, managed deer hunts on Minden WMAs resulted in 580 hunter efforts accounting for 90 deer harvested.

Most of the Minden WMA acreage is owned by other governmental agencies. LDWF is the sole owner of Bayou Pierre WMA and owns 65% of Loggy Bayou WMA. USACE, Red River Waterways Commission, Caddo Parish Levee Board and Louisiana State Lands Office all provide acreage to the Minden WMA program. At present, landowners do not receive direct payments for the leases, but instead are compensated through a combination of road maintenance, mowing, prescribed burning projects, reduced theft and vandalism (due to regular presence of LDWF staff), as well as public goodwill. To continue these lease areas, LDWF personnel are required to meet with and negotiate lease agreements with the landowners. The leases help the landowners and LDWF to properly manage and maintain these properties for wildlife and public recreation.

Prescribed burns conducted on Bodcau WMA improved upland habitat for a variety of wildlife species including songbirds, turkey, deer, reptiles, amphibians and small mammals.

Routine trapping and banding of wood ducks and woodcock were conducted on WMAs.

Dove fields were planted and maintained on Bayou Pierre, Bodcau and Loggy Bayou WMAs. Plans were developed to establish new dove fields on acreage expected to be added to Soda Lake WMA.

All Minden WMAs have at least one waterfowl impoundment with a total of seven actively managed. Management activities include regulation of water levels, control of nuisance vegetation, mowing and disking to promote desirable vegetation, maintaining nest boxes, and monitoring of waterfowl activity.

Feral hog control operations continued by shooting, trapping and contract aerial shooting on all WMAs. Trapping activities resulted in the removal of 283 hogs. Nuisance animal control activities also included the removal of beavers and coyotes.

Minden WMA personnel participated in a variety of Wildlife Division activities. These include environmental assessments, technical assistance, research, planning, development, management, and alligator and nuisance animal programs. Forty-seven wood duck nesting boxes were maintained and monitored by Minden WMA personnel.

Personnel also reviewed and monitored oil and gas production activities and pipeline installations on Minden WMAs On Bayou Pierre WMA, one existing well location received a slight expansion and a new gas well was drilled. A frack water withdrawal and piping operation was conducted in conjunction with the new well development. On Loggy Bayou WMA, a new well site was created. Two gas wells were drilled on the new well site, and an additional gas well was drilled on an existing well site. An approximately 1300'

LEFT: Grading and repairing roads allows public access on WMAs. RIGHT: Planting a dove field for public hunting opportunity.

Newly created pads for campers on WMAs.

gathering pipeline was installed by boring between the new site and the existing site. Drilling operations were still ongoing on these locations when the fiscal year came to an end, with well completion activities expected to be finished near the end of September.

Private Lands Program

The Private Lands Program provides assistance to landowners, land managers, hunting clubs and others who desire to improve habitat and/or manage wildlife on their property. Assistance can vary from answering simple questions to a comprehensive written management plan. Assistance is not only available for traditional game species such as deer, ducks and turkey, but includes all wildlife and their habitats.

Many landowners are already working with a natural resource professional, such as a consulting forester, or are enrolled in state or federal programs such as DMAP, Forest Stewardship and/or USDA-NRCS programs such as the Wetland Reserve Easements, Conservation Reserve Program or Environmental Quality Incentives Program. Minden Private Lands biologists cooperate with other natural resource professionals to achieve the landowner's objectives. Most importantly, landowners are encouraged to develop a cooperative relationship with LDWF Private Lands biologists and other natural resource professionals. Wildlife habitat is dynamic, and with the assistance of knowledgeable wildlife professionals, landowners can provide productive habitat for wildlife while meeting other goals they may have, such as income generation and optimizing recreational opportunity.

During FY 2019-2020, Minden Private Lands biologists conducted 16 site visits and delivered five written habitat management plans. They fielded 1,168 requests for information from the public. Under an agreement with USDA-NRCS, Private Lands biologists conducted four inspections of Wetland Reserve Easement properties to assess conditions and make recommendations for management. Minden biologists and technicians monitored and maintained 52 wood duck boxes on U.S. Forest Service property.

Minden Private Lands biologists are also responsible for carrying out activities such as migratory and resident bird surveys and banding, collection of biological data for research, habitat evaluations, disease investigations, nuisance animal response, administration of the alligator program to 124 license holders, delivery of the DMAP program to 72 cooperators, and public outreach via workshops and media outlets.

FARM BILL/GRANTS PROGRAM

FARM BILL

The Farm Bill Program provides support for many species management programs and the Private Lands Program within LDWF. A primary function of the program is to provide input on conservation and other programs contained within the Farm Bill at the national, state and local levels to enhance wildlife habitat. During FY 2019-2020, the program provided direct input on many conservation programs, such as the Agricultural Conservation Easement Program, Conservation Reserve Program, Environmental Quality Incentives Program, Regional Conservation Partnership Program, Conservation Stewardship Program, and Working Lands for Wildlife Program that were included in the Agricultural Improvement Act of 2018. In addition, the program provided training for Private Lands Program staff and developed recommendations on individual properties to facilitate enrollment into Farm Bill conservation programs. The Farm Bill Program continued implementation of an agreement with the USDA-NRCS to provide technical assistance for the Wetland Reserve Program and Agricultural Conservation Easement Program. This agreement provides funding to develop wildlife habitat management recommendations in response to Compatible Use Authorization requests on Wetland Reserve Program/Agricultural Conservation Easement Program easements in Louisiana, which currently total over 300,000 acres. Additional accomplishments in FY 2019-2020 included continued implementation of a Working Lands for Wildlife Program that will directly benefit the threatened Louisiana pine snake. Work until this point has been providing regulatory assurance to private landowners conducting beneficial habitat management activities on suitable habitats. During this fiscal year, necessary measures were put in place for NRCS to begin funding a portion of these activities that benefit the Louisiana pine snake. Another aspect of this program is focused on a suite of shorebird species that are of conservation concern. LDWF staff worked with partners to secure funding for staff to work with agricultural producers to provide shallow-water habitats during late summer and early fall on cropland, when water is typically scarce across our state. The Conservation Stewardship Program rewards the good stewardship of private landowners while compensating them for habitat enhancements that will move them to the next level of conservation on their lands. New projects were initiated for forest landowners to be rewarded for the installation of wildlife habitat enhancements. Staff along with partners from across the country provided input at the national level that will impact how the 2018 Farm Bill is delivered nationwide. These activities help ensure that items within that legislation are applicable to cropland, pasture and forestland in Louisiana.

GRANTS

During FY 2019-2020, two State Wildlife Grants were administered under this program with assistance from the Private Lands Program. Both the East Gulf Coastal Plain and West Gulf Coastal Plain Prescribed Burn Initiatives provided funding to enhance wildlife habitat on privately-owned forestlands in Louisiana. Cumulatively these initiatives funded prescribed burning activities on 1469 acres during FY 2019-20. LDWF staff also worked with the Louisiana Wildlife and Fisheries Foundation to secure funding to update and revise the document that guides how bottomland hardwood forests are managed in the Mississippi Alluvial Valley. This effort will facilitate training private landowners, as well as professionals, to actively manage these forests while providing desired habitat conditions for multiple species of at risk wildlife.

COASTAL & NONGAME RESOURCES

ROCKEFELLER WILDLIFE REFUGE

Rockefeller Wildlife Refuge (RWR), located in coastal Cameron and Vermilion parishes, was created in 1920 through a land donation developed by E.A. McIlhenny. He later persuaded the Rockefeller Foundation to deed the land to the State of Louisiana. In FY 2019-2020 RWR celebrated its 100-year anniversary, hosting both the Rockefeller and McIlhenny families as well as governmental and private stake-holders all playing key roles in the success of the refuge. Along with serving as a refuge for wildlife and fisheries species, RWR is also considered an "outdoor laboratory," with the property serving as a site for marsh-related research pursued by RWR staff, collaborators and governmental and academic researchers. RWR staff also provides professional expertise regarding the sustainable use of alligators, management of coastal wetlands and other important wildlife and fisheries resources. Further, management expertise, technical assistance and guidance is provided by RWR staff to local landowners for the wise use of their marshland. Lastly, RWR serves as a recreational outlet for the local populace, as well as a destination for regional tourists.

Based on the original deed of donation, the primary goal of RWR is to provide a refuge and preserve for all wildlife and fisheries species. Therefore, management activities are used to promote appropriate habitat and conditions for waterfowl species (the original intent of E.A. McIlhenny for the property), establish/maintain historic flora and fauna of RWR, and maintain the hydrology of the Mermentau River Basin. In many cases, refuge management activities positively benefit other marsh inhabitants including shorebirds, wading birds, alligators, furbearers and estuarine organisms (i.e., fish, shrimp and crabs).

Another main goal is to study wildlife, fisheries and wetlands in order to address pertinent ecological research questions and to disseminate findings to local, state, national and international audiences. Since 1955, RWR staff has published 350+ peer-reviewed manuscripts, while also preparing technical reports and contributed papers to professional conferences. Secondary goals include providing technical assistance and public outreach and providing a popular destination for recreational activity, primarily through the use of abundant fisheries resources (i.e., fishing, shrimping, crabbing) and the diversity of watchable wildlife (i.e., birdwatching); it should be noted that these two activities never supersede the main goals of RWR.

CONSTRUCTION/ REPAIRS

RWR personnel and administrators continue to work with Louisiana Facility Planning and Control on projects exceeding $150,000. The remaining FEMA project is the Phase III Levee Repair Project which had been recently held up because of legal matters pertaining to the bid documents submitted by contractors. A decision from the court was made and the project is scheduled to begin in FY 2020-2021. Maintenance and construction staff continue to maintain other levees for the protecting and managing of critical habitat for wildlife and fisheries. This annual practice maintains the refuge's levee system comprised of over 200 miles.

Additional funds were approved in FY 2014-2015 to construct the new laboratory and grow-out facility near the storm platform. The project was awarded to Alfred Palma Construction on Dec. 21, 2016 for $6,159,000. Construction began in FY 2016- 2017 and was completed in FY 2019-2020.

The partnership with Ducks Unlimited continued in FY 2019-2020 with the unit 10 pump, NAWCA GRANT, and management enhancement for 420 acres. In FY 2019-2020 additional funding from sponsors and LDWF paid for the Rockefeller signage and fishing piers project and was awarded to B&J Oilfield and Marine Services. Over 75 navigational and educational signs were installed throughout the refuge as well as four new fishing piers constructed in three locations. The signs and new fishing piers aid in providing a safe and enhanced recreational opportunity for the public.

After Hurricane Audrey in 1956, RWR constructed and completed the present office in 1959. In FY 2018-2019 a contract was awarded by Facility Planning and Control to Angelle Architects to design a new office complex. The current design plans are to construct the new office just west of the present office. Construction is anticipated to occur in FY 2020-2021.

MINERAL MANAGEMENT

The only active oil production taking place on the refuge is Hilcorp Oil Company. The program manager and staff continues to work with Hilcorp regarding maintenance and safe operations on RWR.

Multiple pipeline proposals have been presented for removal and abandon in place in FY 2019-2020. Permit drawings have been produced for each project for review with clearance authorization letters being issued from LDWF. One of these projects was completed within FY 2019-2020.

MARSH, WILDLIFE AND FISHERIES MANAGEMENT

MARSH MANAGEMENT

RWR staff maintains over 200 miles of levees and 55 water control structures for the conservation of approximately 71,000 wetland acres on RWR and 100,000 private sector acres within the Mermentau River Basin. Maintenance and manipulation of RWR's system of levees and water control structures vary somewhat by management unit, but general goals are to maintain marsh health, provide conditions favorable for waterfowl forage, and incorporate multi-species management when possible. Biological staff uses the approved RWR management plan, which acts as a tool to guide research and management on the property.

Habitat conditions have become more stable, with many water control structures replaced for the management of water levels throughout RWR. Furthermore, staff have also worked on wetland permit applications with USACE and the LDNR - Coastal Management Division for levee restoration and maintenance. Hydrologic restoration and unit management have improved as a result of maintenance. In addition to water control, staff performed vegetation control with herbicides via airboat to help improve habitat in Units 3,4,6, & Price Lake. Aerial applications were also conducted to assist with vegetation control in Units 2,3,13,14, & Price Lake; as well as the East and West Goose Pastures. Approximately 620 acres were treated on the refuge.

Unit 9 (about 90 acres) is managed as the second release site for whooping cranes (*Grus americana*) in southwestern Louisiana. Staff continues to manage habitat conditions in Unit 9 specifically for the continued introduction of whooping cranes.

Marsh fires during certain times of the year decrease fuel loads of marsh vegetation, prevent catastrophic fires when the marsh is

excessively dry during the summer, and provide new stem growth for migratory waterfowl species. Generally, one-third of the refuge is burned on a yearly basis. During FY 2019-2020, approximately 5000 acres were prescribed burned with an additional 1100 acres burned via lightning fire.

Refuge staff continued monitoring giant salvinia and feral hogs. Salvinia continues to be managed on the refuge via the use of higher levels of salinity that are introduced by opening the East End Locks and by cooperatively working with the LSU AgCenter with the weevil eradication control project. Efforts continue in FY 2019-2020 to monitor and manage the status of these two invasive species on RWR.

The recent discovery of the roseau cane scale in the eastern Louisiana deltas has initiated the development of research projects to understand the possible effects of the roseau cane scale. Discovery of large die-offs of Roseau cane stands are occurring to the east. It is considered a vital species of vegetation in vulnerable areas to prevent land loss. Collections of two healthy stands of roseau cane occurred on RWR of the Gulf variety and the Delta variety. Samples continued to be used from RWR for experiments performed in collaboration with USDA-NRCS, LSU, and the Louisiana Department of Agriculture and Forestry.

INUNDATION RELIEF PROJECT

The Mermentau Basin includes over 700,000 acres. RWR is located within the sub-basin of the Mermentau Basin and historically existed as a watershed during high rainfall events. The construction of LA Hwy 82 in the 1950s restricts drainage of local communities and marshes north of the highway to outlets located on RWR. That restriction can result in prolonged periods of inundation during high rainfalls and flooding events. A modified system including the East End Lock system along with additional structures will aid with the increase volume flow to the eight outlets at the Gulf of Mexico. This will prevent prolonged periods of ponding and negative impacts to thousands of acres of wetlands.

The goals of this project are to reduce prolonged periods of inundation to relieve flooding stress and restore the function, value, and sustainability to thousands of acres of marsh. The proposed project will also allow RWR to accommodate additional water flow during flooding events to relieve flooding of local communities. The project will create marsh and divert water into marsh areas that will benefit from the freshwater, nutrients and sediment.

The proposed project would construct additional drain structures that would allow for an increase in the flow of water from the upper basin. The current lock system is over 40 years old, is in desperate need of repair, and cannot adequately relieve flooding in much of the Mermentau Basin. In addition to the locks and outflow structures, modifications at Hwy 82 with cleaning of drainage laterals and connecting flow through outlets to main canals will enhance the project by creating/nourishing 105 acres of marsh. Reduced inundation of marsh is predicted to increase marsh production over the 35,000 acres.

The project has been submitted in FY 2019-2020 to the Louisiana Watershed Initiative program in hopes of funding. A decision is expected to be made in December of FY 2020-2021.

MARSH CREATION AND HABITAT ENHANCEMENT WITH BENEFICIAL USE OF DREDGE MATERIAL

LDWF entered into an agreement with USACE and other regulatory agencies to construct the Rockefeller Mitigation Bank to offset wetland losses caused by adverse impacts in Louisiana's Coastal Zone. The major objective of the mitigation bank is to compensate for impacts occurring on RWR or for impacts outside the refuge (provided there are no available approved mitigation projects).

LDWF originally permitted three areas on RWR as potential wetland mitigation sites in the year 2000 (totaling 177.7 acres). Staff continues to monitor these sites annually, with very successful grass plantings observed at the 4.7- and 66-acre sites. Consequently, these marsh creation projects have attracted fisheries species, a diversity of birds, and even muskrats.

A release of credits has been issued with the acceptance acres within the 4.7- and 66-acre sites. The 107-acre site is in design for additional pumping of spoil in areas that have settled lower than expected since the original construction in 2014. The 107-acre permit had been renewed for additional dredge pumping to occur in FY 2019-2020, however the project was over budget and credits are being adjusted to qualifying acres with hopes to begin in FY 2020-2021.

SHORELINE PROTECTION AND STABILIZATION

The shoreline along RWR's 26 miles of beach typically erodes at approximately 30-50 feet per year. We have seen a steady increase in the erosion rate. Surveys conducted in 2016 indicated the Price Lake Unit Shoreline eroded 233 feet in nine months.

In FY 2015-2016 RWR was successful with being awarded $33 million from the Coastal Wetlands Planning, Protection and Restoration Act on Dec. 10, 2015. This project is designed for shoreline protection along a portion of RWR coastline in the form of segmented breakwaters. The project has been designed and was awarded to the lowest bidder, Leblanc Marine in FY 2016-2017. Construction began in August 2018.

With the project bidding coming in under budget, approximately $8 million of allocated funds still remain. A proposed change order to use the remaining funds to extend the project was approved by the Coastal Wetlands Planning, Protection and Restoration Act committee members and is supported by the Coastal Protection and Restoration Authority. The additional funds extended the shoreline protection approximately 1 mile further from the 2.8 miles' base bid section and was completed in May 2020.

Another funding source dedicated to shoreline protection along RWR is the Coastal Protection and Restoration Authority RESTORE Local Match Program funds awarded to Cameron Parish Police Jury in the amount of $6,671,531. The Cameron Parish Police Jury also used $2 million of Cameron Parish RESTORE funds and $4,270,262.72 Community Development Block Grant money to add towards the project. Governor John Bel Edwards added surplus funds of an additional $5 million totaling $17,941,793.72 allocated to additional shoreline protection along the coastline of RWR. This portion of construction funds was announced for bids in FY 2019-2020 with construction estimated to begin in FY 2020-2021.

In FY 2018-2019 a memorandum of understanding was approved between LDWF and The Nature Conservancy for the RWR Oyster Restoration Project along Humble and Union canal on RWR. The project consists of installing biodegradable oyster mats with oyster stacks in order to restore oyster growth. The oyster reefs will stabilize the banks of the

canal and reduce erosion. As the reefs expand, the project is expected to create recreational fishing locations by creating excellent saltwater fish habitat. This project was completed in FY 2019-2020, and continued monitoring is ongoing.

WILDLIFE MANAGEMENT

Alligator Nuisance Harvest

An experimental nuisance alligator harvest is normally conducted on RWR during September by nine alligator hunters with 40 tags each. The harvest was done by alligator hunters with a prior trapping history on RWR, as well as two hunters selected via a lottery system; all were approved by LDWF after successful completion of an enforcement background check. In September 2019, five trappers were issued 100 alligator harvest tags each. Hunting areas were distributed throughout RWR with the intent of taking alligators from areas with high public use, thus reducing the chance of negative interactions between alligators and humans. The experimental nuisance alligator harvest occurred Sept. 4, 2019 and ended Sept. 8, 2019. Hunters harvested 488 alligators of the 500 tags issued for a 97.6% success rate, at a size average of 7.65 feet. Sex ratio data was available for 466 of the alligators, of which 73.2% were males and 26.8% were females.

FISHERIES MANAGEMENT

RWR continued an active approach with the operations of water control structures across the refuge. This permits the ingress and egress of estuarine marine organisms into and out of the marsh without impacting established habitats on RWR and adjacent landowners.

In FY 2019-2020 RWR staff continued the stocking of Florida-strain largemouth bass (*Micropterus salmoides floridanus*) in an ongoing effort to augment the species population within the refuge, as well as improve recreational opportunities for the species. In the spring of 2020, the rearing ponds at RWR were stocked with 190,200 fry. Staff seined the ponds after 43 days and the result was approximately 116,774 fingerlings (61.4% survival rate).

The Florida-strain largemouth bass fingerlings were stocked on RWR in May 2020. Normally a portion of the fingerlings are dispersed in other various locations within the state by the LDWF Inland Fisheries Division, however due to the COVID-19 pandemic we were unable to achieve this initiative. We hope to continue the cooperative effort to assist Inland Fisheries with their target stocking goals in future years.

WATERFOWL/ MIGRATORY GAME BIRD PROGRAM

In 1994, RWR began a long-term Mottled Duck (*Anas fulvigula*) banding program to monitor annual survival rates and analyze distribution along the Gulf Coast between Texas and Louisiana. Recent studies and mid-winter aerial survey data indicate the Gulf Coast mottled duck population is experiencing declines. Anthropogenic changes, including loss and degradation of coastal wetlands and adjacent prairies are likely responsible for historical recent declines in mottled duck populations. RWR supports research to help scientists and managers better understand mottled duck ecology and population dynamics. Since 1994, LDWF staff at RWR have banded 47,910 mottled ducks, primarily in the coastal marshes of southwestern Louisiana. The banding effort is now a cooperative effort with Texas and Louisiana and involves many state and federal staff. In 2019, RWR staff banded 1,375 mottled ducks and recaptured an additional 129 mottled ducks.

Black-bellied whistling ducks (*Dendrocygna autumnalis*) have greatly expanded their range since the mid-1990s to include southern Louisiana and recently as far east as the Carolinas and as far north as Wisconsin and Illinois. Black-bellied whistling duck banding efforts have been ongoing in Louisiana since 2010 in collaboration with the LDWF Waterfowl Program. During the spring of 2020, refuge biologists banded a total of 424 individuals at two sites in southwestern Louisiana. These same sites recaptured 157 whistling ducks.

Winter aerial waterfowl surveys are conducted annually over Coastal and Nongame Resources areas in south Louisiana on a monthly basis from November through January. Due to logistical and weather constraints the January survey was not flown in 2020. Transects are flown in each management unit and the unmanaged marsh area, and thereafter, extrapolated to yield an estimate of waterfowl abundance on the area. The waterfowl survey estimate on RWR during November 2019 and December 2019 was 61,379 and 132,140 ducks, respectively. This was 48% and 15% below the long term averages for November and December, respectively.

In 2020, RWR staff banded a total of 27 doves. Banding totals declined significantly from 2019 because black-bellied whistling ducks frequently disturbed traps and likely discouraged doves from using the trapping locations.

WHOOPING CRANES

Eleven juvenile whooping cranes were received in November 2019 from the Freeport-McMoRan Audubon Species Survival Center in New Orleans, Louisiana. They were transported to the White Lake Wetlands Conservation Area (WLWCA) in Vermilion Parish where they were temporarily held in a top-netted pen before being released. Nine survived through the end of the report period. Additionally, one of six known chicks hatched in the wild in 2020 fledged and survived through the end of the report period.

Twenty-one day old whooping crane chick, LW2-20 preens next to his dad, L8-13 after returning to their nest to roost for the evening.

The COVID-19 pandemic impacted our ability to track and monitor cranes in remote locations, and it's likely that some nests, and possibly some chicks, went undocumented.

The maximum size of the Louisiana non-migratory population at the end of the report period was 76 individuals (39 males, 36 females, and one unknown), with 68 birds located in Louisiana, seven in Texas, and one in Oklahoma. Based on location data generated via remote transmitters, we documented cranes in 15 parishes throughout Louisiana, with three of those parishes accounting for 87% of the data points within the state. Similar to previous years, a number of Louisiana whooping cranes used areas in Texas, mainly in the southeast, with nearly 17% of the data points collected during the report period located there. One crane was also documented using six additional states. In 2020, a pair nested for the first time in Texas after pairing and establishing a territory there the previous year. It is likely that pair will remain and continue to nest in Texas in future years.

During the 2020 breeding season, 12 nesting pairs initiated 22 nests in seven different parishes in Louisiana and one county in southeast Texas. It is likely that several additional pairs nested, but those nests and any resulting chicks were not able to be documented due to their remote and inaccessible locations and restrictions related to the COVID-19 pandemic. Nine pairs consisted of individuals who each had previous nesting experience while three pairs nested for the first time. Seventeen nests from seven pairs were located on private property in actively fished crawfish fields, while the remaining five nests from five pairs were located in marsh habitats - one pair nested in the WLWCA marsh and four nested in marsh habitat on private property.

In 2020, six chicks hatched naturally to five pairs, two of whom had previous parenting experience, while the remaining three were first time parents. One chick survived and fledged at 84 days of age to experienced parents, who have now fledged five chicks between them since 2016. The remaining chicks disappeared at approximately 11-41 days of age and are presumed dead. Due to ongoing, significant embryo mortality, we continued submitting adult blood and egg content samples for heavy metal and toxicology screening. The COVID-19 pandemic limited our ability to perform egg manipulations for data-logging egg deployments and egg swaps, although we were able to deploy a few data-logging eggs early in the nesting season. Additionally, restrictions at the captive breeding centers significantly impacted their ability to hatch and rear chicks for release, resulting in no juvenile cranes available for release into the population in the fall of 2020. Although the future is uncertain due to the ongoing pandemic, we do plan to continue with research initiatives to the extent possible in future years while adhering to any regulations or restrictions captive centers have in place.

LDWF continues to educate the public about the Whooping Crane Reintroduction Program through a variety of means including a new display that will travel to libraries across the state.

Our media campaign continued to focus on raising public awareness regarding both positive and negative aspects of the program, including re-emphasizing the issue around illegal shootings involving whooping cranes which accounts for almost 30% of the mortality in the population where a cause of death could be determined. The media plan once again utilized an assortment of methods including billboards, television, and radio advertisements.

Now in its 10th year, the Louisiana Whooping Crane Reintroduction Program has made much positive progress but still has challenges to overcome. We are determined to continue making strides towards our ultimate goal of establishing a self-sustaining population in the state.

WILDLIFE AND FISHERIES RESEARCH

RWR places high priority on wildlife, fisheries, and marsh management research. Throughout the year, staff biologists conducted independent and collaborative research, while also presenting research findings and regional, national, and international meetings. Several notes or manuscripts describing research results or observations were also accepted for publication in peer-reviewed journals.

Outside researchers made multiple research requests and all were approved to use RWR as a study site. Projects included sampling for saltmarsh topminnow (*Fundulus jenkinsi*) (USFWS), monitoring nesting productivity of beach nesting birds (Audubon Louisiana), and evaluating the relative importance of site selection and phases of the annual cycle to shorebird survival and productivity (University of Missouri and Texas A&M University).

STAFF RESEARCH AT RWR

Assessing Seaside Sparrow Abundance, Distribution, Annual Survivorship and Nesting Productivity in Southwest Louisiana

A research study investigating the breeding productivity, survival, and other demographic factors of seaside sparrows (*Ammodramus maritimus*) was initiated in 2018 at RWR. Two WAE technicians were hired at the beginning of 2020 to assist with bird banding operations, nest searching and monitoring, tracking of birds with VHF transmitters, vegetation sampling, and data entry. A total of 145 seaside sparrows were banded with a metal band and a unique color combination of plastic leg bands to facilitate recognition of individuals. Three observers spent 464.8 hours nest searching and found 154 nests. Nest failure in all study plots was higher than anticipated as only 12 (7.8%) nests successfully fledged young. A number of weather events caused substantial nest losses including two extreme high tides and a wildfire caused by lightning. The greatest cause of nest failure, however, was predation. Vegetation data were collected at 145 nest sites and 78 random points within breeding territories in 2020. Nests were most frequently placed in *Distichlis spicata*, *Spartina alterniflora*, and *S. patens*. More than 2.5 times as many nests were located in unmanaged study plots as in managed study plots. Additionally, secretive marsh bird callback surveys were conducted three times in the spring at 18 point-count stations located near study plots to determine species abundance and distribution. The project is antici-

An adult seaside sparrow color-banded to facilitate individual recognition.

Typical nest location and clutch size for seaside sparrows in southwest Louisiana.

A seaside sparrow fitted with a miniature VHF transmitter for tracking purposes.

pated to last for two years and is funded through the Louisiana State and Tribal Wildlife Grants Program and RWR.

Winter Shorebird Response to a Coastal Shoreline Protection Project

Surveys were conducted during the winter months along a 3-mile stretch of beach on RWR during pre-determined four-hour diurnal periods at low tide. RWR researchers recorded total numbers of all observed species and documented the exact locations of several focal shorebird species including the federally threatened piping plover (*Charadrius melodus*). Time-activity budgets were also conducted on focal species to document behaviors. Beginning in the winter of 2017-18, shoreline surveys were conducted west of the mouth of Joseph Harbor during the demonstration phase of the ME-18 Shoreline Stabilization Project. Three breakwater test sections were in place at various locations along the shore. The lightweight aggregate core breakwater was selected and used during the construction phase of the project. Surveys in the winter of 2018-2019 were conducted while breakwater construction was ongoing. RWR researchers conducted the last set of surveys during the winter of 2019-2020 to document habitat use by shorebirds post-construction of the lightweight aggregate core breakwaters. Project funded through RWR.

Nesting Ecology and Habitat Use of Reddish Egrets

Research focused on the distribution, abundance and nesting ecology of reddish egrets (*Egretta rufescens*) was initiated in the spring of 2015. RWR researchers continue to actively monitor 14 reddish egrets equipped with satellite transmitters and compile vast amounts of location data into a database for future analyses. During FY 2019-2020 a student intern was hired to organize and update the location database with information on preferred foraging sites in Louisiana based on telemetry data, which is an important objective of the rangewide species recovery efforts outlined by the Reddish Egret International Working Group. Habitat polygons were delineated and classified based on characteristics such as natural marsh areas versus coastal restoration sites then joined to GPS location data using GIS software. Additionally, telemetry data during the breeding season were examined to attempt to determine remotely whether or not nesting attempts were likely successful. Based on the telemetry data, new breeding sites were observed at locations in the southwestern and southeastern parts of the state. Project funded through Louisiana State and Tribal Wildlife Grants Program and RWR.

Using Light-Level Geolocators to Measure Breeding Propensity of Mottled Ducks in the Western Gulf Coast

During summer 2018 and 2019, researchers deployed 240 light-level geolocators on molting female mottled ducks in association with pre-season banding operations conducted by LDWF and Texas Parks and Wildlife Department. From November 2018 to January 2020, we recovered 15 geolocators from hunter-harvested birds. Fourteen of these were recovered during the hunting season immediately following deployment and thus did not provide data from the breeding season with which to assess breeding propensity. The lone geolocator recovered more than one year from deployment yielded breeding season data and indicated an apparent nesting attempt, which likely was successful given the light-level readings recorded during March 27 - April 26, 2019. Due to the low sample size of

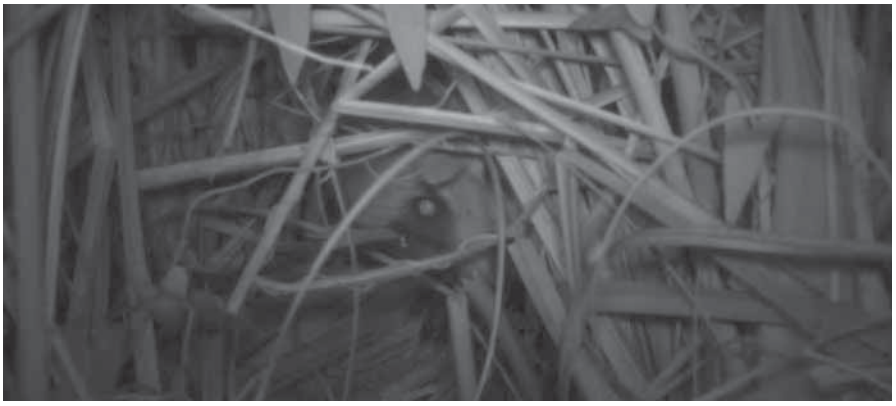
LDWF biologist holds a mottled duck that has been fitted with a geolocator.

recovered geolocators possessing breeding season data (n = 1), no formal analyses were performed. The overall geolocator recovery rate during this 2.5-year study was 6.3%, which was lower than we anticipated based on pre-study simulations (10.4%). Additionally, the recovery rate of geolocators more than one year after release (i.e., with usable breeding propensity data) was 0.4%, compared to 3.2% expected based on a pre-study simulation. Including the recoveries of the two mottled ducks that lost the geolocators would have raised the overall recovery rate to 7%. The recovery rate of units with breeding season data would have increased to 1.4%, excluding the 20 geolocators deployed in 2019, as they had not yet persisted through a breeding season at the time of this report. Project funded through Ducks Unlimited and USFWS.

PIT-Tagging and RFID Tracking of Black-Bellied Whistling Ducks: *Evaluation and Insights on Nest Site Use, Fidelity, and Female Survival and Recruitment*

During spring 2020, RWR researchers deployed more than 700 PIT-tags in black-bellied whistling duck adults and ducklings of both sexes throughout southwestern Louisiana to investigate nest site use, fidelity, and female recruitment and survival. Additionally, RWR researchers collected blood samples to investigate genetic differences among populations and to conduct a parentage analysis with blood samples from ducklings. RFID readers were deployed on artificial nest boxes during the 2020 breeding season.

LEFT: Black-bellied whistling-duck nest boxes equipped with PIT (Passive Integrated Transponder) tag readers to identify previously captured individuals. RIGHT: LDWF biologists are marking a black-bellied whistling-duck with a PIT tag.



Researchers attempt to determine the causes of mottled duck nest depredations based on camera footage. This raccoon was caught in the act of depredating an artificial mottled duck nest set up by LDWF biologists.

Unfortunately, the data collected during the 2020 breeding season was not usable because the antenna diameter was too large and the RFID reader did not reliably record each PIT tag when a bird entered or exited a nest box. A future timeline for this project has yet to be determined as Hurricanes Laura and Delta destroyed all of the artificial nest box structures on RWR and surrounding areas.

Evaluating the Mottled Duck Nest Predator Community in Southwestern Louisiana Using Artificial Nests

In spring 2019, RWR researchers undertook a limited pilot season to practice creating artificial nests, test camera technology, evaluate the overall logistics and relevancy of this project, and provide an opportunity for adaptation of study design. Researchers deployed artificial nests on 2-ha replicates in each of three habitat types: two upland replicates, two terrace replicates, and two overwater replicates (n=60 nests). As expected, survival varied markedly by replicate. Researchers detected raccoons (*Procyon lotor*), Virginia opossums (*Didelphis virginiana*) definitively depredating nests, as well as visits by nutria (*Myocastor coypus*), white-tailed deer (*Odocoileus virginianus*), water snakes (*Nerodia spp.*), rabbits (*Sylvilagus spp.*), and mice/rats (Rodentia). At the two sites with low survival (20%), we observed raccoons depredating nests all on the same night (overwater habitat) or over the span of the month (terrace habitat), and infer they were also responsible for nests without cameras. Results from the MARK analysis showed no significant differences in survival rates (counting partially-depredated nests as successful) between habitat types with this limited sample size. Proposed sample sizes for the full study are more than 13 times larger, so precision should dramatically increase.

COLLABORATIVE RESEARCH AT ROCKEFELLER WILDLIFE REFUGE

During FY 2019-2020, RWR biologists collaborated on a number of marsh management, wildlife and fisheries research projects on the refuge, across the region and state, and beyond. These projects include:

- **Monitoring movement patterns and seasonal migrations of finfish in Rockefeller Wildlife Refuge.** J. Marty, R. Temple, P. Trosclair, L. Ardoin, with M. Dance, E. Gutierrez, and G. Fignar.
- **Hybridization rates of Mottled Ducks in southwestern Louisiana.** J. Marty, R. Temple with P. Lavretsky, University of Texas El Paso (funded by Rockefeller Operating Funds).
- **Mottled duck breeding ecology in southwest Louisiana.** J. Marty with K. Ringelman and L. Bonczek, LSU (funded by Rockefeller Operating Funds, Wildlife Division Waterfowl Funds, and additional funds from Ducks Unlimited and the Gulf Coast Joint Venture).
- **Monitoring beach-nesting birds in southwestern Louisiana.** R. Temple with E. Johnson, Audubon Louisiana (funded by American Bird Conservancy and grants awarded to Audubon Louisiana)
- **Managing coastal wetlands for wildlife and suitability in the face of sea level rise.** J. Marty with S. King, and S. Graham, LSU (funded by Rockefeller Operating Funds).
- **The relative importance of site selection and phases of the annual cycle to shorebird survival and productivity.** J. Marty, R. Temple, J. Olszak with M. Weegman and S. Clements, University of Missouri; and B. Ballard, Texas A&M University-Kingsville (funded by the aforementioned universities).
- **The efficacy of marsh terraces in enhancing and restoring gulf coastal wetlands.** J. Marty with B. Davis, and M. McFarland, Mississippi State University; and M. Brasher, Ducks Unlimited, Inc. (funded by Mississippi State University)
- **Understanding mechanisms driving coastal marsh sustainability in the face of sea level rise.** J. Marty with A. Booth, A. Nyman, and S. King, Louisiana State University (funded by Texas Parks and Wildlife and LDWF).

PUBLICATIONS BY RWR STAFF BIOLOGISTS

Whitaker, J. M., J. R. Marty, S. A. Collins, M. S. Lognion, and D. U. Greene. 2019. Bait preference and banding cost analysis for Mourning Doves in the Chenier Plain of southwest Louisiana. Journal of the Southeastern Association of Fish and Wildlife Agencies 7:183-188.

Collins, S. A., G. J. Giffin, and W. T. Strong. 2019. Using flight initiation distance to evaluate responses of colonial-nesting Great Egrets to the approach of an unmanned aerial vehicle. Journal of Field Ornithology 90:382-390.

Marty, J. R., J. B. Davis, R. M. Kaminski, M. G. Brasher, and S. A. Rush. 2020. Gulf Coast riceland seed biomass estimates for waterfowl habitat conservation. The Journal of Wildlife Management 84:1315-1325

Waddle, J. H., Jones, L. R., Vasseur, P. L., and Jeske, C. W. In review. Estimating detection and occupancy of secretive marsh bird species in low and high saline marshes in southwestern Louisiana using automated recording units.

Marty, J. R., A. D. French, S. K. McDowell, and W. C. Conway. In prep. Lead exposure in Louisiana Mottled Ducks.

Marty, J. R., S. A. Collins, J. M. Whitaker, and R. Temple. In prep. Black-bellied whistling duck survival and recovery rates in southwestern Louisiana.

Vasseur, P. L., S. A. Collins, and J. R. Marty. In prep. Effects of tropical cyclones on Reddish Egret populations in Louisiana as indicated by satellite telemetry.

Vasseur, P. L., S. L. King, and M. D. Kaller. In prep. Diurnal Time-activity Budgets and Habitat Use of Whooping Cranes in the Reintroduced Louisiana Nonmigratory Population.

Vasseur, P. L., S. L. King, M. D. Kaller, and S. E. Zimorski. In prep. Behavior Analysis and Long-Term Survival of Captive-reared Juvenile Whooping Cranes in the Reintroduced Louisiana Nonmigratory Population.

In addition to the manuscripts outlined above, alligator program staff at RWR published 13 papers in 2019 on a variety of topics, highlighting LDWF's reputation as a leader in crocodilian research.

TECHNICAL ASSISTANCE, OUTREACH AND EDUCATION

Understanding the ecology of southwest Louisiana and coastal marshes is paramount to understanding the vital role that Rockefeller plays in the Chenier Plain area. RWR places a high importance on education and outreach, ensuring that educational programs are facilitated at the refuge and the area itself can be used as the classroom.

In FY 2019-2020 Rockefeller was challenged with the unprecedented COVID-19 pandemic. Louisiana state offices were forced to close their doors to the public as a precautionary effort to control the outbreak of this pandemic. Although RWR did not close its gates to the public, it did restrict the office and overnight housing from the public and therefore was unable to host many annual public outreach and education groups.

Each year various groups visit the refuge and receive talks on marsh management, coastal protection and many other educational topics related to wetland ecology. Professional groups that specialize in marsh ecology also utilize Rockefeller for its "outdoor laboratory," are often visiting from other coastal areas in the United States. The overnight facilities at Rockefeller can accommodate these groups and allow them to spend significant time in the field without having to commute to municipalities for housing.

Throughout FY 2019-2020 General Quarters was used to host college student workers, college classes, and other special interest groups. Typically, these groups are overnight groups coming on weekends to spend time at the general quarter's facility next to the RWR office. The facility can accommodate most groups with 17 beds, full kitchen and dining space, and complete AV setup for educational talks that take place while groups spend a few days at the refuge.

Examples of technical assistance provided by RWR staff include:

- Organizing, compiling and participating in Christmas Bird Counts.
- Assisting the Wildlife Diversity Program by conducting surveys for winter plover species and beach nesting birds on RWR beaches, while also conducting marsh bird surveys at Cameron Parish sites.
- Completing mourning dove banding for the statewide dove monitoring program.
- Assisting private landowners in assessing marsh conditions and management for waterfowl.
- Conducting peer-review and editorial duties for scientific journals; reviewing graduate student theses.
- Participating in guided tours to the whooping crane pen site, Nunez Woods Bird Sanctuary and around RWR.
- Presenting on the Whooping Crane Reintroduction Program to multiple grade school, college, local and professional groups, as well as providing an informational table at multiple local and state festivals.
- Presenting lectures to visiting college and university students on wetlands ecology, wetlands management, waterfowl ecology and conservation research.
- Reviewing research and grant proposals for university students and faculty.
- Participating in career fairs for Cameron Parish School District and the LSU AgCenter.

RWR staff also participated in guided tours for a number of organizations and groups (471 technical assistance contacts, 2,239 general information contacts and 299 group contacts).

RECREATIONAL USE

Marsh management units, and more specifically water control structures, continue to be very popular with sport fishermen. RWR remained open during the COVID-19 pandemic as an alternate option of social distancing away from home for public recreational users. In FY 2019-2020 Rockefeller saw approximately 235,497 visitors with the very popular Price Lake Road attracting almost half of these recreational users.

In FY 2018-2019 funding became available from Natural Resource Damage Funds through the Coastal Protection and Restoration Authority to construct additional fishing piers and to install educational signs about the RWR in the amount of $690,000. The project was started and successfully completed in FY 2019-2020. These projects will greatly enhance the fishing opportunities at these already popular recreational areas.

WHITE LAKE WETLANDS CONSERVATION AREA

LOCATION

The White Lake Property (as referred to in Act 613, 2004 Louisiana Legislature) or White Lake Wetlands Conservation Area (WLWCA) (as referred to by LDWF) is located in Vermilion Parish. The contiguous unit is 70,965 acres, located along the western boundary of Vermilion Parish; it is bounded on the south by White Lake, and the northern boundary is 7.4 miles south of Gueydan at the south end of Hwy. 91. Lafayette is 32 air miles northeast, and Lake Charles is 40 air miles northwest. The southern boundary of White Lake is 17.5 miles north of the Gulf of Mexico. The property averages 12 miles from east to west and 9 miles from north to south.

HISTORY OF OWNERSHIP

BP America Production White Lake properties have a long history of company ownership and management. Note that Stanolind Oil and Gas Company (Stanolind) preceded Amoco Production Company (Amoco) which preceded BP America Production Company (BP). Stanolind acquired the 70,965-acre property from Wright Morrow by Act of Sale on July 31, 1935. This sale included all of the property acquired by Yount-Lee Oil Company from P. L. Lawrence, et. ux., by Act of Sale dated March 7, 1931 and a portion of the property acquired by M.F. Yount from Elizabeth M. Watkins by Act of Sale dated Nov. 5, 1929. BP owned and managed the BP American Production White Lake Property until July 8, 2002 when BP donated the property to the state of Louisiana. On July 8, 2002, a Cooperative Endeavor agreement between the state and White Lake Preservation Inc. (a 501(c) 3 corporation) for management of the property was executed. On Jan. 1, 2005, Act 613 of the 2004 Regular Legislative Session became effective. This act established:

1. Transfer of property management from White Lake Preservation Inc. to LDWF.
2. The White Lake Property Advisory Board, LDWF and the Wildlife and Fisheries Commission powers and duties relative to the management of the White Lake Property.
3. A special account within the Conservation Fund for the White Lake Property.

On Dec. 17, 2004, the state, BP and White Lake Preservation Inc. signed a Transition Agreement for the management of the property by White Lake Preservation Inc. until July 1, 2005, at which time LDWF took total control.

SURFACE LEASES

AGRICULTURAL AND HUNTING

There are currently 37,841 acres of property leased out in nine separate tracts. The property is leased to eight separate tenants for the purpose of farming, raising cattle, crawfish farming and hunting. There is a rice base totaling 4,587.5 acres on this property. There were approximately 2,000 acres of rice planted in 2020. There were approximately 1,500 acres of crawfish ponds on the property in 2020.

There are over 100 miles of levees, canals and roads on WLWCA agricultural lands that are maintained by our agricultural tenants. They also own and operate the pumping systems that are needed to manage water levels on this impounded agricultural land. All of the farmland on WLWCA was at one time freshwater marsh that was impounded in the late 1940s when agricultural activities first began on the property.

TRAPPING

There were 355 alligators harvested in the 2019 alligator trapping season. The average size of the alligators trapped was 6.64 feet, with an average live length value of $3.88 per foot.

There was a contract negotiated for the collection of alligator eggs from the WLWCA property in 2018 for a three-year period. In 2019, WLWCA received a payment of $20 per egg. A total of 12,000 eggs were collected.

OTHER SURFACE LEASES

There are three oil and gas valve site leases on the property. In addition, there is one oil & gas surface use agreement with an associated road servitude agreement.

LOTTERY ACTIVITIES

FISHING LOTTERY

2019 - One-hundred fishing permits were issued at a cost of $40 per permit. Permittees and their guests were allowed to fish the Florence Canal Area and specified well location canals that flow into the Florence Canal. The area was open from sunrise to sunset from March 15 - Aug. 15, 2019

2020 - One-hundred fishing permits were issued at a cost of $40 per permit. Permittees and their guests were allowed to fish the Florence Canal Area and specified well location canals that flow into the Florence Canal. The area was open from sunrise to sunset from March 15 - Aug. 15, 2020

WATERFOWL LOTTERY

Waterfowl Hunting (2019-2020 Season)		
	Total Hunts	Participants
Teal Lottery Hunts	9	84
Marsh Lottery Hunts	14	133
Youth Hunts	2	15
Rice Field Lottery Hunts	30	232
Group Hunts	7	80

Waterfowl Hunting Results (2019-2020 season)		
	Marsh	Rice Field
Total Ducks Harvested	1,276	327
Average Kill/Hunter (ducks)	4.37	1.41
Total Geese Harvested	90	37
Average Kill/Hunter (geese)	0.31	0.16

NON-CONSUMPTIVE ACTIVITIES

LDWF established dates for the use of WLWCA facilities for non-consumptive group activities including nature photography, bird watching, educational field trips and business retreats. Use of WLWCA for non-consumptive purposes was originally offered from Feb. 1 - May 31, 2020. Site use could be scheduled on a first come first serve basis pending facility and staff availability, with up to 15 guests allowed to attend the day trips and up to 12 guests allowed to attend the overnight trips. There were no trips scheduled in FY 2019-2020. Implementation of COVID-19 restrictions eliminated these offerings in April 2020.

Group hunt participants shooting on the Sporting Clay Range.

BIRDING TRAIL

The WLWCA birding and nature trail, with accompanying kiosk, was completed in April 2012. The trail is on approximately 30 acres located on the northern boundary of the property where LA-91 ends. Birding paths, a parking area, access bridges, a birding tower and a picnic pavilion are open to the public. There were approximately 86 logged names in our visitor's guest book in FY 2019-2020.

EDUCATION, OUTREACH AND RESEARCH

MARSH MANEUVERS

During December 2019, WLWCA was host to a group of 16 teenage 4-H students for three days. The three-day camp was designed to educate the students on the importance of coastal erosion, restoration, conservation and ecology. They were also able to go on a morning marsh tour and were taught waterfowl identification techniques. They participated in a sporting clay shoot where they were instructed on gun safety and the proper use of a shotgun.

COASTAL PRAIRIE

There is approximately 200 acres of coastal prairie on the WLWCA property located south of the Gulf Intracoastal Waterway and west of the Florence Canal. For the past couple of years, the LDWF Wildlife Diversity Program has been conducting research on the different plant species located on this prairie. To date, approximately 95 different species have been identified. A coastal prairie enhancement project was completed in 2019 by White Lake WCA and Wildlife Diversity Program that included prescribed fire and herbicide application to reduce woody encroachment. This project was funded through the State Wildlife Grants Program and the White Lake Fund.

WHOOPING CRANE REINTRODUCTION PROGRAM

WLWCA assisted the Whooping Crane Reintroduction Program by providing office space, staff and vessel support. WLWCA staff maintained the 700-acre impoundment water levels around the whooping crane pen and associated release site and also assisted with demolition and removal of the old pen site in the Refuge Unit.

DUCK & DOVE BANDING PROJECTS

WLWCA continued banding birds to complement various LDWF statewide programs. In the 2019 calendar year, 52 wood ducks were banded and 29 were recorded as recaptures. Thirty-four black-bellied whistling-ducks were banded and nine were recorded as recaptures. In addition, 20 mourning doves were banded.

NESTING BOX PROJECTS

WLWCA continued maintaining and monitoring wood duck nesting boxes to complement the LDWF statewide program. In the 2019 nesting season, 99 nesting boxes were monitored and maintained. These boxes produced 67 successful wood duck nests and 872 hatchlings. Black-bellied whistling-ducks used the same nesting boxes to produce 52 successful nests and 775 hatchlings. In the 2019 nesting season, 36 passerine next boxes were monitored and maintained. These boxes produced three successful prothonotary warbler nests and nine hatchlings.

SPECIES INVENTORY AND AVIAN NEST PREDATION TRAPPING

WLWCA staff began utilizing numerous trapping techniques to generate an inventory of species found on various types of habitat at WLWCA. In addition to tallying an inventory, trapping was used to reduce avian nest predator density. Methods included the use of camera surveys, Sherman traps, live traps,

Nesting box with a mixed hatch of wood ducks and black-bellied whistling ducks.

LEFT: Biologist setting a trap to reduce avian nest predation. RIGHT: A marsh sediment core collected for a lead testing project.

foot holds, pit falls, drift fences, corral traps, and body grips. This research will continue for another two years.

