LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

2018-2019 ANNUAL REPORT

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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 2019-2020

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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. Sammy Martin, Enforcement
Harry Blanchet, Fisheries Management
Jason Froeba, Fisheries Research & Development
Kenneth Ribbeck, Wildlife
Buddy Baker, Coastal & Nongame Resources

Commission for fiscal year 2019-2020

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FRONT & BACK COVER PHOTO: *Cypress trees in Caddo Lake by Edwin M., Shutterstock.com*

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This public document was published at a total cost of $????.??. One-hundred-twenty (120) copies of this public document were published in this first printing at a cost of $1,171.50. The total cost of all printings of this document including reprints is $1,171.50. This document was published by OTS-Production Support Services, 627 North 4th Street, Baton Rouge, LA 70802 for the Department of Wildlife and Fisheries to provide an account of the department's activities during the 2018-2019 fiscal year. This material was printed in accordance with standards for printing by state agencies established in R.S. 43:31. Printing of this material was purchased in accordance with the provisions of Title 43 of the Louisiana Revised Statutes.

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 marsh 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 Louisiana Department of Wildlife and Fisheries (LDWF) is a front porch agency in Louisiana State Government. Because we regulate and manage so many of the precious natural resources in our state the public has a basic idea of what we do. Even so, there's plenty of work done here the average person may not realize takes place. Research, restoration and education are just a few things in which we are heavily involved that don't necessarily hit the front pages.

Reflecting on the past fiscal year they were vital to our mission. And, once again, LDWF personnel rose to a level of expected excellence in performing all duties that continue to make me proud to be the leader of our agency. There were certainly challenges, but each time we met them head on and had another year in which the public can be proud of our efforts.

One of the things front and center, in the last fiscal year, was the restoration proposal being greenlighted for Queen Bess Island. The 37-acre island located near Grand Isle in Jefferson Parish is one of the state top brown pelican rookeries. The project aims to restore 30 acres of brown pelican and wading bird habitat and seven acres of nesting tern habitat. The project, funded by the Deepwater Horizon oil spill Natural Resource Damages (NRD) settlement, should be complete by the spring of this year.

While this project is a spectacular success, it's only one of the ways we're working to improve habitat throughout the state. Habitat improvement is key in our mission to protect and preserve our natural resources.

The mission of the Forest Management Program goal is to improve forest and wildlife habitat on our Wildlife Management Areas (WMAs) through sound forest management, reforestation practices and active forest/wildlife research activities. To that end, LDWF's 490,000 acres of forestland have been certified through the Sustainable Forestry Initiative Program. LDWF completed its second surveillance audit and was found to be in accordance with the requirements of the Sustainable Forestry Initiative Standard 2015-19. Those are important achievements.

While flooding hampered efforts last fiscal year, we continue North American Wetland Conservation Act (NAWCA) projects at Russell Sage and Sherburne WMAs. Construction has been delayed until summer 2020. But major improvements to water control structures, levee construction and impoundment dirt work is in the offing. An additional Phase 2 NAWCA grant is being developed for Russell Sage WMA. This project will replace additional water control structures and construct water delivery infrastructure thereby increasing waterfowl habitat and better enabling shallow water management for wintering waterfowl.

A partnership with Ducks Unlimited continued in FY 2018-2019 with the development of the prototype water control structure for Unit 4 at Rockefeller Wildlife Refuge. This project was funded through NAWCA for $1 million. Construction began in FY 2017-2018. Additional money from sponsors and LDWF funded the construction of fishing piers behind the new water control structure at Rockefeller. This provides a safe and enhanced recreational opportunity for the public.

We continued our battle against invasive aquatic vegetation species, including giant salvinia. Herbicides were applied to 36,121 acres of nuisance aquatic vegetation and the majority of these efforts included control of 11,683 acres of water hyacinth, 16,791 acres of giant salvinia, 1,910 acres of alligator weed and 1,425 acres of common salvinia. In addition, approximately 1 million adult giant salvinia weevils were stocked in water bodies throughout Louisiana to combat the problem.

With chronic wasting disease in our three border states, our work to keep it out of Louisiana continues in earnest. We have worked heavily with private landowners in northeast Louisiana to monitor for the disease which is deadly to deer. In addition, sampling from hunter harvested deer was increased on Tensas National Wildlife Reserve, Buckhorn WMA and Bayou Macon WMA. LDWF collected 1,249 CWD samples statewide in 2018-2019. CWD has not been detected in Louisiana.

Service to the public is our top priority. Our licensing section issued more than 2 million recreational hunting, fishing, trapping and non-consumptive use licenses and sold permits to more than 800,000 customers, generating more than $22 million in revenue. We also maintained license records for more than 100,000 lifetime licenses.

In addition, 59,000 commercial licenses were sold, representing 12,000 commercial anglers, 5,800 business entities, 800 charter businesses and various permits that generated more than $3 million in revenue.

LDWF's Enforcement Division made 585,558 contacts with the public, most of whom, I'm glad to report, were in compliance with state and federal wildlife and fisheries regulations. Enforcement agents issued 12,394 criminal citations and 5,916 warnings during this period.

One effective deterrent has been our Operation Game Thief program. During the 2018 year, Operation Game Thief paid out $16,750 in rewards for information that led to arrests. In 2018 the Louisiana Operation Game Thief board reviewed 44 cases that led to 95 subjects being cited or arrested and a total of 617 citations issued.

We continue to add to our enforcement ranks as the enforcement academy graduated its 32nd class in January of 2019.

We have many iconic wildlife species in our state and the American alligator is chief among them. The alligator, at dangerously low levels in the 1960s and '70s, continues to thrive in Louisiana thanks to our sustained use program that is the envy of the world.

During the summer of 2018 we estimated that 53,733 alligator nests were present in the coastal marsh habitats, a record year due to optimum marsh water level and habitat conditions.

One of the reasons for the success of the program is the wild alligator egg collection program in which alligator farmers return a percentage of alligators hatched at their facilities to the wild when they reach four feet in length. During 2018, 52,850 farm-raised alligators were released into the wild.

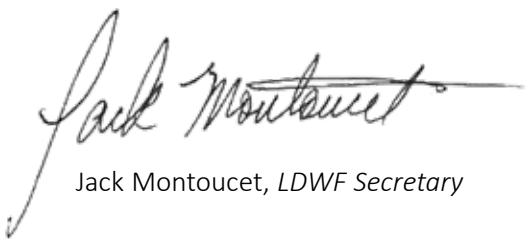
Like our alligator sustained use program, LA Creel is still cutting edge and has served the citizens of our state well. LDWF monitors recreational fisheries through the LA Creel Program and inland creel surveys. The LA Creel Program uses dockside interviews of recreational anglers to determine catch and a telephone/email survey to determine fishing effort.

During FY 2018-2019, fisheries biologists worked 1,599 LA Creel assignments and conducted approximately 11,595 interviews of recreational fishing trips along Louisiana's coast through the LA Creel Program. This resulted in 31,876 anglers being surveyed and 88,130 fish being counted. During FY 2018-2019, 148,434 private angler effort phone call or email attempts were conducted to estimate effort. Of those attempts, 44,428 resulted in completed surveys.

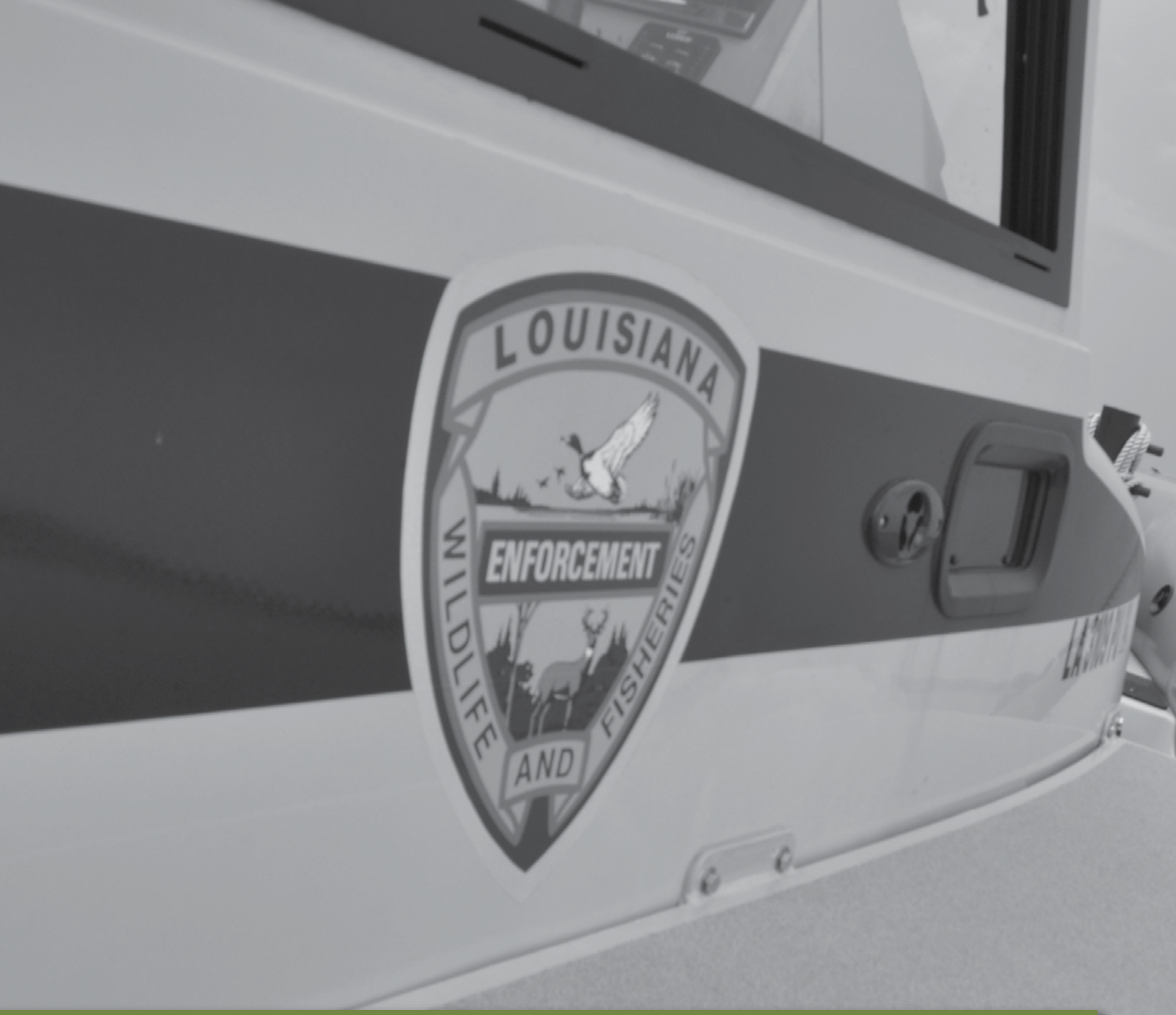
Approximately 860 charter captains were monitored with an estimated 171,842 charter angler trips taken during FY 2018-2019. During FY 2018-2019 using LA Creel data, it was estimated that nearly 2 million recreational angler trips were taken.

Our Get Out and Fish program added two new community fishing locations in FY 2018-19, including I-10 Park in Jennings and Joe Brown Park in New Orleans. With the addition of those two sites, there are now 14 total locations in the community fishing program. About 30,800 pounds of channel catfish and 3,000 pounds of rainbow trout were stocked in all of the current community fishing sites during the past fiscal year.

There are just a few of the highlights of another busy and successful year for LDWF. 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.

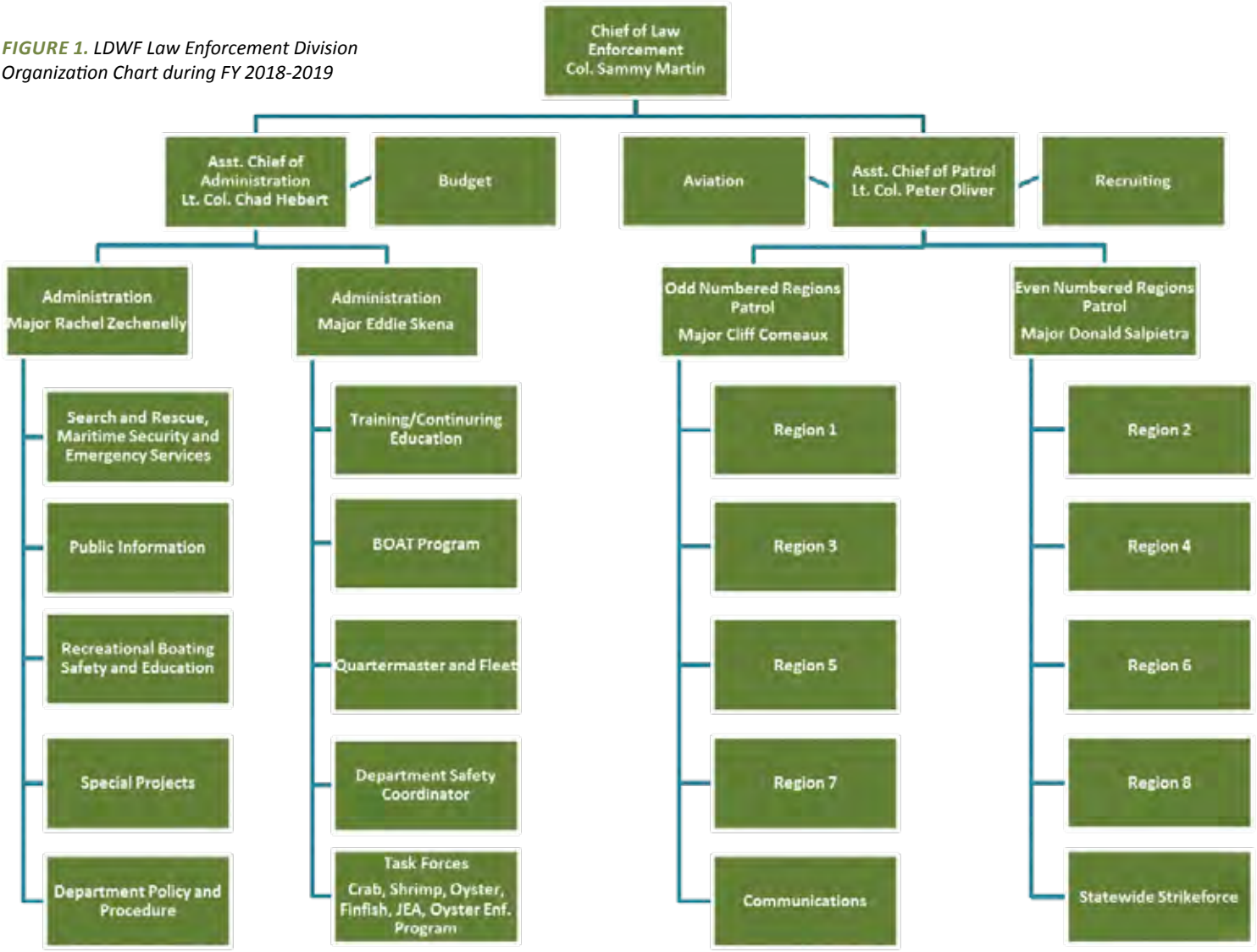
LDWF-LED is a fully-commissioned statewide law enforcement agency with the primary mission of protecting Louisiana's natural resources and serving the people who utilize them. Beyond the traditional role of ensuring compliance with licensing and harvesting regulations, LDWF-LED also conducts search and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

LDWF-LED 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 and Hospitals/LDWF Law Enforcement
  - Memorandum of Understanding - Louisiana Shellfish Sanitation Program
  - National Shellfish Sanitation Program

LDWF-LED conducted 247,995 patrol hours in FY 2018-2019: 199,468 on land and 48,527 on water. Agents made 585,558 contacts with the public, the majority of whom were in compliance with state and federal wildlife and fisheries regulations. LDWF-LED agents issued 12,394 criminal citations and 5,916

FIGURE 1. LDWF Law Enforcement Division Organization Chart during FY 2018-2019



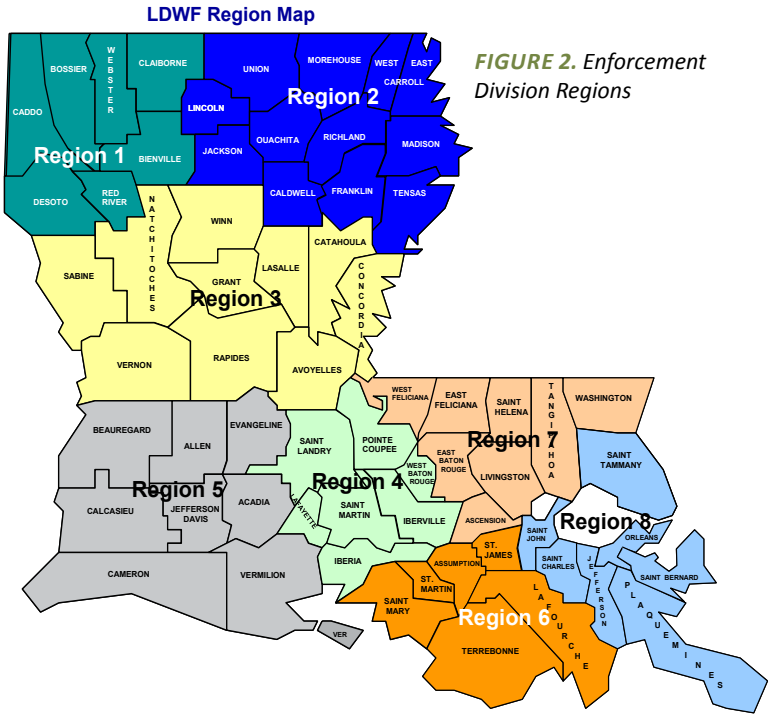


FIGURE 2. Enforcement Division Regions

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 (*Figure 1*). LDWF-LED is commanded by one colonel, the Chief of Enforcement, who reports directly to LDWF's Secretary and oversees administration of the division. Reporting to the colonel are two lieutenant colonels. One lieutenant colonel serves as assistant chief of administration which includes recreational boating safety and education, emergency services, training, support, public information and budget. The other lieutenant colonel serves as the assistant chief of patrol and supervises all

state regional field operations, statewide communications, aviation and recruiting. There are four majors:

- one over the even-numbered enforcement regions of the state and statewide strike force
- one over the odd-numbered regions and the statewide communications sections
- one over training, support (quartermaster and fleet), Joint Enforcement Agreement, and safety, and serves as the LDWF Enforcement representative for the shrimp, oyster, crab and finfish task forces
- one over the recreational boating safety and education programs, emergency services, special projects, policy and procedure, and serve as the state's boating law administrator

The LDWF-LWD headquarters staff works out of Baton Rouge, headed by Col. Sammy Martin who was promoted to the head position in September 2017. Col. Martin, a native of Terrebonne Parish, graduated from the Louisiana POST Training Academy in 1982, receiving his POST certification from Louisiana State Police, and has been an agent for over 36 years.

The Enforcement Division is divided into eight enforcement regions (*Figure 2*) and the statewide strikeforce. 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 June 2019) is 239.

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

LDWF-LED 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

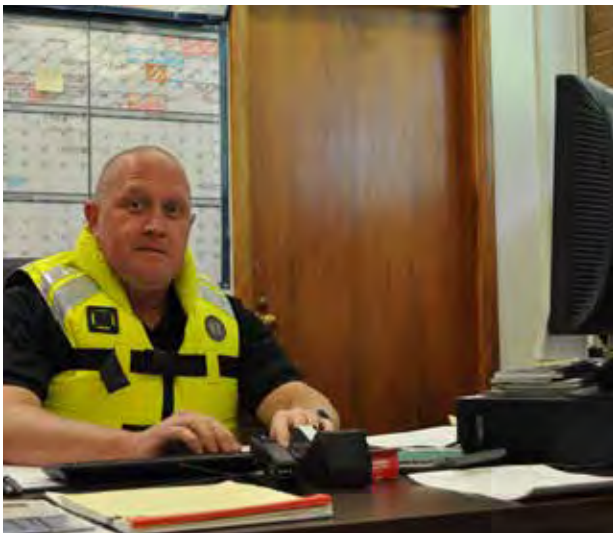
The Aviation Section contains two pilots and four total planes which include one Kodiak, one Cessna 210 and two Cessna 206 amphibians. The Aviation Section's aircraft provide a valuable platform for detecting illegal hunting and fishing activities and frequently play a vital life-saving role in search 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.

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 145,882 public contacts during the course of 34,569 patrol hours dedicated to boating enforcement, education and accident investigation in FY 2018-2019. Of those hours, 25,528 patrol hours were performed in vessels on the water.



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

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 2018-2019, LDWF-LED agents issued 61 citations for careless and reckless operation of a vessel and 88 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 2018-2019, 7,407 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 120,316 students.

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

LDWF certified 37 students during the NASBLA "Spring Aboard" national marketing campaign from March 17-23, 2019 to promote opportunities for boaters to enroll in a boating education course.

LDWF also certified 113 boaters statewide after their eighth "Boating Education Lagniappe Day" on April 27, 2019. Lagniappe Day ran from 9 a.m. to 5 p.m. at eight locations across the state and consisted of the NASBLA boating education course, food and drinks, giveaways and door prizes, all free of charge to the public.

LDWF participated in several national campaigns including "Wear Your PFD to Work Day" on May 17, "Ready Set Wear It" on May 18 and the "Safe Boating Week" in Louisiana from May 18-24. LDWF-LED 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.

Media interviews, news release articles, public relation events and social media comments occurred throughout the state during all listed campaigns.

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 manmade 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

LDWF-LED finished construction on a new training academy and emergency response facility. This project supports the mission of LDWF-LED agent training, continuing education, boating safety and waterway enforcement activities, and specialized enforcement training the agency provides to other state and local law enforcement. It also supports the state's lead emergency support function agency for search and rescue response and maritime security. In addition, this project further develops existing training infrastructure to maximize benefits for LDWF-LED, aids in the support of the training needs of local, parish and marine enforcement agencies, and provides a facility to meet the needs for providing boating safety course instruction.

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 2018, 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/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)
- Officer Survival (scenario based simunitions force on force training)
- 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

Four agents were certified as Drug Recognition Experts, bringing the LDWF-LED total to 21 Drug Recognition Experts.

MARINE LAW ENFORCEMENT TRAINING PROGRAM

At the end of 2018, all agents had completed their annual recertification as Boat Operators for Search and Rescue (BOSAR) in the NASBLA Boat Operations and Training Program (BOAT).

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 consists of agents who are specially trained as skilled listeners. The objective of the 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-LED Academy on Jan. 4, 2019 graduated its 32nd class of cadets into the ranks of LDWF-LED agents. A ceremony for the graduating class was held in Baton Rouge.

After completing over six months of intensive physical and academic training at the acade-

***TOP:** Cadets performing the daily flag detail at the academy.*
***BOTTOM:** Cadets standing at attention during the graduation ceremony.*

my, the 12 newly commissioned agents are ready to begin enforcing hunting, fishing and boating regulations that govern the use of the state's natural resources. Agents are also trained to provide emergency services as the state's lead agency for search and rescue and maritime security. At the academy, cadets train to enforce the state's recreational boating laws, the state and federal wildlife and fisheries laws and general law enforcement work on the state's many wildlife management areas. The academy also covers general law enforcement training equal to that of other state law enforcement officers.

JOINT ENFORCEMENT AGREEMENT

LDWF-LED again entered into a Joint Enforcement Agreement with the National Oceanic and Atmospheric Administration's Office for Enforcement. LDWF-LED received approximately $820,626 in FY 2018-2019 to patrol for compliance with federal commercial and recreational fisheries regulations, primarily 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 2018 year, Operation Game Thief paid out $16,750 in rewards. In 2018 the Louisiana Operation Game Thief board reviewed 44 cases that led to 95 subjects getting cited or arrested and a total of 617 citations issued. From 1984 till the end of 2018 the Louisiana Operation Game Thief board has paid out a total of $418,200 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 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 2018, Maritime Special Response Team members had completed their annual recertification as Tactical Operators Course in the NASBLA BOAT 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 partners successfully completed a three-day training exercise as well as a full scale exercise.

ACQUISITIONS

EQUIPMENT:

- 2 search and rescue vessels
- 19 replacement outboard motors
- 37 (4x4) patrol trucks
- 2 administration SUVs
- 50 replacement iPads
- 7 replacement/new personal ballistic vests
- 4 boat trailers

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 114 enforcement related press releases during FY 2018-2019. 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.

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LDWF ENFORCEMENT NEWS

LDWF AGENT HONORED WITH BOATING AWARD

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

Sgt. Austin Arteaga, of Slidell, received the NASBLA award at the monthly Louisiana Wildlife and Fisheries Commission meeting on Sept. 6, 2018 in Baton Rouge.

Sgt. Arteaga has been an LDWF agent for over 10 years and he mainly patrols the waterways in southeastern Louisiana including Lake Pontchartrain, the Mississippi Sound, the Gulf of Mexico and Lake Borgne.

Sgt. Arteaga has distinguished himself by becoming 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 BOSAR course.

Sgt. Arteaga is also an instructor in the more advanced NASBLA Tactical Boat Operators Course and the NASBLA Pursuit and Stop course.

LDWF PROVIDES SURVIVOR BENEFITS TO FAMILIES OF LDWF CADETS

The family of an LDWF-LED cadet who died last year while in training will be eligible to receive survivor benefits because of legislation Gov. John Bel Edwards signed as Act 378 on June 20, 2019.

Without the legislation, the wife and two minor children of Cadet Immanuel Washington would not be entitled to survivor benefits. Washington, a native of Franklin and resident of Youngsville, was in LDWF training academy in 2018 when he died.

The bipartisan legislation, House Bill 170, authored by State Reps. Sam Jones, D-Franklin, and Stuart Bishop, R-Lafayette, passed unanimously in both the House and the Senate. It allows spouses and children of cadets that died while training to receive full financial benefits even though the cadets were not fully commissioned LDWF agents at the time of their death.

Cadet Washington passed away on July 19, 2018, while in the third week of training at LDWF's Training Academy in Baton Rouge. Act 378 will extend eligibility for survivorship benefits to spouses and children of all LDWF enforcement personnel participating in the LDWF Enforcement Training Academy on or after July 1, 2018, even though the cadet had not been commissioned as an enforcement officer.

The new law also extends to members of the Louisiana State Police, including any cadet participating in the Louisiana State Police Training Academy on or after July 1, 2018.

LDWF AGENT CREDITED WITH SAVING LIFE OF MOTORIST

An LDWF-LED agent saved the life of a motorist on May 19, 2019 in East Feliciana Parish.

Senior Agent Mason Spillman was on patrol when he came across a car in the ditch at the entrance of the Port Hudson State Historic Site off of Hwy. 61 around 9:30 a.m.

When he got out of his truck, Spillman found two good Samaritans pulling a 27 year old New Roads woman out of the car that was in the ditch. Her leg was severed at the knee. Spillman immediately applied a tourniquet to her severed leg to stop the bleeding and called 911.

While waiting for the emergency medical services (EMS) ambulance, Spillman learned that the good Samaritans witnessed the car hit a guardrail before going in the ditch and that he arrived within 30 seconds of the accident happening. When the accident happened, it was during a severe thunderstorm with heavy rains.

The East Baton Rouge Parish EMS ambulance arrived around 9:45 a.m. and transported the woman to Our Lady of the Lake Hospital where she was listed in stable condition. It is believed that the tourniquet that Spillman applied prevented her from bleeding to death.

The Zachary Fire Department, East Feliciana Parish Sheriff's Office and the East Baton Rouge Parish Sheriff's Office also arrived on scene and assisted with traffic and loading the woman into the ambulance.

LDWF AGENTS RESCUE FATHER AND SON IN VERMILION BAY

LDWF-LED agents performed a successful search and rescue mission on Nov. 3, 2018 in Vermilion Bay.

LDWF agents were notified about two overdue boaters on board a vessel about 9 p.m. on Nov. 3. The missing boaters were a 57-year-old father and his 10-year-old son, both from Erath.

LDWF agents immediately began conducting search and rescue efforts in conjunction with U.S. Coast Guard and the Iberia Parish Sheriff's Office to locate the missing boaters.

LDWF agents located the missing boat with both boaters safely inside the vessel on Nov. 4 around 1:25 a.m. LDWF-LED agents loaded the father and son onto their vessel and transported the boaters back to the dock where they were evaluated by EMS and released to go home.

Agents found out that the boat battery died leaving the two boaters in need of assistance.

LDWF RECOGNIZED FOR RE-ACCREDITATION OF NASBLA BOAT PROGRAM

LDWF-LED was recognized for its achievement of re-accreditation with the NASBLA BOAT Program. LDWF was the first law enforcement agency to receive this national accreditation in 2011. Since then the agency has been an exemplary role model for other agencies pursuing accreditation.

LDWF's instructor cadre has played an integral role, not only in the training of Louisiana's maritime operators, but also as instructors for NASBLA's direct delivery courses throughout the nation. At the end of 2017, LDWF-LED had trained all of their agents in BOSAR, Boat Accident Investigations, and the Seated Battery of Field Sobriety Tests.

An additional 68 agents were trained in Boat Crew Member, 53 in Officer Water Survival, and 34 in the Tactical Operator Course discipline. LDWF-LED has also trained an additional 73 officers in Boat Crew Member and eight officers in BOSAR from other marine law enforcement agencies throughout the state.

Through the BOAT Program accreditation process, an agency, division, department or unit and its maritime training policies, procedures, curricula, qualification process and documentation are assessed to ensure alignment with the National Standard. This process and subsequent accreditation ensures interoperability with marine units across the country in specific applicable competencies. By accrediting agencies and departments throughout the country, the NASBLA BOAT Program creates more trainers and qualifies more officers than any other program in the nation, truly enhancing the safety and security of America's waterways. Agencies accredited are required to go through a re-accreditation process every three years.

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

The department 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 the department.

- Facebook Followers: 89,649
- Instagram Followers: 4,850
- YouTube Subscribers: 1,010
- Twitter Followers: 6,339

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, *wlf.louisiana.gov*, had 1.7 million users visit the site. The breakdown of new and returning viewers was comprised of 78 percent, and 22 percent respectively. Site visitors executed more than 7 million page views and spent an average of 2:48 minutes on the site.

2018-2019 PUBLIC INFORMATION PROJECTS

PROJECTS FOR OFFICE OF SECRETARY

Overall Projects

- News Releases (126 total: 110 for Enforcement and 16 for Secretary)
- R3 Strategic Planning
- 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
- Facebook Banners

Brochures/Handouts

- Food Bank Drive Flyer
- 2020-2024 LDWF Priority List Handout

Louisiana Conservationist

- Fall 2018
- Winter 2018
- Spring 2019
- Spring 2019

Annual Publications

- 2017-2018 Annual Report

Videos

- LDWF - Department Overview 2019
- LDWF - Hikers, Boaters and Wildlife Watchers
- LDWF Enforcement 32nd Cadet Class Commencement/Overview

Miscellaneous

- LDWF Branded Note Cards
- Enforcement Fine Schedule Binder
- Boater Education Fillable Forms
- JBE Oyster Processing Tour Invitation
- Lettering for Joe L. Herring Louisiana Room
- Media 101 Training Materials
- NHFD Patch
- Legislative Auxiliary Luncheon Agenda

PROJECTS FOR OFFICE OF MANAGEMENT & FINANCE

Posters/Signs

- Licensing Signs

Brochures/Handouts

- Hunting and Fishing License Fees Handout

Miscellaneous

- Licensing Fillable Forms

PROJECTS FOR OFFICE OF WILDLIFE

Overall Projects

- News Releases (103 total)
- LDWF Wildlife Rehabilitation Program (handouts, social media, website, workshop ads, etc.)
- Bat Colony Monitoring Program Materials (handouts, website, social media, etc.)
- WMA Self-Clearing Permit App Promotion Materials (poster, flyer, social media, etc.)
- Trapper Education Promotion Materials (flyers, social media, website, etc.)

Posters/Signs

- Waddill Bird Sound ID Sign
- WMA Property Signs

Videos

- 2018 Louisiana Duck Stamp Competition
- WMA Check-in/Check-out App
- Chronic Wasting Disease Sample Demonstration
- Archery in Louisiana Schools (ALAS)

PROJECTS FOR OFFICE OF WILDLIFE (cont.)

Annual Publications/Newsletters

- Friends of the Whooping Cranes Newsletter (January 2019)
- Wildlife Insider Newsletter (Fall/Winter 2018, Spring/Summer 2019)
- 2018-2019 Hunting Regulations
- 2018-2019 Trapping Regulations
- 2017-2018 Alligator Advisory Committee Annual Report
- 2017-2018 Fur Advisory Council Annual Report

Brochures/Handouts

- ALAS Sponsorship Handout
- Recovering America's Wildlife Act Handout
- BearWise Louisiana Handout
- Chronic Wasting Disease Handouts
- 2018 DMAP Brochure
- WMA Hunting Opportunities Handouts
- Youth Hunter of the Year Flyer
- Alligator Research and Management Program Handout
- Dawson's Creek Clean-Up Day Flyer

Miscellaneous

- Louisiana Species Flip Cards (amphibians, mammals, snakes, turtles, waterfowl)
- Hunter Education Fillable Forms
- Duck at a Distance Workbook
- Waddill Outdoor Education Center Usage Infographic
- Dove Hunting Permits
- Spotted Skunk PSA

PROJECTS FOR OFFICE OF FISHERIES

Overall Projects

- News Releases (165 total)
- 2019 Big Bass Rodeo Marketing and Print Materials
- Get Out & Fish! Marketing Materials (flyers, signs, brochures, etc.)
- 2018 Recreational Red Snapper Season Materials (posters, handouts, social media, etc.)

Posters/Signs

- Angler in Training Posters
- Spat-on-Shell Pilot Project Poster
- Channel Catfish Age and Growth Study Poster
- American Eel Poster

Brochures/Handouts

- Derelict Crab Trap Rodeo Handout
- BOEM Platform Removal Seminar Flyer
- Youth Angler of the Year Flyer
- Marine Mammal and Sea Turtle Stranding & Rescue Program Handout

Annual Publications

- 2019 Recreational Fishing Regulations
- 2019 Commercial Fishing Regulations

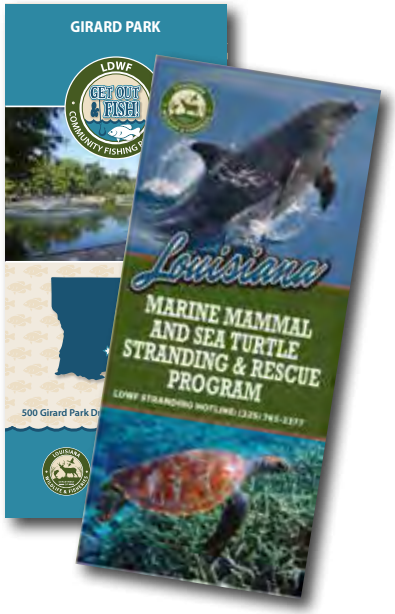
Videos

- GO&F Stocking Girard Park Lafayette
- City Park Big Bass Rodeo 2019
- Red Snapper State Management
- ROLP Reporting App (iPhone)

Miscellaneous

- Louisiana Species Flip Cards (freshwater fish, offshore fish, saltwater fish)
- Aquatic VIP Sticker
- Angler in Training Sticker
- Dolphin & Whale 911 Ad
- Louisiana Sport Fish Restoration Dollars at Work Booklet

ABOVE (L TO R): *I Found a Baby Bird , Bat Colony Monitoring and Bearwise Louisiana flyers.*



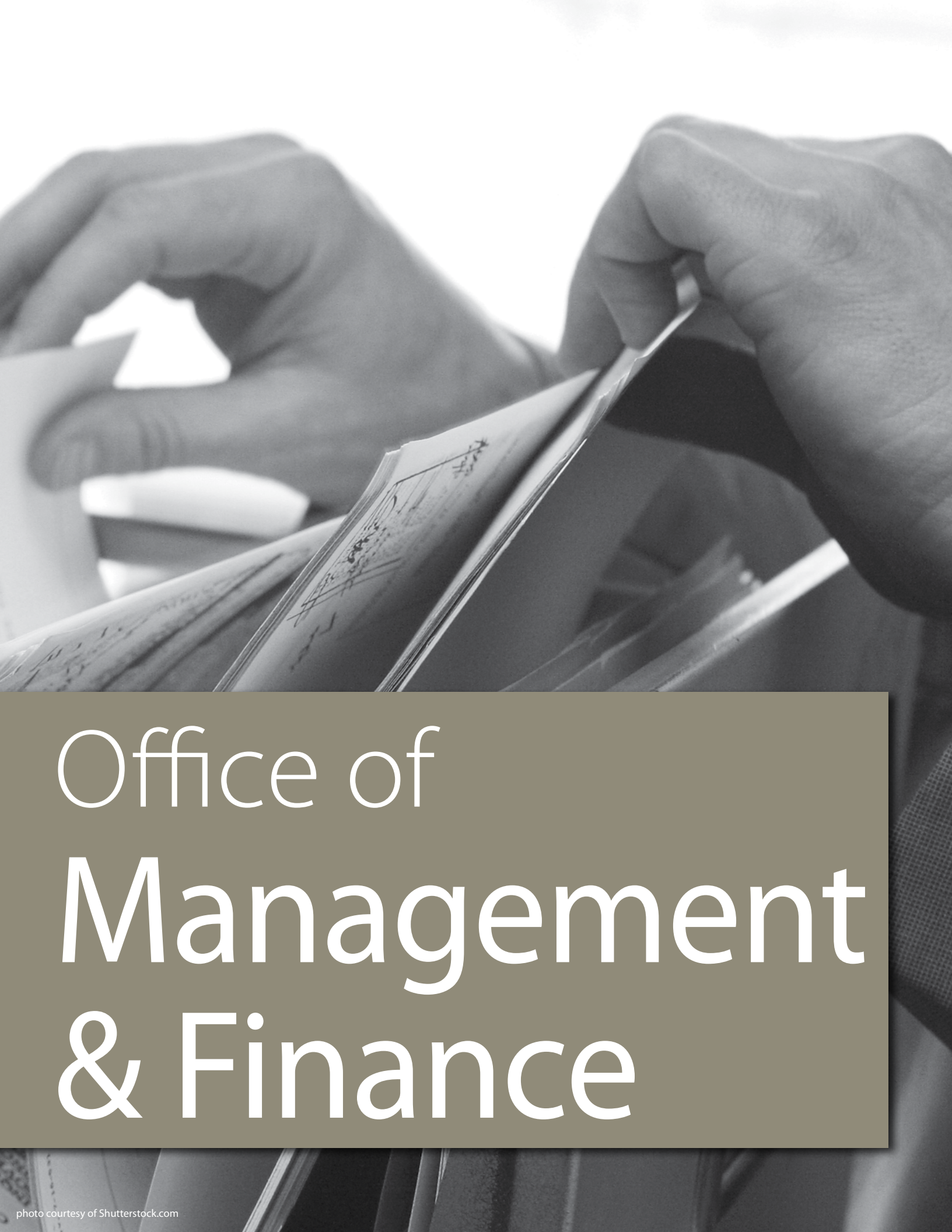
ABOVE: *Get Out & Fish! Girard Park and Marine Mammal & Sea Turtle Stranding and Rescue brochures.*

BELOW: *Louisiana Conservationist magazine.*

LEFT: *"Wildlife Insider" and "Friends of the Whooping Cranes" newsletters.*

LEFT: *Channel Catfish and American Eel scientific posters.*

LEFT: *Louisiana Fishing Regulations.*
RIGHT: *Angler in Training sticker and NHFD patch.*



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 800 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.
- 59,000 commercial licenses sold, representing 12,000 commercial fishermen, 5,800 business entities, 800 charter businesses, and various permits that generate in excess of $3 million in revenue.
- 290,000 boat registration/title transactions that generated in excess of $4.3 million in revenue. Maintained boat data in excess of 1 million records - 313,000 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' 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 2018-2019 this program certified a moveable property inventory, which consisted of 10,871 items for a total acquisition, cost of $81,066,744.85. 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 815 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 15 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 900 employees.

