



LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

2015-2016 ANNUAL REPORT



LOUISIANA DEPARTMENT OF **WILDLIFE & FISHERIES** 2015-2016 ANNUAL REPORT

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



Administration for fiscal year 2016-2017

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LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

ORGANIZATIONAL OVERVIEW

OFFICE OF SECRETARY

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

➔ ENFORCEMENT DIVISION

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

➔ PUBLIC INFORMATION

The Public Information section was moved under the Office of the Secretary later in FY 2015-2016. The Public information section is responsible for media relations, all print publications (regulation brochures, "The 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: 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.

OFFICE OF WILDLIFE

The Office of Wildlife consists of the Wildlife Division, Coastal & Non-game Resources Division, Habitat Section and Minerals Management Section.

➔ 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 are the primary division responsibilities. This responsibility is addressed through major programs: Rockefeller Wildlife Refuge; White Lake Wetlands Conservation Area; Fur Advisory Council; Natural Heritage Program; Oil Spill Response; Natural Resource Damage Assessment; Alligator and Furbearer Program; Alligator Advisory Council; and Coastal Operations Program.

➔ EDUCATION

The vital Hunter & Aquatic Education program provides mandatory hunter training to thousands of students annually and promotes hunting, fishing, archery, firearm safety, and conservation. The Environmental Education program provides information and resources to PK-16 educators and students and acts on behalf of the Governor-appointed Environmental Education Commission.

➔ MINERALS MANAGEMENT & HABITAT SECTIONS

Minerals Management is responsible for ensuring that oil and gas activities on all LDWF properties are carried out in a manner that is compatible with the environment and management area goals and objectives. By administering regulatory programs or by coordinating regulators, the Habitat Section seeks to conserve fish and wildlife resources, in particular wetlands.

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 six sections: Marine Fisheries, Inland Fisheries, Fish Management, Fisheries Extension, Fisheries Oversight, and Fisheries Administration.

A Word from the Secretary

The Louisiana Department of Wildlife and Fisheries is known for its service to the people of the state whether they be outdoor enthusiasts or not. It is also recognized for its research and tireless labor in making sure our abundant natural resources thrive even with the many challenges faced.

The 2015-2016 fiscal year showcased the outstanding work of the department in those areas and many others.

LDWF enforcement agents were called upon in rescue efforts during the March 2016 flooding event and served admirably. The department also celebrated two impressive milestones during the spring of 2016 with the delisting of the Louisiana black bear and the first whooping crane wild chick hatching in more than 75 years.

From March 8-16, 2016, enforcement agents rescued a total of 805 people and 148 animals during a statewide flooding event. The role of enforcement agents also focused on providing public safety protection, maritime security, crime prevention and detection throughout the 37 parishes that were affected by the slow-moving storm.

Enforcement agents made 719,112 contacts with the public in fiscal year 2015-2016, the majority of whom were in compliance with state and federal regulations. Agents issued 11,385 criminal citations and 5,625 warnings.

The Enforcement Academy added two new classes and 16 agents to the staff. In November of 2015 the 29th class graduated followed by the 30th class in June of 2016.

The Office of Wildlife observed several notable achievements during fiscal year 2015-16, many that have been years in the making.

After nearly 25 years, the Louisiana black bear was added to an impressive list of recovery efforts made in the state. In April of 2016, it was announced the bear had been removed from the U.S. Fish and Wildlife Service's list of species protected by the Endangered Species Act. The work, however, is not finished as LDWF and its many partners will work on a post-delisting monitoring plan for seven years to help ensure the bear's future remains secure.

Also in April, the whooping crane reintroduction program in Louisiana witnessed the first hatching of a chick since 1939 in Jefferson Davis Parish. The hatching represents another step forward in the program established in February of 2011 when LDWF reintroduced whooping cranes back into the state at the White Lake Wetlands Conservation Area in Vermilion Parish.

The Wildlife Division continues to work to improve public lands in the state. It manages more than one million acres in the Wildlife Management Area program



throughout the state. The primary mission is to deliver conservation priorities to Louisiana's landscape as well as provide an array of outdoor recreational activities to the public.