LEAD TESTING PROJECT

WLWCA staff began researching and collecting soil samples in various locations on WLWCA. Some samples were sifted through for lead pellets and others were submitted to a soil laboratory for lead testing. Samples were processed and data was compiled. The project report is expected next fiscal year.

MARSH MANAGEMENT RESTORATION, HABITAT ENHANCEMENT, AGRICULTURAL MANAGEMENT, AND MINERAL MANAGEMENT

MARSH MANAGEMENT

The WLWCA property consists of approximately 52,000 acres of fresh water marsh. There are four separate management units that comprise the marsh. Within these marsh areas there are over 100 miles of trenasses, seven water control structures, four pumping stations, and over 30 miles of levees, most of which are operated, managed and maintained by WLWCA personnel. Objectives of maintenance and manipulation of the conservation area's system of levees and water control structures vary somewhat by management unit, but generally goals are to maintain marsh health, provide conditions favorable for production of waterfowl food plants, and incorporate multi-species management when possible.

As part of the overall management of the WLWCA properties, in the fall of 2008 a comprehensive set of rules and regulations was drafted and presented to the Wildlife and Fisheries Commission for approval. The White Lake Rules and Regulations were approved by the Commission and became effective in the spring of 2009.

AGRICULTURAL MANAGEMENT

Although WLWCA is comprised mostly of marsh, the property consists of approximately 19,000 acres of agricultural land. The agricultural land is separated into seven tracts that are leased out to the highest bidder. Each leaseholder follows an LDWF lease agreement that directs the leaseholder to complete numerous habitat management practices each year. These practices maintain the property in farmable condition, while also providing valuable habitat for wildlife. The benefits to the leaseholder are the ability to farm, graze and hunt the property.

MINERAL MANAGEMENT

There are three producing oil and gas fields on the WLWCA property that were once operated by Amoco Production Company. Amoco sold the subsurface rights in these fields and all the facilities associated with these fields in the latter part of the 1990s to Hilcorp Energy Company. Hilcorp has since sold these fields, and for a period of time they were operated by three separate owners/operators: the West White Lake Field (approximately 1,500 acres) was owned and operated by Energy Quest; the Florence Field (approximately 1,920 acres) was owned and operated by Dune Energy Company; and the South Kaplan Field (approximately 800 acres) was owned and operated by Texas Petroleum Investments. In the spring of 2010, Texas Petroleum Investments purchased the West White Lake and Florence Field and became the sole oil and gas operator on the WLWCA property. However, in July 2011 Magnum Producing secured a mineral lease from BP to drill an exploratory well in the Kaplan Field Area. LDWF granted a Surface Lease to Magnum Producing to facilitate the drilling of this well. This well was successfully completed and is currently producing. In 2013 LDWF granted Magnum Producing an additional Surface Lease for a Salt Water Disposal Well, which also included a road servitude and P/L right-of-way agreement. The State of Louisiana owns the surface of the property that comprises these three production areas. LDWF monitors surface activities and helps enforce the conservation terms of the agreements that were executed by and between Amoco Production Company, BP and the three owners/operators mentioned. Texas Petroleum Investments has responsibilities for maintenance of roads, levees, canals, bridges, etc.

MAINTENANCE OF FACILITIES AND EQUIPMENT

There are approximately 55 acres of property associated with the WLWCA office, dorm, lodge facility, sporting clay course, skeet range, birding trail, and Florence Canal Landing area. This acreage is maintained and landscaped throughout the year by WLWCA personnel.

Routine maintenance on the WLWCA buildings and equipment was conducted throughout the year.

Routine maintenance was performed on our fleet of more than 25 boats. Our two wooden mud boats were dry-docked and repainted, and other routine annual maintenance was done.

A new pump was installed at the office pond in June 2020. This pump is powered by an electric motor with an automatic float to ensure that the pond does not overflow during heavy rainfall events.

2019-2020 FINANCIAL REPORT

Totals	
Beginning Fund Balance 2019-2020	$2,955,097
Total Revenue	$1,291,888
Total Expenditures	$1,110,283
Ending Fund Balance 2019-2020	$3,136,703

Expenditures	
Salaries	$323,830
Wages	$107,587
Related Benefits	$229,941
Travel	$1,070
Operating Services	$153,654
Supplies	$85,992
Professional Services	$158
Other Charges	$3,750
Acquisitions	$17,962
Major Repairs	$140,091
Interagency Transfers (insurance)	$46,249
Total	*$1,110,283*

Revenue	
Group Hunt Trip Fees	$87,251
Group Hunt Charitable Contributions	$112,900
Agricultural Leases	$520,186
Hunting Leases	$217,680
Alligator Egg Collection	$240,000
Lottery Hunt Fees	$56,515
Alligator Trapping Income	$3,663
Interest Income	$40,681
Mineral Bonuses	-
Right of Way	-
Surface Leases	$54,412
Surplus Property	$590
FEMA Reimbursements	-
Oil and Gas Royalty	-
Non-Consumptive Trips	-
Fishing Lottery	$5,225
Prior Year Revenue Adjustments	-
Total	*$1,291,888*

The White Lake WCA Birding and Nature Trail contains numerous bridges and an observation tower.

LOUISIANA WILDLIFE DIVERSITY PROGRAM

The Louisiana Wildlife Diversity Program (WDP) is charged with the conservation of Louisiana's rare, threatened and endangered plant and animal species, nongame birds and natural communities. WDP staff conducts, guides, funds and facilitates research, monitoring and inventory of Species of Greatest Conservation Need (SGCN) and their associated habitats as identified in LDWF's Wildlife Action Plan. The WDP also maintains a geospatial database of these elements. These data are vital for determining potential adverse impacts to the environment from proposed construction and development projects and for providing guidance to prevent, minimize or mitigate such impacts. Data are also frequently requested by researchers and other conservation professionals to inform scientific studies or restoration. The WDP is composed of subject-matter experts who focus on botany, community ecology, zoology, State Wildlife Grants and the Louisiana Wildlife Action Plan, and database management.

WDP OUTREACH AND PUBLIC EVENTS

In addition to WDP staff regularly interacting with the public during field work, staff participated in many outreach presentations and public events throughout Louisiana in FY 2019-2020 including:

- Louisiana Master Naturalist Program spring and fall workshops
- Guest speakers for university courses and birding and gardening clubs
- Annual Eagle Expo, Morgan City
- Yellow Rails and Rice Festival, Jefferson Davis Parish
- Articles for the Wildlife Insider
- Articles for the Louisiana Conservationist
- Published the Bluestem, the official newsletter of the Louisiana Natural Areas Registry Program
- Various press releases and radio and television interviews, including "Get Outside St. Tammany" on Louisiana pearlshell conservation efforts
- Provided habitat descriptions and species accounts for the Lake Charles Education Center
- National Hunting and Fishing Day
- Provided species accounts for the LDWF website's Field Guide project

SCIENTIFIC RESEARCH AND COLLECTING PERMITS

Review and issuance of Scientific Research and Collecting Permits for all rare, threatened, and endangered species and all terrestrial species, including insects and plants, are also in the purview of the WDP. Scientific Research and Collecting Permits are utilized by many researchers from bird banders to mussel surveyors. During FY 2019-2020, 99 Scientific Research and Collecting Permits were issued to academic institutions, museums, consultants, private individuals and others. These permits are issued at no-cost. Permit holders are mandated to submit reports at the expiration of their permits; occurrence data of rare, threatened, and endangered species provided in these reports assist the WDP in supporting its mandate to conserve at-risk species.

WILDLIFE ACTION PLAN AND STATE WILDLIFE GRANTS PROGRAM

In November 2001, the U.S. Congress created the State and Tribal Wildlife Grants (State Wildlife Grants) Program "for the development and implementation of programs for the benefit of wildlife and their habitat, including species that are not hunted or fished." The inclusion of species that are not hunted or fished (i.e. nongame species) is a crucial aspect of the State Wildlife Grants Program, as many of these at-risk species previously had no existing source of funding. The State Wildlife Grants Program is now the primary funding source for nongame conservation nationwide, with the stated goal of preventing species from being federally listed as threatened or endangered.

WILDLIFE ACTION PLAN AND REVISIONS

In order to participate in the State Wildlife Grants Program, Congress mandated that states develop a Comprehensive Wildlife Conservation Strategy (Wildlife Action Plan). In response, LDWF developed the Louisiana Wildlife Action Plan to establish conservation needs and guide the use of State Wildlife Grants funds for the next 10 years. A crucial aspect of the Wildlife Action Plan is the identification of SGCN, which are those species most in need of conservation action as identified by each state. Coauthored by WDP staff and peer-reviewed by a diverse group of colleagues from state and federal agencies, academia, nongovernmental groups, citizen scientists and others, the Wildlife Action Plan is truly a collaborative effort by subject-matter experts best positioned to positively affect conservation and restoration actions in our state. The first edition of the Wildlife Action Plan was submitted to the USFWS National Advisory Acceptance Team for approval and was subsequently approved in December 2005. The Wildlife Action Plan is the roadmap for nongame conservation in Louisiana, and, as a living document, must be reviewed and revised at least once every 10 years to ensure that it remains a nimble and effective tool for conservation planning and implementation.

The first comprehensive revision (i.e. second edition) of the Louisiana Wildlife Action Plan was completed and submitted to USFWS during FY 2015-2016, and final approval was received from USFWS during FY 2016-2017. The second edition added several chapters to the treatise including treatments on invasive species, the impacts of climate change, and the delineation of Conservation Opportunity Areas. During FY 2019-2020, WDP staff finalized a minor revision which included the addition of 17 reptile and amphibian SGCN and updated the associated habitat types, added one new invasive species, and revised the invasive species Tiers.

The Louisiana Wildlife Action Plan (2015) is available now via the LDWF website (*www.wlf.la.gov/assets/Resources/Publications/Wildlife_Action_Plans/Wildlife_Action_Plan_2015.pdf*).

GRANT MANAGEMENT ACTIVITIES AND STATE WILDLIFE GRANTS FUNDING CYCLE OF FY 2019-2020

The State Wildlife Grants Program is funded by annual congressional appropriations. USFWS apportions these funds to state fish and wildlife agencies based on the land area and population of each state. Since the inception of the State Wildlife Grants Program, the State of Louisiana has received approximately $16 million in federal State Wildlife Grants funding, with an apportionment of approximately $700,000 in FY 2019-2020. Louisiana has funded 192 projects through the State Wildlife Grants Program to date; funded projects have included biological inventories, monitoring, research projects, habitat management, and the development and maintenance of databases. A wide range of SGCN have benefited from State Wildlife Grants funding in Louisiana, including freshwater mussels, alligator snapping turtles, reddish egrets, whooping cranes, swallow-tailed kites, Neotropical migratory landbirds, Louisiana black bears and many more.

TABLE 1.

New Louisiana State Wildlife Grants Opened During FY 2019-2020
State Wildlife Grants Program Coordination and Administration
Species of Greatest Conservation Need Database and Environmental Review
Invertebrates, Mammals, and Aquatic Species of Greatest Conservation Need
Turtle Species of Greatest Conservation Need
Herptile Species of Greatest Conservation Need
Natural Communities of Louisiana

photo by James R. Holland (forestryimages.org)

State Wildlife Grants proposals are accepted by the WDP on an annual basis and include projects developed by LDWF personnel, nongovernmental organizations, universities, and others. State Wildlife Grants proposals are reviewed by LDWF's State Wildlife Grants Committee, consisting of 13 biologists from the Coastal and Nongame Resources Division, Inland Fisheries, Marine Fisheries and the Wildlife Division.

During FY 2019-2020, six new project proposals were submitted to USFWS for approval (*Table 1*). After grant closings on June 30, 2020, 37 ongoing State Wildlife Grants-funded projects remained (*Table 2*).

Nine State Wildlife Grants were closed in FY 2019-2020 (*Table 3*). Copies of final reports for all closed State Wildlife Grants are available to interested parties upon request. LDWF submitted 46 grant reports to USFWS during FY 2019-2020. COVID-19 posed many challenges for principle investigators as many were unable to conduct fieldwork as scheduled. As such, 12 formal grant amendments were submitted to and approved by USFWS. Since the inception of the State Wildlife Grants Program in Louisiana, research funded through these grants has produced over 70 peer-reviewed publications, adding greatly to the body of knowledge concerning Louisiana's fish and wildlife.

DATA SECTION

The WDP procures and compiles occurrences and associated data of rare, threatened, and endangered animal and plant species (i.e. SGCN) and natural communities. Constantly updated data are integral in determining the status and state rankings of these SGCN. These data drive the direction of nongame species' projects and conservation in Louisiana. The information is stored in a secure, centralized, geospatial database known as Biotics, developed by NatureServe, with whom the WDP collaborates. Biotics currently houses more than 10,000 records of Louisiana's Element Occurrences, carefully vetted data on SGCN and their associated habitats collected by staff biologists or conservation partners. During FY 2019-2020, a total of 203 Element Occurrence Records were added or updated (39 and 164 records, respectively) in Biotics along with the associated information such as geographic location, habitat condition, emerging threats,

TABLE 2.

Ongoing Louisiana State Wildlife Grants During FY 2019-2020	
Completion of the SPDOR VHF Network to Inform Conservation of SGCN: Phase II Extension	Distributional Assessment of Imperiled Fishes in Louisiana
Breeding Bird Surveys	Coordinated Surveys for Alligator Snapping Turtles Phase 2
Beach-nesting Bird Surveys	Assessing the Current Status and Distribution of Southern Crawfish Frogs in Louisiana
Distribution, Abundance, Nesting, and Movements of Reddish Egrets in Louisiana	Wildlife Habitat Inventory Initiative
Surveys for S1, S2, and S3 Amphibian and Reptile SGCN	State Wildlife Grants and State Wildlife Action Plan Coordination
Assessing Seaside Sparrow Abundance, Distribution, Annual Survivorship, and Nesting Productivity in Southwest Louisiana	West Gulf Prescribed Burn Initiative
Population Monitoring and Surveillance for White-nose Syndrome in Six Bat Species of Greatest Conservation Need in Louisiana	East Gulf Coastal Plain Prescribed Burn Initiative
Cooperative Research to Inventory and Monitor the Current Status, Abundance, and Distribution of the Saltmarsh Topminnow, and Two Associated Killifish SGCN Phase 2	Natural Areas Registry Program for SGCN
Habitat Affinities and Day Roost Characteristics of the Northern Long-eared Bat in Louisiana	Collection and Analysis of American Eels in Louisiana
Coastal Prairie Conservation Opportunity Area Corridor Evaluation and Survey	Distribution and Conservation Genetics of Myotis and Other Bats in Louisiana
Wild Bees in Fire-managed Eastern Upland Longleaf Pine Ecosystems	Using Land Cover to Refine Conservation Opportunity Areas in Louisiana
Conservation Status and Distribution of Mussels in the Lower Reach of Bayou Bartholomew Drainage	Population Size and Ecology of Four Rare Dragonflies in Louisiana
Occurrence of Western Chicken Turtle	Assessment of the Effects of a Planned Coastal Island Restoration on Seabirds and Their Nest Predators
Distribution and Abundance of Three Co-occurring SGCN Turtle Species in the Pearl River, Louisiana	Alligator Snapping Turtle Head-start Post-release Monitoring
Distribution, Population Size, and Habitat Assessment of Crayfish SGCN in the Eastern Florida Parishes of Louisiana	Survey of Crayfish SGCN and Associated Species Assemblages in Central and Northern Louisiana and Southern Arkansas
Pass-a-Loutre Bird Enhancement Project - Phase 2	Southern Dusky Salamander Surveys
Gulf Coast Box Turtle Re-surveys	Louisiana Amphibian Monitoring Program
Razor-backed Musk Turtle Surveys	Rare Snake Trapping and Surveys
Anuran SGCN Data Collection and Analysis	

TABLE 3.

Louisiana State Wildlife Grants Closed During FY 2019-2020	
Status Survey for Frecklebelly Madtom in the Pearl River Drainage of Louisiana Phase 2	Population Genetics and Life History of the Sarracenia Spiketail
Novel Detection Method for the Imperiled Frecklebelly Madtom in the Pearl River Basin	A Two-year Comprehensive Status Survey and Habitat Assessment of Crayfish, Amphibian, and Reptile Species of Greatest Conservation Need and Assemblages in Central Louisiana
Tracking Prothonotary Warbler Migration and Effects of Winter Ecology on Breeding Success	Habitat Use of Bachman's Fox Squirrels in Southeast Louisiana
Distribution and Abundance of Map Turtles in the Red and Ouachita River Drainages of Northern Louisiana	Database For Tracking Rare, Threatened, and Endangered Species
Identifying Priority Amphibian and Reptile Conservation Areas	

and population status. These additions and updates impacted 45 different types of elements (i.e. species of animals and plants and types of natural communities) including the federally threatened gopher tortoise, black rail, piping plover, red knot, and northern long-eared bat and the federally endangered red-cockaded woodpecker. Additions and updates resulted from actual new detections, but also from taxonomic changes and revisions to the WDP Tracked Species list.

The Biotics database is used daily by WDP staff to review proposed construction activities and development projects planned by government, industry, and other private entities throughout the state in order to determine potential impacts of the projects on SGCN and natural communities. Proposed projects range from small-scale construction such as cell phone towers, residential, commercial and industrial development, and dredging activities to large-scale construction such as pipeline projects and interstate development. Clients may also request digital data for proposed project siting or for scientific studies; data may be queried by the species of interest, the client-supplied project footprint, the footprint plus a buffer, or by 7.5-minute USGS quadrangle (quad) boundaries. Because persistence of native species is constantly threatened by loss and alteration of habitat, an up-to-date database of known Element Occurrences is crucial for informing decisions on countering such threats – minimizing, mitigating or eliminating the threats altogether.

A subset of project reviews, referred to as private consultant projects, are submitted by consulting firms on behalf of government and private entities. The requesting organization submits a description of the proposed project as well as a detailed map to the WDP, and a query of the WDP database determines the SGCN and natural communities within 1 mile of the project area. A comment letter identifying potential impacts to SGCN, communities, and critical habitats is submitted to the requesting organization. The letter also indicates the presence of scenic rivers, state or federal parks, wildlife refuges and WMAs occurring within 0.25 miles of the project area.

WDP also receives Coastal Use Permits submitted to LDWF by LDNR. Coastal Use Permits are required for commercial, residential, and oil and gas projects occurring within Louisiana's Coastal Zone. LDNR houses an abridged version of the WDP database, allowing LDNR to flag Coastal Use Permit projects that oc-

cur near SGCN. These flagged permit applications are forwarded to WDP biologists for further review. As with private consultant reviews, comments are generated for potential impacts to SGCN, critical habitats, and natural communities. The presence of scenic rivers, state or federal parks, wildlife refuges and WMAs within the project area are also included in the comment letter. The WDP's comments, along with comments from other programs within LDWF, are compiled, and an agency-wide letter is submitted to LDNR.

In addition, WDP reviews USACE permit applications, as well as applications from other regulatory agencies. These reviews are collectively referred to as internal reviews due to the fact they are received by WDP from other departments within LDWF.

In FY 2019-2020, the WDP Assistant Data Manager conducted 1,141 project reviews, which included 322 private consultant project reviews, 700 new or modified Coastal Use Permits, and 119 internal project reviews.

The WDP Data Manager processed 68 digital data requests from state and federal agencies, private consultants, timber companies, nonprofit organizations, and universities. The requesting organization submits a description of the proposed project to WDP, and a query of the WDP database shows the SGCN and natural communities within a predetermined distance stated in the client's project request letter. A comment letter identifying potential impacts to SGCN, natural communities, and critical habitats, along with point and/or polygon data and associated species and habitat information is provided to the requesting organization. The information provided by the WDP is applied to land use decisions, environmental impact assessments, resource management, conservation planning, threatened and endangered species reviews, species status assessments, research, and education.

DATA SECTION PROJECTS

In FY 2019-2020, the Data Section closed out the State Wildlife Grants' project "Database for Tracking Rare, Threatened, and Endangered Species" (T236). This project (grant period Aug. 1, 2015 to June 30, 2020) was wildly successful with more than 3,500 Element Occurrence Records added and/or updated in Biotics (*Table 4*). Of the 3500+ Element Occurrence Records, more than 600 pertained to critically imperiled (S1 rank) species or habitats and more than 900 to imperiled (S2 rank) species or habitats.

TABLE 4. Wildlife Diversity Program Element Occurrence Records added or updated in Biotics

CATEGORY	# TYPES OF ELEMENTS*	# ELEMENT OCCURRENCE RECORDS
Mollusks	22	70
Crawfish	13	305
Spiders	1	5
Insects	33	138
Fish	40	489
Amphibians	14	238
Reptiles	31	699
Birds	15	1175
Mammals	6	114
Plants	87	138
Communities	42	149

Numbers cumulative over grant period (2015-2020)
**Number of species or natural community types*

During the grant period, WDP staff used the database (1) to determine potential impacts of thousands of proposed projects on SGCN and natural communities, (2) to provide existing SGCN and natural community data for eleven multi-jurisdictional projects that incorporate large-scale efforts, and (3) to share data with more than 30 collaborators and partners. In addition, the WDP performed a data exchange with NatureServe, which provided taxonomic updates and a first order quality control of the database.

In April 2020, the Data Section received State Wildlife Grant funding for the "Species of Greatest Conservation Need Database and Environmental Review" project, which provides the WDP with additional latitude in project reviews and data requests. This will allow additional maintenance of the database and will further ensure that new and updated records are available to inform construction, development, conservation, and restoration projects in Louisiana.

LOUISIANA WATERSHED INITIATIVE

After two significant flooding events in Louisiana in 2016, the Louisiana Senate passed a resolution in 2017 that required the state to facilitate efficient watershed management. Via an Executive Order the following year, Louisiana Governor John Bel Edwards established the Council on Watershed Management, an interagency collaboration with representation from five State agencies (Louisiana Office of Community Development, Coastal Protection And Restoration Authority, Governor's Office of Homeland Security and Emergency Preparedness, Louisiana Department of Transportation and Development, and LDWF) tasked with leadership of the Louisiana Watershed Initiative. The Louisiana Watershed Initiative seeks to more holistically manage water resources in the state and to address contraindicated "solutions," recognizing that earth-moving projects may benefit one watershed region, while adversely impacting neighboring regions. Given the magnitude of the charge, multiple technical advisory groups were formed, populated by subject-matter experts from diverse backgrounds from public relations to data modeling to ecology. The WDP Data Manager represents LDWF on the Louisiana Watershed Initiative Planning Technical Advisory Group. The Planning Technical Advisory Group's main responsibilities are to make recommendations to the Council on Watershed Management on (1) delineated boundaries of the different watershed regions and (2) the expected content and level of detail of a statewide watershed management plan, which may then be scaled down to regional watersheds. Like other Louisiana Watershed Initiative LDWF representatives, the WDP Data Manager ensures that watershed plans and projects avoid, minimize, or mitigate negative impacts to wildlife and their habitats and emphasizes the vital ecosystem services provided by more natural watersheds.

BOTANY & COMMUNITY ECOLOGY SECTION

The main responsibilities of the Botany and Community Ecology Section include:

- Actively monitoring all at-risk (rare, threatened, and endangered) or otherwise sensitive plant species and natural communities in Louisiana to ensure conservation and management actions benefit those elements
- Promoting proactive measures to preclude the need for federal listing of plant species as threatened or endangered and working to improve the status of those plants that are already listed as such
- Conducting botanical inventories and ecological assessments on all types of land ownership
- Interacting with landowners and managers to promote conservation of native plants and natural communities

- Administering the Natural Areas Registry Program
- Implementing habitat stewardship practices on LDWF-owned properties and private lands
- Providing plant identification services to LDWF staff, natural resources professionals with other state and federal agencies or private entities, and the public
- Contributing expert knowledge on Louisiana ecology and flora for conservation decision making processes including environmental impact review, conservation planning, and habitat management
- Providing direction, guidance, and oversight to LDWF interns and other staff working on botany and community ecology projects

BOTANY & COMMUNITY ECOLOGY SECTION PROJECTS

Most of the work of the Botany and Community Ecology Section is grant project-based. Currently, nine projects are being successfully carried out, with all but one receiving external grant support:

- Botanical and Ecological Surveys on Kisatchie National Forest (USDA Good Neighbor Agreement)
- Natural Areas Registry Program (USFWS State Wildlife Grants)
- Wildlife Habitat Inventory Initiative (USFWS State Wildlife Grants)
- Coastal Prairie Stewardship in Southwest Louisiana (EPA Gulf of Mexico Program)
- Louisiana Quillwort Population Status Assessment in Southeast Louisiana (USFWS Section 6)
- Texas Trillium Population Status Assessment on Private Lands in Caddo Parish, Louisiana (USFWS Section 6)
- Louisiana Native Plant Gardens at LDWF Baton Rouge Headquarters
- Coastal Prairie Conservation Opportunity Area Corridor Evaluation and Survey (USFWS State Wildlife Grants)
- Natural Communities of Louisiana (USFWS State Wildlife Grants)

NATURAL AREAS REGISTRY PROGRAM

Almost 90% of Louisiana's 43,566 square-mile area is privately owned. Therefore, private landowners hold the key to conservation of Louisiana's native habitats and the animal and plant species they support. Motivated by this fact, the Louisiana Natural Areas Registry was created by an act of the Louisiana legislature (Acts 1987, No. 324, §1, eff. July 6, 1987) to establish a program through which landowners of all types may voluntarily agree to protect the natural integrity of their properties, thereby safeguarding the best remaining examples of the state's natural heritage. Enrollment of properties in the registry involves a voluntary, nonbinding agreement between landowners and LDWF. The Natural Areas Registry Program is coordinated by the WDP Botany and Community Ecology Section. To date, 128 properties are enrolled in the registry, capturing 52,579 acres distributed in 38 of Louisiana's 64 parishes. Thirty-three different natural communities and numerous populations of rare animals and plants are found on these Natural Areas.

Responsibilities of the Natural Areas Registry Program include:

- Assessing habitats on existing Natural Areas and providing information to landowners
- Providing technical assistance regarding species and habitat ecology and management to landowners
- Directing landowners to outside funding opportunities to implement habitat stewardship, as well as providing direct financial assistance for beneficial management practices on-site
- Implementing appropriate habitat management
- Advocating Natural Areas' protection
- Modifying agreements and deactivating Natural Areas when appropriate (e.g. ownership changes)
- Evaluating properties for potential inclusion in the Natural Areas Registry
- Enrolling new properties in the Natural Areas Registry
- Distributing a regular newsletter, Bluestem, to registry participants and others interested in Natural Areas

Funding for the Natural Areas Registry Program was renewed through a State Wildlife Grant, which will allow operation of the registry through 2022. A new capability for the registry is the direct implementation of habitat stewardship practices on Natural Areas. Previously, LDWF was limited to assisting landowners in securing funding for habitat management elsewhere. However, a new process was devised whereby landowners of enrolled properties may request assistance. The initial intake period for landowner assistance requests began in summer 2017. During this first cycle, Delacroix Preserve Natural Area received funding to manage invasive species on the property with an emphasis on controlling Chinese privet (*Ligustrum sinense*) and feral hogs. Evergreen Farms at Carter's Bottom and Sugar Creek Farm received funding for prairie and pollinator enhancement plantings. Evergreen Farms was planted in spring 2019. Preparations for planting at Sugar Creek Natural Area are ongoing, and the site will be planted in winter 2020/2021. In addition to these activities, six site visits were made to existing registry properties for either ecological checkups or landowner assistance and consultation. Ten site visits were made to assess new, potential registry properties.

In addition to receiving expertise, funding, and commendation from the Natural Areas Registry Coordinator, occasionally, landowners may be eligible for regional awards and recognition. In FY 2019-2020, Natural Areas Registry Program participants Dr. Johnny and Karen Armstrong received the Private Landowner Conservation Champion award from the Lower Mississippi Valley Joint Venture. The Armstrongs exemplify ideal conservation partners; their 500-acre property includes a critically imperiled natural community - Shortleaf pine/Oak-hickory Woodland - and through sound habitat management such as prescribed fire, selective herbicide application, and understory restoration, the Armstrongs have greatly enhanced the woodland to benefit numerous game and nongame species. In addition, they promote conservation and restoration education among the general public and university students.

BOTANICAL AND ECOLOGICAL SURVEY ON KISATCHIE NATIONAL FOREST

A cost-sharing position between LDWF and the U.S. Forest Service was created under the authority of a USDA Good Neighbor Agreement to support a botanist to perform botanical and ecological surveys on Kisatchie National Forest. These surveys target rare, threatened, and endangered species, nonnative invasive species, and high-quality, natural plant communities. The surveys aim to document new records and to update previously detected records within focal project areas slated for timber harvests, restoration projects, and other habitat management activities. Deliverables include stand-level status update reports within each project area and georeferenced detections of at-risk plant species, sensitive habitats, and invasive plants.

During FY 2019-2020, the LDWF/Kisatchie National Forest botanist completed a survey

LEFT: A rare S1 ranked plant, one-flowered broomrape (Orobanche uniflora), found in Kisatchie National Forest Vernon Unit. After two years of searching for this plant, only three viable populations were identified in Louisiana including this newly discovered one. BELOW: A previously unreported western hillside seepage bog, in healthy condition, on the Vernon Unit of Kisatchie National Forest, identified during botany project surveys. Winged pitcher plant (Sarracenia alata) in foreground and background.

Damage form the December 2019 F3 tornado that impacted Kisatchie National Forest (photos taken 2020 - KNF Vernon Unit).

for the December 2019 Tornado Damage Assessment Project on the Calcasieu Ranger District, Vernon Unit. The tornado crossed approximately 16 miles of the Kisatchie National Forest Vernon Unit. The project area included a 0.5-mile buffer on each side of the tornado path centerline in Kisatchie National Forest totaling approximately 14,000 acres. Field survey efforts identified 118 polygons (380 acres), which were composed of 98 bogs (including 30 newly reported pitcher plant bogs) and 20 flatwood/forested seeps (six newly reported). All the polygons were mapped and delineated at a fine scale to improve species' data accuracy. The surveys also generated new discoveries of several rare plants, including one-flowered broomrape (*Orobanche uniflora*, critically imperiled), Canby's bulsedge (*Schoenoplectus etuberculatus*, critically imperiled), and spindle-fruited rosette grass (*Dichanthelium fusiforme*, a new state record). The *Dichanthelium fusiforme* specimen was sent to Richard LeBlond, Associate of the University of North Carolina Herbarium and Dichanthelium specialist, who confirmed the identification.

The LDWF/Kisatchie National Forest botanist also worked on the Lower Drakes Creek Project (9,265 acres) and the Vernon Farm Bill Restoration Project (10,527 acres) during FY 2019-2020. Botanical and ecological surveys were also conducted in several other compartments on the Kisatchie and Calcasieu Ranger Districts during opportune times of the year when some of the plant SGCN were more readily identifiable. The status of all records are being updated in the U.S. Forest Service and WDP databases.

A rare S1 ranked plant, Canby's sedge (Schoenoplectus etuberculatus), found in Kisatchie National Forest Vernon Unit. Only three known viable populations are known in Louisiana, including this newly reported Vernon and Kisatchie National Forest record.

COASTAL PRAIRIE PROJECTS

Coastal Prairie is an extension of tall-grass prairie from the eastern Great Plains. Historically, this grassland occupied approximately 2.2 million acres in southwest Louisiana. Because of modern agriculture practices, less than 0.2% of this prairie remains intact in Louisiana. The Coastal Prairie Research and Stewardship Initiative began in 2013 following the discovery of new coastal prairie remnants in the Lake Charles area that quadrupled the known acreage of remnant prairie in Louisiana. Calcasieu and Cameron parishes still feature a considerable amount of grazing lands, in contrast to the prairie region of Acadiana, which is largely under rice or sugarcane cultivation. The newly discovered prairie remnants are used as rangeland. While "passive" farming has been carried out on some of this prairie acreage, most of the rangeland prairies have never been plowed, which would have greatly undermined the integrity of the community by disrupting the microbial community and destroying the root and seed bank.

Coastal Prairie Stewardship in Southwest Louisiana

Relationships between LDWF and three family-owned ranches have strengthened. The goal of these partnerships is to enhance coastal prairie habitat through stewardship and grazing optimization. During FY 2019-2020, Botany and Community Ecology Section staff oversaw installation of fire lines at two sites and led crews that burned almost 300 acres of remnant Coastal Prairie. WDP staff plan to coordinate additional woody brush removal, herbicide projects, and implementation of prescribed fire at these coastal prairie sites in the near future. Spring and fall vegetation surveys were completed on a 1,000-acre prairie remnant for an ongoing coastal prairie management study seeking to identify best management practices to restore coastal prairie on actively grazed rangeland. Survey work on additional sites owned by these ranching families is ongoing. Data collected for this project were presented at the North American Prairie Conference in Houston, Texas, in FY 2019-2020.

Botany and Community Ecology staff attended a two-day grassland workshop sponsored by the Southeastern Grassland Initiative to meet with other conservation professionals from a variety of organizations including non-governmental organizations and governmental and private entities with the primary goal of developing priorities for grassland research in the region. This workshop lead to the development of a white paper on the conclusions of the workshop that is to be published by USGS.

LDWF personnel (Brian Sean Early) and members of the Cajun Prairie Habitat Preservation Society while surveying a coastal prairie remnant in Jefferson Davis Parish.

Coastal Prairie Conservation Opportunity Area Corridor Evaluation & Survey

Preliminary data collection and early assessments for the Coastal Prairie Conservation Opportunity Area Corridor Evaluation and Survey were conducted in the spring and summer of 2019. The project goal is to identify and rank lands that may best serve as corridors between coastal prairies and increase wildlife habitat for grassland dependent species. Data from this project will be used to refine the two coastal prairie conservation opportunity areas defined in the Wildlife Action Plan and will serve as an example of how conservation opportunity areas may be used to implement conservation on the landscape.

A preliminary review of remote sensing data suggests unreported coastal prairie remnants may remain in southwest Louisiana. During the early stages of this project, a reassessment of all known prairie remnants was performed, which identified approximately 3,697 acres (ca. 0.168% of historical acreage) of coastal prairie remnants in Louisiana. Remote sensing evaluations have been conducted on less than 25% of Calcasieu Parish. These evaluations identified 27,912 acres of pimple mounded lands (a topographic feature that suggests unplowed land) of which 7,867 acres have unmanicured grassy cover types. These pimple mounded lands have the greatest potential for harboring unidentified prairie remnants and for serving as grassland corridors connecting fragmented remnants, potentially increasing the coastal prairie acreage in Louisiana. Eventually, these data will be utilized to develop more focused conservation opportunity areas for future preservation and restoration efforts. The scope of this project and the preliminary findings were presented at the North American Prairie Conference in Houston, Texas, during FY 2019-2020. The surveys for this grant are ongoing.

NATURAL COMMUNITIES OF LOUISIANA

Natural Community identification and management are crucial to conservation of Louisiana's native animal and plant species. Through this grant, LDWF works with organizations and individuals to achieve conservation goals identified in Louisiana's Wildlife Action Plan. Objectives of this grant are to perform (1) technical assistance; (2) outreach activities; (3) research, surveys, data collection, and analyses; and (4) direct habitat and species management that will benefit the natural communities of Louisiana and ensure conservation actions that specifically benefit natural communities of Louisiana are implemented.

Through this grant, WDP botanists were able to perform research on Louisiana natural communities and provide technical guidance to federal and State agencies in the development of natural community conservation benchmarks for Clean Water Act Section 404 Wetland Mitigation Banks. This grant also provides botanists opportunities to survey Louisiana's critically imperiled coastal prairies and further develop coastal prairie assessment tools and grassland restoration techniques. During these coastal prairie surveys, an undescribed *Pycnanthemum* (mountain mint) was identified; additional study is needed to determine if this is a new taxonomic entity. Botany and Community Ecology staff have been in contact with researchers with expertise on this genus to obtain confirmation of the specimen's identity. While surveying the Vermilion River floodplain, an LDWF botanist identified a possible population of *Oxalis brasiliensis* in Lafayette, Louisiana. Further investigation and additional specimen collections are needed for positive identification, which will be pursued in 2021. In addition to this research, WDP botanists also participated in outreach and education events by supporting and teaching Louisiana Master Naturalist classes, providing plant identifications to public and private entities, and contributed articles to the LDWF Wildlife Insider.

WDP staff developed the Louisiana Native Plant Gardens to provide outreach opportunities and celebrate our state's natural beauty. The Gardens contain two interpretive stations and over 160 native plant species grouped into smaller gardens to resemble natural communities of Louisiana. Many people come to view the gardens and learn about various natural communities, native plants, and how to support wildlife in an urban landscape. LDWF staff maintain the Louisiana Native Plant Gardens largely through organizing volunteer efforts. During FY 2019-2020, four volunteer workdays were held (Pre-COVID 2019), and 32 volunteers assisted with garden maintenance.

TEXAS TRILLIUM SURVEYS IN NORTHWEST LOUISIANA

Texas trillium (*Trillium texanum*) is a spring ephemeral, perennial herb known from less than 30 locations in east Texas and northwest Louisiana. This species is currently under review for possible Endangered Species Act listing by the USFWS, which prompted the need to prioritize surveys of known popula-

A prescribed burn taking place on a coastal prairie remnant in Calcasieu Parish.

tions in Louisiana and to search for potential new sites with suitable habitat. In spring 2019, Botany and Community Ecology Section staff surveyed all three known locations for this species in Caddo Parish as well as sites with suitable habitat in Bossier Parish. During the survey of the three known occurrences, two populations were discovered to be threatened by feral hog activity, and one of the populations was discovered to be healthy and secure. The landowners at one threatened site are utilizing the property as a private hog hunting club. Due to the heightened threat of increased hog activity, staff requested permission from the landowners to remove Texas trillium plants so that they could be transplanted into similar habitat at The Nature Conservancy's Black Bayou Preserve. Approximately 50 individual plants were transplanted to the new site. During a follow-up survey in spring 2020, about 60 stems of Texas trillium were observed with one of those stems being in flower. Given that Texas trillium is not known to be a prolific flower producer, having only one individual being in flower is not surprising. The second site that was found to be threatened by feral hog activity is located on privately owned land that is under short rotation timber management. Population density at this location appears to be decreasing, and Botany and Community Ecology Section staff will continue to monitor this site.

In March 2020, the private hog hunting club property was revisited by WDP botanists and Dr. Beth Middleton (USGS) to reassess the status of this population and to collect and transplant specimens to a second location at Caddo Black Bayou Preserve. In addition, Dr. Middleton collected specimens to be cultivated and studied at the USGS Wetland and Aquatic Research Center in Lafayette. Dr. Middleton is growing the collected specimens in a controlled garden setting to study potential environmental constraints on the species such as shading and drought to further enhance the conservation of the species.

ZOOLOGY SECTION: Endangered and At-risk Species; Reptile & Amphibian Program; Nongame Bird Program; and Marine Mammal & Sea Turtle Stranding & Response Programs

ENDANGERED AND AT-RISK SPECIES PROJECTS

The WDP administered federal aid grants for SGCN through the Endangered Species Act Section 6 Program, Multi-state State Wildlife Grants, and Louisiana's State Wildlife Grants Program. Section 6 projects included endangered species coordination and work on the following species: Louisiana pearlshell, Louisiana pinesnake, gopher tortoise, and black rail. Section 6 Cooperative Agreements were renewed among LDWF, USFWS, and the National Oceanic and Atmospheric Administration (NOAA).

Section 6 Projects

Section 6 funds allowed staff to work on a multitude of rare, threatened, and endangered species issues including:

- Southeast Association of Fish & Wildlife Agencies - Wildlife Diversity Committee to address at-risk species in the Southeast
- Continued partnership with USFWS and USDA-NRCS on Endangered Species Act coordination
- Prescribed burning of public and private properties
- White-nose syndrome surveillance, coordination, and response planning
- Participation on the 3-Bat Species Status Assessment Technical Team
- Participation on the Dusky Gopher Frog Recovery Team
- Collection and preservation of petitioned crawfish DNA for genetic studies
- Gopher tortoise population assessment, habitat improvement, and public outreach
- Collaboration with private landowners for gopher tortoise status and potential habitat restoration
- Response and coordination for waif gopher tortoises
- Data submittal for the Gopher Tortoise Species Status Assessment
- Review of the draft Pearl River Map Turtle Species Status Assessment
- Louisiana pearlshell population trends, long-term monitoring protocol, and data management
- Louisiana pearlshell conservation coordination with federal and parish partners and private landowners
- Participation on the Rabbitsfoot (*Quadrula cylindrica*) Species Status Assessment Technical Team
- Spatial and temporal distribution of black rail (*Laterallus jamaicensis*) in coastal Louisiana
- Louisiana pinesnake research and monitoring
- Maintenance of database of West Indian manatee sightings and response to stressed/dead manatees when reported

ONGOING STATE WILDLIFE GRANTS PROJECTS

Zoological projects funded through State Wildlife Grants included:

- Tracking Prothonotary Warbler Migration and Effects of Winter Ecology on Breeding Success
- Breeding Bird Surveys
- Calcasieu Painted Crawfish Surveys
- Beach-nesting Bird Surveys
- Distribution, Abundance, Nesting, and Movements of Reddish Egrets in Louisiana
- Multi-state Sandhills/Upland Longleaf Restoration Project
- Alligator Snapping Turtle Head-start Post-release Monitoring
- Rare Amphibian and Reptile (SGCN) Surveys
- Anuran SGCN Data Collection and Analysis
- Gulf Coast Box Turtle Re-Surveys
- Rare Snake Trapping and Surveys
- Southern Dusky Salamander Surveys
- Louisiana Amphibian Monitoring Program
- Statewide Passive Detection for Organismal Research (SPDOR) Wildlife Tracking VHF Network

LOUISIANA PEARLSHELL

The Louisiana pearlshell (*Margaritifera hembeli*), a freshwater mussel species, is endemic to Grant and Rapides parishes in Louisiana and is listed as state and federally threatened. Surveys for this species have been ongoing since 1985. The WDP is responsible for surveying all private lands where this species occurs in the state. A new standardized sur-

LEFT: USFWS Natchitoches Fish Hatchery staff training LDWF's Wildlife Diversity Program staff in the field on assessing glochidia presence in Louisiana pearlshell mussels. RIGHT: LDWF staff conducting Louisiana pearlshell surveys in Grant Parish

View of Louisiana pearlshell mussel with numbered, colored tag for marking individuals.

vey protocol was developed in 2017 and has since been used by WDP staff. Louisiana pearlshells may be found as scattered individuals throughout a creek bed or as large aggregations (100+ mussels) within close proximity to each other. During FY 2019-2020, a total of 14,631 individuals was detected within 19 aggregations across four creeks with another 2,467 scattered individuals detected across six creeks. The largest of these aggregations comprised 5,307 individuals, while the smallest aggregation contained 106 individuals. In early 2020, an effort was made to contact each private landowner residing within the four drainage systems containing Louisiana pearlshells. As part of the outreach effort, packets of information were assembled and included a Louisiana pearlshell fact sheet and a request for property access to conduct surveys. Packets were mailed to 235 landowners with 115 responding positively to date.

ALLIGATOR SNAPPING TURTLE

The alligator snapping turtle (*Macrochelys temminckii*) is listed as an SGCN in the Louisiana Wildlife Action Plan. A determination of whether or not to list the alligator snapping turtle as federally threatened under the Endangered Species Act is currently underway by USFWS. WDP staff have participated in the Species Status Assessment process for this species by providing species occurrence information, participating in technical team conference calls, and reviewing chapters of the document. During FY 2019-2020, 18 previously released, head-started alligator snapping turtles were tracked by WDP and University of Louisiana-Monroe staff using radio telemetry. Additionally, trapping was implemented to obtain growth data on all previously released head-started turtles. Preliminary data suggest that the radio-tracked turtles have exhibited 100% survivorship.

GOPHER TORTOISE

The gopher tortoise (*Gopherus polyphemus*) can be found in Tangipahoa, Washington, and St. Tammany parishes and is state and federally listed as threatened in Louisiana. WDP staff conducted gopher tortoise population status surveys on two right-of-ways (ROW 1 & 2) to update the species' occurrence data. A total of 86 burrows were assessed on ROW 1 from February to March 2020; 38 were classified as active/potentially active, 20 as inactive, 26 were collapsed/abandoned burrows, and two burrows no longer exist. All active/potentially active and inactive burrows were scoped with a burrow camera, which resulted in 16 gopher tortoises being detected in burrows. Of the active/potentially active and inactive burrows, 15 were not able to be scoped to the chamber of the burrow; therefore, tortoise presence could not be confirmed for these burrows. For the survey of burrows on ROW 2 in March 2020, a total of 39 burrows were assessed with 13 classified as active/potentially active, nine as inactive, three were collapsed/abandoned, and 14 burrows no longer exist. Nine gopher tortoises were detected in burrows after using the burrow camera. In addition, the WDP continues to work with other states in the gopher tortoise's range as part of a "waif" tortoise working group to increase education and outreach to the public on the importance of not removing gopher tortoises from their natural habitat. The public is requested to continue to notify LDWF should tortoises be found outside of their natural range. A waif tortoise pen installed on the north tract of Sandy Hollow WMA received two male tortoises after each passed a health assessment conducted by the LSU School of Veterinary Medicine. Both tortoises are adjusting well, and the pen will be removed after a 12-month acclimation period. One female gopher tortoise was located in Westwego in April 2020 after she had been mauled by a dog; she was rehabilitated by the Audubon Nature Institute with her release scheduled for late summer 2020. WDP staff reviewed various development

LDWF- Wildlife Diversity Program staff releasing female waif gopher tortoise into release pen at Sandy Hollow Wildlife Management Area.

Gopher Tortoise detected during burrow camera surveys at Lee Memorial Forest.

projects to assess their potential impacts to gopher tortoises and provided consultations on preventative measures as necessary.

WDP staff continue to collaborate with state, federal, and nongovernmental partners regionwide on the Gopher Tortoise Range-Wide Conservation Strategy to work towards species recovery by prioritizing and implementing action items and assessing threats to the species. Through a federal grant acquired for gopher tortoise habitat restoration, an additional prescribed fire was applied in March 2020 to a Longleaf Pine tract (104 acres) on Ben's Creek property in Washington Parish adjacent to Louisiana's largest gopher tortoise support population. During surveys by a researcher at Mississippi State University, a total of 176 adult burrows, four juvenile burrows, and nine nests were located and assessed on this property. LDWF continues to partner with USDA-NRCS staff to enroll private landowners into the Working Lands for Wildlife Program which provides opportunities for financial and technical assistance. WDP staff also continue to coordinate with LDWF Wildlife Division staff to prioritize and implement habitat restoration on Sandy Hollow WMA in order to provide optimal habitat for gopher tortoises, northern bobwhite, and wild turkey. WDP staff will continue to build partnerships with private landowners and timber companies to survey new properties and promote habitat restoration efforts to increase the amount of quality habitat for tortoises. Land acquisition for gopher tortoise conservation remains a goal of this program and, coupled with habitat restoration, is critical to create a long-term viable population in Louisiana.

LOUISIANA PINESNAKE

The Louisiana pinesnake (*Pituophis ruthveni*) was federally listed as a threatened species on April 6, 2018. The WDP, in coordination with federal partners, finalized a programmatic Candidate Conservation Agreement with Assurances for the Louisiana pinesnake. The Candidate Conservation Agreement with Assurances promotes forest management practices that increase suitable habitat for the species and protects private landowners from future regulations due to the listing status. Since the implementation of the Candidate Conservation Agreement with Assurances, approximately 8,465 acres have been enrolled for management of the Louisiana pinesnake with 3,907 acres being intensively managed for the species. WDP staff continue to be proactive in working with the

timber industry to increase habitat quality by facilitating controlled burning through various grant programs. During FY 2019-2020, LDWF staff continued to monitor several Louisiana pinesnake populations throughout the state with box trap arrays. No Louisiana pinesnakes were captured over 2,830 trap-nights.

RED-COCKADED WOODPECKER

WDP personnel continued to implement the Louisiana Statewide Red-cockaded Woodpecker (*Dryobates borealis*) (RCW) Safe Harbor Program to benefit the federally and state-listed endangered species. Over the life of the program, LDWF has entered into 14 Safe Harbor Management Agreements with nonfederal landowners. A total of 487,419 acres are currently enrolled in the RCW Safe Harbor Program with 105 baseline RCW family groups and two above baseline RCW family groups. The RCW Safe Harbor Program Coordinator conducted annual site visits to 13 Safe Harbor Program properties. During these site visits, staff confirmed compliance of voluntary RCW management activities implemented by landowners on their property, and staff provided technical assistance regarding RCW management. WDP staff continued to promote the Safe Harbor Program via press releases, presentations at public forums, and the LDWF website.

WDP personnel continued to perform RCW demographic monitoring and management for 13 RCW family groups at Alexander State Forest WMA located in Woodworth. These activities include, but are not limited to, (1) annual activity status checks of 200+ cavity trees, (2) capture and color banding of adults, (3) nest checks and nestling color banding, (4) fledgling checks to determine survivorship, (5) artificial cavity installation and maintenance, (6) midstory control in 14 RCW cluster sites, and (7) technical assistance to Louisiana Department of Agriculture and Forestry staff regarding beneficial timber management practices for the species. WDP personnel performed cavity maintenance at Big Branch Marsh National Wildlife Refuge in Lacombe. Additionally, staff assisted with the translocation of four RCWs from Fort Polk to Big Branch in the fall of 2019.

WEST INDIAN MANATEE

The West Indian manatee (*Trichechus manatus*) is a transient species in Louisiana, occasionally traveling from Florida to Louisiana during the summer months when water temperatures are warmer. They typically return to Florida by October when water temperatures begin to decrease in Louisiana. WDP staff continue to coordinate with USGS, USFWS, Florida Fish and Wildlife Conservation Commission, Alabama Department of Natural Resources, Dauphin Island Sea Lab, Audubon Zoo, and Texas Parks and Wildlife staff for information exchange on manatee sightings across the range, especially during the cold weather season. WDP staff continue to document sightings provided by LDWF staff and the public and update the WDP database. In FY 2019-2020, 15 sightings of live manatees were reported in Louisiana, including six in St. Tammany Parish near Mandeville and Slidell, one in Ascension Parish, six in Orleans Parish, one in Tangipahoa Parish, and one in Terrebonne Parish. Manatee caution signs continue to provide the LDWF 24-hour dispatch number to assist and encourage citizens to report live manatee sightings as well as possibly injured or deceased manatees.