The functions include:

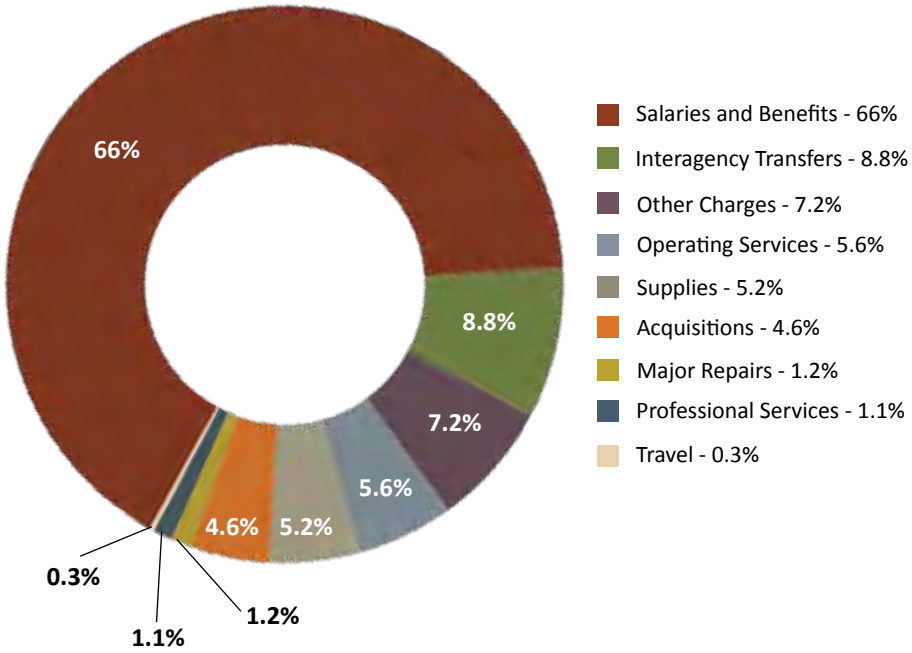
- preparation of the annual operating and capital outlay budgets.
- budget and expenditure control and monitoring.
- federal grant tracking and reporting.
- self-generated and interagency transfer agreement tracking and reporting.
- preparation of annual financial report.
- preparation of all required 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 2018-2019, the Fiscal Section staff:

- prepared four agency budgets consisting of five programs totaling $176 million.
- prepared department capital outlay budget totaling $151 million.
- audited and processed 433 contract invoices payments with a total amount payable of $8.9 million.
- processed 8,676 vendor invoice payments.
- audited and processed 12,987 purchasing card transactions.
- audited and processed 751 travel reimbursements.
- processed 468 checks through QuickBooks.
- warranted funds and prepared periodic reports for 121 federal grants.
- warranted funds and prepared periodic reports for 11 self-generated agreements.
- warranted funds and prepared periodic reports for 12 interagency agreements.
- deposited $45 million in receipts from various sources on 785 pay in vouchers.

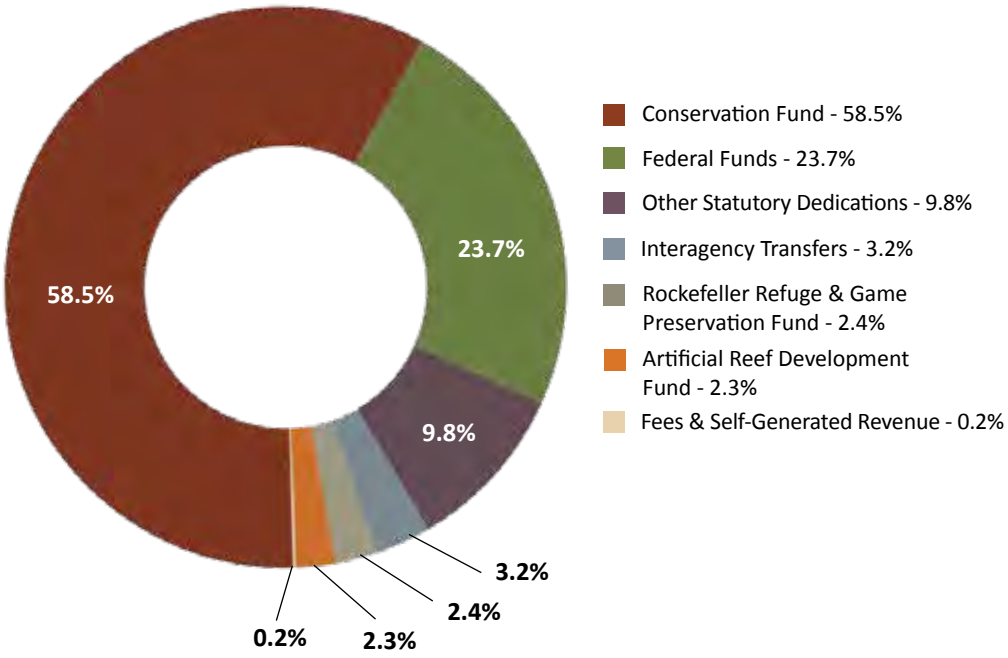
LDWF EXPENDITURES BY CATEGORY (FY 2018-2019)

Total Expenditures: $118,806,201



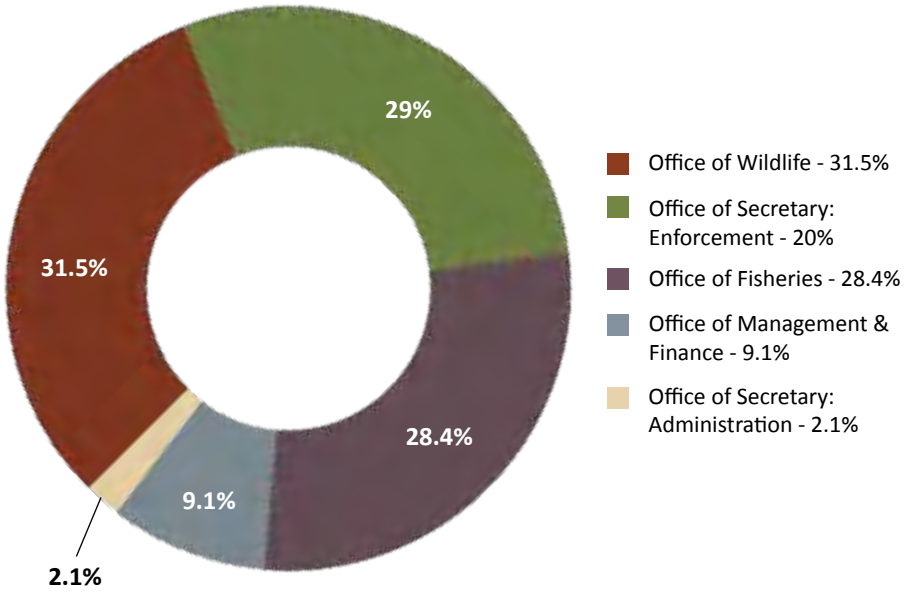
HOW EXPENDITURES WERE FUNDED (FY 2018-2019)

Total Means of Financing: $118,806,201



LDWF EXPENDITURES BY PROGRAM (FY 2018-2019)

Total Expenditures: $118,806,201

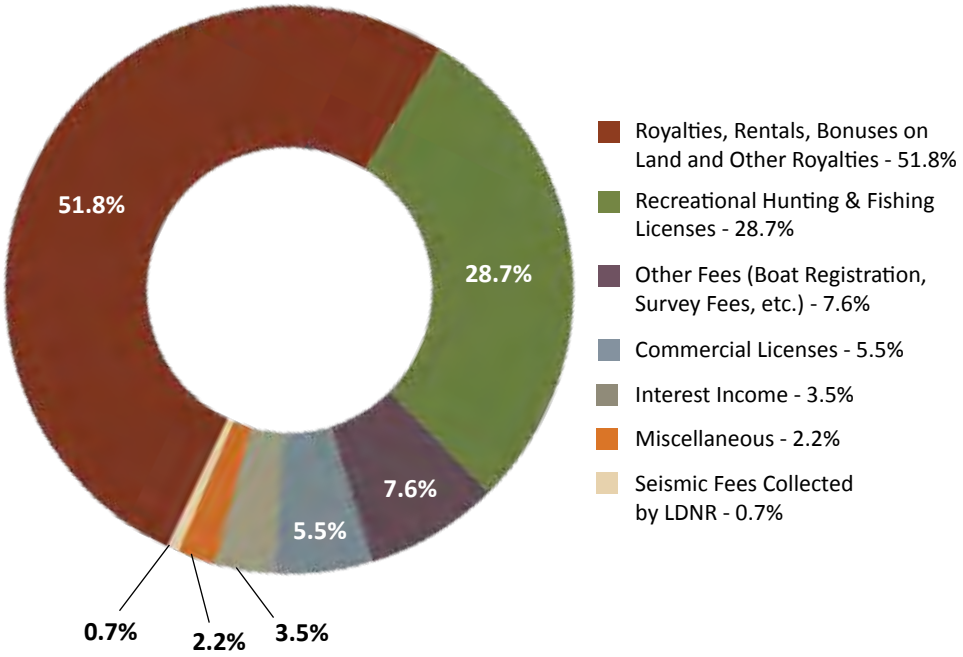


EXPENDITURES BY CATEGORY	
Salaries and Benefits	78,386,413
Interagency Transfers	10,419,532
Other Charges	8,597,850
Operating Services	6,694,193
Supplies	6,197,293
Acquisitions	5,433,677
Major Repairs	1,447,975
Professional Services	1,297,844
Travel	331,424
TOTAL	*$ 118,806,201*

HOW EXPENDITURES WERE FUNDED	
Conservation Fund	69,500,452
Federal Funds	28,145,913
Other Statutory Dedications	11,589,287
Interagency Transfers	3,838,993
Rockefeller Refuge & Game Preservation Fund	2,865,110
Artificial Reef Development Fund	2,682,290
Fees & Self-Generated Revenue	184,156
State General Fund	0
TOTAL	*$118,806,201*

SOURCES OF REVENUE TO THE CONSERVATION FUND (FY 2017-2018)

Total Revenue: $58,384,837



EXPENDITURES BY PROGRAM	
Office of Wildlife	37,379,240
Office of Secretary - Enforcement	34,449,133
Office of Fisheries	33,749,214
Office of Management & Finance	10,768,111
Office of Secretary - Administration	2,460,503
TOTAL	*$118,806,201*

SOURCES OF REVENUE TO THE CONSERVATION FUND	
Royalties, Rentals, Bonuses on Land, and Other Royalties	30,256,462
Recreational Hunting & Fishing Licenses	16,777,808
Other Fees (Boat Registration, Survey Fees, etc.)	4,463,957
Commercial Licenses	3,206,141
Interest Income	2,033,486
Miscellaneous	1,254,780
Seismic Fees Collected by LDNR	392,203
TOTAL	$58,384,837

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 2018-2019 was 783. LDWF also employs students and other temporary employees throughout the state and has a total of 860 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

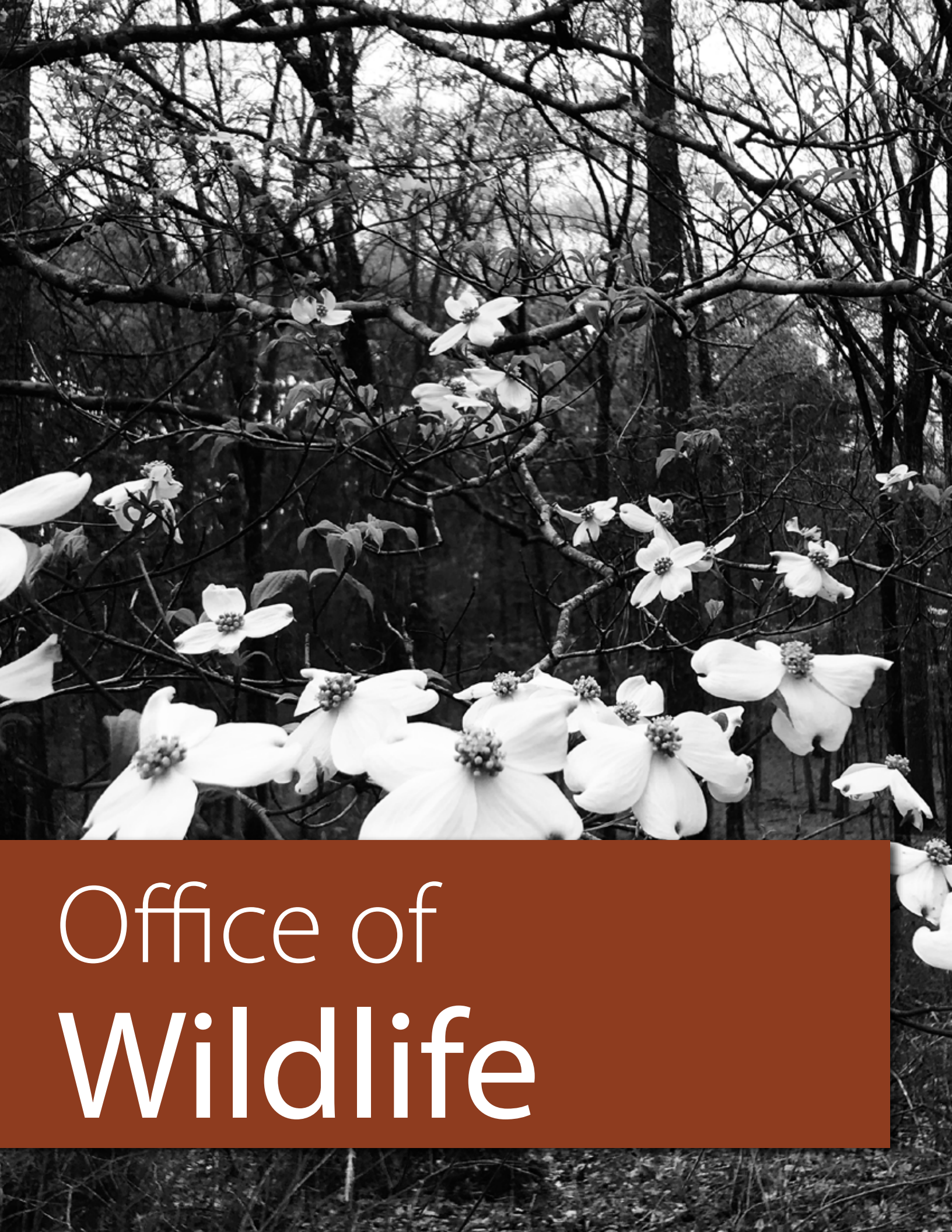
- Leading LDWF's safety program including, but not limited to, preparing Headquarters (non-Enforcement) for annual audits/compliance reviews; preparing quarterly safety meetings, providing assistance to field offices, maintaining-up-to-date Office of Risk Management training records and providing training 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 2018-2019. This is not all inclusive list of every action processed.

ACTION PROCESSED	NUMBER
Position Description reviewed and processed	183
Applications received and reviewed	5527
New Hires	97
Retirements	22
Separations	128
Career Progression Group Reallocations	71
Promotions	33
Market Adjustments	711
Permanent Status Actions	106
Miscellaneous Entries	299
Performance Evaluations and Planning Documents Processed	1477
Prior Period Payroll Adjustments	1328



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. 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 2018-2019 deer season, 136,000 deer hunters harvested an estimated 120,800* white-tailed deer. The harvest sex ratio from the license tag reporting system was 59 percent male and 41 percent female. The estimated number of deer harvested and hunters was derived from the annual mail survey. The mail survey has been used since 1970. **Senior hunters and harvest included in the mail survey.*

Wildlife management area (WMA) hunters harvested 1,952 deer during the WMA-managed deer hunts, which was 14 percent below the 10-year average. LDWF staff collects biological data from deer harvested during the WMA-managed deer hunts through mandatory deer checks at designated weigh stations. Total WMA managed deer hunt efforts were 17,192. While hunter efforts and harvest was down, the number of efforts to harvest a deer during the managed hunts was 8.8 which was the second best ratio over the past 10 seasons. Since the majority of WMA-managed hunts are held on two weekends, weather has an effect on success and participation. In general, conditions were favorable during the 2018-2019 managed hunts.

Mandatory tagging and reporting of deer entered the 11th year in 2018. The reporting system tallied 68,232 deer, a 3 percent decrease from the previous year. The total reported harvest, including WMA-managed hunts and Deer Management Assistance Program (DMAP) lands, was 82,599, down 5 percent from the previous year. Reported harvest data is used by LDWF biologists and managers to assess success and deer population parameters by parish. Compliance appears to have improved over the past two seasons since shortening the reporting window from seven days to 72 hours. The compliance assessment is based on the comparison between the annual mail survey and license reporting system data. The license reporting system allows managers to collect harvest and deer sex data at the parish level.

DMAP provides detailed statewide harvest information while providing the largest known age sample of physical deer data. The DMAP harvest was 12,624 deer, an 8 percent decrease from the previous year. The harvest rate was one deer per 121 acres compared to one deer per 113 acres the previous season. The DMAP harvest sex ratio was 39 percent male and 61 percent female. There were 713 clubs/cooperators with 1.55 million acres participating in the program. Enrollment remained on pace with the previous year. Critical habitat data was also collected in the form of browse surveys. A total of 41 browse surveys were conducted on properties enrolled in DMAP during 2018-2019. Browse availability and utilization is recorded and assessed on the browse transect 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 percent) 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 harvested during 2018-2019 meeting minimum qualifications for the Louisiana Big Game Records Recognition Program were documented in the annual Deer Program report. A total of 30 bucks met the minimum qualification for the recognition program. In addition, 13 of the 30 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 six bucks harvested with bows 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 focusing on the 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, MS, south to Baton Rouge, LA. 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 percent. 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).

Louisiana continues to submit 200 - 500 serological samples each year. Prevalence rates remain high for both epizootic hemmorhagic disease and blue-tongue virus. Despite high exposure rates, reported epizootic hemmorhagic disease and blue-tongue virus (2018) mortality was light due to frequent herd exposure and resistance. In addition to routine serological surveillance, LDWF has an active chronic wasting disease (CWD) surveillance program. The February 2018 discovery of CWD in Issaquena, MS, led to increased surveillance in northeast Louisiana. Cooperating landowners in East Carroll, Madison and Tensas parishes provided access to their properties for the purpose of sampling in response to the CWD positive in Mississippi. Their cooperation and willingness to assist has been critical in assessing the extent of CWD in that region. In addition, sampling from hunter harvested deer was increased on Tensas NWR, Buckhorn WMA and Bayou Macon WMA. LDWF collected 1,249 CWD samples statewide in 2018-2019. CWD has not been detected in Louisiana.

WEBLESS MIGRATORY BIRDS

DOVE

Dove hunting regulations for Louisiana in 2018-2019 were set at 90 days with a bag limit of 15 birds. A survey of resident license holders indicates that approximately 17,100 Louisiana hunters harvested approximately 276,000 doves during the 2018-2019 hunting season. An estimated 8,500 Eurasian collared-doves and 21,500 white-winged doves were also taken.

In addition to dove fields on 12 WMAs, LDWF leases property from private landowners for public hunting. This land is leased for public hunting on opening day only. In 2018, five fields totaling 1,800 acres were leased. During the opening day hunt, 346 hunters participated, bagging 552 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 1,778 doves during July-August 2018 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.

Biologists from LDWF attended the USFWS Annual Woodcock Wing Bee in 2018 hosted by Michigan Department of Natural Resources. Data derived from aging and sexing about 9,400 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 percent 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 10,300 woodcock during the 2018-2019 season.

ANNUAL HUNTER HARVEST SURVEY

Big and small game harvest indices for the 2018-2019 hunting season were obtained through a mail survey based on the purchases of basic resident hunting licenses or any other resident license that included the basic resident hunting privileges for 2018-2019. The 2018-2019 Game Harvest Survey was mailed to 15,994 (6 percent sample) 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 3,296 individuals before the cutoff date. The estimated harvest and hunter efforts for the 2018-2019 hunting seasons utilized 1,895 responses. The procedures used to calculate the 2018-2019 estimates were the same as those used for the 2017-2018 harvest estimates. The 2018-2019 harvest estimates were extrapolated based on the current year's license sales of 190,691. 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.

Banding American woodcock.

WILD TURKEY & RESIDENT SMALL GAME

WILD TURKEY

The most recent turkey hunter survey estimated 10,800 turkey hunters harvested approximately 3,200 wild turkeys during the spring of 2019. Although estimated hunter numbers decreased by approximately 20 percent, estimated harvest increased by approximately 7 percent from that of 2018. These numbers do not include youth and exempted hunters. The number of recreational days spent turkey hunting (68,700) was down by approximately 10 percent in 2019 compared to 2018 (76,300).

A poult production survey was initiated in 1994 to assess annual brood rearing success and monitor long-term production trends. The 2018 survey indicated slightly increased reproduction in two of the five habitat regions over 2017 data (Western Longleaf and North Mississippi Delta). The Southeast Loblolly region experienced similar production from the previous year. Production in the Northwest Lobololly/ Shortleaf/ Hardwood and Atchafalaya/ Lower Miss. Delta regions decreased in 2018. Production was below the long-term (1994-present) average in all management regions.

LDWF is involved in several wild turkey research projects. A research project has been implemented on Peason Ridge WMA and Kisatchie National Forest to study female wild turkey movements and production in relation to habitat improvements. This work is being done in conjunction with Louisiana State University (LSU) and U.S. Forest Service and is scheduled for completion in 2021. LDWF was also engaged in banding gobblers on all five ranger districts of the Kisatchie National Forest. Banding and subsequent reporting by hunters of banded gobblers provides information needed to estimate wild turkey harvest rates. Collectively 38 wild turkeys were captured and tagged as part of these research projects in 2019.

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 2018-2019 harvest survey results indicate that there were approximately 52,200 squirrel hunters in Louisiana, which is a decrease of 28 percent from 2017-2018. Total harvest estimates also decreased 38.4 percent to 703,900 squirrels for 2018-2019. The number of rabbit hunters is estimated at 14,500, which is a 40.3 percent decrease from the previous year. In addition, estimated harvests decreased 13.5 percent from the previous year to 100,800.

Bachman's squirrel with collar.

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 have also implemented 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 squirrels on two separate study sites in southeast Louisiana. By the end of February 2019, six squirrels were captured and collared in East Feliciana Parish and four squirrels were captured and collared in Tangipahoa Parish. Data collection began with deployment. LDWF staff will be deploying another 10 collars in 2020 and collecting data through next year before a final home range/habitat summary and report will be developed.

Quail

Statewide fall whistling counts were conducted on six 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 600 Louisiana hunters harvested 1,900 wild quail during the 2018-2019 season. Hunters were also asked about their harvest of pen-raised quail. About 1,000 hunters harvested over 18,600 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 mid-winter inventory conducted in early January 2019 maintained traditional methods in all surveyed regions. The survey indicated 2.5 million ducks and 647,000 geese wintered in coastal marsh and inland areas of the Mississippi Delta. This was 30 percent fewer ducks than 2018 and 17 percent below the most recent 10-year average. The goose count was down 4 percent from 2018 and is similar to the most recent 10-year average. The coastal aerial survey was not completed in November due to extensive rain during the survey period. However, the survey in the southwest portion of coastal Louisiana allowed comparison with past years in that region, and the estimate was by far the lowest on record since this survey was initiated in 1969 despite some early cold weather at the north end of the flyway. Above average temperatures and extensive rainfall and flooding persisted across Louisiana and up the flyway through December and January, and the estimates of 1.94 million and 2.05 million respectively were well below both the prior year estimates and the long-term averages. Estimates were low for most all dabbling ducks, especially for normally abundant species such as gadwalls, and American coots. Only scaup and ring-necked ducks, both diving ducks, were above long-term average. Indeed, estimates from transects flown on Lakes Maurepas, Pontchartrain and Borgne increased markedly from last year. The 135,000 estimated in both December and January was far above the previous year's estimate of 9,200 but still 8 percent below the most recent 10-year average of 147,000 scaup. Geese are only counted in northeast Louisiana prior to January, and counts in that region were below the previous year and the 10-year average at 121,000 in December and 153,00 in January. White-fronted geese, a species of particular importance to Louisiana goose hunters, declined from 151,000 in January 2018, the highest count on record for this survey, to 82,750 in January 2019.

Based on federal harvest estimates, 36,300 active duck hunters harvested 506,000 ducks during the 2018-2019 season. That Is a 23 percent decline in active hunters and a 53 percent decline in duck harvest. It was the lowest harvest estimate since 1988, the first year of 30-day seasons with three-duck daily bag limits. Per-hunter harvest also declined from 23.1 in 2017-2018 to 13.9 in 2018-2019, the lowest since 1993, the last year of 30-day seasons with three-duck daily bag limits. This was almost certainly due to above average temperatures and excessive flooding across both the state and entire Mississippi Flyway leading to lower population abundance and poorer hunting opportunity during the entire season. As described the past three years, federal estimates are inconsistent with LDWF hunting license sales and results from the Big and Small Game Survey, which reported 41,200 active waterfowl hunters killed 814,000 ducks. However, the proportional decline in both active hunters and total harvest are similar. 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 506,000 ducks included 32 percent blue-winged teal, 20 percent green-winged teal, 20 percent gadwall, 5 percent mallard, and 5 percent lesser scaup. Wood duck, ring-necked duck, northern shoveler, mottled duck, pintail, widgeon, canvasback, bufflehead, and redhead comprised the remainder.

Goose hunters in Louisiana harvested 22,000 geese during the 2018-2019 hunting season, a 70 percent decline from the previous year which was a 25 percent decline from the year before. The spring breeding habitat conditions were considered to be extremely poor with spring storms and cold temperatures coinciding with the hatch, which is highly synchronized in both snow and white-fronted geese. Extremely poor reproduction was anticipated, and very few juveniles were banded by crews in the Arctic. The fall staging survey of white-fronted geese was 775,000, essentially unchanged from the 2017 estimate, and the three-year average fell to remains over 849,000. This is still well above the 600,000 threshold to maintain liberalized harvest regulations implemented in 2016. White-fronted geese made up 16,400 (or 75 percent) 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. Expansive and extensive flooding during summer 2018 greatly limited construction and enhancement activities. In FY 2018-2019, North American Wetland Conservation Act (NAWCA) construction projects at Russell Sage and Sherburne WMAs were delayed until summer 2020. The Russell Sage project includes replacing many large dilapidated water control structures and culverts, extensive levee construction, and impoundment dirtwork. The Sherburne project also includes replacing many dilapidated water control structures and culverts, installation of an additional underground water well, and many levee repairs caused by flooding and wave action. An additional Phase 2 NAWCA grant is being developed for Russell Sage WMA. This project will replace additional water control structures and construct water delivery infrastructure thereby increasing waterfowl habitat and better enabling shallow water management for wintering waterfowl.

Similar to 2017-2018, prolonged high water levels and disputed land ownership again minimized undesirable vegetative treatments on Catahoula Lake during FY 2018-2019. Planned bulldozer clearing of mature invasive woody vegetation and spraying of younger stands will not be implemented until ownership disputes are settled. A very late but successful drawdown produced outstanding moist-soil vegetation until October rainfall inundated potentially excellent habi-

tat conditions prior to the waterfowl season. Herbicide applications, mowing, disking and burning were conducted on many WMAs to invigorate wetlands and improve wetland bird habitat. Several WMAs have been improved by partnerships with local Delta Waterfowl chapters to enhance hunting access and enhance waterfowl habitat. Management plans developed by field staff with assistance from program staff are being implemented and strive to improve wetland productivity and use by waterfowl.

WOOD DUCKS

During 2018-2019, LDWF banded 3,612 wood ducks, which is 60 percent more than the 2,263 banded last year and is the highest total since our banding program was established in 1992. Pre-season rocket-netting accounted for 3,330 of the total bandings, and 282 hens were captured in nesting boxes. Low water levels across the state during the pre-season banding period, outstanding effort by our crews in northeast Louisiana, new effort from both Wildlife Division and Rockefeller Refuge staff in southwest Louisiana, and continued excellent success by the NAWMP coordinator contributed to the record total. In addition, 2,983 black-bellied whistling ducks were banded during the winter and spring. This is 11 percent lower than in 2017-2018 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. In addition, Rockefeller staff has increased effort on this species.

The wood duck nest-box program completed its 30th year in 2019. LDWF personnel maintained only 1,755 boxes in spring 2019 due to extensive flooding precluding access and inundating many existing boxes. That is a 15 percent 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 1,398 boxes, again well below the 2,011 last year due to flooding. Utilization has ranged from 45-100 percent in past years with an average utilization of about 80 percent.

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 as part of a seven-year Post-Delisting Monitoring Plan that the Large Carnivore Program and USFWS finalized during 2015.

2018-2019 Bear Research

1. Reproductive Vital Rates -
To collect information on reproductive vital rates, we attempted to conduct 43 adult female den visits across all four bear subpopulations during February and March 2019 to count and mark cubs-of-the-year, and to count yearlings. High water prevented successful den visits in all subpopulations.

2. Survival and Mortality -
To monitor survival and cause-specific mortality, we maintain 43 bears outfitted with VHF or VHF-GPS radio-collars. Using monthly aerial telemetry, we monitored all 43 radio-collared bears from all four subpopulations during 2018-2019. We documented 49 mortalities during FY 2018-2019, 65 percent of which was from roadkills.

LEFT: *Wood duck box being checked.*
ABOVE: *Louisiana black bear cubs.*

3. Abundance, Density and Growth -
To estimate abundance and density and monitor temporal changes in population growth, we conducted our 12th consecutive year of non-invasive hair trapping in the Tensas River and Upper Atchafalaya River Basin subpopulations during May through July 2019. Hair snare traps allowed us to collect 1,698 hair samples. We were not able to sample over half of the study area due to high water. 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 292 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 2018–2019, we captured eight bears to address human-bear conflict issues reported to LDWF, primarily in the West Gulf Coastal Plain subpopulation.

The Large Carnivore program manager presented a bear workshop to the LDWF Law Enforcement Cadet Class and the St. Mary Parish Sheriff Office on bear behavior and biology and bear conflict response.

Work continued with the U.S. Geological Survey to improve the BearTrak database, and the U.S. Geological Survey 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 2018-2019 centered on exhibition and presentation of information to schools and other interest groups around the state. Key outreach events for the year included National Hunting and Fishing Day (Woodworth), Family Adventure Day (Lafayette), and various summer camps across the state.

The large educational library display was moved on a bi-monthly basis to libraries across the state. In addition, a Paradise Louisiana display was created that included bear information. To date, the displays have been hosted at six headquarter library locations in the parishes of Rapides, West Feliciana, East Feliciana, St. Helena, Washington, St. Tammany and Livingston.

Bear Safety in Mind (St. Mary Parish Program)

Accomplishments during 2018-2019 include:

- Maintained close communications with biologist 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 along River Road in Berwick, areas South of U.S. Highway 90 in Patterson, Hunting Road in Ricohoc, LA Highway 317 in Bayou Sale, and LA Highway 182 in Ricohoc
- The local fabrication shop in St. Mary Parish will be able to provide replacement parts for the bear proof cans.
- Attended the 26th Eastern Black Bear Workshop in Missouri and gave a presentation “update” on the Black Bear Conflict Office achievements in St. Mary Parish.
- Due to the increased number of nuisance bear reports and requests for bear proof garbage cans, worked with Parish Council Members, Parish Administration, City of Patterson Officials and Pelican Waste & Debris and have expand the use of bear proof garbage cans before the 2020 contract renewal date. The expansion has begun and will include an additional 5,000 bear proof garbage can in the Parish areas north of U.S. Highway 90 beginning at the Eastern most point at the Patterson incorporation line traveling west to the Chariton Canal. The City of Patterson will expand north of U.S. Highway 90 by 1,000 bear proof garbage cans and the City of Franklin will also add 1,000+ bear proof garbage cans to areas reporting nuisance bear activities.
- Worked on the Black Bear Festival board of directors to host the Bear-y Patch, black bear informational & educational activity area during the festival.
- 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 Environmental Office, owner of Dottie’s Trailer Park and Steven’s Lane residents in Ricohoc to clean up property to reduce the bear activity in and around the residential dwellings.
- Informational outreach with Central Catholic School in Morgan City, The Baldwin Library and Lafayette News Chanel 15 KADN.
- 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 was 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, 460 serology samples were collected for serological analysis of *Brucella spp.*, infectious bovine rhinotracheitis, bovine viral diarrhea virus, and bovine parainfluenza-3 virus, bluetongue virus, epizootic hemorrhagic disease virus, *Leptospira interrogans*, and *Histophilus somni*. Serologic samples were submitted to Texas A&M Veterinary Medical Diagnostic Laboratory, analysis is pending. In addition, 984 samples were collected statewide for CWD surveillance. Samples were submitted to

the Texas A&M Veterinary Medical Diagnosis Laboratory. No samples tested positive. This brings the total number of wild white-tailed deer tested in Louisiana to 9,892 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 percent) were serologically positive for swine brucellosis. One hundred twenty-six (10.02 percent) were positive for pseudorabies. In addition, 299/557 samples (53.68 percent) were positive for leptospirosis.

Additional projects included studies of white-nose syndrome surveillance, population monitoring and winter use of transportation structures for bat species, 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.

Disease investigations included mortality events involving waterfowl and red-eared sliders as well as numerous individual mortality events including, but not limited to, raccoons, opossums, squirrels, white-tailed deer and Louisiana black bears.

Biologists conducted white nose syndrome surveillance and bat colony monitoring on Louisiana bats.

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 second 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, Little River, Loggy Bayou, Pomme de Terre, Richard K. Yancey, Russell Sage, Sherburne, and Spring Bayou WMAs.

Harvest preparations including forest inventory, regeneration evaluations, timber marking, GIS map development, timber sale proposal preparations, timber sale development, contract development, and timber contract amendments were conducted on Bayou Macon, Boeuf, Dewey Wills, Grassy Lake, Little River, Richard K. Yancey, Russell Sage, Sandy Hollow, and Sherburne WMAs. Harvests to improve wildlife habitat were initiated and/or completed on Bayou Macon, Richard K. Yancey, Russell Sage, Sandy Hollow, and Sherburne 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, Pomme de Terre, Sandy Hollow and Spring Bayou WMAs. Herbicide applications were conducted on Sandy Hollow WMA to improve habitat through mid-story removal.

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 USDA Natural Resources Conservation Service's (NRCS) Wetland Reserve Program. Evaluations of state-owned properties include 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 105 acres through reforestation on Richard K. Yancey WMA.

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 Sherburne, Tunica Hills and Russell Sage WMAs. These permanent plots aid in monitoring habitat conditions and effects of our forest management program on the habitat components represented on the WMAs.

Forestry Section personnel continued to implement the Louisiana Statewide Red-cockaded Woodpecker (*Dryobates fmr. Picoides borealis*) (RCW) Safe Harbor Program to benefit the federally and state endangered RCW. LDWF has entered into 14 Safe Harbor Management Agreements with nonfederal landowners. A total of 487,419 acres are enrolled in the RCW Safe Harbor Program with 105 baseline RCW family groups and two above baseline RCW family groups. LDWF personnel conducted annual site visits to 13

***LEFT:** Continuing education workshop discussing hardwood silviculture.* ***RIGHT:** Prescribed burning on Sandy Hollow WMA.*

Safe Harbor Program properties to confirm compliance with the voluntary RCW management activities each landowner agreed to implement on their property and provide technical assistance regarding RCW management. Forestry Section personnel continue to promote the Safe Harbor Program via press releases, presentations at public forums and the LDWF website.

Forestry Section 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: annual activity status checks of over 200 RCW cavity trees; adult RCW capturing and color banding; RCW nest checks and nestling color banding; RCW fledgling checks to determine survivorship; RCW artificial cavity installation and maintenance; midstory control in 14 RCW cluster sites and providing technical assistance to Louisiana Department of Agriculture; and Forestry staff regarding timber management to benefit the RCW. Additionally, Forestry Section personnel performed RCW demographic monitoring for one RCW family group at Southeast Louisiana Hospital located in Mandeville and 18 RCW family groups at Big Branch Marsh National Wildlife Refuge in Lacombe.

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 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 Louisiana black bear, 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, brackish marsh, and the list goes on 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 - 247,247 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.

A total of 49,844 user days were estimated for Hammond WMAs during FY 2018-2019. An alligator season was available on Joyce, Manchac, Maurepas Swamp and Pearl River WMAs with a harvest of 1,033 alligators by 16 commercial alligator trappers. Alligator applications were reviewed, and licenses and tags were issued to 56 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 18,746 eggs valued at $365,508 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 488 hunter efforts with a total of 25 deer harvested. On the 10 WMAs managed by the Hammond Office, 372 deer were harvested.

Through the application of prescribed fire, 2,342 acres of longleaf pine on Sandy Hollow WMA and 60 acres of loblolly pine on Hutchinson Creek 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 CWD 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.

LAFAYETTE

Wildlife Management Areas
(*Total Acres - 189,895 acres*)

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

Habitat types range from mixed pine-hardwoods to 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, 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,

Sherburne WMA Youth Waterfowl Hunt.

***LEFT:** Sandy Hollow WMA herbicide application to enhance quail habitat by removing midstory.* ***RIGHT:** Prescribed burning on West Gulf Coastal Prairie.*

equipment maintenance, public user data collection, vegetation control, food plot planting, reforestation, and conducting managed hunts.

A total of 144,896 user days were provided on Lafayette WMAs during FY 2018-2019.

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 4,726 user-days recorded and 373 deer harvested. An additional 915 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 19,500 efforts for the 2018-2019 season. Turkey hunts were held on four WMAs, where five turkeys were harvested by an estimated 112 users. This includes nine youth hunters who participated in the, Sherburne, Spring Bayou and Pomme de Terre WMAs youth lottery hunts. A member of the National Wild Turkey Federation or Lafayette WMA staff served as a guide for each youth hunter to ensure a quality hunt and to teach youth safe turkey hunting techniques. Squirrel and rabbit hunting is also very popular on the ecoregion's bottomland hardwood WMAs, accounting for over 12,800 user days. Waterfowl hunting is very popular as well on Lafayette WMAs in moist soil impoundments, greentree reservoirs, swamps and flooded bottoms. Waterfowl user days totaled over 4,000 for this period. Dove fields are maintained, along with many acres of wildlife openings.

Youth lottery deer and duck hunts were also held in Lafayette WMAs, with great success on these hunts. Fifteen youth waterfowl lottery hunters harvested 35 ducks, for an average of 3.5 ducks per youth hunter. A disabled veteran's waterfowl hunt was held where six disabled veteran's participated and harvested 22 ducks, for an average of 3.6 ducks per hunter. Thirty-nine youth deer lottery hunters harvested 22 deer on nine hunts. Youth hunters observe many deer on these hunts. The hunts are held in refuge areas set aside for youth hunts, where these youth hunters have a quality hunt and learn about hunting in a safe environment. Six different Physically Challenged Hunter Permit wheelchair hunters on 19 hunts utilized wheelchair-bound waterfowl and deer hunts.

Biologists and technicians maintain and monitor over 500 wood duck boxes, conduct pre-season wood duck banding, and collect samples for CWD, 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 102 WMA lottery hunters who filled 306 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 208 tags.

Major projects being initiated or completed included:

- Initiation of NAWCA project on Sherburne WMA.
- Morganza Floodway opening – move all assets off of area and back to area after threat of flooding had passed

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

Habitat 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 recreation opportunities for all user groups. A total of approximately 88,000 user days were estimated for Coastal Lafayette WMAs and refuges during FY 2018-2019. The most popular consumptive activities include hunting, fishing, crabbing and cast-netting for shrimp. Fishing, crabbing and shrimping make up the majority of the activities on some WMAs/refuges in this region. 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.

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 these 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 2018-2019 waterfowl season was from Nov. 10, 2018 - Jan. 20, 2019 (closed Dec. 3-14) on coastal WMAs. Coastal Lafayette staff conducted hunter participation/harvest surveys on 11 days during the season on four coastal WMAs (Atchafalaya Delta, Pointe-aux-Chenes, Salvador and Pass-a-Loutre WMAs). An estimated 4,013 duck hunters visited the WMAs during the survey dates and averaged 1.9 ducks per attempt. Hunters also harvested approximately 678 coots, 314 gallinules, 55 mergansers and approximately 24 geese (two being white-fronted geese) during the survey dates. The 2018-2019 teal season was from Sept. 15-30, 2018. Coastal Lafayette staff conducted hunter participation/harvest surveys on four days during the season on the four previously listed WMAs. An estimated 601 teal hunters visited the WMAs this year during the four days that waterfowl bag checks were performed. These hunters harvested an estimated 640 teal for a success of 1.1 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 2,490 hunter efforts yielded 105 deer during the 2018-2019 hunting season on Coastal Lafayette WMAs. This equates to a success of one deer for every 23.7 efforts; this includes 94 efforts and 11 deer harvested during the managed youth lottery hunts on Atchafalaya Delta and Pointe-aux-Chenes WMAs. The majority of the deer hunt efforts (83 percent) and deer harvested (79 percent) 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 1,320 alligators and 9,355 nutria were harvested on these WMAs/refuges for FY 2018-2019. Forty-one WMA lottery alligator hunters harvested 108 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 collaborated with NRCS to implement a vegetation planting project using LA-39 funding 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 worked 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.

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 - 299,995 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 35,777 user days for Lake Charles WMAs during FY 2018-2019. 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 5,448 hunter efforts accounting for 679 deer harvested.

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 335 efforts harvesting 25 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 2018-2019 with 245 miles of roadway graded by Lake Charles personnel. In addition, 256 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 60 participants harvesting five gobblers. The Fort Polk-Ver-

non/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.

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 170 acres burned and 3 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 maintained by mechanical control through fallow disking to allow native forbs and grasses to regrow and agricultural planting of desirable forage totalled 463 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 38 birds were trapped and banded. Of that total, 32 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 2018-19, Lake Charles Region Biologists conducted 53 Private Lands site visits offering technical assistance on nearly 330,000 acres. They produced eight detailed habitat management plans for landowners, and they fielded 1,094 requests for information from the public. Under an agreement with USDA-NRCS, staff conducted 46 Wetland Reserve Easement property inspections to assess conditions and make recommendations for management. They also worked with a private landowner to lease 500 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 48 cooperators on more than 154,000 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 306 wood ducks and 494 black-bellied whistling ducks. In addition, 42 wood duck boxes were maintained. A woodcock banding project was initiated with 107 birds banded in Beauregard Parish.

PINEVILLE

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

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

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

There were an estimated 29,814 actual user days reported for the Pineville Region's WMAs during FY 2018-2019. These areas are readily accessible and very popular with the public. Along with public hunting and fishing opportunities, these areas are also utilized for many types of non-consumptive outdoor opportunities; such as scouting, hiking, birding and nature photography.

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 1,681 hunter efforts accounting for 278 deer harvested. WMA biologists collected and submitted 80 blood 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 Corp 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.