The LA Creel Program produced vital information to our fisheries biologists during the fiscal year. Through in-person interviews of recreational fishing trips along Louisiana's coast, LA Creel surveyed more than 30,000 anglers and more than 86,000 fish were counted. The program also utilizes telephone surveys to gauge fishing effort by our anglers.

LDWF continues to work to develop new and updated fishery management plans to strategically implement science-based management recommendations.

Part of that work is the LDWF leading collaborative research in lakes Pontchartrain and Borgne to study movements and habitat preferences of several fish species, including juvenile bull sharks, using acoustic telemetry technology.

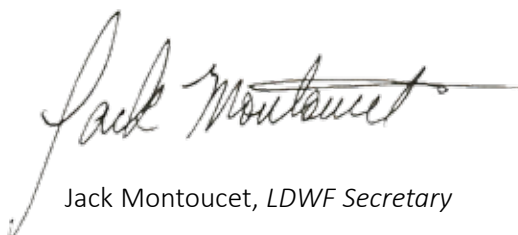
Our Inland fisheries biologists are working to get a handle on invasive species that threaten healthy habitats and access opportunities to Louisiana's waters. The Aquatic Plant Control Program strives to provide the public with safe and usable fishing and boating access. Aggressive treatment of affected waters (using chemical, mechanical and biological techniques)

continued during fiscal year 2015-16 to restore and improve the aquatic habitat and natural balance of plants and fish.

Our Get Out and Fish! program continues to recruit new anglers and, we hope, a new generation of fishermen and women. Three new locations for free public fishing were added during fiscal year 2015-2016, including Zemurray Park in Hammond, Sidney D. Torres Memorial Park in Chalmette and BREC's Burbank Park in Baton Rouge.

More than 800,000 customers were served by the Office of Management and Finance, and more than 2.6 million recreation hunting, fishing, trapping and non-consumptive use licenses were issued. OMF also handled 222,000 boat registration/title transactions while maintaining more than one million records on watercraft.

These are only some of the highlights of a busy year for the Louisiana Department of Wildlife and Fisheries. The details that follow illustrate more completely what is involved in this agency's natural resource management efforts.



Jack Montoucet, *LDWF Secretary*



Office of Secretary

ENFORCEMENT DIVISION



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

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

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

- Constitution of the State of Louisiana
- Louisiana Revised Statutes
- U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration/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/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 287,557 patrol hours in FY 2015-2016: 216,738 on land and 70,819 on water. Agents made 719,112 contacts with the public, the majority of whom were in compliance with state and federal wildlife and fisheries regulations. LDWF-LED agents issued 11,385 criminal citations and 5,625 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, and failure to comply with deer tagging or harvest record regulations.