REPTILE AND AMPHIBIAN PROGRAM ACTIVITIES

The following Reptile and Amphibian Program activities were completed during FY 2019-2020.

Surveys for S1, S2 and S3 Amphibian and Reptile SGCN

A three-year, multi-part project to survey for Louisiana's rare reptile and amphibian species was conceived in early 2016. Funding became available in August 2016 and was extended through June 2020. This grant has provided funding for six subprojects that survey for S1, S2, and S3 (including SH) reptile and amphibian SGCN in order to update and generate new Element Occurrence Records. Thus far, the grant has provided much needed updated information on the presence/absence of these SGCN at known localities as well as provided documentation of new localities. The accumulated data are entered into Biotics, which ensures that these SGCN are fully considered during project reviews as well as helps facilitate conservation planning at both the state and regional levels.

For this reporting period, work focused on anuran (frogs and toads) SGCN. Data were collected from two sites in De Soto and Vernon parishes from automated recording units designed to passively collect frog vocalizations at night. A total of 420 hours of audio was collected from the site in De Soto Parish and 188 hours of audio were collected from the site in Vernon Parish. Audio files are planned to be analyzed for SGCN species at a later date with an alternate grant. Additionally, staff attended the Southeast Partners for Amphibian and Reptile Conservation conference at Camp McDowell in Nauvoo, Alabama, to present updates on the status of Crawfish Frog and Dusky Gopher Frog in Louisiana as well as to discuss potential reintroduction programs for the species.

Louisiana Amphibian Monitoring Program

The Louisiana Amphibian Monitoring Program was initiated in 1996 as Louisiana joined dozens of states participating in the newly created USGS North American Amphibian Monitoring Program. The purpose of the program is to monitor anuran populations over time through frog calls detected at randomly selected sites. The Louisiana Amphibian Monitoring Program was initially coordinated by the Louisiana Department of Environmental Quality with cooperative assistance from LDWF. State coordination transferred from personnel at Louisiana Department of Environmental Quality to Loyola University, then to Kisatchie National Forest, and has remained with LDWF since 2005. In 2016, the federal government terminated the North American Amphibian Monitoring Program, but the LDWF state coordinator managed route assignments and data collection until Louisiana Amphibian Monitoring Program sponsorship was formally implemented by LDWF in 2017. Late in 2017, all North American Amphibian Monitoring Program data files for Louisiana were transferred to the LDWF Data Management System. As of completion of the 2020 field season, the Data Management System contains call and weather data for 1,338 route runs. Authorized directives are to create a public page for the Louisiana Amphibian Monitoring Program on the LDWF website and to enable access to Data

Gulf Coast toad detected calling while conducting Louisiana Amphibian Monitoring Program Route in southwest Louisiana.

Management System data for established Louisiana Amphibian Monitoring Program volunteers. The public page has been produced, but awaits the debut of the new LDWF website. Access to the Data Management System remains limited to specific LDWF personnel.

Restricted Snakes

Act 1221 of the 2005 Louisiana Legislative Session required LDWF to adopt rules regarding possession of venomous snakes and large constrictors. Those rules, now RS 76.101.K, include a permit system (Restricted Snake Permit) whereby Louisiana residents, or nonresidents who bring restricted snakes to Louisiana, may conditionally possess such snakes. Restricted snakes must be kept under secure conditions, and those interested in possessing venomous snakes must demonstrate prior experience in maintaining them in captivity. Permittees are subject to inspection of facilities by LDWF personnel and, as of 2017, must provide digital images of their facilities as well as an inventory of their restricted snakes. During FY 2019-2020, 67 individuals received renewed permits for 2020.

Turtles

Thirty-two species and subspecies of native turtles occur in Louisiana. Several of these species are in need of immediate conservation action to maintain or improve populations to avoid additional species listings. As of July 2020, a total of 19 turtle species were considered SGCN by LDWF with seven of those species listed as state and federally threatened or endangered. Successful conservation requires plans of action to assess species status and to ensure long-term viability of populations. To address these needs, LDWF convened a conservation planning working group to draft the Louisiana Turtle Conservation Plan. The primary objective of the plan is to offer a strategic approach to the restoration and conservation of Louisiana's native turtle species by providing the necessary information to facilitate these actions. This document provides information on the following:

- Life history
- Regulations
- Threats and associated solutions
- Inventory and Monitoring
- Habitat management and restoration
- Partnership and Collaboration

In addition to detailing the topics above, the document includes fact sheets for all species covered by this plan (sea turtles and gopher tortoise are not included in this plan, as they are treated at length in various other documents), as well as the cultural significance of turtles in Louisiana and the history of turtle harvest and farming. LDWF recognizes that the implementation of the strategies outlined in this plan will be contingent upon budgetary constraints. The purpose of this plan is to identify conservation goals, strategies, and actions to help guide management decisions that will contribute to the long-term recovery and sustainability of viable native turtle populations in Louisiana. LDWF expects the completion of a finalized document in 2021.

GULF COAST BOX TURTLE RE-SURVEYS

More than 20 years ago, LDWF personnel and a contractor captured, marked, and released over 400 box turtles at seven sites in southeast Louisiana. This original project laid the groundwork to estimate potential impacts of harvest for the pet turtle trade as well as habitat fragmentation on box turtle populations. From March to May 2020, WDP staff re-surveyed several of the original seven sites, detecting a total of 12 live Gulf Coast box turtles (*Terrapene carolina major*) and three remnant shells. Of the live turtles, ten were adults and two were sub-adults. All three remnant shells were adults. Despite the significant marking effort in the late 1990s, only a single, marked box turtle - a large, adult male - was detected during the 2020 field season. Future surveys will collect additional data that can be used to estimate population changes. At the completion of this project, WDP will be better informed on the population trend of this species as well as be more equipped to make sound management and conservation decisions for box turtles in our state.

NONGAME BIRD PROGRAM ACTIVITIES

Louisiana's avifauna is diverse, encompassing more than 480 species, over 400 of which are nongame species that fall under the responsibility of the WDP. The WDP is responsible for facilitating and directing research, monitoring, and conservation actions for all nongame birds in our state, as well as providing

LEFT: View of survey area in Laplace for Gulf Coast box turtles. RIGHT: Sub-adult male Gulf Coast box turtle (approximately 5 years old) captured during surveys in Laplace.

peer-review for scientific and layperson products. The bulk of the responsibilities involve coordinating or participating in scaled-down monitoring that feeds into regional, national, or international datasets. During FY 2019-2020, a significant amount of field work was curtailed due to the COVID-19 pandemic, including all of Louisiana's survey efforts for the North American Breeding Bird Survey (coordinated by USGS and, locally, by LDWF) and a Louisiana coast-wide beach-nesting bird survey (conducted every five years, coordinated by Barataria-Terrebonne National Estuary Program with LDWF as a partner). Nevertheless, other surveys and field-based projects proceeded normally (e.g., Christmas Bird Counts) or with only moderate COVID-related disruptions, including LDWF State Wildlife Grant Beach-Nesting Bird Surveys, the Statewide Passive Detection for Organismal Research VHF Network, and others. Geographically expansive and long-term bird projects, crucial for the conservation and management of these species, have benefitted greatly from LDWF's financial commitment to nongame birds and have been matched by generous support from ConocoPhillips, the Louisiana Wildlife and Fisheries Foundation, Barataria-Terrebonne National Estuary Program, and federal aid grant opportunities such as Section 6 funds and the State Wildlife Grants Program. In fact, State Wildlife Grants have contributed, in part, to the majority of the projects previously mentioned. In FY 2019-2020, WDP biologists documented many rare and noteworthy birds, which were submitted for verification and inclusion into national datasets, including eBird, thereby contributing to the ever-evolving understanding of bird status and distribution in Louisiana. The WDP nongame ornithologist coordinated and compiled data for three Christmas Bird Count surveys, including LDWF's White Lake WCA, Lacassine National Wildlife Refuge - Thornwell, and Sweet Lake - Cameron Prairie National Wildlife Refuge. The White Lake WCA Christmas Bird Count was attended by 12 surveyors, who tallied more than 245,000 birds of 135 species. WDP biologists alone tallied more than 177,000 individual birds of 140 species on LDWF-coordinated Christmas Bird Count surveys and documented numerous rare species, including Couch's kingbird and great kiskadee, and other noteworthy records such as northern waterthrush and prairie warbler. Results from these and other Christmas Bird Counts in the region continue to highlight the critical need of preserving rice cultivation and culture for the benefit of both the human and bird communities of the region.

In addition to the collaborative work outlined above, the WDP nongame ornithologist spent a significant portion of time representing LDWF at meetings and workshops and was frequently tasked with print and video media interviews, particularly on brown pelicans and other colonial waterbirds related to coastal restoration efforts, and individual pieces on rare owls of Louisiana and the significance of White Lake WCA for birds and birding. The nongame ornithologist gave an invited presentation on the status of Louisiana's colonial waterbirds to the Gulf Coast Joint Venture's Bird Nesting Island Cooperative Forum Summit (February 2020) and continued representing Louisiana as a co-chair of that group. The ornithologist also served on Gulf Coast Joint Venture's Monitoring, Evaluation, and Research Team's Landbird working group and, upon request, represented LDWF in other Joint Venture-related exercises (e.g., attending the East Gulf Coastal Plain Joint Venture's board meeting in November 2019). The WDP nongame ornithologist contributed to outreach and education efforts on several occasions, including maintaining a booth at National Hunting and Fishing Day, giving lectures and participating in discussions at the Louisiana Master Naturalists of Greater Baton Rouge workshops, and leading public, bird-oriented field trips (e.g., Yellow Rails and Rice Festival in Jefferson Davis Parish, Annual Eagle Expo in Morgan City).

The WDP nongame ornithologist continued to play an important role in restoration planning to benefit Louisiana's coastal birds, including many SGCN. In particular, the ornithologist represented LDWF as a co-chair of the Regionwide Trustee Implementation Group (TIG) Bird Team (technical working group) to develop and apply screening criteria for regionwide bird project proposals for consideration by the Regionwide TIG in the Regionwide Restoration Plan #1. In addition, the ornithologist worked internally with LDWF personnel representing Bird, Oyster, Sea Turtle, and Marine Mammal resource types to ensure that LDWF priorities were considered among the Regionwide TIG's preferred alternatives for its Restoration Plan #1. For Louisiana birds, this resulted in $8,000,000 being allocated to Chandeleur Islands Restoration Engineering and Design and $1,408,000 for Reducing Marine Debris Impacts to Birds (and Sea Turtles) in the Regionwide Restoration Plan #1. Under a separate Regionwide Monitoring and Adaptive Management allocation, these efforts also resulted $2,500,000 being allocated to Regionwide Colonial Waterbird Monitoring, which will include photographic nest count

A rare winter treat in Louisiana is the brilliant red Vermilion Flycatcher, a species of the American Southwest and Central and South America. Although females with their salmon underparts are drabber than the males, both males and females often allow close observation.

Loggerhead shrikes are predatory, grassland birds that impale prey items like small vertebrates on barbed wire or thorns. Like most grassland birds, this species is declining in population.

Merlins are small falcons that may be found in Louisiana as migrants or wintering visitors. This Merlin has captured a shorebird.

During the White Lake Wetlands Conservation Area Christmas Bird Count, this Couch's kingbird was observed and documented by WDP staff. This species has only been verified in the state a couple of dozen times.

One of the most common wintering warblers, the orange-crowned warbler can be found in many habitats across the state.

analysis of colonial waterbird monitoring data collected in 2015, two new aerial colonial waterbird monitoring surveys to be conducted in 2021, and the consolidation and production of a summary report for all photographic nest count data sets, including both Louisiana-only and regionwide data collected in 2010, 2011, 2012, 2015, 2018, and 2021.

Gulf of Mexico Avian Monitoring Network's "Strategic Bird Monitoring Guidelines for the Northern Gulf of Mexico"

Since its inception in 2013, the Gulf of Mexico Avian Monitoring Network (GoMAMN) has shown tremendous potential in the bird conservation community. The WDP nongame ornithologist represents LDWF on the GoMAMN coordination committee, the organization's governing body that consists of 15 professional bird scientists. GoMAMN's rapidly expanding community of practice includes more than 100 individuals representing more than 30 state and federal agencies, universities, nonprofit organizations and others. Building upon a foundation that utilized structured decision making, GoMAMN created an objectives hierarchy to maintain consistent progress towards the group's main objective of "maximizing the usefulness of avian monitoring data to inform and facilitate avian conservation towards achieving restoration and management of the Gulf ecosystem." In late 2019, GoMAMN published its landmark "Strategic Bird Monitoring Guidelines for the Northern Gulf of Mexico," which included taxa-specific guidance, including chapters on raptors and landbirds that were coauthored by the previous and current WDP nongame ornithologist, respectively.

Statewide Passive Detection for Organismal Research (SPDOR) VHF Network

Funded by ConocoPhillips, the Louisiana Wildlife and Fisheries Foundation, Barataria-Terrebonne National Estuary Program, the State Wildlife Grants Program, and LDWF's Rockefeller Trust, the SPDOR VHF Network entered its fourth year. This passive network facilitates radio tracking of hundreds of organisms simultaneously, provided those organisms are first fitted with nanotags (tiny coded radio tags) and then move through the approximately 9-mile detection radius of at least one receiver station. The potential for such a network of stations to contribute to our current knowledge level of SGCN is substantial and is identified as a strategy for the conservation of landbirds in the Louisiana Wildlife Action Plan. In addition, this network contributes to the projects of many other scientists currently utilizing the Motus Wildlife Tracking System, an international collaborative network of scientists that is coordinated and maintained by Birds Canada, and thus provides invaluable migratory connectivity data that may inform full annual cycle conservation efforts. As of June 2020, the WDP's network of receiver stations had logged more than 1800 detections of approximately 460 individual research birds of 33 species, primarily shorebirds (13 species, including the federally threatened red knot) and songbirds (13 species), but also one to two species each representing nightjars, rails, seabirds, herons, and falcons. This work has almost limitless potential for collaborating with other agencies, industry, nongovernmental organizations, academia, and others from across the Western Hemisphere. Activities in 2019-2020 included regular downloading of data from receiver stations, uploading these data to the Motus network, repairing and maintaining receiver stations, and completely reconstructing four damaged stations. As of June 2020, SPDOR VHF receiver stations were active at the Grand Isle Marine Lab Facility, Grand Isle's Exxon Fields, Fourchon Beach, Pass-a-Loutre WMA, Sabine National Wildlife Refuge, Rockefeller Wildlife Refuge East and West, two private properties north of Rockefeller Wildlife Refuge, Baton Rouge Audubon Society's Peveto Woods Sanctuary in Cameron Parish, LDWF's Baton Rouge HQ, Richard K. Yancey WMA, LDWF's Lake Charles office, and Jean Lafitte National Historical Park and Preserve's Barataria Preserve.

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Lejeune, K.L. 2019. Louisiana Gopher Tortoise Conservation Efforts. The 41st Annual Gopher Tortoise Council Meeting, Gulf State Park, Gulf Shores, AL, November 2019.

WDP SCIENTIFIC JOURNAL PUBLICATIONS

Seymour, M. A., J. O. Coulson. 2019. GoMAMN Strategic Bird Monitoring Guidelines: Raptors. Pages 97-128 in R. R. Wilson, A. M. V. Fournier, J. S. Gleason, J. E. Lyons, and M. S. Woodrey (Editors), Strategic Bird Monitoring Guidelines for the Northern Gulf of Mexico. Mississippi Agricultural and Forestry Experiment Station Research Bulletin 1228, Mississippi State University. 324 pp.

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FURBEARER MANAGEMENT

MONITORING FUR HARVEST

The 2019-2020 furbearer harvest was monitored by compiling distribution and total harvest data. Each year, fur buyers and dealers are required to submit reports providing information on pelts purchased by species and parish of harvest. Annual audits of all fur dealers provide a record of total pelts by species shipped from Louisiana. Individual trappers are also required to submit records of pelts harvested that they shipped out of state. River otter and bobcat possession tags provide data on timing and location of all bobcat and otter harvested in the state. These tags are necessary to ensure that Louisiana otter and bobcat are tagged with federal export tags (a federal requirement for out-of-country shipment).

Records indicate a total of 2,642 trapping licenses were sold during the 2019-2020 trapping season. Of these, 2,358 were adult residential licenses, 29 were adult non-residential trapping licenses, and 255 were youth residential licenses. These figures show a 3% increase in trapping licenses sold when compared to the previous season (2,572).

A total of 2,372 animals were harvested for fur (all species), which was a decrease of 3,023 from the previous season's total of 5,395. The total value of the 2019-2020 fur harvest to the state's trappers was estimated at $14,488.04. This total value was a decrease from the previous season's total of $48,074.68.

The nutria harvest (245,865) increased by 22,710 from the previous season's total of 223,155. The average nutria pelt price paid to trappers during this past season was $2. An additional $6 was paid for all nutria taken during the Coast-wide Nutria Control Program by registered participants.

COAST-WIDE NUTRIA CONTROL PROGRAM

The Coast-wide Nutria Control Program is funded by the Coastal Wetlands Planning, Protection and Restoration Act. The objective is to decrease nutria-induced damage to coastal vegetation by increasing the incentive for harvest. During the 2019-2020 season, a total of 245,865 nutria tails, worth $1,475,190 in incentive payments, were collected from 259 participants. This showed an increase in participation from the previous year's 241. The fewest number of tails turned in by a single participant was 3 and the greatest number of tails by a single participant was 12,281. Approximately 34% of active participants turned in 800 or more tails. Of the 89 participants who turned in 800 or more tails, 9% turned in more than 4,000 tails.

A volunteer instructor explains the various trap types and their uses to trapping workshop students.

TABLE 5.

10-YEAR AVERAGE VALUE FOR EACH SPECIES				
Species	Total Harvest for the 2019-20 Fur Market	10-year Average Harvest	Average Price Paid Per Pelt (includes cost of green fur as well as dried fur)	10-year Average Value for each species (2010-2020)
River Otter	218	1,583	$18.75	$65,771.58
Raccoon	950	5,968	$2.43	$31,881.54
Bobcat	91	465	$21.16	$20,575.98
Nutria	44	6,234	$2.00	$12,984.10
Beaver	500	1,724	$5.95	$12,0957.95
Mink	372	669	$5.77	$5,880.93
Gray Fox	80	333	$7.59	$4,354.53
Muskrat	50	652	$0.86	$2,831.13
Red Fox	9	58	$5.00	$939.09
Coyote	39	85	$10.00	$659.82
Opossum	15	169	$0.75	$155.66
Total	2,372	17,937	$14,488.04	$158,992.32

TOTAL NUMBER OF NUTRIA HARVESTED BY METHOD OF TAKE IN 2019-2020

Twenty parishes were represented in the 2019-2020 program season with harvests ranging from 271 to 62,380 nutria per parish. The greatest number of tails (62,380) were collected from Plaquemines Parish, followed by Terrebonne (45,208) and St. Mary parishes (27,963).

Nutria (Myocastor coypus) are an invasive species in North America. Their feeding activities negatively impact valuable coastal habitats.

The predominant method of take was by rifle (62%), followed by trapping (19%) and by shotgun (19%).

February was the most active month for harvesting nutria (80,622 tails) while November was the least active month (8,222 tails). (See Coast-wide Nutria Control Program 2019-2020 Report, Coastal Wetlands Planning, Protection and Restoration Act Project LA-03b, *nutria.com/site13.php*).

VEGETATIVE DAMAGE CAUSED BY NUTRIA

As a monitoring requirement of the Coast-wide Nutria Control Program, a coast-wide aerial survey was conducted in June 2020 covering the coastal parishes of Louisiana. Twenty-five sites were visited in 2020, all of which were identified as having nutria damage in 2019. Two sites were identified as recovered during the 2020 survey.

The 23 nutria-damaged sites observed along transects during the 2020 survey had a total of 3,654 acres impacted by nutria feeding activity (13,702 extrapolated). This is approximately a 6.5% decrease in acres impacted by nutria since the 2019 survey (3,907 acres, extrapolated to 14,652 acres coast-wide). The Coast-wide Nutria Control Program continues to be a successful means of controlling the nutria population with an average of over 300,000 animals harvested annually. Despite the reduced level of harvest the past few seasons, the program has been successful in achieving its goal and the number of nutria-impacted acres in Louisiana's coastal marsh has decreased significantly over the 18 seasons of the program.

FUR ADVISORY COUNCIL

The Fur Advisory Council continued to focus on two major goals during FY 2019-2020. The first goal was to educate the public concerning the role of wildlife utilization in conservation and habitat management which serves to address public opinion of the fur market. The second goal was to educate both new and experienced trappers on state regulations, best management practices and handling fur from the field through the finishing process.

The Fur Advisory Council has continued to interface with the public through local events such as the Cameron Wildlife Festival, 4-H Achievement Days and National Hunting and Fishing Day events. The council engaged in multiple K-12 science focused events including Ocean Commotion at LSU. Department staff has also presented at numerous school-wide events with Louisiana themes. The council website carried the educational story to a much broader audience (*www.louisianafur.com*). With the start of the COVID-19 pandemic, outreach moved online in the form of social media posts.

LDWF has worked with the Association of Fish and Wildlife Agencies to construct an online trapper education course and see it advertised across LDWF platforms and on local trapper websites (*conservationlearning.org/login/index.php*). LDWF also partnered with the Louisiana Trappers and Alligator Hunters Association to provide a series of hands-on trapping workshops to compliment the online course, which the Fur Advisory Council has supported with supplies and resources. Five trapping workshops were held in FY 2019-2020 around the state, and one three-day trapping school was held at the Woodworth Educational Center. Students learned about trap preparation, skinning and hide care, regulations and best management practices. The council has worked to make sure that the art of fur trapping continues as part of Louisiana's living heritage.

CONTRACTS

LDWF contracted with Glenn Delaney to monitor legislation in Washington D.C. that may impact Louisiana's furbearer management program. Glenn Delaney works closely with the Louisiana delegation to educate them on issues important to LDWF and the Fur Advisory Council.

A trapper education student learns the proper way to prepare raccoon for market.

ALLIGATOR PROGRAM

Louisiana's Alligator Management Program consists of two complex segments: research/management of the wild population and a statewide farm/ranch program. The program is funded by alligator industry generated revenues (alligator hide tag fees, shipping label fees, alligator hunting license fees, alligator hide severance taxes, and other alligator related fees).

WILD ALLIGATOR PROGRAM

Inventory methods, harvest regulations, tagging and reporting requirements, and a complex computer program are continually upgraded to regulate and monitor a sustainable-use alligator management program in Louisiana. Annual coast-wide alligator nest surveys are conducted to index alligator populations and to establish harvest quotas in coastal Louisiana. During the summer of 2019 we estimated that 67,935 alligator nests were present in the coastal marsh habitats; a record year due to optimum marsh water level and habitat conditions.

Wild alligator harvest quotas are established to correlate harvest with alligator population density and distribution. Alligator harvest tags are allocated to individuals who either own or lease land that is considered alligator habitat. Digital landowner and survey information are combined with the latest aerial photography images to allow for an accurate assessment/classification of each participant's property. The majority of the lands enrolled in the wild alligator harvest program have been entered in the GIS system for property ownership and habitat assessment.

Each year the alligator program staff works closely with landowners and alligator hunters to provide assistance regarding alligator management on their respective properties. We have provided numerous habitat base maps to landowners for their use in participation of both the wild and alligator egg harvest programs. Harvest reports summarizing average lengths and size class frequency distribution of harvested alligators are available upon request.

Under this sustained use alligator program, over 1.1 million wild alligators have been harvested since 1972. The annual harvest takes

FIGURE 1. LOUISIANA COASTAL MARSH ALLIGATOR NEST PRODUCTION (1970-2019)

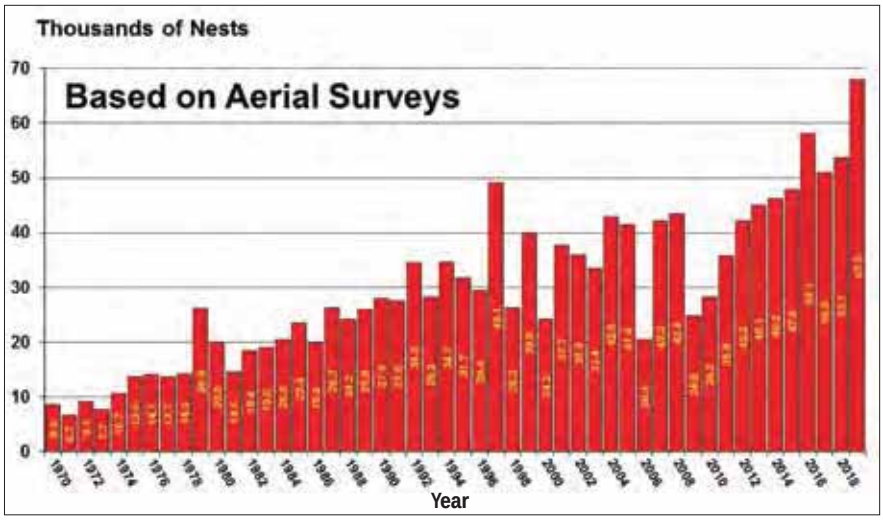


FIGURE 2. LOUISIANA WILD ALLIGATORS HARVESTED (2019 REGULAR HARVEST SKIN LENGTHS)

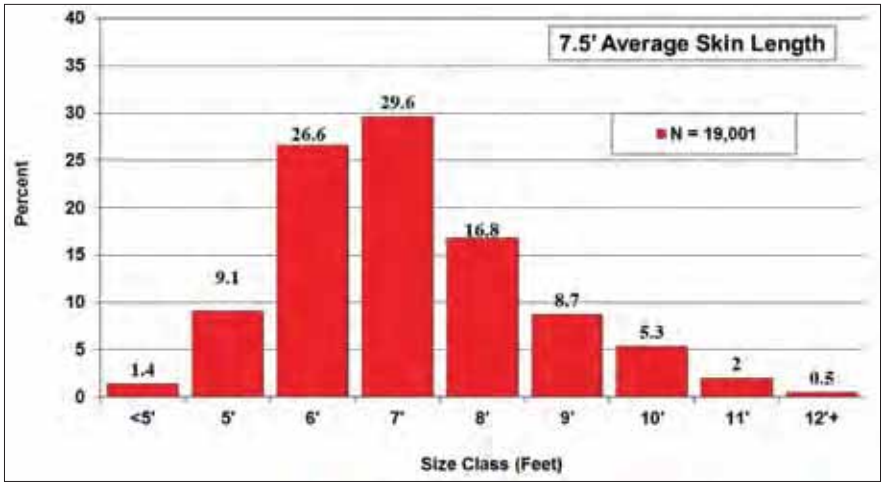


FIGURE 3. LOUISIANA FARM ALLIGATORS HARVESTED (2019 SKIN BELLY WIDTHS)

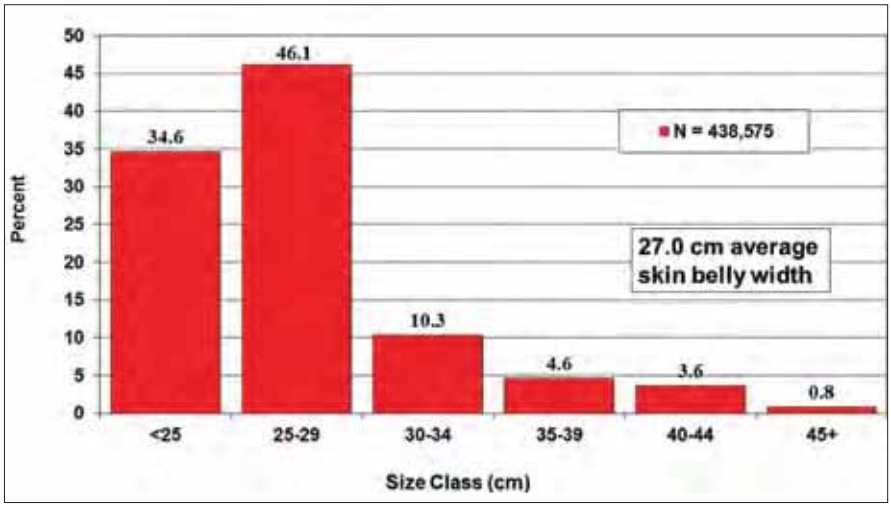


TABLE 6.

WILD ALLIGATOR EGG COLLECTIONS BY ALLIGATOR FARMERS (2013-2019)

Year	Wild Alligator Eggs Collected	Hatchlings Yielded
2013	498,285	432,386
2014	528,719	468,142
2015	465,100	394,231
2016	616,546	548,416
2017	387,373	332,711
2018	587,776	536,361
2019	650,878	579,008

place in September to specifically target the adult males and immature segments of the alligator population. Adult females, which typically inhabit interior marshes in September, would be more susceptible to harvest if the season was scheduled during the spring or summer. During the 2019 wild season, a total of 23,828 alligators were harvested by 2,861 licensed alligator hunters. Alligators harvested averaged 7.55 feet in length, with an estimated value of $5.2 million. Adult-sized alligators (those 6 feet and larger) comprised the majority of the harvest. This represents an increase in harvest for the second consecutive year, but harvest remains depressed due to a global surplus of crocodilian skins.

LDWF provided additional alligator harvest opportunities for the general public by continuing its lottery alligator harvest program. In 2019 the lottery alligator harvest program provided opportunities for 419 alligator hunters to harvest 1257 alligators. Lottery alligator harvests were conducted on 47 public areas (WMAs and public lakes) throughout the state.

FARM ALLIGATOR PROGRAM

The January 2020 statewide farm/ranch inventory totaled 998,152 alligators, up again from 900,999 alligators in January 2019, with high numbers due to several consecutive years of excellent nesting and high numbers of egg collections. The decline in 2012 was due in large part to the worldwide economic recession, and to farmers voluntarily limiting their egg collections significantly in the summer of 2009; then collecting about half the usual amount in 2010 (205,261 eggs) as markets and demand slowly improved. Market conditions were strong with high demand for farm hides, but lower demand for wild hides has been an issue for the last few years.

During the 2019 tag year (January through December 2019) an estimated 438,575 farm-raised alligators were harvested, averaging 27.0 cm belly width. The total estimated value of these alligators was $86 million.

Farmers participating in the wild alligator egg collection program are required to return a percentage of the eggs hatched as 4-foot alligators, which compensates the wild alligator population for the collection of eggs. This return rate percentage was decreased to 10% in early 2017, to start with the 2017-year egg permits. The remaining animals can be sold by the farmer. During 2019, a total of 38,598 farm-raised alligators were released to the wild. All released alligators were measured, marked, tagged and sexed. Survival of farm-released alligators appears to be similar to wild alligators. Re-trapped alligators were harvested in September 2019, and data on size class and sex ratio collected. Data evaluation continues on survival rates of the farm-released alligators.

Program staff members routinely communicate with various alligator industry participants including trappers, farmers, landowners and dealers. Information is provided regarding wild alligator and alligator egg harvests, harvest statistics and management recommendations (*Table 6*). Staff routinely visit alligator farms providing recommendations on alligator husbandry and culture. Numerous requests for information are handled each year.

NUISANCE ALLIGATOR PROGRAM

LDWF manages a statewide nuisance alligator control program. The nuisance program is designed to remove problem alligators in order to avoid potential human/alligator conflicts. Through the process of nuisance alligator hunter appointments and annual renewals, LDWF maintains a statewide network of qualified nuisance alligator hunters. Nuisance alligator complaints are phoned into various LDWF offices, where complaints are recorded and then forwarded to a nuisance alligator hunter in the vicinity of the complaint. Nuisance hunters respond promptly and catch and remove the alligator as deemed necessary. Hunters are allowed to harvest the nuisance alligator and to process the meat and skin of the alligator for commercial sale. This process provides for immediate response to problem alligators and for payment to the nuisance alligator hunter, thereby minimizing the program operating costs to the department. Beginning in 2018, LDWF authorized incentive payments of $75 per complaint to participating nuisance hunters to help alleviate challenges presented by low hide prices.

During FY 2019-2020, approximately 50 nuisance alligator hunters were enrolled in the program; annually nuisance hunters respond to several thousand complaints and harvest more than 1,000 alligators.

RESEARCH ACTIVITIES

The following list provides a summary of the various research and monitoring projects that the alligator program staff conducted and/or participated in during FY 2019-2020.

MONITORING

1. Evaluation of Survival, Growth and Reproduction in Farm-Released Alligators - This activity involves numerous projects related to survival analysis, growth, and reproductive success (farm-released vs. native wild). Due to the reduction of the release rate percentage, it is imperative to monitor survival closely. The 12% return rate started with the 2007 permits (releases "due"

in 2009); and this was decreased to 10% starting with the 2017 year permits. Information on size class frequency distribution of wild alligator populations and susceptibility to harvest is provided annually to enhance survival estimates. We now have "re-traps" that were captured over 20 years since release, and this is undoubtedly one of the largest mark-recapture projects currently in progress. This year we published a manuscript that documented survival of a farm-released alligator for over 22 years. Following the survival, growth, and dispersal of farm-released alligators is a key component to our management, monitoring, and research programs that will continue for many years to come.

2. Coast-Wide Nest Survey - The annual coastal nesting survey is essential for monitoring our alligator population, and is used annually to determine wild alligator and wild alligator egg harvest quotas (for the adult harvest each September as well as egg ranching quotas). This is an integral part of our required "finding of no detriment" needed to achieve export authorization by the USFWS.

3. Evaluation of Statewide Harvest Program - We continue to analyze size class frequency distribution, average size, sex ratios, etc. for alligators harvested each year. During the 2019 wild season staff collected sex ratio data on 8997 alligators (72.8% males, 27.2% females) which represented a significant percentage of the total alligators harvested. This project, coupled with the coast-wide nest survey provides critical information regarding the status of the wild alligator population. Data generated from these projects provides the basis for evaluating the impact of our current harvest strategies and for establishment of annual wild harvest quotas.

4. Evaluation of Alligator Nest Density - LDWF biologists work with cooperating alligator farmers to gain access to their GPS data from annual egg collections. This data will facilitate comparisons between our coast-wide nest survey and estimates of nest density as recorded by the farmer during egg collections. Some farmers have advised staff of reduced nest production on selected wetlands; close review of this nesting production data will allow us to evaluate nest distribution and density changes over time. Many areas had excellent nest production; the estimated nest count of 67,935 was the highest on record, and egg collections were again very high.

5. West Nile Virus - LDWF, in conjunction with LSU School of Veterinary Medicine, continues to monitor occurrence of West Nile Virus on alligator farms in Louisiana. Initial mortality related to West Nile Virus occurred in fall/winter 2003. Aggressive mosquito control on farms has reduced on farm mosquito populations and seems to have reduced the incidence of West Nile Virus in recent years. During fiscal year 2019-2020 we continued to have expertise from staff at LSU School of Veterinary Medicine available if needed to collect samples from farm alligators to monitor for any health concerns, provide diagnostics as needed, and assist with other health surveillance parameters. After several years of research, development, and testing, a West Nile Virus vaccine was developed, gained conditional approval by the USDA and became available to farmers in October 2011. Several farmers have taken advantage of this new proactive technology to prevent West Nile Virus in captive hatchling and yearling alligators.

6. Best Management Practices - LDWF and the LSU School of Veterinary Medicine in conjunction with the Louisiana Alligator Farmers and Ranchers Association developed a document entitled "Best Management Practices for Louisiana Alligator Farming." The document was distributed in June 2011 and details recommended practices to ensure animal welfare of captive reared alligators in Louisiana, including egg collection, hatching, rearing, release to the wild and euthanasia. This document was updated and distributed in January 2013 and again in January 2016 as new information regarding euthanasia was investigated, and will be updated as any pertinent topic to alligator farming becomes available. The intent of this document is to ensure that licensed alligator farms/ranches are employing humane methods of working with alligators. Through industry contributions, Dr. Javier Nevarez at LSU's School of Veterinary Medicine has continued to work with LDWF staff to update Best Management Practices as needed. This has been even more important recently with international recognition of animal welfare concerns on crocodilian farms world-wide.

7. Alligator Research Facility - After several years of planning and fund raising by industry personnel, construction began on an alligator research facility at LSU's AgCenter Aquaculture Research Station. Funding for facility construction was provided purely by monetary donations from alligator industry participants including alligator farmers, wetland landowners, tanners, feed manufacturers, alligator hunters and other interested parties. The building is available to house alligators of various sizes for projects related to all phases of alligator husbandry. LDWF staff has worked closely with alligator producers and feed manufacturers to provide input to identify and prioritize research goals and secure long term funding sources for facility operation. The LSU AgCenter has established an Alligator Research Fund to receive additional donations for funding various research projects. Hatchlings were provided to Dr. Robert Reigh by LDWF from eggs collected and incubated at Rockefeller Refuge for continued incubation and nutrition studies to benefit the alligator farming industry; various diets and feeding regimes are tested and findings disseminated to industry personnel at meetings throughout the year or through publications in the scientific literature.

CONTRACTS

1. Diagnostic Services (LSU School of Veterinary Medicine - Dr. Javier Nevarez) - Dr. Javier Nevarez is contracted to provide diagnostic services as needed for the alligator industry. Farmers may consult with Dr. Nevarez at any time for assistance with any alligator husbandry or disease issue. Our staff often assists with logistics and transport of alligators/samples to LSU School of Veterinary Medicine in Baton Rouge for evaluation. Periodic health surveillance of farm released alligators is conducted to monitor health status of farm alligators released to the wild; a manuscript on these findings is being prepared. Dr. Nevarez and colleagues worked with LDWF to evaluate possible culture of Chlamydia and Mycoplasma from wild and captive (farm-releases) alligators this fiscal year.

2. Health Monitoring (LSU School of Veterinary Medicine - Dr. Javier Nevarez) - Dr. Javier Nevarez has been instrumental in providing guidance in evaluating concerns over possible disease introduction from alligators (predominantly hatchlings) imported from other southeastern states. Concerns are focused on Mycoplasma and Chlamydia. Additional samples were collected from wild alligators (liver and lung tissue) while a contract was being drafted. We collected samples last fiscal year from imported hatchlings and additional wild alligators to survey for prevalence of these microorganisms, if present. Dr. Nevarez provided guidance as we implemented the required certificates of veterinary inspection of health for import and exports of captive farm alligators.

3. Nutrition Research (LSU AgCenter, Aquaculture Research Station) - A research contract was established for aquaculture nutritionist Dr. Robert Reigh and his research associate to conduct digestibility studies to continue to aid farmers in their farm management; industry support from feed manufactures at Cargill Inc. have been instrumental in this process. Research committee meetings are held periodically and projects are outlined for study. Current work is underway evaluating specific amino acid requirements and digestibility during grow-out. A Master's degree student was recruited and is currently doing thesis research on these projects. The COVID-19 pandemic has led to obstacles with some studies while campus was on shut-down for health concerns.

OTHER RESEARCH

In addition to LDWF research studies, we continued to support and collaborate with graduate students, post-doctoral research associates, and university faculty with their research studies on numerous projects. Associates from several universities (Harvard University, Yale University, Clemson University, Missouri State University, University of North Texas, University of Missouri, Arizona State University, and Indiana University School of Medicine) were hosted at Rockefeller in 2018 - 2019 to collect additional samples for several studies, or we provided samples to them if travel costs were prohibitive. Due to the COVID-19 pandemic beginning in early 2020, numerous planned studies and field trips by university personnel were cancelled due to travel and safety concerns, with many university labs being shut down and travel prohibited. Several collaborators made presentations with LDWF staff as co-authors at meetings (some virtual) as listed below.

Alligator program staff made a presentation on the history of research conducted at Rockefeller at the "100 year" celebration held at Rockefeller Wildlife Refuge in October 2019. The event was well attended by former and current LDWF employees, members of our administration, and members of the McIlhenny and Rockefeller families. We published an article highlighting the event in the Crocodile Specialist Group Newsletter.

We published several abstracts and full papers this year, one of which was selected for a Publication Award by the Louisiana Association of Professional Biologists. Staff members organized and participated in an alligator session at the SEAFWA conference in Hilton Head, South Carolina in October 2019. Staff hosted the Alligator Working Group meeting held at Rockefeller Refuge in spring 2019; focus items included finding solutions for low wild hide prices and concerns about disease transmission with alligators moved between states. In May 2020 we had planned to meet with the Alligator Working Group hosted by Texas, but the COVID-19 pandemic led to this being cancelled.

Research Manuscripts Published in 2019

Alderman, S. L., D. A. Crossley II, R. M. Elsey, and T. E. Gillis. 2019. Hypoxia-induced reprogramming of the cardiac phenotype in American alligators (*Alligator mississippiensis*) revealed by quantitative proteomics. Scientific Reports. *https://doi/org/10.1038/s41598-019-45023-3*

Codd, J. R., K. A. R. Rose, P. G. Tickle, W. I. Sellers, R. J. Brocklehurst, R. M. Elsey, and D. A. Crossley, II. 2019. A novel accessory respiratory muscle in the American Alligator. Biology Letters. 15:20190354.

Conner, J., J. L. Crossley, R. M. Elsey, D. Nelson, T. Wang, and D. A. Crossley, II. 2019. Does the left aorta provide proton-rich blood to the gut when crocodilians digest a meal? Journal of Experimental Biology. Volume 222, jeb201079. doi: 10.1242/jeb.201079

Elsey, R. M., D. Underwood, and S. Rosteet. 2019. *Alligator mississippiensis* (American alligator). Predation. Herpetological Review 50(2):357-358. [otter attack alligator]

Elsey, R. M., J. Waller, and J. Linscombe. 2019. First SEAFWA Alligator Working Group meeting is held at Rockefeller Wildlife Refuge, Louisiana. Crocodile Specialist Group Newsletter. 38 (2): 10 – 12.

Elsey, R. M. 2019. 100 years of wildlife conservation celebrated at Rockefeller Wildlife Refuge. Crocodile Specialist Group Newsletter. 38 (4): 4 – 6.

Eme, J., Cooper, C. J., A. Alvo, J. Vasquez, S. Muthaseb, S. Rayman, T. Schmoyer, and R. M. Elsey. 2019. Scaling of major organs in hatchling female American alligators (*Alligator mississippiensis*). Journal of Experimental Zoology. 331:38-51. *https://doi.org/10.1002/jez.2236*

Escobedo-Galvan, A. H., R. M. Elsey, F. McCann, F. G. Cupul-Magana, and M. A. Lopez-Luna. 2019. Putting eggs in one big basket: communal egg-laying between long-lived reptiles. North-Western Journal of Zoology. 15(1):96-100.

Platt, S. G., T. Lwin, K. Platt, R. M. Elsey, and T. R. Rainwater. 2019. *Geochelone platynota* (Burmese Star Tortoise). Maximum body size and giantism. Herpetological Review. 50 (1): 121 - 123.

Rege, J., S. Garber, A. J. Conley, R. M. Elsey, A. F. Turcu, R. J. Auchus, and W. E. Rainey. 2019. Circulating 11-oxygenated androgens across species. Journal of Steroid Biochemistry and Molecular Biology. 190:242-249.

Smith, B., J. L. Crossley, R. M. Elsey, J. W. Hicks, and D. A. Crossley, II. 2019. Embryonic developmental oxygen preconditions cardiovascular functional response to acute hypoxic exposure and maximal β-adrenergic stimulation of anesthetized juvenile American alligators (*Alligator mississippiensis*). Journal of Experimental Biology. 222. jeb205419. doi: 10.1242/jeb.205419

Wang, Q., V. Kondru, R. M. Elsey, Y. Jing, and J. Feng. 2019. Abstract. Osteocytes in the American alligator (*Alligator mississippiensis*). Presentation at the Experimental Biology meetings. April 6-9, 2019. Orlando, Florida. The FASEB Journal. 33(1): Supplement - Abstract Number 452.20

Woodward, A. R. and Elsey, R. M 2019. American Alligator (*Alligator mississippiensis*). Pp. 1-6 in: Crocodiles. Status Survey and Conservation Action Plan. Fourth Edition, ed. by S. C. Manolis and C. Stevenson. Crocodile Specialist Group: Darwin.

We also have several manuscripts currently in press or in review; and we serve as manuscript reviewers for multiple scientific journals and review numerous manuscripts each year.

Our research efforts were hampered in large part by lack of holding facilities for alligators. We had a small functioning laboratory, but the tremendous physical plant losses due to Hurricane Rita in 2005 and Hurricane Ike in 2008 have limited our progress. Construction of the new laboratory building and improved alligator holding facilities will aid our future research. We were granted access to the new lab in February 2020 and began work to make the alligator holding tanks usable (designing and crafting lids, braces, handles, adjusting thermostats for stable heating capabilities, etc.). and began moving supplies into the lab for future use.

ALLIGATOR ADVISORY COUNCIL

The Alligator Advisory Council is responsible for reviewing and approving recommended marketing, research and educational programs funded through the Alligator Resource Fund. The Alligator Advisory Council monitors and addresses numerous issues affecting the alligator industry at local, national and international levels. The council supports husbandry and disease research through LSU AgCenter, addresses public concerns regarding animal welfare through media and education, engages in international conservation and trade issues, carefully monitors local and national legislation that may impact wildlife management, and communicates with designers and manufacturers to promote the use of sustainable Louisiana products.

LDWF administrative and biological staff participated in several international conservation groups including the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Crocodile Specialist Group, and the International Union for Conservation of Nature. LDWF and the council's participation in these groups continues to provide a strong foundation for sustainable international trade.

The following list provides a summary of the various issues and projects the Alligator Advisory Council supported the use of contractors to address during FY 2018-2019.

CONTRACTS

RESPONSIVE MANAGEMENT

LDWF contracted with Responsive Management to develop a communication strategy for the LDWF alligator program and the alligator industry. The target audiences include fashion brands, consumers, legislative bodies and the general public. Several short videos were created that can be utilized by LDWF and the alligator industry.

MONARCH MARKETING

LDWF contracted with Monarch Marketing to assist with technical representation at national and international meetings involving wildlife trade issues. LDWF staff and Monarch Marketing grew alliances within CITES, Crocodile Specialist Group and International Union for Conservation of Nature. Monarch Marketing attended the 18th CITES Conference of the Parties meeting in Geneva, Switzerland and presented at the National Assembly of Sportsmen's Caucuses and Congressional Sportsman's Foundation Annual meeting. Along with LDWF staff, Monarch Marketing coordinated with industry members to investigate possible solutions to a variety of issues affecting the alligator Industry, including wild alligator market challenges and international shipping delays. Monarch Marketing is also responsible for developing domestic marketing. Monarch Marketing created a social media presence to promote Louisiana alligators, pitched sustainable use articles, and has worked with tanneries, designers, manufacturers and retailers to encourage positive messaging.

WORLD CONSERVATION AND MONITORING CENTER

LDWF contracted with the World Conservation and Monitoring Center to develop the International Alligator and Crocodile Trade Study report. This report has been funded since 1988 to monitor world trade in all crocodilians and to increase accountability of sustainable management practices.

GLENN R. DELANEY

LDWF contracted with Glenn Delaney to monitor legislation in Washington D.C. that may impact Louisiana's alligator management program. Glenn Delaney works closely with the Louisiana delegation to educate them on issues important to LDWF and the Alligator Advisory Council.

SEA GRANT

The Alligator Advisory Council and LDWF contracted with the Board of Supervisors of Louisiana State University and Agriculture and Mechanical College to develop educational and outreach materials related to the alligator industry. Although the schedule of deliverables has been extended due to delays related to COVID-19, the alligator initiative has already resulted in a draft document entitled "A Snapshot of the Louisiana Wild Alligator Industry."

CALIFORNIA MEDIA CAMPAIGN

The Alligator Advisory Council and LDWF contracted with Applied Paradigms to educate California legislators about the Louisiana alligator program and its sustainable use benefits. The goal of this legislative education was to eliminate California Penal Code 653o, so the sale of crocodilian leather will remain legal in California.

NATIONAL ASSEMBLY OF SPORTSMEN'S CAUCUSES

The Alligator Advisory Council and LDWF sponsored the 16th Annual National Assembly of Sportsmen's Caucuses Sportsman-Legislator Summit. The National Assembly of Sportsmen's Caucuses is the largest non-partisan caucus in the country whose goal is to advance hunting, fishing, and conservation of wildlife. Each year, legislators, governors, and wildlife directors from all over the USA attend the summit to gain education on important topics for advancing conservation. The keynote evening speech was given by a Louisiana industry representative to educate legislators and wildlife agents on our successful alligator management program.

American alligator hides from Louisiana are used to make some of the most elegant and expensive leather products in the world.

EDUCATION PROGRAM

Conservation education is a vital part of the LDWF mission. The Education Program focuses on two main areas: Hunter Education and General Wildlife Education/Outdoor Skill Development.

Staffing for the Education Program consists of 12 educators who work in the field, four supervisors who have field responsibility in addition to their supervisory duties, one administrative specialist, one education manager, and one education program manager. Three full time and one part time wildlife technicians staff LDWF-operated shooting ranges, and one maintenance repairer is responsible for maintenance of an education facility, including a shotgun and air rifle range

HUNTER EDUCATION

Hunter and bow-hunter education classes cover firearm safety and operation, hunting ethics, principles of wildlife management, outdoor survival and tree-stand safety. Hunter education certification is mandatory for hunters born on or after Sept. 1, 1969. There are exceptions to the hunter education requirement that allow persons to hunt without hunter education certification if they are directly supervised by someone 18 or older with hunter education certification or by a licensed hunter born prior to Sept. 1, 1969. An exemption is also provided for persons with a current POST certification or military experience, and a hunter education exemption card is issued to those who qualify. Most states have mandatory hunter education requirements, and these exemptions, including the POST/military exemption, apply only in Louisiana. The regular Louisiana hunter education certification card is honored in all 50 states.