Five prescribed burns totaling 457 acres were conducted on Little River WMA. Also, three and one-half miles of firebreaks were created or reconditioned. These burning operations improve upland habitat for a variety of wildlife species including songbirds, turkey, deer, reptiles, red-cockaded woodpeckers, amphibians, and small mammals.

Pineville Region personnel participated in a wide variety of Wildlife Division activities. These include habitat assessments, technical assistance, species research, 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, public dove hunts, nuisance animal response, National Hunting and Fishing Day, alligator tag management, and black bear public education and response.

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

The primary habitat type found on Monroe Region WMAs is the Mississippi River Alluvial Valley bottomland hardwood forest, with the exception of Sonny J.C. 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 CWD 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; 12,550 deer hunter user-days were recorded harvesting 1,155 total deer in the Monroe Region. Wild turkey hunts were held on four WMAs, where 820 users harvested 28 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 239 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.

Russell Sage WMA Wham Brake boat launch.

***LEFT:** PCHP waterfowl blind on Bayou Pierre WMA. **RIGHT:** NAWCA project Bayou Pierre WMA.*

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:

- Completion of Moon Mullins RTP Project on Big Lake WMA.
- Completion of Wham Brake Boat Ramp
- 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 41 site visits. They fielded 1,116 requests for information from the public. Under an agreement with USDA-NRCS, Private Lands Program biologists conducted 112 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 157 license holders, delivery of the DMAP program to over 206 cooperators, and public outreach via workshops and media outlets.

MINDEN

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.

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

- Bayou Pierre - 2,799 acres
- Bodcau - 33,766 acres
- Loggy Bayou - 6,559 acres
- Soda Lake - 2,500 acres

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

A total of 33,631 user days were estimated for Minden WMAs during FY 2018-2019. 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 602 hunter efforts accounting for 142 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 percent 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 was 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 298 hogs and an estimated three were taken through shooting efforts. 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 interstate pipeline installations on Minden WMAs. No new oil and gas exploration occurred on state-owned properties.

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 2018-2019, Minden Private Lands biologists conducted 34 site visits and delivered four written habitat management plans. They fielded 1,080 requests for information from the public. Under an agreement with USDA-NRCS, Private Lands biologists conducted six inspections of Wetland Reserve Easement properties to assess conditions and make recommendations for management. Minden biologists and technicians monitored and maintained 54 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 116 license holders, delivery of the DMAP program to 77 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 level to enhance wildlife habitat. During FY 2018-2019, 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 new 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 approximately 300,000 acres. Additional accomplishments in FY 2018-2019 included continued implementation of a Working Lands for Wildlife Program that will directly benefit the threatened Louisiana pine snake, and a suite of shorebird species that are of conservation concern. Participation will provide regulatory assurance for non-industrial private landowners that manage properties on suitable sites for the Louisiana pine snake. In other aspects of the program, staff worked with agricultural producers to provide shallow-water habitats during late summer and early fall on 7,000 acres of 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 2018-2019, 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 237 acres during FY 2018-2019. Another grant was completed and closed that funded prescribed burning on 7,000 acres of forestland managed by corporate partners. These sites demonstrate that prescribed fire is still a viable management tool to manage industrial holdings.

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. 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., birdwatchers); 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 Phase III Levee Repair Project which has been held up because of legal matters pertaining to the bid documents submitted by contractors. A decision from the court is scheduled for October of 2019. Maintenance and construction staff continues to maintain other levees for protecting and managing 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 continued in FY 2018-2019.

The Rockefeller Unit 5 Jetty Project was approved as a capital outlay project and was in the design phase FY 2016-2017. The jetty project will maintain Joseph Harbor's outlet to the Gulf for drainage and navigation, and with collecting sediments on the eastern

Rockefeller Wildlife Refuge research lab.

shoreline of the outlet. Proper coastal use permits were obtain during FY 2017-2018. The project was constructed and completed in FY 2018-2019 at a cost of $1,848,800.

The partnership with Ducks Unlimited continued in FY 2018-2019 with the development of the prototype water control structure for Unit 4. This project was funded through the North American Wetlands Conservation Act for $1 million. Construction began in FY 2017-2018. Additional money from sponsors and LDWF paid for the construction of fishing piers behind the new water control structure. This provides a safe and enhanced recreational opportunity for the public.

On June 28, 2018 a fire started from a lithium battery in the RWR office. The sprinkler system was activated and extinguished the fire. Remediation immediately took place to have the office in operation within a day while final clean up occurred within a few weeks. In FY 2018-2019 repairs to the fire damage area was bid and awarded to Hill Construction for $86,937. A final walk-through of the completed repairs occurred on May 28, 2019 with the project being accepted.

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 2017-2018. Permit drawings have been produced for each project for review with clearance authorization letters being issued from LDWF. These projects are being scheduled within FY 2018-2019.

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 U.S. Army Corps of Engineers (USACE) and the Louisiana Department of Natural Resources (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 6, 9, 10 and 13. Aerial applications were also conducted to assist with vegetation control in Unit 10. Approximately 500 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.

Prescribed burns during the 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. However, during FY 2018-2019, water levels along with weather conditions and large-scale construction projects prevented any prescribed burns on the refuge.

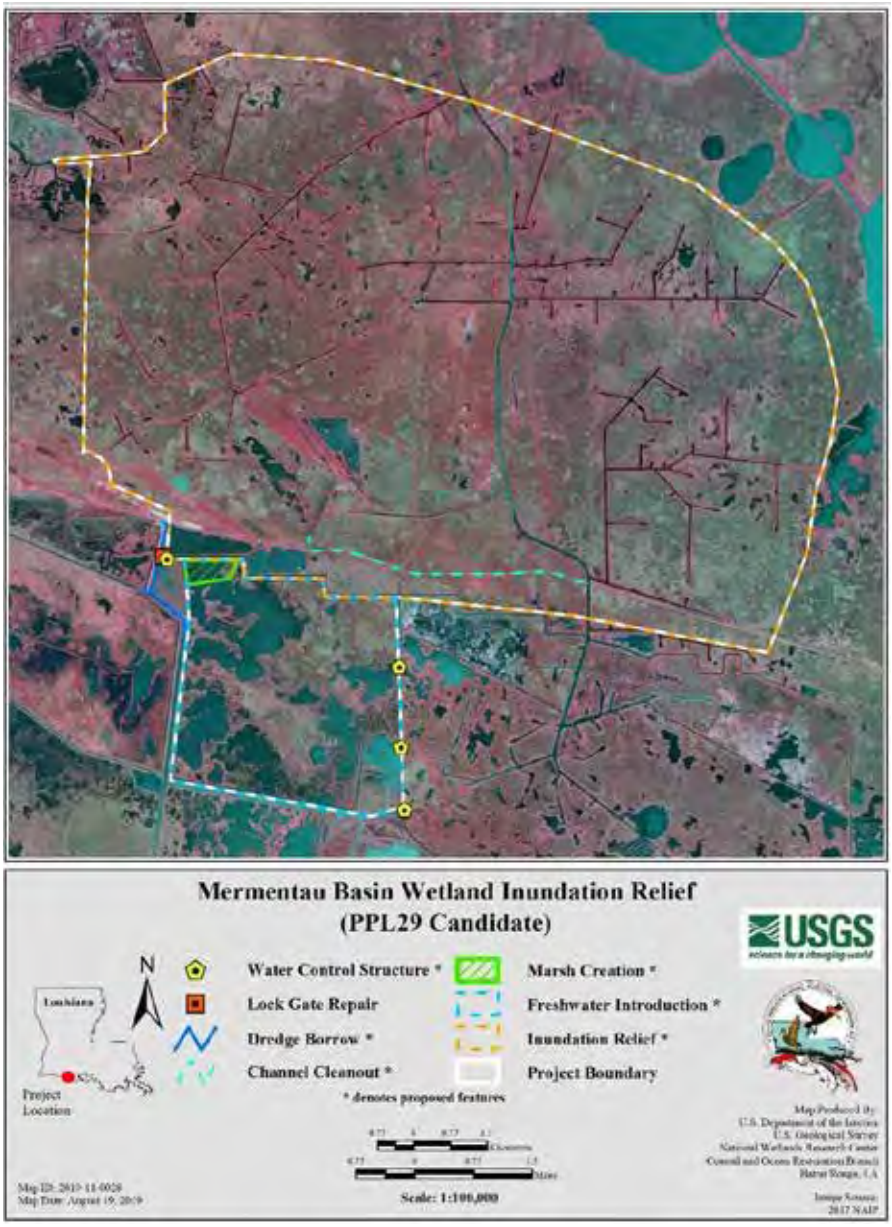
Refuge staff continued monitoring giant salvinia and feral hogs. Salvinia continues to be managed on the refuge via the use of higher levels of salinity that are introduced by opening the East End Locks and by cooperatively working with the LSU AgCenter with the weevil eradication control project. Efforts continue in FY 2018-2019 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. Roseau cane 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 the U.S. Department of Agriculture - Natural Resources Conservation Service (USDA-NRCS), LSU and the Department of Agriculture and Forestry.

The Mermentau Basin Wetland 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 Highway 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.



ABOVE: *Mermentau Basin Project.* ***BELOW:*** *Unit 4 Water Control Structure.*

The proposed project would construct additional drainage structures that would allow for an increase in 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 area providing an estimated 64 net acres. Another 126 acres are expected to be enhanced from diversion of some of the water through Unit 4.

The project has been submitted to Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) for consideration of funding. A decision is expected to be made in December of FY 2019-2020.

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 has been renewed for additional dredge pumping to occur in FY 2019-2020 following the completion of construction plans for bidding the project.

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 CWPPRA 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 CWPPRA committee members and is supported by the Coastal Protection And Restoration Authority. The additional funds will extend shoreline protection approximately 1 mile further from the 2.8 miles base bid section.

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. It is estimated this portion of construction funds will be announced for bids in FY 2019-2020 with construction 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 stabilized 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. Project implementation is expected in FY 2019-2020.

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. 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. 5, 2018 and ended Sept. 7, 2018. Hunters harvested 349 alligators at a size average of 7.35 feet and a total sale value of $20,096.22. Each hunter was required to pay 40 percent of the total sale value back to LWDF totaling $8,038.52. The average price per foot for FY 2018-2019 season was $7.83.

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 2018-2019 RWR staff continued the stocking of Florida-strain largemouth bass (*Micropterus salmoides v. M. 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 2019, the rearing ponds at RWR were stocked with 286,800 fry. Staff seined the ponds after an average of 54 days and the result was approximately 171,551 fingerlings (61.9 percent survival rate). The Florida-strain largemouth bass fingerlings were stocked on RWR in May 2019 and a portion of the fingerling were dispersed to Saline Lake and Toledo Bend Reservoir with the help of LDWF Inland Fisheries Division. We hope to continue this cooperative effort to assist Inland Fisheries with their target stocking goals.

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. The banding effort is now a cooperative effort with Texas and Louisiana and involves many state and federal staff. Early data analysis has shown high variability in survival rates with some mortality attributed to hunting.

ABOVE: *LDWF biologists with black-bellied whistling ducklings.* ***BELOW:*** *LDWF biologist holds a mottled duck that has been fitted with a geolocator.*

Since 1994, staff have banded 46,535 mottled ducks. Biologists completed the 25th year of the program by banding 2,229 mottled ducks statewide, primarily at RWR. Along with the 2,229 mottled ducks banded, there were 106 recaptures.

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. Black-bellied whistling duck banding efforts have been ongoing in Louisiana since 2010 in collaboration with the LDWF Waterfowl Program. During the spring of 2019, refuge biologists banded a total of 655 individuals at three sites in southwestern Louisiana. These same sites recaptured 93 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 November survey was not flown in 2018. 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 mean waterfowl survey estimate on RWR during 2018-2019 was approximately 117,911 ducks per survey. This is 17 percent decrease from the 2017-2018 average (141,376). We anticipate that ongoing marsh management activities will continue to improve waterfowl counts in the upcoming years.

In 2019, RWR staff banded a total of 339 doves. Three different species of dove were trapped during the 2019 season: mourning dove (*Zenaida macroura*), white-winged dove (*Zenaida asiatica*), and Eurasian collared-dove (*Streptopelia decaocto*) with the latter being non-native and not banded. Mourning doves were the most frequently encountered of the dove species, with five individual white-winged doves captured and banded throughout the season.

WHOOPING CRANES

Twelve juvenile whooping cranes were received in November 2018 from two captive rearing facilities, the International Crane Foundation (seven) and the Freeport-McMoRan Audubon Species Survival Center (five). The two groups were housed next to each other in the top-netted section of the release pen at RWR prior to being released together. A 13th juvenile, who had been reared by a captive pair of cranes at the Audubon Species Survival Center, but initially held back for medical reasons, was hard-released in the vicinity of older cranes on property near the White Lake Wetlands Conservation Area in mid-January. Additionally, all five chicks that hatched in the wild in 2018 survived to independence and separated from their parents in January and February.

Male whooping crane feeding a dragonfly to a chick.

The maximum size of the Louisiana non-migratory population at the end of the report period was 71 individuals (33 males, 37 females and one unknown), with 55 birds located in Louisiana, 15 in Texas and one in Oklahoma. Based on location data generated via remote transmitters, staff documented cranes in 24 parishes throughout Louisiana, with five of those parishes accounting for 69 percent of the data points. Louisiana whooping cranes were also documented using five different states, although one crane alone accounts for the points located in four of the five states outside of Louisiana. One-fifth of the location data points are in Texas as a result of 43 percent of the population spending some time there. Many of these data points represent short, exploratory trips typically made by young cranes; however, cranes from multiple cohorts have spent considerable amounts of time in southeast Texas where habitats are similar to those in southwest Louisiana. LDWF partners from other state and federal agencies work closely with us to document such occurrences and provide updates on the status of cranes in their vicinity.

In late 2018, years after the idea was first proposed, and with approval from the International Whooping Crane Recovery Team, the U.S. Fish and Wildlife Service (USFWS), and the states of Florida and Louisiana, plans were initiated to capture several of the remaining Florida non-migratory whooping cranes and transfer them to Louisiana. In mid- January, two adult females were captured and held in captivity for two weeks prior to being translocated to Louisiana. Both individuals survived through the end of the report period and the younger female has consistently associated with a number of different Louisiana cranes since shortly after her release.

During the 2019 breeding season, 13 nesting pairs initiated 27 nests in seven different parishes. Unfortunately, two experienced breeding pairs were lost prior to the 2019 nesting season due to the death of one member of the pair. In both cases, however, the surviving member re-paired in time to nest this year. Seven pairs consisted of individuals who each had previous nesting experience, three contained one member with previous experience, and three were nesting for the first time. In 2019, six chicks hatched to six pairs; three hatched naturally to their biological parents and three hatched from fertile eggs that were swapped into wild nests as eggs or newly hatched chicks. Chicks disappeared at 2 to 22 days old, despite four of the six pairs having previously raised offspring to independence. Due to ongoing occurrences of embryo mortality, biologists continued submitting adult blood and egg content samples for heavy metal and toxicology screening. Additionally, biologists continued to deploy data-logging eggs in nests to gather nest environment and incubation data. Biologists plan to continue with these new research initiatives to learn more about factors that influence reproductive success, and use that knowledge to increase the productivity of Louisiana whooping cranes.

LDWF continues to educate the public about the whooping crane reintroduction program through a variety of means. Public outreach efforts consisted of staff participating in festivals and outreach events around the state where literature and other information were disseminated to the public. Staff also presented information on the reintroduction effort to various clubs and organizations throughout the year. The department's 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 25 percent of the confirmed or suspected 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.

Now in its ninth year, the Louisiana whooping crane reintroduction has made much positive progress but still has challenges to overcome. LDWF is determined to continue making strides towards the ultimate goal of establishing a self-sustaining population in Louisiana.

The Whooping Crane Program is supported by multiple funding cooperators including Rockefeller Trust Funds, the Louisiana Wildlife and Fisheries Foundation, USFWS State and Tribal Wildlife Grants Program and funds through Section 6 of the Endangered Species Act, the Coypu Foundation, and corporate partners including Chevron, Cameron LNG, SLEMCO, and Entergy.

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 at 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), an investigation of migration stopover ecology of the semipalmated sandpiper (*Calidris pusilla*) in the northern Gulf of Mexico (Tulane University), and monitoring nesting productivity of beach nesting birds (Audubon Louisiana).

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. LDWF staff selected paired study plots in managed and unmanaged sections of the refuge and conducted a prescribed burn of a managed and unmanaged plot during the summer 2019. Differing fire management treatments will be carried out to examine seaside sparrow response to associated changes in habitat. Two WAE technicians were hired to assist staff with field work beginning in 2020 which will consist of bird banding operations, nest searching and monitoring, tracking birds with VHF transmitters, vegetation sampling, and data entry. The project is anticipated 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. LDWF staff 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. The last set of surveys will take place

Banded piping plover - winter shorebird 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 2016. Staff continued to monitor the 16 birds outfitted with satellite transmitters on Rabbit Island to provide information on movement patterns, habitat use and survival. In the fall of 2016, four birds migrated outside of Louisiana. Wintering locations outside of Louisiana included Nicaragua, Guatemala and one area in Texas (Matagorda Island Wildlife Management Area/Aranasas National Wildlife Refuge). All transmitted birds returned to Rabbit Island for the breeding season, although one mortality did occur during the reporting period. During the 2018 nesting season (March-June), staff monitored 27 nests on Rabbit Island in southwestern Louisiana. RWR staff continued efforts to deploy satellite transmitters on adults and deployed an additional nine transmitters on birds captured at three nesting locations in southeastern Louisiana (Raccoon Island, Queen Bess and Brandy Island). A total of 15 adults and 56 chicks were banded during the 2018 season with blood samples submitted for genetic analyses at Texas Tech University. To better understand foraging habitat selection and suitability for these birds, staff compiled data on habitat measurements and prey samples at "use" points and "random" points using satellite transmitter data, as well as "observation" points where birds without transmitters were observed. LDWF staff continue to actively monitor 18 reddish egrets equipped with satellite transmitters and compile vast amounts of location data into a database for future analyses. Project funded through Louisiana State and Tribal Wildlife Grants Program and RWR.

Value of Chenier Stopover Habitat to Nearctic-Neotropical Migratory Birds

Research was initiated in spring 2018 to investigate the value of cheniers as stopover habitat to neartic-neotropical migratory birds. Banding data collected from migration stations will contribute to over 20 years of spring migration data in southwestern Louisiana coastal cheniers, assist collaborative researchers with projects investigating weather radar data, and parasite load research questions. Preliminary work was conducted in spring 2016 to assess suitability of Nunez Woods as a research site for spring migration research. Sites located at Nunez Woods and Hollister Woods properties were established for spring migration research. Crews stationed at migration stations collectively banded 4,852 new birds at the two sites. Nanotags, which are small, lightweight coded VHF transmitters, were deployed on focal species to further investigate stopover duration, body condition and pace of migration to northern breeding grounds. For the 2018 season, 31 Swainson's thrush (*Catharus ustulatus*) and nine northern waterthrush (*Parkesia noveboracensis*) were outfitted with nanotag units. Crews additionally collected data investigating resource availability as well as avian presence during the field season (March-May). During the 2019 season, 72 Swainson's thrush and 24 northern waterthrush were outfitted with nanotags. As a tagged bird moves to northern locations during migration, the signal broadcast by its nanotag may be detected by a network of automated radio telemetry stations in the Motus Wildlife Tracking System. When detections from multiple stations are combined, the pace of migration and direction of travel can be determined. This project is funded through RWR and the University of Southern Mississippi. Additional support was provided by the Wildlife Diversity Program, which constructed and maintained several VHF receiver stations funded by ConocoPhillips, the Louisiana Wildlife and Fisheries Foundation, USFWS State and Tribal Wildlife Grants, and RWR.

Using light-level geolocators to measure breeding propensity of mottled ducks in the Western Gulf Coast

During July through September 2018, 220 geolocators were deployed on mottled ducks throughout southwestern Louisiana and southeastern Texas. Eleven geolocators were recovered from hunters during the 2018-2019 waterfowl hunting season. Data was downloaded from nine geolocators. To aid in evaluation of the success of this project, a standard list of questions to ask each hunter reporting a recovered geolocator was developed. Specifically, these questions relate to the circumstances under which the bird was harvested (e.g., whether it decoyed or was shot in passing) and the condition of the bird and geolocator upon harvest. With 11 confirmed geolocator retrievals out of 220 deployments, the direct recovery rate for geolocators was 5 percent during the 2018-2019 hunting season. LDWF banders did not recover any geolocators during the 2019 banding season.

Avian nanotag deployed on northern waterthrush.

Blood Lead Concentrations in Mottled Ducks in the Louisiana Chenier Plain

During July and August of 2017-2019, staff collected blood samples from molting mottled ducks to investigate blood lead concentrations during the molt period of the annual cycle. Results indicated that 14 percent of mottled ducks sampled contained elevated blood Pb levels (>200ppb), and that 1.5 percent contained toxic but sub-lethal levels (500-1,000 ppb). No differences in Pb concentrations were detected between age and sex of birds, and little variance was explained by weight of the bird at capture. Stable isotope analyses indicated that the Pb found in mottled duck blood was likely a result of ingested lead shotshell pellets. Additional blood samples collected during summer 2018-2019 have been sent to a laboratory for analyses. Project funded through RWR.

A Survey of Waterbird and Waterfowl Nests Found on Terraces Constructed in Price Lake Unit

During the spring-summer of 2019, staff and student interns conducted surveys on marsh terraces within Price Lake and Unit 6 of RWR to determine habitat suitability and nest site selection by waterbirds and waterfowl. Surveys were conducted on foot and nests were located by visual encounter as well as by physically disturbing vegetation causing nesting birds to flush. During the 2019 surveys three species of birds were found nesting on marsh terraces: Canada goose (*Branta canadensis*; two nests), fulvous whistling-duck (*Dendrocygna bicolor*; one nest), and mottled duck (three nests). Results from 2017-2019 indicate that marsh terraces were utilized by mottled ducks, a non-migratory waterfowl species of conservation concern found in the western Gulf Coast, as well as cavity-nesting birds such as black-bellied whistling-ducks. The ability of marsh terraces to provide nesting habitat for birds one to three years after construction demonstrates the immediate impact they can have on marsh ecosystems. This study is ongoing and will be continued in coming years. Project funded through RWR.

An Investigation of Moist-soil Seed Production in the Rockefeller Wildlife Refuge Goose Pastures

During fall 2018, plant samples were collected from the RWR goose pastures and sent to the University of Tennessee Knoxville for moist-soil seed biomass analyses. Results indicate that moist-soil management during spring-summer 2018 (e.g., delayed drawdowns, disking, roller chopping, etc.) was effective in increasing moist-soil vegetation and seed biomass when compared to 2017 results. This is an ongoing study which will be continued in coming years. Project funded through RWR.

Evaluating Nest Box Use of Black-bellied Whistling-Duck in Southwest Louisiana

In 2015, nest boxes were deployed on RWR and on private property in Pecan Island, LA, in an attempt to provide nesting habitat for black-bellied whistling-ducks. In 2019, nests were initiated in 95 percent of nest boxes. Multiple clutches were observed in eight boxes. Clutch size ranged from two to 60 eggs and averaged 28.25 eggs per nest. Fifty percent of nests were successful. Among the 678 total eggs laid in boxes with successful nests, 275 eggs hatched (41 percent). An additional 20 nest boxes have been ordered and will be installed on RWR during December 2019. This study is ongoing and will be continued in coming years. Project funded through RWR.

COLLABORATIVE RESEARCH AT ROCKEFELLER WILDLIFE REFUGE

During FY 2018-2019, 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:

- **Nest site selection and nest success of avian SGCN on colonial nesting bird islands in southwestern Louisiana.** J. Marty with S. King and K. Ritenour, LSU (funded by LSU and 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.** J. Gibson 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 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

Vasseur, P.L., S.E. Zimorski, E.K. Szyszkoski, J.M. LaCour, J.S. Lankton, and L.A. Granger. 2019. Wing abnormality in a Wild-hatched Whooping Crane (*Grus americana*) Chick from the Nonmigratory Population in Louisiana, USA. Journal of Wildlife Diseases 55: 954-957.

Whitaker, J.M., K.M. Ringelman, J.R. Marty, W. Selman, and J.T. Linscombe. 2019. Changes In waterfowl abundance and species composition on Louisiana coastal wildlife management areas and refuges 2004-2016. Journal of the Southeastern Association of Fish and Wildlife Agencies 6:136-145.

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

Whitaker, J.M., J.R. Marty, J.P. Duguay, and M.S. Lognion. In review. Dove bait preference and banding costa analysis in Louisiana.

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.

Marty, J.R. and J.M. Whitaker. In prep. Changes in mottled duck abundance on Louisiana coastal wildlife management areas and refuges 2004-2006.

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.

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.

During FY 2016-2017 both the office and general quarters underwent cosmetic renovations on their exterior, including new windows to help with insulation. The project was completed with use of the building beginning for FY 2018-2019. Throughout FY 2018-2019 the facility was used to host college classes, birding groups, boy scouts and other special interest groups like the annual visit of the Baton Rouge Astronomical Society each January.

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.

One of the largest groups the refuge hosts each summer is the 4-H Marsh Maneuvers Camp. In 2018, 68 high school students from 19 parishes throughout Louisiana participated in the week-long camps in July. These camps are designed to educate high school students in the importance of coastal marsh erosion, restoration, conservation and ecology. Staff from RWR aids in logistics to view the refuge and provides the true Louisiana experience with activities ranging from airboat rides to lessons on throwing a cast net, to the life cycle of crabs in the Gulf of Mexico.

Examples of other 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 (601 technical assistance contacts, 3,384 general information contacts and 2,366 group contacts).

RECREATIONAL USE

Marsh management units, and more specifically water control structures, continue to be very popular with sport fishermen. During FY 2018-2019, Price Lake road was inundated from the Gulf of Mexico with extreme high tide events. Multiple washouts had occurred causing the road to be closed until staff made the necessary repairs. Price Lake Road continues to be a very popular recreation area attracting some of the largest groups of 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 is expected to be announced for bids in FY 2019-2020. These projects will greatly enhance the fishing opportunities at these already popular recreational areas.

In FY 2018-2019, approximately 124,702 person use days were counted entering the refuge. Most activities observed of recreational users visiting RWR consisted mainly crabbing and fishing. Other activities consisted of wildlife viewing and cast netting.

Recreational cast netting on the refuge.

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 1,800 acres of rice planted in 2019. There were approximately 1,500 acres of crawfish ponds on the property in 2019.

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 352 alligators harvested in the 2018 alligator trapping season. The average size of the alligators trapped was 6.65 feet, with an average live length value of $5.40 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 2018, WLWCA received a payment of $20 per egg. A total of 10,000 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

2018 - 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, 2018

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

WATERFOWL LOTTERY

Waterfowl Hunting (2018-2019 Season)		
	Total Hunts	Participants
Teal Lottery Hunts	9	85
Marsh Lottery Hunts	10	96
Youth Hunts	2	16
Rice Field Lottery Hunts	30	234
Group Hunts	14	162

Waterfowl Hunting Results (2018-2019 season)		
	Marsh	Rice Field
Total Ducks Harvested	2,004	502
Average Kill/Hunter (ducks)	4.77	2.15
Total Geese Harvested	47	15
Average Kill/Hunter (geese)	0.11	0.06

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 offered from Feb. 1 - May 31, 2019. 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. We had two scheduled trips with 17 total participants during FY 2018-2019.

BIRDING TRAIL

The WLWCA birding and nature trail, with accompanying kiosk, was completed in April 2012. The trail is on approximately 30 acres of property located on the northern bound-

ary 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 58 logged names in our visitor's guest book in FY 2018-2019.

EDUCATION, OUTREACH AND RESEARCH

MARSH MANEUVERS

During December 2018, 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.

Banding black-bellied whistling ducks.

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 is currently ongoing with the LDWF Wildlife Diversity Program that includes prescribed fire and herbicide application to reduce woody encroachment. This project is funded through the State Wildlife Grants Program.

WHOOPING CRANE REINTRODUCTION PROGRAM

WLWCA assisted the Whooping Crane Reintroduction Program by providing office space, staff and vessel support. In addition, WLWCA staff maintained the 700-acre impoundment water levels around the whooping crane pen and associated release site.

WOOD DUCK PROJECT

WLWCA continued a wood duck nesting box and banding program to complement the LDWF statewide program. In the 2018 calendar year, 16 wood ducks were banded and 28 were recorded as recaptures. Also, four black-bellied whistling-ducks were recorded as recaptures. In addition to banding birds, staff monitored nest boxes and collected nesting data. In the 2018 nesting season, 66 nesting boxes were monitored and maintained. These boxes produced 47 successful wood duck nests and 564 hatchlings. Black-bellied whistling-ducks used the same nesting boxes to produce 16 successful nests and 278 hatchlings.

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.

***LEFT:** Black-bellied whistling ducks using wood duck box for nest.* ***RIGHT:** Marsh Maneuvers students with wood duck boxes.*

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 (approx. 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 50 acres of property associated with the White Lake 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 office project composed of a pond, parking lot and elevated office building was completed.

2018-2019 FINANCIAL REPORT

Totals	
Beginning Fund Balance 2018-2019	$2,681,293
Total Revenue	$1,410,513
Total Expenditures	$1,136,708
Ending Fund Balance 2018-2019	$2,955,098

Expenditures	
Salaries	$356,118
Wages	$74,265
Related Benefits	$217,601
Travel	$958
Operating Services	$196,602
Supplies	$132,014
Professional Services	$9,409
Other Charges	-
Acquisitions	$108,535
Major Repairs	$2,278
Interagency Transfers (insurance)	$38,928
Total	***$1,136,708***

Revenue	
Group Hunt Trip Fees	$170,927
Group Hunt Charitable Contributions	225,600
Agricultural Leases	$520,179
Hunting Leases	$216,912
Alligator Egg Collection	$120,000
Lottery Hunt Fees	$51,845
Alligator Trapping Income	$5,053
Interest Income	$62,942
Mineral Bonuses	-
Right of Way	$405
Surface Leases	$30,580
Surplus Property	$480
FEMA Reimbursements	-
Oil and Gas Royalty	-
Non-Consumptive Trips	$770
Fishing Lottery	$4,820
Prior Year Revenue Adjustments	-
Total	***$1,410,513***

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 program is composed of subject-matter experts who focus on botany, community ecology, zoology, State Wildlife Grants and the Louisiana Wildlife Action Plan, marine mammal and sea turtle strandings, and database management.

Summer sunrise on the Ouachita River in Caldwell Parish, La.

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 2018-2019 including:

WDP staff discussing Species of Greatest Conservation Need with attendees of the National Hunting and Fishing Day event in Baton Rouge.

- Louisiana Master Naturalist Program spring and fall workshops
- Summer kids' camps, festivals, and career fairs for high school students
- Guest speakers for elementary, middle and high schools, university field labs, and birding and gardening clubs
- Articles for the "Wildlife Insider"
- Various press releases and radio and television interviews
- National Hunting and Fishing Day
- Grand Isle Migratory Bird Celebration

SCIENTIFIC RESEARCH AND COLLECTING PERMITS

Review and issuance of Scientific Research and Collecting Permits for rare, threatened and endangered species and all nongame birds 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 2018-2019, 88 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 2018-2019, WDP staff began revisions for the 2025 plan. Significant updates have been added to several chapters and various taxa groups this fiscal year, and the list of SGCN reflects additions suggested by WDP staff and colleagues.

The Louisiana Wildlife Action Plan (2015) is available now via the LDWF website (*www.wlf.la.gov/wildlife/wildlife-action-plan*).

GRANT MANAGEMENT ACTIVITIES AND STATE WILDLIFE GRANTS FUNDING CYCLE OF FY 2018-2019

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 $15.5 million in federal State Wildlife Grants funding, with an apportionment of approximately $700,000 in FY 2018-2019. Louisiana has funded 186 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.

Reddish egrets were banded for an LDWF project interested in the movement and habitat usage of this critically imperiled species. The bird on the right is one of these birds; the bird on the left is the closely related snowy egret.

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 2018-2019, 28 new project proposals and one project extension request were received for funding consideration. Sixteen proposals and the extension request received approval from the State Wildlife Grants Committee and were subsequently submitted to USFWS for approval (*Table 1*). After grant

TABLE 1.

New Louisiana State Wildlife Grants Opened During FY 2018-2019
Status Survey for Frecklebelly Madtom in the Pearl River Drainage of Louisiana Phase 2
Anuran SGCN Data Collection and Analysis
Alligator Snapping Turtle Head-start Post-release Monitoring
Rare Snake Trapping and Surveys
Razor-backed Musk Turtle Surveys
Louisiana Amphibian Monitoring Program
Gulf Coast Box Turtle Re-surveys
Southern Dusky Salamander Surveys
Pass-a-Loutre Bird Enhancement Project Phase 2
Survey of Crayfish SGCN and Associated Species Assemblages in Central and Northern Louisiana and Southern Arkansas
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
Distribution, Population Size, and Habitat Assessment of Crayfish SGCN in the Eastern Florida Parishes of LA

TABLE 2.

Ongoing Louisiana State Wildlife Grants During FY 2018-2019	
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	Database For Tracking Rare, Threatened, and Endangered Species
Alligator Snapping Turtle Head-start Program	Distribution and Abundance of Map Turtles in the Red and Ouachita River Drainages of Northern Louisiana
Surveys for S1, S2, and S3 Amphibian and Reptile SGCN	State Wildlife Grants and State Wildlife Action Plan Coordination
Habitat Use of Bachman's Fox Squirrels in Southeast Louisiana	Wildlife Habitat Inventory Initiative
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
Tracking Prothonotary Warbler Migration and Effects of Winter Ecology on Breeding Success	Population Genetics and Life History of the Sarracenia Spiketail
Habitat Affinities and Day Roost Characteristics of the Northern Long-eared Bat in Louisiana	Collection and Analysis of American Eels in Louisiana
A Two-year Comprehensive Status Survey and Habitat Assessment of Crayfish, Amphibian, and Reptiles Species of Greatest Conservation Need and Assemblages in Central Louisiana	Distribution and Conservation Genetics of Myotis and Other Bats in Louisiana
Novel Detection Method for the Imperiled Frecklebelly Madtom in the Pearl River Basin	Coastal Prairie Conservation Opportunity Area Corridor Evaluation and Survey
Wild Bees in Fire-managed Eastern Upland Longleaf Pine Ecosystems	Using Land Cover to Refine Conservation Opportunity Areas in Louisiana

TABLE 3.

Louisiana State Wildlife Grants Closed During FY 2018-2019	
Coastal Prairie Stewardship on White Lake Wetlands Conservation Area	Population Status and Distribution of Bluenose Shiner, Flagfin Shiner, Pontchartrain Painted Crayfish, Pearl Blackwater Crayfish, Ribbon Crayfish, Plain Brown Crayfish, Flatnose Crayfish, and Flatwoods Digger in the Pearl River Basin
Bald Eagle Nesting Surveys	Status Survey for Frecklebelly Madtom in the Pearl River Drainage of Louisiana
A Biogeographic Analysis of the Crawfish Biodiversity of Northwestern Louisiana	Conservation Status and Distribution of Mussels in the Lower Reach of Bayou Bartholomew Drainage
Assessment of Back Barrier Marsh Creation Projects Ability to Provide Avian Habitat	Population Size and Ecology of Four Rare Dragonflies in Louisiana
An Inventory and Comparative Study of Pollinators a Keystone Ecological Group in the Endangered Coastal Prairie of Louisiana	Occurrence of Western Chicken Turtle
Promotion of Prescribed Burning as a Management Tool on Selected Habitat Types within the Louisiana East Gulf Coastal Plain	Assessment of the Effects of a Planned Coastal Island Restoration on Seabirds and Their Nest Predators
Cooperative Research to Inventory and Monitor the Current Status, Abundance, and Distribution of the Saltmarsh Topminnow and Two Associated Killifish SGCN	Distribution and Abundance of Three Co-occurring SGCN Turtle Species in the Pearl River, Louisiana
Influence and Soil Texture on the Density of Baird's Pocket Gopher in Louisiana	Distribution, Population Size, and Habitat Assessment of Crayfish SGCN in the Eastern Florida Parishes of LA

closings on June 30, 2019, 30 ongoing State Wildlife Grants-funded projects remained (*Table 2*).

Sixteen State Wildlife Grants were closed this fiscal year (*Table 3*). Copies of final reports for all closed State Wildlife Grants are available to interested parties upon request. Nine formal grant amendments and 40 grant reports were submitted to USFWS during FY 2018-2019. Since the inception of the State Wildlife Grants Program in Louisiana, research funded through these grants has produced over 55 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 wildlife species (SGCN) and natural communities. Constantly updated data are integral in determining the status and state rankings for 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 program collaborates. Biotics currently houses more than 10,000 records of Element Occurrences, carefully vetted data on SGCN and their associated habitats collected by staff biologists or conservation partners. During FY 2018-2019, a total of 1,194 Element Occurrence Records were added (849 new records) and/or updated (345 records) in Biotics along with the associated information such as geographic location, habitat condition, emerging threats and population status. These additions and updates impacted more than 100 different types of elements (e.g., species of reptiles, birds, plants, etc. and natural communities). During this period, occurrences of 15 elements were added to Biotics for the first time: bay scallop, black rail, lightning whelk, monarch, northern long-eared bat, Ouachita map turtle, Pearl River map turtle, red knot, Sabine map turtle, salt marsh snake, slender glass lizard, southeastern crowned snake, southern dusky salamander, freshwater floating marsh, and prairie pothole. These additions resulted from actual new detections, but also from taxonomic changes and revisions to the WDP Tracked Species list.

During FY 2018-2019, significant progress on data backlog and various WDP projects, particularly those that focused on herptiles and aquatic invertebrates, meant an increase in

viable Biotics data. More than 600 reptile and amphibian occurrences resulting from survey efforts and museum records were updated or added, including Hurter's spadefoot (74), slender glass lizard (64), pygmy rattlesnake (59), western chicken turtle (58), alligator snapping turtle (49), salt marsh snake (46), Gulf coast waterdog (34) and 31 other species (281). Approximately 200 records, representing 10 species of freshwater crawfish, were also added or updated. Nonbreeding plover surveys supplied more than 40 new or updated piping and snowy plover records and red knot records. Element occurrence records (26) of six mammal species were also added or updated. More than 108 records of natural communities (36 types) were also added or updated in Biotics. Botanical surveys and herbaria records provided 57 new or updated records of 38 plant species.

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-foot U.S. Geological Survey 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 WDP, and a query of the WDP database shows the SGCN and natural communities within 1 mile of the project area. A comment letter is submitted to the requesting organization identifying potential impacts to SGCN, communities, and critical habitats. The letter also indicates the presence of scenic rivers, state or federal parks, wildlife refuges and wildlife management areas (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 occur 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 2018-2019, WDP staff conducted 1,239 project reviews, which included 446 private consultant project reviews, 663 new or modified Coastal Use Permits and 130 internal project reviews.

The WDP Data Section processed 21 digital data requests from 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 is provided to the requesting organization identifying potential impacts to SGCN, natural communities, and critical habitat, along with point and/or polygon data and associated species information. 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

The Data Section worked on the State Wildlife Grants project "Database for Tracking Rare, Threatened, and Endangered Species" (T236).

- This grant provided funding for a contractor to manage the backlog of plant, animal, and natural community data collected and housed by the WDP.
- The contractor organized and identified tracked species detected during WDP staff projects, published in peer-reviewed literature, submitted in grant reports, and entered into online databases; determined if the extracted information qualified as a new Element Occurrence Record or an updated record; prepared the data by digitizing polygons in ArcGIS; and entered the information into the Biotics database.
- During FY 2018-2019, the following large-scale datasets were updated in Biotics:
  - Louisiana Pearlshell Mussel
  - Crawfish (10 species)
  - Saltmarsh Topminnow
  - Frecklebelly Madtom
  - Other Fishes (9 species)
  - Red River Mudpuppy and Gulf Coast Waterdog
  - Louisiana Pinesnake
  - Alligator Snapping Turtle
  - Herptile Museum Data (13 species)
  - Piping and Snowy Plovers
  - Red Knot
  - Natural Communities (36 natural community types)
  - Kisatchie National Forest and Peason Ridge WMA Plant Surveys
- The funds in this grant were also used for WDP staff to determine potential impacts of proposed projects on SGCN and natural communities, to provide existing SGCN and natural community data for multi-jurisdictional projects that incorporate large-scale conservation efforts, and to share data with collaborators.
- Digital data were provided to two timber companies and two universities this period.

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.

Longleaf Academy field lecture.

A rare natural community type, small stream forest along Boggy Bayou in Rapides, Parish Louisiana.

- 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 organizations, and the public. (186 plant identifications were made for clients during FY 2018-2019.)
- 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 any LDWF interns 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, 12 projects are being successfully carried out, with all but one receiving external grant support. The following information explains in more detail a selection of projects active during FY 2018-2019.