ORGANIZATIONAL STRUCTURE & PERSONNEL

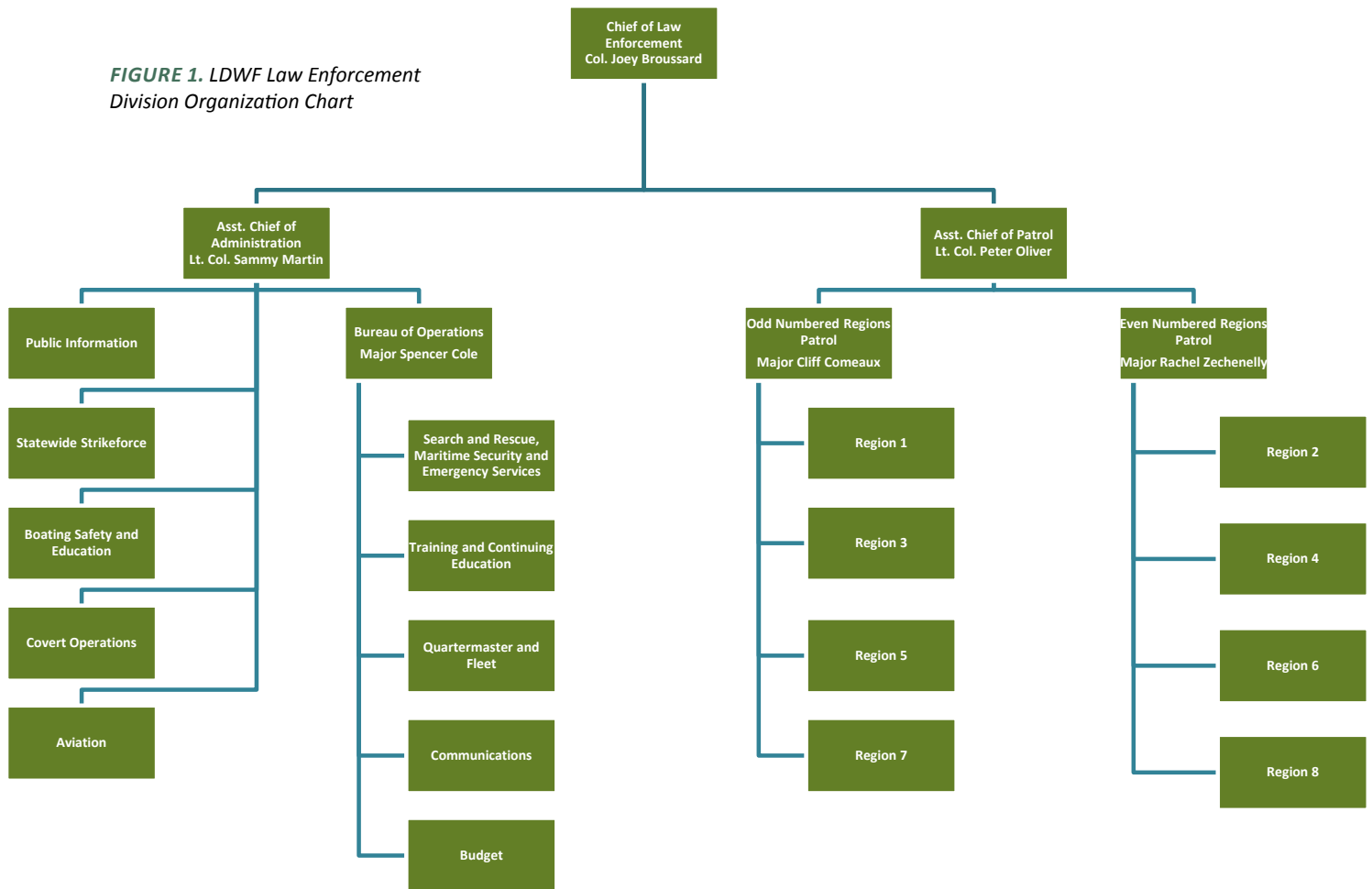
LDWF-LED is organized in a paramilitary structure to assure the efficient use of resources, consistent statewide enforcement policy, and

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 who serves as assistant chief of administration which includes state boating law administrator, statewide strikeforce, covert, public information, and aviation sections supervisor. The other Lieutenant Colonel serves as the assistant chief of patrol and supervises all state regional field operations. There are three majors: one over the even-numbered enforcement regions of the state who serves as policy and procedure administrator; one over the odd-numbered regions who serves as safety coordinator; and one over the emergency services, training, support and budget sections.

The LDWF Enforcement Division headquarters staff works out of Baton Rouge headed by Col. Joey Broussard who was promoted to the head position in July 2014. Col. Broussard, a native of Pointe Coupee Parish, graduated from the LDWF cadet academy in 1991, receiving his POST certification from LSU, and has been an agent for over 24 years.

The Enforcement Division is divided into eight enforcement regions (*Figure 2*) and one statewide strikeforce region. 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.