Students have two options for taking a hunter education class. The classroom course consists of 10 hours of instruction, usually spread over two to three days. The online course consists of an interactive internet course that the student can complete at home and is followed by a mandatory four-to-six-hour field day event. The field day reinforces the lessons learned in the online course and provides an opportunity for hands-on learning. Both the classroom course and the online/field day include a live-fire exercise where students must demonstrate that they can safely handle and discharge a firearm.

Hunter education classes are taught by Education Program staff and a network of volunteer instructors. There are approximately 900 active volunteer hunter education instructors in Louisiana. Volunteer instructors complete an instructor training course and background check prior to being certified. Education Program staff coordinate the delivery of classes with volunteers, recruit and train volunteer instructors and keep volunteer instructors supplied with materials to teach classes. COVID-19 significantly impacted program events in FY 2019-2020 as multiple classes, workshops, camps, and trainings were cancelled. In all, 83 new volunteer instructors were trained through 15 instructor courses. The annual volunteer instructor workshop normally held at Camp Grant Walker in Pollock was cancelled. The time volunteered by hunter education instructors, volunteer range officers and Archery in Louisiana Schools coaches to deliver hunter education classes, shooting range operation and train archers is used as in-kind match for the hunter education federal grant. In FY 2019-2020, volunteers contributed 27,315 hours of service time valued at approximately $976,511.

STUDENT CERTIFICATION

Total hunter education certifications declined significantly from last fiscal year (8,555 in FY 2019-2020 versus 11,288 FY 2018-2019). This decline is likely attributable to class cancellations beginning in March 2020 due to COVID-19. The online/field day course remains popular as the proportion of students choosing this option rose to 29%. Demand for bow-hunter education remained at all-time lows as this requirement is no longer mandatory to hunt with archery equipment on national wildlife refuges in Louisiana.

Hunter Education

LA Hunter Education Courses FY 2019-2020			
Course Type	No. of Courses	No. of Students	Percentile
Classroom Course	241	6,116	71%
Home Study/ Field Day	98	2,439	29%
Total	*339*	*8,555*	

Bowhunter Education

Two bow-hunter education classes were offered, with 13 students certified.

HUNTING INCIDENTS

During FY 2019-2020, there were 12 reported hunting incidents involving injury or death. One of the 12 resulted in fatalities. Eight incidents involved falling from an elevated stand, one incident involved a limb falling on a hunter, and the remainder involved firearms. Incidents were compiled and entered into the International Hunter Education Incident Database. Information on these incidents were provided to Hunter Education Instructors. Education Program staff and volunteer instructors are placing additional emphasis on tree-stand safety in their hunter education classes and field days. Additionally, per legislative request, LDWF developed and disseminated tree-stand safety materials through print, website and social media.

Primary causes for these incidents are shown below.

Hunting Incidents (FY 2019-2020)	
Type	No. of Incidents
Careless Handling of Firearm	1
Failure to Check Beyond Target	1
Fall While Climbing in/out of Position	5
Other	5
Total Incidents	*12*

SHOOTING RANGE/ TRAINING FACILITIES

Two education centers and four shooting ranges are available to the public and managed by the LDWF Education Program. In FY 2019-2020, approximately 30,088 user visits occurred on LDWF shooting ranges. Through a cooperative endeavor with a private entity, lead reclamation was accomplished on all LDWF shooting ranges at no cost to the state. COVID-19 use restrictions limited the number of range users allowed on the ranges at any given time from March through July.

Completed lead reclamation on Sherburne rifle range.

Renovated 5-stand shooting tower on Woodworth shooting range.

Bodcau Shooting Range

The Bodcau range is located in Bossier Parish on the Bodcau WMA. Accommodations for public use include 13 rifle and 18 pistol shooting positions and a shotgun range with four manual clay target throwers. The range is open to the public three days a week and recorded 6,463 user visits in FY 2019-2020.

Woodworth Education Center

The Woodworth Education Center located in Rapides Parish contains a classroom, lodging facilities and a public shooting range. Range facilities consist of a rifle range, handgun range and a five-stand shotgun range. The range is open for public access three days a week, and recorded 6,425 user visits in FY 2019-2020. Renovation of the 5-stand thrower tower and static archery range was completed.

Sherburne Shooting Range

Located in Pointe Coupee Parish on the Sherburne WMA, the Sherburne range consists of two shotgun ranges, one archery range, one handgun range and one rifle range. It is open to the public six days per week and recorded 7,516 user visits in FY 2019-2020.

Waddill Outdoor Education Center and Refuge

The Waddill Outdoor Education Center and Refuge in East Baton Rouge Parish provides an outdoor education environment in an urban setting. A classroom, shotgun range, archery range and air rifle range are used for hunter education instruction and recreational shooting opportunities.

Honey Island Shooting Range

The Honey Island Shooting range is located on the Pearl River WMA in St. Tammany Parish. The range is managed under an agreement with Southeast Louisiana Firearms Safety, Inc (SELFS). SELFS is a non-profit organization staffed by volunteers that maintains and operates the range for public use. Shotgun, rifle and handgun shooting opportunities are available to the public. The range is open to the public three days per week. There is a $6 per day fee to use the range that is collected by SELFS to fund operation and maintenance of the range. This range recorded 9,684 user visits in FY 2019-2020, but was closed from January through mid-June due to high water events prohibiting access to the range and damaging the access bridge.

GENERAL WILDLIFE EDUCATION AND OUTDOOR SKILL DEVELOPMENT

Education Program staff are involved in a variety hunter education related activities. Staff provide information and make presentations on topics of interest to civic organizations, school groups and others. Outdoor skill development programs and efforts have increased in recent years. Demand is high for programs that teach beginners about getting started in hunting and shooting sports. In recognition that funding and support for conservation are directly linked to hunters and shooters, the LDWF Education Program has expanded its efforts to recruit and teach skills to new outdoor enthusiasts.

NATIONAL HUNTING AND FISHING DAY

The general public is invited to join LDWF and other conservation partners in an open house atmosphere that involves hands-on activities and information about conservation. The Education Section provided training to the public in the safe use of firearms and archery equipment. Four LDWF-sponsored events were held at the following locations: Bodcau WMA, Monroe Field Office, Waddill Wildlife Refuge, and the Woodworth Outdoor Education Center.

BECOMING AN OUTDOORS WOMAN (BOW)

BOW is a popular program with women interested in learning about outdoor recreation. During the BOW weekend workshop, education staff and volunteers conduct classes on a variety of outdoor skills, including shooting, fishing, canoeing, hunting, orienteering, camping and wildlife appreciation. The BOW workshop was cancelled due to COVID-19. One Beyond BOW deer hunt was conducted on Tensas National Wildlife Refuge.

FAMILIES UNDERSTANDING NATURE (FUN) CAMP

Families Understanding Nature provides both fun and education to a parent and youth(s) through a weekend of staff-led outdoor activities. Family members are introduced to archery, rifle and shotgun shooting, kayaking and camping. The education staff conducted one FUN Camp during FY 2019-2020, and the other was cancelled due to COVID-19. One Mother/Child camp hosted a total of 15 participants.

ARCHERY IN LOUISIANA SCHOOLS (ALAS)

ALAS is Louisiana's version of the National Archery in the Schools Program. ALAS promotes international style target archery as part of the physical education curriculum for grades 4-12. At the end of FY 2019-2020, 170 active schools were participating in the program, impacting an estimated 19,633 students. Two regional and one state 3-D tournament were held last year. The state bullseye tournament was cancelled due to COVID-19. Total tournament participation was 2,267 archers in the elementary, middle, and high school divisions.

The NASP national and open (world) tournaments were cancelled due to COVID-19.

Student archers participate in the ALAS statewide 3-D archery tournament.

Beyond Becoming an Outdoors Woman deer hunt participant.

HABITAT

The objectives of the Habitat Section are to gather and compile data on fish and wildlife resources, determine the requirements for conserving the resources, and provide information to governmental agencies, nongovernmental organizations and the public. Data are also gathered on the potential impacts of human activities on the resources. These data and technical assistance are provided to regulators, planners and decision-makers in advance of execution of projects in order to avoid, minimize and/or mitigate any adverse environmental impacts. The Habitat Section is comprised of the four following programs: Statewide Environmental Investigations, Louisiana Natural and Scenic Rivers Program, Permits Coordination, and Seismic Section. In addition to our four established programs, the Habitat Section remains heavily involved in the development and implementation of the state's new, multi-agency Watershed Initiative Program that was established by Governor Edwards' Executive Order JBE 2018-16 for Watershed-Based Floodplain Management Coordination.

STATEWIDE ENVIRONMENTAL INVESTIGATIONS

PERMIT REVIEW AND COMMENT - LDNR & USACE

Statewide Environmental Investigations is authorized under the Fish and Wildlife Coordination Act and is partially funded by a USFWS grant. Staff is responsible for reviewing and providing comments and mitigation recommendations on all permits sought from state and federal environmental regulatory agencies, primarily LDNR and USACE. Staff members reviewed and provided comments to 1,351 state and federal permit applications during FY 2019-2020. Written comments and recommendations aimed at avoiding, minimizing and/or mitigating adverse impacts were issued by LDWF for all state and federal permit applications received.

Staff continued to receive a number of USACE Section 10 permit applications for the withdrawal of surface water classified as waters of the United States. These water withdrawal requests were primarily for hydraulic fracturing of shale formations. LDWF responded to all such permit requests with recommendations on how to conduct these substantial water withdrawals while also avoiding adverse impacts to fish and wildlife resources. A total of approximately 17 such permits were issued during FY 2019-2020.

In addition to permit review, staff participated in permit site inspections and habitat evaluations, provided technical assistance to the public on wetland issues, and worked with private developers and consultants involved in the regulatory process. During FY 2019-2020, staff conducted several on-site field inspections and participated in 17 meetings and conference calls with applicants, agents and regulatory agency personnel. Staff gave presentations to non-governmental organizations, state agencies and user groups.

Staff members also represented the agency on two Mitigation Bank Interagency Review Teams chaired separately by the USACE Vicksburg and New Orleans districts. The purpose of the Interagency Review Teams is to provide regulatory review, approval and oversight of wetlands mitigation banks. During FY 2019-2020, staff evaluated, inspected and provided technical comments and recommendations on dozens of wetlands mitigation banking proposals, mitigation banking instruments and mitigation banking monitoring plans. Five wetland mitigation banks were approved and authorized in Louisiana during FY 2019-2020. Staff attended all Interagency Review Team meetings and 25 site investigations.

Staff continued to provide technical assistance to USACE related to several large- and small-scale maintenance dredging projects, beneficial use projects, flood control projects, and navigation projects being undertaken by the New Orleans and Vicksburg districts. As Bipartisan Budget Act 2018 (BBA 18) project planning progressed, Habitat Section staff remained abreast of developments and supplied comments and recommendations to several USACE led project development teams.

Statewide Environmental Investigations also assisted in protecting all lessees of private oyster grounds by reviewing and approving, sometimes with modification, water bottom assessments submitted by project applicants prior to the initiation of activities affecting state water bottoms under lease to private parties for oyster production. Coastal Use Permit applicants can be required at the request of Statewide Environmental Investigations staff to modify the activity if the proposed project unnecessarily impacts oyster resources. There were 33 water bottom assessments reviewed and approved by agency staff during FY 2019-2020.

Mitigation bank proposed during FY 2019-2020 - habitat determinations being made with Wildlife Diversity Program Botanists and Mitigation Bank Sponsors to ensure that appropriate habitat types are restored across the project site.

PROJECTS OF OTHER AGENCIES AND THE PRIVATE SECTOR

LDWF worked with numerous governmental agencies in conducting environmental investigations including:

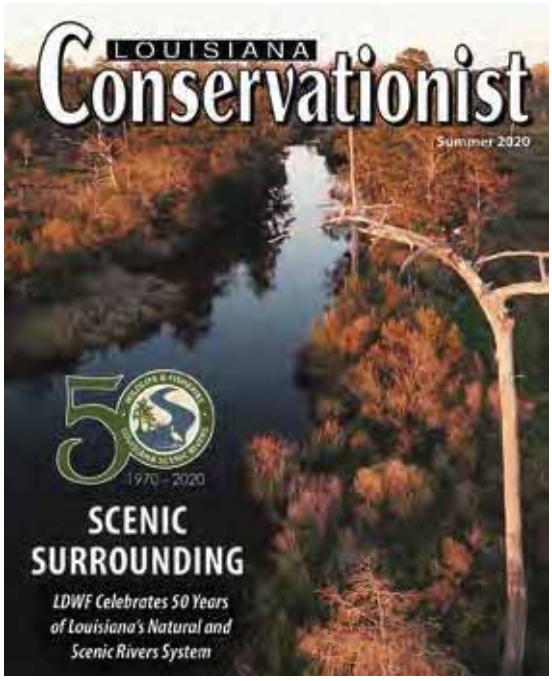
- USFWS
- National Marine Fisheries Service
- U.S. Environmental Protection Agency
- USACE
- U.S. Forest Service
- USDA
- Federal Highway Administration
- Federal Aviation Administration
- U.S. Coast Guard
- Department of Energy
- Federal Energy Regulatory Commission
- Department of Defense
- National Park Service
- Louisiana Department of Transportation and Development
- LDNR
- Louisiana Department of Environmental Quality
- Louisiana Department of Culture, Recreation and Tourism
- Louisiana National Guard
- Louisiana Division of Administration - Office of Community Development.

TECHNICAL ASSISTANCE PROVIDED

Staff continue to track the number of telephone and e-mail responses provided to any request of a technical nature from the public, landowners, media, public agencies, universities, schools and non-governmental organizations for conservation recommendations, guidance, biological data or project reviews. During FY 2019-2020 we replied to a total of 1,305 requests for technical information.

LOUISIANA NATURAL AND SCENIC RIVERS PROGRAM

The Scenic Rivers Program is charged with the administration of the Louisiana Natural and Scenic Rivers Act (the Act). The Act requires that LDWF, through the Scenic Rivers Coordinator, administer a permitting system for activities that have potential for significant ecological impact to designated Natural and Scenic Rivers, as well as a system of monitoring, surveillance, investigation and enforcement for the purpose of ensuring compliance with the Act. The Act, and the rules and regulations promulgated under its authority,



Cover of the Summer 2020 Louisiana Conservationist magazine

Bayou Trepagnier becomes more accessible during the winter months, due to reduced aquatic vegetation that typically impedes navigation.

Nestled within the Kisatchie National Forest as the only National Wild and Scenic River found in the state, LDWF system stream Saline Bayou meanders through undisturbed bottomland hardwoods.

provide for the development of management plans, stream surveys and enforcement. There are currently approximately 80 streams and/or stream segments in the system constituting an estimated 3,100 linear miles of Louisiana's streams, rivers and bayous.

New for FY 2019-2020 was the addition of an education and outreach component for the Scenic Rivers Program. In order to garner additional support for the program and to advocate for its valuable mission of conserving and protecting Louisiana's designated Scenic Rivers, LDWF staff implemented new avenues to promote the program and all of its accomplishments. This goal was achieved through a variety of different approaches. The majority of individuals interested in Scenic Rivers initially consult the LDWF website to seek out program information. Therefore, the first initiative was ensuring all information provided on the LDWF's updated website was complete and up to date. Second, was engaging new partners that will assist with the promotion of the Louisiana Scenic Rivers Program. A number of non-governmental organizations engaged meaningfully with program staff, and The Louisiana Wildlife and Fisheries Foundation agreed to support the Scenic Rivers Program by promoting program information on the Foundations website and by agreeing to house donations made by private donors in support of the programs' goals.

Creation of the educational aspect of this program corresponded well as 2020 marked the 50th Anniversary of the Scenic Rivers System's enactment in the state of the Louisiana. The anniversary celebration allowed the promotion of this program to be brought about in a multitude of ways, including a collection of videos aiming to promote individual streams protected by Scenic River designation which premiered in April 2020. The first in this ongoing video series highlighted the attributes of Cane Bayou located in St. Tammany Parish. Additionally, the Conservationist Summer 2020 issue included the Scenic Rivers program as its cover story. This piece provided information pertaining to the Scenic Rivers Program and highlights of the anniversary celebration. Another LDWF publication, the Wildlife Insider, included information about the 50th anniversary celebration on its back cover. One of the most highly anticipated and publicized events for the 50th anniversary celebration was the creation of a photography contest. This contest aimed to promote the beauty and associated attributes of Louisiana Scenic Rivers. The contest began on March 1, 2020. Participants were eligible to compete in three categories: youth, amateur and professional. A summary of the contest and its winners will be included in the FY 2020-2021 report.

The Scenic Rivers Program has incorporated the public's input to help promote the program. A lack of safe and legal public access on certain system streams is one of the largest hurdles the Scenic Rivers Program has to overcome. Staff began working more closely with the Louisiana Department of Transportation and Development in efforts to overcome this obstacle where opportunities arose. Also, beginning in 2020, staff have incorporated a means for the public to submit Scenic River access points through a submission form made available on LDWF's website. The coordinates of that access point, along with a photo of the area, and any additional information are being made available to the public through LDWF's outdoor explorer tool.

Several enforcement actions were initiated in FY 2019-2020. These included issuance of a number of Compliance Orders and the forwarding of 14 violations to LDWF's Enforcement Division for citations. The coordinator and staff, through routine surveillance, project inspections and response to complaints, ensured compliance with permit conditions, utilization of adequate best management practices, and appropriate cleanup and restoration of permitted project sites. Staff continued to spend a considerable amount of time and effort on numerous sand and gravel operations to develop/implement water management plans and riparian buffers aimed at minimizing impacts to Scenic Rivers. Scenic River's staff also coordinated more closely with the Louisiana Department of Environmental Quality, to address some of the construction site stormwater and sanitary issues impacting several system streams. We initiated cooperation with Louisiana Department of Environmental Quality Water Quality staff, bringing their expertise to bear.

Staff made 123 site investigations and surveyed over 119 miles of streams. During surveys, Scenic River staff noted potential violations and compliance issues. Staff also continued efforts to document derelict vessels, attempted to locate responsible parties and have the vessels removed by whichever means prudent.

A total of 48 Scenic River Permits were issued during FY 2019-2020. In addition to considering permits, Scenic Rivers staff made 35 determinations of "no permit required" for activities undertaken near scenic rivers but with no potential to significantly degrade the ecological integrity of a scenic river. Staff held 37 meetings and conference calls with applicants and agents, specific to scenic rivers issues. The coordinator and staff maintained regular contact with both state and federal agencies to ensure that designated Scenic Rivers were considered in all levels of planning and permitting. They also worked closely with city planners, police juries, mayors and local interest groups and organizations throughout the state.

PERMITS COORDINATION

The purpose of the Permits Coordination Program is to ensure that LDWF receives, reviews and responds to and distributes comments and mitigation recommendations on all permit notices received from state and federal environmental regulatory agencies in an efficient and timely manner (i.e. prior to public notice comment period deadlines). LDWF's written comments are in-turn used by the regulatory agencies to make final determinations on how to best avoid, minimize and/or mitigate adverse impacts to fish and wildlife resources.

In order to accomplish this task, the LDWF permits coordinator serves as the primary liaison and "single point of contact" for all regulatory agencies, primarily LDNR and USACE. It is the responsibility of the permits coordinator to ensure that the LDWF biologist with the appropriate authority and expertise is included in the formulation of written comments and mitigation recommendations. The permits coordinator also ensures that there is adequate LDWF representation at all LDNR Geologic Review and pre-application meetings.

The permits coordinator also utilizes, maintains and populates a comprehensive searchable database for all permit notices. This database is of critical importance to ensure a timely response from LDWF. The database also archives LDWF's formal response to all permit notices dating back to 2006. During FY 2019-2020, the permits coordinator received, processed, tracked and disseminated 1,351 permit notices.

SEISMIC SECTION

The LDWF Seismic Section was created in 1939 specifically to protect fish, oysters, shrimp, wildlife and other areas of concern from the effects of seismic exploration. Seismic exploration uses energy waves to generate a profile of sub-surface reflective layers that help define potential oil and gas traps. The energy waves can be produced by explosives detonated below the ground, by air guns that emit a burst of air at the surface

of water bodies, by large vibrating pads placed on the surface, or other means. These projects can occur in sensitive wetlands, water bodies and other habitats.

LDWF performs a Wildlife Diversity Review on each individual seismic job to determine the presence of rare, threatened and endangered species and other areas of conservation concern. The Wildlife Diversity Review includes specific conditions that the applicant must adhere to for the protection of such resources. LDWF Seismic agents also monitor geophysical activities to protect Louisiana's fish and wildlife resources by ensuring compliance with LDWF seismic rules and regulations.

Some of the Seismic Section's accomplishments for FY 2019-2020 are:

- Staff issued four seismic permits throughout the state.
- One public meeting was conducted to inform landowners and user groups of seismic surveys beginning in their area.
- 26 days were expended on field monitoring.
- Staff closely interacted with seismic companies to ensure compliance with the rules and regulations of the Seismic Section.
- The Section ensured protection of threatened and endangered species and other areas of concern.

WATERSHED INITIATIVE

In March and August 2016, Louisiana experienced two historic rain events that produced trillions of gallons of rainwater and impacted 56 of Louisiana's 64 parishes. Widespread flooding exposed weaknesses in Louisiana's approach to floodplain management and planning. Water does not recognize political or arbitrary boundaries; thus, it must be managed, and associated risks mitigated, in a manner that takes this behavior into account (Watershed Vision Whitepaper, 2018). In response, following the Governors May 2018 Executive Order (EO JBE18-16), various state agencies, including LDWF began collaborating on a framework to advance a watershed based approach to floodplain management and flood risk reduction, the Watershed Initiative.

LDWF remains committed to solving watershed management collaboratively with our partnering state agencies, as well as cities, parishes, federal agencies, research and nonprofit organizations, universities and private-sector participants. By highlighting and promoting the natural functions and ecosystem services which our state's streams and floodplains provide, we have ensured that conservation and restoration of these functions and services are recognized as an essential strategy for flood risk reduction. We have also helped to ensure that modeling and science drive future watershed level decision making and that the consequences of management decisions and other actions are better understood and considered prior to project selection.

During FY 2019-2020, Habitat Section staff have worked as our agencies single point of contact and coordinator and have also continued the roles of working group member and technical advisory group leader. In that time, Habitat staff attended all Watershed Council meetings, updating the council and providing information to our representatives. Our staff have also attended all Working Group meetings and numerous conference calls, developing various aspects of the program for the council's consideration. In addition to these activities, staff have also represented both LDWF and the Watershed Initiative at other related meetings and workshops.

MINERALS MANAGEMENT

The Minerals Management Program, hereafter called Mineral Program, is responsible for ensuring that mineral activities on all LDWF properties are compatible with the environment and that such activities do not prevent LDWF from meeting WMA/refuge goals and objectives. In FY 2019-2020 Mineral Program staff reviewed, evaluated and authorized 57 well locations, pipeline projects and other mineral exploration related activities on LDWF properties. During FY 2019-2020, the program also issued 16 rights-of-way, surface leases and servitudes for oil and gas activities occurring on LDWF properties. All of these projects are reviewed and coordinated with field personnel to ensure that they are compatible with LDWF management area programs.

In FY 2019-2020 the Mineral Program continued to generate significant revenues for LDWF, which includes mineral royalties, rights-of-way, surface leases and seismic fees. The Mineral Program represented LDWF at each monthly meeting of the State Mineral and Energy Board. The Mineral Program also coordinated with the LDNR Office of Conservation for the removal of numerous abandoned oil and gas facilities on WMAs and refuges. The Mineral Program continues to work closely with other programs within LDWF and the LDNR Office of Coastal Management in an ongoing effort to streamline the Coastal Use Permitting process.

WETLAND MITIGATION BANKING

The Mineral Program continued to ensure regulatory compliance and coordinate credit sales for LDWF's wetland mitigation bank located on Rockefeller Wildlife Refuge in Cameron Parish. These restored wetland ecosystems functionally compensate unavoidable habitat impacts, such as those associated with oil and gas exploration and production, occurring within LDWF's WMA and refuge system.

FIGURE 4. Vegetation classification of the Rockefeller Refuge 107-acre site generated from state of the art technology, including an unmanned aerial vehicle, also known as a drone.

DREDGE FILL PROGRAM

In addition to the above-mentioned duties, the Mineral Program has continued to administer LDWF's Dredge Fill Program. This program issues approximately 75 licenses annually for the dredging and severing of state water bottoms. This program also collects approximately $1 million in annual severance royalties associated with dredging and severing state water bottoms. In FY 2019-2020 commercial dredge fill pits were inspected to ensure operator compliance with program regulations and LDWF also actively investigated unlicensed commercial pit operators.

LDWF and the Wildlife and Fisheries Commission amended Dredge Fill Program rules and regulations in FY 2019-20. The purpose of commission action was to align regulations with statute and codify long-standing LDWF practice. Included in the rule change was an increase in the commercial license fee and codification of a 1.5% penalty for late royalty payments. In addition, commercial license holders that exceed the licensed dredge volume may be levied a penalty of 5 cents per cubic yard calculated on the excess volume.

PERMIT ACQUISITION

The Mineral Program applied for and received 11 USACE permits and 15 LDNR Consistency Determinations that authorized LDWF to undertake management actions on LDWF properties statewide. All permit requests must also be coordinated with and approved by federal resource agencies (i.e., USFWS, Environmental Protection Agency and NOAA - National Marine Fisheries Service).

WATER RESOURCES

LDWF continued to serve on the Louisiana Water Resources Commission. The purpose of the commission is to develop a statewide water management plan for ground water and surface water use and conservation. Much of the focus of the initial plan was on ground water resources. The commission convened twice during FY 2019-2020 to receive reports on progress of implementing the recommendations of the initial plan. As the commission continues its work, LDWF's role will be to ensure that the conservation of fish, wildlife and their supporting habitats as well as outdoor recreation are an important consideration when making water management decisions.

Aerial image of active commercial dredge fill pit operating on and adjacent to state water bottoms.

RESTORATION PROGRAM

Program Manager - Jon J. Wiebe
Biologist Supervisor - Laura Carver
Biologist - Casey Wright
Biologist - Sadie Buller
Biologist - Katie Bouchereau

OVERVIEW

LDWF's Restoration Program is responsible for the development and implementation of technically sound, effective restoration of the State of Louisiana's natural resources. Many of these restorative actions are the direct result of defensible biological and ecological injury assessment associated with statewide oil spills. Programmatic facets include: Oiled Wildlife Response, Natural Resource Damage Assessment and Restoration. *Deepwater Horizon* oil spill restoration activities exemplify LDWF's continued commitment towards resource protection and restoration associated with oil spills. LDWF personnel collected invaluable response information throughout the incident, played a critical role in determining resource injury, and now play an instrumental role in coastal habitat restoration. For FY 2019-2020, our program worked on the following 2010 *Deepwater Horizon* oil spill restoration activities:

- Construction and engineering and design for historical colonial waterbird colonies, large-scale marsh creation projects and coastwide recreational-use projects.
- Addressing critical informational needs that will inform construction of preferential avian habitats as well as means to determine associated restoration benefits.

Collectively, these activities were accomplished in large part through strong collaborations amongst LDWF programs, Coastal Protection and Restoration Authority and the Louisiana and Regionwide Technical Implementation Groups; the principal means by which state and federal trustees implement 2010 *Deepwater Horizon* oil spill restoration within the state of Louisiana and the broader northern Gulf of Mexico.

OILED WILDLIFE RESPONSE

LDWF's Restoration Program monitors and responds to reports of oil spills throughout Louisiana. During FY 2019-2020 our program received 7,740 oil spill reports from the principal reporting agencies, National Response Center and Louisiana State Police. These reports encompass a broad array of potential situations where volume reported may not be indicative of the overall resource injury. Program personnel carefully reviewed each of these reports so as to assess potential impacts to the state's wildlife and sensitive habitats.

Many of these spills required multiple and detailed site visits over several months to ensure complete injury documentation and cleanup oversight. Personnel led by Program Response Lead Laura Carver performed regimented evaluations of injury to wildlife and associated habitats. Personnel documented and recovered live, oiled wildlife for rehabilitation and subsequent release as well as wildlife killed during the incident. Of note, several spills required extensive assistance from select LDWF Office of Wildlife (Coastal and Nongame Resources and Wildlife Divisions) and Office of Fisheries personnel certified in Hazardous Waste Operations and Emergency Response (HAZWOPER).

REPRESENTATIVE SPILLS (FY 2019-2020)

The spills listed in *Table 6* and other spills presented many unique challenges during FY 2019-2020. LDWF's ability to effectively and safely engage on these and other spill-related issues stems from a commitment that personnel maintain HAZWOPER certification and reinforcing these training principles among partner agencies (e.g., Unified Response Drills and Planning Sessions). Collectively, this as well as stepwise implementation of wildlife response activities has been memorialized within LDWF's Oiled Wildlife Response Plan and Field Guide. In total, wildlife and habitat information generated from LDWF Restoration Program's wildlife response activities continues to be an invaluable resource to develop natural resource restoration activities.

NATURAL RESOURCE DAMAGE ASSESSMENT ACTIVITIES

Within FY 2019-2020, LDWF's Restoration Program continues to make concerted efforts involving current and legacy (i.e., incident occurred greater than 10 years ago) Natural Resource Damage Assessment case management.

CASE MANAGEMENT OF CURRENT AND LEGACY NATURAL RESOURCE DAMAGE ASSESSMENT CASES

Program personnel spent extensive time and effort engaging with state and federal trustees on fifteen current and legacy Natural Resource Damage Assessment case activities (*Table 7*). Much of these activities involved detailed data review (e.g., response and pre-assessment information) and technical resource analyses (e.g., Habitat Equivalency and Resource Equivalency Analyses) to quantify resource injury extent, as well as scale representative restoration.

DEEPWATER HORIZON RESTORATION

During the 2010 *Deepwater Horizon* oil spill, approximately 134 million barrels of oil and other substances were released into the Gulf of Mexico. Many of Louisiana's coastal re-

TABLE 6. Representative Spills (FY 2019-2020)

NRC & LSP	LOCATION	PARISH	RESPONSIBLE PARTY	OVERVIEW
NRC#125101	Grand Isle	Jefferson	Cox Operating	This Incident was reported (7/16/2019) by Cox Operating as the release of ~4 bbls of crude oil from their offshore facility.
NRC#1252432	Mud Lake	Plaquemines	Hilcorp	This Incident was reported (7/18/2019) by Hilcorp as the release of ~4 bbls of crude oil at their Manilla Village facility.
NRC#1252115	Port of Iberia	Iberia	Exploraciones y Perforadora	This Incident was reported (7/16/2019) by an LDWF employee as a partially sunken barge leaking red dye diesel.
NRC#1254713	North Little Lake	Jefferson	S2 Energy	This Incident was reported (8/9/19) by S2 Energy as the release of an unknown amount of crude oil from an inactive wellhead.
NRC#1255238	Cox Bay	Plaquemines	Time Energy	This Incident was reported (8/15/19) by a CRMS contractor who noted oil within their soil sample (Multiple site visits).
NRC 1257062	West Deer Island	Iberia	Castex	This Incident was reported (09/02/19) by Castex as the release of ~4 barrels of crude oil.
NRC#1258478	Lake Hatch	Terrebonne	Dimension Energy	This Incident was reported (09/17/19) by Dimension Energy as the release of ~3-6 barrels of crude oil (Multiple site visits).
NRC#1260032	Belle Chasse	Plaquemines	Phillips 66	This Incident was reported (10/02/2019) by Phillips 66 as the release of ~1,256 barrels into / maintained within the facility's storm water sewer system (Multiple site visits).
NRC#1260434	Main Pass 69	Plaquemines	TPIC	This Incident was reported (10/07/2019) by TPIC as a release of ~10-20 barrels of crude oil on PALWMA refuge.
LSP#19-05277	Calcasieu River	Calcasieu	Calcasieu Refining Company	This Incident was reported (11/06/19) by Calcasieu Refining Company as the release of ~20 bbls of crude oil into the Calcasieu River.
NRC#1265267	Bayou Bouillon	St. Martin	Thyssen Petroleum	This Incident was reported (12/02/2019) by Thyssen Petroleum as the release of ~27 bbls of crude oil from a permanently moored holding barge.
NRC#1265477	IDBIR Trinity Island	Terrebonne	Brammer	This Incident was reported (12/04/2019) by Brammer Engineering as the release of ~10-15 bbls of crude oil.
NRC#1266011	Southwest Pass	Plaquemines	Whitney Oil and Gas	This Incident was reported (12/10/2019) by Whitney Oil and Gas as the release of an unknown volume of crude oil.
LSP#20-00154	Larto Lake Field	Catahoula	McGowan Working Partners	This Incident was reported (01/13/2020) by McGowan Partners as the release of ~60 bbls of crude oil (maximum release estimate based on the loss of two (2) production days) into a large irrigation ditch/bayou (Multiple site visits).
NRC#1270527	Houma Industrial Canal	Terrebonne	Gaubert	This Incident was reported (02/06/2020) by Gaubert as these release of ~2,000 gallons of diesel.
NRC#1272238/ LSP# 20-00745	Pass-a-Loutre WMA	Plaquemines	Whitney Oil and Gas	This Incident was reported (02/27/2020) by Whitney Oil and Gas as the release of ~2-3 barrels of crude oil from a 600 bbl tank.
NRC#1273080	Thistlethwaite WMA	St. Landry	Key Operating Company	Incident was reported (3/9/20) by Key Operating Company as the release of ~3-4 bbls of crude oil (Multiple site visits).
LSP# 20-01188	Toledo Bend	Sabine	Unknown RP	This Incident was reported (3/30/20) by a private landowner who observed oil traversing through a creek on his property (mixed pine/hardwood forest) which eventually drains into Toledo Bend (Multiple site visits).
NRC#1275691	DeQuincy	Calcasieu	Magna Operating	This Incident was reported (4/20/20) by Magna Operating as the release of ~3 bbls of crude oil.
LSP#20-01996	SW Napoleonville	Assumption	Daylight Petroleum	This Incident was discovered (June 12) by LDNR representatives as the release of ~15 bbls of crude and <10 bbls of saltwater.
NRC#1279863	Pass-a-Loutre WMA/ Garden Island Bay	Plaquemines	Whitney Oil and Gas	This Incident was initially reported (6/18/20) by Whitney Oil and Gas as the discharge of ~5 bbls of crude oil from an underwater flow line.
NRC#1270070	Pass-a-Loutre WMA/ Garden Island Bay	Plaquemines	Whitney Oil and Gas	This Incident was reported (6/21/20) by Whitney Oil and Gas as the discharge of an unknown volume of crude oil.
NRC#1280202	Delta NWR	Plaquemines	TPIC	This Incident was reported (6/23/20) by TPIC as the release of ~ 5 bbls of crude oil associated with a blowout from a retired well.

TABLE 7. Natural Resource Damage Assessment Case Summary

CURRENT	LEGACY	RESTORATION ACTIVITIES
Sunoco Logistics Milepost 51.1 & Hilcorp Bay St. Elaine Status: Settlement Discussions	ACL Gretna-MS River / DM-932, Citgo Calcasieu River, & ExxonMobil Torbert Status: Settlement Discussions	Shell Green Canyon Status: Project Identification
Hilcorp Rattlesnake Bayou & Hilcorp Bay Long Status: Injury Assessment	Whitney Oil & Gas Garden Island Bay Area of Concern (AOC) Status: Remediation Planning and Permitting	LWMIWCB Status: Project Identification

sources were significantly impacted. As such, Louisiana factors prominently ($5 billion) in its ability to restore for these injured resources. Within FY 2019-2020, our program's activities centered around coordinated engineering and design and construction activities which supported restoration of historical colonial waterbird colonies, large-scale marsh creation projects and coastwide recreational-use projects.

ONGOING RESTORATION PROJECTS

QUEEN BESS ISLAND

Queen Bess Island has a rich and diverse history. LDWF utilized the island as one of its principal reintroduction localities for brown pelican, a species that was once extirpated from the state. Today, the island ranks as the third most productive breeding colony for the species, as well as providing critical historic nesting habitat for over 60 bird species. That stated, this island experienced expansive and repeated oiling events during the 2010 *Deepwater Horizon* oil spill, and significant direct and indirect bird losses and habitat damage associated with response activities. To that point, the island had less than 5 acres of suitable colonial waterbird nesting and brood-rearing habitat remaining. As such, restoration of Queen Bess Island was prioritized by LDWF within Louisiana Trustee Implementation Group Restoration Plan #1: Restoration of Wetlands, Coastal and Nearshore Habitats; Habitat Projects on Federally Managed Lands; and Birds (October 2016).

With island construction completed in February 2020, 30 acres of brown pelican (*Pelecanus occidentalis*) habitat and 7 acres of tern and black skimmer (*Rynchops niger*) nesting habitats were created or enhanced (*Figure 5*). Native vegetative species were planted within select areas of pelican nesting habitat as one means of encouraging future nesting activities. Tern and skimmer habitat consisted of an elevated platform of crushed limestone (6 inches deep) devoid of vegetation; the guilds preferential nesting habitat. Hay bales were deployed throughout the project area as a means of reducing sand and vegetative (e.g., plants and grass seeds) losses due to high winds. Ironically, the hale bales would eventual serve as additional pelican nesting material as well as elevated nesting platforms on occasion.

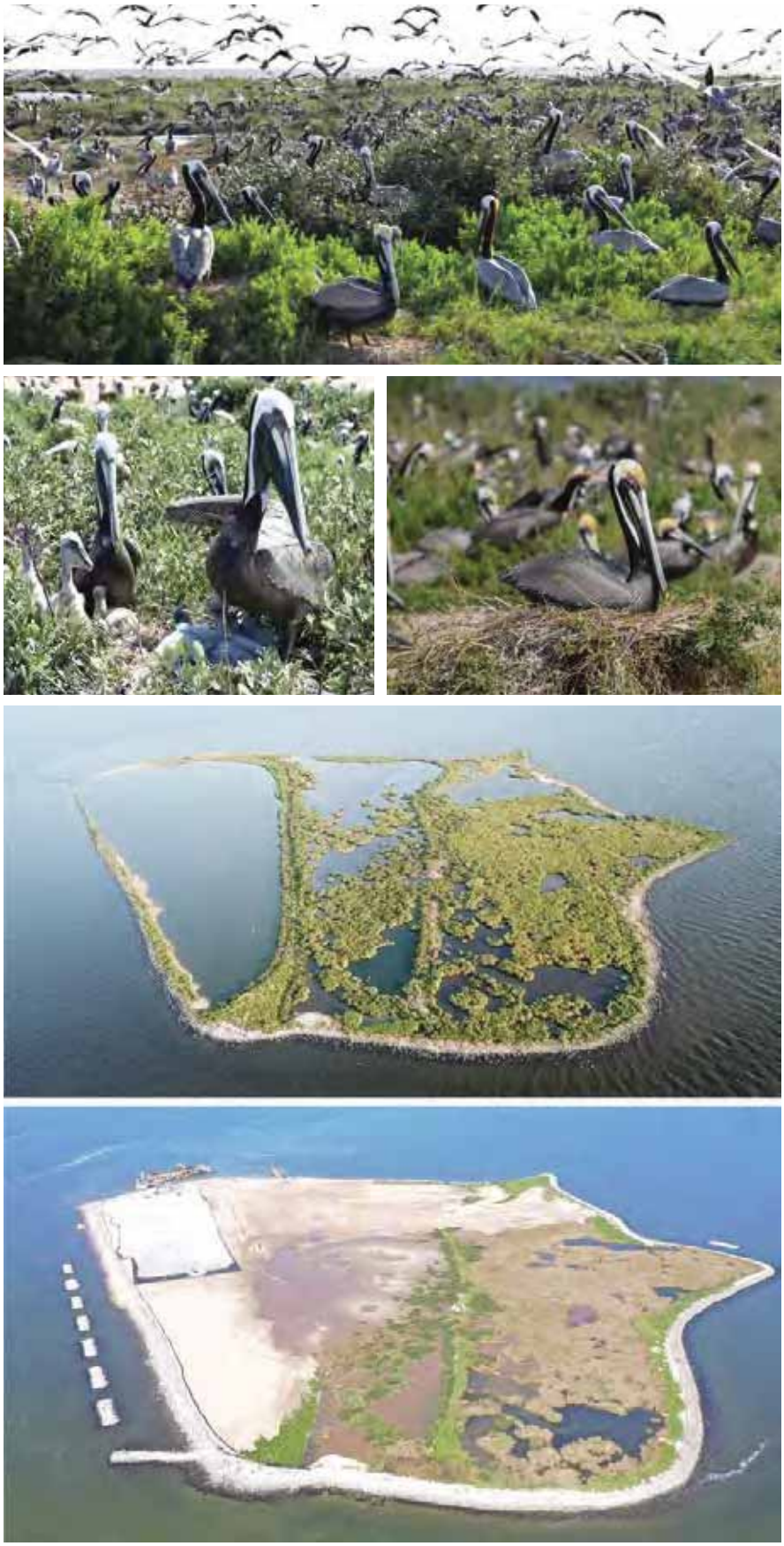


FIGURE 5. Nesting habitats created and enhanced on Queen Bess Island.

By early to mid-April 2020, program biologists began documenting extensive numbers of brown pelican and a host of other species returning to the island for the annual reproductive event; a major accomplishment as this activity represents the first time this type of holistic restoration had ever been attempted in the State of Louisiana. This success was further validated by the return of multiple generations of Queen Bess pelicans as indicated by year-specific leg bands. Collectively, this project well surpassed initial nesting projections with colonial waterbirds returning in the thousands.

It cannot be overstated, that lessons learned from the Queen Bess Island Restoration project will continue to bolster the Restoration Program's ability to implement effective and representative actions within engineering and design and construction efforts for ongoing (Rabbit Island) and future (Chandeleurs, New Harbor, Isle of Pitre and Terrebonne HNC Islands) colonial waterbird restoration projects.

Proposed Timeline

Queen Bess Island continues to perform at a level expected based on project engineering and design. Future 2020 activities being discussed include a fall planting of native vegetation (Black Mangrove and Matrimony Vine) to supplement the initial planting as well as expected on-site adaptive management (e.g., ponding relief).

RABBIT ISLAND

Rabbit Island represents the only brown pelican colony in southwest Louisiana. The island has historically provided essential nesting habitat for a number of species impacted by the 2010 *Deepwater Horizon* oil spill (brown pelican, colonial waders, terns and black skimmers), including species of greatest conservation need (reddish egret [*Egretta rufescens*], American oystercatcher [*Haematopus palliates*]) as identified within the LDWF Wildlife Action Plan. However, the island's mean high-water elevation (+1.01' NAVD88) results in most of the island being inundated on high tides and is the leading source of colonial waterbird nest mortality (nest inundation). It is not uncommon to lose over 50% of nests in a given year due simply to tidal inundation. As such, restoration of Rabbit Island was prioritized by LDWF within Louisiana Trustee Implementation Group Restoration Plan #1: Restoration of Wetlands, Coastal, and Nearshore Habitats; Habitat Projects on Federally Managed Lands; and Birds (October 2016).

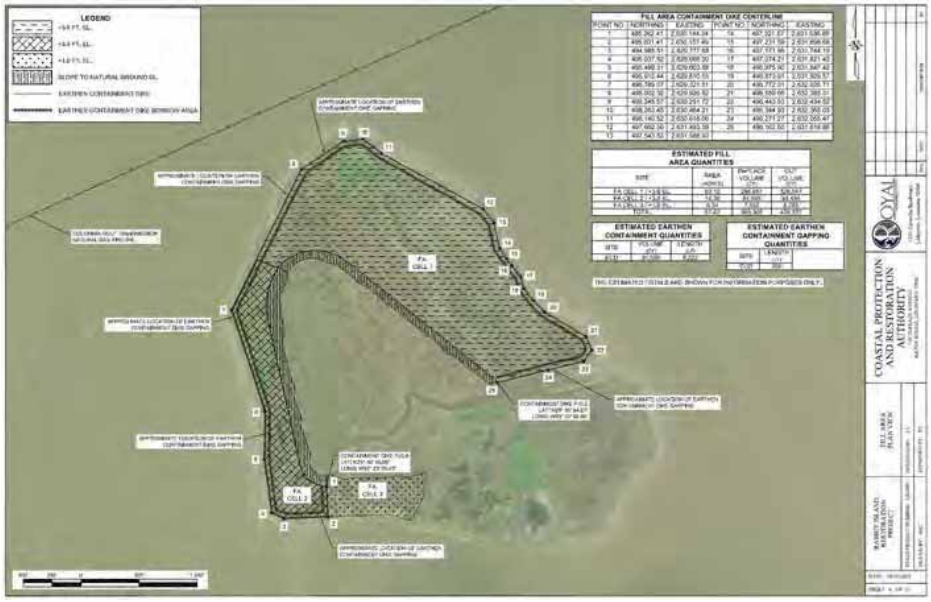


FIGURE 6. Rabbit Island restoration project.

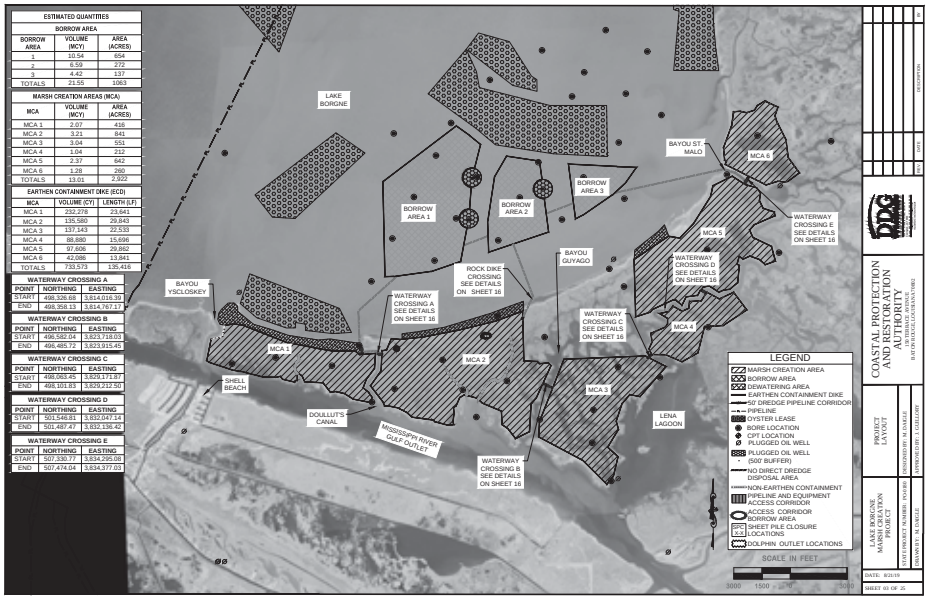


FIGURE 7. Lake Borgne marsh creation project.

LDWF actively participated in all engineering and design activities toward the eventual development/selection of Proposed Design Alternative (Alternative 1b); the design determined to cause the fewest environmental impacts while preserving a substantive portion (approximately 88 acres) of the island's historic 200-acre footprint (*Figure 6*). The design would raise the island's elevation using dredged fill material (fill) from the Calcasieu Ship Channel. Fill would be placed in two completely contained and one un-contained fill area cells with the goal of creating/enhancing optimal colonial waterbird nesting and brooding habitat. Fill Area Cell A would be constructed to a +3.0 ft NAVD88 elevation, with a very gradual slope inward towards an existing tidal creek and pond. Fill Area Cell B would be pumped to a +3.5 ft NAVD88 elevation with a natural slope to an existing pond. Fill Area Cell C would be nourished to a +1.0 ft NAVD88 elevation encompassing the adjacent pond and tidal creek. An estimated 390,000 cubic yards are anticipated to be dredged and placed in these contained cells. The linear footage of the containment dike is approximately 8,222 feet with strategic containment dike gapping implemented.

Extensive conversation and coordination was implemented amongst designated Office of Fisheries personnel towards minimizing potential impacts to the state's Tier 1 public

oyster seed ground in association with this restoration project. To that point, a host of best management practices were instituted for the project duration including:

- Stringent island access guidelines for project contractors.
- Installation and maintenance of Type II sediment curtains along targeted sections of the project's access corridor.
- LDWF project oversight to ensure full best management practices compliance and coordination with Office of Fisheries.

Proposed Timeline

Based on current (end of 2019) scheduling, the Rabbit Island Restoration Project will initiate construction in September 2020.

LAKE BORGNE

Lake Borgne Marsh Creation Project represents a large-scale restoration strategy for the southwestern shoreline of Lake Borgne that would re-establish the bay rim and intertidal marsh habitat that has degraded. As such, restoration was prioritized within the Louisiana Trustee Implementation Group Restoration Plan #1: Restoration of Wetlands, Coastal and Nearshore Habitats; Habitat Projects on Federally Managed Lands; and Birds (October 2016). The comprehensive project would create or restore approximately 2,935 acres of marsh habitat designed to establish habitat for a 20-year project life (*Figure 7*). This marsh creation project would utilize an estimated 13.0 million cubic yards of fill from the Lake Borgne borrow area. The Preferred Alternative (LB3) addresses an area of marsh that has a greater potential for erosion due to the exposure of wind-driven waves, boat traffic and deteriorating shoreline protection features.

Proposed Timeline

Based on current scheduling, the Lake Borgne Marsh Creation Project will initiate construction in 2021.

RECREATIONAL-USE RESTORATION PROJECTS

The 2010 *Deepwater Horizon* oil spill prevented Louisiana citizens from enjoying typical recreational activities, such as fishing and spending time on the beach. As such, trustees were charged with the restoration of lost recreational opportunities. To restore these losses, LDWF focused on:

- Creating new or improved access to natural resources for recreational purposes by enhancing existing or constructing new infrastructure.
- Providing or improving water access in publicly owned areas through the con-

TABLE 8. Status of individual 2010 Deepwater Horizon oil spill recreational-use projects.