- Botanical and Ecological Surveys on Kisatchie National Forest (Good Neighbor Agreement with USDA)
- Natural Areas Registry Program (State Wildlife Grants)
- Coastal Prairie Stewardship on White Lake Wetlands Conservation Area (State Wildlife Grants)
- Wildlife Habitat Inventory Initiative (State Wildlife Grants)
- Coastal Prairie Stewardship in Southwest Louisiana (Environmental Protection Agency's Gulf of Mexico Program)
- Enhancement of Pollinator Habitat on Coastal Prairie Rangelands (Environmental Protection Agency's Gulf of Mexico Program/U.S. Geological Survey)
- Survey for Pondberry in the De Loutre Basin of Northeast 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 (State Wildlife Grants)
- Baird's Pocket Gopher Habitat Survey (State Wildlife Grants)
- Ft. Polk New Lands Botanical and Ecological Survey (U.S. Department of Defense/USACE)

NATURAL AREAS REGISTRY PROGRAM

Almost 90 percent 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 onsite.
- 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 2020. 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, and Sugar Creek Natural Area will be planted in winter of 2019/2020, weather permitting. Bond's Crossing Natural Area received funds to conduct a prescribed burn. In addition to these activities, nine site visits were made to existing registry properties for either ecological checkups or landowner assistance and consultation. Six site visits were made to assess new, potential registry properties.

BOTANICAL AND ECOLOGICAL SURVEY ON KISATCHIE NATIONAL FOREST

A cost sharing position between LDWF and U.S. Forest Service was created under the authority of a 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, SGCN, 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 habitat management activities. Deliverables include stand-level status update reports within each project area and georeferenced detections of at-risk plant species and habitats and nonnative invasives.

During FY 2018-2019, the LDWF/Kisatchie National Forest botanist completed a survey for the Kincaid Reservoir and Boggy Bayou Restoration Project (Calcasieu Ranger District, Evangeline Unit), which encompasses 5,792 acres. During this survey new information was identified for Threatened, Endangered, Sensitive and Conservation plants, nonnative invasive plants, and sensitive plant communities. Three new populations of the imperiled stream bogmoss (*Mayaca fluviatilis*) and six new populations of the imperiled millet beaksedge (*Rhynchospora miliacea*) were discovered. Additionally, the extent of the known populations for these two species within the project area was expanded. In total, 21 nonnative invasive plants polygons were mapped, which are comprised of 18 Japanese climbing fern (*Lygodium japonicum*) polygons and one polygon each for Chinese privet (*Ligustrum sinense*), Johnson grass (*Sorghum halepense*), and Chinese silktree (*Albizia julibrissin*). The final report for the Kincaid Reservoir and Boggy Bayou Restoration Project was completed and submitted to the Kisatchie National Forest botanist. Currently, a WDP botanist is working on two projects for the U.S. Forest Service: the 9,265-acre Lower Drakes Creek Project and the 10,527 Vernon Farm Bill Restoration Project (Calcasieu Ranger District, Vernon Unit). 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 species of concern were more readily identifiable. The status of all records are being updated in U.S. Forest Service and WDP databases.

COASTAL PRAIRIE STEWARDSHIP

Coastal prairie is an extension of tall-grass prairie from the eastern Great Plains. This grassland historically occupied approximately 2 million acres in southwest Louisiana. Be-

***LEFT:** A scene from the back slope of a coastal dune grassland in Cameron Parish, La., dawned with Indian blanket flowers (Gaillardia pulchella). This habitat is considered critically imperiled in Louisiana.* ***RIGHT:** Cinnamon fern (Osmunda cinnamomea) with emerging fronds in an early spring found in Kisatchie National Forest, Natchitoches Parish, La.*

cause of modern agriculture practices, less than 0.2 percent 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 2018-2019, Botany and Community Ecology Section staff oversaw installation of fire lines at two sites and led crews that burned 512 acres of remnant coastal prairie. WPD 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. These sites are not yet being managed with assistance from the Botany and Community Ecology Section staff, but staff will continue to work with landowners to provide ecologically sound advice to enhance these valuable sites.

Coastal Prairie Stewardship on White Lake Wetlands Conservation Area

White Lake Wetlands Conservation Area (WLWCA) is the only state or federally-owned conservation area in Louisiana to support remnant coastal prairie, which is a critically imperiled plant community. The prairie at WLWCA occurs on an elevated ridge embedded within freshwater marsh. This remnant prairie totals approximately 286 acres. This is the wettest expression of coastal prairie due to its low elevation and marsh-fringe setting. The imminent threat facing coastal prairie on WLWCA is woody plant encroachment by Chinese tallow tree (*Triadica sebifera*) and, to a lesser extent, waxmyrtle (*Morella cerifera*). Woody cover is undesirable in prairie communities and would have been historically controlled by natural fires. The objective of this project was to reduce woody cover on the WLWCA prairie from its current level of 25 percent land cover to less than 10 percent by implementing a combination of herbicide applications targeting woody plants and prescribed fire.

Remote sensing data were analyzed from pre-treatment (2013) aerial maps, which indicated that the 286 acre study site had approximately 214 acres (75 percent) of herbaceous cover and 72 acres (25 percent) of woody cover. Remote sensing data post-treatment (2017) indicated only 3.5 acres (1.2 percent) of woody cover remained. After two prescribed fire events and two herbicide applications, woody cover at the study site decreased by approximately 95 percent, as determined by the comparison of the pre-treatment and post-treatment imagery classification analysis. During October 2018, the final vegetation sampling event was completed which also supported the remote sensing findings, as the woody plant relative frequency, relative cover, and importance value decreased significantly between the 2014 to 2018 datasets. The goal of this project was achieved, and an effective habitat management approach for woody species encroachment on coastal prairies of Louisiana was realized.

PONDBERRY SURVEYS IN THE DE LOUTRE BOTTOMS OF NORTH LOUISIANA

Pondberry (*Lindera melissifolia*) is federally listed as endangered under the Endangered Species Act. The last known occurrence of this species in Louisiana was documented by William M. Carpenter in the late 1830s. Although, the exact location of Carpenter's Louisiana collection is not known, it is reportedly from Morehouse Parish and the Bayou De Loutre Basin. Prior to 2018, extensive surveys for pondberry had not been conducted in the Bayou De Loutre Basin, which currently has suitable habitat for this species. In 2018, the WDP received a Section 6 grant from USFWS to conduct surveys for this endangered species in the Bayou De Loutre Basin.

During the fall of 2018, when the bright red fruit of pondberry would be easier to see, surveys were conducted throughout approximately 3,400 acres of bottomland hardwood forests, cypress-tupelo swamps and marsh-pond edges. Unfortunately, no pondberry was detected during the surveys, and some areas remained inaccessible during the survey due to high water events or other logistical constraints. However, this survey did result in the discovery of two new plant community Element Occurrence Records - a sand prairie and a hardwood flatwoods. Additional surveys should be conducted via watercraft where access is limited and in the spring when pondberry flowers will be visible.

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 revisits to known populations in Louisiana and to search for potential new sites with suitable habitat. During spring 2019, Botany and Community Ecology Section staff surveyed all three known locations for this species in Caddo Parish and 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. One of the threatened populations was located on a property previously enrolled in the Natural Areas Registry. This property recently changed ownership, and the new owners decided to no longer participate in the Natural Areas Registry Program; instead, the landowners 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; a follow up visit to monitor survival will be conducted in spring 2020. 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 spring 2020.

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 the following species: Louisiana pearlshell mussel, Louisiana pinesnake, gopher tortoise and black rail, as well as endangered species coordination. Section 6 Cooperative Agreements were renewed between 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 Dusky Gopher Frog Recovery Team.
- Collection and preservation of petitioned crawfish DNA for genetic studies.
- Gopher tortoise population assessment, habitat improvement and public outreach.
- Collaborated with private landowners for gopher tortoise status and potential habitat restoration.
- Response and coordination for waif gopher tortoises.
- Louisiana pearlshell mussel population trends, long-term monitoring protocol, and data management.
- Louisiana pearlshell mussel conservation coordination with federal and parish partners.
- Spatial and temporal distribution of black rail (*Laterallus jamaicensis*) in coastal Louisiana.
- Louisiana pinesnake research and monitoring.
- The West Indian manatee-sighting database was maintained and staff responded 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 Headstart Program
- Rare Amphibian and Reptile (SGCN) Surveys
- 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 survey 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 2018-2019, a total of 666 scattered individuals were detected across five creeks, and 9,717 individuals were detected within 12 aggregations across four creeks. The largest of these aggregations comprised 4,973 individuals, and the smallest aggregation held 183 individuals.

***LEFT:** Wildlife Diversity staff performing Louisiana pearlshell Surveys in Grant Parish.* ***RIGHT:** Louisiana pearlshell is a threatened species of mussel that can only be found in Grant and Rapides parishes.*

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 threatened under the Endangered Species Act is scheduled for 2020 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 2018-2019, two cohorts (3 and 4) of headstarted alligator snapping turtles were released into the wild. Cohort 3 consisted of 58 turtles released at Big Lake WMA in northeast Louisiana. Cohort 4 was comprised of 16 radio tagged individuals released at Horseshoe Lake on Boeuf WMA in Caldwell Parish. Staff plan to track these turtles and determine their survivorship for FY 2019-2020. Six alligator snapping turtles that were previously radio tagged in 2016 were also tracked during FY 2018-2019.

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 public lands including Sandy Hollow WMA and Bogue Chitto National Wildlife Refuge to update the species' occurrence data. Recruitment was documented during this fiscal year with juveniles observed on both the north and south tracts of Sandy Hollow WMA. 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 sixth waif tortoise pen was installed on the north tract of Sandy Hollow WMA, which received one male and one female tortoise after each passed a health assessment and Mycoplasma test 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. WDP staff reviewed various development projects in Tangipahoa, Washington and St. Tammany parishes to assess their potential impacts to gopher tortoises. LDWF staff provided consultations on preventative measures as necessary.

Wildlife Diversity Program staff continue to collaborate with state, federal and nongovernmental partners region-wide 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, prescribed fire was applied to 1,095 acres of private lands on three properties in Tangipahoa, Washington, and St. Tammany parishes (one property/parish) in early spring 2019. Two of these properties are owned by non-industrial, private landowners; the third property is privately owned by industry and currently contains Louisiana's largest gopher tortoise support population. Under the Multi-state State Wildlife Grants Sandhills/Upland Pine Restoration Project, a longleaf pine tract on Ben's Creek received prescribed fire in 2019. 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

***ABOVE:** Prescribed burns like the one above are necessary to reduce woody vegetation and provide enough light for forage of the gopher tortoise. **BELOW:** The after effects of a prescribed burn often appear bleak, but provide opportunity for flowering plants and grasses to grow where they would otherwise be unable.*

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.

LDWF awarded State Wildlife Grants funding in 2018 to develop Priority Amphibian and Reptile Conservation Areas for Louisiana. Priority Amphibian and Reptile Conservation Area designation criteria were developed by Partners in Amphibian and Reptile Conservation in an effort to leverage partnerships and facilitate collaborative conservation on key areas defined as important to long-term population and species survival. Through an intense workshop with key herptile experts and partners statewide, seven Priority Amphibian and Reptile Conservation Areas, two of which contain multiple gopher tortoise support populations, were identified in Louisiana.

LDWF's gopher tortoise biologist was presented a Distinguished Service Award by the Gopher Tortoise Council during the 40th Annual Gopher Tortoise Council Meeting at Archbold Biological Station in Lake Placid, FL. This honorable award represents LDWF's significant contribution to the conservation of the gopher tortoise and upland ecosystems.

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 4,200 acres have been enrolled for management of the Louisiana pinesnake. 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 2018-2019, box traps were stationed at four sites: Sandy-Lands, Kepler Lake, Plantation, and Hodges Garden. However, only one Louisiana pinesnake was captured over 3,619 trap-nights, resulting in a catch per unit effort of 0.00028 for all sites combined. The single pinesnake was detected at Kepler Lake, and no pinesnakes were captured at any other site. Kepler Lake's catch per unit effort was 0.00055 (one pinesnake for every 1,810 trap-nights).

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 U.S. Geological Survey, 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. Louisiana manatee sightings, citizen concerns and the locations of warm water sources, which attract manatees, were assessed. One dead manatee was reported in October 2018 near Seabrook Bridge in New Orleans, but it could not be relocated. An additional dead manatee was assessed on Dec. 18, 2018, in Cameron Parish. WDP staff continue to document sightings provided by LDWF staff and the public and update the WDP database. In FY 2018-2019, 23 sightings of manatees were reported in Louisiana, including 10 adults in St. Tammany Parish near Mandeville and Slidell, one adult in Plaquemines Parish, one adult in St. John the Baptist Parish, and one adult in Orleans Parish. All sightings were reported from July 2018 until January 2019. WDP staff also completed manatee caution sign postings at various boat launches throughout coastal, southeastern Louisiana during this fiscal year. These signs provide the LDWF 24-hour dispatch number to assist and encourage citizens to report live manatee sightings as well as possibly injured or deceased manatee.

REPTILE AND AMPHIBIAN PROGRAM ACTIVITIES

The following Reptile and Amphibian Program activities were completed during FY 2018-2019.

State Wildlife Grant: Surveys for S1, S2 and S3 Amphibian and Reptile SCGN

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 has been 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

WDP staff completed manatee caution signage postings at various boat launches throughout coastal, southeastern Louisiana during this fiscal year. These signs 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.

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. Of the six subprojects, Waterdog Surveys (*Necturus beyeri*) were completed this fiscal year. Updates on other subprojects are listed below.

Coastal Prairie Surveys

For Coastal Prairie Surveys, rare reptiles, including slender glass lizard (*Ophisaurus attenuates*) and eastern hog-nosed snake (*Heterodon platirhinos*), were surveyed at a minimum of two restoration sites using box trap arrays placed within reference and treatment plots that are part of a project investigating the effects of grazing and fire on coastal prairie vegetation. Rare amphibians were surveyed using coverboards within each plot. Otherwise searches consisted of visual encounter surveys. During this fiscal year, snake trapping (38 trap-weeks at Gray Ranch), as well as incidental visual encounter surveys, did not locate any SGCN.

An Eastern Hog-nosed snake doing its hissing display to ward of predation as well as revealing its not often seen rear teeth they use for eating toads.

Rare Snake Surveys

Rare snakes were sought in the eastern Florida Parishes from March through October. Box trap arrays were placed at sites with suitable habitat. The snake trapping component consisted of checking traps at Lee Memorial Forest (22 trap-weeks), Bond property (two trap-weeks), and Hodges Gardens plus Bienville timber lands (517 trap-weeks). These trapping efforts resulted in the capture of the following SGCN: eastern hog-nosed snake, Louisiana pinesnake and timber rattlesnake (*Crotalus horridus*).

Coverboards and sheet metal were also systematically dispersed in upland and flatwoods habitats and checked once per week. Pine woods littersnakes (*Rhadinaea flavilata*) and southeastern crowned snakes (T*antilla coronate*) were sought under cover objects and under and within logs and stumps. Common rainbow snakes (*Farancia erytrogramma erytrogramma*) were sought by systematically placing cover objects near streams and rivers and through visual encounter surveys conducted approximately once per week. The larger snake species, including black pinesnake (*Pituophis melanoleucus lodingi*), eastern diamond-backed rattlesnake (*Crotalus adamanteus*), northern mole kingsnake (*Lampropeltis rhombomaculata*), and harlequin coralsnake (*Micrurus fulvius*) were searched for using transect and road cruising surveys, box trap arrays and cover objects. During this fiscal year, surveys were conducted at five locations with only one SGCN - a rainbow snake - observed at a known locality.

Rare Salamander Surveys

Seven plethodontid salamander species were sought in suitable microhabitat specific to each species. A single method or combination of methods was used to conduct surveys for rare salamanders including: visual encounter surveys, traps/drift fence arrays surrounding ponds, dip-net surveys, and leaf litter surveys. Surveys were conducted approximately once per week during the appropriate season for each species. Desired species were four-toed salamanders (*Hemidactylium scutatum*), southern dusky salamanders (*Desmognathus auriculatus*), southern red-backed (*Plethodon serratus*) and Webster's (*Plethodon websteri*) salamanders, Louisiana slimy salamanders (*Plethodon kisatchie*), and Gulf Coast mud (*Pseudotriton montanus flavissimus*) and southern red (*Pseudotriton ruber vioscai*) salamanders. These surveys resulted in the following SGCN observations:

- Tiger salamander egg masses were located at seven sites in Clear Creek WMA.
- One four-toed salamander nesting female was discovered at a new locality in East Baton Rouge Parish.
- Three southern red salamanders were located at known sites.
- One Louisiana slimy salamander and two southern red-backed salamanders were located at known sites.

***LEFT:** Timber rattlesnake. **RIGHT:** Ring-necked snakes (non-venomous) are small species of snake that occurs in Louisiana. When threatened by predators, this species will show the underbelly to draw attention away from its head and to signal that it tastes foul.*

Three-lined salamanders occur in the "Florida" Parishes of Louisiana near stream sides where they can be found underneath mats of leaves or under logs.

A southern red-backed salamander (SGCN) detected while performing rare salamander surveys at Sicily Island Hills State WMA.

Louisiana slimy salamander (SGCN) detected while performing rare salamander surveys at Sicily Island Hills State WMA.

Four-toed salamander with nest and eggs.

LOUISIANA AMPHIBIAN MONITORING PROGRAM

The Louisiana Amphibian Monitoring Program was initiated in 1996 as Louisiana joined dozens of states participating in the newly created USFWS 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 2019 field season, the Data Management System contains call and weather data for 1,304 route runs. To facilitate statistical review, a spreadsheet was produced and proofed that contains data for 12,792 individual 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 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 2018-2019, 73 individuals received renewed permits for 2019, and three others applied for and received permits.

TURTLES

There are 27 native turtle species in Louisiana and its coastal waters. Seven of the species are protected under the Endangered Species Act, and four others cannot be taken for commercial purposes through regulatory act (RS 76.101.G). The remaining 16 species may be taken for commercial and recreational use. Monitoring commercial take of turtles was facilitated by Act 114 of the 2016 legislative session, which added amphibians and reptiles to the Trip Ticket system. According to Trip Ticket sales, the following turtles were harvested for commerce during FY 2018-2019:

- Common Snapping Turtle - 108
- Stinkpot - 406
- Red-eared Slider – 2,597
- Spiny Softshell - 211

Turtle commerce was also monitored from export data provided by the USFWS Law Enforcement Management System. The Law Enforcement Management System may be used to track trends on demand and export prices for each species, which can be valuable in forecasting demand of wild-caught turtles to supply reptile collectors and turtle farmers. Recent (2018) trends in farmed turtles indicate an increased supply and demand for common snapping turtles and diamondback terrapins, a decreasing supply and demand for mud and musk turtles, cooters and sliders, and softshells, and a stable trend for alligator snapping and map turtles.

FIELD WORK

Twenty-one herpetofaunal surveys were conducted on private lands, nine surveys on city and parish park properties, one on federal lands, nine on WMAs/LDWF sites, 24 surveys on LSU lands, and five in state parks. One-hundred-sixty-one incidental surveys and observations were also made. Observed were 75 species (51 percent of the herptile species in the state) and 1,065 individual amphibians and reptiles (*Table 4*).

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

TABLE 4. **Species of Greatest Conservation Need are in* ***bold font***

Species Observed	# Observed	Species Observed	# Observed	Species Observed	# Observed
Ambystoma opacum	1	*Rana clamitans*	103	***Carphophis amoenus***	**3**
Desmognathus conanti	**15**	*Rana grylio*	call	*Farancia abacura*	4
Desmognathus valentinei	**3**	*Rana palustris*	2	***Farancia erytrogramma***	**1**
Eurycea cirrigera	**6**	*Rana sphenocephala*	35	*Diadophis punctatus*	9
Eurycea guttolineata	**2**	*Gastrophryne carolinensis*	12	***Heterodon platirhinos***	**1**
Eurycea paludicola	5	*Alligator mississippiensis*	8	*Nerodia erythrogaster*	12
Eurycea quadridigitata	2	*Chelydra serpentina*	3	*Nerodia fasciata*	10
Hemidactylium scutatum	**1**	*Kinosternon subrubrum*	1	*Nerodia rhombifer*	59
Plethodon mississippi	11	*Sternotherus odoratus*	7	*Liodytes rigida*	1
Pseudotriton ruber	**2**	*Chrysemys dorsalis*	1	*Virginia valeriae*	1
Bufo fowleri	13	*Pseudemys concinna*	17	*Storeria dekayi*	11
Bufo nebulifer	63	*Terrapene carolina*	12	*Thamnophis proximus*	23
Bufo terrestris	**1**	*Trachemys scripta*	87	***Thamnophis saurita***	**2**
Acris blanchardi	call	*Apalone spinifera*	8	*Thamnophis sirtalis*	5
Acris crepitans	59	*Hemidactylus parvimaculatus*	2	*Opheodrys aestivus*	2
Acris gryllus	71	*Hemidactylus turcicus*	14	*Coluber constrictor*	31
Hyla chrysoscelis	4	*Anolis carolinensis*	88	*Pantherophis guttatus*	5
Hyla cinerea	2	*Anolis sagrei*	6	*Pantherophis slowinskii*	1
Hyla squirella	11	*Sceloporus consobrinus*	1	*Pantherophis spiloides*	9
Hyla femoralis	call	*Sceloporus undulatus*	10	*Lampropeltis holbrooki*	1
Pseudacris crucifer	call	*Scincella lateralis*	84	*Lampropeltis nigra*	12
Pseudacris fouquettei	call	*Plestiodon fasciatus*	28	***Lampropeltis elapsoides***	**2**
Eleutherodactylus cystignathoides	5	*Plestiodon inexpectatus*	17	*Agkistrodon contortrix*	8
Eleutherodactylus planirostris	3	*Plestiodon laticeps*	6	*Agkistrodon piscivorus*	10
Rana catesbeiana	4	***Aspidoscelis sexlineatus***	**4**	***Crotalus horridus***	**2**

for all nongame birds in our state, as well as providing peer-review for scientific and layman products. The bulk of the responsibilities involve coordinating or participating in scaled-down monitoring that feeds into regional, national or international datasets. During FY 2018-2019, surveys and other projects included U.S. Geological Survey Breeding Bird Surveys, Christmas Bird Counts, Buff-breasted Sandpiper 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; and with such funding, approximately 85 percent of U.S. Geological Survey Breeding Bird Survey routes in Louisiana were assigned to active observers in the 2019 season. WDP biologists documented many rare 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. Although no buff-breasted sandpipers were observed during the region-wide Buff-breasted Sandpiper Surveys, 70 imperiled Hudsonian godwits were recorded along with seven upland sandpipers. During Christmas Bird Counts, WDP biologists tallied more than 23,000 individual birds of 127 species and observed 28 state-rare crested caracaras, seven red-breasted nuthatches (an irruptive species), and a clay-colored sparrow (very rare in Louisiana). LDWF's WLWCA Christmas Bird Count was attended by 16 surveyors, who tallied more than 185,000 birds of more than 140 species. These and results from 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 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, bald eagles and restoration. The nongame ornithologist gave an invited presentation on the status of Louisiana's colonial waterbirds to the Gulf Coast Joint Venture Bird Nesting Island Co-operative Forum Summit and became a core committee member of that group. Sea Grant invited the nongame ornithologist to present at a symposium on birds and oil spills, also requesting panel discussion participation. WDP staff also participated in the Reddish Egret International Working Group Meeting (2019) and provided review of the group's conservation and monitoring plan. With the proposed federal listing of black rail, a diminutive, secretive marsh bird, several meetings were convened to discuss the species' needs

LEFT: *Although no buff-breasted sandpipers were observed during regionwide surveys for that species, more than 70 imperiled Hudsonian godwits were detected.* ***RIGHT:*** *One of the most ubiquitous of our winter visitors, yellow-rumped warblers may be observed in many different habitat types from old fields to forests to suburbia.*

Red-shouldered hawk seen while conducting Christmas Bird Counts in Vermilion Parish

The crested caracara is a relatively new, permanent addition to Louisiana's avifauna, becoming increasingly common here within the last decade or so.

Osprey seen while conducting Christmas Bird Counts in Vermilion Parish

Bald eagles can be found statewide near large waterbodies, particularly where large bald cypress are abundant.

as well as the consequences of listing the bird as threatened or endangered. To assist in the listing decision, WDP staff provided USFWS occurrences of black rail in Louisiana by compiling all known records, and staff attended a workshop with coastal landowners.

GULF OF MEXICO AVIAN MONITORING NETWORK'S "STRATEGIC AVIAN MONITORING PLAN FOR THE NORTHERN GULF OF MEXICO"

Since its inception in 2013, the Gulf of Mexico Avian Monitoring Network has shown tremendous potential in the bird conservation community. The Gulf of Mexico Avian Monitoring Network core committee of a dozen or so professional bird scientists, which includes the WDP nongame ornithologist, rapidly expanded this interdisciplinary network, now including more than 100 individuals representing more than 30 state and federal agencies, universities, nonprofits and others. Building upon a foundation that utilized structured decision making, the Gulf of Mexico Avian Monitoring Network created an objectives hierarchy to maintain consistent progress towards the group's main goal of "maximizing the usefulness of avian monitoring data to inform and facilitate avian conservation towards achieving restoration and management of the Gulf ecosystem." To best address these challenges, the Gulf of Mexico Avian Monitoring Network created smaller working groups based on taxa groups - landbirds, marsh birds, raptors, seabirds, shorebirds, wading birds and waterfowl. Each working group was tasked with authoring chapters on their respective taxa group for a new Strategic Avian Monitoring Plan for the Northern Gulf of Mexico (in press). The co-leads of the Gulf of Mexico Avian Monitoring Network Raptor Working Group, the WDP nongame ornithologist and a leading expert on New World raptors, coauthored the raptor chapter, an approximately 30-page treatise on conservation, management, research and monitoring needs of the Gulf's raptors, with special focus on the Gulf of Mexico Avian Monitoring Network's Raptors of Conservation Concern - osprey, swallow-tailed kite, bald eagle, short-eared owl,

southeastern American kestrel and peregrine falcon. The full plan is expected to be available in FY 2019-2020.

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 third year. This passive network will facilitate radio tracking of hundreds of organisms at once provided those organisms are first fitted with nanotags (tiny coded radio tags) 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 Bird Studies Canada Motus Wildlife Tracking System. In fact, the WDP's network of receiver stations has logged more than 700 detections of approximately 200 individual research birds of at least 18 species, including several Neotropical migratory landbirds, a nightjar, a seabird, a secretive marsh bird and several shorebird species, one of which is federally listed as threatened (red knot). This work has almost limitless potential for collaborating with other agencies, industry, nonprofits, academia, and others from across the Western Hemisphere. With assistance from three wildlife technicians hired for this work, as of June 2019, SPDOR VHF receiver stations were active at the Grand Isle Marine Lab Facility, Pointe-Aux-Chenes WMA, 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, Attakapas WMA, Richard K. Yancey WMA, Marsh Island Refuge, LDWF's Lake Charles, Atchafalaya Delta WMA, and Jean Lafitte National Historical Park and Preserve. Four additional receiver stations initially installed by Barataria-Terrebonne National Estuary Program at East Timbalier Island, Port Fourchon, Grand Isle and East Grand Terre Island were annexed by SPDOR in 2019.

Coastal Live Oak forest patches such as this chenier (Baton Rouge Audubon Society's Peveto Woods Sanctuary) provide critically important stopover habitat for millions of Neotropical migratory birds each year.

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 nongame ornithologist 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 nongame ornithologist 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.

MARINE MAMMAL AND SEA TURTLE STRANDING AND RESPONSE PROGRAMS

LDWF is the lead marine mammal and sea turtle stranding and rescue response organization in Louisiana. These programs continue to receive and investigate all reports of live and dead marine mammals and sea turtles. LDWF biologists work closely with our federal counterparts and staff at NOAA National Marine Fisheries Service and USFWS to investigate the cause of strandings and deaths, following established protocols for consistency in data collection to provide standard and accurate data. During FY 2018-2019, sea turtle carcasses that were not too severely decomposed were recovered for necropsy or, in some instances, a field necropsy was performed. Where appropriate and logistically possible (size of carcass and location), marine mammal carcasses were also recovered for necropsy or were necropsied in the field. LDWF works with the LSU School of Veterinary Medicine - Louisiana Animal Disease Diagnostics Laboratory to utilize their BSL-3 Laboratory to perform necropsies on marine mammals and sea turtles, and many necropsies have been performed utilizing this state-of-the-art facility. In November 2018, LDWF hosted the NOAA sea turtle veterinarian at

LSU to conduct a batch sea turtle necropsy training session. LDWF staff from field offices across the coast, as well as representatives from Anatomic Pathology Resident Students from the Department of Pathobiological Sciences, LSU School of Veterinary Medicine, participated in the two-day, lab-based training. LDWF completed 34 sea turtle necropsies during this fiscal year.

Where beaches were accessible, LDWF staff used 4x4 trucks or UTVs to continue surveillance monitoring, searching for any stranded animals. All encountered strandings were sampled accordingly following protocols. Additional beach surveys were conducted in remote locations where strandings may go undetected by the public. To maximize reports of stranded animals, LDWF has built relationships with others working in coastal areas including coastal restoration contractors, local municipalities that patrol beaches, Foundation Property Managers and others who may cover sections of beaches routinely. It is through these developed and fostered relationships that LDWF receives stranding reports in a timely fashion and covers certain beaches along the coast of Louisiana more frequently than may have been done in the past. A total of 56 beach surveys were conducted across the coast of Louisiana this fiscal year.

During FY 2018-2019, 117 marine mammal strandings (including a live neonate dolphin) and 102 sea turtle strandings were reported in Louisiana. Stranded marine mammal species included common bottlenose dolphins (*Tursiops truncatus*), minke whale (*Balaenoptera acutorostrata*), and delphinids which could not be identified to species due to the state of the specimens. LDWF staff completed six marine mammal necropsies during FY 2018-2019, which included: the live neonate dolphin, which died during transport; Y88, a known dolphin from live dolphin health assessment efforts in previous years; and the minke whale. Four of these necropsies were conducted in the field, and the other two were STAT Lab based necropsies. Since Feb. 1, 2019, the number of dolphin strandings in the northern Gulf of Mexico has been elevated, and this event has been declared an Unusual Mortality Event by NOAA. An Unusual Mortality Event is defined as "a stranding that is unexpected; involves a significant die-off of any marine mammal population; and demands immediate response" in the Marine Mammal Protection Act.

In December 2018, an oil spill occurred in eastern Barataria Bay near Port Sulphur, LA; LDWF staff coordinated marine mammal and sea turtle response surveys via the Unified Command's Wildlife Branch. These surveys covered open waters and areas of shoreline within and along the bay, assessing animals in the impact area. Dolphins observed within the impact area were photographed and environmental oiling conditions were documented during these sightings for each group of dolphins observed. At the end of each day, photographs from the surveys were used to sort individuals by dorsal fin characteristics to enumerate animals and to complete Daily Summary Reports for submission to Unified Command. LDWF, National Marine Mammal Foundation, NOAA and USFWS staff worked collaboratively on response surveys, prioritization of potential target areas, conducting debrief calls, and reporting observations of known research animals. In addition, staff reviewed up-to-date oil spill impact maps, overflight images and associated information to determine target search areas and monitored weather and sea state conditions to determine appropriate days of response surveys. To perform surveys and response activities in oil spill impact areas, biologists attended HAZWOPER training and maintained certification in the program. Staff also participated in oil spill drills during this fiscal year. These drills are conducted by the oil and gas industry and partners to ensure adherence to safety policies and regulations and to maintain readiness for future chemical releases.

Marine Mammal and Sea Turtle Projects

Live Sea Turtle Captures

Louisiana's nearshore habitat provides resources necessary to foraging sea turtles; however, little is known regarding sea turtles off the coast of Louisiana. Determining distribution, seasonal movements, growth rates and habitat use for all life stages of marine turtles has been identified by the USFWS and National Marine Fisheries Service as major actions required to achieve recovery for these threatened and endangered species. However, currently, no program exists to research and monitor these turtle assemblages via in-water efforts in Louisiana. Without baseline information identifying critical habitat and use of these habitats by turtles, proper man-

An LDWF biologist with a Kemp's Ridley sea turtle

agement and recovery of these at-risk species cannot occur. Since December 2014, LDWF has collaborated with researchers from U.S. Geological Survey to initiate a long-term mark and recapture survey of sea turtles in Louisiana occurring each December and May. In FY 2018-2019, LDWF performed live sea turtle capture efforts with U.S. Geological Survey in December 2018 and April 2019, when at total of 29 captures was made. A total of 166 captures including 134 individual sea turtles and 32 recaptures have occurred since the start of the project. Of the turtles captured, all were green sea turtles except for one loggerhead sea turtle and one Kemp's Ridley sea turtle, which was captured nearby as part of a relocation trawling project while the sampling crew was in the area. Sea turtles are captured (National Marine Fisheries Service Permit Number 17307-03) and temporarily held for sample collection including skin biopsies, a carapace biopsy and blood samples. In addition, all turtles captured are scanned to determine if they have been previously tagged by researchers. If no tag exists, all individuals receive external flipper tags (small metal tags on both front flippers) and an internal Passive Integrated Transponder tag. LDWF staff will continue to work with fellow sea turtle researchers at U.S. Geological Survey. Grants awarded by the Fourchon Oilman's Association in conjunction with the Bayou Community Foundation to the Louisiana Wildlife and Fisheries Foundation support these efforts. With limited data available for these species, it is vital to invest in efforts with collaborators such as our partners at U.S. Geological Survey to evaluate sea turtle abundance and richness and to elucidate the areas used during their entire life cycle in order to fill data gaps and enact protective measures to conserve these imperiled species.

Barataria Bay Dolphin Projects

In July 2018, live dolphin health assessments focusing on reproductive health of common bottlenose dolphins in Barataria Bay were performed. As part of a Gulf of Mexico Research Initiative funded project, LDWF collaborated with the National Marine Mammal Foundation and NOAA. Dolphins were captured, temporarily restrained, and tested for a suite of health parameters. Female dolphins were assessed via ultrasound to determine if they were pregnant. If they were pregnant, the ultrasound was utilized to determine expected due dates for the fetus based on skull diameter measurements. In order to relocate them in the future, pregnant individuals were outfitted with a satellite linked, tracking tag attached to the dorsal fin. Each captured animal was freeze-branded on both sides of the dorsal fin to aid in identification purposes for follow-up monitoring surveys. Reproductive Outcome Surveys (National Marine Fisheries Service Permit Number 18786-03) were performed by LDWF and National Marine Mammal Foundation staff in July 2018 and by LDWF staff in June 2019 to determine if the pregnancy was a success or failure. Pregnancy was deemed successful if a previously tagged pregnant female was observed with a neonate (baby dolphin) after the expected due date. The animals are photographed for further documentation and tracking purposes. Since these efforts began in 2011, a total of 202 dolphins have been captured, representing 168 individuals and 34 recaptures. Field work such as these efforts provide further networking opportunities for our staff with experts from across the country and world, as well as provide hands-on live dolphin handling experience that simply cannot be overlooked.

LDWF plays a vital role in protecting marine mammals and sea turtles that inhabit the waters of Louisiana. The program has allowed researchers to gain a better understanding of marine mammals and sea turtles via live captures and releases, tagging projects, necropsy work and overall stranding response and sample collection. These efforts are critical to monitoring marine mammals and sea turtles and their mortalities along the coast of Louisiana as part of long-term monitoring associated with the 2010 *Deepwater Horizon* oil spill incident. These animals play a vital role in our coastal ecosystem, and obtaining samples from these animals allows for an overall better understanding of this natural resource. The LDWF Marine Mammal and Sea Turtle Stranding and Response Programs' efforts will provide Louisiana and our federal partners the data necessary for effective protection and management of marine mammals and sea turtles which are protected under the Marine Mammal Protection Act and the Endangered Species Act, respectively.

WDP SCIENTIFIC PRESENTATIONS

Lejeune, K.L. 2018. Louisiana Gopher Tortoise Status. The 40th Annual Gopher Tortoise Council Meeting, Archbold Biological Station, FL, October 2018.

Seymour, M.A. 2019. Wildlife Diversity Program and the Gulf of Mexico Avian Monitoring Network: Using Modified Delphi Method and Structured Decision Making in Planning. Louisiana Watershed Initiative Planning Technical Advisory Group meeting, Baton Rouge, LA, April 2019. Oral.

Seymour, M.A. 2019. Raptors of Conservation Concern. Gulf of Mexico Avian Monitoring Network community of practice meeting, Biloxi, MS, March 2019. Oral.

Seymour, M.A. 2019. Birds of Louisiana's Coast: a Shared Resource and a Shared Responsibility. Sea Grant's Birds and Oil Spills Symposium, Baton Rouge, LA, February 2019. Oral and Panel discussion.

Seymour, M.A. 2018. Louisiana's Waterbird Nesting Colonies. Gulf Coast Joint Venture Bird Nesting Island Cooperative Forum Summit, Lafayette, LA, July 2018. Oral.

WDP SCIENTIFIC JOURNAL PUBLICATIONS

Remsen Jr., J.V., B.P. Wallace, M.A. Seymour, D.A. O'Malley, and E.I. Johnson. 2019. The Regional, National, and International Importance of Louisiana's Coastal Avifauna. Wilson Journal of Ornithology 131(2): 221-242.

FURBEARER MANAGEMENT

MONITORING FUR HARVEST

The 2018-2019 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 2,572 trapping licenses were sold during the 2018-2019 trapping season. Of these, 2,310 were adult residential licenses, 28 were adult non-residential trapping licenses, and 234 were youth residential licenses. These figures show an 8 percent increase in trapping licenses sold when compared to the previous season (2,374).

A total of 5,395 animals were harvested for fur (all species), which was a decrease of 147 from the previous season's total of 5,542. The total value of the 2018-2019 fur harvest to the state's trappers was estimated at $48,074.68. This total value was a decrease from the previous season's total of $50,394.16.

The nutria harvest (223,155) increased by 52,684 from the previous season's total of 170,471. The average nutria pelt price paid to trappers during this past season was $2. An additional $5 was paid for all nutria taken during the Coast-wide Nutria Control Program by registered participants. As a result of the previous seasons' below average harvest, the bounty has been increased to $6.00.

TABLE 5.

10-YEAR AVERAGE VALUE FOR EACH SPECIES				
Species	Total Harvest for the 2018-19 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 (2009-2019)
River Otter	1,091	1,657	$23.05	$56,423.80
Raccoon	2,119	6,348	$2.74	$25,139.66
Bobcat	164	473	$26.67	$17,133.48
Nutria	150	6,911	$2.00	$13,165.24
Beaver	1,268	1,790	$6.55	$12,052.07
Mink	272	662	$6.29	$5,220.53
Gray Fox	119	342	$8.19	$3,773.05
Muskrat	5	670	$1.78	$1,938.20
Red Fox	19	59	$7.32	$780.99
Coyote	68	84	$16.50	$652.87
Opossum	111	171	$0.92	$119.76
Total	5,395	19,166	$48,074.68	$136,399.66

COAST-WIDE NUTRIA CONTROL PROGRAM

The Coast-wide Nutria Control Program is funded by the CWPPRA. The objective is to decrease nutria-induced damage to coastal vegetation by increasing the incentive for harvest. During the 2018-2019 season, a total of 223,155 nutria tails, worth $1,115,775 in incentive payments, were collected from 241 participants. This showed a decrease in participation from the previous year's 263. Eighty-six participants (36 percent) turned in less than 200 tails, 49 participants (20 percent) turned in 200-499 tails, 28 participants (12 percent) turned in 500-799 tails, and 78 participants (32 percent) turned in 800 or more tails.

TOTAL NUMBER OF NUTRIA HARVESTED BY METHOD OF TAKE IN 2018-2019

Twenty parishes were represented in the 2018-2019 program season with harvests ranging from 163 to 51,960 nutria per parish. The greatest number of tails (51,960) were collected from Terrebonne Parish, followed by Plaquemines (39,657) and St. Mary parishes (31,257).

The predominant method of take was by rifle (55 percent), followed by trapping (27 percent) and by shotgun (18 percent).

February was the most active month for harvesting nutria (75,307 tails) while November was the least active month (7,508 tails). (See Coast-wide Nutria Control Program 2018-2019 Report, CWPPRA 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 April 2019 covering the coastal parishes of Louisiana. Twenty-five sites were visited in 2019, 21 of which were identified as having nutria damage in 2018 (four were identified as new damage). No sites that were revisited from the previous year were identified as recovered.

The 25 nutria-damaged sites observed along transects during the 2019 survey had a total of 3,907 acres impacted by nutria feeding activity (14,652 extrapolated). This is approximately a 11 percent decrease in acres impacted by nutria since the 2018 survey (4,380 acres, extrapolated to 16,424 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 this past season, 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 15 seasons of the program.

FUR ADVISORY COUNCIL

The Fur Advisory Council focused on two major goals during FY 2018-2019. 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*).

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. Eight trapping workshops were held in FY 2018-2019 around the state, and two three-day trapping schools were 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.