FIGURE 1. LDWF Law Enforcement Division Organization Chart



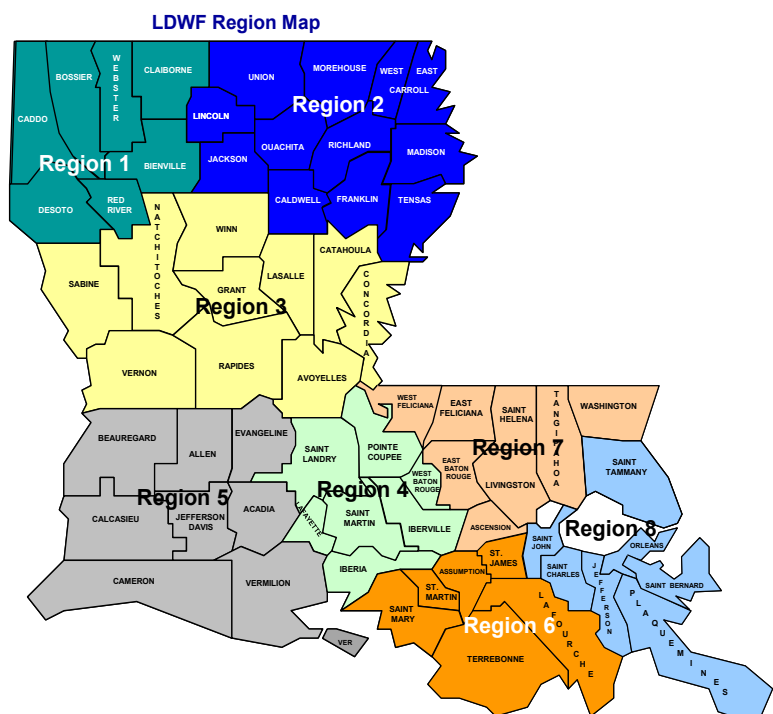
Total division head count is 257 positions including 235 enforcement agents, 24 administrative staff, six communications officers and two pilots. The actual number of filled positions (as of January 2016) is 235.

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.

FIGURE 2. Enforcement Division Regions



SPECIALIZED UNITS

LDWF-LED contains four specialized units with selected missions or purposes: the Special Operations Section; the Statewide Strike Force; the Maritime Special Response Team; and the Aviation Section. 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.

SPECIAL OPERATIONS SECTION

The Special Operations Section houses covert operations in which undercover agents work to stem the illegal sale of fish and wildlife, develop information about ongoing criminal enterprises, and address major violations of state and federal law.

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 wildlife management areas 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 (CBRNE) 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.

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 320,000 registered boats, Louisiana contains many geographic, demographic and economic features that pose special challenges for boating safety enforcement. LDWF-LED agents made 211,190 public contacts during the course of 56,718 patrol hours dedicated to boating enforcement, education and accident investigation in FY 2015-2016. Of those hours, 41,936 patrol hours were performed in vessels on the water.

The adoption of "Rules of the Road" regulations for boaters has enhanced the enforcement of boating safety regulations and boating under the influence laws. These regulations provide the boating public with clear rules for the manner in which boats are operated and are an important tool in determining

fault in boating accidents. The "Rules of the Road" also enhance the ability of agents to address reckless and careless operation of motorboats. In FY 2015-2016, LDWF-LED agents issued 39 citations for careless and reckless operation of a vessel and 75 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. 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



An agent on a boating safety patrol.



Agents teaching kids at summer camp about paddling safety.

each region for anyone who wishes or is required by Louisiana law to take them. In FY 2015-2016, 10,585 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 94,413 students.

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

LDWF participated in "Safe Boating Week" in Louisiana from May 21-27, 2016. LDWF Enforcement Division agents were out in full force as always during the week to perform boating safety checks and driving or operating a vessel while intoxicated (DWI) patrols.

LDWF sponsored two summer day camps for children 11 to 16 years old at the Waddill Outdoor Education Center in Baton Rouge this summer. The camps were held from July 20-24, 2015 and again from June 6-10, 2016. Each camp was completely free of charge and allowed participants to receive their official boater and hunter education certifications. A total of 23 children received their boating and hunting education certificates during the camps.

LDWF certified 179 boaters statewide after their sixth "Boating Education Lagniappe Day" on April 23, 2016. Boating Education Lagniappe Day was a part of the National Association of State Boating Law Administrators (NASBLA) "Spring Aboard" national marketing campaign to promote opportunities for boaters to enroll in a boating education course. Lagniappe Day ran from 9 a.m. to 5 p.m. at nine 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 once again participated in NASBLA's Operation Dry Water from June 24-26, 2016. During Operation Dry Water, agents stepped up patrols looking for operators of vessels who were impaired or under the influence of alcohol or drugs. During the weekend, agents made one boating under the influence case and issued 116 safe boating citations.