PROJECT	STATUS (FY 2019-2020)
Atchafalaya Delta WMA Campground Improvements	Engineering & Design
Atchafalaya Delta WMA Improvements	Engineering & Design
Middle Pearl Boat Launch	Engineering & Design
Pass-a-Loutre WMA Campground Improvements	Construction of principal campground improvements completed (6/24/20). Final project elements (bulk heads, boats) to be completed soon (July 2020).
Pass-a-Loutre WMA Crevasse Access	Construction of five crevasses initiated (late February, 2020) and completed (April 2020)
Pointe-aux-Chenes WMA Island Road Fishing Piers and Boat Landing (Phase I)	Construction initiated (February 2020) with estimated completion (December 2020).
Pointe-aux-Chenes WMA Water Control Structure, Docks and Pirogue Launch (Phase II)	Final engineering and design submitted (June 2020).
Pointe-aux-Chenes WMA Pirogue Pull-overs (Phase III)	Awaiting completion of resident levee work before construction initiated
Rockefeller Wildlife Refuge Piers	Construction initiated for three recreational piers (East End Locks, Unit 4, and Mud Hole) completed (6/23/20).
Rockefeller Informational Signage	Installation of 165 signs (navigation, road, education) completed (1/20/20 - 2/27/2020).

Recreational-use restoration projects on Pass-a-Loutre WMA.

Recreational-use restoration projects on Rockefeller Wildlife Refuge.

struction and operation of boat ramps, piers or other infrastructure could also improve public access.

- Larger-scale infrastructure improvements such as the construction or improvement of roads and bridges could also serve to improve access to natural resources.
- Enhancing public access would also include targeted acquisition of land parcels to serve as public access points.

For FY 2019-2020, *Table 8* provides an overview status of individual 2010 *Deepwater Horizon* oil spill recreational-use projects

UPCOMING PROJECTS

RESTORATION PLAN #7

On Oct. 23, 2020, the Louisiana Trustee Implementation Group finalized Restoration Plan and Environmental Assessment #7: Wetlands, Coastal, and Nearshore Habitats and Birds. The plan formalized restoration of species and critical wildlife habitats that were significantly impacted by the 2010 *Deepwater Horizon* oil spill.

Isle au Pitre Restoration: Engineering and Design

Isle au Pitre represents one of the state's remaining historic brown pelican colonies. Located in St. Bernard Parish, the island is currently 20 acres in size, however, only less than 2 acres serve as suitable colonial waterbird nesting habitat for brown pelican, clapper rail (*Rallus crepitans*), black skimmer, terns and gull species.

Initial project design highlights the enhancement of colonial waterbird nesting conditions by elevating portions of the existing island with dredged sediment and planting suitable vegetation for nesting brown pelican and wading bird species (*Figure 8*). Of note, the original island footprint may be expanded should an economically feasible method be identified. Additionally, specific habitat features will be implemented to support targeted avian species productivity including American oystercatcher (shell rakes) as well as tern and black skimmer nesting habitat (shell or small limestone). Due to the island's inherent and detrimental environmental forces (e.g., wind driven wave energy), horizontal shoreline protection features (e.g., simple rock breakwaters) will be installed around select portions of the island in support of extending project lifespan as well as encouraging oyster attachment and reef recruitment.

Terrebonne Bay HNC Restoration: Engineering and Design

Terrebonne Bay HNC represents one of the state's remaining historic brown pelican colonies. Located in Terrebonne Parish, the island is currently 32 acres, however, only less than 10 acres serve as suitable nesting habitat for brown pelican, roseate spoonbill (*Platalea ajaja*), royal tern (*Thalasseus maximus*), tricolored heron (*Egretta tricolor*), laughing gull (*Leucophaeus atricilla*) and various other species.

Initial project design will restore the island's original rock containment dyke footprint (approximately 50 acres, *Figure 9*). This action will serve two primary purposes: First, contain future deposited sediment and second, provide erosion protection from wind driven wave energy. Upon completion, island elevation will be increased via dredge sediment and suitable vegetation will be planted. Limestone aggregate will be deposited along the island's perimeter thereby a low maintenance beach-like feature for nesting terns and black skimmers. Collectively, these actions are intended to prevent routine tidal inundation and increase overall nesting success.

Bird's Foot Delta Hydrologic Restoration: Engineering and Design

The Mississippi River Bird's Foot Delta remains one of North America's most unique and vibrant wetland habitats. Nowhere else does a shallow fresh riverine system mix with the deep saline waters of the continental shelf. The area maintains a unique assemblage of wildlife and fisheries species including freshwater and marine fisheries, migratory and resident birds, a unique blend of marine and freshwater reptiles, and marine mammals among others. Collectively, the Delta (approximately 165,000 acres) is managed by USFWS and LDWF. These agencies are charged with the implementation of wildlife conservation measures while ensuring the public access and opportunities to enjoy those same natural resources year round.

The Mississippi River Bird's Foot Delta received another designation: the closest landmass to the 2010 *Deepwater Horizon* oil spill. As such, the Delta experienced some of the most pervasive and repeated oiling events which caused extensive damage throughout these unique habitats and, impacting a host of wildlife species that rely on its services. Due to the size and scale of this specific injury, Trustees asserted that landscape-scale restoration was the most appropriate and effective means to address 2010 *Deepwater Horizon* oil spill impacts to the Delta. This

FIGURE 8. Isle au Pitre restoration plan.

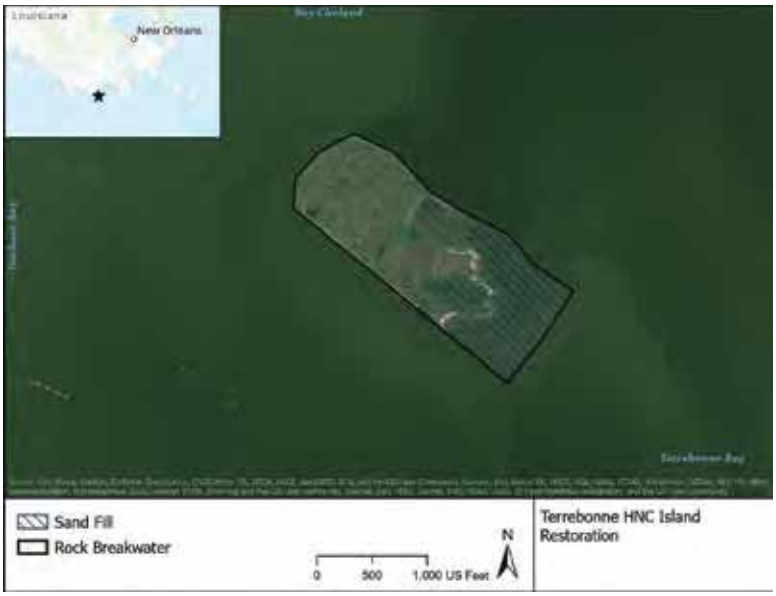


FIGURE 9. Terrebonne Bay HNC restoration plan.

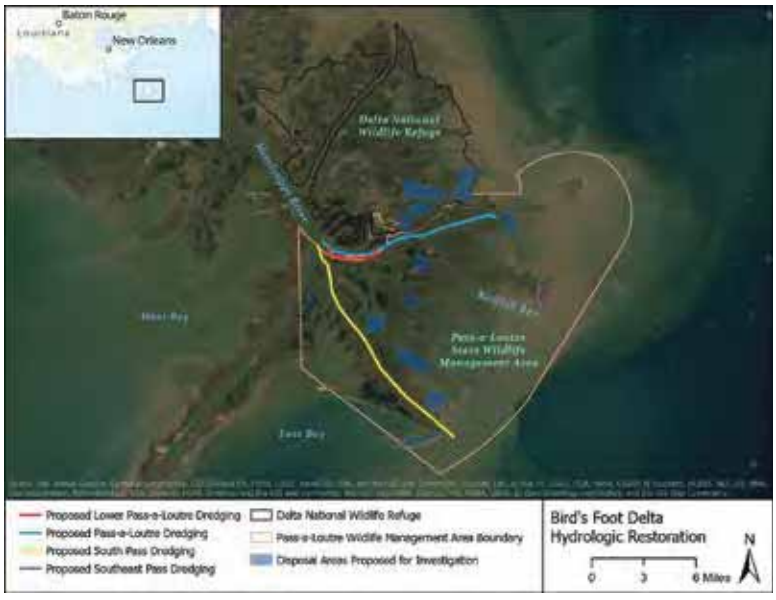


FIGURE 10. Bird's Foot Delta hydrologic restoration plan.

project entails hydrologic restoration of the Mississippi River Bird's Foot Delta by dredging select passes (Pass-a-Loutre, South Pass, and Southeast Pass). In doing so, the Mississippi River will be reconnected to the Bird's Foot Delta's eastern and central marsh complexes.

The project seeks to accomplish four principal goals:

- Restore riverine processes to enhance natural marsh accretion via existing small sediment diversions (crevasses) - creating approximately 750 acres of tidal wetlands.
- Build and enhance over 1,500 acres of subtidal mudflats and submerged aquatic weed beds.
- Use dredged sediment beneficially to create over 1,000 acres of fresh and brackish marsh.
- Use dredged sediment to create approximately 20 acres of beach habitat for colonial nesting waterbirds such as terns, Black Skimmers, and solitary shorebirds.

The project will initially yield measurable benefits by building new wetlands from the dredged sediment; however, the primary long-term project benefits will result from restoring the hydrology of the Bird's Foot Delta (*Figure 10*). With flow increased through the passes proposed for dredging, the Mississippi River will be able to disperse its sediment laden freshwater payload (land building) and lower salinities within to the marshes and bayous of the Delta (approximately 100,000 acres). This project is truly a total ecosystem restoration project, as it would have a positive influence on land manager's ability to implement wildlife conservation measures which have a direct nexus to enhancing the public's recreational opportunities (fishing, hunting, boating, camping, and several other non-consumptive activities) within the Bird's Foot Delta.

Proposed Timeline

Based on current scheduling, formal engineering and design activities for all projects identified will initiate in 2021.

LOUISIANA TIG: MONITORING AND ADAPTIVE MANAGEMENT

Secretive Marshbird Population Modeling

Based on available habitat, Louisiana's coastal wetlands quite possibly supports the largest populations of secretive marshbirds in North America. However, the expansive and somewhat inaccessible nature of these habitats has generated significant data gaps (e.g., secretive marshbird species abundance and distribution within coastal basins), a fact that greatly limited the trustees' ability to document potential 2010 *Deepwater Horizon* oil spill injury to this guild. To address this problem, LDWF and the trustees proposed and received funding via LA TIG resolution in support of a multi-year collection of remotely sensed and local habitat data. These activities will be accomplished in tandem with call back surveys (i.e., the principal survey means for the guild) to create robust predictive models for estimating secretive marshbird densities within select coastal basins. Information generated from this project will address identified data gaps and greatly assist the trustees' ability to characterize and promote beneficial habitat features that may likely benefit this bird guild.

Within FY 2019-20, Contractor has been actively engaged in the identification of representative field site locations throughout the designated study area (Pontchartrain, Biloxi, Barataria and Terrebonne coastal basins). To the extent possible, field site locations are being established in direct proximity to existing CRMS stations to maximize informational and fiscal efficiencies. In tandem, these sites are being individually ground truthed to ensure the Contractor's ability to access the site for future data collection. Collectively, these activities will be instrumental in developing the Contractor's project monitoring plan (due to LA TIG by the end of the calendar year) and ensure timely initiation of the 2021 field sampling. Additionally, Contractor has been identifying/securing assets (e.g., boats, vehicles, lodging, etc.) in support of future monitoring activities.

Avian Guidance Document

Louisiana represents one of the largest and most dynamic coastal systems in the world consisting of a vast complex of freshwater, intermediate, brackish, and saline marshes, sandy barrier islands and headland beaches, estuaries, and nearshore marine habitats. These critical habitats support regionally, nationally, and, in some cases, globally important populations of migratory and resident bird species (Remsen et al. 2015). The 2010 *Deepwater Horizon* oil spill caused extensive negative impacts (injuries) to these bird populations and to their habitats, reducing habitat quality and resource availability necessary for the recovery of these bird populations.

Within the LA TIG, the Small Bird Group continues to identify and prioritize critical informational needs (LA TIG Resolutions: Colonial Water Birds, Secretive Marsh Birds) to facilitate more efficient and representative bird restoration projects throughout Louisiana. As such, the Small Bird Group proposed and received funding for the development of a Guidance Document for Avian Habitat Restoration and Monitoring in Louisiana (Avian Guidance Document or Deliverable); a deliverable(s) which integrates coastal processes and avian ecology requirements with potential coastal engineering / construction specifications within representative individual coastal habitats/regions, based on taxonomic Working Groups (Working Groups). Deliverable(s) will address a major knowledge gap and is considered critical in supporting ongoing and future 2010 *Deepwater Horizon* oil spill avian restoration activities. Further, deliverable(s) will greatly enhance the LA TIG's ability to inform the general public regarding restoration of their injured natural resources.

Final Deliverables

For each of the following bird types (Shrub-Associated Breeding Birds, Ground-Associated Breeding Birds and Marsh-Associated Breeding Birds), the final deliverable(s) will document:

1. habitat(s) and beneficial features within these habitat(s) utilized for meeting targeted aspects of avian species life history requirements, with emphasis placed on increased nesting and reproductive productivity, to efficiently and effectively restore Louisiana's injured coastal bird species.
2. guidelines for project engineering and construction to maximize the development of productive avian habitat(s) and/or incorporation of beneficial habitat features within restoration projects.
3. standard comprehensive monitoring protocol(s) required to facilitate documentation of avian benefits generated by both individual (i.e., site-scale) and broader coastwide Louisiana restoration projects.

Proposed Timeline

Based on current scheduling, formal project activities will initiate Fall 2020.

REGIONWIDE TIG: RESTORATION PLAN #1 / ENVIRONMENTAL ASSESSMENT

Chandeleur Islands Restoration: Engineering & Design

Deepwater Horizon Regionwide TIG funds have been designated to complete engineering and design (E&D) for a large-scale restoration project benefiting the Chandeleur Islands and the many species that use them with a particular focus on birds. The Chandeleur Island chain is a series of barrier islands in eastern St. Bernard and Plaquemines Parishes in Southeast Louisiana. The islands are located between the Gulf of Mexico and Chandeleur Sound. The Chandeleur Islands include Chandeleur Island, Gosier Islands, Grand Gosier Islands, Curlew Islands, New Harbor Island, North Island, Freemason Island, and a few unnamed islands. This E&D project focuses on restoration of the large Chandeleur Island, the seagrass beds behind it, its southern fragmented portion, and New Harbor Island; a significant historic colonial waterbird nesting colony. The islands and seagrass beds that would be the focus of this E&D project are state and federally owned and collectively managed by the USFWS via memorandum of agreement with LDWF as Breton National Wildlife Refuge.

There are more than 50 species of flora and fauna designated as "species of greatest conservation need" on the Chandeleur Islands. Some of these species' only occurrence in Louisiana is on these islands. New Harbor Island contains the largest density of nesting birds on the island chain. The Chandeleur Is-

LEFT: Representative image of Chandeleur Islands. RIGHT: Colonial waterbird nest dotting analyses.

lands are also the only significant site of sea turtle nesting in Louisiana, the northernmost nursery for Lemon Sharks, and provide important habitat for a variety of fisheries species.

The islands have suffered extensive damage from hurricanes, especially Georges in 1998 and Katrina in 2005. They are also subject to subsidence, sea level rise, and suboptimal sediment input. The islands and seagrass beds were damaged by the 2010 *Deepwater Horizon* oil spill, and then benefitted from the construction of spill-related mitigation sand berms. Despite the berm project, the project area is experiencing a high rate of land loss, which threatens the dozens of avian and aquatic species that depend on it as critical habitat.

This restoration project will complement and enhance ongoing efforts of Deepwater Horizon Trustees and other partners to address habitat loss and degradation to nesting and foraging habitats for a large number and wide variety of species.

Proposed Timeline

Based on current scheduling, formal engineering and design activities will initiate in 2021.

REGIONWIDE TIG: MONITORING AND ADAPTIVE MANAGEMENT

Regionwide Colonial Waterbird Monitoring

Colonial waterbirds incurred significant injuries throughout the northern Gulf of Mexico as a result of the 2010 *Deepwater Horizon* oil spill. One of the principle means by which Trustees documented these injuries was through the implementation of regimented colonial waterbird aerial nest surveys and nest dotting analyses implemented in 2010 through 2013 (Colibri and Ford 2015). As this method has proven to be tremendously accurate (within 1 cm^2) and repeatable, the State of Louisiana has adopted this monitoring method in documenting individual and statewide performance (number of nests generated, adult bird census, etc.) within current and future colonial waterbird activities.

Building on theses success, Deepwater Horizon Regionwide TIG funds (current and future) have been designated towards implementing regionwide (Texas through Florida) monitoring of colonial waterbird nesting activities. These activities are intended as one means by which Trustees will document and partially evaluate colonial waterbird breeding population performance at a regionwide scale. It is envisioned that these efforts will be fully integrated with established, ongoing, smaller-scale monitoring programs thereby providing Trustees with a more comprehensive means to characterize benefits generated from 2010 *Deepwater Horizon* oil spill bird restoration activities. Other potential benefits associated with this activity include:

1. population trend data necessary to contextualize outcomes from restoration activities throughout the Gulf (see Frederick and Green 2019).
2. document outcomes of restoration projects that have already been implemented that lack a current bird monitoring component.
3. partially inform future restoration decision-making by informing the cost-effectiveness (i.e., Restoration Evaluation) and the local and regional context of proposed projects (i.e., Restoration Planning).

Proposed Timeline

Based on current scheduling, formal project activities will initiate Fall 2020.

LITERATURE CITED

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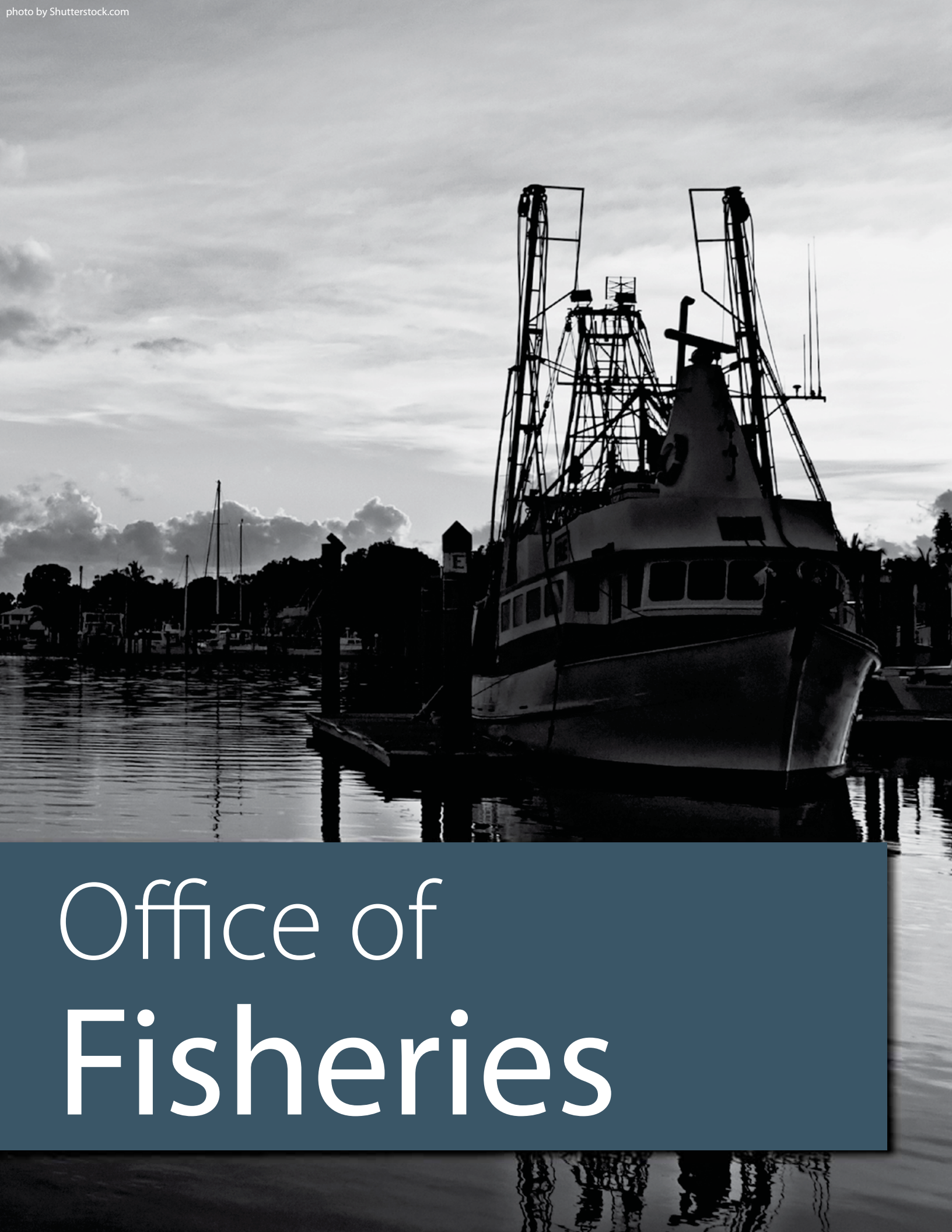


Office of Fisheries

MISSION

The purpose of the Fisheries program is to manage living aquatic resources and their habitat, to support the fishing industry, and to provide access, opportunity and understanding of the Louisiana aquatic resources to the state's citizens and other beneficiaries of these sustainable resources.

OBJECTIVES

- To provide high-quality fishery management information through effective data collection, analysis and information sharing.
- To be an effective, efficient steward of our renewable aquatic resources.
- To provide and enhance the recreational fishing experience through improved access, opportunity and public awareness.
- To maintain a sustainable and economically viable fisheries environment.
- To create a work environment in which all Fisheries staff are enabled and empowered to achieve the office's goals and objectives.

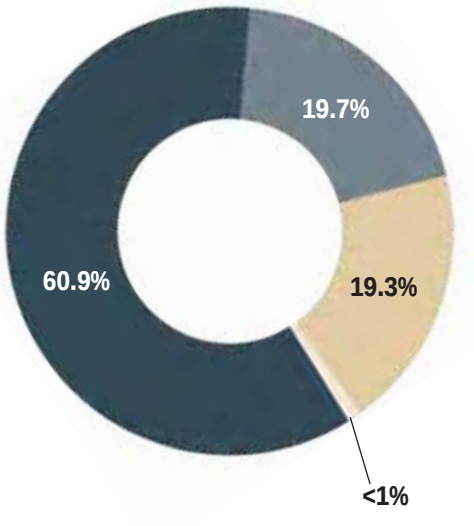
ORGANIZATION

The Office of Fisheries structure is comprised of the following sections and programs:

- *Marine Fisheries* - to manage the marine (saltwater) fisheries resources of the state.
- *Inland Fisheries* - to manage the inland (freshwater) fisheries resources of the state.
- *Oyster Lease Program* - to manage oyster lease agreements and alternative oyster culture permits.
- *Fisheries Research and Assessment* - to provide technical and scientific research in support of fisheries management.
- *Fisheries Extension* - to provide guidance and assistance to Louisiana's valuable commercial fishing industries, and to provide fishery management information to the recreational sector through improved fishing and boating access, aquatic outreach and volunteer activities.

FISHERIES FUNDING

FISHERIES FUNDING SOURCES
(APPROPRIATED FUNDING)



Statutory Dedications - $33,175,692

Interagency Transfer - $10,716,873

Federal Funds - $10,508,651

Self-Generated Funds - $116,976

The Statutory Dedications utilized by the Office of Fisheries are primarily from the Conservation Fund and the Artificial Reef Trust Fund. The Conservation Fund is funded primarily by license revenue and oil and gas revenue from Louisiana Department of Wildlife and Fisheries (LDWF) property. The Conservation Fund is a general funding source used to fund invasive aquatic plant control, marine commercial fisheries monitoring, socioeconomic analyses and reports, and general office operations. The Artificial Reef Trust Fund is funded through donations from oil and gas companies. Oil and gas companies donate one half of the realized savings over a traditional onshore removal of obsolete oil and gas offshore structures. The Artificial Reef Trust Fund is used to fund the building and monitoring of inshore, nearshore and offshore artificial reefs, and operations of the Artificial Reef Program.

Federal funds used by LDWF come from various federal entities, such as USFWS, NOAA and Gulf States Marine Fisheries Commission. Funds from USFWS are primarily from federal assistance through the Sport Fish Restoration Program. These funds are dedicated to marine and freshwater monitoring, research, management and boating access, aquatic education, and aquatic outreach. The funds from NOAA represent various grants that are utilized to collect offshore fisheries independent data and commercial fisheries dependent data. The funds from Gulf States Marine Fisheries Commission represent various grants that are utilized to collect recreational and commercial fisheries dependent data.

Interagency transfer funds are provided by other state agencies and used to fund various projects. These projects include fisheries monitoring associated with the state coastal master plan, oil spill response and damage assessment, and oil spill restoration projects.

Self-generated funds are provided by other non-governmental entities and are used to fund various projects. These activities include participation in Gulf of Mexico Fisheries Council and collaborations with various universities.

RESOURCE MANAGEMENT

Louisiana's fisheries resources benefit all constituent groups in Louisiana, across the Gulf Coast and throughout the nation. The Louisiana Constitution of 1974 provides the framework to protect and enhance habitat and to ensure sustainable commercial and recreational fisheries. Fisheries biologists collect the basic ecological data needed to efficiently and effectively manage fisheries resources to benefit all constituent groups.

LDWF is responsible for managing Louisiana's fisheries and maintaining healthy fish populations and habitat for the benefit of Louisiana's residents and visitors of both today and tomorrow. Responsible fisheries management starts with sound, scientific information about fish populations and the ecosystems in which they live, as well as the fisheries that harvest them. LDWF biologists use a variety of methods to gather this information, including examining fishermen's catch (fishery dependent data) and conducting scientific studies (fishery independent data).

MONITORING

Monitoring fisheries, both fresh and saltwater, is a crucial component of resource management. Important biological data is collected specific to each type of sampling. In addition, hydrological data (conductivity, turbidity, dissolved oxygen, salinity and water temperature) are collected with each biological sample, as are air temperature and unusual or other significant conditions. The information gathered during monitoring efforts, such as fisheries independent sampling, gives biologists and administrators the information essential to manage each fishery appropriately; openings, closures, limits and emergency actions are based upon monitoring data.

SHRIMP SAMPLING

The long-term objectives of the shrimp fishery research program are to assess and monitor shrimp stocks and to evaluate shrimp fishery impacts on other fisheries and protected species. Each species requires an assessment of the condition of the stock, the fishery and sectors of the economy that are impacted by changes in either. The assessments are also needed so that LDWF can determine whether or not a stock is overfished.

Inshore and offshore shrimp sampling continued during FY 2019-2020. In inshore waters, 299 6-foot and 1,747 16-foot trawl samples were collected. In state offshore territorial waters and the Exclusive Economic Zone, 306 20-foot trawl samples were collected. Information crucial to setting the opening dates of the 2020 spring inshore shrimp season, closure dates of the 2020 spring inshore shrimp season, opening and closing dates of the 2019 fall inshore shrimp season, and the closing and reopening of shrimping in portions of state territorial waters in 2019 and 2020 was collected using these sampling procedures.

OYSTER SAMPLING

Management of the public oyster grounds and reservations relies heavily upon data gathered through a comprehensive biological monitoring program. State biologists use two gear types (24-inch hand dredge and square-meter frame) when sampling the public reef areas, and analyze the data collected to determine overall health of the oyster resource. For annual stock assessments, LDWF biologists collect field samples in July from each CSA across Louisiana to perform a quantitative evaluation of the oyster stock on the state's public oyster areas. Biologists SCUBA dive on designated sampling stations within each CSA. At each sampling station, an aluminum square-meter frame (quadrat/m^2) is randomly placed on the oyster reef, and all live and dead oysters, reef- associated organisms, and exposed reef material are collected by hand from the upper portion of the substrate within the quadrat. This process is replicated five times at each sampling station. Water temperature, dissolved oxygen, and salinity data are collected in conjunction with the m^2 samples, and cultch material types are identified and weighed. Sampling conducted as part of the annual oyster stock assessment plays a valuable role in predicting the success of the upcoming oyster season, which generally opens in early September and runs through April of the following year. However, the season may be closed or delayed if biological concerns or enforcement problems are encountered. LDWF uses oyster stock assessment information to make recommendations regarding setting the oyster season to the Louisiana Wildlife and Fisheries Commission.

Over 500 square-meter samples are collected in early July (including 25 sites in Barataria Basin for the Coastal Protection and Restoration Authority System-Wide Assessment and Monitoring Program (SWAMP), and approximately 1,600 dredge samples are collected during each calendar year (including three sites sampled each event for SWAMP. In addition, 34 square-meter sites in Barataria Basin and 42 square-meter sites in Pontchartrain Basin are each sampled in April/May and again in September/October for SWAMP, for an overall total of 1,036 square-meter samples collected between July 2019 and June 2020. Oyster impacts from the increased freshwater flows in the spring and summer of 2019 were investigated via standard and enhanced fisheries independent sampling (dredge) on public oyster areas. The flood event of 2019 dramatically reduced salinities in the receiving basins and increased oyster mortalities were documented in subsequent biological sampling. As a result of the 2019 flood event, oyster mortality on public oyster areas in St. Bernard Parish ranged from 75-100%. Mortality from LDWF samples on private leases near Lake Borgne and Mississippi Sound were also observed to be over 75%. Observed mortality in the Atchafalaya basin ranged from 32-100%. Sabine Lake saw significantly high mortality as well, concentrated in the northern part of the lake. No single oyster growing area in the state was left unaffected, and the losses to the resource will continue to affect the oyster industry for years to come. Sampling carried over into FY 2019-2020 on which the Bonnet Carré Spillway opened for an unprecedented two times in 2019, for a total of 123 days, not closing until July 27, 2019. USACE initiated an opening of the Bonnet Carré Spillway again on April 03, 2020 to divert high water flow from the Mississippi River into Lake Pontchartrain in order to reduce pressure on the river levees protecting the city of New Orleans. The spillway remained open for 28 days, closing on May 1, 2020. This opening marked the first time the structure was operated in three consecutive years. Due to low amounts of resource from prior year flooding mortalities, a less traditional method was used to monitor oyster mortality and spat recruitment. Beginning in April 2020, oyster retention traps (modified crab traps) were deployed at six sites in CSA1. Each oyster retention trap was outfitted with a spat plate and contained 20 live seed- or sack-sized oysters. Traps were checked bi-weekly and continued to be monitored for four weeks beyond the final closure of the Bonnet Carré Spillway.

In an effort to facilitate natural recovery from the 2019 flooding event, LDWF collected oysters from reefs in the least impacted basins of the State and transplanted to previously productive reefs in Pontchartrain Basin. Adult reproductive oysters were collected in Sister Lake and in Calcasieu Lake during each rou-

Michael C. Voisin Oyster Hatchery

tine dredge event in October 2019, November 2019, and January 2020 and transplanted to Round Island, Shell Island, and Lake Fortuna sites, respectively. The objective of the project was for these transplanted animals to spawn and reseed reefs as the salinities in the area return to a suitable range for oyster production. With each transplant, a sub sample of 20 oysters were set in a containment device (modified crab trap) with a spat plate attached to it for monthly monitoring. As of June 2020, only one containment device remained at the Shell Point site to be monitored. It contained 92 live spat found attached to the spat plate. All other containment devices were lost and not replaced over the course of the monthly monitoring.

Dredge data is used to monitor the overall health of the oyster resource during the year and to assess recruitment of new age classes of oysters into the population. Field biologists also gather hydrological data on public oyster areas and develop harvest and fishing effort estimates by conducting boarding report surveys of oyster boats. Reef areas are determined using periodic side-scan sonar surveys, historical reef maps and poling surveys. Additionally, field biologists routinely gather hydrological data on public oyster areas and develop harvest and fishing effort estimates by conducting boarding report surveys of oyster boats during open oyster seasons.

Annual Oyster Stock Survey

The statewide oyster stock size in 2019 decreased from 2018 levels, where approximately 266,782 barrels of oysters decreased to 249,800 barrels available on the public oyster areas of Louisiana (excluding Sabine Lake). Unfortunately, this stock size represents an approximate decrease of 6% from 2018 levels and 92% decrease from the long-term average (1999 through 2018) of 2.41 million barrels.

Sustainable Oyster Shellstock Modeling

Sustainable Oyster Shellstock Models (SOS), also called Shell Budget Models, are being improved and utilized to provide harvest thresholds for the public oyster areas of Louisiana. These models will help maintain reef material over the course of time and were created in partnership with Dr. Thomas Soniat at the University of New Orleans (UNO). This computerized model provides guidance for fisheries management with the goal of conserving the oyster reef base. Oyster stock assessment sampling provides model input data such as estimates of reef mass (grams per m^2) and size-frequency of oysters. Utilizing additional data on oyster growth, mortality, salinity and estimated commercial harvest rates, the model estimates the amount of oyster harvest that can be allowed on each individual reef while preserving the reef mass simulated based on three different conditions—low, medium, and high salinity patterns for each basin. The model has been tested statewide and showed promising results, getting expanded to other Gulf States too. At this time, SOS models are applied to reefs in CSA 1 North, 1 South, 3, and 5. CSA 6 has no known reef acreage to apply to model outputs and CSA 7 is managed as a separate entity from the remainder of state. Sabine Basin is closed for commercial oyster harvest since Legislative Act 159 (2018) that instituted a moratorium on oyster fishing in Sabine Lake. Calcasieu Lake is tonging only with strict, low daily harvest limits.

Meat Yield Study

LDWF Oyster Program staff collected data from 93 shucked oyster sacks from November 2018 through December 2019 to investigate average meat yield to compare with the current conversion factor (6.47 lbs per 105-lb sack of oysters) used by the National Marine Fisheries Service. Sacks of oysters were collected from four basins across the coast of Louisiana: Pontchartrain, Barataria, Terrebonne, and Calcasieu. An initial report was produced internally in February 2020. The report suggests that the National Marine Fisheries Service 6.47-lb conversion factor may be good for a yearly meat yield average, though data indicates a likely need for seasonal and/or basin-specific conversion factors rather than a flat conversion.

Michael C. Voisin Oyster Hatchery Operation Overview

The Michael C. Voisin Oyster Hatchery is operated cooperatively by both LDWF and Louisiana Sea Grant. Louisiana Sea Grant is contracted to assist with facility operations and to provide recommendations to LDWF for hatchery operations. Hatchery staff work together to produce oyster larvae and algae. Phycologists grow marine microalgae, which is used to feed oyster larvae and supplement broodstock holding systems. LDWF staff includes a biologist supervisor, two biologists, and a technician. One biologist is designated as a

Senior Phycologist and Water Quality Manager and the other biologist is designated as a Water Systems and Larval Production Assistant Manager. Louisiana Sea Grant staff includes a technical director and three research associates. Like LDWF, one research associate is a phycologist, another manages the water systems and larval production, and one assists with daily operations and management of the Louisiana Sea Grant Oyster Research and Demonstration Farm. In addition, Louisiana Sea Grant hatchery staff provide extension services for people interested in topics such as growing oysters, producing larvae and operating seed nursery systems. LDWF and Louisiana Sea Grant staff work together to produce diploid, triploid and tetraploid larvae and seed for orders, restoration, breeding program and research.

Louisiana Sea Grant manages the Louisiana Sea Grant Breeding Program. This oyster breeding program houses several breeding lines of diploid and tetraploid oysters. Diploid and tetraploid refers to the number of chromosome sets an organism contains (diploid being two sets and tetraploid four sets). Tetraploid oyster sperm is used to fertilize diploid oyster eggs, which reliably produces 100% triploid (three chromosome sets) oysters. LSU and a private breeding company, 4Cs Breeding Technologies, Inc., share intellectual property rights for these tetraploids. 4Cs licenses the use of these tetraploid oysters.

Historically LDWF focused to produce diploid larvae and spat for restoration, but that mission changed in 2018 when LDWF was tasked with handling larval and seed sales. Sales had been a Louisiana Sea Grant task since the hatchery opened in 2015. Thus, throughout the hatchery season, which goes from March through November, LDWF produces both diploid and triploid larvae and seed to fulfill customer sales orders and complete restoration projects.

2019 Fall Production

2019 Total Fall Production

Diploid, triploid, and tetraploid larvae and seed were produced for restoration, sales, research, or Louisiana Sea Grant's breeding program. The majority of hatchery production was diploid pediveligers (approximately 231 million pediveligers) for LDWF spat-on-shell restoration projects. Additional diploid pediveligers were set on macrocultch (coarsely ground up oyster shell) for restoration projects. Approximately 326 million D-stage larvae were deployed in Barataria Bay, with the hopes that some will survive and settle to on-bottom substrate. The D-stage larvae were deployed in a non-harvestable area near the coast of Grand Isle. A portion of diploid and triploid pediveligers were set on microcultch (finely ground up oyster shell that is approximately 250 microns large), to produce single seed oysters for sales. The fall 2019 larval production ended in November. Final production numbers for the 2019 hatchery season are as follows for diploid production approximately 271,386,125 pediveliger larvae, 326,866,666 D-stage, 40,213,964 spat, and 524,576 seed, for triploid approximately 25,788,980 pediveliger larvae and 513,626 seed, for tetraploid approximately 8,716 pediveliger larvae and 32 seed.

Fall Spat-on-Shell

Fall spat-on-shell production began in July 2019, when hatchery staff had large diploid spawns. In July 2019, 2,000 shellbags were constructed using approximately 40 cubic yards of recycled shell. Bags were prepared with the help of LDWF staff, Louisiana Sea Grant hatchery staff, and LDWF Volunteer Instructor Program. All bags were washed to remove dirt and grit and loaded into tanks by LDWF staff. In order to complete spat-on-shell production there was a collaborative effort between the LDWF Fisheries Research Lab Director, lab staff, LDWF hatchery staff, and Marine Fisheries Section (including specifically Oyster Program and Oyster Program Manager, Marine Fisheries Program Manager, and Biologists Managers and staff from Coastal Study Areas 1 and 3) for help with deployment locations and sampling. Louisiana Sea Grant offered support, both in the form of consultation from the Hatchery Technical Director and Louisiana Sea Grant hatchery staff.

In Fall 2019, all of the deployment locations designated by the LDWF Oyster Program Manager were in Hackberry Bay, north of Grand Isle. These deployments were completed by LDWF staff. Fisheries Research Lab boats were used for the deployments. A total of 166,780,064 pediveligers were set on shell from July through August 2019, which was considered the fall spat-on-shell set. A subsample of 60 shells were collected during each deployment, then counted to determine an estimated number of spat deployed per deployment location. An estimated 31,614,311 spat were deployed in Hackberry Bay over various plots. Marine Fisheries continued the monitoring and sampling at each site for Months 1, 6, and 18, to determine spat survival and growth.

The overall goal of setting on shell is to produce spat-on-shell to replenish and enhance public oyster seed grounds and to create broodstock sites to enhance spawning stocks, which would provide recruits to surrounding oyster reefs. This project demonstrates LDWF's ability to use hatchery products as restoration services, to enhance oyster populations for the Louisiana oyster industry. Future spat-on-shell production or other restoration efforts can build on the experience and lessons gained from this first large-scale department run of hatchery-produced spat-on-shell.

Seawater Trial with Triploid Larvae

In September 2019, a seawater trial was conducted with a triploid larval brood, to compare different seawater treatments on larval growth and survival. Seawater treatments included artificial seawater, tangential flow filter seawater, post-gravel filter seawater, and normal hatchery seawater (control). Larvae raised in artificial seawater treatment had the highest percent hatching rate at 9% and larvae raised in normal hatchery seawater (control) had the lowest hatching rate at 3.2%. All treatments and control showed declines in cumulative larval survival and health from Day 0 through Day 4. At Day 4 all seawater treatments and control had 100% larval mortality. Possible factors contributing to larval mortality for seawater treatments and control could be from hatchery seawater water quality, which is mixed with the live algae fed to each treatment and control. Future water quality testing will continue in collaboration with Louisiana Sea Grant in 2020.

2020 Spring Production

Algal Production

Algal stock production continued through Jan. 1 and algal bags were inoculated mid-January. Algal production continued throughout the year. Staff installed a new UV filter in the Algal Production Room to reduce potential contamination of Vibrio species in seawater sent to the algae bags. An EDTA and nutrient media volume trial was conducted with flasks and bags in January, to observe how EDTA and different levels of media affected flask and bag growth and survival. Preliminary results showed minimal differences between treatments and control, final results are still pending.

Larval Production

The 2020 spring larval production began mid-March with diploid spawn attempts and then triploid spawn attempts. Due to the COVID-19 pandemic and staffing restrictions, only one hatchery staff operated the hatchery at a time from end of March through the middle of May. This was implemented to ensure the hatchery continued running while keeping staff safe. During this time, only diploid spawn

attempts were made. Production was focused on strictly diploid larvae for LDWF sales in the beginning of Spring 2020, then triploid and diploid production for LDWF sales from June and into the fall. Triploid spawn attempts were unsuccessful at producing pediveliger larvae, the cause of mortality needs further research. There was a tetraploid spawn attempt in the spring, which did not survive to pediveliger size. Total spring diploid production is as follows 13,511,065 pediveligers set on microcultch to produce seed for LDWF sales, 7,052,668 pediveligers sold, and 11,350,000 pediveligers set on macrocultch and used for restoration. The spat-on-macrocultch was deployed at LDWF's West Karako Bay Artificial Reef Site.

Spring Spat-on-Shell

In late February and early March 2020 there was a large scale effort for making shellbags for LDWF restoration purposes. Approximately 110 cubic yards of recycled shell was bagged, which produced over 4,000 shellbags. This is enough to satisfy eight setting rounds in setting tanks located under the Fisheries Research Lab in Grand Isle. Members from LDWF's Volunteer Instructor Program assisted LDWF staff with bagging shell. Due to the COVID-19 pandemic and staffing restrictions there was no spring 2020 spat-on-shell production.

Remote Setting Program

Since the 2010 *Deepwater Horizon* oil spill, Louisiana's public oyster seed grounds have experienced significantly lower levels of successful oyster reproduction (oyster spat set). Spat set is a key indicator of the overall oyster population's stability because it shows the recruitment of young oysters into the population. In response, LDWF developed the Remote Setting Program to increase oyster production levels.

In 2019, in collaboration with the Michael C. Voisin Oyster Hatchery, LDWF developed spat-on-shell protocol to investigate and monitor survival and growth of hatchery-raised animals by following protocols developed in a 2014 remote setting pilot project. Diploid oyster larvae were produced and deployed to nine sites--one in Breton Sound, one in Barataria Bay and seven in Hackberry Bay. At six months monitoring, no live oysters were observed at Barataria and Hackberry sites (December 2019), and further monitoring of those sites was discontinued. No live oysters were observed at 12-month monitoring at Breton Sound Public Oyster Seed Ground (May 2020).

The Oyster Remote Setting Facility in Buras became operational in November 2017, but due to the remoteness of the site and lacking sufficient staffing to maintain a daily presence there, LDWF is in the process of transporting operations to the Michael C. Voisin Oyster Hatchery in Grand Isle in order to continue smaller spat-on-shell trial runs that are more manageable, less remote, and able to be completed with staff on hand.

In February and March 2020, the hatchery coordinated multiple shellbagging events with assistance from LDWF and Louisiana Sea Grant. Approximately 110 cubic yards of shell were bagged, generating approximately 4,000 shellbags, which is enough shell for setting at least 64 million diploid pediveligers or enough to satisfy eight setting rounds in setting tanks located under the Fisheries Research Lab, Grand Isle. Spat-on-shell production and deployments were delayed during the spring of 2020 due to COVID-19, and not able to set any larvae on shell. However, during June 2020, the hatchery set 11,350,000 pediveligers on macrocultch that were deployed by LDWF staff within the public oyster seed grounds of Karako Bay.

The recycled oyster shell is a partnership between LDWF and Coalition to Restore Coastal Louisiana, collecting and stockpile oyster shells at the Buras site. Oyster shell is the material of choice for setting larval oysters. This program began during FY 2013-2014, when Coalition to Restore Coastal Louisiana began delivering shell to the Buras site for storage. As of June 2020, approximately 4,926 tons of shell had been delivered to the site.

MARINE FINFISH SAMPLING

The primary objective of the Finfish Program is to make rational recommendations for the management of coastal finfish stocks based on a database of scientific information. The information in the database is collected through fishery independent and dependent sampling. The fishery independent monitoring program is an ongoing collection of data by fisheries biologists in the field conducting surveys designed to sample coastal waters in an objective manner. The surveys collect information based on geographic ranges independent of commercial or recreational fishing operations.

Three gear types are used coast-wide to sample various year classes of estuarine-dependent fish:

1. A bag seine is used to sample young-of-the-year and provide information on growth and movement. More significantly, these samples provide information on the forage species and ecological components of marsh-edge and shoreline habitats throughout the coastal zone. Seine samples are taken monthly.
2. A gill net is used to sample juvenile, sub-adult and adult fish. It provides information on relative abundance, year class strength, movement and gonad condition. Gill net samples have been collected semi-monthly from April through September, and monthly from October through March using a strike net technique.

TABLE 1. 2020 Michael C. Voisin Oyster Hatchery spring production of diploid pediveligers and seed used by Louisiana Sea Grant and LDWF for restoration, sales and research.

	PURPOSE	DIPLOID
Total Pediveligers	LDWF Sales	13,999,334
Total Pediveligers Set on Microcultch	Produce Seed for LDWF Sales	16,856,065
Total Seed	LDWF Sales	1,090,338
Total Pediveligers Set on Macrocultch	LDWF Restoration	11,350,000

**NOTE: There are no numbers for triploid or tetraploids in 2020 because all spawn attempts and broods failed before harvest age. There was an issue with tetraploids and water quality this season. There was also no spat-on-shell restoration due to COVID-19 restrictions.*

TABLE 2. Spring 2020 hatchery-produced spat-on-macrocultch production.

LOCATION	GPS COORDINATES	LARVAL BROOD NAME(S)	EST. TOTAL # OF PEDIVELIGERS SET ON MACROCULTCH	EST. # OF SPAT DEPLOYED	DEPLOYMENT DATE
West Karako Bay Artificial/Brookstock Reef	30° 01' 00.012'N, 89° 16' 29.064"W	2SL++_05/12/2020 2CL++_05/21/2020	11,350,000	1,192,533	06/10/2020

LDWF staff deploying seine sampling gear.

LEFT: Removing a sample from a gillnet retrieval. RIGHT: Ladyfish, spot, menhaden and spotted seatrout sampled from a gillnet.

3. A trammel net is used to sample juvenile and sub-adult fish. It provides information on relative abundance, standing crop and movement. Trammel net samples are taken monthly from October through March.

During FY 2019-2020, the fishery-independent finfish sampling program collected 953 of 954 gill net samples (99%), 1,271 of 1,224 seine samples (104%) and 271 of 270 trammel net samples (100%), for a 100% overall completion rate statewide.

Marine fisheries biologists also collected 159 electrofishing samples in the Barataria Basin as part of an Interagency Agreement for coast-wide sampling as well as a State Wildlife Grant evaluating populations of certain estuarine species of concern.

FRESHWATER FINFISH SAMPLING AND MANAGEMENT

Waterbodies throughout Louisiana differ in their importance to the overall state fisheries and in the degree to which they can be managed. LDWF routinely samples a subset of rivers, streams, lakes and reservoirs based on their importance to the fishing public, size, productivity and, in the case of reservoirs, drawdown capability. Other considerations include existing and potential management needs that are specific to the waterbody. Waterbody sampling schedules are developed each year, and monitoring and management results are reported in LDWF Waterbody Management Plan updates, which can be accessed on the LDWF website.

Freshwater fisheries resources are monitored and managed through various sampling methods. In FY 2019-2020, biologists estimated relative abundance, age, growth and mortality, size class structure, species composition and genetic composition of sportfish populations in addition to physiochemical characteristics of the water on 93 lakes, rivers and streams. Sampling sites on inland lakes, reservoirs and rivers are predetermined and selected to represent available aquatic habitats within the various water bodies. Sampling protocol is standardized to the extent possible to allow for comparison of data over time and includes electrofishing, lead net, seine net, hoop net and gill net gear types. Lotic sampling methodology follows lake methodology closely, with the addition of habitat type and river stage parameters. LDWF Inland Fisheries biologists have developed standard operating procedures for sampling rivers and wadeable streams for biomonitoring of fish and mussel communities.

Electrofishing samples are collected in both spring and fall to provide an estimation of population trends including abundance, size, distribution, age structure and genetic composition. Sampling includes largemouth bass and crappie in the spring and fall for species population assessments, and fish community assemblage samples of all species collected in the fall of each year. A total of 604 electrofishing samples were taken for 120 hours of timed electrofishing during FY 2019-2020.

Seine samples are taken in many water bodies to determine fish community relative abundance and young-of-the-year recruitment of popular sport fishes that might be underrepresented with electrofishing gear. These samples occur from June to August each year. Fifty-two seine hauls were made during the FY 2019-2020.

Entanglement and trap net webbing are also used during standardized sampling throughout the year to collect crappie species, catfishes and sunfishes. A total of 51 gill net samples were taken on various lakes and rivers, while 168 lead net and hoop net samples were fished during FY 2019-2020.

With increased public demand for evaluation of freshwater fish harvest regulations, detailed largemouth bass age and growth assessment studies started or continued on 20 water bodies during FY 2019-2020, while crappie population assessment studies started or continued on four lakes. The extensive age, growth and mortality data collected for these assessments are used to inform and evaluate future management decisions and are summarized in LDWF technical report series.

Water quality data is collected each time a fisheries sample is collected on a waterbody. In FY 2019-2020, approximately 537 water quality samples were taken for physical and chemical criteria including temperature, dissolved oxygen, pH, salinity and conductivity.