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 2018 we estimated that 53,733 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 million wild alligators have been harvested since 1972. The annual harvest takes

FIGURE 1. LOUISIANA COASTAL MARSH ALLIGATOR NEST PRODUCTION (1970-2018)

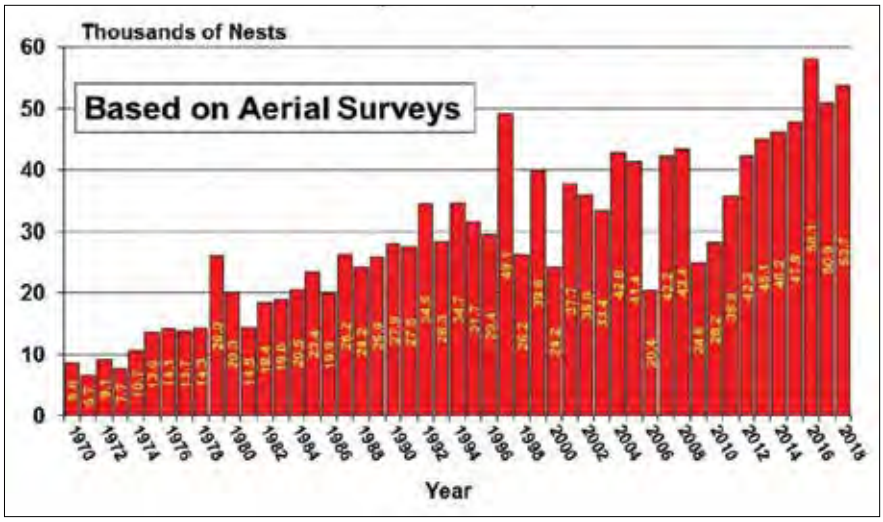


FIGURE 2. LOUISIANA WILD ALLIGATORS HARVESTED (2018 REGULAR HARVEST SKIN LENGTHS)

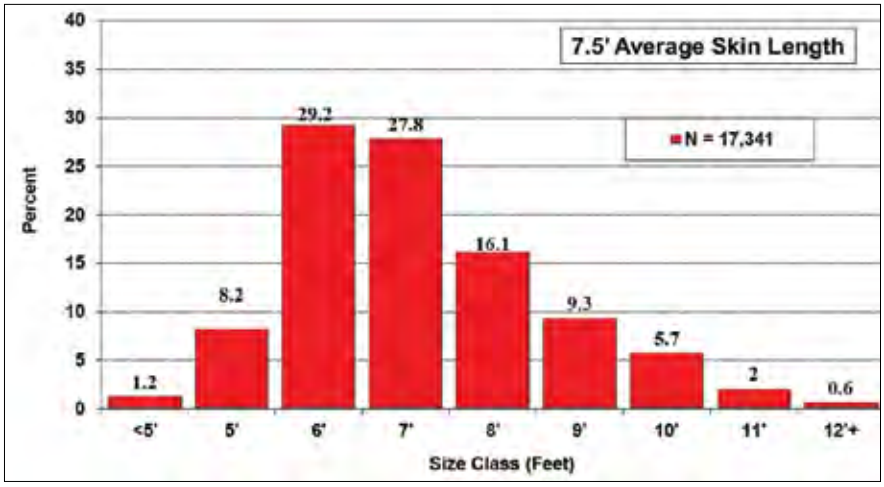


FIGURE 3. LOUISIANA FARM ALLIGATORS HARVESTED (2018 SKIN BELLY WIDTHS)

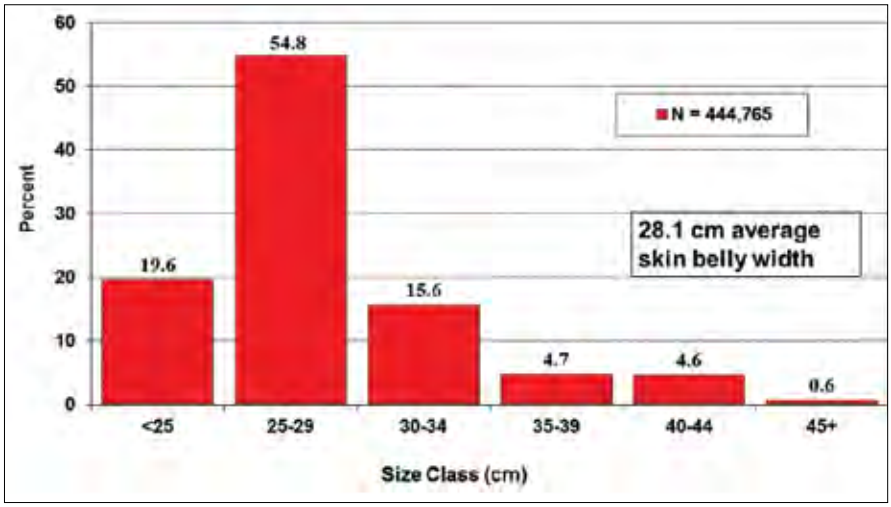



photo by Patrick Civello, Shutterstock.com

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 2018 wild season, a total of 20,165 alligators were harvested by 2,773 licensed alligator hunters. Alligators harvested averaged 7.57 feet in length, with an estimated value of $4.4 million. Adult-sized alligators (those 6 feet and larger) comprised the majority of the harvest. The continued reduction in harvest can be attributed to a global surplus of crocodilians skins.

LDWF provided additional alligator harvest opportunities for the general public by continuing its lottery alligator harvest program. In 2018 the lottery alligator harvest program provided opportunities for 381 alligator hunters to harvest 991 alligators. Lottery alligator harvests were conducted on 45 public areas (WMAs and public lakes) throughout the state.

FARM ALLIGATOR PROGRAM

The January 2019 statewide farm/ranch inventory totaled 900,999 alligators, up slightly from 857,728 alligators in January 2018, 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 2018 tag year (January through December 2018) an estimated 444,765 farm-raised alligators were harvested, averaging 28.1 cm belly width. The total estimated value of these alligators was $104 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 percent in early 2017, to start with the 2017 year egg permits. The remaining animals can be sold by the farmer. During 2018, a total of 52,850 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 2018, 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 visits 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

TABLE 6.

WILD ALLIGATOR EGG COLLECTIONS BY ALLIGATOR FARMERS (2011-2018)		
Year	Wild Alligator Eggs Collected	Hatchlings Yielded
2012	413,648	349,514
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

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.

During FY 2018-2019, 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 2018-2019.

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 percent return rate

started with the 2007 permits (releases "due" in 2009); and this was decreased to 10 percent 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. Although some growth information has been published we plan to evaluate growth rates in more detail; 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. Previously staff from the LSU Department of Experimental Statistics assisted with annual evaluation of survival and growth based on farm "re-traps" recovered in September harvests. We worked with contractors from LSU's School of Renewable Natural Resources providing input as to analyses on this project, which included a graduate student Master's degree project. We have initiated work to produce a manuscript with the graduate student and her major professor on the results.

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 for 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 2018 wild season staff collected sex ratio data on 8490 alligators (72.8 percent males, 27.2 percent females) which represented a significant percentage of the total alligators harvested. This project, coupled with 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 53,733 was the second highest on record, and egg collections were also 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 FY 2018-2019 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 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 faming 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.

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.

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 con-

tract was being drafted. We collected samples from imported hatchlings and additional wild alligators to survey for prevalence of these microorganisms, if present.

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.

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 Wildlife Refuge in 2018-2019 to collect additional samples for several studies, or we provided samples to them if travel costs were prohibitive. Several collaborators made presentations with LDWF staff as co-authors at meetings.

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 Southeast Association of Fish and Wildlife Agencies conference in Mobile, AL, in October 2018. Staff hosted the Alligator Working Group meeting held at Rockefeller Wildlife Refuge in the spring of 2019; focus items included finding solutions for low wild hide prices and concerns about disease transmission with alligators moved between states.

Our research efforts have been 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. This lab was a shared room in the maintenance workshop and is now not usable due to repairs to the shop. Construction of the new laboratory building and improved alligator holding facilities will aid our research progress in the future.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Research Manuscripts Published in 2018

Cooper, C., A. Alvo, J. Vasquez, S. Muthaseb, S. Rayman, T. Schmoyer, R. M. Elsey, and J. Eme. 2018. (Abstract). Allometric and biphasic allometric growth of major organs in hatchling alligators (*Alligator mississippiensis*). Presentation at the annual Experimental Biology meetings. The FASEB Journal April 2018 Supplement. 32: (1)602.9.

Elsey, R. M., D. LeJeune, M. Miller, M. Dupuis, and E. Ledet. 2018. *Alligator mississippiensis* (American alligator). Novel nesting site. Herpetological Review. 49(3):531-532. [alligator nest on terrace].

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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. The department and 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

1. ADVOCACY AND CONSULTING

LDWF contracted with Advocacy and Consulting upon recommendation of the Alligator Advisory Council to facilitate the successful passage of legislation that would eliminate the sunset clause to Penal Code 653o. The sale of alligator and crocodile products within the state of California is permitted as an exemption to the anti-wildlife trade laws under this bill until the sunset clause activates on Jan. 1, 2020. During this partnership, Advocacy and Consulting was able to provide valuable information about the lawmaking process in California, and identify the focal points of contact in the California Assembly. Advocacy and Consulting was also able to promote the various benefits of alligator products and garner support for Assembly Bill (AB 527) from Assembly Members and stakeholder groups. AB 527 would have eliminated the sunset clause within 653o and allowed the continued sale of non-endangered alligator or crocodile products in California. Although Advocacy and Consulting was able to facilitate getting AB 527 to a hearing in front of a key Assembly Committee, AB 527 was eventually unsuccessful and the contract was terminated. The council continues to discuss the importance of exempting alligators from the anti-wildlife trade laws.

2. MONARCH MARKETING

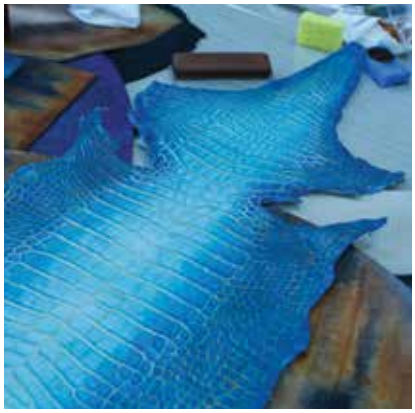
LDWF contracted with Monarch Marketing to assist with technical representation at national and international meetings involving wildlife trade issues. LDWF staff and Monarch Marketing helped establish alliances within CITES, Crocodile Specialist Group and International Union for Conservation of Nature. Monarch Marketing attended three CITES meetings: The Animal Committee meeting in Switzerland, the Standing Committee in Russia, and the Conference of the Parties in Switzerland. 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.

3. WORLD CONSERVATION AND MONITORING CENTER

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

4. 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.



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. In FY 2018-2019, 95 new volunteer instructors were trained through 12 instructor courses. A volunteer instructor workshop was held at Camp Grant Walker in Pollock, LA, with 120 instructors in attendance. Service and performance awards were presented to volunteer instructors. 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 2018-2019, volunteers contributed 35,215 hours of service time valued at approximately $1,127,000.

STUDENT CERTIFICATION

Total hunter education certifications remained stable from last fiscal year (11,288 versus 11,256 in FY 2017-2018). The online/field day course remains popular as the proportion of students choosing this option remains at 25 percent. Demand for bow-hunter education declined to an all-time low 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 2018-2019

Course Type	No. of Courses	No. of Students	Percentile
Classroom Course	312	8,414	75%
Home Study/ Field Day	127	2,868	25%
Total	*439*	*11,288*	

Tree stand safety PSA created by Tree Stand Safety Awareness Foundation and distributed in Louisiana by LDWF.

Bowhunter Education

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

HUNTING INCIDENTS

During FY 2018-2019, there were 10 reported hunting incidents involving injury or death. Two of the 10 resulted in fatalities. One incident involved falling from an elevated stand, one incident involved electrocution while crossing a fence, and the remainder involved firearms. Incidents were compiled and entered into the International Hunter Education Incident Database. Information on these incidents was presented to instructors at the Volunteer Instructor Workshop. 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 2018-2019)	
Type	**No. of Incidents**
Careless Handling of Firearm	1
Victim Out of Sight of Shooter	1
Failure to Check Beyond Target	1
Failure to Identify Target	1
Shooter Swinging on Game	1
Improper Crossing of an Obstacle	2
Fall While Climbing in/out of Position	1
Trigger Caught on Object	1
Other	1
Total Incidents	***10***

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 2018-2019, approximately 40,000 user visits occurred on LDWF shooting ranges.

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 6,700 user visits in FY 2018-2019.

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 four days a week, and recorded 7,933 user visits in FY 2018-2019. Renovation of facility staff quarters was completed, and installation of trellis baffling and renovation of static archery range began. Projected completion for these two projects in FY 2019-2020.

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 seven days per week and recorded 7,892 user visits in FY 2018-2019.

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

ABOVE: *Volunteer Range Safety Officers with novice shooting class participants at Bodcau Range.* ***BELOW:*** *Newly remodeled archery range at Woodworth Education Center.*

per day fee to use the range that is collected by SELFS to fund operation and maintenance of the range. This range recorded 14,434 user visits in FY 2018-2019, but was closed a total of 41 days due to high water events prohibiting access to the range.

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. One BOW workshop was conducted in FY 2018-2019 with 135 participants and a Beyond BOW deer hunt was conducted on Floy McElroy WMA.

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 two FUN Camps during FY 2018-2019. One camp was Mother/Child and the other was Father/Child with a total of 48 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 2018-2019, 207 active schools were participating in the program, impacting an estimated 21,500 students. Two regional and one state tournament (which included a 3-D component) were held last year Fifty-seven schools participated in the regionals and 50 of these participated in the state tournament. Total tournament participation was 2,450 archers in the elementary, middle, and high school divisions.

Teams and individuals from Louisiana schools participated in the National Archery in the Schools Program National and World Tournaments (14 and 6 schools respectively). Louisiana schools had a strong showing at both tournaments with several schools placing in the top three of their respective divisions in both bulls-eye and 3-D competition.

ABOVE: *2019 ALAS state tournament.*
BELOW: *Spring 2019 Fun Camp riflery.*

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 1,447 state and federal permit applications during FY 2018-2019. It was determined that compensatory mitigation was required on approximately 24 percent of the 1,447 projects reviewed. 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 40 such permits were issued during FY 2018-2019.

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 2018-2019, staff conducted several on-site field inspections and participated in 23 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 2018-2019, staff evaluated, inspected and provided technical comments and recommendations on dozens of wetlands mitigation banking proposals, mitigation banking instruments and mitigation banking monitoring plans. Six wetland mitigation banks were approved and authorized in Louisiana during FY 2018-2019. Staff attended all Interagency Review Team meetings and nearly all of the 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.

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 28 water bottom assessments reviewed and approved by agency staff during FY 2018-2019.

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 2018-2019 we replied to a total of 1,770 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 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 Scenic Rivers Act, and the rules and regulations promulgated under its authority, 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.

The Scenic Rivers Program's website continued to be updated throughout FY 2018-2019. Applications for proposed activities on Scenic Rivers were made available online for review and comment by all interested parties. The interactive map which allows users to see where activities have been permitted in the past along with information about the applicant and nature of the activity was regularly updated by staff.

Several enforcement actions were initiated in FY 2018-2019. These included issuance of several Compliance Orders and the forwarding of five 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 sediment control measures, 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 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 joint site inspections with Louisiana Department of Environmental Quality Water Quality staff, bringing their expertise to bear.

Staff made 119 site investigations and surveyed over 256 miles of streams. During surveys, Scenic River staff noted potential violations and continued efforts to document derelict vessels, attempted to locate responsible parties and have the vessels removed by whichever means prudent.

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. Staff coordinated with Louisiana Department of Transportation and Development to have Scenic River signage installed at numerous crossings along system streams.

A total of 37 Scenic River Permits were issued during FY 2018-2019. In addition to considering permits, Scenic Rivers staff made 40 determinations of "no permit required" for activities undertaken near scenic rivers but with

ABOVE: *Canoers on Cane Bayou.* ***BELOW:*** *Trout Creek at its mouth into Little River.*

no potential to significantly degrade the ecological integrity of a scenic river. Staff held 28 meetings and conference calls with applicants and agents, specific to scenic rivers issues.

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 department 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 2018-2019, the permits coordinator received, processed, tracked and disseminated 1,477 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 subsurface 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 energy sources. These projects can occur in sensitive wetlands, water bodies and other habitats.

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

Some of the Seismic Sections accomplishments for FY 2018-2019 are:

- Issued three seismic permits throughout the state.
- Four public meetings were conducted to inform landowners and user groups of seismic surveys beginning in their area.
- Three meetings with seismic survey companies were held to better minimize impacts to fish and wildlife resources.
- 54 days were expended on field monitoring.
- Closely interacted with seismic companies to ensure compliance with the rules and regulations of the Seismic Section.
- Ensured protection of threatened and endangered species and other areas of concern.

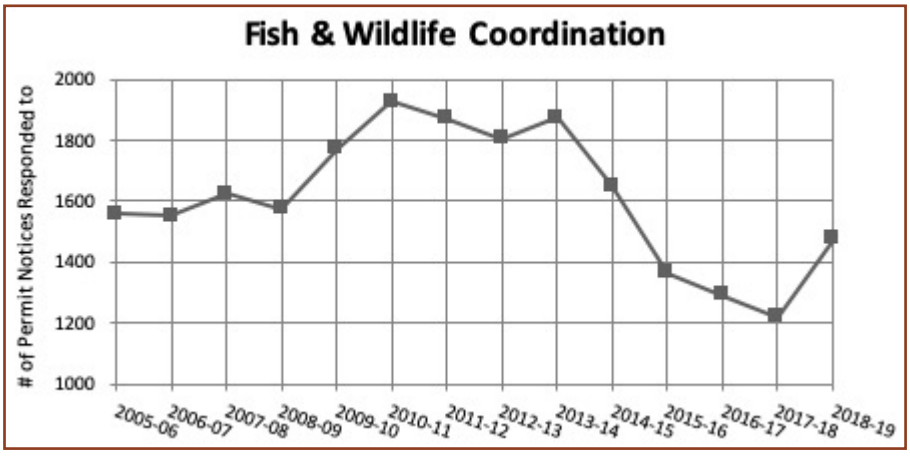


FIGURE 4. *Annual number of state and federal permit applications reviewed and responded to with the aim of avoiding, minimizing and/or mitigating adverse impacts to fish and wildlife resources.*

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 is 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 ecological services which our state's floodplains provide, we have ensured that conservation and restoration of our floodplains' natural functions 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 2018-2019, Habitat Section staff have worked as our agencies single point of contact and coordinator and have also taken on 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

Approximately 100 acres of restored brackish marsh that makes up a portion of the Rockefeller Wildlife Refuge wetlands mitigation bank.

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 2018-2019 Mineral Program staff reviewed, evaluated and authorized 90 well locations, pipeline projects and other mineral exploration related activities on LDWF properties. During FY 2018-2019, the program also issued 17 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 2018-2019 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.

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 2018-2019

Commercial dredge pit in St. Bernard Parish pumped full of water bottom sediment dredged from the Mississippi River

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 2018-19. 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 percent 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 30 USACE permits and 31 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 this initial plan was on ground water resources. The commission convened twice during FY 2018-2019 to receive reports on progress of implementing the recommendations of the initial plan. Furthermore, a working group of the Water Resources Commission, which included LDWF, produced a report on the out-of-sate sale of surface water to inform state leaders on the implications and mechanisms for out-of-state sale of publicly owned surface waters in Louisiana. 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.

ABOVE: *Well site on Sandy Hollow WMA.* ***BELOW:*** *Staff conducting field monitoring related to state and federal permit compliance.*

RESTORATION PROGRAM

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

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: Wildlife Response, Natural Resource Damage Assessment and Restoration. 2010 *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 2018-2019, our program worked on the following 2010 *Deepwater Horizon* oil spill restoration activities:

- 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.

WILDLIFE RESPONSE

LDWF's Restoration Program monitors and responds to reports of oil spills throughout Louisiana. During FY 2018-2019 our program received 10,048 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 2018-2019)

The spills listed in **Table 7** and other spills presented many unique challenges during FY 2018-2019. 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 (overview below). 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.

LOUISIANA OILED WILDLIFE RESPONSE PLAN AND FIELD GUIDE

The plan memorializes LDWF's wildlife response procedures in a stepwise progression to guide responders in the correct and safe means to implement these activities throughout the state. Significant time is dedicated to highlighting the importance of evaluating spill notifications utilizing established decision criteria. Information gained during this time-sensitive period can be critical in determining potential threat(s) to wildlife, fisheries and/or sensitive habitats. In addition, the plan identifies principal trustee agencies as well as their inherent resource responsibilities, should LDWF require additional information. Based on information received in the initial report and through follow up discussions with the Louisiana Oil Spill Coordinator's Office, LDWF may implement a site visit to further assess the potential injury extent and coordinate with responders on appropriate cleanup metrics and countermeasures, as needed. The plan identifies current means by which LDWF collects information and regularly stresses the need for responders to complete and submit all relevant paperwork under established Chain of Custody procedures. Coordination amongst the parties during an active response is accomplished through the Unified Command, an organizational structure built on the widely accepted incident Command System which can be scaled to the appropriate size and nature of each incident. The Unified Command represents the principal platform to inject and receive relevant information about or

TABLE 7. *Representative Spills (FY 2018-2019)*

NRC & LSP	LOCATION	PARISH	RESPONSIBLE PARTY	OVERVIEW
NRC#1217671	Deer Island	St. Mary	Castex	This Incident was reported (7/8/18) by Castex as the release of ~25-32 bar-rels of crude oil from a tank overfill.
NRC#1219943	Salvador WMA	St. Charles	American Natural Energy Corp	This Incident was reported (7/31/18) by American Natural Energy Corp. as the release of ~5 bbls of crude oil from a leaking wellhead casing.
NRC#1220212	New Orleans	Orleans	City of New Orleans	This Incident was reported (8/5/18) by the City of New Orleans as the re-lease of an unspecified amount of red-eye diesel from a storage tank located within a city-owned, abandoned building.
NRC#1220963 LSP#18-03766	Lake Fausse Point	Iberia St. Martin	BCF Resources	This Incident was reported (8/8/18) by BCF Resources as the release of ~4 bar-rels of crude oil.
NRC#1229729	Bayou St. Denis	Terrebonne	Orphan Well	This Incident was initially reported (11/7/18) by LDNR as a fine mist releasing from an orphan well.
NRC#1230472	Jug Lake	Terrebonne	TPIC	This incident was reported (11/15/18) by TPIC as the release of ~40 bbls of crude oil impacting adjacent Sagittaria flotant marsh (~ 0.28 acres).
NRC#1230552	Bay St. Elaine	Terrebonne	Hilcorp	This Incident was reported (11/16/18) by Hilcorp as the release of ~5 bbls of crude oil which impacted an adjacent Spartina sp. shoreline (~2,500').
NRC#1231906 LSP#18-06020	Lake Salvador	St. Charles	TPIC	This Incident was initially reported (12/3/18) by TPIC as the release of ~6.25 bbls of crude oil. NOTE: Release volume was later updated to ~8-10 bbls.
NRC#1232430 LSP#18-06108	Rattlesnake Bayou	Plaquemines	Hilcorp	This Incident was reported (12/9/18 @ ~3:00) by Hilcorp as a plug blow out on a wellhead casing which resulted in the discharge of an unknown volume of an oil/gas mixture into Barataria Bay.
NRC#1240077	Baton Rouge	East Baton Rouge	Gator Environmental	This Incident was reported (3/14/19) by Gator Environmental as the release of ~215 bbls of slop oil in which ~70 bbls had left their facility.
LSP#19-01339	Olla	LaSalle	CLEPCO	This Incident was reported (3/28/19) by CLEPCO as the release of ~50 barrels of crude oil.
NRC#1241638	Grand Bay	Plaquemines	LOBO Operating	This Incident was reported (04/01/2019) by LOBO Operating as the release of ~10 bbls of crude oil at their Grand Bay Facility.
LSP#19-01842	Colgrade	Winn	TPIC	This Incident was reported (4/28/19) by TPIC as the release of ~400 bbls of crude oil.
LSP#19-01773	Monterey	Concordia	Sanchez Oil and Gas	This Incident was reported (4/24/19) by Sanchez Oil and Gas as the release of ~140 barrels of crude oil/ salt water mixture which escaped a tank battery.
LSP#19-01855	Summerville	Claiborne	CLEPCO	This Incident was reported (4/29/19) by CLEPCO as the release of ~160 bbls of crude oil.
NRC#1246852	Pointe-Aux Chenes WMA	Lafourche	Badger Energy	This Incident was reported (5/26/19) by Badger Energy as the release of ~95 barrels of crude oil at their Bowley Cap facility.
NRC#1250257	Violet	St. Bernard	Southeast Louisiana Flood Protection Authority	This Incident was reported (6/27/2019) by SELFPA as the release of ~1,500 gal-lons of red dye diesel from a storage tank.
NRC#1250405	Black Lake	Cameron	TPIC	This Incident was reported (6/28/19) by TPIC as the release of ~5bbls of crude oil into open water.

TABLE 8. *Natural Resource Damage Assessment Case Summary*

CURRENT	LEGACY	SETTLED	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	Gulf Production Raphael Pass $395,890	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
	Shell Joseph's Bayou I & II, Taylor Energy MC20 & Status: Pending		Hilcorp Duck Lake & Unocal Lake Palourde Status: Project Completed

within each incident. Should injured wildlife be encountered in association with the incident, LDWF may request the Unified Command to establish a Wildlife Rehabilitation Unit to provide care for live, oiled wildlife, as well as provide an interim evidence freezer for carcasses. At the conclusion of the incident, the Wildlife Rehabilitation Unit lead turns over all original paperwork, carcasses, etc., and LDWF terminates response activities utilizing established criteria. To date, the plan has been submitted to LDWF administration for review/comment.

NATURAL RESOURCE DAMAGE ASSESSMENT ACTIVITIES

Within FY 2018-2019, 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 8*). 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.

2010 DEEPWATER HORIZON OIL SPILL

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 resources were significantly impacted. As such, Louisiana factors prominently ($5 billion) in its ability to restore for these injured resources. Within FY 2018-2019, our program's activities centered around coordinated engineering and design activities which supported restoration of historical colonial waterbird colonies, large-scale marsh creation projects and coast-wide 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 has 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).

LDWF actively participated in all engineering and design activities towards the eventual development/selection of the Preferred Design Alternative (Design Alternative 2B). The design will create 30 acres of brown pelican habitat and 7 acres of tern and skimmer habitat (*Figure 5*). This would be accomplished by filling the existing open water cell (Cell 3) and gradually sloping fill material through Cell 2 from west to east. Marsh nourishment would occur in Cell 1, which would leave this cell immediately available for colonial waterbird nesting and brood-rearing habitat following construction. In Cell 3, the elevated platform of crushed limestone (6 inches deep) would be created for nesting terns and skimmers. Limestone would be placed over geotextile fabric to reduce the potential for vegetation growth. In addition, herbicide application would be applied in the spring (prior to bird nesting season) and fall (after the conclusion of the bird nesting season) to maintain optimal tern and skimmer habitat.

The Preferred Design Alternative allows for a variety of vegetation growth and nesting substrate options for colonial waterbirds, including an upland, unvegetated tern/skimmer habitat platform in Cell 3, areas supporting marsh shrub growth in Cells 2 and 3, and black mangrove (*Avicennia germinans*) and marsh grasses in Cell 1. Plantings of appropriate native vegetation species would occur within all cells. Cell 1 would reach elevations

FIGURE 5. *Queen Bess Island Restoration Project*

within the higher intertidal range during approximately the first two years of the project lifespan. A tidal exchange point would be created in Cell 1 to promote or enhance fish access within this cell. Breakwaters would be installed on the island's northeast side to reduce potential scour associated with the tidal exchange point and the southwest side to dissipate wave energy, which would thereby provide young colonial waterbirds with a calm water environment. The project includes up to 21 bird ramps placed approximately every 250 feet at an approximate 3:1 slope to facilitate young birds' access to water around the island.

Proposed Timeline

Based on current (end of 2019) scheduling, the Queen Bess Island Restoration Project will initiate construction in August or September 2019.

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, American oystercatcher) 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 percent 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).

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 (*Figures 6 & 7*). The design would raise the island's elevation using dredged fill material (fill) from the Calcasieu Ship Channel. Fill would

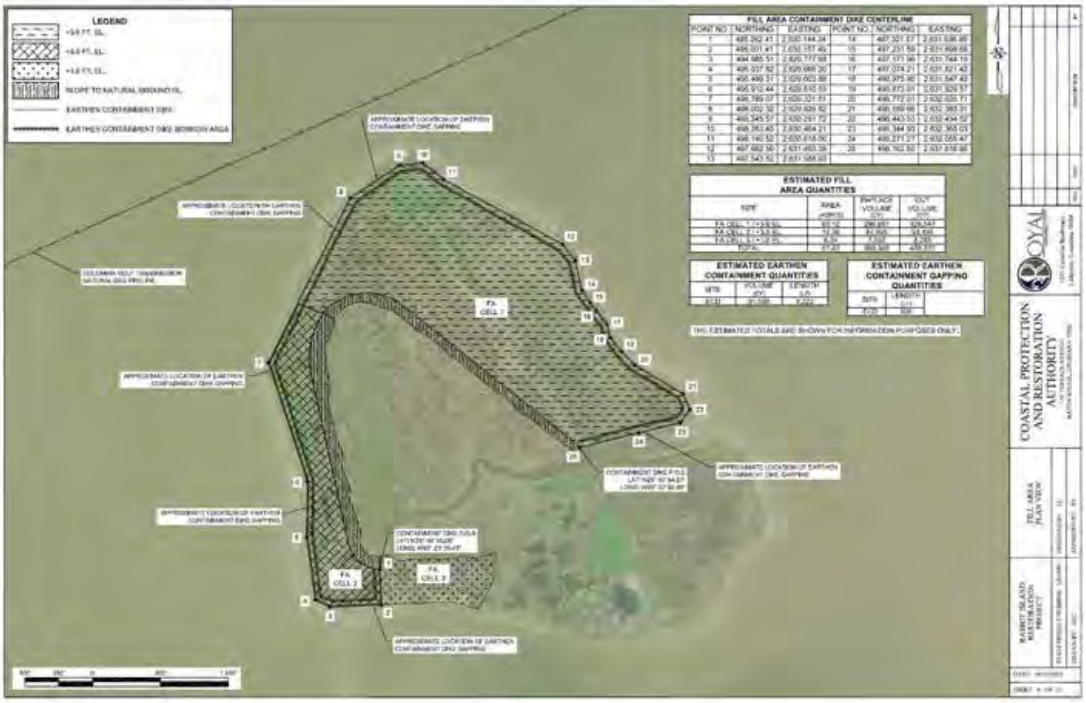


FIGURE 6. *Rabbit Island Restoration Project.*

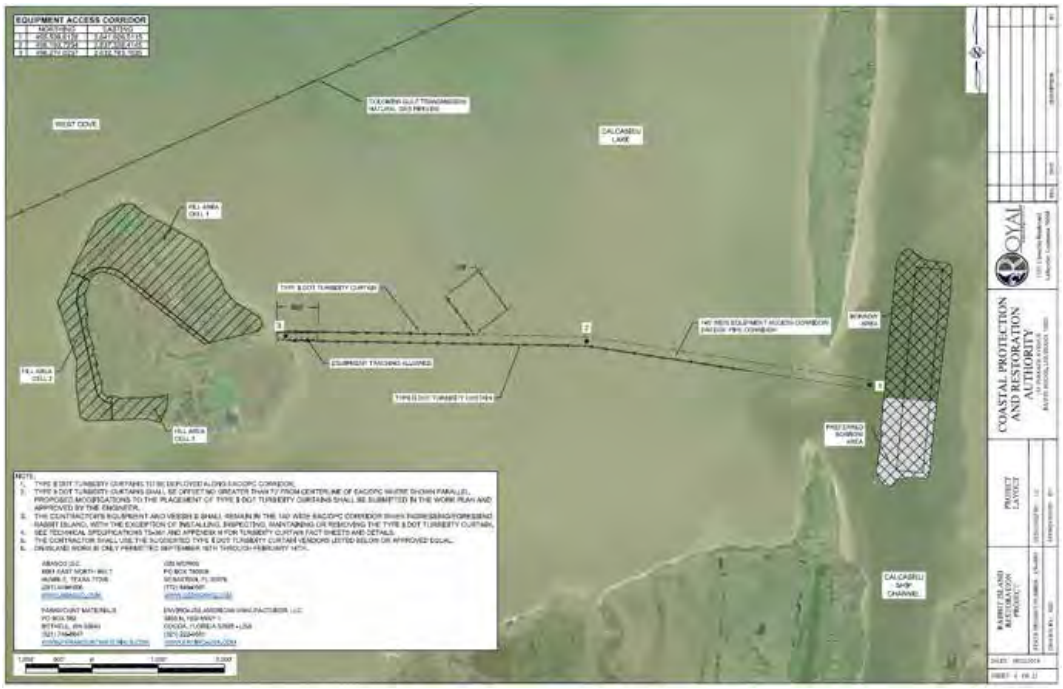


FIGURE 7. *Rabbit Island Restoration Project - access corridor.*

be placed in two completely contained and one uncontained 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:

1. Stringent island access guidelines for project contractors.
2. Installation and maintenance of Type II sediment curtains along the full extent of the project's access corridor.
3. 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 8*). This marsh creation project would utilize an estimated 13.0 million cubic yards (MCY) 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 (end of 2019) scheduling, the Lake Borgne Marsh Creation Project will initiate construction in later 2020.

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:

1. Creating new or improved access to natural resources for recreational purposes by enhancing existing or constructing new infrastructure.
2. Providing or improving water access in publicly owned areas through the construction and operation of boat ramps, piers or other infrastructure could also improve public access.
3. Larger-scale infrastructure improvements such as the construction or improvement of roads and bridges could also serve to improve access to natural resources.
4. Enhancing public access would also include targeted acquisition of land parcels to serve as public access points.

LDWF personnel, in tandem with Louisiana Trustee Implementation Group representatives, participated in engineering and design of the following LDWF projects:

- Atchafalaya Delta WMA campground improvements
- Middle Pearl boat launch
- Pointe-aux-Chenes WMA Island Road fishing piers
- Pointe-aux-Chenes WMA recreational use enhancements
- Pass-a-Loutre WMA campground improvements
- Pass-a-Loutre WMA crevasse access project
- Rockefeller Wildlife Refuge piers
- Rockefeller signage

UPCOMING PROJECTS

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 LATIG resolution in support of a multi-year collection of remotely sensed and local habitat data. These activities would 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.

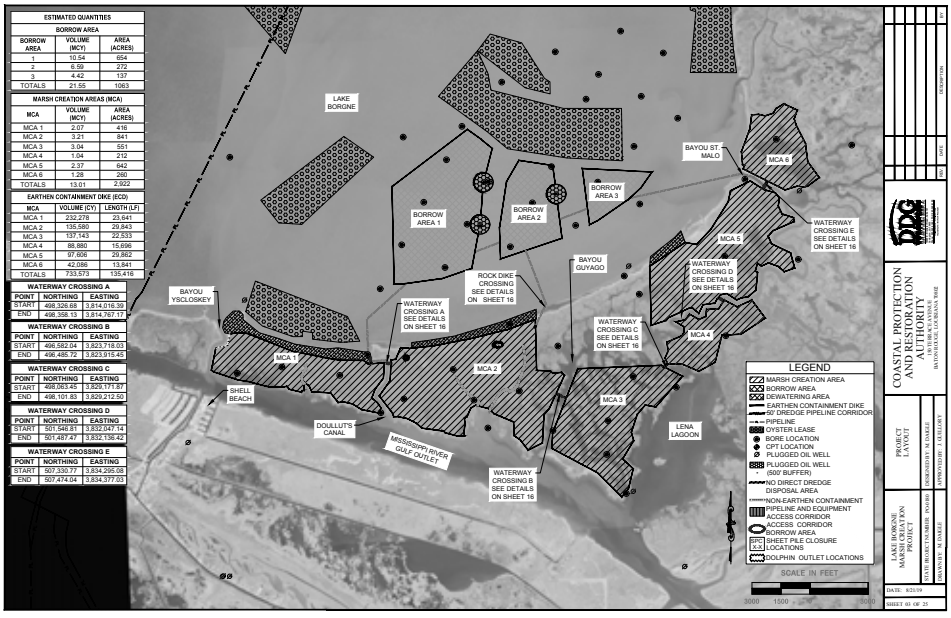
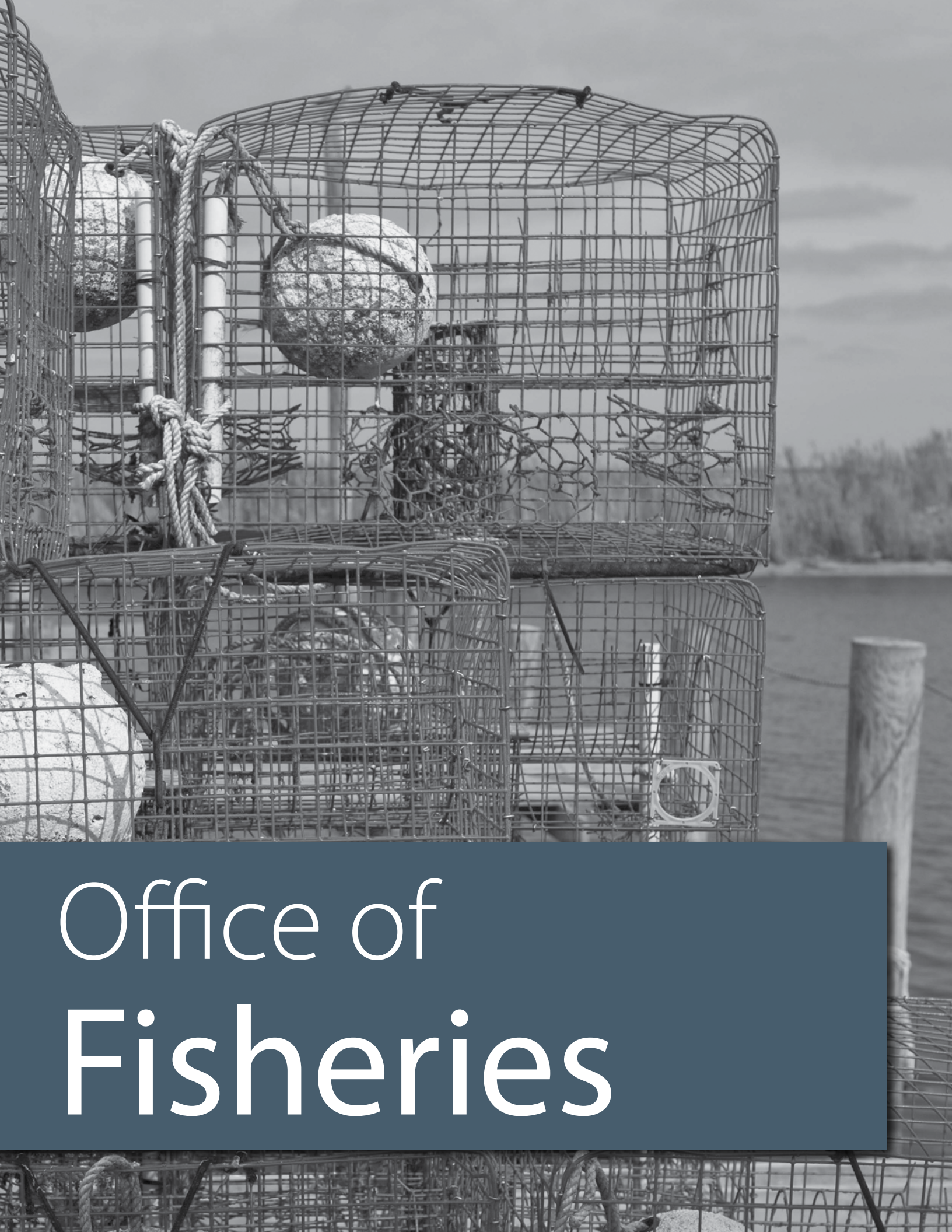


FIGURE 8. *Lake Borgne Marsh Creation Project.*



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.

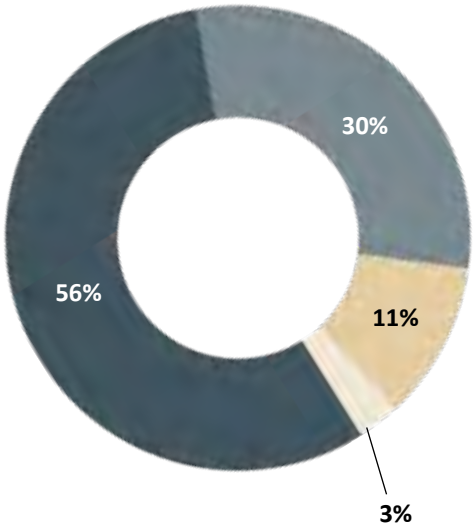
ORGANIZATION

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 - $30,543,610 (56%)

Federal Funds - $16,585,762 (30%)

Interagency Transfer - $6,225,781 (11%)

Self-Generated Funds - $1,508,674 (3%)

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 annual 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 2018-2019. In inshore waters, 254 6-foot and 1,698 16-foot trawl samples were collected. Due to the 2019 flood event, an additional 23 16-foot trawl samples were collected as part of the Bonnet Carrè Spillway special monitoring program. In state offshore territorial waters and the Exclusive Economic Zone, 272 20-foot trawl samples were collected. Information crucial to setting the opening dates of the 2019 spring inshore shrimp season, closure dates of the 2019 spring inshore shrimp season, opening and closing dates of the 2018 fall inshore shrimp season, and the closing and reopening of shrimping in portions of state territorial waters in 2018 and 2019 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. 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, and approximately 1,600 dredge samples are collected during each calendar year (including three sites sampled each event for the Coastal Protection And Restoration Authority System-Wide Assessment and Monitoring Program). In addition, 34 square-meter sites in Barataria Basin and 48 square-meter sites in Pontchartrain Basin are each sampled in April/May and again in September/October for the Coastal Protection And Restoration Authority System-Wide Assessment and Monitoring Program, for an overall total of over 1,000 square-meter samples collected between July 2018 and June 2019. 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 highest freshwater output was concentrated in Coastal Study Area 1 North. Coastal Study Area 1 North is the outfall area for the Bonnet Carré Spillway, as well as Pearl River. Following the opening of the Bonnet Carré Spillway in February 2019, four weekly dredge samples were collected in the Pontchartrain Basin beginning the first week of March and continuing into July to monitor for mortality events from freshwater influx, with a total of 147 extra dredge samples in the area. In addition, weekly dredge sampling in the Vermilion Basin (Coastal Study Area 6) and in Sabine Lake (Coastal Study Area 7) began the first week of June and continued through the flooding event, adding another 48 dredge samples among these basins. A grant total of over 1,800 dredge samples were collected during FY 2018-2019.