Stocking data for LDWF waterbodies can be found in the Freshwater Fish Hatchery Program section of this report.

photo by Jess Van Dyke, Snail Busters (*forestryimages.org*)

RIVER AND STREAM SAMPLING

Understanding river basin biotic assemblages is an important aspect of fisheries management. Changes in community structure of aquatic biota in river and tributary systems within a watershed are indicators of anthropogenic and natural disturbances. Fish and mussel communities are sensitive to a wide array of direct and indirect stresses, including the effects of point source and non-point source pollution, sedimentation and changes in substrate deposition, habitat loss, riparian zone disruption, physicochemical changes in water chemistry, and flow modification. Fish and mussels occupy positions throughout the aquatic food web and share a unique relationship. The larval mussel stage, or glochidia, is attached and parasitic on the host fish's gills or fins. After a period of time, the larval mussel drops off of the fish and settles to the stream bottom. All Inland Fisheries districts performed sampling on flowing waters to analyze species composition of fish, sport fish populations, crawfish, freshwater mussels, and to conduct habitat assessments. Thirty rivers, streams, and bayous were sampled during FY 2019-2020, representing all of the major watersheds in the state.

AQUATIC NUISANCE SPECIES MONITORING

The "State Management Plan for Aquatic Invasive species in Louisiana" was written in 2005 and includes five objectives to help in the coordination and management of aquatic nuisance and invasive species within Louisiana. Briefly, the five objectives are to:

- Coordinate all aquatic invasive species management activities and programs within Louisiana and collaborate with other aquatic invasive species programs.
- Prevent and control non-indigenous invasive species through education.
- Eliminate locally established invasive species.
- Control the spread of established invasive species.
- Prevent the introduction of non-native species, or the spread of existing ones, through legislation and regulation.

In order to educate Louisiana citizens on the threat of aquatic nuisance and invasive species in our waterbodies, LDWF biologists conducted the following outreach and education activities during FY 2019-2020:

- Answered over 1,000 calls and emails related to apple snail inquiries.
- Asian Carp - with the assistance of Inland Fisheries LDWF collected plankton samples to locate breeding locations in major river basins
- Mississippi Interstate Cooperative Resource Association: Mississippi River Basin Panel - annual meeting and webinar.
- Gulf and South Atlantic Regional Panel on Aquatic Invasive Species - Spring and fall meeting and webinar.

The LDWF Aquatic Invasive Species coordinator compiled records and locations of aquatic invasive species within Louisiana waters and added those new occurrences to the USGS Non-indigenous Aquatic Species Program center database. Below is a list of aquatic invasive species monitored and logged occurrences for FY 2019-2020:

- Apple Snail - over 1,000 reports (most of which were from known locations)
- Tiger Prawn - 1 report
- Asian Carp (bighead, black, grass, silver) - 2 reports (seems to be due to the public becoming accustomed to seeing the carp)

photo by Jess Van Dyke, Snail Busters (*forestryimages.org*)

LEFT & ABOVE: Invasive apple snails and their bright pink eggs are prevalent throughout south Louisiana. RIGHT: The invasive Asian swamp eel was reported for the first time in Louisiana.

- Zebra Mussel - 1 report
- Asian Swamp Eels - have been reported for the first time in Louisiana
- Tilapia - reported in one private pond which were removed and in University Lakes in Baton Rouge
- Pacu - 1 report – these reports occur periodically but Pacu cannot survive over winter.

The LDWF Aquatic Invasive Species coordinator along with Inland Fisheries staff participated In the Lower Mississippi River Asian Carp Cooperative call and webinars. This participation allowed LDWF to receive funds to support future Asian carp research in Louisiana.

FISH KILL MONITORING

LDWF is charged with managing, conserving and promoting fisheries resources in Louisiana's waters. Investigating fish and/or mussel kills is a high priority that requires the immediate attention of Fisheries personnel. LDWF is responsible for responding to fish kills in a timely manner because the cause and effects of fish kills are typically unknown at the time of initial notification. Also, fish kills are highly visible to the public and often prompt related questions that must be addressed, and they may serve as a symptom of more significant problems in an area. When responding to a fish and/or mussel kill, LDWF biologist managers refer to the American Fisheries Society Special Publication #30 "Investigation and Monetary Values of Fish and Freshwater Mussel Kills" for protocol. The selection of the most appropriate method for estimating fish kill numbers and species composition is dependent on the type of habitats involved. In some cases, strand line counts may be used, while in other cases, transects, segments or other methods are often necessary. During FY 2019-2020, LDWF Office of Fisheries, Inland Fisheries Section investigated 20 fish kills throughout the state. All but two were attributed to naturally occurring low oxygen conditions in the rivers, lakes and marshes. The two other fish kills were from a power outage and a chemical spill. Nine fish kills were reported in the weeks following Hurricane Barry's July 13, 2019, landfall, which was followed by declining flood waters in the Atchafalaya and Mississippi Rivers. During FY 2019-2020, LDWF Office of Marine Fisheries investigated six fish kills throughout the state. Most causes were attributed to naturally occurring low oxygen conditions in the rivers, lakes and marshes.

OYSTER LEASE PROGRAM

The leasing and permitting of state water bottoms for cultivating oysters is administered by the Office of Fisheries. The Oyster Lease Program is responsible for maintaining records, collecting revenue and issuing lease agreements and permits for this purpose. In April 2020, the Wildlife and Fisheries Commission approved a notice of intent lifting an 18 year moratorium on new oyster lease agreements. Currently, the program is working with the Office of State Lands and the Coastal Protection and Restoration Authority to issue 35 new oyster lease applications in various coastal parishes throughout the state.

At this time, there are 8,033 leases covering 403,553 acres of water bottom. These leases account for $1.2 million in annual revenue. This revenue is specifically deposited into the Public Oyster Seed Ground Development Account for the enhancement of the state's public oyster resource.

ALTERNATIVE OYSTER CULTURE PERMITTING PROGRAM

Beginning in 2013, the Office of Fisheries was tasked with issuing Alternative Oyster Culture Permits. These permits offer commercial fishermen an opportunity to cultivate oysters using alternative methods on state leases or on privately owned water bottom. Currently, six sites are permitted covering approximately 118 acres of water bottom. Out of the six sites, two permits have been issued on private property.

COMMERCIAL HARVEST

Louisiana produces nearly one-quarter of the seafood in the continental United States. Louisiana comes in second only to Alaska in terms of commercial fishing production and is home to three of the top six commercial fishing ports in the country. In the Gulf of Mexico, 78% of the seafood production comes from Louisiana shrimpers, crabbers, oyster harvesters and fishermen. Nearly 12,000 commercial fishermen and 6,225 seafood dealers/processors and brokers register each year to provide the nation with fresh seafood.

LDWF utilizes the Trip Ticket Program to collect commercial seafood statistics. Through this program, commercial landings data are collected on a trip basis from wholesale/retail seafood dealers, crab shedders and commercial fishermen holding fresh products licenses. There were 184,902 commercial fishing trips reported in FY 2019-2020 producing in excess of 147 million pounds of seafood.

Beginning in May 2000, a computerized electronic trip ticket program was developed and made available to dealers. To date, 336 dealers use the computerized program to submit their trip ticket data. Trip ticket information has been used:

- to enhance the accuracy of stock assessments conducted by state and federal fishery management agencies.
- to extend certain inshore shrimp seasons providing additional economic opportunity to fishermen.
- to develop a crop insurance program for oyster growers.
- to estimate damages from hurricanes Katrina and Rita in 2005 and the 2010 *Deepwater Horizon* oil spill.

Along with the collection of commercial landings data, LDWF also conducts trip interviews of commercial fishermen to gather detailed information about a specific fishing trip. The federally funded program focuses on species of greatest state and federal interest.

Shrimp are the state's most valuable fishery. In FY 2019-2020, total shrimp landings measured over 73.8 million pounds (all species combined/heads on weight) and had a dockside value of nearly $107.4 million. Brown shrimp landings in FY 2019-2020 measured over 12.1 million pounds (heads on weight) with a dockside value of $12.9 million, while white shrimp landings in FY 2019-2020 measured over 61.3 million pounds (heads-on weight) with a dockside value of $94.2 million (*Figure 1*). While white shrimp landings and value were similar to the previous two fiscal years, brown shrimp showed a significant decrease. This drop in landings can be directly associated to the negative impacts caused by COVID-19, the early May cold fronts that likely displaced sub-adult brown shrimp, and an early June tropical storm in Louisiana which lowered the available days to fish and flushed a portion of marketable brown shrimp into the open waters of the Gulf of Mexico.

Louisiana commercial blue crab landings for FY 2019-2020 totaled approximately 40 million pounds and had a dockside value of approximately $59.2 million (*Figure 2*).

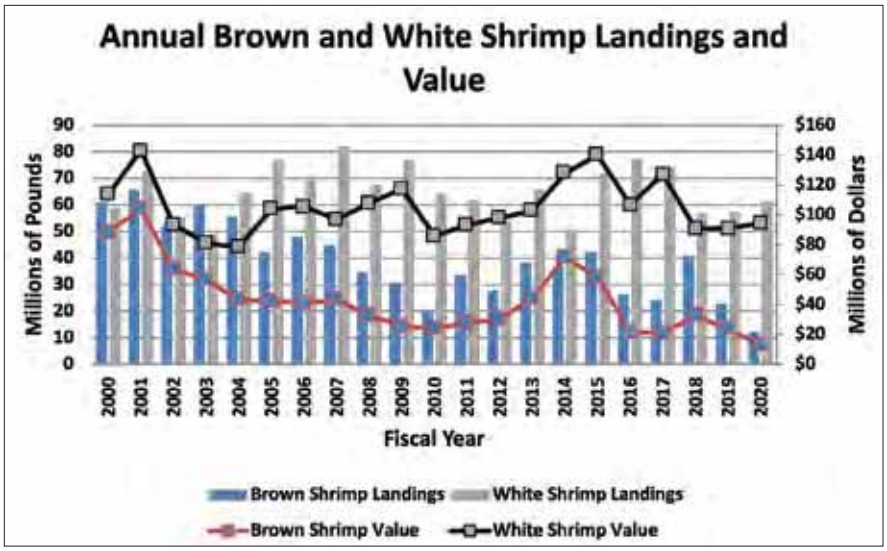


FIGURE 1. Annual white and brown shrimp landings and value (Source: LDWF trip ticket data).

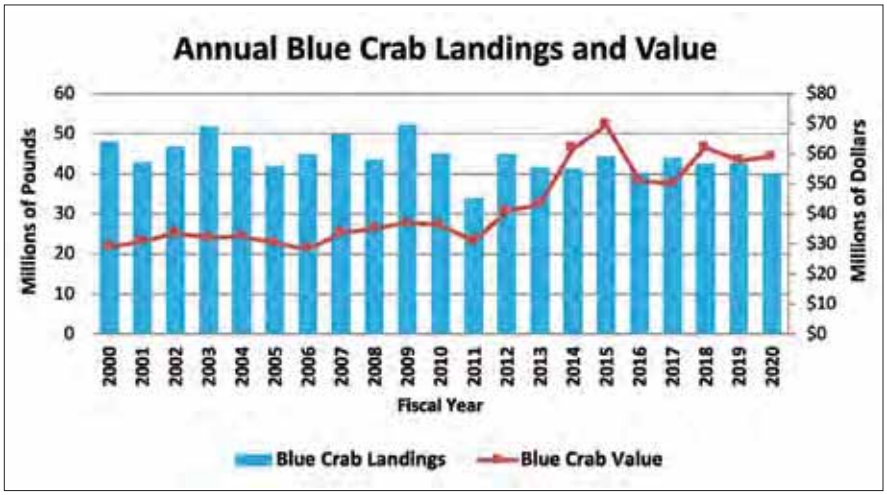


FIGURE 2. Annual blue crab dockside landings and values (source: LDWF trip ticket data).

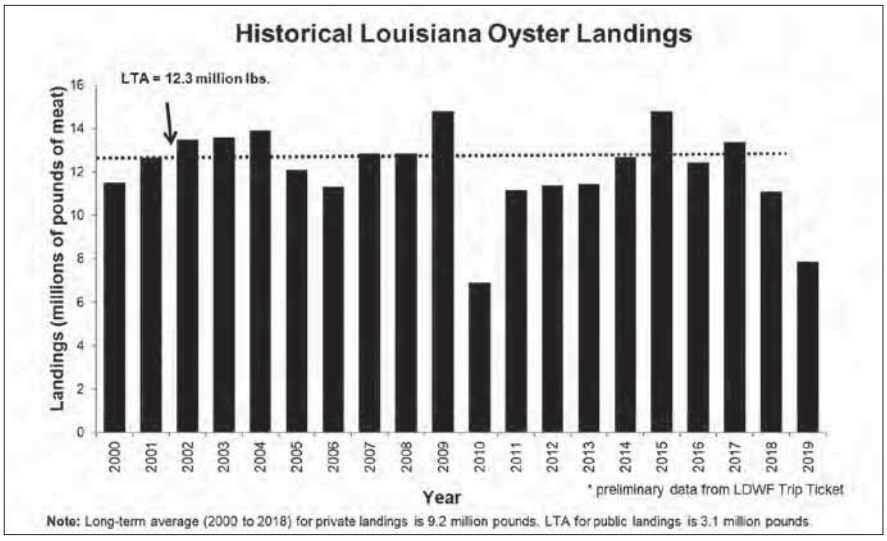


FIGURE 3. Historical Louisiana Oyster Landings from private oyster leases and public oyster areas.

Louisiana regularly leads the nation in the production of oysters and continues to account for 34.4% of the nation's oyster landings. Among Gulf of Mexico states, Louisiana consistently ranks first in landings, accounting for nearly 52% of all oysters landed. For 2019, public oyster reef landings totaled approximately 149 thousand pounds and had a dockside value of approximately $1.1 million. Private oyster reef landings totaled approximately 7.7 million pounds and had a dockside value of approximately $54 million. Total Landings in 2019 was reported at approximately 7.8 million pounds of meat (*Figure 3*).

Louisiana commercial freshwater finfish landings for FY 2019-2020 totaled approximately 13 million pounds and included common species such as alligator gar, blue catfish, channel catfish, flathead catfish, freshwater drum, buffalo, bowfin, carp and gizzard shad. Total dockside value of these species was approximately $4.8 million. Wild caught crawfish landings in Louisiana for FY 2019-2020 was approximately 8.2 million pounds with a dockside value of $11 million.

RECREATIONAL HARVEST

LDWF monitors recreational fisheries through the LA Creel Program and inland creel surveys. The LA Creel Program uses dockside interviews of recreational anglers to determine catch and a telephone/email survey to determine fishing effort.

During FY 2019-2020, fisheries biologists worked a total of 1,583 LA Creel assignments and conducted approximately 11,822 interviews of recreational fishing trips along Louisiana's coast through the LA Creel Program. This resulted in a total of 32,574 anglers being surveyed and 79,212 fish being counted. During FY 2019-2020, 176,854 private angler effort phone call or email attempts were conducted to estimate effort. Of those attempts, 48,183 resulted in completed surveys. Approximately 860 charter captains were monitored with an estimated 137,007 charter angler trips taken during FY 2019-2020. Using LA Creel data, it was estimated that a total of 2,281,005 recreational angler trips were taken during FY 2019-2020.

A revised inland creel procedure was developed in 2015 in order to increase the number of completed interviews, facilitate consistent methodology across all waterbodies, and enable more accurate characterization of angler activities. A monthly creel sample schedule is

generated for each waterbody designated for creel survey through the Inland Fisheries waterbody prioritization procedure. This schedule consists of a random selection of survey days for each month that district biologists follow as they conduct the surveys. Further minor revisions were added in 2020, which clarified start and end times of surveys, added counts of non-target species, and refined the ramp weighting process by observing usage in the year prior to a scheduled survey.

Creel surveys put the fisheries biologists in direct contact with the anglers. Information collected includes species sought and species caught, distance traveled, time fished, number caught and released, and length and weight measurements of all black bass and crappie harvested. Six recreational creel surveys were conducted on inland waters during 2019. These lakes and rivers include Caney Creek Reservoir, Cross Lake, Lower Atchafalaya River, Henderson Lake, and Toledo Bend Reservoir. Due to the COVID-19 pandemic, inland creel surveys were cancelled for 2020. Fishing pressure was much greater than usual, and harvest rates were also suspected to be higher. Inland creel surveys are used to determine average angler preferences, catch rates, and harvest rates in inland waters, which influence regulations when combined with biological data. It was determined that abnormal usage rates would show erroneous correlations with multi-year biological data, and should not influence future regulations. Combined statistics for calendar year 2019 are reported in *Table 3*.

ASSESSMENT

Fisheries management involves sampling, analysis and development of recommendations to renovate and enhance fish populations. Information collected is used to evaluate the status of the fisheries through stock assessments, monitoring trends and evaluating the benefits of regulations.

STOCK ASSESSMENT

Marine

Stock assessments of black drum, sheepshead, southern flounder, and striped mullet were completed in November 2019 and presented to the Louisiana Wildlife and Fisheries Commission for transmittal to the Louisiana Legislature in February 2020. These stock assessments use statistical catch-at-age models to estimate annual time-series of spawning stock biomass and fishing mortality rates. Time-series of fishery catch-at-age along with fishery-independent relative abundance indices are the primary model inputs. Current status of each stock is determined from the history of each stock and fishery. Based on results of these assessments, the black drum, sheepshead, and striped mullet stocks are currently not overfished and not experiencing overfishing, and the southern flounder stock is considered overfished.

LA Creel

The Stock Assessment Section continues to provide weekly marine recreational landings estimates from the LA Creel Survey to marine fishery managers.

Inland

Fishery-independent and fishery-dependent surveys are being conducted on Louisiana waterbodies with important largemouth bass and crappie fisheries to provide information to inland fishery managers to make science-based management decisions (*Tables 4 & 5*). Fishery-independent surveys are conducted for three consecutive years on each waterbody to provide population-specific information. A creel survey is conducted one of these years to provide fishery-specific information.

Assessment analyses include estimation of important population and fishery metrics (growth, mortality, harvest and catch rates) and the use of population models to simulate each fishery's response to size regulations. Results provide information to inland fishery managers to better understand the effects of current harvest regulations on their fisheries, while also providing a baseline to compare future regulation changes against. Final project reports are available for waterbodies with completed sampling, describing the status of each waterbody's largemouth bass (or crappie) population and fishery, as well as a comparison of population and fishery characteristics among all waterbodies included in this project. Citations for reports completed in the past year are presented below.

TABLE 3. Louisiana Freshwater Creel Surveys of bass and crappie anglers for calendar year 2019.

	2019 CALENDAR YEAR			
	Interviews	Anglers	Trip Length	Catch Per Trip
Largemouth Bass	1,069	1,797	4.76	2.96
Crappie	436	747	4.37	7.64
Total	**1,505**	**2,544**	**4.65**	**4.32**

TABLE 4. Schedules of Louisiana Crappie Stock Assessments - 19 waterbodies

WATERBODY	YEARS CONDUCTED	SAMPLING STATUS	ASSESSMENT STATUS
Lake Bistineau	2016 - 2018	Completed	Ongoing
Lake Bruin	2013 - 2015	Completed	Completed
Bundick Lake	2012 - 2014	Completed	Completed
Caddo Lake	2010 - 2012	Completed	Completed
Caney Creek Reservoir	2014 - 2016	Completed	Completed
Cross Lake	2010 - 2012	Completed	Completed
Lake D'Arbonne (Follow-up Assessment)	2010 - 2012	Completed	Completed
	2019 - 2021	Ongoing	Ongoing
Fausse Point	2013 - 2015	Completed	Completed
Grand Bayou Reservoir	2015 - 2017	Completed	Completed
Larto-Saline Complex	2020 - 2022	Ongoing	Ongoing
Lake Louis	2013 - 2015	Completed	Completed
Poverty Point Reservoir	2010 - 2012	Completed	Completed
Raccourci	2009 - 2013	Completed	Completed
Red River (Pool 5)	2013 - 2015	Completed	Completed
Sibley Lake	2015 - 2017	Completed	Completed
Spring Bayou Complex	2016 - 2018	Completed	Ongoing
Toledo Bend Reservoir	2009 - 2011	Completed	Completed
Turkey Creek Lake	2016 - 2018	Completed	Ongoing
Vernon Lake	2009 - 2011	Completed	Completed

TABLE 5. Schedules of Louisiana Largemouth Bass Stock Assessments - 30 waterbodies

WATERBODY	YEARS CONDUCTED	SAMPLING STATUS	ASSESSMENT STATUS
Atchafalaya Basin (Follow-up Assessment)	2009 - 2011	Completed	Completed
	2017-2019	Completed	Ongoing
Bistineau	2016 - 2018	Completed	Ongoing
Black-Clear	2010 - 2012	Completed	Completed
Blind River Complex	2018-2020	Ongoing	Ongoing
Bruin	2013 - 2015	Completed	Completed
Bundick	2015 - 2017	Completed	Ongoing
Caddo	2011 - 2013	Completed	Completed
Calcasieu	2012 - 2014	Completed	Completed
Cane River	2015 - 2017	Completed	Ongoing
Caney Creek	2014 - 2016	Completed	Completed
Cataouatche	2010 - 2012	Completed	Completed
Chicot (Follow-up Assessment)	2010 - 2012	Completed	Completed
	2020 - 2022	Ongoing	Ongoing
Concordia	2010 - 2012	Completed	Completed
Cross (Follow-up Assessment)	2010 - 2012	Completed	Completed
	2019 - 2021	Ongoing	Ongoing
D'Arbonne	2010 - 2012	Completed	Completed
False River	2010 - 2012	Completed	Completed
Grand Bayou Reservoir	2015 - 2017	Completed	Ongoing
Grassy, Verret, Palourde Complex	2015 - 2017	Completed	Ongoing
Henderson Lake	2017 - 2019	Completed	Ongoing
Iatt Lake	2013 - 2015	Completed	Completed
Indian Creek	2020 - 2022	Ongoing	Ongoing
Lacassine Pool NWR	2017 - 2019	Completed	Ongoing
Larto-Saline Complex	2015 - 2017	Completed	Ongoing
Poverty Point Reservoir	2010 - 2012	Completed	Completed
Raccourci	2015 - 2017	Completed	Ongoing
Red River (Pools 1-5)	2013 - 2015	Completed	Completed
Spring Bayou Complex	2018 - 2020	Completed	Ongoing
Toledo Bend Reservoir	2010 - 2012	Completed	Completed
	2018 - 2020	Completed	Ongoing
Turkey Creek Lake	2016 - 2018	Completed	Ongoing
Vernon Lake	2010 - 2012	Completed	Completed

Publications

West, J., X. Zhang, and J. Adriance. 2020. Update Assessment of Striped Mullet in Louisiana Waters – 2020 Report. Report to the Louisiana Legislature by the Wildlife and Fisheries Commission.

West, J., X. Zhang, and J. Adriance. 2020. Assessment of Black Drum in Louisiana Waters - 2020 Report. Louisiana Department of Wildlife and Fisheries.

West, J., X. Zhang, and J. Adriance. 2020. Assessment of Sheepshead in Louisiana Waters - 2020 Report. Louisiana Department of Wildlife and Fisheries.

West, J., X. Zhang, and J. Adriance. 2020. Assessment of Southern Flounder in Louisiana Waters - 2020 Report. Louisiana Department of Wildlife and Fisheries.

MANAGEMENT PLANS

INLAND WATERBODY MANAGEMENT PLANS

Inland Waterbody Management Plans provide a detailed compilation of lake description, history, authorities, synopsis of fisheries and vegetation sampling data, analyses, corrective measures needed, and recommended actions. During FY 2019-2020, the 27 management plans below were updated and approved. A total of 80 management plans are now available to the public on the LDWF website.

Waterbody management plans completed during FY 2019-2020 and available to the public on the LDWF website:

- Anacoco Lake
- Atchafalaya Basin
- Barataria Basin
- Bayou Plaquemine
- Black River-Cocodrie Lake
- Black-Clear Lake
- Bonne Idee Lake
- Caddo Lake
- Chicot Lake
- Cotile Lake
- Cross Lake
- D'Arbonne Lake
- Grand Bayou Reservoir
- Hardwater Lake
- Henderson Lake
- Iatt Lake
- Indian Creek Lake
- Ivan Lake
- Lake Bistineau
- Lake Lafourche
- Lake St. Joseph
- Macon Bayou
- Poverty Point
- Saline Lake
- Spring Bayou
- Toledo Bend Reservoir
- Turkey Creek Lake

INLAND VEGETATION MANAGEMENT PLANS

Inland Vegetation Management Plans provide a detailed compilation of lake description, vegetation history and current status, management limitations, implemented plant control measures, and recommended actions. During FY 2019-2020, 72 vegetation management plans were completed and/or updated and approved. A total of 84 management plans are now available to the public on the LDWF website, and a discussion of nuisance vegetation can be found in the Fishing Access and Opportunity section.

MARINE FISHERY MANAGEMENT PLANS

LDWF has been developing new and updating existing fishery management plans to provide a mechanism to strategically implement science-based management recommendations for proactively responding to and resolving fisheries issues. The goal of these plans is to ensure long-term conservation and sustainable use of these fisheries resources for the maximum environmental, social and economic benefit to the state and its citizens and visitors.

- LDWF created a document to guide the development of future fishery management plans to ensure they are consistent with federal fisheries conservation and management practices and international best management practices, mainly applicable principles and standards of the United Nations Food and Agriculture Organization's Code of Conduct for Responsible Fisheries.
- Using the guidance document referenced before, LDWF previously completed new fishery management plans for blue crab, shrimp and oyster. Staff review new research and monitoring information for these species every year, document progress toward fishery management goals, and will fully review and revise management plans every five years, or sooner if necessary. Currently, the shrimp fisheries management plan and the blue crab fisheries management plan are being updated. LDWF will prioritize development of additional new fishery management plans for other species based on commercial, recreational and ecological significance and management needs.
- These fishery management plans are also complemented by United Nations Food and Agriculture Organization-based self-assessments to document consistency with best management practices and identify any potential gaps in information or management to address in future plan updates.

MANAGEMENT RECOMMENDATIONS

Through utilization of the previously mentioned recreational and commercial sampling techniques, fisheries managers then analyze the resulting data to develop recommendations to manage and enhance fish populations. The information collected is used to produce recommendations for setting seasons and harvest limits and to monitor the species found in an area over time.

SHRIMP MANAGEMENT

Greater flexibility in managing the shrimp resource is now provided through the use of a basin type management approach, as opposed to the historical zone approach. Louisiana's major estuarine basins include the Pontchartrain Basin, Mississippi River Basin, Barataria Basin, Terrebonne Basin, Atchafalaya River Basin, Vermilion-Teche River Basin, Mermentau River Basin, Calcasieu Basin and Sabine River Basin.

Based on analysis of historical data, as well as data generated from biological sampling conducted by fisheries biologists, the following shrimp management recommendations were made to the Secretary of LDWF and the Louisiana Wildlife and Fisheries Commission. These measures were implemented during FY 2019-2020.

Lake Pontchartrain Basin and Portions of Mississippi River Basins

2019 - Spring Inshore Shrimp Season

Opened at 6:00 a.m. May 27, 2019, from the MS/LA state line westward to the eastern shore of South Pass of the Mississippi River.

Closed at 6:00 p.m. June 28, 2019, from the MS/LA state line westward to the eastern shore of South Pass of the Mississippi River except in the following areas:

- the Louisiana portion of Mississippi Sound and the open waters of Breton and Chandeleur sounds.

2019 - Fall Inshore Shrimp Season

Opened at 6:00 p.m. Aug. 5, 2019, from the MS/LA state line westward to the eastern shore of South Pass of the Mississippi River.

Closed at official sunset Dec. 16, 2019, from the MS/LA state line westward to South Pass of the Mississippi River except for the following waters:

- Lake Pontchartrain, Chef Menteur and Rigolets passes, Lake Borgne, the Louisiana portion of Mississippi Sound, the Mississippi River Gulf Outlet, a section of the Gulf Intracoastal Waterway in Orleans parish from the Gulf Intracoastal Waterway East Closure Sector Gate westward to the Gulf Intracoastal Waterway intersection with the Inner Harbor Navigation Canal, and the open waters of Breton and Chandeleur sounds as bounded by the double-rig line described in R.S. 56:495.1(A)2.

Closed at official sunset Jan. 20, 2020, in Lake Pontchartrain, Chef Menteur and Rigolets passes, Lake Borgne, the Louisiana portion of Mississippi Sound , the Mississippi River Gulf Outlet, and a section of the Gulf Intracoastal Waterway in Orleans parish from the Gulf Intracoastal Waterway East Closure Sector Gate westward to the Gulf Intracoastal Waterway intersection with the Inner Harbor Navigation Canal, except for the following waters:

- The open waters of Breton and Chandeleur sounds as described by the double-rig line described in R.S. 56:495.1(A)2.

2020 - Spring Inshore Shrimp Season

Opened at 6:00 a.m. May 18, 2020, from the MS/LA state line westward to the eastern shore of South Pass of the Mississippi River.

Closed at 6:00 p.m. July 1, 2020, from the MS/LA state line westward to the eastern shore of South Pass of the Mississippi River, except for the following waters:

- The Louisiana portion of Mississippi Sound and the open waters of Breton and Chandeleur sounds as bounded by the double-rig line described in R.S. 56:495.1(A)2.

Closed at 6:00 p.m. July 6, 2020, in the Louisiana portion of Mississippi Sound, except for the following waters:

- The open waters of Breton and Chandeleur sounds as bounded by the double-rig line described in R.S. 56:495.1(A)2.

Western Mississippi River, Barataria, Terrebonne, Atchafalaya River and Vermilion-Teche River Basins

2019 - Spring Inshore Shrimp Season

Opened at 6:00 a.m. May 20, 2019, from the eastern shore of South Pass of the Mississippi River westward to the western shore of Freshwater Bayou Canal.

Closed at 6:00 p.m. June 28, 2019, from the eastern shore of South Pass of the Mississippi River westward to the western shore of Freshwater Bayou Canal.

2019 - Fall Inshore Shrimp Season

Opened at 6:00 p.m. Aug. 5, 2019, from the eastern shore of South Pass of the Mississippi River westward to the Atchafalaya River Ship Channel Buoy Line.

Opened at 6:00 a.m. Aug. 5, 2019, from the Atchafalaya River Ship Channel Buoy Line westward to the western shore of Freshwater Bayou Canal.

Closed at official sunset Dec. 16, 2019, from the eastern shore of South Pass of the Mississippi River westward to the western shore of Freshwater Bayou Canal.

2020 - Spring Inshore Shrimp Season

Opened at 6:00 a.m. May 18, 2020, from the eastern shore of South Pass of the Mississippi River westward to the western shore of Freshwater Bayou Canal.

Closed at 6:00 p.m. July 6, 2020, from the eastern shore of South Pass of the Mississippi River westward to the western shore of Freshwater Bayou Canal.

Mermentau, Calcasieu and Sabine River Basins

2019 - Spring Inshore Shrimp Season

Opened at 6:00 a.m. May 27, 2019, from the western shore of Freshwater Bayou Canal westward to the LA/TX state line.

Closed at 6:00 p.m. June 28, 2019, from the western shore of Freshwater Bayou Canal to the LA/TX state line.

2019 - Fall Inshore Shrimp Season

Opened at 6:00 p.m. Aug. 5, 2019, from the western shore of Freshwater Bayou Canal westward to the LA/TX state line.

Closed at official sunset Dec. 16, 2019, from the western shore of Freshwater Bayou Canal westward to the LA/TX state line.

2020 - Spring Inshore Shrimp Season

Opened at 6:00 a.m. May 27, 2020, from the western shore of Freshwater Bayou Canal westward to the LA/TX state line.

Closed at 6:00 p.m. July 6, 2020, from the western shore of Freshwater Bayou Canal westward to the LA/TX state line.

Offshore Shrimp Seasons

Closed at official sunset Jan. 6, 2019, in the following waters:

- The portions of state outside waters between Caillou Boca and Freshwater Bayou Canal. The eastern boundary line originates on the northwest shore of Caillou Boca at 29 degrees 02 minutes 46 seconds north latitude, -90 degrees 50 minutes 27 seconds west longitude and ends at a point on the 3-mile line as described in R.S. 56:495(A) at 28 degrees 59 minutes 30 seconds north latitude, -90 degrees 51 minutes 57 seconds west longitude. The western boundary line originates on the western shore of Freshwater Bayou Canal at 29 degrees 32 minutes 03 seconds north latitude, -92 degrees 18 minutes 33 seconds west longitude and ends at a point on the 3-mile line as described in R.S. 56:495(A) at 29 degrees 29 minutes 02.27 seconds north latitude, -92 degrees 19 minutes 34.60 seconds west longitude.

Opened at 12:00 p.m. April 15, 2020, in the following waters:

- The portion of state outside waters between Caillou Boca and the Atchafalaya River Ship Channel at Eugene Island. The eastern boundary line originates on the northwest shore of Caillou Boca at 29 degrees 02 minutes 46 seconds north

FIGURE 4. 2019 Spring Inshore Shrimp Season Closure Map.

FIGURE 5. 2019 Fall Inshore Shrimp Season Opening Map.

FIGURE 6. 2020 Spring Inshore Shrimp Season Opening Map.

latitude, -90 degrees 50 minutes 27 seconds west longitude and ends at a point on the 3-mile line as described in R.S. 56:495(A) at 28 degrees 59 minutes 30 seconds north latitude, -90 degrees 51 minutes 57 seconds west longitude. The western boundary line originates at the Atchafalaya River Ship Channel at Eugene Island as delineated by the red buoy line at 29 degrees 22 minutes 14.93 seconds north latitude, -91 degrees 22 minutes 58.92 degrees west longitude and ends at a point on the 3-mile line as described in R.S. 56:495(A) at 29 degrees 18 minutes 33.89 seconds north latitude, -91 degrees 26 minutes 16.05 seconds west longitude.

Opened at 6:00 a.m. May 15, 2020, in the following waters:

- The portion of state outside waters between the Atchafalaya River Ship Channel at Eugene Island westward to western shore of Freshwater Bayou Canal. The eastern boundary line originates at the Atchafalaya River Ship Channel at Eugene Island as delineated by the red buoy line at 29 degrees 22 minutes 14.93 seconds north latitude, -91 degrees 22 minutes 58.92 seconds west longitude and ends at a point on the 3-mile line as described in R.S. 56:495(A) at 29 degrees 18 minutes 33.89 seconds north latitude, -91 degrees 26 minutes 16.05 seconds west longitude. The western boundary line originates on the western shore of Freshwater Bayou Canal at 29 degrees 32 minutes 03 seconds north latitude, -92 degrees 18 minutes 33 seconds west longitude and ends at a point on the 3-mile line as described in R.S. 56:495(A) at 29 degrees 29 minutes 02.27 seconds north latitude, -92 degrees 19 minutes 34.60 seconds west longitude.

BLUE CRAB MANAGEMENT

The Louisiana blue crab fishery is the largest blue crab fishery in the United States and it accounts for more than half of the total blue crab harvest in the Gulf of Mexico. Landings of blue crab in Louisiana averaged 44 million pounds annually (fiscal year) from 2000-2019. The dockside value of the harvest over that same time period averaged $42.1 million annually (prices not adjusted for inflation).

Management of the blue crab fishery strives for the maintenance of the stock while providing for long-term benefits to the fishery. Key objectives of management include:

- Conservation, restoration and enhancement of habitat essential to blue crabs.
- Reductions in juvenile blue crab incidental mortality, wasteful harvesting practices within the fishery, and conflicts among crab fishermen and other user groups.
- Enhancement of social and economic benefits derived from resource use.
- The assessment of biological, social and economic impacts of existing and proposed fisheries management regulations affecting the fishery.

These objectives are met via licensing, record keeping and reporting requirements, minimum size limit, time, gear and area restrictions.

Blue Crab Stock Assessment

The most recent stock assessment for blue crab was in early 2019. In early 2020, the blue crab stock assessment models were run in order to provide data during fishery sustainability certification audits. A full assessment was not updated. Model estimates in 2020 confirmed that the Louisiana blue crab stock is currently not overfished or experiencing overfishing.

Management Options

In 2016, the Louisiana Wildlife and Fisheries Commission promulgated a rule that prohibited the commercial harvest of blue crabs during a 30-day period that began the third Monday in February and prohibited the commercial harvest of immature female blue crab for a three-year period. This rule was scheduled to take place during the 2017, 2018 and 2019 blue crab harvest seasons. This rule was altered before the 2018 harvest year, after receiving negative input from the industry, by removing the 30-day full closure and replacing it with a 60-day mature female restriction beginning March 1, 2018. After the 60-day spring mature female restriction was complete, the industry brought more concerns to LDWF about lost market shares and fishing opportunity. This rule was altered once again for the 2019 harvest season and the 60-day mature female restriction was replaced with a 35-day mature female restriction beginning the second Monday in September. The three-year annual ban on the commercial harvest of immature female blue crab remained in effect during the three-year period.

Estimated reductions in blue crab landings for the 30-day closure, the 60-day spring female harvest prohibition, and the 35-day fall female harvest prohibition were 1,381,609 pounds, 1,580,392 pounds, and 1,535,974 pounds, respectively. The actual reduction in blue crab landings are as follows: 1,354,263 pounds during the 30-day closure, 1,927,778 pounds during the 60-day spring female harvest prohibition, and 1,076,101 pounds during the 35-day fall female harvest prohibition. Although the 35-day fall female prohibition failed to reduce blue crab landings by the estimated amount (nearly 500,000 pounds different), blue crab landings in Louisiana waters were 1 million pounds lower during September and October 2019 compared to the five-year average (2014-2018).

All in all, the goal was to reduce landings of blue crab, which would also lower the effort. After the first year, LDWF knew that any alternate management option would need to reduce landings of blue crab by no less than that observed during the first year of harvest restriction (2017). The three-year results indicate that the cumulative actual reduction in landings during the three-year period were only 3% below the original estimate.

Blue Crab Stock Legislation

No legislative actions were enacted during FY 2019-2020.

SB 65 during the 2019 Legislative Session still states that escape rings will be required to also be no more than one mesh from the corner of the trap by July 1, 2022.

Derelict Crab Trap Removal Program

The removal of derelict crab traps from fishing grounds reduces navigational risks to boaters and threats to public safety while reducing mortality of incidental species captured in traps, potentially increasing the number of crabs available for harvest by preventing crab mortalities in abandoned, out-of-use traps.

In 2019, the Louisiana Wildlife and Fisheries Commission promulgated a rule defining six distinct derelict crab trap closure areas for 2020. The closure areas and dates were as follows:

1. The first closure took place in Lake Pontchartrain, east of the Lake Pontchartrain Causeway Bridge, from 12 a.m. Monday, Feb. 3, 2020, through 11:59 p.m. Sunday, Feb. 16, 2020.
2. The second closure took place in the upper Barataria Basin, in an area from Lafitte to Little Lake, from 12 a.m. Monday, Feb. 3, 2020, through 11:59 p.m. Sunday, Feb. 16, 2020.
3. The third closure took place in the Calcasieu Basin, in the lower portion of Calcasieu Lake, from 12 a.m. Monday, Feb. 10, 2020, through 11:59 p.m. Wednesday, Feb. 19, 2020.

TABLE 6. Number of crab trap closures and numbers of traps removed annually.

YEAR	AREA(S)	TRAPS
2004	2	6,894
2005	4	4,623
2006	1	2,935
2007	2	1,495
2008	1	1,234
2009	1	788
2010	1	477
2011	1	1,100
2012	2	2,798
2013	2	969
2014	1	1,051
2015	1	422
2016	3	2,580
2017	6	5,674
2018	5	4,061
2019	5	4,041
2020	6	4,188
Total	*44*	*45,330*

TABLE 7. Average annual number of traps removed.

YEAR	AREA(S)	AVG. TRAPS
2004-2005	6	5,758
2006-2016	16	1,441
2017-2020	22	4,491
Total	*44*	*2,666*

4. The fourth closure took place in the Vermilion-Teche Basin, in the western portion of Vermilion Bay, from 12 a.m. Monday, Feb. 10, 2020, through 11:59 p.m. Sunday, Feb. 23, 2020.
5. The fifth closure took place in the Pontchartrain Basin, Lake Borgne, from 12 a.m. Monday, March 2, 2020, through 11:59 p.m. Sunday, March 15, 2020.
6. The sixth closure took place in the Terrebonne Basin, within an area between Bayou Pointe-aux-Chenes and Bayou Terrebonne, from 12 a.m. Monday, March 2, 2020, through 11:59 p.m. Sunday, March 15, 2020.

Two volunteer days were scheduled: one in the Barataria Basin and one in the Calcasieu Basin. Both cleanups were headed by LDWF with one being staged at the Jean Lafitte Harbor in Lafitte, Louisiana, and the other at the Cameron Parish boat launch located at the west bank of the Calcasieu River Ship Channel near the ferry. Approximately 90 volunteers, including 17 vessels, from Jean Lafitte Harbor, students from several universities, Louisiana Sea Grant, LSU AgCenter, the American Daughters of Conservation, Fenstermaker, the Coalition to Restore Coastal Louisiana, Cameron Parish Port Harbor and Terminal District, Coastal Conservation Association (CCA), and members of the recreational and commercial fishing community worked with LDWF personnel to collect more than 520 traps during the two events. The events would have not been as successful without the help from our sponsors:

- Cameron Parish Port Harbor and Terminal District
- CCA of Louisiana
- Fenstermaker
- Jean Lafitte Harbor

The Pontchartrain Conservancy was contracted by LDWF to assist in the removal of derelict and abandoned crab traps during the two Pontchartrain closures. The Pontchartrain Conservancy removed more than 3,000 traps from within these two closure areas.

Since the inception of the program in 2004, LDWF and volunteers have removed over 45,000 derelict or abandoned crab traps from state waters (*Table 6*). The largest numbers of traps removed from state waters came during the program's first two years. From 2006-2016 the number of closure areas was reduced to focus on one area at a time, which resulted in fewer traps being removed annually. Since 2017, the abandoned crab trap program has expanded with more closure areas annually and the amount of traps removed has greatly increased (*Table 7*). During the 11-year period (2006-2016), the annual derelict crab traps removed averaged over 1,400, while more recent years indicate an average of nearly 4,500.

OYSTER MANAGEMENT

Oysters provide both important economic and ecological benefits to Louisiana. They act as barometers for the overall health of the ecosystem, providing forage and shelter habitat for a variety of fish and invertebrate species. Oysters improve water quality through filter-feeding activities, affect estuarine current patterns and may provide shoreline stabilization. Due to their economic and ecological importance, wise management of the public oyster resource is critically important to ensure that this valuable species continues to thrive in Louisiana's coastal areas.

The Office of Fisheries Mollusk Program is responsible for the oyster resource on nearly 1.7 million acres of public oyster seed reservations, public seed grounds and public oyster areas. Seed grounds are designated by the Louisiana Wildlife and Fisheries Commission and include a large continuous area east of the Mississippi River as well a portion of the Vermilion/Cote Blanche/Atchafalaya Bay system. Seed reservations and the public oyster areas of Calcasieu and Sabine lakes are designated by the legislature. LDWF manages four seed reservations, including one east of the Mississippi River (Bay Gardene), one in the Barataria Bay system (Hackberry Bay) and two in Terrebonne Parish (Sister Lake and Bay Junop).

State laws mandate that LDWF can open the oyster season on Louisiana public seed grounds on the first Wednesday following Labor Day of each year and close these areas no later than April 30 of each year. However, the

TABLE 8. 2019-2020 Oyster season opening and closing dates on the public oyster areas of Louisiana (Estimated from LDWF oyster boarding reports conducted by Marine Fisheries biologists).

2019-2020 LDWF OYSTER SEASON SUMMARY						
Area	Season Opening	Season Closure	Season/Type	Days Open to Date	Harvest to Date	Coastal Study Area
Public Oyster Seed Grounds East of Mississippi River and North of Mississippi River Gulf Outlet CLOSED						1
Public Oyster Seed Grounds East of Mississippi River and South of Mississippi River Gulf Outlet CLOSED						1
Hackberry Little Lake, Barataria Bay CLOSED						3
Deep Lake, Lake Chien, Lake Felicity and Lake Tambour CLOSED						3
Lake Mechant and Bay Junop CLOSED						5
Sister Lake	Nov. 18	Nov. 18	1-day Seed Harvest	1	1,250 bbl	5
	Nov. 19	Nov. 25	Market Oyster Harvest	7	10,314 sacks	
Vermilion Bay CLOSED						6
Calcasieu Lake	Nov. 1	Jan. 20	East Cove: Market Oyster Harvest	80	3,861 sacks	7
	Nov. 1	April 30	West Cove: Market Oyster Harvest	210	4,985 sacks	

Louisiana Wildlife and Fisheries Commission is authorized to extend the season beyond April 30, provided sufficient stocks are available for harvest. The Secretary of LDWF may close seasons or areas as needed, based on biological data or if enforcement problems are encountered. The Secretary Is also authorized to take emergency action to reopen areas previously closed if the threat to the resource has ended and to open areas if substantial oyster resources are located. The Secretary can also delay the season or close certain areas where significant spat catch has occurred with good probability of survival, or if an excess amount of shell in oyster loads occurs. Management practices often use rotational openings of the four oyster seed reservations in alternating years. The public seed grounds may be opened to the harvest of seed oysters between the first Wednesday following Labor Day and the second Monday in October; after which the public grounds may be opened to harvest of market-size oysters.

The goal for the 2019-2020 oyster season was to reduce harvest stress as a means to conserve remaining resource from the 2019 flooding event, and manage public oyster areas as recommended by the shell budget model thresholds, in exception of Calcasieu Lake where closure is triggered before it reaches 15% of the total estimated stock —all of which should help minimize reef degradation. Details of the 2019-2020 Oyster Season can be found in *Table 8*.

Estimated commercial harvest totaled 1,250 bbls of seed oysters and 19,160 sacks (9,580 bbls) of market oysters for an overall total of 10,830 bbls of oysters. This was a 46% decrease from the 2018-2019 oyster season. There were decreases in both seed- and market-sized oyster harvest observed statewide. This decrease in harvest reflects declining oyster availability in recent years combined with the record 2019 flood event and Bonnet Carré Spillway openings (2018, 2019, and 2020). Over the past 10 years, heavy localized harvest, high mortality events, strong tropical events, environmental changes and lack of recruitment have contributed to an ongoing downturn in the oyster resource in the public seed grounds. Scarce oyster availability resulted in closed seasons in CSA's 1 North and South, 3, and 6. It also resulted in Sister Lake in CSA 5 being managed with a short 8 day season.

To help mitigate reef loss and low recruitment issues, harvest of bedding material was allowed for just one day (Sister Lake) and a restriction of 15% non-living material (cultch) was placed on all bedding loads.

MARINE FINFISH MANAGEMENT

The primary objective of the finfish program is to make rational recommendations for the management of coastal finfish stocks based on a database of scientific information. The information in the database is collected through fishery-independent and fishery-dependent sampling.

The following management recommendations were made to the Secretary of LDWF and the Louisiana Wildlife and Fisheries Commission and implemented during FY 2019-2020:

July 2019

- Commercial king mackerel season opened on July 1 at 12:01 a.m., concurrent with a federal opening of the 2019-2020 harvest season.
- Commercial fisheries for small coastal sharks and large coastal sharks reopened July 1 following an annual seasonal closure from April 1 - June 30.

August 2019

- Louisiana adjusted the daily possession limit for commercially harvested large coastal sharks from 45 to 55 per day on Aug. 13, 2019, concurrent with an adjustment in federal waters.

September 2019

- At its September 2019 meeting, the Louisiana Wildlife and Fisheries Commission approved a Notice of Intent to modify recreational size limits for shortfin mako sharks. The Notice of Intent proposes a change from 54 inches minimum fork length to 71 inches and 83 inches minimum fork length for male and female shortfin mako sharks, respectively. Public comments are being taken until Nov. 7, 2019.
- Louisiana waters and federal waters closed to the private recreational and state charter harvest of red snapper on Sept. 3, 2019. Louisiana waters subsequently reopened, on a weekends only basis (Friday, Saturday and Sunday) beginning Sept. 27, 2019, including the Monday of Veterans Day.

October 2019

- Louisiana waters opened to the commercial harvest of striped mullet with a mullet strike net on Oct. 21, 2019
- Louisiana closed state waters for the commercial harvest of greater amberjack on Oct. 31, 2019.

November 2019

- Louisiana closed state waters to the commercial harvest of gray triggerfish on Nov. 27, 2019.
- Louisiana season for the private recreational harvest of red snapper was modified on Nov. 28, 2019, to be open seven days per week.

December 2019

- Louisiana waters closed for the commercial and recreational harvest of lane snapper on Dec. 13, 2019.
- Louisiana waters closed for the commercial harvest of small coastal sharks on Dec. 31, 2019, concurrent with a closure in federal waters.
- Louisiana waters closed for the commercial fishery for the harvest of spotted seatrout closed on Dec. 31, 2019.

January 2020

- Louisiana waters opened to the commercial harvest of small and large coastal sharks opened on Jan. 1, 2020, concurrent with an opening in federal waters.
- Louisiana waters closed to the recreational harvest of gag grouper on Jan. 1, 2020, concurrent with a closure in federal waters.
- Louisiana waters closed to the recreational harvest of gray triggerfish on Jan. 1, 2020, concurrent with a seasonal closure until March 1, 2020, in federal waters.
- Louisiana waters opened to the commercial and recreational harvest of lane snapper on Jan. 1, 2020, concurrent with an opening in federal waters.
- Louisiana waters opened to the commercial harvest of spotted seatrout on Jan. 2, 2020.
- Louisiana waters closed to the commercial harvest of king mackerel on Jan. 17, 2020.
- Louisiana waters closed to the commercial harvest of striped mullet with a mullet strike net on Jan. 20, 2020.

February 2020

- The annual stock assessments for striped mullet, black drum, sheepshead, and southern flounder were presented to the Louisiana Wildlife and Fisheries Commission for transmittal to the Louisiana Legislature.
- During February 2020, LDWF conducted eight statewide meetings in Gray, Baton Rouge, Lafayette, Metairie, Slidell, Lake Charles, Alexandria, and Ruston to solicit public input on the future management of spotted seatrout stocks in Louisiana waters. The most recent stock assessment for the species indicated the stock is overfished and undergoing overfishing.

March 2020

- Louisiana waters closed to the harvest of sharks in the aggregated large coastal group (nurse, bull, lemon, sandbar, silky, spinner, and tiger) and the hammerhead group (smooth, scalloped, and great) on March 14, 2020.

April 2020

- Louisiana waters closed to the recreational and commercial harvest of all sharks on April 1, 2020, consistent with an annual state closed season from April 1 - June 30.

May 2020

- Louisiana waters opened to the recreational harvest of greater amberjack from May 1-31, 2020.
- Louisiana waters closed to the recreational harvest of gray triggerfish on May 2, 2020, concurrent with a closure in federal waters.
- Louisiana waters opened on May 22, 2020, for the private recreational harvest of red snapper during weekends only (Friday, Saturday and Sunday), including the Mondays of Memorial Day and Labor Day.
- At its regular meeting on May 7, 2020 the Louisiana Wildlife and Fisheries Commission ratified a Notice of Intent to modify the recreational and commercial minimum size limit for cobia to 36 inches fork length.

June 2020

- At its regular meeting on June 4, 2020, the Louisiana Wildlife and Fisheries Commission promulgated a Notice of Intent to modify the commercial trip limits for greater amberjack from 1,500 pounds gutted weight to 1,000 pounds gutted weight and to allow for Secretarial authority to modify commercial reef fish trip limits if notified by NOAA Fisheries of in-season changes.
- Louisiana waters closed for the recreational harvest of gray triggerfish on June 1, 2020, concurrent with a seasonal closure in federal waters.
- Louisiana waters opened for the recreational harvest of gag on June 1, 2020, concurrent with a seasonal opening in federal waters.

FISHERIES RESEARCH

GRAND ISLE LABORATORY

The Fisheries Research Lab, located in Grand Isle on the shore of Barataria Bay, is one of the richest estuarine complexes in the Gulf of Mexico. While fisheries research and monitoring is conducted throughout the state, the Fisheries Research Lab is the base for much of this work within the Office of Fisheries. This ideal location allows for the research and monitoring of many of Louisiana's key recreational and commercial marine species including offshore species that are just a short boat ride away. The Fisheries Research Lab also provides fisheries biologists with the ability to develop and conduct additional research projects, collecting vital information for the management of Louisiana's aquatic resources. Along with being a home-base for fisheries research projects, the lab also serves as a place that public, state and federal partners can utilize, as well as other entities engaged in fisheries research, management, enforcement, coastal restoration and marine education.

Southeast Area Monitoring and Assessment Program (SEAMAP)

SEAMAP is a cooperative state, federal and university program designed for the collection, management and dissemination of fishery-independent biological and environmental data of the coastal waters (state and Exclusive Economic Zone) off the southeastern United States, Caribbean and northern Gulf of Mexico. Since 1981, SEAMAP has collected data on fish stocks that are managed by either state or federal governments. Louisiana takes part in four components of the SEAMAP program: shrimp/groundfish, icthyoplankton, vertical line and bottom longline. The surveys are conducted by teams of three to nine fisheries biologists who collect, process and enter data. In addition, all surveys collect environmental parameters including a water column profile and water samples from bottom, middle and surface depths for chlorophyll measurements. These surveys are conducted from April through October and the following summaries are based on the calendar year.

SEAMAP Shrimp/Groundfish Survey

The SEAMAP Shrimp/Groundfish Survey collects information to characterize shrimp and groundfish assemblages west of the Mississippi River using a SEAMAP standardized 42-foot trawl in nearshore waters along the Louisiana coast. Shrimp/Groundfish Surveys are conducted during the summer and fall, and stations are selected from the SEAMAP randomized sampling grid. At least 16 trawl stations are selected by LDWF for each survey. Additional stations are added as feasible. Species are identified, counted, measured, weighed and recorded; these data are submitted to the SEAMAP data management

system, and near-real time data are transmitted to National Marine Fisheries Service as required. In 2019, 35 shrimp/groundfish stations were sampled by LDWF personnel. Depths ranged from 10 to 105 meters (latitudes 28.2° to 29.2° and longitudes -89.0° to -91.7°).

SEAMAP Icthyoplankton Survey

The SEAMAP Icthyoplankton Survey is conducted annually to provide information on the occurrence, abundance and geographical distribution of the eggs and larvae of fall spawning fish, particularly king and Spanish mackerel. LDWF participates in the fall icthyoplankton survey and stations are selected from the National Marine Fisheries Service icthyoplankton grids. Sampling is conducted using 60-cm bongo nets and 1x2m neuston nets. Samples are field processed, preserved and transferred to the National Marine Fisheries Service Pascagoula Laboratory for transshipment to the Polish Sorting and Identification Center. During 2019, no sampling was conducted per NOAA's direction.

SEAMAP Vertical Line Survey

The SEAMAP Vertical Line Survey is conducted from June to October to collect information on the spatial and temporal distribution of commercial and recreational reef species off the Louisiana coast. Sampling stations are drawn from a pre-established sampling universe provided by the Gulf States Marine Fisheries Commission and includes petroleum platforms, artificial reefs, and natural bottom sites in depths ranging from 60 to 360 feet. Beginning in 2020, LDWF's annual allocation of habitat types was adjusted from 50 petroleum platforms, 46 natural bottom sites, and four artificial reef sites to 65, 29 and six stations at each habitat type, respectively. Sampling encompassed sites form the South Pass of the Mississippi River to the TX/LA border (-89.00°--94.00°). Vertical line sampling is completed using commercial bandit gear equipped with three hook sizes (8/0, 11/0, 15/0). Fishes encountered are identified to species, and total length, weight, sex, and the size of the hook on which the fish was caught are recorded. Otoliths and tissues of select reef species are removed and processed when necessary.

Fifty-eight vertical line stations were completed in 2019. A total of 350 fish representative of 16 species were sampled, of which 266 (76%) were red snapper. Fin clips were retained from 264 red snapper for subsequent genetic analysis as part of a Gulf-wide assessment. Catch per unit effort for red snapper was 0.96 fish/hhr at artificial reefs (n=4), 2.00 fish/hhr at petroleum platforms (n=45), and 1.47 fish/hhr at natural bottom sites. Because the 2020 sampling season only briefly overlapped with the previous fiscal year, only seven stations were completed within the reporting period with a total of nine red snapper having been sampled.

SEAMAP Bottom Longline Survey

The SEAMAP Bottom Longline Survey collects information on the abundance and distribution of elasmobranchs and bottom feeding species with standard 1 nautical mile longline sets. Stations are generated by Gulf States Marine Fisheries Commission, in which bottom longline stations are proportionally allocated by longitude and depth based on the width of the continental shelf within depths of 10 meters. The annual stations are divided with the intent of sampling the entire Louisiana coast once per season (spring, summer, fall) during the months of April through September. All species are recorded, counted and measured for length(s), weight and sex (sharks). Sharks selected for tagging are tagged with dart or metal tag prior to their release to collect biological and life history information. Otoliths of selected reef species are removed and processed. LDWF completed 46 longline sets in Louisiana's territorial waters between July 1, 2019 and 30 June 2020. Longline efforts resulted in 1250 captures. Elasmobranchs composed 48.1% of the catch, teleosts composed 51.8%, and sea turtles composed the remaining 0.2%. The most frequently captured shark was the blacktip shark, comprising 60.3% of the total shark captures, followed by the bull shark (22.7%), and the finetooth shark (7.6%). The most frequently captured teleost was the gafftopsail catfish, comprising 86.1% of the teleost captures, followed by the red drum (9.4%). Three hundred and fifty eight sharks were tagged with metal tags. During the 2019 summer season, too many shrimp boats were present when sites 44 and 38 were first attempted and therefore they were moved to a later cruise. One cruise, scheduled for June 25-27, was cut short while in the field due to inclement weather. Sites 22, 19 and 20 were scheduled for the previously mentioned cruise and were therefore accomplished later in the season than originally scheduled. Inclement weather on Aug. 14, 2019 caused sites 27, 26 and 23 to be rescheduled and sampled later in the season. All sites scheduled were completed for the fall season. Due to the COVID-19 response throughout the 2020 spring season we were unable to sample until the end of the spring season. We dropped sites 19-48 due to COVID-19 restrictions. We attempted site 18 but had to drop it due to its close proximity to multiple oil rig heads and due to shrimp boat presence. Our June sampling was impacted by Tropical Storm Cristobal which made landfall in southeast Louisiana on June 7.

Fisheries Research Projects

Offshore Red Drum Age Structure

The red drum (*Sciaenops ocellatus*) is one of the most harvested marine recreational fishes, both across the northern Gulf of Mexico and specifically in Louisiana (National Marine Fisheries Service). However, before 1988 red drum were overfished and undergoing overfishing. According to a red drum stock assessment conducted by the Southeast Fisheries Science Center in 1987, the chance of juvenile escapement to the spawning stock was less than 2% (Goodyear 1987). The Gulf of Mexico Fisheries Management Council implemented regulations that prohibited the retention of red drum from the Exclusive Economic Zone (Red Drum Fishery of the Gulf of Mexico 1988). While the moratorium on Exclusive Economic Zone harvest, which is still in effect, has increased spawning stock biomass in the Atlantic, the status of the Gulf of Mexico stock is unclear (SEDAR 2015, Porch 2000). Trammel net data from LDWF indicates an upward trend in mean size through sampling years, but it is difficult to determine whether this is the result of estuaries becoming more open water habitat or a recovering drum population. In addition, the closure of the offshore commercial purse seine fishery has limited biological sampling of older or larger red drum for otolith or gonad sampling to determine age composition or fecundity. The 2000 red drum stock assessment lists age composition of the adult population as a research priority for the Gulf of Mexico while both the 2000 Gulf of Mexico and 2015 Atlantic stock assessments are still using fecundity estimates from 1986-1992 (Wilson and Nieland 1994, Porch 2000, SEDAR 2015). There is a clear need for biological samples from the offshore red drum stock to inform future assessment attempts.

The portion of the SEAMAP bottom longline survey conducted by LDWF could provide a solution to red drum stock assessment needs. The SEAMAP bottom longline survey redesign was instituted for the 2015 sampling season and resulted in greater sampling effort along the entire Louisiana coast inside the 10m contour. This survey has caught over 100 red drum per year from 2015 through 2017 in offshore coastal waters adjacent to the Louisiana coast, with over 20% of the

90 stations-recording of red drum catches. The lack of a consistent biological sampling source for offshore red drum has hindered stock assessment, but the LDWF portion of the SEAMAP bottom longline survey has provided a fishery independent source of otolith samples. Otolith samples have produced abundance of age or year classes within the population. The abundance indices from standardized sampling coupled with age analysis from the otolith samples will more accurately assess the adult population of red drum off Louisiana.

During 2018 and 2019, LDWF has collected and aged 429 red drum otoliths from offshore randomized Bottom Longline Sampling. Due to the COVID-19 pandemic it was difficult to sample in 2020 and we are unsure if red drum samples will be collected. Ages for red drum collected offshore ranged from 3 to 39 years (*Figure 7*). The most frequent age caught was between 25 and 29 years. We expect that these data will be critical in characterizing the offshore spawning stock of red drum off the Louisiana coast in future stock assessments.

Removing otolith from red drum.

Black Drum Life History

Black drum is highly sought in Louisiana recreational and commercial fisheries. It is the 2nd highest landed commercial saltwater finfish species in Louisiana with approximately 3 million pounds landed annually. The recreational landings of black drum are similar to sheepshead and only behind spotted seatrout and red drum. Trends in abundance are well documented by our fisheries independent standardized survey, but spawning output or egg production is not well understood. In 2020 we attempted to remedy that with a bottom longline survey in Caminada Pass and sampling commercial fish houses, which provided otoliths and ovaries to determine spawning frequency and fecundity. Unfortunately, the COVID-19 halted the project in mid-March. Despite the halt we still managed to collect 115 otolith and ovary pairs. These ovaries will contribute to a spawning frequency estimate when we are able to collect more fish in 2021. However, none of these ovaries were progressed enough to provide a fecundity estimate.

Sheepshead Life History

Sheepshead is highly sought in Louisiana recreational and commercial fisheries. It is the sixth highest landed commercial saltwater finfish species in Louisiana with approximately 1.5 million pounds landed annually. The recreational landings of sheepshead are similar to black drum and only behind spotted seatrout and red drum. In 2020 we attempted to remedy that with a hook and line survey on nearshore structures and sampling commercial fish houses, which provided otoliths and ovaries to determine spawning frequency and fecundity. Unfortunately, the COVID-19 halted the project in mid-March, which meant only three days of sampling for this project. Despite the halt, 84 ovaries were histologically processed and will contribute to future spawning frequency analysis and four of those ovaries were able to generate batch fecundity estimates. From those four estimates, the average batch fecundity of Louisiana sheepshead is 166 thousand eggs per spawn. However, more data is needed to be sure of an overall estimate.

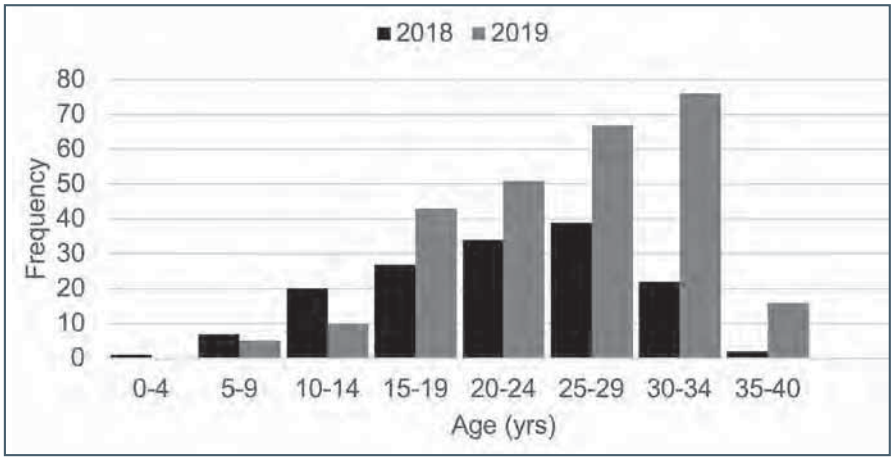


FIGURE 7. Red drum (Sciaenops ocellatus) from 2018-2019 LDWF summer bottom longline sampling in the Louisiana nearshore area (less than 10 meters).

Sport Fish Monitoring on Artificial Reefs

Prior to 2018, sport fish monitoring conducted as part of the Gulf-wide SEAMAP Vertical Line Survey targeted less than 1% (n = 4) of LDWF Artificial Reef Program's offshore artificial reefs, annually. To expand fisheries-independent monitoring of Louisiana's artificial reef complex and to better characterize the associated sport fish assemblages, LDWF expanded annual sampling efforts to include an additional 10% (n = 45) of Louisiana's offshore artificial reefs. Commercial vertical line (bandit) gears are implemented according to SEAMAP Vertical Line protocols, and a downward-facing camera is included on each bandit to identify sport fish that may not recruit to commercial bandit gear. In addition, a roving diver survey was developed to further identify sport fish assemblages associated with Louisiana's artificial reefs.

During the 2019 portion of the current reporting period, 27 artificial reefs were surveyed using bandit and camera gears. A total of 58 unique GoPro videos were compiled from the survey. Four videos were not included for analysis due to technical issues or camera failure; 55 of the remaining videos met visibility requirements and were subsequently analyzed to identify min-counts (i.e., the most individuals of a single species observed in a single frame) for all species encountered.

A total of 660 individuals from at least 13 species were identified from both bandit and video surveys, of which 422 individuals were identified to the species level. Video surveys encountered more individuals (n=612) from more species (n=13) than bandit gear (n=44 and n=6, respectively). Bandit gear encountered five species of reef fish included under the Gulf of Mexico Fishery Management Council Reef Fish Management Plan while video surveys identified six. Further data analysis on vertical line and video sampling is ongoing (*Table 9*).

TABLE 9. The species and number of individuals of each species encountered during video and vertical line surveys conducted on Louisiana artificial reefs. Bold species names indicate those included in the GSMFC Reef Fish Management Unit.

SPECIES	COMMON NAME	# ENCOUNTERED	
		VIDEO	BANDIT
Balistes capriscus	**Gray Triggerfish**	19	1
Carangoides ruber	Bar Jack	8	
Caranx crysos	Blue Runner	2	
Caranx hippos	Jack Crevalle	8	
Carcharhinus falciformis	Silky Shark	2	2
Chaetodipterus faber	Atlantic Spadefish	66	
Lutjanus campechanus	**Red Snapper**	159	37
Lutjanus griseus	**Gray Snapper**	2	
Rhomboplites aurorubens	**Vermilion Snapper**	13	3
Seriola dumerili	**Greater Amberjack**	35	1
Seriola rivoliana	**Almaco Jack**	42	4
Sphyraena barracuda	Great Barracuda	7	
Sphyrna tiburo	Bonnethead Shark	11	
Unidentified Fish	N/A	238	
TOTAL		*612*	*48*

LDWF sought to include a roving diver survey component to the LDWF artificial reef monitoring effort. While LDWF has previously conducted dive surveys at standing platforms, no dive surveys of this type had been conducted at artificial reef sites until 2018. Scientific divers survey finfish species at the artificial reef site and the nearest standing platform. Surveys consist of teams of three scientific divers, equipped with dive slate data sheets and GoPro video cameras. Following the roving diver technique, divers survey as much of the structure as possible within recreational dive limits. Following each dive trip, the data and videos are reviewed to verify and update observations.

Sampling opportunities were limited during this reporting period due to COVID-19 restrictions as well as the many tropical systems impacting the area. During the reporting period, dive surveys were completed on two structures off of western Louisiana in the East Cameron 272 Planning Area, a reefed structure (SM66 "C-Aux" Top) and the nearest standing platform (SM66). Assemblage data and videos were collected at both sites. All videos were reviewed to confirm species and quantities. Videos were then analyzed to determine min counts, survey start and finish times assigned as well as ascent and descent times. Min counts were then performed in 10-second intervals using the protocols for the vertical line video reads. MIN counts were performed on species covered in the Gulf of Mexico Fishery Management Council Reef Fish Fishery Management Plan (gray triggerfish, almaco jack, greater amberjack, gray snapper, Lane snapper, red snapper, vermilion snapper and groupers) as well as Coastal Migratory Pelagics FMP (cobia and Spanish mackerel). Over the survey times of the videos, 241 reads were made, as well as the descent and ascent reads. In total, 50 species from 33 genera have been identified and recorded. Further analysis on diver generated data and video sampling is ongoing.

Offshore Invasive Species Monitoring

LDWF conducted roving diver surveys at offshore structures to document the presence, abundance, and habitat preferences of the invasive lionfish (*Pterois sp.*). Survey zones were the areas east of the Mississippi River Delta (Delta East), the area west of the Mississippi River Delta to Port Fourchon (Delta), Fourchon to Marsh Island (central Louisiana), and Marsh Island to the western Louisiana state line (west Louisiana). LDWF scientific divers were able to conduct two dive surveys during the reporting period. Dive surveys were completed on two structures off of western Louisiana in the East Cameron 272 Planning Area, a reefed structure (SM66 "C-Aux" Top) and the nearest standing platform (SM66). Diver data and videos were captured at both sites and lionfish were taken for sampling. Lionfish tissue, otoliths and stomachs were retained for species identification, age analysis and stomach content identification, respectively. Dive survey videos were reviewed and MIN counts performed at 10 second intervals.

Future work on this project includes further video analysis which will produce consensus counts (min count) and species associations of lionfish sighted during the survey. Samples collected from lionfish will be processed and read, resulting in ages and characterization of lionfish diet on artificial structures in the north central Gulf of Mexico. Stomach contents will be analyzed by metabarcoding via MiSeq assay. Previous work suggests that the red lionfish (*Pterois volitans*) is dominant in the Gulf of Mexico, but that other cryptic lionfish species may co-occur therefore DNA samples were taken from all lionfish sampled and will be analyzed through mtDNA sequencing to confirm species. Video review, aging of otoliths and analysis of gut contents will be conducted with continued sampling planned for 2021.

Age and Growth of Yellowfin Tuna from the Northern Gulf of Mexico

This project has been halted as we have collected and aged over 2,500 otoliths and contributed a great deal to the stock assessment of yellowfin tuna. We greatly appreciate all the fishermen that contributed samples through the years of this project.

Age and Growth of Wahoo from the Louisiana Recreational Fishery

This project has been halted as we have established age, growth and maturity trends in a peer reviewed published article that can be used in stock assessment of this species. We greatly appreciate all the fishermen that contributed samples through the years of this project.

AGE & GROWTH LABORATORY

The collection of age, growth and reproductive information used to develop age-structured stock assessments is coordinated through the LDWF Age and Growth Laboratory in Baton Rouge. The Age and Growth Lab monitors 17 species of fish. Monitoring is done through the collection of otoliths and spines (gray triggerfish) for aging purposes. Coastal Study Area biologists record length, weight, gender and location when fish are collected in the field. The 17 fish species consist of 13 saltwater and four freshwater species. The freshwater species are black crappie, white crappie, largemouth bass and channel catfish. The channel catfish study was completed December 2018 and will no longer be collected. The saltwater species are black drum, cobia, gray snapper, greater amberjack, gray triggerfish (spines), king

mackerel, red drum, red snapper, sheepshead, southern flounder, spotted seatrout, striped mullet and vermilion snapper. Yellowfin tuna and wahoo are sampled by Fisheries Research biologists and considered fishery research species. Since 2015, LDWF Fisheries Research staff have been Gulf of Mexico-wide leaders in yellowfin tuna processing protocol and aging. Opportunistic samples of wahoo have led to age and growth model estimations and a maturity ogive. As of January 2019, saltwater otoliths/spines are obtained by fisheries independent sampling in addition to fisheries dependent sampling. Dependent sampling requires field marine biologists to collect the otolith or spine when they interview a recreational angler, and also includes interviewing commercial fishermen at commercial fishing docks. Independent sampling, requires field biologists to target a particular species. Freshwater otoliths are obtained through independent sampling. The lab receives otoliths (and spines) throughout each month of the year.

During FY 2019-2020, the Age and Growth Lab in Baton Rouge received 13,477 otoliths, of which 13,343 have been aged. Within that total, 2,034 otoliths were saltwater fisheries independent, of which 2,003 were aged and 1,867 otoliths were freshwater, of which 1,864 were aged. Spotted seatrout was the most collected species out of any marine or inland species because quotas for spotted seatrout are the highest and it is very popular among anglers. The totals for each species are listed in *Table 10*.

TABLE 10. Saltwater and freshwater fish otoliths collected and aged.

SPECIES	COLLECTED	AGED
Black Crappie	400	400
Black Drum	1,933	1,918
Cobia	25	25
Gray Snapper	141	140
Gray Triggerfish	0	0
Greater Amberjack	41	38
King Mackerel	1	1
Largemouth Bass	1,264	1,264
Red Drum	2,382	2,371
Red Snapper	761	752
Sheepshead	881	865
Southern Flounder	871	868
Spotted Seatrout	4,029	4,016
Striped Mullet	230	221
Vermilion Snapper	37	37
White Crappie	187	187

The season for striped mullet and black and white crappie collection is typically during the fall. Largemouth bass sampling is mostly done during the spring and early summer months. The number of freshwater otoliths decreased when compared to last year, primarily due to ending the sampling of channel catfish.

The 2019 otolith sampling quotas were maintained through FY 2019-2020. The number of marine otoliths increased slightly when compared to last year's numbers, primarily due to the addition of independent otolith samples collected. All otoliths received during this time period have been processed, meaning they were cataloged, prepared to be sectioned, first and second read.

During FY 2019-2020, the Age and Growth Lab received the reference set for gray snapper, gray triggerfish, king mackerel and red snapper. Reference sets were stopped in early 2020 due to the COVID-19 pandemic. The annual Gulf States Marine Fisheries Commission Otolith Processor's Workshop was held in September 2019, in Panama City, Florida, and hosted by Gulf States Marine Fisheries Commission. The reference sets are used to help sharpen Age and Growth biologists' otolith aging skills and control bias over time. The sets are also used to ensure all labs base their ages on the correct criteria.

INLAND RESEARCH

Many issues that Inland Fisheries biologists face require laboratory and field research to validate current techniques, investigate new methods of resource management and prioritize management actions across Louisiana's freshwater ecosystem.

Freshwater Artificial Reef Program

LDWF facilitates this program by partnering with sponsor groups to construct artificial reef projects in inland waterbodies. LDWF's role in this program is that of administrator and/or consultant. As such, LDWF makes final decisions relative to project design, material selection and placement for all projects sanctioned by LDWF. The U.S. Coast Guard is consulted if artificial structures are proposed to be placed in navigable waterways. LDWF's Inland Fisheries biologist managers serve as points of contact for proposed projects and must grant prior approval for proposed projects to ensure compliance with project guidelines. Once implemented, LDWF Inland Fisheries biologists monitor the reef via diving, snorkeling or underwater video/photography to evaluate usage by target species.

Florida Largemouth Bass Genetics

LDWF Inland Fisheries has worked closely with LSU AgCenter to determine the genetic composition of selected largemouth bass populations in the state. The data is used to manage hatchery stocks, assess the relative mortality of native, Florida and hybrid largemouth bass, and assess the introgression of Florida largemouth bass genes into Louisiana largemouth bass populations resulting from continuing stocking efforts by LDWF. During FY 2019-2020, 1,494 largemouth bass were tested for sub-species identification. These fish were from Cross Lake, D'Arbonne Lake, Turkey Creek Lake Lacassine National Wildlife Refuge, the Amite, Blind and Tickfaw Rivers, the Spring Bayou Complex, and Toledo Bend Reservoir (*Table 11*).

An additional Florida largemouth bass genetics project was continued in FY 2019-2020 to provide more detail of the introgression patterns based on several factors. Six largemouth bass populations were selected for introgression research on the two deviance patterns of hybrid largemouth bass and related management strategies. The factors considered in the selection of largemouth bass populations included: number of years stocked, number of years since last stocking, total number of Florida largemouth bass stocked, lake type based on morphology and dominant habitat type. The selected waterbodies for this project are: Lake St. John, Lake Cataouatche, Poverty Point, Lake D'Arbonne, Chicot Lake, and Lake Rodemacher.

Habitat sampling is completed for the project lakes. The distance from the end of the vegetation bed to shore was measured and percent cover of aquatic plants (submersed, floating or emergent) within that measured distance was recorded. Also, shoreline characteristics such as timber (fallen or standing) or any shoreline development, such as housing or businesses, was noted. These metrics were quantified at random points along the shoreline of the lake, resulting in approximately 100 data points per lake. Multiple water samples were collected, and several vertical profiles taken for chlorophyll a and nutrient analyses.

The largemouth bass populations of all project lakes have been sampled The sample number was increased from 30 to 60 per lake to give a better representation of the populations. Weight, length, otoliths, and stomach contents were recorded or collected for all sampled largemouth bass. All otoliths have been mea-

TABLE 11. Largemouth bass tested for sub-species identification in FY 2019-2020.

LOCATION	NUMBER				PERCENT			DATE SAMPLED	DISTRICT
	NORTHERN	HYBRID	FLORIDA	TOTAL	NORTHERN	HYBRID	FLORIDA		
Cross Lake	124	71	19	214	57.9	33.2	8.9	March 2019	1
Turkey Creek	98	11	3	112	87.5	9.8	2.7	December 2018	2
D'Arbonne	106	28	5	139	76.3	20.1	3.6	October 2019	2
Lacassine	40	62	45	147	27.2	42.2	30.6	March 2019	5
Spring Bayou	124	25	8	157	79	15.9	5.1	October 2019	6
Amite	90	12	0	102	88.2	11.8	0	May 2019	7
Blind River	24	3	0	27	88.9	11.1	0	May 2019	7
Tickfaw	15	2	0	17	88	11.8	0	May 2019	7
Toledo Bend	379	156	44	579	65.5	26.9	7.6	January 2019	10
TOTAL				*1,494*					

Largemouth bass.

Frecklebelly madtom.

sured and assigned an age for growth modeling. DNA has been extracted and allozyme analyses completed for each fish. Matrix A primers (Misa55, Misa90, Misa11, Misa28) have been analyzed using fragment analysis and capillary electrophoresis on fish from 4 of 6 lakes. Matrix B (Lar7, Misa112, Misa68, Misa117), Matrix C (Mdo3, LMA10, Mdo6, Mdo7) and Matrix A fragment analysis is ongoing on all remaining largemouth bass. Florida largemouth bass and northern largemouth bass standards (Yucatan and Finch Lake) have been optimized with fragment analysis and capillary electrophoresis.

American Eel Age and Growth

American eels have been studied very little along the coast of the Gulf of Mexico, which has lead Inland Fisheries biologists to research the life history of eels found in Louisiana. Inland Fisheries District 5 has been working on a State Wildlife Grant for American eel life history information since November 2017. In FY 2019-2020, they processed 187 eels that were collected throughout the state by various methods. To date, 420 eels have been processed for the project. The parameters collected include length, weight, stomach contents, sex determination, presence of the swim bladder parasites *Anguillicoloides crassus* and removal of otoliths and tissue for DNA. Aging otoliths has provided the ages for 298 specimens, with the oldest eel being 16 years. Staff has found 104 specimens from 20 different sites that contained the parasite A. crassus. The final report will be submitted by October 2021. This study will provide the department with much needed information on American eels for future management considerations.

Status Survey for Frecklebelly Madtom in the Pearl River Drainage of Louisiana

LDWF Inland Fisheries biologist completed a survey to assess presence/absence and relative abundance of the frecklebelly madtom during FY 2019-2020. Using a State Wildlife Grant, they completed 19 samples on the main stem Pearl and Bogue Chitto rivers throughout Louisiana. There were 724 frecklebelly madtoms collected across 18 of the 19 sample locations. The frecklebelly madtom had the second highest relative abundance at 21%. A final report was completed that will provide current and thorough distribution along with abundance data to federal partners, allowing them to make a more informed decision regarding federal listing of the frecklebelly madtom.

Crawfish Survey and Genetic Analysis for Petitioned Species in Calcasieu River

Inland Fisheries and Wildlife Diversity sections are investigating the distribution and genetics of the Calcasieu Painted Crawfish (*Faxonius blacki*), an uncommon species thought only to inhabit streams that drain into the western fork of the Calcasieu River in southwest Louisiana. Due to the small distribution and unknown population status, this crawfish has been petitioned to be placed on the fed-

eral list of threatened and endangered species. This investigation is focused on the population status of the Calcasieu Painted Crawfish and to determine, through genetic testing, if a full species status is warranted or if it is actually a subspecies of the Teche Painted Crayfish. During FY 2019-2020, District 5 staff collected and preserved tissue from 118 painted crawfish, during 63 sampling events, conducted across 36 different locations. Due to the efforts of this project thus far, the Calcasieu Painted Crayfish has been discovered at nine new locations. Sampling and tissue collection will be completed in the fall with the full genetic analysis projected to be conducted during 2021.

Hydrologic Alterations on Mississippi River Batture Lands

In 2016, a partnership between federal, private and state entities initiated a restoration project in the batture lands of Richard K. Yancey WMA in order to accomplish the common goals of fish passage restoration, fish habitat enhancement, increased floodplain connectivity and increased public fishing access along the Lower Mississippi River. Over FY 2019-2020, this partnership successfully enhanced boating and fishing opportunities in the Mississippi River batture lands of the WMA by resurfacing the boat launch at the Blackhawk Scar Lake complex. Inland Fisheries biologists and researchers from LUMCON and Nicholls State University also collected baseline water quality, bathymetry data, fish community assemblage and fish abundance data with the use of advanced SONAR technology, targeted gill netting and boat electrofishing during the fiscal year. Inland Fisheries concluded continuous, pre-construction monitoring of changes in water temperatures across the floodplain habitat as the Mississippi River inundated the batture area during the 2018-2019 flood pulse. Future alterations that have moved through engineering and design phase and have received dedicated funding through the partnership include replacing a failing weir and upgrading several culverts that limit floodplain access at certain river stages. Changes in fish community composition, bathymetry, water quality and fish habitat will be evaluated post-alteration to assess how management of floodplain hydrology can impact fisheries productivity, aquatic habitat and boating access.

Advisory Group Membership

- Atchafalaya Basin Program Technical Advisory Group (chair)
- Lake Providence Watershed Council (chair)
- False River Watershed Council (chair)
- Louisiana Vegetation Managers Association (Board Member & Advisor)
- Southeast Association of Fish & Wildlife Agencies - state representative
- Mississippi Interstate Cooperative Resource Association - state representative
- Lower Mississippi River Conservation Committee - Executive Committee & Secretary/Treasurer
- Mississippi Interstate Cooperative Resource Association - Paddlefish and Sturgeon Committee
- Catfish Management Technical Committee of the Southern Division of the American Fisheries Society
- Reservoir Committee of the Southern Division of the American Fisheries Society
- Warm Water Streams Committee of the Southern Division of the American Fisheries Society
- American Eel Subcommittee of the Warm Water Streams Committee of the Southern Division of the American Fisheries Society
- Pollution Committee of the Southern Division of the American Fisheries Society
- Atchafalaya Basin Research and Promotion Board
- Mid-South Aquatic Plant Management Society (Board Member)
- Louisiana Fish Contaminants Advisory Group
- Toledo Bend Power Project Relicensing Project (FERC/SRA) - Aquatic Resources Working Group
- Pallid Sturgeon Recovery Team
- Lower Basin Pallid Sturgeon Workgroup
- Gulf Sturgeon Recovery Team
- Mississippi River Basin Panel on Aquatic Nuisance Species
- Gulf and South Atlantic Regional Panel of the Aquatic Nuisance Species Task Force
- Louisiana Watershed Initiative Projects TAG
- Louisiana Watershed Initiative Data and Modeling TAG
- Instream Flow Council
- Alligator Gar Committee of the Southern Division of the American Fisheries Society

Presentations and Posters

Maxwell, R. The Calcasieu River, the Gem of SWLA. Oral Presentation. SWLA Master Naturalists invited speaker series. Nov. 9, 2019.

Faria, V., Hale, A., Maxwell, R., and S. Kinney. Effect of Freezer Storage on *Anguilla rostrata* Gonadal Tissue. Oral presentation at the University of Louisiana Undergraduate Research Conference. November 2019. Lafayette, LA.

FISHING ACCESS AND OPPORTUNITY

Louisiana is nationally recognized by anglers and fisheries professionals as a premier sport fishing destination. The Office of Fisheries strives to create, enhance and restore our state's inventory of public boating and fishing access sites. Access sites, including marinas, boat launches and fishing piers, serve as doorways to our state's natural resources.

ACCESS

In a cooperative effort, LDWF provides financial assistance to local government entities through a competitive process to construct, improve and repair boating and fishing access facilities. Improvements and repairs are also made to boating and fishing access facilities owned by LDWF. This program is funded through the Sport Fish Restoration Program and includes both freshwater and saltwater projects. Projects may include the construction of boat ramps, parking areas, docks, bulk heading and fishing piers.

BOATING ACCESS PROJECTS COMPLETED

- **Bussey Brake Reservoir** - Bussey Brake Reservoir is owned and maintained by LDWF. Two boat lanes have been cleared to provide safe boating access in the reservoir. Additional project plans include installation of breakwater structures at the boat ramp, construction of a mooring dock, extension of two existing fishing piers, and the construction of two new fishing piers.
- **West End-Breakwater Drive Boat Launch** - Project includes renovating the existing two-lane boat ramp and parking area.

BOATING ACCESS FACILITIES PLANNED OR UNDER CONSTRUCTION

- **Deer Park Boat Launch** - The Deer Park boat launch is owned and maintained by LDWF. Repairs include replacing sections of the concrete boat ramp, installing sheet piling and back fill to prevent future erosion and drainage improvements to the parking area.
- **City of New Iberia Boat Slips** - Project includes the construction of mooring facilities along Bayou Teche in downtown New Iberia to accommodate transient boaters.
- **City of New Iberia Civic Center Marina Phase I** - Project includes the construction of mooring docks and related amenities along Bayou Teche in downtown New Iberia adjacent to the Civic Center facility.
- **Town of Leonville Boat Launch Improvements** - Project includes the construction of a pavilion and bathroom facilities at the existing boat launch.
- **Town of Madisonville Boat Launch Renovations** - Project includes repairs/replacement of the existing mooring docks.
- **Marina del Ray Renovations** - Project includes renovation of multiple docks and amenities for transient boaters.
- **City of New Iberia Civic Center Marina Phase II** - Project includes the construction of mooring docks and related amenities along Bayou Teche in downtown New Iberia adjacent to the Civic Center facility.

FISHING ACCESS FACILITIES PLANNED OR UNDER CONSTRUCTION

- **St. Tammany Fishing Pier Phase II** - Project includes constructing amenities and additional wooden crossovers to connect the existing Phase I Twin Span fishing pier.
- **Port Sulphur Civic Drive Fishing Pier** - Project plans include construction of a fishing pier at the existing boat ramp and improvements to the parking area.
- **Indian Creek Recreation Area Fishing Pier** - This project includes the construction of a fishing pier at the Indian Creek Recreation Area to provide safe and accessible shoreline fishing opportunities.

CLEAN VESSEL ACT PROGRAM

- **City of New Iberia CVA Sanitation Facility** - Project includes relocation of an existing pump out facility to the future site of a mooring facility in downtown New Iberia.

NUISANCE AQUATIC VEGETATION

Control of nuisance aquatic plant species is necessary to provide access to many public waterways. Aquatic vegetation management efforts are designed to ensure that the natural environment and human interests are mutually protected.

Our natural resources are constantly under attack from invasive species posing a threat to healthy habitats and access opportunities for the public. The flagship of these initiatives is our Aquatic Plant Control Program, which strives to provide the public with safe and usable fishing and boating access. Left unchecked, invasive plants have the potential to completely inundate the state's abundant freshwater lakes, making them inaccessible and threatening the natural habitat of our valuable aquatic resources. Aggressive treatment of affected waters continued in FY 2019-2020 in an ongoing effort to restore and improve the aquatic habitat and the natural balance of plants and fish.

The Aquatic Vegetation Management Plan format was created for lakes that do not have an approved LDWF Waterbody Management Plan to provide a lake description, basic information, a listing of lake authorities, historical vegetation control information, current aquatic plant status, and recommendations for control. These documents are used as a guide for aquatic plant control and as a source of recommendations and information to provide to the lake authorities and the public. In FY 2019-2020, the Aquatic Plant Control Program completed 72 Vegetation Management Plans for Louisiana public waterbodies.

In FY 2019-2020, herbicides were applied to 45,921 acres of nuisance aquatic vegetation, and the majority of these efforts included control of 19,764 acres of water hyacinth, 20,318 acres of giant salvinia, 1,483 acres of alligator weed and 1,019 acres of common salvinia. In addition, approximately 747,871 adult giant salvinia weevils were stocked in water bodies throughout Louisiana.

Another method used for control of aquatic vegetation includes water level fluctuations. Natural water systems benefit from high springtime water levels and lower water levels in the fall. Benefits include aquatic vegetation control and a healthier fish population. For impounded waters, partial dewaterings (typically called drawdowns) are often conducted to induce similar benefits. These drawdowns also provide the opportunity for improvements to shoreline properties. Drawdowns were conducted on 15 inland reservoirs in FY 2019-2020 (*Table 12*).

TABLE 12. Drawdowns conducted in FY 2019-2020.

LAKE NAME	DATES	PURPOSE OF DRAWDOWN
Lake Bistineau	July 22, 2019 - Feb. 11, 2020	Giant salvinia control and bottom oxidation
Kepler Lake	Aug. 5, 2019 - Nov. 29, 2019	Aquatic vegetation control, shoreline maintenance, habitat improvement
Bussey Brake	At minimal level until early 2020	Complete renovation
Cheniere Lake	Since 2016	Repairs to highway, bridge, and spillway
Lake Louis	Aug. 29, 2019 - Feb. 15, 2020	Bottom oxidation
Saline-Larto Complex	June 9, 2020 - Nov. 2, 2020	Aquatic vegetation control
Bundick Lake	July 19, 2019 - Dec. 2, 2019	Bottom oxidation, vegetation control, and landowner/parish maintenance
Vernon Lake	2017 - March 2020	DOTD Initiated Dam and spillway repairs due to Hurricane Harvey damage
Chicot Lake	Sept. 3, 2019 - Jan. 2020	Vegetation control; bottom oxidation
Lake Cocodrie	Jan. 3, 2019 - Sept. 30, 2019	Vegetation control; bottom oxidation
Lake Cocodrie	Jan. 2, 2020 - Sept. 30, 2020	Vegetation control; bottom oxidation
False River	Sept. 3, 2019 - Jan. 15, 2020	Bottom oxidation/sediment consolidation
Saline Lake	June 30, 2019 - Oct. 1, 2019	Vegetation control; bottom oxidation
Clear-Smithport	July 2, 2018 - Dec. 13, 2019	Gate damaged, left open through 2018 until Dec. 2019

In recent years, aquatic plant control biologists have shifted efforts towards identifying and utilizing all effective plant control methods available. Integrated pest management involves combining the effects of chemical, mechanical and biological control methods to manage nuisance species more effectively and efficiently. The long-term benefits and cost efficiency provided by the integrated pest management strategy allows LDWF to more effectively manage the aquatic vegetation infestations throughout Louisiana's public waterbodies.

Maintaining Community Fishing Opportunities

Waters available and accessible to the public for recreation and fishing are often unavailable in big cities and urban areas. For this reason, those ponds and lakes that are available can experience increased use during the summer months. University Lake in Baton Rouge is no exception. The lake is both heavily fished and utilized by many local schools and organizations. During routine aquatic vegetation assessments, District 7 crew noticed infestations of water hyacinth and water lettuce that had not been problematic in the recent past. Several applications treating a total of 5.5 acres of water hyacinth and 3.5 acres of water lettuce were made throughout FY 2019-2020 using diquat at a rate of 1 gallon per acre with a nonionic surfactant at a rate of 0.25 gallons per acre for water lettuce. Results were excellent. LDWF personnel assesses the LSU lakes frequently and applications are made as necessary. The lakes were able to remain open and accessible to the public year-round.

Saline Lake Giant Salvinia Control

Saline Lake is a 7,001-acre impounded cypress/tupelo swamp surrounded by hardwood and pinelands in Natchitoches, Winn and Bienville parishes. Saline Lake has been plagued with nuisance aquatic vegetation of many species since the impoundment of Saline Bayou in 1933. In the past, water hyacinth has inhibited fishing and boating recreation. Giant salvinia was first recorded on Saline Lake in 2007, and has since become the dominant nuisance aquatic vegetation species. Giant salvinia has been especially problematic during years following mild winters. In order for the Aquatic Plant Control Program to maintain open water areas and bayous, herbicide applications usually begin in April and continue into December. In FY 2019-2020, LDWF treated 1,174 acres of giant salvinia in Saline Lake. These concentrated efforts have been successful in providing both recreational and commercial use to the public throughout the year.

Evaluation of Giant Salvinia Control Methods

Since 2006, giant salvinia has spread to waters throughout much of Louisiana. As a result, identifying and implementing all efficient and effective control methods for this invasive aquatic weed has been a priority for the Aquatic Plant Control Program. Introduction and establishment of giant salvinia weevils, a species-specific biological control, has been a major focus of the program since that time. Most recently, salvinia weevil research has focused on finding a cold tolerant weevil in order to ensure overwintering in the northern part of the state. In recent years, LDWF has evaluated the effectiveness of several mechanical control devices including the WaterMower, bucket boats, mashers, harvesters and weed cutters. Unfortunately, mechanical control options are typically slower, more labor intensive and more expensive than LDWF's current giant salvinia control approach which includes herbicide applications, water level manipulation and weevil establishment. Although herbicide applications remain a major part of the salvinia control efforts, the Aquatic Plant Control Program continues to search for more effective and cost efficient chemicals available for use in aquatic systems. Since 2012, LDWF has worked closely with USACE and LSU AgCenter weed scientists to explore the effectiveness of new herbicides and to test the potential of mixtures of herbicides and the effects of different surfactants. This research includes controlled, replicated experiments, as well as field evaluations of mixtures that show potential for more cost-efficient control. It has been proven that either of the herbicides Clipper (flumioxazin) or Stingray (carfentrazone) can be used as an alternative to diquat dibromide to act as an indicator and to initiate plant damage when combined with glyphosate for salvinia control. Experiments continued throughout FY 2019-2020, focusing on the effectiveness of alternative herbicides both alone and in combination. Metsulfuron methyl was recently tested for activity on giant salvinia. This herbicide is new to aquatics and was found to have very positive results in a mesocosm study conducted by the LSU AgCenter. This herbicide in combination with other Environmental Protection Agency-approved aquatic herbicides shows strong potential for alternative low rate applications and has been added to the LDWF Aquatic Herbicide Application Procedures. These efforts will continue as new herbicides become available and could lead to more effective control of giant salvinia in the future.

Presentations

David, J. Spring Bayou Integrated Approach to control Aquatic Vegetation. Mid-South Aquatic Plant Management Society, Nov. 6, 2019. Baton Rouge, LA.

Hill, D. Louisiana: A History of *Salvinia molesta* Management. Louisiana Aquatic Vegetation Management Association, Oct. 2, 2019. Pineville, LA.

Hill, D. Louisiana: A History of *Salvinia molesta* Management Louisiana Aquatic Vegetation Management Association, Jan. 27, 20120. Baton Rouge, LA.

Hill, D. Aquatic Pest Control: Calibration Review. Louisiana Aquatic Vegetation Management Association, Jan. 28, 2020. Baton Rouge, LA.

Hill, D. Louisiana: A History of *Salvinia molesta* Management. Mid-South Aquatic Plant Management Society, Nov. 6, 2019. Baton Rouge, LA.

Kinney, S. Aquatic Vegetation Update for Toledo Bend Reservoir. SRA Commission Meeting, Feb. 27, 2019. Lake Charles, LA.

Perret, A. Giant Salvinia Growth Trends in Northern Louisiana. Mid-South Aquatic Plant Management Society, Nov. 6, 2019. Baton Rouge, LA.

Sibley, J. Hydrilla and Giant Salvinia Management on Caney Creek Reservoir. Public Meeting on Caney Creek Reservoir. March 2, 2020. Chatham, LA.

FISHING OPPORTUNITY

Louisiana's fishery resources, including habitat, benefit all of Louisiana's constituent groups within the state and across the Gulf Coast. Habitat stewardship and resource management provide opportunities for the public to access these natural resources.

COMMUNITY FISHING PROGRAM

The "Get Out & Fish!" community fishing program was initiated in November 2014. The goal of the program is to work with local community organizations and governments to provide easily accessible, high-quality fishing opportunities to everyone in Louisiana. The program intends to recruit new anglers to the sport of fishing and promote outdoor activities for future generations. In order to accomplish this mission, public water bodies that met the required specifications were chosen by LDWF biologists to begin stocking fish on a regular basis.

Get Out and Fish! Sites

An agreement was signed with one new community fishing location in FY 2019-2020, at Bogue Chitto State Park in Franklinton. The

launch event for this site was originally scheduled for Spring of 2020, but was postponed due to the stay at home restrictions in place set by the Governor of Louisiana in order to combat the spread of COVID-19 in Louisiana. Agreements with three other sites that were being considered for FY 2019-2020 have also been postponed at this time. With the addition of Bogue Chitto State Park, there are currently 14 active community fishing sites in the program. A total of 25,600 pounds of channel catfish and 4,400 pounds of rainbow trout were stocked in all of the current community fishing sites during this fiscal year. These numbers were also impacted by park closures and the stay at home order in the Spring of 2020 (*Table 13*).

ARTIFICIAL REEFS

The Louisiana Artificial Reef Program was created by Act 100 of the 1986 Louisiana Legislature within LDWF. Act 100 also required the formation of the Artificial Reef Development Council, development of an Artificial Reef Plan, and establishment of the Artificial Reef Trust Fund.

The Artificial Reef Development Council is comprised of the Secretary of LDWF, the Dean of LSU's School of the Coast and the Environment, and the Executive Director of Louisiana Sea Grant, or their designees. The council is charged with providing guidance on policy, procedural matters, site selection and allocation of funds to the program. The Office of Fisheries administers and manages the program in accordance with the National Artificial Reef Plan, Louisiana Artificial Reef Development Plan, pertinent regulations, laws and budget allocation.

The Louisiana Artificial Reef Plan was developed and implemented in November 1987. The plan outlines the siting, permitting and monitoring requirements. The plan centers on nine artificial reef planning areas and the conversion of oil and gas platforms into permanent marine hard-bottom habitat. The program also includes special artificial reef sites, deepwater reefs, nearshore reefs and inshore reefs. The program works closely with stakeholders, public and private conservation groups, and appropriate regulatory agencies when developing, maintaining and monitoring Louisiana's artificial reefs.

In FY 2019-2020, the program enhanced three offshore reefs with three oil and gas platforms and received $4.5 million in donations from oil company participation. It also completed one new deepwater reef, West Cameron 661.

The Louisiana Artificial Reef Program enhanced seven inshore reef sites and added four new reef sites in FY 2019-2020. *Table 14* shows the reef name, acreage, material type and size, and amount of material deployed. The West End, Lake Front, Cypremort Point II, Rabbit Island, Point Mast, Bird Island and Ship Shoal 26 reef sites were enhanced using Natural Resource Damage Assessment Recreational Use Funds. The new reefs created at Grand Banks, West Karako , Lake Borgne, and Cabbage Reef were created as part of a cooperative endeavor with the Lake Pontchartrain Basin Foundation.

In FY 2019-2020, through funds provided by the Louisiana Restoration Area Trustee Implementation Group, LDWF continued the monitoring of all completed inshore and nearshore artificial reef enhancement sites. This is part of a five-year plan to assess the success of artificial reefs enhanced in an effort to mitigate for recreational use opportunities lost during the 2010 *Deepwater Horizon* oil spill. Monitoring efforts include the study of the aquatic organisms utilizing the reef enhancement sites via the use of gillnetting, rod and reel sampling, and benthic tray observations, as well as observations of recreational users. Together, those efforts are intended to provide insight into the overall biological health of the reef enhancement sites as well as insight into whether those sites are providing enhanced recreational opportunities to the public.

The locations of all of Louisiana's artificial reefs can be found on the LDWF website, including an Interactive GIS-based map (*ldwf.maps.arcgis.com/apps/MapSeries/index.html?appid=4c4a4d9526c248c080c3eaa4808b9bea*).