Square-meter data is used to measure the annual oyster stock size and for yearly oyster season recommendations by the Office of Fisheries. 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. In addition, Sustainable Oyster Shellstock models, also called Shell Budget models, are being improved and utilized to provide harvest thresholds that will maintain reef material.

Annual Oyster Stock Survey

The statewide oyster stock size in 2018 decreased from 2017 levels, where approximately 283,432 barrels of oysters decreased to 266,782 barrels available on the public oyster areas of Louisiana (not including Sabine Lake in the averages). Unfortunately, this stock size represents an approximate decrease of 6 percent from 2017 levels and 91 percent decrease from the long-term average of 3.26 million barrels.

Sustainable Oyster Shellstock Modeling

Under contract and through collaboration with LDWF, a research team led by Dr. Tom Soniat at UNO continued working with LDWF to test a sustainable oyster shellstock model for the public oyster areas of Louisiana. This computerized model provides guidance for fisheries management with the goal of conserving the oyster reef base. Oyster stock assessment sampling in 2018 provided model input data such as estimates of reef mass (grams per square-meter) 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 while preserving the reef mass simulated based on the different salinity patterns for each basin. The model was tested

***LEFT:** Spat-on-shell deployment in Lake Fortuna.* ***RIGHT:** Aerial view of the Michael C. Voisin Oyster Hatchery.*

statewide and showed promising results. It continues to be tested and strengthened utilizing updated data each year.

Cultch Planting

In September 2018, 6 acres within the 100-acre 2018 Lake Fortuna cultch plant were supplemented with spat-on-shell sourced from a private hatchery. This restoration strategy was chosen due to the lack of natural spat setting in the area over the last 10 years, even though suitable hydrology for oyster growth and reproduction were favorable. Early sampling showed promise; however, the freshwater input from the 2019 flood event, including the opening of the Bonnet Carré Spillway, caused 100 percent oyster mortality of the spat-on-shell.

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 percent 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. In the fall of 2018 LDWF focused on larval production for restoration purposes, primarily for setting diploid larvae onto whole oyster shell. In the spring of 2019 LDWF focused on the production of larvae for both triploid sales and diploid restoration projects.

The hatchery had additional help throughout the spring, summer and fall from Fisheries Research Lab staff, Nicholls State University graduate interns and volunteers. Helpers assisted with dropping larval hatching tanks, cleaning tanks, collecting daily water quality, cleaning algal glassware, spawning oysters, culling adult oysters, power-washing longline bags, and rinsing the up-welling nursery system.

Larval Production

<u>Fall 2018 Production</u>

Hatchery 2018 fall production was geared towards producing diploid pediveligers, to make spat-on-shell for LDWF restoration projects. Hatchery staff, LDWF staff and volunteers helped bag whole oyster shell in anticipation for setting diploid pediveligers throughout the fall. Approximately 40 cubic yards of shell were bagged in 3-foot long mesh sleeves, making approximately 2,000 shellbags. This number of bags will satisfy four setting rounds in four 2,000-liter tanks.

The fall production had low pediveliger larval production and only produced a small amount of diploid seed with approximately 35,637 seed (*Figure 1*). Diploid seed was provided to Louisiana Sea Grant for research and broodstock purposes. Large spawns occurred in the

hatchery during the fall; however, the larvae did not survive or grow well. Mass larval mortalities were observed when larvae were around 5 to 7 days old during September. During late September larval broods looked deformed, but as the fall season continued larvae began having normal shaped shells and velums. Although the late fall larvae appeared healthy, these larvae grew slowly and the majority did not grow and/or survive to pediveliger size or even past 150 microns in size. Pediveligers are around 320 microns in size. Some broods were terminated because the larvae were either deformed, did not grow or there were too few to even complete half a tank of setting on shell (approximately 1 million pediveligers is required for setting half a tank).

Figure 1 shows LDWF fall 2018 diploid larval brood production. It includes the number of animals and number of days each brood survived, beginning with the first fall brood spawned on Aug. 16, 2018 and the final brood spawned on Nov. 13, 2018. Broods displayed in *Figure 1* have fertilized eggs at Day 0. Broods 2n_08/29/18* and 2SL16_10/01/18* were the only fall broods that reached pediveliger stage. Brood 2n_10/22/18 has more larvae at Day 1 than eggs at Day 0 likely due to subsampling or counting inaccuracies. Broods 2n_10/22/18 and 2nT_11/09/18 were combined on Day 24 and counted again on Day 26 and 28 as the combined brood 2n_10/22/18 & 2nT_11/09/18. The majority of broods were terminated when they were less than 1 week old due to total larval mortality or a minimal number of larvae left that would not yield enough pediveligers for restoration projects. Broods terminated around Day 5 to 7 rarely made it past 100 microns in size or even develop into veligers. Broods that made it past Day 7 grew slowly, with only a few larvae within select broods making it to the pediveliger stage. Broods in the beginning of the fall were mainly fed live algae and broods in the late fall were mainly fed Shellfish Diet 1800 (Reed Mariculture). Hatchery seawater was tested for mosquito spray chemicals in the beginning of September, results were negative. Beginning in the middle of September and continuing throughout the fall, hatchery seawater was tested for presence of Vibrio bacteria using CHROMAgar™ plates, results confirming the presence of Vibrio alginolyticus are pending.

Fall 2018 larval broods were consistently dying between five and eight days old for unknown reasons. Mass larval mortalities made hatchery staff think that mosquito spray chemicals were the primary cause of mortalities. Mosquito Control Services, LLC, notified the hatchery biologist supervisor at the end of August that Grand Isle was being heavily sprayed with three different chemicals from trucks and with one or more aerial sprays. Water samples from larval hatching tanks were provided to the LSU AgCenter Department of Agricultural Chemistry for mosquito spray chemical testing. Water samples included hatching tank water from brood 2SL_09/18/18 from Day 1 through 7 and 2SL_09/24/18 Day 0 through 4. These broods were terminated on Day 8 (approximately only 80,000 live larvae left) and Day 6 (all dead) respectively. Both broods did not grow past 80 microns. Mosquito spray chemicals results came back negative and suggested that mosquito spray chemicals did not affect larval growth and survival.

With continual high larval mortality rates in the fall 2018 season and ruling out mosquito spray chemicals as a source of contamination, bacteria was suspected as the culprit. To test this theory, samples were plated on CHROMAgar™ Vibrio plates. These plates were designed to identify select vibrio species including *Vibrio alginolyticus*, *V. parahaemolyticus*, *V. vulnificus*, and *V. cholera*. Water samples were collected from larval tanks before and after feeding live algae; as well as, from algae bags prior to feeding. Only colorless colonies, which represents *V. alginolyticus*, were present in the algae sample. Additionally, larvae were performed slightly better when fed Shellfish Diet 1800, concentrated bottled algae, rather than live algae. This led to the conclusion that the bacteria could be coming from somewhere in the Algal Production Room process. Water samples were collected from each part of the APR seawater filtration system, from algal bags and from hatchery seawater lines and spread on CHROMAgar™ plates. There were a couple areas in the APR filtration process that showed bacteria colonies and new cleaning protocols were put in place to minimize/eradicate any future bacteria in those areas. Diatom algae bags also showed bacteria colonies; whereas, flagellate bags did not. Diatom bags were terminated and no longer fed to oyster larvae. Additionally, a pilot study was conducted to assess bacterial loads with different food sources and larval growth and survival. Results suggested that Shellfish Diet 1800 stored in the refrigerator and fed to oyster larvae had no bacteria in the feed and grew oyster larvae better than live algae, which had bacteria colonies.

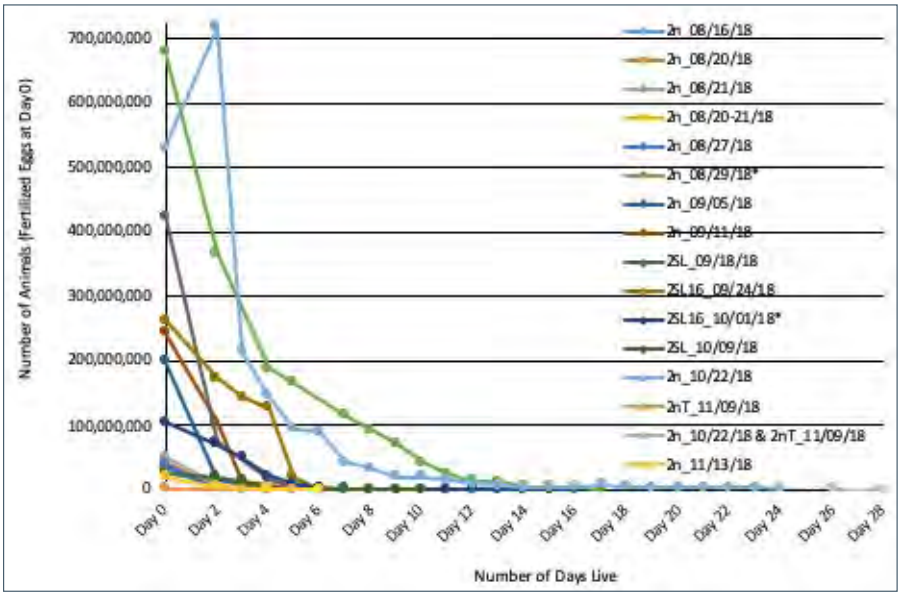


FIGURE 1. *LDWF fall 2018 diploid larval brood production.*

Despite all efforts mentioned above, there were no clear answer as to where the bacteria was entering and contaminating the water or if the bacteria observed growing on the agar plates was actually *Vibrio alginolyticus*. LDWF collaborated with Nicholls State University to identify possible bacteria species. Results of two samples showed that *Pseudomonas viridilivida* and *Pseudomonas mendocina* was present in the hatchery seawater samples.

Before the spring 2019 season began, hatchery staff made efforts to remove any potential source of bacteria through deep cleaning equipment and systems and following updated protocols. The tubing in the APR was replaced and deep cleaned where possible, to prevent any future contamination.

Spring 2019 Production

The first spawn attempts for the 2019 season were at the end of March; however, the first few broods did not survive to pediveliger stage or were terminated prior to pediveliger stage because there were not enough animals to continue raising for sales or restoration. LDWF focused on both triploid and diploid production in spring 2019. The first successful diploid and triploid spawns of spring 2019 were from broods spawned on March 27 (diploid) and May 22 (triploid). Diploid spawns and resulting larvae survived and grew better than triploid larvae produced in the spring. Louisiana Sea Grant and LDWF are currently investigating possible parameters that affected the triploid production in 2019 and are seeking solutions.

Spawning mid-March was made possible due to successful conditioning of broodstock oysters in a warm broodstock holding system for about three weeks. Conditioning oysters in the spring allows the hatchery to ripen broodstock oysters before wild oysters left in the bay ripen. In addition, conditioning broodstock is a hatchery technology that can expand larval production into cooler months. A boiler system also allows the hatchery to expand the larval season. The boiler heats filtered seawater to maintain an optimal temperature (around 28°C) for raising oyster larvae during cooler months. After the end of March, spawn attempts continued weekly throughout the rest of the season and stopped when broodstock were no longer in spawning condition (beginning of November 2019).

Sales

LDWF continued to manage larval and seed sales in 2019. Order forms can be found at *www.wlf.la.gov/fishing/oyster-larvae-order-form*. LDWF's Commercial Outreach Section manages the order form, contacting customers, and coordinating production needs with the hatchery biologist supervisor, Fisheries Research Lab director, and biologist manager. LDWF accepts both in-state and out-of-state orders. Customers have the option of purchasing diploid or triploid hatchery seed or pediveliger larvae. The majority of orders received were for triploid pediveligers. Fall 2018 and spring 2019 triploid production was minimal. Research is being conducted by Louisiana Sea Grant and LDWF to try and determine the cause of triploid larval failures.

2019 Total Spring Production

Spring production included pediveliger and seed produced for LDWF and Louisiana Sea Grant restoration, sales and research (*Table 1*). The majority of diploid pediveligers, approximately 69 million, were set onto whole oyster shell as part of LDWF's spring spat-on-shell setting rounds. About 18.4 million triploid pediveligers and 468 thousand triploid seed were sold via LDWF's sales program.

Comparison of Auburn University Shellfish Laboratory vs. Louisiana Sea Grant Tetraploid Males

In spring 2019, hatchery staff thought poor triploid production might be from a certain line of Louisiana Sea Grant tetraploids. To test if a line of Louisiana Sea Grant tetraploids was the cause of poor triploid production, staff compared the survival and growth of triploid larvae produced with Auburn tetraploids and

TABLE 1. *2019 Michael C. Voisin Oyster Hatchery spring production of diploid, triploid, and tetraploid pediveligers and seed used by Louisiana Sea Grant and LDWF for restoration, sales and research.*

	PURPOSE	DIPLOID	TRIPLOID	TETRAPLOID
Total PV	LDWF Sales	5,000,000	18,463,083	
Total PV Set on Microcultch	Produce Seed for LDWF Sales	3,337,333	3,904,499	
Total Seed	LDWF Sales	0	468,116	
Total PV	Louisiana Sea Grant Research	319,000	100,000	8,716
Total Seed	Louisiana Sea Grant Research	17,650	11,748	32
Total PV	LDWF Sales to LSU Research*	5,000,000	0	
Total PV Set on Shell	LDWF Restoration	69,297,997	0	
Total PV Set on Macrocultch	LDWF Restoration	17,241,332	0	
Total PV Deployed	LDWF Restoration	25,000	0	

**This was an LDWF PV sale, but it was for LSU Research so there was no charge (not commercial sale).*

LEFT: *LDWF biologist harvests oysters that are in their final larval stage, known as pediveligers.* ***RIGHT:*** *Oyster triploid seed for commercial sale.*

Louisiana Sea Grant diploids at the Michael C. Voisin Oyster Hatchery on Grand Isle, LA. Louisiana Sea Grant also sent Auburn Louisiana Sea Grant diploids to spawn with Auburn tetraploids at their hatchery on Dauphin Island, AL, and produce triploids. The Auburn tetraploids were used by other oystermen to produce triploids; therefore, the understanding was that the Auburn tetraploids would have viable sperm.

LDWF and Louisiana Sea Grant received 40 young animals (approximately 1-year-old) from Auburn. Louisiana Sea Grant diploid eggs from the same mothers were split into two buckets. Half were fertilized with Auburn tetraploid sperm and the other half with Louisiana Sea Grant tetraploid sperm. The Louisiana Sea Grant brood line used for this spawn was a 2016 brood line called 4DGNL16. Resulting brood names were 3n_4MC-19_05/22/19 (Auburn) and 3n_4DGNL16_05/22/19 (Louisiana Sea Grant) (*Table 2H*).

At the Michael C. Voisin Oyster Hatchery, staff observed that the Auburn larvae had a slightly higher hatching rate and harvest than the Louisiana Sea Grant triploid larvae (*Table 2*). However, Louisiana Sea Grant's technical director and LDWF's hatchery biologist supervisor do not think this difference is great enough to say that one brood outperformed the other. At the Auburn hatchery, they were successful with spawning and raising triploids produced with Louisiana Sea Grant diploid eggs and Auburn tetraploid sperm.

Based on this trial, we think that poor triploid production is not from a certain line of tetraploids, but rather from something environmental. Further research and water quality testing will continue in 2019 and 2020 to test this concept.

Spring 2019 Spat-on-Shell Production

The majority of diploid pediveligers produced in the spring were used for setting onto whole oyster shell in remote setting tanks, as part of a large-scale spat-on-shell LDWF deployment project (*Table 3*). Oyster shell and diploid pediveligers are the products of choice for setting larval oysters for restoration projects. Whole shell provides a 3D habit for spat to grow on and diploid spat can reproduce and enhance oyster reefs. Hatchery-produced products such as spat-on-shell is one adaptation strategy that the state can use to restore public oyster seed grounds. Supplementing reefs with hatchery-produced spat-on-shell can provide future spawning broodstock for those reefs, as well as support the Louisiana oyster industry through the production of seed and market sized oysters for commercial harvest. Additionally, oyster reef building is essential to maintain other popular recreational and commercial fisheries in Louisiana.

Setting tanks were set-up underneath the LDWF Fisheries Research Lab in Grand Isle, LA, in fall 2018. Oyster shellbags, constructed from fall 2018, were used for 2019 spring setting rounds. Shellbags were constructed using 40 cubic yards of recycled oyster shell that were delivered to the Fisheries Research Lab from Buras, LA. This created approximately 2,000 oyster shell bags. Approximately 400-440 shellbags were used per setting round and were placed in tanks set-up underneath the Fisheries Research Lab.

Many collaborations were made to construct, set, and deploy hatchery-produced spat-on-shell. LDWF collaborates with the Coalition to Restore Coastal Louisiana's oyster shell recycling program, which began in FY 2013-2014. The Coalition to Restore Coastal Louisiana collects and stockpiles oyster shell at a site in Buras, LA. This site is managed by LDWF and LDWF is able to receive 20 percent of the recycled shell. In addition, the Fisheries Research Lab director, lab staff, LDWF hatchery staff, and Marine Fisheries Section (including specifically Oyster Program and Oyster program manager, Marine Fisheries program

TABLE 2. *Comparison of triploid broods spawned using tetraploid males from Auburn University Shellfish Laboratory, Dauphin Island, AL and Louisiana Sea Grant Research and Demonstration Farm, Grand Isle, LA. Spawning was conducted May 22, 2019 at the Michael C. Voisin Oyster Hatchery on Grand Isle, LA.*

BROOD NAME	SPAWN DATE	MALES	FEMALES	# OF EGGS	# D-STAGE	% HATCHING RATE	# PEDIVELIGERS HARVESTED
3n_4MC-19_05/22/19 (Auburn)	5/22/2019	4 stripped	9 stripped, 1 natural (2nGen)	271,800,000	21,350,000	7.9%	2,427,000
3n_4DGNL16_05/22/19 (Louisiana Sea Grant)	5/22/2019	2 stripped	9 stripped, 1 natural (2nGen)	271,800,000	12,880,000	4.7%	1,700,000

TABLE 3. *Spring 2019 hatchery-produced spat-on-shell production, Setting Rounds 1 through 4. Setting Rounds 1, 3, and 4 were deployed at Breton Sound, Barataria Bay, and Hackberry Bay. Setting Round 2 was a 30-day grow out trial, to test the survival of spat in flow-through versus static tanks.*

SETTING ROUND	LOCATION	GPS COORDINATES	# SETTING TANKS	LARVAL BROOD NAME(S)	EST. TOTAL # OF PEDIVELIGERS SET ON SHELL	EST. # SPAT DEPLOYED	DEPLOYMENT DATE
1	Breton Sound	Experimental: 29°38'10.40"N, 89°28'12.10"W Control: 29°38'10.70"N, 89°28'8.90"W	4	2SL+VB_03/27/19	8,024,000	601,179	April 16, 2019
2	30 Day Grow Out Trial static tanks vs. flow-through tanks. Did not deploy		4	2SL_04/02/19 and 2SL+VB_03/27/19	8,250,000	At Day 17, there was ~39,127 spat total for all four tanks	
3	Barataria Bay		4	2n_05/23/19	9,066,666	1,489,215	June 10 and 11, 2019
4	Hackberry Bay-Green Ribbon	N 29 25'14.8" W 90 01'25.0"	4	2ACL19-01	39,189,665	6,494,721	June 20, 2019
4			3 raceway tanks				

manager, and biologists managers and staff from Coastal Study Areas 1 and 3) assisted with deployment locations and sampling. Louisiana Sea Grant offered support, both in the form of consultation from the technical director and Louisiana Sea Grant hatchery staff.

Deployment locations were designated by the LDWF Oyster program manager. Deployment locations included Breton Sound (Setting Round 1), Barataria Bay (Setting Round 3), and Hackberry Bay (Setting Round 4). A total of approximately 56,280,331 pediveligers were set on shell for these rounds and approximately 8,585,115 spat were deployed. Setting Round 2 was a 30-day grow-out trial, to test the survival of spat in either a flow-through or static tank system. Approximately 8,250,000 pediveligers were set on shell for this project. Spat performed better in the flow-through tanks than in the static tanks, but survival was still low after three weeks.

Research Projects

In spring 2019, LDWF, Louisiana Sea Grant and LSU teamed up and gathered wild diploid broodstock oysters from different sites across Louisiana to enhance and maintain local Louisiana breeding lines. Broodstock were collected from Sabine Lake, Pass a Loutre, Mississippi Sound, Point au Fer, and Calcasieu Lake. These animals were spawned by LDWF and Louisiana Sea Grant at the hatchery and set on microcultch to produce first generation single seed offspring for each of the respective sites. Hatchery staff were successful at producing first generation offsprings from all research broods except Mississippi Sound. Mississippi Sound broodstock will be spawned in spring 2020 to produce seed for this project. Offspring and broodstock will be kept in the Oyster Research and Demonstration Farm and managed by Louisiana Sea Grant.

In spring 2019, LDWF assisted Louisiana Sea Grant with production of triploid larvae for part of a project funded by NOAA National Sea Grant College Program 2018 Aquaculture Initiative. This project examines the problem of decreasing mortalities of triploid eastern oysters in commercial grow-out systems in Gulf of Mexico estuaries. Further information regarding these projects should be submitted to the Louisiana Sea Grant Hatchery technical director.

Algal Production

In addition to raising oyster larvae, the hatchery also produces live marine microalgae to feed oyster larvae and provide supplemental feed for broodstock held in conditioning/holding systems.

The 2019 algal season began in January to produce supplemental feed for conditioning broodstock and feeding larvae. The algae that is grown is maintained in the Stock Room and Algal Production Room. The Stock Room houses flasks ranging from 500 mL to 2,000 mL so that we can slowly increase the volume of algae cultures before moving them to the Algal Production Room and into an algal bag. The Algal Production Room has 144 hanging algal bags, that can produce approximately 2,000 L of algae feed per day. A new bag culture protocol was established in fall 2018 based on a feed trial and bacterial testing. Bags were taken down at three months, rather than letting the algae continue to grow. This led to less bag crashes and improved quality of harvested algae. This protocol was implemented in spring 2019. In addition, hatchery staff worked on maintaining optimal and consistent pH, salinity and temperature for the algal cultures.

Algal cultures are transferred into 13-gallon hanging bags for a rearing period. The algal bags system is continuous, with 144 hanging bags at any given point. Filtered seawater continuously flows into the bags.

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.

The Oyster Remote Setting Facility in Buras became operational in November 2017. A trial run proved successful and the spat-on-shell were transported to and deployed in Lake Fortuna (Lake Machias) in late 2017. However, the status of future operations has yet to be determined and no further runs in Buras have been conducted. LDWF is in the process of transporting shell from Buras 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 the fall of 2018, LDWF conducted a small transplant study in Barataria Public Oyster Seed Ground to see if oysters can survive and grow as part of a larger spat-on-shell project also planned for the area. This project was deemed unsuccessful and terminated due to continued loss of samples and replacement of containment devices (crab traps) which held samples.

In 2019, in collaboration with the Michael C. Voisin Oyster Hatchery, LDWF developed spat-on-shell protocol to investigate and monitor survival and growth with hatchery-raised animals by following protocols developed in a 2014 remote setting pilot project. Diploid oyster larvae were produced and set

on oyster shells recycled in a concerted effort to set on spat-on-shell and deploy to the public seed grounds across the state. To date (July 2019), there have been nine spat-on-shell deployments - one in Breton Sound, one in Barataria Bay and seven in Hackberry 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 the Coalition to Restore Coastal Louisiana began delivering shell to the Buras site for storage. As of June 2019, approximately 3,971 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.
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 2018-2019, the fishery-independent finfish sampling program collected 944 of 948 gill net samples (99 percent), 1,227 of 1,224 seine samples (100 percent) and 270 of 270 trammel net samples (100 percent), for a 100 percent overall completion rate statewide.

Marine fisheries biologists also collected 220 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.

***LEFT:** Marine finfish sampling using electrofishing.* ***RIGHT & ABOVE:** Freshwater finfish sampling using gill net on Spring Bayou.*

***LEFT:** Grubbing for mussels during river and stream sampling.* ***RIGHT:** Sorting mussels found during river and stream sampling.*

Freshwater fisheries resources are monitored and managed through various sampling methods. In FY 2018-2019, 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 89 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. Four river systems (Calcasieu River, Bayou Bartholomew, Amite River and Pearl River) were surveyed for mussel and/or fish populations during FY 2018-2019.

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 616 electrofishing samples were taken for 135 hours of timed electrofishing during FY 2018-2019.

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-three seine hauls were made during the FY 2018-2019.

Entanglement and trap net webbing are also used during standardized sampling throughout the year to collect crappie species, catfishes and sunfishes. A total of 80 gill net samples were taken on various lakes and rivers, while 205 lead net and hoop net samples were fished during FY 2018-2019.

With increased public demand for evaluation of freshwater fish harvest regulations, detailed largemouth bass age and growth assessment studies started or continued on 15 water bodies during FY 2018-2019, 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 2018-2019, approximately 545 water quality stations were sampled for physical and chemical criteria including temperature, dissolved oxygen, pH, salinity and conductivity. In addition, at least one waterbody in each of nine districts is sampled monthly for one year in order to develop stratification profiles to determine thermocline formation and vertical changes in water quality throughout the water column.

Stocking data for LDWF waterbodies can be found in the Freshwater Fish Hatchery Program section of this report.

Conducting river and stream sampling.

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. Inland Fisheries' Districts 2 (Monroe), 5 (Lake Charles), 7 (Baton Rouge) and 8 (Lacombe) analyze species composition of fish, crawfish and freshwater mussels, and conduct habitat assessments in multiple watersheds, as well as monitor sportfish parameters on the lower reaches of the watersheds. Areas sampled during FY 2018-2019 include the Calcasieu, Bayou Bartholomew, Amite and Pearl River basins.

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 nonindigenous 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 2018-2019:

- Answered over 1,000 calls and emails related to apple snail inquiries.
- Asian Carp - with the assistance of Inland Fisheries LWDF.
- 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 occurrences to the U.S. Geological Survey Nonindigenous Aquatic Species Program center database. Below is a list of aquatic invasive species monitored and logged occurrences for FY 2018-2019:

- Apple Snail - over 500 reports (most of which were from known locations)
- Tiger Prawn - 2 reports
- Asian Carp (bighead, black, grass, silver) - 3 reports (seems to be due to the public becoming accustomed to seeing the carp)
- Zebra Mussel - 1 report
- Asian Swamp Eels - have been reported for the first time In Louisiana

The Inland Fisheries Hatchery system also created a Hazard Analysis and Critical Control Point plan to mitigate the spread of aquatic nuisance species while conducting stocking operations. This plan includes aquatic nuisance species occurrence maps based on U.S. Geological Survey records and state level observations made by Inland Fisheries staff. More information on the Hazard Analysis and Critical Control Point effort can be found in the Hatchery section.

Larval fish tows looking for Asian carp.

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 2018-2019, LDWF Office of Fisheries investigated 22 fish kills throughout the state. Most causes were attributed to naturally occurring low oxygen conditions in the rivers, lakes and marshes. Eight fish kills were reported in the two weeks following Hurricane Barry's July 13 landfall.

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. At this time, there is a moratorium on the issuance of new leases. However, recent law changes have addressed lifting the moratorium which will require LDWF to redefine the rules and regulations relating to the leasing of water bottoms.

Currently, there are 8,032 leases covering 403,841 acres of water bottom which accounts for $1.2 million in annual revenue. This line of revenue is specifically deposited into the Public Oyster Seed Ground Development Account for the enhancement of the state's public oyster resource.

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.

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. Seventy-eight percent of the seafood production in the Gulf of Mexico 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 217,140 commercial fishing trips reported in FY 2018-2019 producing in excess of 162 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.

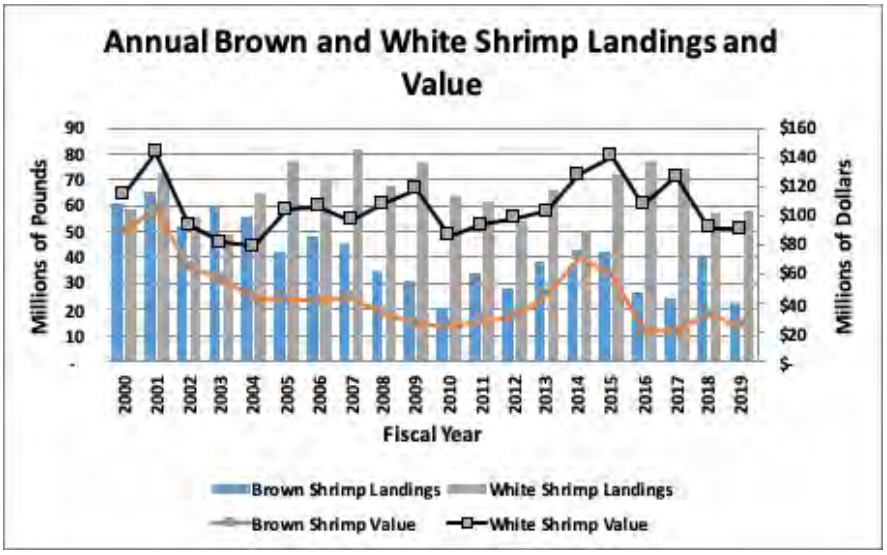


FIGURE 2. Annual white and brown shrimp landings and value (Source: LDWF trip ticket data).

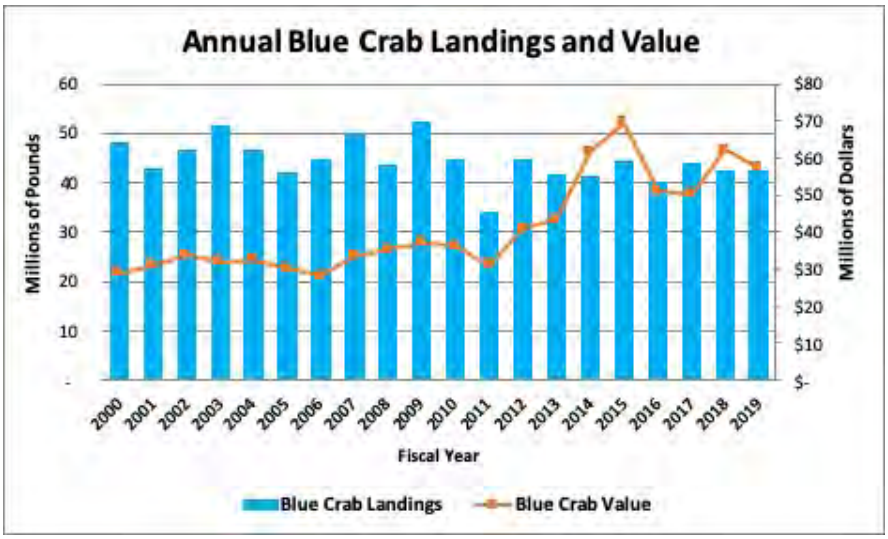


FIGURE 3. Annual blue crab dockside landings and values (source: LDWF trip ticket data).

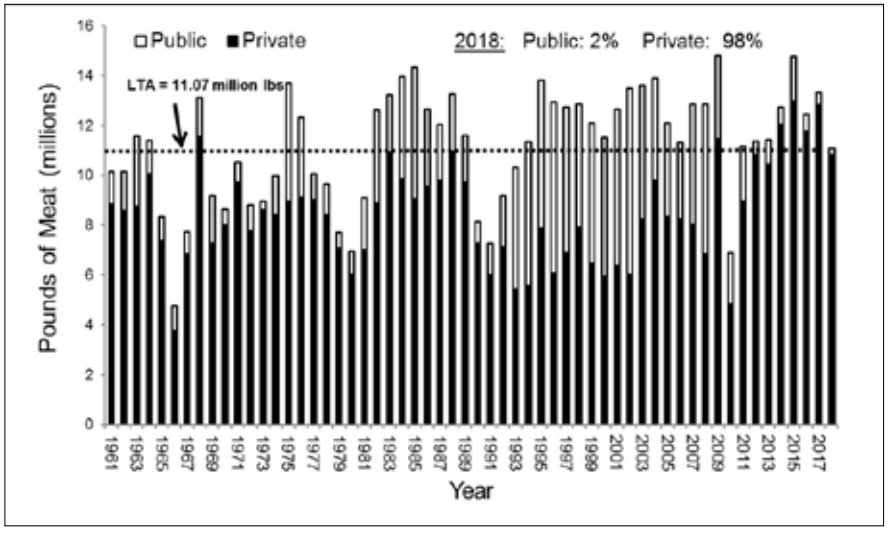


FIGURE 4. Historical Louisiana Oyster Landings from private oyster leases and public oyster areas.

Shrimp are the state's most valuable fishery. In FY 2018-2019, total shrimp landings measured over 81 million pounds (all species combined/heads on weight) and had a dockside value of $114.7 million. Brown shrimp landings in FY 2018-2019 measured over 22.9 million pounds (heads on weight) with a dockside value of $23.6 million, while white shrimp landings in FY 2018-2019 measured over 57 million pounds (heads-on weight) with a dockside value of $90.8 million (*Figure 2*).

Louisiana commercial blue crab landings for FY 2018-2019 totaled approximately 42.3 million pounds and had a dockside value of approximately $57.3 million (*Figure 3*).

Louisiana regularly leads the nation in the production of oysters and continues to account for 40 percent of the nation's oyster landings. Among Gulf of Mexico states, Louisiana consistently ranks first in landings, accounting for nearly 85 percent of all oysters landed (*Figure 4*). Public oyster reef landings totaled approximately 167 thousand pounds and had a dockside value of approximately $1.4 million. Private oyster reef landings totaled approximately 9.7 million pounds and had a dockside value of approximately $69 million.

Louisiana commercial freshwater finfish landings for FY 2018-2019 totaled approximately 11 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 $4.6 million. Wild caught crawfish landings in Louisiana for FY 2018-2019 was approximately 9.3 million pounds with a dockside value of $13.1 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 2018-2019, fisheries biologists worked a total of 1,599 LA Creel assignments and conducted approximately 11,595 interviews of recreational fishing trips along Louisiana's coast through the LA Creel Program. This resulted in a total of 31,876 anglers being surveyed and 88,130 fish being counted. During FY 2018-2019, 148,434 private angler effort phone call or email attempts were conducted to estimate effort. Of those attempts, 44,428 resulted in completed surveys. Approximately 860 charter captains were monitored with an estimated 171,842 charter angler trips taken during FY 2018-2019. During FY 2018-2019 using LA Creel data, it was estimated that a total of 1,996,792 recreational angler trips were taken.

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.

Creel surveys put the fisheries biologist in direct contact with the fishermen. 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 FY 2018-2019. These lakes and rivers include Caney Creek Reservoir, Cross Lake, Henderson Lake, Lacassine National Wildlife Refuge, Lower Atchafalaya Basin and Toledo Bend Reservoir. Calendar year 2018 and FY 2018-2019 statistics are reported in *Table 4*.

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

An updated stock assessment of striped mullet was completed and presented to the Louisiana Wildlife and Fisheries Commission for transmittal to the Louisiana Legislature in February 2019. This stock assessment used a statistical catch at age model to estimate annual time-series of spawning stock biomass and fishing mortality rates. Current status of the stock was determined with estimates of reproductive potential. Based on results of this assessment, no overfishing is currently occurring and the stock is not considered overfished.

An updated stock assessment of blue crab was completed and presented to the Louisiana Wildlife and Fisheries Commission in June 2019. This stock assessment used a catch-survey model to estimate annual time-series of spawning stock biomass and fishing mortality rates. Based on results of this assessment, no overfishing is currently occurring and the stock is not considered overfished.

A benchmark stock assessment of spotted seatrout was completed in June 2019. This stock assessment used a statistical catch at age model to estimate annual time-series of spawning stock biomass and fishing mortality rates. Current status of the stock was determined from the history of the fishery/stock. Based on results of this assessment, the stock is currently considered overfished and overfishing has occurred frequently in the most recent decade.

LA Creel

The Stock Assessment Section continues to provide weekly marine recreational landings estimates from the LA Creel Survey to marine fishery managers. Stock Assessment Section personnel also finalized a calibration procedure in October 2018 to allow hind-casting of the LA Creel Survey estimates to the historic recreational landings estimate time-series for use in stock assessments.

Inland

Fishery-independent and fishery-dependent surveys are being conducted on Louisiana waterbodies with important largemouth bass

TABLE 4. *Louisiana Freshwater Creel Surveys for calendar year 2018 and fiscal year 2018-2019*

	2018 CALENDAR YEAR				2018-2019 FISCAL YEAR			
	Interviews	Anglers	Trip Length	Catch Per Trip	Interviews	Anglers	Trip Length	Catch Per Trip
Largemouth Bass	680	1,188	4.06	3.09	816	1,380	4.83	2.64
Crappie	109	109	4.82	1.88	174	308	3.77	2.61
Total	**789**	**1,297**	**4.17**	**2.92**	**990**	**1,688**	**4.63**	**2.63**

LDWF Biologist conducting LA Creel survey.

***TABLE 5.** 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	2010 - 2012	Completed	Completed
Fausse Point	2013 - 2015	Completed	Completed
Grand Bayou Reservoir	2015 - 2017	Completed	Completed
Larto-Saline Complex	2009 - 2012	Completed	Completed
Lake Louis	2013 - 2015	Completed	Completed
Poverty Point Reservoir	2010 - 2012	Completed	Completed
Old River - 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
	2018-2020	Ongoing	Ongoing
Turkey Creek Lake	2016 - 2018	Completed	Ongoing
Vernon Lake	2009 - 2011	Completed	Completed

***TABLE 6.** Schedules of Louisiana Largemouth Bass Stock Assessments - 30 waterbodies*

WATERBODY	YEARS CONDUCTED	SAMPLING STATUS	ASSESSMENT STATUS
Atchafalaya Basin	2009 - 2011	Completed	Completed
Atchafalaya Basin Follow-up Assessment	2017 - 2019	Completed	Ongoing
Lake Bistineau	2016 - 2018	Completed	Ongoing
Black-Clear Lake	2010 - 2012	Completed	Completed
Blind River Complex	2018 - 2020	Ongoing	Ongoing
Lake Bruin	2013 - 2015	Completed	Completed
Bundick Lake	2015 - 2017	Completed	Ongoing
Caddo Lake	2011 - 2013	Completed	Completed
Calcasieu River	2012 - 2014	Completed	Completed
Cane River Lake	2015 - 2017	Completed	Ongoing
Caney Creek Reservoir	2014 - 2016	Completed	Completed
Lake Cataouatche	2010 - 2012	Completed	Completed
Chicot Lake	2010 - 2012	Completed	Completed
Lake Concordia	2010 - 2012	Completed	Completed
Cross Lake	2010 - 2012	Completed	Completed
Cross Lake Follow-up Assessment	2019-2021	Ongoing	Ongoing
Lake 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	Ongoing	Ongoing
Iatt Lake	2013 - 2015	Completed	Completed
Lacassine Pool NWR	2017 - 2019	Completed	Ongoing
Larto-Saline Complex	2015 - 2017	Completed	Ongoing
Poverty Point Reservoir	2010 - 2012	Completed	Completed
Old River - Raccourci	2015 - 2017	Completed	Ongoing
Red River (Pools 1-5)	2013 - 2015	Completed	Completed
Lake St. John	2018 - 2020	Ongoing	Ongoing
Spring Bayou Complex	2017 - 2019	Ongoing	Ongoing
Toledo Bend Reservoir	2010 - 2012	Completed	Completed
	2018 - 2020	Ongoing	Ongoing
Turkey Creek Lake	2016 - 2018	Completed	Ongoing
Vernon Lake	2010 - 2012	Completed	Completed

and crappie fisheries to provide information to inland fishery managers to make science-based management decisions (*Tables 5 & 6*). 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.

Publications

West, J., and X. Zhang. 2018. LA Creel/MRIP Calibration Procedure. Louisiana Department of Wildlife and Fisheries.

West, J., and J. Adriance. 2019. Update Assessment of Striped Mullet *Mugil cephalus* in Louisiana Waters - 2019 Report. Report to the Louisiana Legislature by the Wildlife and Fisheries Commission.

West, J., H. Blanchet, and P. Cagle. 2019. Update Assessment of Blue Crab *Callinectes sapidus* in Louisiana Waters - 2019 Report. Louisiana Department of Wildlife and Fisheries.

West, J., X. Zhang, and J. Adriance. 2019. Assessment of Spotted Seatrout *Cynoscion nebulosus* in Louisiana Waters - 2019 Report. Louisiana Department of Wildlife and Fisheries.

Presentations

Daniel, R. Update on Restoration Efforts at Bussey Brake WMA. March 26, 2019 Bastrop, Louisiana

David, J. Spring Bayou Update for Spring Bayou Lake Commission. March 18, 2019. Avoyelles Parish Courthouse, Marksville, LA

Heimann, B. False River Fisheries Update. False River Watershed Council. April 25, 2019. New Roads, LA.

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 2018-2019, the 20 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 2018-2019 and available to the public on the LDWF website:

- Atchafalaya Basin
- Black Bayou Lake
- Blind River
- Bundick Lake
- Calcasieu River
- Caney Creek Reservoir
- Chatham Lake
- False River
- Henderson Lake
- Kepler Lake
- Lacassine Refuge Pool
- Lake Bistineau
- Lake Claiborne
- Lake Fields-Lake Long Complex
- Lake Louis
- Lower Pontchartrain Sub-Basin
- New Orleans City Park
- Spanish Lake
- Tchefuncte River
- Vernon 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 2018-2019, 72 vegetation management plans were completed and/or updated and approved. A total of 80 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 reviews new research and monitoring information for these species every year, documents 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 is being updated and the blue crab fisheries management plan is scheduled to be updated in 2020. 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 op-

posed 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 2018-2019.

Lake Pontchartrain Basin and Portions of Mississippi River Basins

2018 - Spring Inshore Shrimp Season

Opened at 6:00 a.m. May 9, 2018, from the southern shore of the Mississippi River Gulf Outlet to the eastern shore of South Pass of the Mississippi River.
Opened at 6:00 a.m. May 28, 2018, from the MS/LA state line to the southern shore of the Mississippi River Gulf Outlet.
Closed at 6:00 p.m. June 27, 2018, from the MS/LA state line westward to the eastern shore of South Pass of the Mississippi River except in the following areas:

- Lake Pontchartrain, Chef Menteur and Rigolets passes, Lake Borgne, the Louisiana portion of Mississippi Sound, and the open waters of Breton and Chandeleur sounds.

Closed at 6:00 p.m. July 3, 2018, in Lake Pontchartrain, Chef Menteur and Rigolets passes, Lake Borgne, and the Louisiana portion of Mississippi Sound except in the following areas:

- Breton and Chandeleur sounds.

2018 - Fall Inshore Shrimp Season

Opened at 6:00 p.m. Aug. 13, 2018, from the MS/LA state line westward to the eastern shore of South Pass of the Mississippi River.
Closed at official sunset Dec. 17, 2018, from the MS/LA state line westward to South Pass of the Mississippi River except for the following waters:

- 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. 21, 2019, in Chef Menteur and Rigolets passes, Lake Borgne, the Louisiana portion of Mississippi Sound , the Mississippi River

FIGURE 5. 2018 Spring Shrimp Season Closure Map.

FIGURE 6. 2018 Fall Shrimp Season Opening Map.

FIGURE 7. 2019 Spring Inshore Shrimp Season Opening Map.

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.

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 for the following waters:

- The open waters of the Louisiana portion of Mississippi Sound and the open waters of Breton and Chandeleur sounds.

Western Mississippi River, Barataria, Terrebonne, Atchafalaya River and Vermilion-Teche River Basins

2018 - Spring Inshore Shrimp Season

Opened at 6:00 a.m. April 30, 2018, from the eastern shore of South Pass of the Mississippi River to the western shore of Freshwater Bayou Canal.

Closed at 6:00 p.m. June 27, 2018, from the eastern shore of South Pass of the Mississippi River westward to the western shore of Freshwater Bayou Canal.

2018 - Fall Inshore Shrimp Season

Opened at 6:00 p.m. Aug. 13, 2018, 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. 13, 2018, from the Atchafalaya River Ship Channel Buoy Line westward to the western shore of Freshwater Bayou Canal.

Closed at official sunset Dec. 17, 2018, from the eastern shore of South Pass of the Mississippi River westward to the western shore of Freshwater Bayou Canal.

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 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 to the western shore of Freshwater Bayou Canal.

Mermentau, Calcasieu and Sabine River Basins

2018 - Spring Inshore Shrimp Season

Opened at 6:00 a.m. May 21, 2018, from the western shore of Freshwater Bayou Canal westward to the LA/TX state line.

Closed at 6:00 p.m. July 3, 2018, from the western shore of Freshwater Bayou Canal to the LA/TX state line.

2018 - Fall Inshore Shrimp Season

Opened at 6:00 a.m. Aug. 27, 2018, from the western shore of Freshwater Bayou Canal westward to the LA/TX state line.

Closed at official sunset Dec. 17, 2018, from the western shore of Freshwater Bayou Canal westward to the LA/TX state line.

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 westward to the LA/TX state line.

Offshore Shrimp Seasons

Closed at official sunset Dec. 24, 2018, in the following waters:

- The portions of state outside waters between Calliou 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 degrees 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 seconds north latitude, -92 degrees 19 minutes 34 seconds west longitude.

Opened at 12:00 p.m. April 25, 2019, in the following waters:

- The portion of state outside waters between Calliou 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 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 14.933 seconds north latitude, -91 degrees 22 minutes 58.916 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 33.889 seconds north latitude, -91 degrees 26 minutes 16.049 seconds west longitude.

Opened at 6:00 a.m. May 20, 2019, 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 14.933 seconds north latitude, -91 degrees 22 minutes 58.916 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 33.889 seconds north latitude, -91 degrees 26 minutes 16.049 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 seconds north latitude, -92 degrees 19 minutes 34 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 $41.3 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 stock assessment for blue crab was updated in early 2019. The assessment indicated that the Louisiana blue crab stock is currently not overfished or experiencing overfishing, but crossed the overfished benchmark in 2015. The assessment also indicated that the fishing mortality rates during the 2012 and 2014 seasons had exceeded their targets and were very close to their overfishing benchmarks.

Management Options

Due to the fact that the overfished benchmark was crossed in 2015, LDWF and the Crab Task Force entered into discussions on potential changes to the fishery to allow the stock to recover. Options that were discussed included a seasonal closure of the commercial blue crab fishery, raising the size limits of blue crab, restricting the harvest of immature female blue crab, increasing license fees, and implementing trap limits. 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 affect during the three-year period.

All three promulgated rules were projected to have the same impact in reducing the harvest on commercially landed blue crab. The 2017 30-day full closure reduced the commercial harvest on blue crab by approximately 1,381,609 pounds, while the 2018 60-day mature female restriction reduced landings by 1,927,778 pounds. Results from the 2019 closure have not been analyzed at this time, but will be once Trip Ticket landings data has been confirmed and finalized.

Blue Crab Stock Legislation

Two bills were introduced during the 2019 Legislative Session: HB 355 and SB 65. In HB 355, the commercial harvest of immature female blue crab was permanently prohibited, and penalties on two violations were increased. The penalty for the commercial harvest of berry or immature female blue crabs was altered to allow a tiered approach that included citations, loss of license for a period of one, three and 10 years, and vessel monitoring system requirements. The penalty for crab or crab trap theft was increased in a similar manner.

SB 65 was developed to clarify the escape ring requirements. Standard commercial fishing practices included placing the bottom escape ring one mesh off the floor of the trap, but the prior legislation on this stated that the escape ring must be flush with the floor of the trap. This alteration, allowing the escape ring to be no more than one mesh off of the trap floor, was agreed upon by LDWF because many commercial traps actively fishing have rebar lining the inner edges of the bottom of the trap; this rebar would, by law, partially block the escape ring and be deemed illegal. Within this bill, a further description of escape ring requirements in the upper chamber was established, requiring two escape rings to be located in the upper chamber and flush with the baffle, while these 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 2018, the Louisiana Wildlife and Fisheries Commission promulgated a rule defining five distinct derelict crab trap closure areas for 2019. The closure areas and dates were the following:

1. The first closure was in the Upper Barataria Basin and adjacent marshes, west of Port Sulphur, and began at 12 a.m. Friday, Feb. 1, 2019, through 11:59 p.m. Thursday, Feb. 14, 2019.
2. The second closure was in Lake Pontchartrain, west of the Lake Pontchartrain Causeway, and began at 12 a.m. Friday, Feb. 1, 2019, through 11:59 p.m. Sunday, Feb. 10, 2019.
3. The third closure was in the Terrebonne Basin, in an area east of Four League Bay to Bayou Grand Caillou, and began at 12 a.m. Friday, Feb. 15, 2018, through 11:59 p.m. Thursday, Feb. 28, 2019.
4. The fourth closure was in the Pontchartrain Basin, in an area east of the Mississippi River to Bayou Terre Aux Boeufs, and began at 12 a.m. Friday, Feb. 15, 2019, through 11:59 p.m. Thursday, Feb. 28, 2019.
5. The fifth closure area was located in the Sabine Basin, within the area from the LA/TX state line easterly to a point east of Vinton, and began at 12 a.m. Wednesday, March 12, 2019, through 11:59 p.m. Friday, March 22, 2019.

TABLE 7. *Number of crab trap closures and numbers of trap removed annually.*

YEAR	AREA(S)	TRAPS	BOAT DAYS
2004	2	6,894	90+
2005	4	4,623	50+
2006	1	2,935	31+
2007	2	1,495	15
2008	1	1,234	3
2009	1	788	n/a
2010	1	477	n/a
2011	1	1,100	n/a
2012	2	2,798	66
2013	2	969	32
2014	1	1,051	24
2015	1	422	9
2016	3	2,580	50+
2017	6	5,674	68
2018	5	4,061	68
2019	5	4,041	73
Total	***38***	***41,142***	***579+***

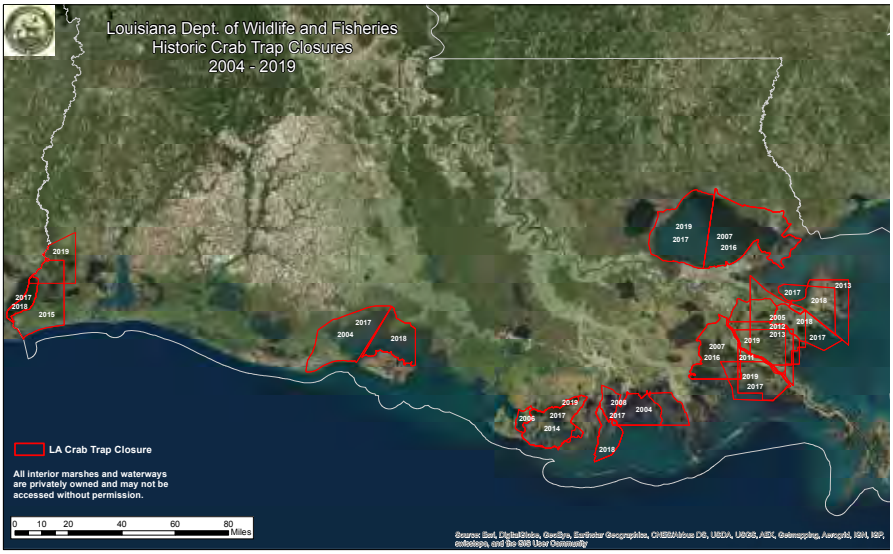


FIGURE 8. Map of derelict crab trap closures and cleanups since 2004.

Derelict crab traps removed during Terrebonne Basin volunteer event.

TABLE 8.

YEAR	AREA(S)	AVG. TRAPS
2004-2005	6	5,758
2006-2016	16	1,441
2017-2019	16	4,592
Total	***38***	***41,142***

Two volunteer days were scheduled: one in the Barataria Basin and one in the Terrebonne Basin. Both cleanups were headed by LDWF with one being staged at the Plaquemines Parish boat launch located behind the Port Sulphur High School and the other at Toby's Oyster Dock in Dularge. Volunteers from the Coastal Conservation Association, the Barataria-Terrebonne National Estuary Program, LSU, Nicholls State, LSU Sea Grant, LSU Ag Center, U.S. Coast Guard, and members of the general public worked with LDWF personnel to collect more than 671 traps during the two events. Lunch was sponsored by LA 23 BBQ in Belle Chasse and the Coastal Conservation Association in Dularge.

The Lake Pontchartrain Basin Foundation assisted LDWF during the first Pontchartrain closure and headed the second. The Lake Pontchartrain Basin Foundation and members of the public removed more than 2,700 traps from within these two closure areas. An additional 436 traps from the Pontchartrain Basin and 164 traps from the Black Bayou area in the Sabine Basin were removed.

Since the inception of the program in 2004, LDWF and volunteers have removed over 41,000 derelict or abandoned crab traps from state waters. 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 8*). During the 16-year period (2006-2016), the annual derelict crab traps removed averaged over 1,400, while more recent years indicate an average of nearly 4,600.

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 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

TABLE 9. *2018-2019 Oyster season opening and closing dates on the public oyster areas of Louisiana (Estimated from LDWF oyster boarding reports conducted by Marine Fisheries biologists).*

2018-2019 LDWF OYSTER SEASON SUMMARY						
Area	**Season Opening**	**Season Closure**	**Season/Type**	**Days Open to Date**	**Harvest to Date**	**Coastal Study Area**
North of Mississippi River Gulf Outlet	Oct. 29	Oct. 29	1-day Seed harvest	1	4,550 bbls	**1**
	Oct. 29	April 30	Market Oyster Harvest *LDH Area 3, Drum Day and 3-mile cultch plant CLOSED as of Jan 20, 2019	183	18,669 sacks	
	March 14	March 16	Special opening for bedding purposes only due to flood event	3	0 bbls	
	March 19	March 21	Second special opening for bedding purposes only due to flood event	3	85 bbls	
All Public Seed Grounds East of Mississippi river and South of Mississippi River Gulf Outlet CLOSED						
Hackberry Little Lake	Oct. 29	Oct. 29	1-day Seed harvest	1	877 bbls	**3**
	Oct. 29	Nov. 3	Market Oyster Harvest	6	186 sacks	
Barataria Bay, Deep Lake, Lake Chien, Lake Felicity and Lake Tambour CLOSED						
Lake Merchant	Oct. 29	Oct. 29	1-day Seed harvest	1	20 bbls	**5**
	Oct. 29	April 30	Market Oyster Harvest	183	25 sacks	
Bay Junop	Oct. 29	Oct. 29	1-day Seed harvest	1	0 bbls	
	Oct. 29	April 30	Market Oyster Harvest	183	500 sacks	
Sister Lake CLOSED						
Vermilion Bay	Oct. 29	Oct. 29	1-day Seed harvest	1	0 bbls	**6**
	Oct. 29	April 30	Market Oyster Harvest	183	8 sacks	
	March 14	March 16	Special opening for bedding purposes only due to flood event	3	0 bbls	
Calcasieu Lake	Oct. 29	April 30	*East Cove*: Market Oyster Harvest **Closed between Dec. 31, 2018 and Jan. 20, 2019	162**	3,062 sacks	**7**
	Oct. 29	April 30	*West Cove*: Market Oyster Harvest	183	6,311 sacks	

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 2018-2019 oyster season was to delay opening to maximize potential oyster reproduction, avoid concentration of the fleet through uniform opening/closure dates, and close areas as recommended by the shell budget model thresholds; all of which should help minimize reef degradation. The 2018-2019 Oyster Season opened Oct. 29, 2018, and closed April 30, 2019.

Estimated commercial harvest totaled 5,532 bbls of seed oysters and 28,761 sacks (14,381 bbls) of market oysters for an overall total of 19,913 bbls of oysters. This is a 70 percent decrease from the 2017-2018 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. 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 low harvests in Coastal Study Area 1 North, Coastal Study Area 5 West and Coastal Study Area 6.

To help mitigate reef loss and low recruitment issues, LDWF initiated a new non-living material protocol for bedding vessels in the 2018-2019 oyster season. Harvest of bedding material was allowed for just one day and a restriction of 15 percent non-living material (cultch) was placed on all bedding loads. Forty-five bedding vessels were documented and only two citations issued.

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 2018-2019:

July 2018

- Commercial king mackerel season opened on July 1 at 12:01 a.m., concurrent with a federal opening of the 2018-2019 harvest season.
- Commercial fisheries for small coastal sharks and large coastal sharks re-opened July 1 following an annual seasonal closure from April 1 - June 30.
- At its regular July meeting, the Louisiana Wildlife and Fisheries Commission modified the private recreational and state charter boat season for the harvest of red snapper to be open weekends only (Friday, Saturday and Sunday) beginning on July 13, 2018 after a previously scheduled closure on July 8, 2018.

August 2018

- Louisiana waters closed to the private recreational and state charter boat harvest of red snapper on Aug. 12, 2018.
- Louisana waters closed to the recreational harvest of gray triggerfish on Aug. 16, 2018.

October 2018

- Louisiana closed state waters for the commercial harvest of king mackerel on Oct. 5, 2018.
- Louisiana opened the commercial season for the harvest of striped mullet on Oct. 15, 2018.

November 2018

- Louisiana waters reopened to the commercial harvest of king mackerel on Nov. 12, 2018.

December 2018

- Louisiana waters closed for the commercial harvest of king mackerel on Dec. 5, 2018.
- Louisiana waters closed for the commercial harvest of small coastal sharks on Dec. 31, 2018, concurrent with a closure in federal waters.
- Commercial fishery for the harvest of spotted seatrout closed on Dec. 31, 2018.

January 2019

- Commercial fishery for small and large coastal sharks opened at 12:01 a.m. on Jan. 1, 2019, concurrent with an opening in federal waters.
- Commercial fishery for the harvest of spotted seatrout opened on Jan. 2, 2019.
- Commercial fishery for the harvest of greater amberjack opened on Jan. 1, 2019, concurrent with an opening in federal waters.
- Commercial fishery for the harvest of gray triggerfish opened on Jan. 1, 2019, concurrent with an opening in federal waters.
- All Louisiana waters closed to the commercial harvest of striped mullet with a mullet strike net on Jan. 21, 2019.

February 2019

- The annual stock assessment for striped mullet was presented to the Louisiana Wildlife and Fisheries Commission for transmittal to the Louisiana Legislature.

March 2019

- Louisiana opened the season for the recreational harvest of gray triggerfish in state waters, concurrent with an opening in federal waters on March 1, 2019.

April 2019

- Louisiana waters closed to the recreational and commercial harvest of all sharks on April 1, 2019, consistent with an annual state closed season from April 1 - June 30.
- At its regular April meeting, the Wildlife and Fisheries Commission set the season for the private recreational harvest of red snapper to be open on weekends only (Friday, Saturday and Sunday) including the Monday of Memorial Day and Thursday July 4, 2019, beginning on Friday May 24, 2019.

May 2019

- Louisiana waters remained closed during May for the recreational harvest of greater amberjack, concurrent with a closure in federal waters.
- Louisiana waters closed to the recreational harvest of gray triggerfish on May 11, 2019, concurrent with a closure in federal waters.
- Louisiana waters opened on May 24, 2019, for the private recreational harvest of red snapper.

June 2019

- Louisiana waters closed for the recreational harvest of gray triggerfish and greater amberjack on June 1, 2019, concurrent with a seasonal closure in federal waters.
- Louisiana waters opened for the recreational harvest of gag on June 1, 2019, 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. Icthyoplankton stations are also sampled during the summer survey to provide information on the occurrence, abundance and geographical distribution of eggs, larvae and juvenile fishes and invertebrates, with 60-cm bongo nets and 1x2m neuston nets. Icthyoplankton samples are field processed and transferred to the National Marine Fisheries Service Pascagoula Laboratory for transshipment to the Polish Sorting and Identification Center. 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°). Plankton stations were not included in the summer survey this year.

SEAMAP Icthyoplankton Survey

SEAMAP Icthyoplankton Surveys are conducted biannually to provide information on the occurrence, abundance and geographical distribution of the eggs and larvae of spring spawning fish, particularly Atlantic bluefin tuna, and of fall spawning fish, particularly king and Spanish mackerel. LDWF only 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 April to September to collect information on the spatial and temporal distribution of commercial and recreational reef species off the Louisiana coast using commercial vertical line (bandit) gear. Sampling stations are drawn from a pre-established station universe provided by Gulf States Marine Fisheries Commission with predetermined depth ranges and structure types, ranging in depth from 60 to 360 feet. The sampling encompassed sites form the South Pass of the Mississippi River to the TX/LA border (-89.00°- -94.00°). The data collected for each fish include the size of the hook on which it was caught, total length, total weight and sex. Otoliths of selected reef species are removed and processed. In 2019, 58 vertical line stations were sampled, landing 350 fish, of which 266 were red snapper (76 percent).

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. In 2019, LDWF completed 89 longline sets in Louisiana's territorial waters. Longline efforts resulted in 2,517 captures. Elasmobranchs composed 46.8 percent of the catch, teleosts composed 53.1 percent, and sea turtles composed the remaining 0.03 percent. The most frequently captured shark was the blacktip shark, comprising 58 percent of the total shark captures, followed by the bull shark (14.6 percent), and the Atlantic sharpnose shark (11.5 percent). The most frequently captured teleost was the gafftopsail catfish, comprising 73.3 percent of the teleost captures, followed by the red drum (21.9 percent). Seven-hundred-and-seven sharks were tagged with metal tags.

Fisheries Research Projects

Spotted Sea Trout Life History Study

Previous assessment analyses (Assessment of spotted seatrout in Louisiana waters: 2011 Report by Joe West, Jason Adriance, Melissa Monk and Joseph Powers) provided estimates of female spawning potential ratio and the spawning stock using biomass as a proxy for fecundity. Actual estimates of egg production could account for the spawning stock more accurately within the assessment model. Additionally, understanding the population spawning dynamics throughout the state may provide a clue to what problems the spawning stock may have or what the recovery goals should be. New techniques have allowed for greater data resolution, which may provid,e more accurate estimates within the assessment model. Through a pilot study in Barataria Bay, reproductive histological analysis has been completed on 209 and 334 seatrout ovaries from the 2015 and 2016 spawning seasons respectively. The success of the pilot study lead to comprehensive sampling of the Louisiana coastline in 2018 where otoliths and ovaries were collected from recreationally caught spotted seatrout females. A

TABLE 10. *2018 Louisiana female spotted seatrout (Cynoscion nebulosus) spawning fraction (proportion of spawning individuals in season), spawning interval (# days between spawns), spawning duration (length of season), and spawning frequency (#spawns/year). All of these metrics are expressed within calendar age.*

AGE (YRS)	SPAWNING FRACTION	SPAWNING INTERVAL (DAYS)	SPAWNING DURATION (DAYS)	SPAWNING FREQUENCY (#SPAWNS/YEAR)
1	0.1895	7.91	100	12.64
2	0.3091	4.85	147	30.29
3	0.3547	4.23	147	34.76
4+	0.3846	3.90	147	37.69

TABLE 11. *Models and parameters with standard errors (SE) to estimate fecundity for each age (yrs) and total length (mm) of female spotted seatrout (Cynoscion nebulosus). These models have been generated from 2015 and 2018 (current) LDWF data and the 1994-1995 data from Nieland et al. (2002). The growth coefficient from the spotted seatrout Von Bertalanffy growth curve in the Louisiana stock assessment (K) is included in the fecundity at age model (West et al. 2014).*

SOURCE	MODEL	EQUATION	a	SE	b	SE	K
All Years	Fecundity at Length	$=a(TotalLength)^b$	0.123	±0.260	3.076	±0.345	
All Years	Fecundity at Age	$=a(1-e^{(-K*FracAge)})^b$	37,814,660	±6,194,206	2.635	±0.512	0.451
All Years	Fecundity at Weight	$=a(BodyWeight)^b$	13,729.5	±13.106.5	1.064	±0.140	

total of 993 females from 2018 were used to determine frequency of spawning while 18 possessed the correct egg stage in the ovaries to determine batch fecundity (#eggs per spawn). Batch fecundity was then multiplied by spawning frequency to achieve annual fecundity. The 2018 data indicated that age 4 seatrout can spawn two to three times more than age 1 seatrout (*Table 10*). Consequently, age 4 fish produce 20 million more eggs than age 1 fish annually (*Table 11*). Further analysis is currently underway. Future collections may be useful in monitoring increases or decreases in egg production which may be an indicator of stock health.

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 percent (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 at least 100 red drum per year from 2015 through 2017 in offshore coastal waters adjacent to the Louisiana coast, with over 20 percent 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.

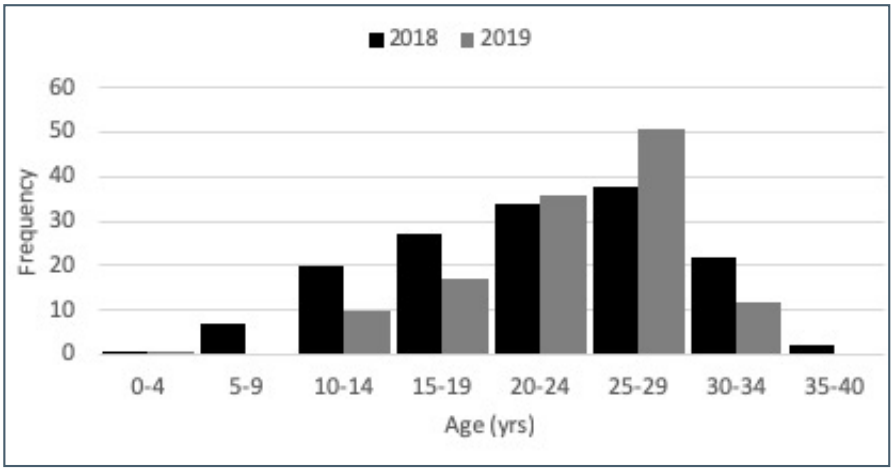


FIGURE 9. *Red drum (Sciaenops ocellatus) from 2018-2019 LDWF summer bottom longline sampling in the Louisiana nearshore area (<10 meters).*

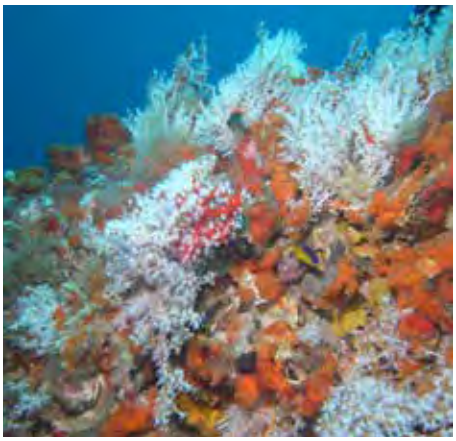
During 2018 and 2019, LDWF has collected and aged 278 red drum otoliths from offshore randomized Bottom Longline Sampling. Ages for red drum collected offshore ranged from 4 to 39 years (*Figure 9*). The most frequent age caught was between 25 and 29 years. We expect that these data will be critical in characterizing the offshore spawning stock of red drum off the Louisiana coast in future stock assessments.

Southern Flounder Tag Retention

In an effort to assess perceived declines in southern flounder stocks, LDWF began to explore a pilot field tagging study in Barataria Estuary where a large number of southern flounder could be captured using fishery-independent survey methods, tagged and released. Fishery recaptures could then be monitored through time and space to provide information on mortality rates, population size and movement. Gear tests for this potential survey were completed during the reporting period.

A tank-study was conducted to determine the optimal tag-type (T-bar or DART) and tag-location (dorsal fin or caudal peduncle region) for the southern flounder field experiment. Biologists at the Grand Isle Fisheries Research Lab collected 44 southern flounder using drop rings at night. Following a quarantine procedure, these flounder were alternately double-tagged with T-bar and DART tags and separated in equal numbers into four tanks where they were kept for up to six months.

Overall, significant retention differences were found (p value ≤0.05) between the tag types, with T-bar tags outperforming DART tags. No significant retention differences were found between the tag locations. Parameter estimates indicate that T-bar tags are retained longer than DART tags in both tag locations. We found significant post-release tagging mortality differences (p value ≤0.1) between tag types, with T-bar tags indicating a lower post-release tagging mortality rate than DART tags. We did not find a significant difference in post-release mortality between tag locations. Based on the results of this tank test, we recommend that T-bar tags be used on southern flounder if the pilot tagging study in the Barataria Basin moves forward.



Offshore Artificial Reef Monitoring

The Artificial Reef Monitoring Grant Program has three main goals:

1. Analysis of GoPro video from previous (2015-17) and current vertical line (2018) surveys.
2. Conduct vertical line surveys on LDWF artificial reef structures to enhance SEAMAP survey coverage of these structure.
3. Develop and conduct roving diver surveys on LDWF artificial reef structures.

While these surveys are all ongoing, progress can be reported toward the objectives of each.

During the reporting period, 430 unique GoPro videos were compiled from previous SEAMAP vertical line surveys (2015-2017). These videos were filtered for visibility and pre-read to define video read time bounds, with 43 of 247 videos readable from 2015, 37 of 97 videos readable from 2016, and 18 of 86 videos readable from 2017. Of the total collected, 98 videos were determined to be readable and these were read by two independent readers for finfish species identification on a 'min count' basis. Concurrently, 312 GoPro videos were collected (SEAMAP funding for field work) from 2018 vertical line survey sites, of which 201 met visibility requirements for min counts. Following the completion of the season, readability criteria was applied to videos and the video catch was compared to vertical line survey catch. For all videos (2015-2018), video surveys were found to encounter more species and a more diverse and even fish community. Shannon-Weaver H indices were greater for video surveys (H=0.521 ± 0.426) than vertical line surveys (H=0.071 ± 0.194). Peilou's EH demonstrated a more even distribution of species in video surveys than hooked gear surveys (EH=0.527 ± 0.377). Michaelis-Menten whole community models estimated that video surveys can accumulate more than twice the number of species (maximum expected number of species, "a"=42.88) than vertical line gear (a=19.72). 2019 video data will be handled in the same way and new statistics will be applied.

LDWF also sought to enhance the monitoring of LDWF artificial reef sites using the established SEAMAP vertical longline survey protocol. Ten percent of the artificial reef structures in the LDWF Offshore Artificial Reef Program were randomly selected and added to the 2019 survey. Nineteen of the 48 assigned vertical line stations were sampled following the SEAMAP vertical line protocol. Videos were attempted at each station.

In addition, 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 had been conducted at artificial reef sites until 2018. Biologists surveyed finfish species at the artificial reef site and the nearest standing platform. During 2019, artificial reef survey divers conducted two dive surveys on two structures in the western zone with one reefed structure (EC272H) and the nearest standing platform to that structure (VR282D). Diver data and videos were captured at both sites and is in the process of review.

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 LA), and Marsh Island to the western Louisiana state line (West LA). LDWF biologists have conducted two dive surveys thus far in 2019. Dive surveys were completed on two structures in the western zone with one reefed structure (EC272H) and the nearest standing platform to that structure (VR282D). Diver data and videos were captured at both sites and is in the process of review. Lionfish were only observed on reefed platform EC272H. No lionfish were sighted on the nearby platform VR282D. Lionfish tissue, otoliths and stomachs were retained for species identification, age analysis and stomach content identification, respectively. Video counts, aging and analysis of gut contents will be conducted with continued sampling planned for the remainder of 2019.

Future work on this project includes dive video reads 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. In addition, DNA samples were taken from all lionfish sampled. 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. DNA samples can be sequenced in the future to confirm species identification.

Age and Growth of Yellowfin Tuna from the Northern Gulf of Mexico

As part of a yellowfin tuna research initiative that began in 2012, LDWF biologists collect ear bones (otoliths) from yellowfin tuna catches in Louisiana, with 2,604 otolith sets collected to date. Yellowfin tuna in the Atlantic are managed by the International Commission for the Conservation of Atlantic Tunas, which assesses this stock every five

FIGURE 10. *Gulf of Mexico female wahoo (Acanthocybium solandri) spawning capable probability (P) binomial logistic regression models with fork length (mm; FL) and age (yrs) as independent variables. Each of the two variables were estimated with maximum likelihood methods and are expressed with upper (UCL) and lower (LCL) confidence limit values. The area under the receiver operating curve (ROC) is also displayed as a goodness of fit metric.*

Independent Variable	Formula	b_0			b_1			ROC	n
		Pred.	95% LCL	95% UCL	Pred.	95% LCL	95% UCL		
Age (yrs)	$P = \frac{e^{b0+b1*Age}}{1+e^{b0+b1*Age}}$	-2.041	-4.159	-0.410	1.092	0.195	2.418	0.68	31
Fork Length (mm)	$P = \frac{e^{b0+b1*FL}}{1+e^{b0+b1*FL}}$	-12.621	-25.690	-5.099	0.011	0.002	0.021	0.84	31

years. During the previous assessment (2011), the need for better and age-specific aging data was noted. Working with experts from Texas A&M - Galveston's Pelagic Fisheries Conservation Lab, LDWF biologists were able to develop a new methodology for aging yellowfin tuna and generate an updated growth curve for yellowfin from the Gulf of Mexico. LDWF biologists are now working with federal scientists to combine collections from both United States recreational and commercial fisheries to generate an updated consolidated growth model. In addition, the aging techniques developed at LDWF for yellowfin tuna were used to train fisheries lab in other countries to build capacity in developing nations to keep up with the need for accurate fisheries data for this recreationally and commercially import stock that is managed on an Atlantic-wide basis.

Age and Growth of Wahoo from the Louisiana Recreational Fishery

Previous work in the Atlantic has defined the age and growth relationship for wahoo, but no work has been completed in the Gulf of Mexico. LDWF has obtained ovaries and otoliths with lengths from wahoo as they are seasonally encountered during routine dock sampling at offshore recreational angling ports. Ages have been assigned for 146 females and 49 males (195) wahoo from the Louisiana coast. The average fork length, in millimeters (±SE), of females (1360.89mm ±13.84) and males (1330.22mm ±16.26) were similar, but all wahoo above 1550mm and below 910mm were females. While the mean (±SD) age for females (2.11±0.96) was about the same as males (2.14±0.75), female ages spanned 6 years and males ranged 3 years. There were 13 spawning capable female wahoo from the 31 sampled in the spawning season. Binomial logistic regressions were used to determine female proportion spawning capable within length and age (*Figure 10*).

Publications

Kitchens LL, JR Rooker, L Reynal, BJ Falterman, E Saillant, and H Murua. Discriminating among yellowfin tuna *Thunnus albacares* nursery areas in the Atlantic Ocean using otolith microchemistry. Marine Ecology Progress Series, Vol. 603: 201-213, 2018.

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Presentations

Barksdale, K, E Craft, V Morejon, S Shields, and A Hollander. Bacteria as a potential cause of high larval mortality rates in Eastern Oyster (*Crassostrea virginica*) at the Michael C. Voisin Oyster Hatchery in Grand Isle, LA. Louisiana American Fisheries Society. May 23-24, 2019. Thibodaux, LA.

Lang, ET, CA Levron, CD Marshall, and BJ Falterman. Life History Metrics of Wahoo (*Acanthocybium solandri*) in the northern Gulf of Mexico. Louisiana American Fisheries Society. May 23-24, 2019. Thibodaux, LA.

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Falterman, BJ. A review of the Gulf SEAMAP Bottom Longline survey. Southeast Area Data and Assessment Program (SEAMAP) Joint Annual Meeting, FWC-FWRI St. Petersburg, FL, July 23-24, 2019.

Falterman, BJ. An overview of a comprehensive yellowfin tuna (*Thunnus albacares*) research program in the northern Gulf of Mexico. ICCAT-AOTTP Program Management Meeting, Dakar, Senegal, 2018.

Mohan JA, JM Hendon, E Jones, BJ Falterman, K Boswell, and RJD Wells. 2018. Survival after trauma? Linking capture stress to post-release mortality of blacktip sharks in the Gulf of Mexico recreational fishery. American Fisheries Society, Atlantic City, New Jersey.

Mohan JA, JM Hendon, E Jones, BJ Falterman, K Boswell, and RJD Wells. 2017. Capture stress and post-release survival of Blacktip

Sharks (*Carcharhinus limbatus*) in the Gulf of Mexico recreational fishery. Texas Chapter of the American Fisheries Society, Corpus Christi, Texas.

O'Malley, PE, ET Lang, and BJ Falterman. Using ongoing bottom longline surveys to examine reproductive metrics of red drum (*Sciaenops ocellatus*) off the coast of Louisiana. Louisiana American Fisheries Society. May 23-24, 2019. Thibodaux, LA.

Zuckerman, Z, ET Lang, SD Delaune, CE Edds, and BJ Falterman. Comparing video surveys and fishery-independent survey methods for monitoring marine sport fish. Louisiana American Fisheries Society. May 23-24, 2019. Thibodaux, LA.

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 trigger fish) 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.

***TABLE 12.** Saltwater and freshwater fish otoliths collected and aged.*

SPECIES	COLLECTED	AGED
Black Crappie	511	500
Black Drum	1,697	1,687
Channel Catfish	15	15
Cobia	32	31
Gray Snapper	146	142
Gray Triggerfish	1	0
Greater Amberjack	93	91
King Mackerel	10	10
Largemouth Bass	1,824	1,814
Red Drum	2,695	2,687
Red Snapper	1,032	1,021
Sheepshead	973	971
Southern Flounder	486	486
Spotted Seatrout	3,618	3,518
Striped Mullet	161	161
Vermilion Snapper	30	30
White Crappie	192	192

***TABLE 13.** Wahoo and yellowfin tuna otoliths collected and aged.*

SPECIES	COLLECTED	AGED
Yellowfin Tuna	343	0
Wahoo	4	0

During FY 2018-2019, the Age and Growth Lab in Baton Rouge received 13,516 otoliths, of which 13,356 have been aged. Within that total, 2,758 otoliths were saltwater fisheries independent, of which 2,747 were aged and 2,542 otoliths were freshwater, of which 2,521 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 12*.

Otoliths were also collected from the two research species, wahoo and yellowfin tuna. The Fisheries Research and Assessment section spearheads the sampling and processing of these species. The total for those species are listed in *Table 13*.

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 2018 otolith sampling quotas were maintained through FY 2018-2019. The number of marine otoliths decreased slightly when compared to last year's numbers, primarily due to less red snapper collected overall. All otoliths received during this time period have been processed, meaning they were cataloged, prepared to be sectioned, first and second read.

During FY 2018-2019, the Age and Growth Lab received the reference set for black drum, gray triggerfish, greater amberjack, red snapper, sheepshead, southern flounder and vermilion snapper. 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. During 2018, District 5 received funding from a non-profit group to deploy a new commercial artificial reef design and monitor the harvest and use of the structures via remote sensing cameras. In addition, biologists took one pre- and four post-deployment underwater videos to document the species using the new reefs, and the extent and use of the new structures by sportfish.

TABLE 14. Largemouth bass tested for sub-species identification in FY 2018-2019.

LOCATION	NUMBER				PERCENT			DATE SAMPLED	DISTRICT
	NORTHERN	HYBRID	FLORIDA	TOTAL	NORTHERN	HYBRID	FLORIDA		
Cross Lake 100310	17	10	4	31	54.8%	32.3%	12.9%	March 18	1
Bistineau 100502	169	32	8	209	80.9%	15.3%	3.8%	March 18	1
Claiborne 80602	63	11	2	76	82.9%	14.5%	2.6%	April 18	1
Lake Bruin 081203	38	2	1	41	92.7%	4.9%	2.4%	April 18	2
Poverty Point 081010	22	24	16	62	35.5%	38.7%	25.8%	April 18	2
Lake St John	60	9	3	72	83.3%	12.5%	4.2%	Oct. 18	3
Lacassine 50607	28	57	54	139	20%	39%	41%	March 18	5
Spring Bayou	135	22	6	164	82.8%	13.5%	4.7%	Oct. 18	6
Amite 40302	84	14	0	98	85.7%	14.3%	0%	April 18	7
Blind River 40401	25	4	0	29	86.2%	13.8%	0%	April 18	7
Tickfaw 40502	35	3	0	38	92.1%	7.9%	0%	April 18	7
Toledo Bend 110101	284	127	43	454	62.5%	28.00%	9.50%	March 18	10
TOTAL				***1,413***					

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 2018-2019, 1,413 largemouth bass were tested for subspecies identification. These fish were from Lake Bistineau, Cross Lake, Lake Claiborne, Lake Bruin, Poverty Point Reservoir, Lake St. John , Lacassine National Wildlife Refuge, the Amite, Blind and Tickfaw Riversthe Spring Bayou Complex, and Toledo Bend Reservoir (*Table 14*).

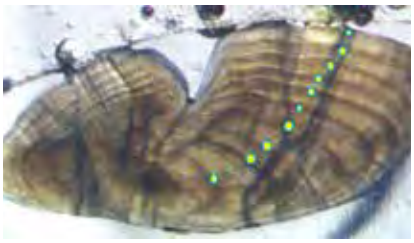
An additional Florida largemouth bass genetics project was begun in FY 2018-2019 to provide more detail of the introgression patterns based on several factors. Eight largemouth bass populations were selected for introgression research on the two deviance patterns of hybrid largemouth bass and related 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, Lake Rodemacher, Grand Bayou Reservoir, and Bundick Lake.

Habitat sampling is ongoing for the project lakes, and has been completed in Lake Cataouatche, Chicot Lake, Grand Bayou Reservoir and Lake Rodemacher. The distance from the end of the vegetation bed to shore is measured and percent cover of aquatic plants (submersed, floating or emergent) within that measured distance is recorded. Also, shoreline characteristics such as timber (fallen or standing) or any shoreline development, such as housing or businesses, is noted. These metrics are quantified at random points along the shoreline of the lake resulting in approximately 100 data points per lake. Multiple water samples are collected and several vertical profiles taken for chlorophyll a and nutrient analyses.

The largemouth bass populations of Lake St. John and D'Arbonne Lake have been sampled. For Lake St. John (n=60) and D'Arbonne Lake (n=60), weight, length, age and stomach contents were recorded. DNA has been extracted and allozyme analyses completed for each fish. The sample number was increased from 30 to 60 per lake to give a better representation of the populations. Florida largemouth bass and northern largemouth bass standards (Yucatan and Finch Lake) are being 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 work-



***TOP:** Otolith from an American eel. **BOTTOM:** Taking otolith sample from an American eel.*

ing on a State Wildlife Grant for American eel life history information since November 2017. In FY 2018-2019, they processed 168 eels that were collected throughout the state by various methods. To date, 237 eels have been processed for the project. The parameters collected include length, weight, stomach contents, sex determination, presence of swim bladder parasites and removal of otoliths and tissue for DNA. Aging otoliths has provided the ages for 129 specimens, with the oldest eel being 16 years. Staff has found 51 specimens from three different sites that contained swim bladder parasites. These were submitted for DNA verification, and are the parasite *Angullicoloides crassus*. The project was extended by a year, and should be concluded by November 2020. This study will provide the department with much needed information on American eels for future management considerations.