TABLE 13. Get Out & Fish! Stocking Schedule: Number of Fish in Pounds

PARKS	TYPE OF FISH	SEPT. 2019	OCT. 2019	NOV. 2019	JAN. 2020	MARCH 2020	MAY 2020
Purple Heart Memorial Park (Ragley)	Rainbow Trout				300		
	Channel Catfish	600		600			600
Girard Park (Lafayette)	Rainbow Trout				200		
	Channel Catfish	400	400				400
Zemurray Park (Hammond)	Rainbow Trout				300		
	Channel Catfish		300			300	300
BREC's Burbank Park (Baton Rouge)	Rainbow Trout				400		
	Channel Catfish		800			800	800
Kiroli Park (West Monroe)	Rainbow Trout				400		
	Channel Catfish	500				500	500
William T. Polk Park (Vidalia)	Rainbow Trout				200		
	Channel Catfish	400		400			
Turner's Pond (Minden)	Rainbow Trout				500		
	Channel Catfish	1000		1000		1000	1000
Grambling City Park (Grambling)	Rainbow Trout				200		
	Channel Catfish	400		400		400	
Southside Regional Park - Fabacher Field (Youngsville)	Rainbow Trout				200		
	Channel Catfish	400	400				400
Elmore D. Mayfield Park (Ruston)	Rainbow Trout				500		
	Channel Catfish	1000		1000		1000	1000
I-10 Park (Jennings)	Rainbow Trout				500		
	Channel Catfish		1000				1000
Joe W. Brown Park (New Orleans)	Rainbow Trout				500		
	Channel Catfish		1000			1000	1000
Sidney Hutchinson Park (Walker)	Rainbow Trout				200		
	Channel Catfish	400	400			400	400
TOTALS	**Rainbow Trout**				**4400**		
	Channel Catfish	**5100**	**4300**	**3400**		**5400**	**7400**

TABLE 14.

REEF SITE NAME	PERMIT ACREAGE	MATERIAL TYPE & SIZE	SIZE	AMOUNT DEPLOYED
West End	10 acres	Limestone	5-10"	300 tons
Lake Front	4 acres	Limestone	5-10"	1,950 tons
Cypremort Point II	50 acres	Limestone	3-5"	7,650 tons
Rabbit Island	50 acres	Limestone	3-5"	9,750 tons
Point Mast	50 aces	Limestone	3-5"	4,000 tons
Bird Island	69 acres	Limestone	3-5"	4,000 tons
Ship Shoal 26	187 acres	Limestone	3-5"	8,000 tons
Grand Banks	10 acres	Limestone, reefballs, oyster shell	mixed	32 Reefballs, 27cy shell, 75 cy limestone
West Karako	10 acres	Limestone, reefballs, oyster shell	mixed	30 RB, 27cy shell, 36 cy limestone
Lake Borgne	10 acres	Reefballs	3' high	30 reefballs
Cabbage Reef	10 acres	Limestone, reefballs, shell	mixed	30 Reefballs, 27cy shell, 63 cy limestone

Important Figures for FY 2019-2020

- 78 total established offshore artificial reef sites
  - 48 planning area reefs
  - 18 special artificial reef sites
  - 12 deepwater reefs
- Offshore structures converted to permanent habitat
  - 406 platform jackets
  - 8 drill rig legs
  - 3 oil and gas structures deployed
- 13 established nearshore reefs
- 33 inshore reefs sites

FRESHWATER ARTIFICIAL REEF PROGRAM

Freshwater artificial reefs can be utilized to accomplish multiple Inland Fisheries objectives, but the primary objective for this program is to increase angler success. For many anglers, finding fish in a waterbody, especially one that is new to them, is a major obstacle to a successful fishing trip. Artificial reefs concentrate fish, and identifying the structures on maps and with buoys makes them available to all anglers. A secondary objective is increased fisheries habitat. As lakes age, flooded timber decomposes and water bottoms may accumulate silt and organic debris. This progression can lead to a reduction in fisheries productivity. If sufficient artificial cover or substrate is added, fisheries productivity can be maintained.

LDWF facilitates this program by partnering with sponsor groups to construct artificial reef projects. LDWF's role in this program is that of an administrator and/or consultant. As such, the department makes final decisions relative to project design, material selection and placement for all approved projects. The U.S. Coast Guard is consulted if artificial structures are proposed to be placed in navigable waterways. LDWF's Inland Fisheries biologist managers serve as points of contact for proposed projects and must grant prior approval for proposed projects to ensure compliance with project guidelines.

Important Figures for FY 2019-2020

- 130 total established freshwater artificial reef sites
- 2 new freshwater artificial reef sites established in 1 waterbody during FY 2019-2020

FRESHWATER FISH HATCHERY PROGRAM

The Louisiana Hatchery Program partners with local, state and federal agencies to produce or purchase freshwater fish to start or enhance statewide sport fisheries, to hasten the recovery of fisheries affected by natural or man-made disasters, and to produce threatened or endangered species, if necessary. Fish are requested annually by Inland Fisheries staff, according to the department's "Resource Enhancement through Stocking" guidelines. The program also provides support services for LDWF's outreach, education and aquatic plant control programs.

FISH STOCKING

Approximately 6.7 million fish were stocked into 90 Louisiana waterbodies in FY 2019-2020. Ten species of fish were released, for the purposes of rough fish control, sportfish enhancement, aquatic plant control, and to provide fishing opportunities. Fish ranged in size from fry to adults. Approximately 6.6 of the 6.7 million fish stocked in Louisiana were hatched at LDWF hatcheries and grown out at LDWF or partner facilities. Nearly 19,000 triploid grass carp were purchased from Arkansas farms and stocked into Louisiana waterbodies for aquatic vegetation control using LDWF Aquatic Plant Control Funds. The other 0.1 million fingerlings were purchased by local or state organizations with oversight, approval, and assistance from LDWF. *Table 15* details fish stockings by the LDWF hatchery program and partners over the 2019-2020 reporting year.

HAZARD ANALYSIS CRITICAL CONTROL POINT PLANNING

Nuisance aquatic species are harmful and expensive to control. The best way to avoid or reduce problems involving these species is prevention. This fiscal year, hatchery biologists continued their work to develop and implement Hazard Analysis Critical Control Point (HACCP) plans. HACCP plans identify, assess, and minimize risks of spreading nuisance aquatic species from Booker Fowler Fish Hatchery to stocking sites across the state and vice versa. The plans mitigate the risks of spreading nuisance aquatic species in Louisiana waters.

The existing plan for stocking Florida largemouth bass fingerlings was reviewed and updated and a new plan for stocking channel catfish fingerlings was created. Nuisance invasive aquatic species occurrence maps and at-risk basins were updated by state fisheries biologists based on actual Nuisance aquatic species reporting. Hatchery staff reference these tables prior to using hatchery equipment at any particular stocking site so they understand the known and potential risks at each site and what particular disinfection efforts are required for each site.

A custom hatchery truck wash was designed and constructed by hatchery staff this fiscal year to assist staff with killing, removing, and safely disposing of any nuisance aquatic species that might inadvertently hitch a ride to the hatchery from a stocking site on hatchery equipment. The equipment disinfection process includes using environmentally safe disinfectants, low pressure hot water, and high pressure cool water to kill and remove any potential undesirable species that may return to the hatchery on fish stocking equipment. The truck wash has an independent underground drain line that prevents any unfiltered runoff from entering surface water.

HATCHERY AND FISHERIES OUTREACH/EDUCATION

Hatchery staff assisted with hosting the annual CENLA National Hunting and Fishing Day Event held in Woodworth, in September 2019. Hatcheries kicked off the 2020 spawning season with an educational paddlefish spawning event in support of LDWF's Fisheries Outreach Native Fish in the Classroom Program. Students and teachers participating in the Native Fish in the Classroom Program attended the event to learn about spawning techniques used to produce Paddlefish, invasive aquatic species, age and growth of fish, and largemouth bass production. They had an opportunity to participate in the spawning event and then they took fertilized paddlefish eggs back to their classrooms to hatch and grow. Shortly after the paddlefish event, gathering and work restrictions mandated by the Governor due to the COVID-19 pandemic limited the hatchery's ability to perform outreach and education tasks. The hatchery was closed to the public for the remainder of the 2020 spring production season due to the COVID-19 pandemic. The U.S. Forest Service and Fort Polk fishing derbies normally supported by LDWF hatcheries through fish transportation and stocking were cancelled. The hatchery's planned annual open house was also canceled.

INVESTIGATIONAL NEW ANIMAL DRUG PROGRAM PARTICIPATION

LDWF hatcheries continued to participate in the USFWS National Investigational New Animal Drug Program. This program provides a safe and legal way for aquaculturists to procure and use experimental drugs and allows LDWF to contribute safety and efficacy data to the USFWS for helping with the approval process. This year, the hatchery participated by using LHRHa, a synthetic hormone that causes spermiation and ovulation, for spawning paddlefish.

PRESENTATIONS

Butler, K. Design, Cost, and Construction of a Hatchery Truck Wash for HACCP Compliance. Southern Division American Fisheries Society Aquaculture Technical Committee Annual Meeting. Jan. 22, 2020.

ADVISORY GROUP MEMBERSHIP

Southern Division of the American Fisheries Society Aquaculture Technical Committee

PROFESSIONAL ORGANIZATION MEMBERSHIPS

- Louisiana Chapter of the American Fisheries Society
- Southern Division of the American Fisheries Society
- American Fisheries Society
- Fish Culture Section of the American Fisheries Society
- U.S. Aquaculture Association
- World Aquaculture Association

TABLE 15. FISH STOCKING BY WATERBODY (7/1/2019 - 6/30/2020)

BODY OF WATER	SPECIES	SIZE	NUMBER STOCKED
Abbeville Community Fishing Pond	Channel Catfish	Fingerlings	1,010
	Florida Largemouth Bass	Adults	58
Bartholomew Lake	Florida Largemouth Bass	Fingerlings	19,500
		Fry	200,000
Bayou Bienvenue	Florida Largemouth Bass	Phase II Fingerlings	4,132
Bayou des Glaises	Channel Catfish	Fingerlings	400
Bayou D'Arbonne Lake	Florida Largemouth Bass	Fingerlings	275,000
		Phase II Fingerlings	6,340
Bayou Huffpower	Channel Catfish	Fingerlings	200
Bayou Nezpique	Paddlefish	Fry	10,000
Beaver Park Pond	Channel Catfish	Fingerlings	300
Black Bayou Lake	Florida Largemouth Bass	Fingerlings	38,000
Black Bayou & Black Bayou Reservoir	Florida Largemouth Bass	Fingerlings	11,200
Black Lake & Clear Lake	Florida Largemouth Bass	Fingerlings	119,000
Black River Lake	Florida Largemouth Bass	Fingerlings	32,900
BREC Pond - Burbank	Florida Largemouth Bass	Adults	20
BREC - Central Community Park	Florida Largemouth Bass	Fingerlings	101
	Triploid Grass Carp	Adults	10
BREC - Cohn Arboretum	Triploid Grass Carp	Adults	10
BREC Pond - Doyles	Florida Largemouth Bass	Fingerlings	81
BREC Pond - Forest Park	Channel Catfish	Adults	150
BREC Pond - Greenwood Park	Florida Largemouth Bass	Fingerlings	304
BREC Pond - Howell Park	Channel Catfish	Fingerlings	150
BREC Pond - Oak Villa	Channel Catfish	Adults	250
BREC Pond - Palomino	Florida Largemouth Bass	Fingerlings	81
BREC Pond - Perkins	Channel Catfish	Adults	150
	Triploid Grass Carp	Adults	5
BREC Pond - Sherwood	Channel Catfish	Adults	200
	Florida Largemouth Bass	Adults	20
BREC Pond - Zachary	Channel Catfish	Fingerlings	350
			53
Bussey Brake	Bluegill	Fingerlings	905,600
	Florida Largemouth Bass	Fingerlings	49,100
	Redear Sunfish	Fingerlings	193,500
	Threadfin Shad	Fingerlings	9,040
	White Crappie	Fingerlings	32,410

WATERBODY	SPECIES	SIZE	NUMBER STOCKED
Caddo Lake & James Bayou	Florida Largemouth Bass	Fingerlings	151,100
Calcasieu River	Hybrid Striped Bass (reciprocal cross)	Fingerlings	45,820
Cameron Prairie	Bluegill	Fingerlings	1,000
	Redear Sunfish	Fingerlings	1,000
Caney Lake (Upper & Lower Combined)	Florida Largemouth Bass	Fingerlings	4,000
Chatham Lake	Florida Largemouth Bass	Fingerlings	4,050
Chicot Lake	Florida Largemouth Bass	Fingerlings	33,000
Cocodrie Lake	Florida Largemouth Bass	Fingerlings	52,500
Corney Lake	Florida Largemouth Bass	Fingerlings	1,400
Cross Lake	Florida Largemouth Bass	Fingerlings	98,100
Cypress Bayou Reservoir	Florida Largemouth Bass	Fingerlings	49,070
Drainage Canals, Orleans & Jefferson Parish	Redear Sunfish	Fingerlings	4,300
Dubuisson Lake	Channel Catfish	Fingerlings	7,100
Eunice City Lake	Florida Largemouth Bass	Adults	50
False River	Channel Catfish	Fingerlings	7,240
	Florida Largemouth Bass	Fingerlings	6,080
Fifth Ward Park	Florida Largemouth Bass	Fingerlings	284
Fullerton Lake	Channel Catfish	Fingerlings	1,500
	Florida Largemouth Bass	Fingerlings	340
Grand Bayou Reservoir	Florida Largemouth Bass	Fingerlings	32,600
Gretna City Pond	Bluegill	Fingerlings	2,500
Henderson Lake	Channel Catfish	Fingerlings	7,950
	Florida Largemouth Bass	Fry	400,000
	Triploid Grass Carp	Adults	14,960
Holbrook Park Pond	Channel Catfish	Fingerlings	818
Hunt Correctional	Florida Largemouth Bass	Fingerlings	203
Indian Creek & Indian Creek Reservoir	Triploid Grass Carp	Adults	3,000
Ivan Lake	Florida Largemouth Bass	Fingerlings	9,000
	Triploid Grass Carp	Adults	200
Jackson VA Home	Channel Catfish	Fingerlings	110
Kepler Creek Lake	Florida Largemouth Bass	Fingerlings	21,700
Kincaid Lake	Channel Catfish	Fingerlings	25,140
Lafayette Greenspace/ Moncas Park (Vermilion River)	Bluegill	Fingerlings	4,200
	Florida Largemouth Bass	Fingerlings	482
Lafreineire Park	Channel Catfish	Fingerlings	3,680
Lake Arthur & Mermentau River	Paddlefish	Fry	200,000
Lake Bistineau	Florida Largemouth Bass	Fingerlings	140,000
Lake Bruin	Florida Largemouth Bass	Fingerlings	20,100
	Hybrid Striped Bass (reciprocal cross)	Fingerlings	13,700

TABLE 15 (cont). **FISH STOCKING BY WATERBODY (7/1/2019 - 6/30/2020)**

WATERBODY	SPECIES	SIZE	NUMBER STOCKED
Lake Buhlow	Channel Catfish	Fingerlings	2,990
	Florida Largemouth Bass	Fingerlings	5,290
Lake Claiborne	Florida Largemouth Bass	Fingerlings	75,960
	Hybrid Striped Bass (reciprocal cross)	Fingerlings	31,000
Lake Concordia	Florida Largemouth Bass	Fingerlings	20,000
	Hybrid Striped Bass (reciprocal cross)	Fingerlings	5,180
Lake St. John	Florida Largemouth Bass	Fingerlings	39,970
	Hybrid Striped Bass (reciprocal cross)	Fingerlings	6,700
Lamar Dixon 11-acre Pond	Channel Catfish	Fingerlings	1,600
	Florida Largemouth Bass	Adults	40
	Triploid Grass Carp	Adults	20
Lamar Dixon 4-acre Pond	Channel Catfish	Fingerlings	814
	Triploid Grass Carp	Adults	10
Larto Lake	Florida Largemouth Bass	Fingerlings	81,100
Little Piney Park Pond	Channel Catfish	Fingerlings	407
Martin Lake	Florida Largemouth Bass	Fingerlings	8,000
Mill Creek Lake	Florida Largemouth Bass	Fingerlings	6,800
Moore Park	Triploid Grass Carp	Adults	10
Oil & Gas Park	Triploid Grass Carp	Adults	30
	Channel Catfish	Fingerlings	550
	Florida Largemouth Bass	Adults	20
		Fry	30,000
Port Hudson State Park Pond	Channel Catfish	Fingerlings	88
Poverty Point Reservoir	Florida Largemouth Bass	Fingerlings	20,000
	Hybrid Striped Bass (reciprocal cross)	Fingerlings	13,700
Red River (Dam 2 to Dam 1)*	F1 Hybrid Largemouth Bass (Fl x North LMB)	Phase II Fingerlings	1,800
	Florida Largemouth Bass	Phase II Fingerlings	7,200
Red River (Dam 3 to Dam 2)*	F1 Hybrid Largemouth Bass (Fl x North LMB)	Phase II Fingerlings	1,800
	Florida Largemouth Bass	Phase II Fingerlings	7,200
Red River (Dam 4 to Dam 3)*	F1 Hybrid Largemouth Bass (Fl x North LMB)	Phase II Fingerlings	3,600
	Florida Largemouth Bass	Phase II Fingerlings	14,400
Red River (Dam 5 to Dam 4)*	F1 Hybrid Largemouth Bass (Fl x North LMB)	Phase II Fingerlings	4,500
	Florida Largemouth Bass	Phase II Fingerlings	18,000
Red River (Shreveport to Dam 5)*	F1 Hybrid Largemouth Bass (Fl x North LMB)	Phase II Fingerlings	6,300
	Florida Largemouth Bass	Phase II Fingerlings	25,200
Rockefeller Refuge	Florida Largemouth Bass	Fingerlings	117,000
SWLA War Veteran's Home	Channel Catfish	Fingerlings	525
Saline Lake	Florida Largemouth Bass	Fry	500,000
Sherburne WMA Pond	Channel Catfish	Fingerlings	300
Sibley Lake	Florida Largemouth Bass	Fry	500,000
Sidney Hutchinson Pond	Florida Largemouth Bass	Fingerlings	101
Southside Regional Park	Triploid Grass Carp	Adults	10
Spanish Lake	Channel Catfish	Fingerlings	10,400
Spring Bayou	Florida Largemouth Bass	Fingerlings	54,500
State Police Youth Camp	Channel Catfish	Fingerlings	500
Thistlethwaite WMA Pond	Channel Catfish	Fingerlings	300
Toledo Bend Reservoir	Florida Largemouth Bass	Fingerlings	673,950
	Golden Shiners	Fingerlings	23,600
Turkey Creek Lake	Florida Largemouth Bass	Fingerlings	56,900
Twin Lakes Pond	Bluegill	Fingerlings	383
	Channel Catfish	Fingerlings	110
	Redear Sunfish	Fingerlings	250
University Lake	Florida Largemouth Bass	Fingerlings	1,620
	Triploid Grass Carp	Adults	550
Valentine Lake	Florida Largemouth Bass	Fingerlings	560
Vernon Lake	Florida Largemouth Bass	Fingerlings	82,600
		Fingerlings	5,000
		Fry	1,000,000
Waddill Ponds	Florida Largemouth Bass	Adults	20
West Feliciana Parish Sports Park	Channel Catfish	Fingerlings	500
TOTAL			*6,747,860*

FISHERIES OUTREACH AND EDUCATION PROJECTS

OUTREACH

The Aquatic Outreach and Education Program is designed to inform the public about programs and projects currently underway in the Office of Fisheries. Through outreach efforts including boat shows, school programs, community events and outdoor-related festivals, staff reached approximately 14,000 Louisiana citizens in FY 2019-2020.

In March 2020, LDWF staff had to begin cancelling scheduled events and workshops due to COVID-19. However, staff quickly adapted and created virtual opportunities for volunteer instructors and students through extended education, live video presentations and virtual workshops. These virtual opportunities will continue through the next year until restrictions are lifted in Louisiana.

Classroom aquatic education typically plays a big role during the spring months of the school year reaching over 3,000 students each year. Unfortunately, due to COVID-19, many of the aquatic education activities did not occur. Teachers around the state have access to three aquatic education guidebooks: Finnie the Fingerling; Let's Go Fishing; Fishing for Fun. The guidebooks are used in the classroom in whole and as supplemental material. Physical Education teachers have access to lesson plans and activities that involve casting and knot tying.

This year, LDWF staff hosted four Aquatic Volunteer Instructor Program workshops throughout the state and trained 39 volunteers. Those volunteers completed an eight-hour training course, where they learned how to train others on fishing techniques, fish identification, fish biology, age and growth, and other fishing related topics. The course certified them as an official LDWF Aquatic Education volunteer instructor. These volunteers are given a training manual with access to brochures, informational sheets, lesson plans on each fishing activity, and have access to borrow materials they need through LDWF's loaner kit program. The workshop prepared volunteers to host their own clinics, classes, workshops, or other fishing education programs. In addition, volunteers can teach these activities at events hosted by LDWF. In the last year, LDWF VIPs throughout the state spent over 2,500 hours teaching fisheries education at 50 different events.

In October 2019, LDWF hosted a Get Out and Fish! event at Joe W. Brown Memorial Park in New Orleans. This event was held to launch Joe W. Brown Memorial Park as the newest site to join the Get Out and Fish! community fishing program. Despite the landing of Tropical Storm Olga early the morning of the event west of New Orleans, 130 attendees gathered to fish throughout the morning as the weather improved. As part of this program the pond at each park is stocked in the spring and fall with adult size channel catfish and in the winter with rainbow trout, weather permitting. Get Out and Fish! community fishing events include a fishing competition and educational fishing activities. Through these events, new anglers will be introduced to a new bank fishing location with good odds of catching a fish, and will learn the necessary fishing skills to feel confident to continue to fish at these sites independently.

Our fisheries biologists also worked collaboratively with communications personnel to create promotional and educational material detailing research and fieldwork on a variety of topics relating to the conservation and management of fish, hatchery production, non-indigenous aquatic nuisance species and other aquatic resources.

During FY 2019-2020, staff utilized several educational resources including a casting inflatable, mobile touch tank and LDWF's mascot "Robbie the Redfish."

AQUATIC EDUCATION

LDWF's Education Program introduces people to the sport of fishing and promotes awareness of Louisiana's aquatic resources. This is accomplished through fishing clinics, camps, teacher workshops and distribution of publications. Education Program staff and volunteers deliver aquatic education programs.

FISHING CLINICS

Due to COVID-19, four aquatic education clinics that were scheduled to be held across the state, were canceled. Subjects typically covered at these clinics and workshops include invasive species, boating safety, fish identification, tackle selection, casting, and fishing techniques. Participants also have the opportunity to go fishing.

TEACHER WORKSHOPS

Teacher workshops were conducted to provide training in aquatic education that can be brought back to the classroom. The following workshops were conducted:

Native Fish in the Classroom

Native Fish in the Classroom is a multidisciplinary, classroom-based aquaculture stewardship project for middle to high school students. The goal of the Native Fish in the Classroom project is to develop a positive attitude of natural resource stewardship and to create a constructive, active learning situation in which students can explore strategies for sustaining aquatic ecosystems. Students obtain hands-on, science-based knowledge

WETSHOP participants.

WETSHOP participants.

of the state's aquatic resources. Teachers attended several workshops and meetings to ensure successful preparation for receiving paddlefish eggs. In the spring semester, students attend the paddlefish spawn and are engaged in a meaningful field trip experience by actively assisting biologists with the egg fertilization process as well as learning about fisheries management through several other educational stations during the day. Students rear the paddlefish from eggs to fingerlings then release them to a LDWF pre-selected, pre-approved riverine habitat. During the 2019-2020 school year, 10 schools and approximately 1,500 students participated in the program. Unfortunately, due to COVID-19 and distance learning, most of the schools were unable to hatch out the paddlefish eggs and release them.

Wetland Education Teacher Workshop (WETSHOP)

WETSHOP is a week-long coastal awareness, wetlands institute for teachers. WETSHOP provides an in-depth look at wetland ecology, fisheries management and coastal land loss in Louisiana. In July 2019, 21 enthusiastic teachers representing several parishes participated in field activities and were given information on wetland habitats, botany, wetland ecosystems, Louisiana history, coastal land loss and restoration, water quality, oil and gas exploration, fishing, seining, trawling and fisheries management. Teachers are encouraged to return to their parish and conduct a wetland project with colleague teachers and/or students and/or community. Unfortunately, this year, the workshop was cut short by two days due to the impending landing of Hurricane Barry. Despite the shortened workshop, staff were able to cover all of the major lesson that were originally scheduled for the last two days, even if they had to alter some from field trips to classroom overviews. The educators were also sent home with all of the material, allowing them to go over any material that staff were unable to cover.

COMMERCIAL SEAFOOD PROGRAMS

One of the main objectives of the Office of Fisheries is to maintain the viability of Louisiana's fishing industries through programs that protect native resources and provide technical assistance to the industry, including recovery from natural and man-made disasters.

In addition, the Office of Fisheries is pursuing several initiatives for Louisiana's commercial fishing industry including a seafood certification program and a professionalization program that aims to create a more informed and efficient industry. Programs to collect and recycle used oyster shell and concrete to create artificial oyster and fishing reefs are also being developed in coordination with the Coalition to Restore Coastal Louisiana.

SEAFOOD CERTIFICATION

In 2009, LDWF reprogrammed grant money from a NOAA grant to fund certification programs for Louisiana's seafood industry. The overarching plan for a broad certification program included five key components: seafood origin/quality certification; seafood sustainability certification; industry professionalization; electronic traceability; and seafood marketing.

The goal of the Louisiana Wild Seafood Certification Program is to increase demand for wild-caught Louisiana seafood. By creating an origin based brand, LDWF, in cooperation with the Louisiana Department of Health and the Louisiana Department of Agriculture and Forestry, has the ability to communicate to the consumers that the seafood they are consuming is caught by a licensed Louisiana fisherman, landed in Louisiana and processed by a Louisiana processor through the entire supply chain. The ability to create a national brand that can be sought out by chefs, consumers, distributors and retail chains will increase the demand and thereby prices for the Louisiana seafood fishery.

Several changes and developments to the program were implemented during FY 2013-2014 including the transition to an online application process as well as supply chain verification through invoice validation. Also introduced was a product registration requirement - retail packages possessing the program's logo must register with LDWF. In FY 2014-2015, the online renewal process was simplified, allowing participants to easily renew their permit instead of reapplying. Before applying, applicants must also participate in a 45-minute training video available through the program's website. Once permitted, participants are given access to a participant portal where they may access program logo files and verify participation of their supply chain in the Louisiana Wild Seafood Certification Program.

The program's first three years focused on building program interest among seafood dealers and processors within Louisiana. During FY 2014-2015, implementation was focused on the retailer and consumer aspects of the program, with an emphasis on creating demand for products bearing the Louisiana Wild Seafood Certification Program logo. The program has launched additional marketing campaigns including the use of social media. Within FYs 2015-2017 the focus was to build

the interest of the program amongst the public to demand Louisiana seafood

As of FY 2019-2020 there are a total of 37 permitted seafood businesses participating in the program and several "certified" labeled seafood retail packages are being sold in grocery markets across the state.

SUSTAINABLE FISHERIES AND SEAFOOD

The goal of the sustainability program is to manage Louisiana fisheries in a way that provides for today's needs without damaging the ability of the species to reproduce. Many seafood purveyors worldwide are under pressure to demonstrate the seafood they are sourcing is from sustainable and responsibly managed fisheries. LDWF is meeting these challenges with multiple approaches.

LDWF has explored mainstream sustainability certifications for major fisheries, such as those offered by the Marine Stewardship Council. In March 2012, Louisiana's blue crab fishery became the first blue crab fishery in the world to receive Marine Stewardship Council sustainability certification. This certification was scheduled to expire in March 2017, but it was extended to March 2018 as LDWF participated in a new pilot re-certification process. Re-certification to the Marine Stewardship Council standard was awarded in July 2018. LDWF has since participated in the second surveillance audit in June 2020.

In addition to Marine Stewardship Council certification, the Office of Fisheries has developed a Gulf-centric sustainability certification system in partnership with the Audubon Nature Institute. The Audubon Gulf United for Lasting Fisheries (GULF) Program is leading the development of this Responsible Fisheries Management certification program based on the United Nations Food and Agriculture Organization and International Standards Organization protocols. LDWF participates on the Audubon GULF Technical Advisory Committees, including a Fisheries Technical Advisory Committee, which previously functioned as the more general Technical Advisory Committee; and a new Chain-of-Custody Technical Advisory Committee that was established in May 2017. The Louisiana blue crab fishery attained certification to the Responsible Fisheries Management Program in 2016. The fishery passed the third surveillance audit in November 2019. The Audubon GULF - Responsible Fisheries Management Program itself was assessed by the Global Sustainable Seafood Initiative against Food and Agriculture Organization of the United Nations best international practices regarding certification systems. Recognition of the Audubon GULF - Responsible Fisheries Management certification program was awarded by the Global Sustainable Seafood Initiative in October 2018. Most recently, the Audubon GULF - Responsible Fisheries Management certification program passed its GSSI Monitoring of Continued Alignment review in August 2020.

We are continually vetting our program with seafood buyers to ensure Louisiana seafood and the Audubon GULF Program will have market acceptance. LDWF has engaged national retail organizations and suppliers in intense dialogue concerning sustainable seafood market needs and desires. LDWF continues active conversations with private-sector actors about fishery improvement projects and marine advancement projects for those Louisiana fisheries that have not taken up formal certification. In January 2016, revised pre-assessments were conducted for the Louisiana shrimp fishery according to the Audubon GULF - Responsible Fisheries Management and the Marine Stewardship Council programs. Based on these pre-assessments, the Audubon Nature Institute is leading a joint comprehensive fishery improvement project encompassing issues identified in both pre-assessments. The Louisiana shrimp fishery improvement project recently underwent an audit so that it maintains the comprehensive status. A shrimp by-catch study in support of these fishery improvement projects was completed in July 2020. A final report characterizing bycatch within the Louisiana shrimp fishery is expected to be completed during the fall of 2020.

COMMERCIAL SEAFOOD INDUSTRY PROFESSIONALIZATION

The primary goal of Louisiana Fisheries Forward, the voluntary industry professionalization program, is to create a better-informed and more efficient commercial fishing industry that helps ensure the economic sustainability of the state's commercial fishing industry. The program provides ongoing education opportunities for fishermen and industry participants to receive the most relevant and up-to-date information pertaining to their industry.

Louisiana Fisheries Forward - Advancing Our Seafood Industry is an LDWF Office of Fisheries collaborative effort with Louisiana Sea Grant and LSU AgCenter. Louisiana Fisheries Forward is a multi-year, multi-phase professionalism program for all sectors of the state's commercial fishing industry, including fishermen, dock owners, processors and distributors. This program is providing the education and training essential for the continued success of the industry and is focusing on a number of important topics through videos with corresponding fact sheets, the Louisiana Fisheries Forward Summit, hands-on workshops and the Louisiana Fisheries Forward website.

From July 2019 to June 2020, LDWF and Louisiana Sea Grant continued to execute the production of educational materials (referred to as fast fact sheets), the offering of in-person training sessions (referred to as dock days), a refrigeration demonstration project, the Louisiana Fisheries Forward website (*lafisheriesforward.org*) and conducted our biannual fisheries summit. Within the time frame stated above the Commercial Crab Trap Gear Requirements and the Oyster Harvester Training Requirements remained active (*www.wlf.la.gov/mandatory-oyster-harvester-training*) and (*www.wlf.la.gov/crabtraining/onlinetraining*).

Examples of Fast Fact Sheet (available on *lafisheriesforward.org*):

- 2019-2020 Crab Regulation Changes
- Oyster Remote Setting
- Softshell Crab Shedding
- Alternate Oyster Culture
- Preventing Shrimp Blackspot

Legislation was passed during the 2014 regular session that required the Louisiana Wildlife and Fisheries Commission to establish a program to increase and elevate professionalism in the commercial crab industry. Throughout the fall of 2014, LDWF developed the Louisiana Fisheries Forward Commercial Crab Gear Requirement. The Commercial Crab Gear Requirement consists of basic training and field training requirements that focus on education such as proper fishing techniques necessary for the health and sustainability of crabs, proper techniques for the best capture and presentation of the crabs for marketability and proper placement, tending and maintenance of crab traps to reduce potential conflicts with other user groups. Beginning Nov. 15, 2014, any person who wishes to obtain a commercial crab trap gear license must first complete this program unless the following exception applies (possessed a valid crab trap gear license any two of the license years, 2011, 2012, 2013 or 2014). During FY 2019-2020, there were

TABLE 16. Louisiana Fisheries Forward Commercial Crab Gear Requirement.

PROGRAM STATUS	APPRENTICESHIP	SPONSORSHIP	GRAND TOTAL
Applicant Ineligible	4	12	**16**
Approved	20	85	**105**
Conditionally Approved	0	0	**0**
M S Ineligible	5	18	**23**
In Review	3	2	**5**
Opt Out	0	1	**1**
Program Completed	23	52	**75**
Grand Total	**55**	**170**	**225**

approximately 105 active participants and approximately 75 participants who completed the requirements. Commercial Crab Gear Requirement details are available at *www.wlf.la.gov/crabtraining*.

LDWF's intention is to give our seafood industry access and training to the latest trends, requirements and technology in their profession. The seafood industry should have as much opportunity for training as any other industry in our state - we believe it will yield higher quality products and give our seafood community a competitive advantage in the marketplace. Since the launch of Louisiana Fisheries Forward - Advancing Our Seafood Industry, this one-of-a-kind professionalism program for Louisiana's commercial fishing industry has received inquiry, acknowledgement and recognition throughout many facets of local, regional, national and world fishing industries.

TASK FORCES

The Office of Fisheries has four active task forces: Shrimp, Oyster, Crab and Finfish. The task forces memberships are currently housed under LDWF, and cooperation between the task forces and the Office of Fisheries is essential as we move forward with the continued management of Louisiana's natural resources.

SHRIMP TASK FORCE

During FY 2019-2020, the Shrimp Task Force met on July 31, 2019, Oct. 2, 2019, Dec. 11, 2019, Feb. 5 2020 and May 6, 2020.

Agenda items discussed include:

- Discuss shrimp prices.
- Discuss shrimp imports vs domestic product and prices.
- Discuss the use of TEDs in skimmer trawl vessels that are 40 feet and greater in Length.
- Discuss the Calumet Cut and its impact on juvenile shrimp recruitment.
- Discuss seat vacancies and alternates.
- Recommendations for fall 2019 and spring 2020 shrimp seasons.
- Discuss fall Season ride-alongs.
- Discuss and participated in the Shrimp By-Catch Study.
- Discuss the Seafood Promotion and Marketing Board's shrimp industry marketing efforts.
- Purchased two drones to aid in shrimp enforcement.
- Passed a resolution to support the continued work on Gulf Hypoxia and submitted comment regarding the Louisiana Nutrient Management Strategy.
- Updates and discussion of inshore/near shore artificial reef sites.
- Coordinated Shrimp Task Force trip to Washington, D.C. to host Hill meetings.
- Discuss shrimp violations and possible legislature changes.
- Discuss COVID-19 Seafood Safety.
- Discuss 2019 flood event and fisheries disaster funding and damage assessment.
- Discuss restaurant seafood labeling regulations and legislative changes.

CRAB TASK FORCE

During FY 2019-2020, the Crab Task Force met on Sept. 3, 2019 and April 22, 2020.

Agenda items discussed include:

- Recommend changes to the Derelict Crab Trap Removal Program.
- Considered funding the 2020 Louisiana Fisheries Forward Summit.
- Considered a resolution on Gulf Hypoxia to submit as comments on the Louisiana Nutrient Management Strategy.
- Discuss 2019 flood event and fisheries disaster funding and damage assessment
- Consider Funding the Annual MSC Surveillance Audit for the Louisiana Blue Crab Sustainability Certification.
- Discuss COVID-19 Seafood Safety.

FINFISH TASK FORCE

During FY 2019-2020, the Finfish Task Force met on Aug. 14, 2019.

Agenda items discussed included:

- Discuss the economic impacts on the commercial finfish community from the recent change to the commercial greater amberjack trip limit at Gulf Council.
- Discuss the status of the fisheries disaster declaration.
- Discussion of mullet season.
- Discuss Louisiana finfish labeling.
- Hear a summary of the Louisiana Fisheries Forward efforts and the past summit.
- Consider a resolution to support the continued work to reduce Gulf hypoxia.

OYSTER TASK FORCE

In FY 2019-2020, the Oyster Task Force met on July 30, 2019; Sept. 10, 2019, Oct. 22, 2019, Dec. 3, 2019, Jan. 7, 2020, Feb. 12, 2020 and March 4, 2020.

Agenda items discussed include:

- Discuss the 2019-2020 Public Oyster Seed Grounds Season.
- Hear a Report on Oyster Mortality Surveys Related to the 2019 Flood Event.
- Considered a resolution on Gulf Hypoxia to submit as comments on the Louisiana Nutrient Management Strategy.
- Consider Funding for task force member travel, conference fees, and membership dues for the 2019 Interstate Shellfish Sanitation Conference.
- Discuss a State based assistance program for Louisiana oystermen due to the current flooding crisis and loss of oyster resources.
- Hear an update on Oyster Mortality Surveys related to the 2019 flood event.
- Hear an update on the Sediment Diversion Program.
- Discuss the 2019 ISSC Proposals.
- Discuss and consider funding for a Washington, D.C. seafood reception.
- Discuss planting and sacking on opening day of the public seed grounds in Sister Lake.
- Discuss the action and efforts Mississippi has taken against river diversions and next steps for the Oyster Task Force
- Hear an update on the Federal Fisheries Disaster Declaration.
- Consider funding for the 2019 ISSC hospitality suite.
- Create a Legal Committee.
- Discuss participation in the 2020 Louisiana Fisheries Forward Summit.

- Hear an update on the Oyster Task Force Washington, D.C. Trip.
- Hear an update on the Ed Lallo contract.
- Hear a presentation on Spat- Tech, High Density Seeding of Oysters for the restoration and Repopulation of oyster reefs.
- Hear a presentation on LDWF enforcement drones.
- Consider draft legislation that would make changes to the Public Oyster Seed Ground Vessel Permit fee options.
- Discuss oyster violations and convictions in Terrebonne Parish.
- Discuss the Federal Government's recognition of oyster industry farmers.
- Consider funding to sponsor the Croatian American Society Festival.

The Oyster Task Force also continued their marketing efforts including the Task Force's annual trip to Washington, D.C., where they sponsor the "Louisiana Alive" - D.C. Mardi Gras event, which draws members of the congressional delegation, staff and media, and provides an excellent platform to educate others on the importance of the Louisiana oyster industry. Additional Oyster Task Force Subcommittees met to discuss specific oyster topics.

SOCIOECONOMIC RESEARCH AND DEVELOPMENT

The Socioeconomic Research and Development Section was established in 1992 and currently resides in LDWF Office of Fisheries. The duties and responsibilities of the section are:

- To recommend, conduct and coordinate economic research studies pertaining to wildlife and fisheries resources of Louisiana and the Gulf region.
- To present research findings at appropriate professional and scientific meetings, and publish results in departmental publications and peer-reviewed scientific journals.
- To provide information and support to other sections and divisions within LDWF, as well as agencies outside LDWF, assisting them in accomplishing research needs, management tasks and short- and long-term objectives.
- To represent LDWF and Louisiana on various study groups, task forces and committees established to study, manage and improve wildlife and fisheries resources at the local, state, regional and national levels.
- To administer and implement special programs.
- To perform other activities as directed by LDWF's appointing authorities.

With assistance from the various program managers within the offices of LDWF, the Socioeconomic Research and Development Section prepares Fiscal and Economic Impact Statements that accompany the Notices of Intent for rules and regulations considered for adoption by the Louisiana Wildlife and Fisheries Commission. During FY 2019-2020, 12 Fiscal and Economic Impact Statements were developed and published along with the Notices of Intent in the Louisiana Register.

SURVEYS

SURVEY OF NATIONAL HUNTING AND FISHING DAY PARTICIPANTS

On Sept. 28, 2019, LDWF held a public event in observation of National Hunting and Fishing Day at Waddill Wildlife Refuge in Baton Rouge. Personnel from the Socioeconomic Research and Development Section collected email addresses from 161 event participants and sent them a link to an on-line questionnaire about the event. Seventy attendees responded. Results of this survey were completed and sent to the LDWF Public Information Section in October 2019.

SURVEY OF LOUISIANA ANGLERS WHO USED ARTIFICIAL REEFS

Socioeconomic Research and Development staff and the LDWF Shellfish Management Program initiated a mail survey of 1,493 commercial fishers with trip ticket records of blue crab landings harvested by crab traps. The survey solicited information about the number of traps owned and deployed by commercial crab harvesters and about the quantity of fuel and bait that they used on a typical trip.

SURVEY OF ANGLERS' PREFERENCES FOR SEATROUT MANAGEMENT

Socioeconomic Research and Development staff assisted Louisiana Sea Grant in a series of surveys of Louisiana anglers that solicited their preferences and perspectives regarding spotted seatrout management. Louisiana Sea Grant and the LDWF organized a series of discussion sessions on challenges facing the stock of spotted seatrout in Louisiana and of alternative management practices in February 2020. Persons who participated in these sessions were surveyed using electronic data collection tools.

The LDWF and Sea Grant administered a related survey on the same topic of a random sample of Louisiana residents with saltwater fishing privileges in May 2020. At the same time it conducted an open survey accessible through LDWF's website.

PUBLICATIONS, REPORTS AND PRESENTATIONS

Isaacs, Jack C. "Investigation of Trip Ticket Data Related to Greater Amberjack." Presentation Given to the Louisiana Finfish Task Force, August 2019.

Isaacs, Jack C. "Changes in the Issuance of Recreational Licenses with Hunting Privileges and Inflows into the Louisiana Wildlife Habitat and Natural Heritage Trust." Report Prepared for the Louisiana Department of Wildlife and Fisheries, October 2019.

Isaacs, Jack C. "Revisions to Louisiana's Wildlife and Fisheries Civil Restitution Values." Presentation Given to the Louisiana Wildlife and Fisheries Commission, January 2020.

Isaacs, Jack C. "An Assessment of the Principal Commercial Fisheries in Barataria Bay and Its Environs." Report Prepared for the Louisiana Department of Wildlife and Fisheries, January 2020.

Isaacs, Jack C. "Imports of Shrimp Products." Presentation Given to the Louisiana Shrimp Task Force, February 2020.

Isaacs, Jack C. "Information Relative to Fish and Wildlife Values." Presentation Given to the Louisiana Wildlife and Fisheries Commission, March 2020.

Isaacs, Jack C. "An Examination of Louisiana Department of Wildlife and Fisheries Trip Ticket Data Regarding Commercial Fishers Who Harvested Blue Crabs." Report Prepared for the Louisiana Department of Wildlife and Fisheries, May 2020.

Isaacs, Jack C. "Louisiana Commercial Shrimp Harvesters Report 2000-2018." Report Prepared for the Louisiana Department of Wildlife and Fisheries, May 2020.

REPRESENTATION ON TASK FORCES, STUDY GROUPS AND COMMITTEES

During FY 2019-2020, Socioeconomic Research and Development staff members represented LDWF on the following task forces, study groups and committees:

- Louisiana Blue Crab Task Force
- Louisiana Finfish Task Force
- Louisiana Gulf Hypoxia Working Group
- Louisiana Shrimp Task Force
- Socioeconomic Scientific and Statistical Committee of the Gulf of Mexico Fishery Management Council

ONGOING 2010 *DEEPWATER HORIZON* OIL SPILL ACTIVITIES

DEEPWATER HORIZON NATURAL RESOURCE DAMAGE ASSESSMENT RESTORATION ACTIVITIES

RECREATIONAL USE

The Consent Decree was finalized on April 4, 2016, which resolved $14.9 billion in claims against the 2010 *Deepwater Horizon* oil spill responsible parties and set the stage for the next phase of restoration activities. Louisiana is set to receive a total of $5 billion for Natural Resource Damage Assessment Restoration funding out of the $8.8 billion to be distributed Gulf-wide. Of Louisiana's portion, $60 million has been earmarked to provide and enhance recreational opportunities. In July 2018, two recreational use plans were finalized:

1. Recreational Use Restoration Plans/Environmental Assessments
2. Provide and Enhance Recreational Opportunities, which reallocated the original $22 million in early restoration funds towards other proposed alternative projects that would restore for lost recreational use in Louisiana, with specific focus on enhancing recreational fishing opportunities.

- Elmer's Island Access Project
  - Preliminary engineering and design was completed, and permits were submitted and received for project components.
  - The shuttle service contract and trash contract were put out to bid.
  - Pre-construction monitoring began and is on-going.
- Statewide Artificial Reefs
  - The following seven reefs were constructed: West End, Lakefront, Rabbit Island, Cypremort Point II, Point Mast, Bird Island and Ship Shoal 26.
  - Biological monitoring on constructed reefs began and is on-going.
- Lake Charles Science Center and Educational Complex
  - The Final RP/EA approving the location change that would co-locate the science center with the Lake Charles Children's Museum at the planned Port Wonder facility was approved in July 2019.
  - Engineering and design began and is on-going.

OYSTER RESOURCES

Replenish and Protect Living Coastal Marine Resources was a major restoration category of settlement funds, and includes $26 million of dedicated funding for oyster restoration in Louisiana. In March 2020, LA TIG released the first Living Coastal Marine Resources plan, draft RP/EA #5, for public comments, which described four preferred project alternatives proposed by LA TIG, one for marine mammals and three for oysters. The Final RP/EA #5 was released and funding was approved in August 2020. Implementation of oyster projects approved for funding by this restoration plan will begin in spring of FY 2020-2021. The projects selected; Enhancing Oyster Recovery Using Brood Reefs, Cultch Plant Oyster Restoration, and Hatchery-based Oyster Restoration, will help offset impacts resulting from exposure to Deepwater Horizon oil, dispersant and response activities.

GULF STATES MARINE FISHERIES COMMISSION

Gulf States Marine Fisheries Commission, a compact among the five Gulf states, is charged with promoting better utilization of the marine fisheries including finfish, shellfish and anadromous species through the development of programs for the promotion and protection of these fisheries while preventing any waste of these resources.

Fisheries biologists and economists participate in a number of Gulf States Marine Fisheries Commission programs and initiatives including Aquatic Invasive Species, Interjurisdictional Fisheries, Fisheries Information Network, and economics programs, as well as providing their expertise in the development of management recommendations. In addition, Fisheries biologists serve on a number of Gulf States Marine Fisheries Commission Technical Coordinating Sub-Committees including Data, SEAMAP, Habitat, Artificial Reef, Outreach, and species-specific committees and working groups. Fisheries' biologists were present at meetings and discussions pertaining to the various SEAMAP programs. LDWF biologists participated in the creation of various fishery management plans for Gulf species.

GULF OF MEXICO FISHERY MANAGEMENT COUNCIL

The Gulf of Mexico Fishery Management Council is responsible for the management of commercial, recreational and for hire fishing activities in the Exclusive Economic Zone (EEZ), Gulf waters from the state territorial sea out to 200 miles offshore. The Council prepares Fishery Management Plans and amendments to these plans. Methods of regulation include quotas, size limits, bag limits, seasons, trip limits and other tools fisheries managers employ to control both recreational and commercial harvests.

The head of each state's fisheries division has a seat on the council along with representatives from the fishing industry. Louisiana's seat is assigned to Assistant Secretary Patrick Banks. His designee for Council issues is Chris Schieble, who is delegated to act on his behalf. In addition to the council seat, Office of Fisheries employees participate in advisory roles on various panels and committees: Outreach, Data Collection; Habitat Protection; and Scientific and Statistical Committees for red drum, mackerel, reef fish, shrimp, and socioeconomics. LDWF biologists are also part of the SEDAR pool, a panel assigned to producing the Council's stock assessments.

A list of the Council's Fisheries Management Plans includes: Reef Fish, Coastal Migratory Pelagic, Red Drum, Shrimp, Lobster, Stone Crab, Coral, Aquaculture and Essential Fish Habitat. The council meets five times a year to work on amendments regarding these Fisheries Management Plans. Louisiana is considered a leader in the council's fishery management process with creative and out-of-the-box methodologies.

One such creative idea was the state management of the private recreational red snapper fishery. This concept was furthered during the fiscal year and was finalized at the April 2019 Gulf Council meeting. Amendment 50, as state management is known at the Council level, was approved by National Marine Fisheries Service in November 2019 and provided Louisiana the ability to manage the private recreational red snapper fishery in both state and federal waters during the 2020 recreational red snapper season. This gave Louisiana anglers more quality access to the fishery and more input into decision-making on management.

Further information can be located at gulfcouncil.org.

REPORT ACRONYMS

DMAP - Deer Management Assistance Program
FY - Fiscal Year
GULF - Audubon Gulf United for Lasting Fisheries
LDNR - Louisiana Department of Natural Resources
LDWF - Louisiana Department of Wildlife and Fisheries
LDWF-LED - Louisiana Department of Wildlife and Fisheries Law Enforcement Division
LSU - Louisiana State University
NMFS - National Marine Fisheries Service
NASBLA - National Association of State Boating Law Administrators
NAWCA - North American Wetland Conservation Act
NOAA - National Oceanic and Atmospheric Administration
RWR - Rockefeller Wildlife Refuge
SEAMAP - Southeast Area Monitoring and Assessment Program
SGCN - Species of Greatest Conservation Need
SCS - State Civil Service
USACE - U.S. Army Corps of Engineers
USDA - U.S. Department of Agriculture
USDA-NRCS - USDA Natural Resources Conservation Service
USFWS - U.S. Fish and Wildlife Service
USGS - U.S. Geological Survey
WDP - Wildlife Diversity Program
WLWCA - White Lake Wetlands Conservation Area
WMA - Wildlife Management Area

NOTES

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