Marginal Increment Analysis on Channel Catfish Otoliths

Past catfish stock assessments in Louisiana have relied on pectoral spines as the primary aging structure. A comparison of spines vs. otoliths was performed by the LDWF Age and Growth Lab and over the past year, staff have finalized a process to assign accurate age and margin information to each otolith, and have catalogued a reference set to perform marginal increment analysis. Otolith collections ended in 2018. During FY 2018-2019, all remaining catfish otoliths were aged, and the reference set of otoliths was completed. Also during this time period, otoliths were removed from known-age channel catfish, and were used to further validate annulus formation. At this time, project goals have been completed, and will allow for more informed decisions regarding future management of channel catfish.

Status Survey for Frecklebelly Madtom in the Pearl River Drainage of Louisiana

LDWF Inland Fisheries biologists previously surveyed 34 sites in historic locations of the frecklebelly madtom (*Noturus munitus*) in the Pearl River drainage of Louisiana, and sites adjacent to these areas. This survey is assessing presence and absence, along with relative abundance, of the species. During FY 2018-2019, this project was expanded to include main stem river habitats of the Pearl River. The data generated will provide current and thorough distribution and abundance data to federal partners, allowing them to make a more informed decision regarding federal listing of this species. It also will inform both state and federal managers responsible for planning and implementing long-term conservation and recovery for the species and required habitat, and ensure that management strategies are effective.

At-risk Freshwater Mussel Survey of Bogue Chitto National Wildlife Refuge

LDWF biologists completed sampling of freshwater mussels within and around the Bogue Chitto National Wildlife Refuge in Louisiana. These surveys included data from the Bogue Chitto River, Holmes Bayou, Wilson Slough, the West Pearl River and the Pearl River proper, along with adjacent backwater sloughs and remnant river channels. A document which establishes freshwater mussel assemblages, species richness, relative abundance, and diversity of mussel community of these waterbodies was produced and will serve as a baseline for future management decisions.

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 (*Orconectes blacki*), an uncommon species thought only to be found in 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 federal list of threatened and endangered species. This investigation is focused on the population status of the Calcasieu painted crawfish to determine, through genetic testing, if a full species status assessment is warranted.

Hydrologic Alterations on Mississippi River Batture Lands

A partnership between federal and state entities began in 2016 to improve floodplain access for dependent aquatic species, and enhance natural flow regimes during the annual flood pulse by improving natural and man-made fish passage features throughout the Richard K. Yancey WMA property. This enhancement project will also provide boating and fishing opportunities on the WMA. Over FY 2018-2019, baseline water quality, fish community assemblage and abundance data were collected in the project area. Inland Fisheries also began monitoring how water temperatures change across the floodplain as the Mississippi River inundates the batture area during each flood pulse. Changes in fish community composition, water quality and fish habitat will be evaluated post-alteration to assess how management of the floodplain can impact fisheries productivity, 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 (Past President)
- Southeast Association of Fish & Wildlife Agencies - state representative
- Mississippi Interstate Cooperative Resource Association - state representative
- Lower Mississippi River Conservation Committee - Executive Committee
- 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

Hale, A., V. Faria, R. Maxwell, and S. Kinney. Histologic findings from an investigation of American eel (*Anguilla rostrata*) populations in Louisiana. Poster. Louisiana Chapter of the American Fisheries Society Meeting. May 23, 2019. Thibodeaux, LA.

Hawke, J.P., R. Daniel, K. Strother, J. Elliott, Y. Sokolova, M. Carossino, I. Langohr, and F. Del Piero. (in press) *Streptococcus dysgalactiae*: a pathogen of feral populations of silver carp *Hypothalmychthys molitrix* (Journal of Aquatic Animal Health).

Kinney, S. Toledo Bend Reservoir Spillway Repair: Moving Fish and Water on a Large Scale. Southern Division of the American Fisheries Society Annual Meeting, January 27, 2019. Galveston, TX

Kinney, S. Louisiana Artificial Reef Effort: An Evolving Framework. January 26, 2019. Southern Division of the American Fisheries Society Annual Meeting. January 25, 2019. Galveston, TX.

Lang, J. E. and Keycha M. Johnson. Channel catfish (*Ictalurus punctatus*) age and growth study in Louisiana waters comparing aging techniques. Poster. Louisiana Chapter of the American Fisheries Society Meeting, May 23, 2019. Thibodaux, LA.

Maxwell, R. American Eels on the Bayou: Migrating to a better understanding of an elusive fish, Science on the Bayou, March 13, 2019. Lafayette, LA.

Maxwell, R., S. Kinney, I. Longo, and K. Walsh. An update on the Louisiana American Eel (*Anguilla rostrata*) project: ages, growth rates, diet, and emerging patterns Southern Division of the American Fisheries Society Annual Meeting, January 25, 2019. Galveston, TX.

Maxwell, R., S. Kinney, I. Longo, and K. Walsh. An update on the Louisiana American Eel (*Anguilla rostrata*) Project: Ages, growth rates, diet, and emerging patterns. Louisiana Chapter of the American Fisheries Society Meeting, May 23, 2019. Thibodaux, LA.

Maxwell, R., S. Kinney, I. Longo, and K. Walsh. An update on the Louisiana American Eel (*Anguilla rostrata*) Project: Ages, growth rates, diet, and emerging patterns. Louisiana Chapter of the American Fisheries Society Meeting, June 4, 2019. Vicksburg, MS.

Maxwell, R. Biological Datasets. Louisiana Watershed Initiative Statewide Listening Tour, October 23, 2018. Houma, 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

- **Burns Point Recreational Area Fishing Pier** - Project plans include construction of a fishing pier at the existing recreational area to provide fishing opportunities for visitors.

BOATING ACCESS FACILITIES PLANNED OR UNDER CONSTRUCTION

- **West End-Breakwater Drive Boat Launch** - Project includes renovating the existing two-lane boat ramp and parking area.
- **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.
- **Leonville Boat Launch Facility Improvements** - Project includes the construction of a pavilion and bathroom facilities at the existing boat launch.
- **Town of Madisonville Boat Launch Repairs** - Project includes repairs/replacement of the existing mooring docks.

TABLE 15. Drawdowns conducted in FY 2018-2019.

LAKE NAME	PURPOSE OF DRAWDOWN	DATES
Cheniere Lake	Damage to bridge/spillway	2016 - Current
Bussey Brake	Lake Renovation	2013 - Current
Henderson Lake	Aquatic Vegetation Control	August - September (ended early due to rising MS/ Atchafalaya Rivers)
Cocodrie Lake	Aquatic Vegetation Control	January 2019 - September 2019
Vernon Lake	Repair damage from Hurricane Harvey	August 2017 - October 2019
Bundick Lake	Bottom sediment compaction, Aquatic Vegetation Control , and Maintenance	September 2018 - January 2019
Saline Lake	Aquatic Vegetation Control	June 2018 - October 2018
Black Lake	Aquatic Vegetation Control	July 2018 - January 2019
Clear-Smithport	Aquatic Vegetation Control	July 2018 - Current
Lake Louis	Improve water quality/ turbidity issues	August 2019 scheduled to end in February 2020
Lake Bistineau	Aquatic Vegetation Control and bottom habitat improvement	July 2018 - December 2018
Mill Creek Reservoir	Shoreline Maintenance, Aquatic Vegetation Control	September 2018 - January 2019

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.
- **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.
- **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 2018-2019 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 2018-2019, the Aquatic Plant Control Program completed 72 Vegetation Management Plans for Louisiana public waterbodies.

In FY 2018-2019, herbicides were applied to 36,121 acres of nuisance aquatic vegetation, and the majority of these efforts included control of 11,683 acres of water hyacinth, 16,791 acres of giant salvinia, 1,910 acres of alligator weed and 1,425 acres of common salvinia. In addition, approximately 1,002,662 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 12 inland reservoirs in FY 2018-2019 (*Table 15*).

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 lettuce that had not been problematic in the recent past. Several applications treating a total of 4 acres of water lettuce were made throughout FY

2018-2019 using diquat at a rate of 1 gallon per acre with a nonionic surfactant at a rate of 0.25 gallons per acre. 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 2018-2019, LDWF treated 3,404 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. LDWF is currently collaborating with LSU on establishing a cold-tolerant weevil rearing facility in central Louisiana. 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. Recent research results indicated that a specialized adjuvant containing both methylated vegetable oil and an organosilicone component is as effective as the mixture of two unique surfactants that was being used previously. Along with this discovery, 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 2018-2019, focusing on the effectiveness of alternative herbicides both alone and in combination. Metsulfuron methyl (MSM) 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 in the future. These efforts will continue as new herbicides become available and could lead to more effective control of giant salvinia in the future.

Presentations

Hill, D. Louisiana Department of Wildlife and Fisheries Aquatic Plant Control Program Update. Louisiana Aquatic Vegetation Management Association, Oct. 2-3, 2018. Pineville, LA.

Hill, D. Louisiana Department of Wildlife and Fisheries Aquatic Plant Control Program Update. Louisiana Aquatic Vegetation Management Association, Feb. 5-6, 2019. Baton Rouge, LA.

Hill, D. Louisiana Department of Wildlife and Fisheries Aquatic Plant Control Program Update. Mississippi/Louisiana Joint Meeting, Sept. 12-13, 2018. Percy Quin State Park, MS.

Finkbeiner, W. Giant Salvinia Growth Trends in Northern Louisiana. Mississippi/Louisiana Joint Meeting, Sept. 12-13, 2018. Percy Quin State Park, MS.

Hill, D. Louisiana Department of Wildlife and Fisheries Aquatic Plant Control Program Update. Mid-South Aquatic Plant Management Society, Nov. 5-8, 2018. Chattanooga, TN.

Hill, D. Louisiana Department of Wildlife and Fisheries Aquatic Plant Control Program Update. Arkansas Mississippi Louisiana Joint States Meeting, June 4-5, 2019. Vicksburg, MS.

Salyers, B. An Integrated Approach to Vegetation Control on Henderson Lake, LA. Louisiana Association of Soil and Water Conservation Districts, Sept. 13, 2018. Henderson, 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

Agreements were signed with two new community fishing locations in fiscal year 2018 - 2019, including I-10 Park in Jennings and Joe Brown Park in New Orleans. The launch events for these two sites were scheduled for the fall of 2019. With the addition of these two sites, there are 14 total locations in the community fishing program. In addition, LDWF met with Office of State Parks to form a partnership to bring more community fishing sites into the program in FY 2019-2020. A total of 30,800 pounds of channel catfish and 3,000 pounds of rainbow trout were stocked in all of the current community fishing sites during this fiscal year (*Table 16*).

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 2018-2019, the program enhanced six offshore reefs with 11 oil and gas platforms and received $4.5 million in donations from oil company participation. It also completed one new deepwater reef, Garden Banks 189.

The Louisiana Artificial Reef Program enhanced two inshore reef sites in FY 2018-2019. The Sweet Lake reef site, located in Calcasieu Lake, was enhanced in July 2018 using 1,700 tons of crushed limestone. The East Calcasieu reef site, also located in Calcasieu Lake, was enhanced in June 2019 using 4,000 tons of crushed concrete and 2,000 tons of limestone. The Sweet Lake and East Calcasieu reef sites are both 50-acre permitted sites. The high river levels over spring and summer this year prevented limestone from being delivered via the Mississippi River, postponing many additional reef enhancement projects.

In FY 2018-2019, the artificial reef research and assessment team developed a new monitoring program in an effort to better assess the ecological productivity and public use of inshore artificial reefs. That monitoring program includes the use of gill netting, benthic trays and rod and reel sampling to assess the fish and invertebrate communities that inhabit artificial reefs. In addition, observations of any recreational users are to be made in an effort to assess the public's use of Louisiana's artificial reefs. Through the implementation of this monitoring program, it is anticipated that the artificial reef program will be able to better evaluate the success of the state's artificial reefs and guide the development of future artificial reef projects. Additional monitoring efforts included the amplification and sequencing of environmental DNA collected by Southeastern's Piller Lab in their efforts to explore the use of environmental DNA in characterizing the fish communities inhabiting artificial reefs. Water samples used in that study were collected over inshore and nearshore artificial reef sites slated for future enhancement, which included California Point, Independence Island, Grand Isle 9, Point Mast, Bird Island, The Pickets, Cypremort Point II, Rabbit Island Reef, and East Calcasieu. Lastly, deployment monitoring of the East Calcasieu reef was conducted to ensure compliance with federal regulations.

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 16.** Get Out & Fish! Stocking Schedule: Number of Fish in Pounds*

PARKS	TYPE OF FISH	SEPT. 2018	OCT. 2018	DEC. 2018	JAN. 2019	MARCH 2019	APRIL 2019	JUNE 2019
Purple Heart Memorial Park - Ragley	Rainbow Trout				300			
	Channel Catfish	600	600	600		600	600	600
Girard Park (Lafayette, La.)	Rainbow Trout				200			
	Channel Catfish	400	400	400				400
Zemurray Park (Hammond, La.)	Rainbow Trout				300			
	Channel Catfish		300	300		300	300	
BREC's Burbank Park (Baton Rouge, La.)	Rainbow Trout							
	Channel Catfish	800	800					800
Kiroli Park (West Monroe, La.)	Rainbow Trout				400			
	Channel Catfish	400	500	400		500	500	500
William T. Polk Park (Vidalia, La.)	Rainbow Trout				200			
	Channel Catfish	400	400	400				400
Turner's Pond (Minden, La.)	Rainbow Trout				500			
	Channel Catfish	1000	1000	1000		1000	1000	1000
Grambling City Park (Grambling, La.)	Rainbow Trout				200			
	Channel Catfish	400	400	400		400	500*	400
Southside Regional Park - Fabacher Field (Youngsville, La.)	Rainbow Trout				200			
	Channel Catfish	400	400	400				400
Elmore D. Mayfield Park (Ruston, La.)	Rainbow Trout				500			
	Channel Catfish	1000	1000	1000		1,000	1,100*	1000
Sidney Hutchinson Park (Walker, La.)	Rainbow Trout				200			
	Channel Catfish		600	400				400
TOTALS	**Rainbow Trout**				**3,000**			
	Channel Catfish	**5,400**	**6,400**	**5,300**		**3,800**	**4,000**	**5,900**

**100 pounds paid for by the Cities of Ruston and Grambling.*

ABOVE LEFT: *2019 East Calcasieu deployment.* ***ABOVE RIGHT:*** *Reef monitoring at Point Mast.* ***BELOW LEFT:*** *Twin span sample.*

Important Figures for FY 2018-2019

- 76 total established offshore artificial reef sites
  - 48 planning area reefs
  - 18 special artificial reef sites
  - 11 deepwater reefs
- Offshore structures converted to permanent habitat
  - 406 platform jackets
  - 8 drill rig legs
  - 12 oil and gas structures deployed
- 6 established nearshore reefs
- 29 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 2018-2019

- 128 total established freshwater artificial reef sites
- 45 new freshwater artificial reef sites were established in 8 waterbodies during FY 2018-2019

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

Over the past year, over 8 million fish were released in 86 water bodies around the state in cooperation with the City of Shreveport's Cross Lake Fish Hatchery, LDWF's Rockefeller Wildlife Refuge, LDWF's Aquatic Plant Control Program, the Red River Waterway Commission, the Toledo Bend Lake Association, and the Lake Claiborne Association. *Table 17* details fish stockings by the LDWF Hatchery program and partners over the 2018-2019 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 attended training on developing and

implementing Hazard Analysis Critical Control Point plans. Staff then developed the first Inland Fisheries Hazard Analysis Critical Control Point plan, which identified, assessed and will minimize risks of spreading nuisance aquatic species from Booker Fowler Fish Hatchery to stocking sites across the state and vice versa. This plan will serve as a template as the Hatchery System develops more Hazard Analysis Critical Control Point plans to mitigate the risk of spreading Nuisance aquatic species in Louisiana waters. In this plan, Inland Fisheries staff have developed occurrence maps that show Nuisance aquatic species reports by parish and identify drainage basins that are at risk for invasion in the future based on actual Nuisance aquatic species reporting.

HATCHERY AND FISHERIES OUTREACH/EDUCATION

The hatchery program continued to provide support for fisheries education and outreach programs. Support included providing fish and/or fish transportation for community fishing and outreach events, giving hatchery presentations and tours to groups and visitors by request, providing advice to private pond owners, coordinating/hosting the annual CENLA National Hunting and Fishing Day Event held in Woodworth, LA, with over 3,000 people in attendance. The hatchery program transported 3,000 pounds of catfish for U.S. Forest Service fishing derbies and 2,000 pounds of catfish for Fort Polk fishing derbies. The hatchery program also hosted an Open House on March 30, 2019 where members of the public toured the hatchery to learn about sportfish production techniques and objectives.

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. The Louisiana Fish Hatchery Program: Who, What, Why, Where, & How? Louisiana Wildlife & Fisheries Commission Meeting. October 4, 2018, Baton Rouge, LA.

Sylvester, Robert "Ed". Biology Careers at Louisiana Fish Hatcheries. Presented to Five Class Sections (Approximately 100 Students) at Pineville High School Career Day. February 8, 2019, Pineville, LA.

NEWS STORIES

Bazzle, Allison. (March 30, 2019). Inside the Fish Hatchery: Louisiana Department of Wildlife and Fisheries Opens Doors to the Community. KALB.com. Retrieved from *www.kalb.com/video/?vid=507900391* on 11/15/19.

King, Faith. (Feb. 27, 2019). Booker Fowler Fish Hatchery Gives A Close Look at Fish Spawning. KALB.com. Retrieved from *www.kalb.com/content/news/Students-around-the-state--506464831.html on 11/15/19*.

McNamara, Dave. (March 26, 2019). Heart of Louisiana: Fish Hatchery. WVUE-TV. Retrieved from *www.fox8live.com/2019/03/27/heart-louisiana-fish-hatchery/ on 7/29/19.*

Portier, R. and N. Gremillion. (Feb. 14, 2019). Valentine's Day marks beginning of largemouth bass spawning in the heart of Louisiana: Process to spawn 2.5 million fingerlings starts on Feb. 14. WAFB 9 TV. Retrieved from *www.wafb.com/2019/02/15/valentines-day-marks-beginning-largemouth-bass-spawning-heart-louisiana/* on 7/29/19.

LDWF stocks over 8 million fish across Louisiana in 2018. (Jan. 2, 2019). The Advocate. Retrieved from *www.theadvocate.com/baton_rouge/news/communities/livingston_tangipahoa/article_ba992c72-0793-11e9-9435-f7dda3e719df.html* on 7/29/19.

LDWF stocks Florida largemouth bass in Iatt Lake. (June 21, 2019). KALB Channel 5. Retrieved from *www.kalb.com/content/news/LDWF-stocks-Florida-largemouth-bass-in-Iatt-Lake--511627822.html* on 7/29/19.

PERIODICALS

Isles, Trey. "Louisiana's Hatchery Haven." Louisiana Conservationist, Vol.70 No. 1, Louisiana Department of Wildlife and Fisheries, pp 22-25, Baton Rouge, La.

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

TABLE 17. FISH STOCKING BY WATERBODY (7/1/2018 - 6/30/2019)

BODY OF WATER	SPECIES	SIZE	NUMBER RELEASED
Abbeville Community Pond	Bluegill	Fingerlings	3,730
	Channel Catfish	Phase II Fingerlings	200
	Florida Largemouth Bass	Fingerlings	1,000
	Golden Shiner	Adults	5,300
Anacoco Lake	Florida Largemouth Bass	Fingerlings	52,000
Bartholomew Lake	Florida Largemouth Bass	Fingerlings	8,000
Bayou Bienvenue	Florida Largemouth Bass	Fingerlings	36,760
		Phase II Fingerlings	8,420
Bayou dArbonne Lake	Florida Largemouth Bass	Fingerlings	299,100
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	22,600
Black Lake & Clear Lake	Florida Largemouth Bass	Fingerlings	25,000
Black River Lake	Hybrid Striped Bass	Fingerlings	9,730
BREC Pond - Burbank	Florida Largemouth Bass	Fingerlings	90
BREC - Central Community Park	Channel Catfish	Fingerlings	200
BREC Pond - Doyles	Channel Catfish	Fingerlings	150
BREC Pond - Flanacher	Channel Catfish	Fingerlings	80
BREC Pond - Forest Park	Florida Largemouth Bass	Fingerlings	50
	Triploid Grass Carp	Adults	10
BREC Pond - Greenwood Park	Channel Catfish	Fingerlings	750
BREC Pond - Howell Park	Bluegill	Fingerlings	1,700
	Florida Largemouth Bass	Fingerlings	180
BREC Pond - Oak Villa	Florida Largemouth Bass	Fingerlings	50
BREC Pond - Palomino	Channel Catfish	Fingerlings	100
BREC Pond - Perkins	Florida Largemouth Bass	Fingerlings	50
BREC Pond - Sherwood	Bluegill	Fingerlings	2,000
	Channel Catfish	Fingerlings	200
	Florida Largemouth Bass	Fingerlings	230
BREC Pond - Zachary	Florida Largemouth Bass	Fingerlings	50
Bunkie Youth Center	Bluegill	Fingerlings	2,000
	Channel Catfish	Fingerlings	300
	Florida Largemouth Bass	Fingerlings	220
Bussey Brake	Black Crappie	Fingerlings	4,650
	Bluegill	Fingerlings	392,490
	Northern Largemouth Bass	Adults	20
	Redear Sunfish	Fingerlings	109,300

WATERBODY	SPECIES	SIZE	NUMBER STOCKED
Caddo Lake & James Bayou	Florida Largemouth Bass	Fingerlings	151,930
Calcasieu River	Florida Largemouth Bass	Fry	101,400
Cameron Prairie	Florida Largemouth Bass	Fry	25,200
		Fingerlings	250
Caney Creek Reservoir	Florida Largemouth Bass	Fingerlings	95,600
Chatham Lake	Florida Largemouth Bass	Fingerlings	3,200
Chicot Lake	Florida Largemouth Bass	Fingerlings	36,960
	Triploid Grass Carp	Adults	290
Cotile Lake	Florida Largemouth Bass	Fingerlings	24,200
Crooked Creek Lake	Channel Catfish	Fingerlings	2,000
	Florida Largemouth Bass	Fingerlings	6,000
Cross Lake	Florida Largemouth Bass	Fingerlings	137,200
Cypress Bayou Reservoir	Florida Largemouth Bass	Fingerlings	47,900
Orleans & Jefferson Parish Drainage Canals	Bluegill	Fingerlings	100
	Florida Largemouth Bass	Adults	80
		Fingerlings	340
	Redear Sunfish	Fingerlings	4,250
Eunice City Lake	Florida Largemouth Bass	Fingerlings	450
False River	Black Crappie	Fingerlings	13,610
	Bluegill	Fingerlings	4,680
	Florida Largemouth Bass	Fingerlings	6,090
	Hybrid Striped Bass	Fingerlings	16,430
Fields Lake	Florida Largemouth Bass	Fry	153,000
Fort Polk Ponds	Florida Largemouth Bass	Fry	115,800
Grand Bayou Reservoir	Florida Largemouth Bass	Fingerlings	31,800
Gretna City Pond	Bluegill	Fingerlings	4,270
	Florida Largemouth Bass	Fingerlings	100
Henderson Lake	Triploid Grass Carp	Adults	10,500
Holbrook Park Pond	Channel Catfish	Adults	400
Hunt Correctional	Florida Largemouth Bass	Fingerlings	320
Iatt Lake	Florida Largemouth Bass	Fry	551,400
Indian Creek & Indian Creek Reservoir	Black Crappie	Adults	10
	Bluegill	Adults	100
	Florida Largemouth Bass	Fry	38,800
	Golden Shiner	Adults	1,230
	Largemouth Bass	Fingerlings	1,070
	Redear Sunfish	Adults	10
Ivan Lake	Florida Largemouth Bass	Fingerlings	6,000
	Triploid Grass Carp	Adults	200
Joe W. Brown Memorial Park	Florida Largemouth Bass	Fingerlings	100
Kepler Creek Lake	Threadfin Shad	Adults	7,730
Kincaid Lake	Channel Catfish	Fingerlings	7,720
Lake Bistineau	Florida Largemouth Bass	Fingerlings	140,000
Lake Bruin	Florida Largemouth Bass	Fingerlings	20,000
Lake Buhlow	Channel Catfish	Fingerlings	1,510
Lake Cataouatche	Florida Largemouth Bass	Fry	1,948,800

WATERBODY	SPECIES	SIZE	NUMBER STOCKED
Lake Claiborne	Florida Largemouth Bass	Fingerlings	80,500
	F1 FL/Northern Hybrid Largemouth Bass +	Fingerlings	80,000
	Hybrid Striped Bass	Fingerlings	43,100
Lake Concordia	Florida Largemouth Bass	Fingerlings	12,400
	Hybrid Striped Bass	Fingerlings	5,990
Lake Fausse Point & Dauterive Lake	Florida Largemouth Bass	Fry	1,843,800
Lake LaFourche	Florida Largemouth Bass	Adults	80
Lake Long	Florida Largemouth Bass	Fry	101,400
Lake St. John	Hybrid Striped Bass	Fingerlings	11,740
Lamar Dixon 11-acre Pond	Channel Catfish	Fingerlings	550
	Florida Largemouth Bass	Fingerlings	200
Lamar Dixon 4-acre Pond	Florida Largemouth Bass	Fingerlings	50
Little Piney Park Pond	Bluegill	Fingerlings	530
	Golden Shiner	Adults	2,000
	Redear Sunfish	Fingerlings	500
Mermentau River	Florida Largemouth Bass	Fingerlings	500
	Paddlefish	Fry	261,800
		Fingerlings	6,850
Millers Lake	Florida Largemouth Bass	Fingerlings	32,000
Moore Park	Channel Catfish	Fingerlings	300
Nantachie Lake	Florida Largemouth Bass	Fingerlings	31,590
Oil & Gas Park	Bluegill	Fingerlings	3,000
	Channel Catfish	Adults	550
	Florida Largemouth Bass	Fry	50,400
	Redear Sunfish	Fingerlings	2,000
Pierson Lake	Florida Largemouth Bass	Adults	20
Poverty Point Reservoir	Florida Largemouth Bass	Fingerlings	20,000
	Hybrid Striped Bass	Fingerlings	34,050
Purple Heart Memorial Park Pond	Bluegill	Fingerlings	640
	Florida Largemouth Bass	Fry	25,200
	Golden Shiner	Adults	2,510
	Redear Sunfish	Fingerlings	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	3,620
	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	18,100
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	25,340

BODY OF WATER	SPECIES	SIZE	NUMBER RELEASED
Saline Lake	Florida Largemouth Bass	Fingerlings	70,400
Sibley Lake	Florida Largemouth Bass	Fingerlings	20,400
Spring Bayou	Channel Catfish	Fingerlings	9,770
State Police Youth Camp	Florida Largemouth Bass	Fingerlings	50
Toledo Bend Reservoir	Florida Largemouth Bass	Fingerlings	947,430
	Florida Largemouth Bass#	Fingerlings	55,000
Turkey Creek Lake	Florida Largemouth Bass	Fingerlings	60,000
Twin Lakes Pond	Bluegill	Fingerlings	270
	Channel Catfish	Phase II Fingerlings	100
	Redear Sunfish	Fingerlings	250
University Lake	Channel Catfish	Fingerlings	2,000
	Florida Largemouth Bass	Fingerlings	1,500
Vernon Lake	Florida Largemouth Bass	Fingerlings	10,000
Veteran's Park	Channel Catfish	Fingerlings	300
Waddill Ponds	Florida Largemouth Bass	Adults	20
Wallace Lake	Florida Largemouth Bass	Fingerlings	10,500
West Feliciana Parish Sports Park	Channel Catfish	Fingerlings	150
	Florida Largemouth Bass	Fingerlings	50
Woolen Lake	Florida Largemouth Bass	Adults	90
TOTAL			***8,677,530***

*Fish stockings by the LDWF Hatchery program, Lake Claiborne Watershed District Commission (indicated by +), Red River Waterway Commission (indicated by *), and Toledo Bend Lake Association (indicated by #) by species and/or sub-species, and size, July 1, 2018 - June 30, 2019.*

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 20,000 Louisiana citizens in FY 2018-2019.

The Fisheries Extension staff conducted fishing workshops and family events which focused on Sport Fish Restoration projects and providing hands-on fishing experience.

LDWF staff also worked effortlessly to recruit more women to the sport of fishing. LDWF staff hope to offer knowledge and experience to help the women gain confidence in order to continue fishing as well encourage others to participate. A partnership between LDWF, the Coastal Conservation Association of Louisiana and Cabela's afforded women two opportunities to attend a one-day Women's Fishing Workshop to learn the fundamentals of fishing. Upon completion of each one-day workshop, participants were entered into a lottery drawing for an opportunity to attend a Women's Fishing Weekend in Grand Isle.

Through Fisheries Extension's Aquatic Volunteer Instructor Program, another 80 volunteers have been trained to help teach others about Louisiana's great fisheries. These volunteers were trained all across the state of Louisiana and have assisted at multiple events where LDWF otherwise would not have had representation. The Aquatic Volunteer Instructor Program provided activity guides, lesson plans and LDWF resources for volunteers to utilize. In addition, loaner kits with equipment necessary to offer the activities and lessons were available to all certified volunteers.

In November 2018, LDWF hosted a Get Out and Fish! event at Sidney Hutchinson Park in Walker, LA. This event was held to launch Sidney Hutchinson Park as the newest site to join the Get Out and Fish! community fishing program. 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,

LDWF Volunteer Instructor Don Montgomery teaches a Women's Workshop participant how to clean fish.

***LEFT:** Anglers gather around the pond to fish at the Get Out and Fish! event at Sidney Hutchinson Park in Walker, La.* ***RIGHT:** Youth participants from the Get Out and Fish! event at Sidney Hutchinson Park in Walker, La.*

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 2018-2019, 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

Four aquatic education clinics were held across the state, with 1,610 total participants. Subjects covered at these clinics and workshops include invasive species, boating safety, fish identification, tackle selection, casting, and fishing techniques. Participants also had an opportunity to go fishing.

PUBLICATIONS

Three publications were distributed to teachers in Louisiana schools for classroom use. These publications promote appreciation of aquatic resources and habitats.

- "Fishing For Fun" - 4,866 distributed
- "Let's Go Fishing" - 5,836 distributed
- "Finnie the Fingerling" - 3,347 distributed

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 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 2018-2019 school year, 15 schools and approximately 2,000 students participated in the program.

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 2018, 24 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.

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 re-

new 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 has been to build the interest of the program amongst the public to demand Louisiana seafood

As of FY 2018-2019 there were a total of 52 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. The first surveillance audit is scheduled for July 2019.

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 first and second year audits in 2017 and 2018 and is scheduled to be audited again in the fall of 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 is expected to be awarded by the Global Sustainable Seafood Initiative in September 2018.

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 fishery improvement project encompassing issues identified in both pre-assessments. A shrimp by-catch study in support of these fishery improvement projects began in July 2019 and will continue through June 30, 2020.

COMMERCIAL SEAFOOD INDUSTRY PROFESSIONALIZATION

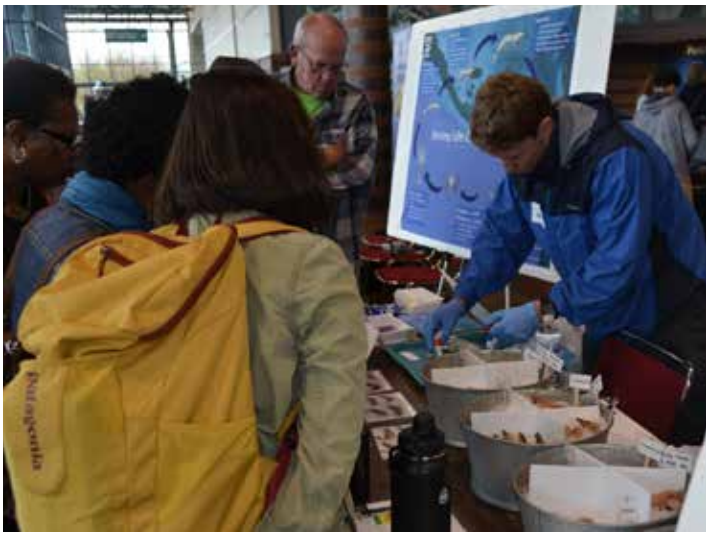
The primary goal of Louisiana Fisheries Forward, the voluntary industry professionalization program, is to create a better-informed and more efficient commercial fishing industry that helps ensure the economic sustainability of the state's commercial fishing industry. The program provides ongoing education 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 2018 to June 2019, LDWF and Louisiana Sea Grant continued to execute Phase IV of Louisiana Fisheries Forward; mainly, the production of educational materials (referred to as fast fact sheets), the

TABLE 18. Louisiana Fisheries Forward Commercial Crab Gear Requirement.

PROGRAM STATUS	APPRENTICESHIP	SPONSORSHIP	GRAND TOTAL
Applicant Ineligible	4	23	**27**
Approved	20	52	**72**
Conditionally Approved	0	0	**0**
M S Ineligible	6	20	**26**
In Review	0	4	**4**
Opt Out	0	3	**3**
Program Completed	30	69	**99**
Grand Total	**60**	**171**	**231**



Louisiana Fisheries Forward Summit.

offering of in-person training sessions (referred to as dock days), a refrigeration demonstration project, the Louisiana Fisheries Forward website (*lafisheriesforward.org*) and reviewing our biannual fisheries summit. Within the time frame stated above the Commercial Crab Trap Gear Requirements and the Oyster Harvester Training Requirements remain 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):

- Freshwater Fish Handling
- Barotrauma
- Oyster Regulations Recap
- Seafood Product Labeling

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 2018-2019, there were approximately 72 active participants and approximately 99 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 2018-2019, the Shrimp Task Force met on July 11, 2018, Sept. 26, 2018, Dec. 5, 2018, Jan. 16, 2019, March 27, 2019, May 1, 2019, and June 21, 2019.

Agenda items discussed include:

- Discuss shrimp prices
- 2018 Louisiana Fisheries Forward sediment diversion panel results
- Discuss seat vacancies and alternates
- Discuss 2019 shrimp bycatch study and importance for shrimp sustainability program
- Recommendations for fall 2018 and spring 2019 shrimp seasons
- Updates on inshore/near shore artificial reef sites
- Coordinated Shrimp Task Force trip to Washington, D.C. to host Hill meetings and participate in the 2020 Louisiana Alive event
- Updates on the Gulf Hypoxia Action Plan
- Discuss shrimp violations and possible legislature changes
- Updates from the LA Seafood Future
- Discuss 2019 flood event and fisheries disaster

CRAB TASK FORCE

During FY 2018-2019, the Crab Task Force met on July 31, 2018, Sept. 18, 2018, Nov. 13, 2018, Dec. 4, 2018, Feb. 5, 2019, March 25, 2019, and June 4, 2019.

Agenda items discussed include:

- Discuss the proposed 2019 and 2020 derelict crab trap removal areas
- Discuss crab violations/escape rings and legislation changes
- Update on finfish stocks
- Discuss 2019 blue crab management options
- 2018 Louisiana Fisheries Forward sediment diversion panel results

- Updates from the LA Seafood Future
- Discuss crab grading requirements while onboard vessel
- Discuss changing crab time restriction to 1 hour before sunrise
- Consider legislation draft bills on escape rings and crab violations
- Updates on the Gulf Hypoxia Action Plan
- Discuss crab container labeling and splitting different crab catches at the docks
- Hear an update on the 2019 blue crab stock assessment
- Discuss 2019 flood event and fisheries disaster

OYSTER TASK FORCE

In FY 2018-2019, the Oyster Task Force met on July 30, 2018; Sept. 25, 2018; Nov 7, 2018; Jan. 9, 2019; Feb. 26, 2019; April 16, 2019; May 14, 2019; and June 25, 2019.

Agenda items discussed include:

- 2018 Oyster Stock Assessment and season recommendations
- 2018-2019 Oyster Season
- Inshore artificial reef sites
- Enforcement drone purchasing and training
- Gulf Hypoxia Action Plan and Louisiana's State strategy
- Oyster Bedding Season and enforcement
- Discussion of standardized method used in determining percentage of non-living cultch material in bedding loads
- Update on Pearl River Project
- Updates on the Coastal Fisheries Industry Adaptation Workgroup
- Commercial licensing restructuring
- 2019 oyster industry convention funding
- Funding for 2019 Oyster Task Force Washington D.C. trip
- Oyster lease moratorium lifting
- Storm surge barriers and oyster industry expansion
- Increased surveillance of AOC water quality
- Cultch material removal from bedding loads of harvesters on public seed grounds
- Consider funding for an oyster industry marketing plan
- Consider funding the 2020 Louisiana Seafood Summit
- Discuss the Governor's request for federal disaster declaration for LA fisheries
- Oyster mortality surveys related to 2019 flood event
- Discuss regulation and enforcement of oyster lease marking poles
- Discuss letters of support for oyster research

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.

FINFISH TASK FORCE

During FY 2018-2019, the Finfish Task Force met on July 20, 2018

Agenda items discussed included:

- Update on the status of black drum and discussion on potential changes to recreational and commercial harvest, size and bag limits
- Discussed mullet fishery issues
- Discussed finfish trawling
- Discussed the status of the recreational red snapper season
- Discussed shad seine gear regulations

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 2018-2019, five 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. 24, 2018, 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 exit surveys of 160 participants in this event. Results of this survey were completed and sent to the LDWF Public Information Section in September 2018.

SURVEY OF LOUISIANA ANGLERS WHO USED ARTIFICIAL REEFS

Socioeconomic Research and Development staff conducted an on-line survey of 2,926 license holders with saltwater fishing privileges in May 20197. The survey assessed anglers' use and perception of artificial reefs in Louisiana. The survey received 644 responses for a response rate of 23.2 percent of the sample adjusted for non-deliverable surveys.

PUBLICATIONS, REPORTS AND PRESENTATIONS

Isaacs, Jack C. "Louisiana Commercial Shrimp Landings: 1980 - 2017." Presentation Given to the Louisiana Shrimp Task Force, December 2018.

Isaacs, Jack C. "Gulf of Mexico Commercial Shrimp Landings and shrimp Imports: 1980 - 2017." Presentation Given to the Louisiana Shrimp Task Force, January 2019.

Isaacs, Jack C. "Entry Exit and Continuous Participation in Louisiana's Fisheries Markets among Licensed Seafood Dealers." Presentation at the meeting of the Center for Natural Resource Economics and Policy, May 2019.

Isaacs, Jack C. "Trends in Specialty Recreational Fishing License Sales." Presentation at the meeting of the Center for Natural Resource Economics and Policy, May 2019.

Smith, David, Steve Midway, and Jack Isaacs. "Characterizing the Southern Flounder Fishery in Louisiana." Poster presented at the meeting of the Center for Natural Resource Economics and Policy, May 2019.

REPRESENTATION ON TASK FORCES, STUDY GROUPS AND COMMITTEES

During FY 2018-2019, 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 NRDA 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 of 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.
2. RP/EA #4: Nutrient Reduction (Nonpoint Source) and Recreational Use, which approved projects by the Louisiana Trustee Implementation Group (LA TIG) to improve water quality by reducing nutrients from nonpoint sources and to compensate for recreational use services lost as a result from the 2010 Deepwater Horizon oil spill.

In RP/EA #2, three fisheries projects were approved: Statewide Artificial Reefs project, Elmer's Island Recreational Access project, and the Lake Charles Science and Educational Center. In FY 18-19, several statewide artificial reef projects went out to bid for construction. The Elmer's Island Recreational Project completed final engineering and design on the construction elements of the project. In October of 2018, the LA TIG was approached by the City of Lake Charles to consider a location change that would co-locate the future science center with the Lake Charles Children's Museum at the planned Port Wonder facility, a future education and recreation development; the LA TIG released a draft RP/EA for the project location change for public comment on April 20, 2019.

OYSTER RESOURCES

Replenish and Protect Living Coastal Marine Resources (LCMR) was a major restoration category of settlement funds, and includes $26 million of dedicated funding for oyster restoration in Louisiana. On April 5, 2019, LA TIG approved funding to develop RP/EA #5, the first restoration plan in LA for LCMR type projects, which will focus on marine mammals and oysters. By July 2019, trustees had drafted project screening criteria for oyster resources and development of this restoration plan will continue through FY 19-20, with an anticipated release of the final plan being accomplished in August 2020.

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 include: 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 will provide Louisiana the ability to manage the private recreational red snapper fishery in both state and federal waters, giving 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

BOAT - NASBLA Boat Operations and Training Program
CWD - Chronic Wasting Disease
CWPPRA - Coastal Wetlands Planning, Protection and Restoration Act
DMAP - Deer Management Assistance Program
FY - Fiscal Year
GULF - Audubon Gulf United for Lasting Fisheries
GULF RFM - Audubon Gulf United for Lasting Fisheries - Responsible Fisheries Management
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
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
WDP - Wildlife Diversity Program
WLWCA - White Lake Wetlands Conservation Area
WMA - Wildlife Management Area