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.

Emergency Support Function Annual Support Plan for our search and rescue partners has been completed. LDWF-LED completed its

five-year update of the Search and Rescue Emergency Support Function Annex Plan to the State Emergency Operations Plan.

LDWF-LED agents rescued a total of 805 people and 148 animals during a statewide flooding event that occurred from March 8-16, 2016. During this time the state experienced a strong storm system that brought heavy rainfall, flash flooding, river flooding and damaging winds across the state. The event resulted in a state declaration of emergency in all parishes and a federal declaration in 37 parishes. The role of LDWF-LED for this event primarily focused on providing public safety protection, maritime security, search and rescue, and crime prevention and detection throughout the impacted and surrounding areas. After the initial response effort, LDWF-LED continued to provide the parishes with support through the enforcement of waterway restrictions and providing public safety throughout the impacted area until May 23, 2016.

An LDWF agent rescued eight people from the Gulf of Mexico on Sept. 6, 2015 in Vermilion Parish.

LDWF agents rescued 23 people from a flooded trailer park in Tangipahoa Parish on Oct. 26, 2015.



Agents participating in search and rescue efforts for the March and August floods.

AGENT TRAINING PROGRAM

LDWF-LED began construction on a new training academy and emergency response facility. This project will support the mission of the 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, and will support the state's lead emergency support function agency for search and rescue response and maritime security. This project will also further develop existing training infrastructure to maximize benefits for the 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.

LDWF-LED completed construction on a swimming pool that is located at the training academy.

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 2015, agents completed their annual and fall in-service training requirements which consisted of the following:

ANNUAL

- active shooter training (advanced law enforcement rapid response training)
- first aid/blood borne pathogens/CPR for the professional rescuer
- defensive tactics/officer survival/use of force
- firearms
- DWI (intox. 5000, intox 9000, standardized field sobriety testing, boating under the influence seated test battery, la drive)

FALL

- Firearms

FIREARMS

LDWF added two agents to its cadre of firearms instructors. These agents completed the selection, qualification and training process to become certified LDWF and peace officer standards and training (POST) firearms instructors.



Agents participating in firearms training.



New cadets are sworn in as agents at an LDWF Cadet Academy Graduation.

tors. They 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.

LDWF added two agents to its cadre of advance law enforcement rapid response training (ALERRT) instructors.

LDWF currently has three agents that are certified as simunition instructors. This certification will enable the division to enhance firearms/officer survival/use of force training through more “force on force” training.

DWI

One agent was certified as a drug recognition expert (DRE), bringing our total to 11 DREs. One agent was certified as a DRE instructor. LDWF-LED now has two DRE instructors to bolster the LDWF DRE program.

MARINE LAW ENFORCEMENT TRAINING PROGRAM

At the end of 2015, all agents had completed their annual recertification as boat operators for search and rescue in the NASBLA Boat Operations and Training Program.

CRISIS INTERVENTION OR CRITICAL INCIDENT TRAINING

LDWF selected four agents to complete training 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.

ACADEMY

The LDWF Law Enforcement Academy on Nov. 24, 2015 graduated its 29th class and on June 29, 2016 graduated its 30th class of cadets into the ranks of LDWF Law Enforcement Division Agents. A ceremony for each graduating class was held in Baton Rouge. After completing over six months of intensive physical and academic training at

the academy, the 16 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 \$834,466 in FY 2015-2016 to patrol for compliance with federal commercial and recreational fisheries regulations, primarily in the Gulf of Mexico. Several patrol vessels and other necessary equipment have been acquired under this program. Agents have been very successful identifying illegal and unregulated fishing activity and obtaining a number of large cases involving commercial and recreational violations.

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 LDWF and their tip to 847411 or download the "LDWF 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 2016 year, Operation Game Thief paid out \$15,600 in rewards. The Operation Game Thief board reviewed a total of 38 cases with a total of 58 subjects apprehended and a total of 456 offenses/violations. The total amount of rewards paid by Operation Game Thief since its inception 30 years ago is \$391,300.

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 (GOHSEP), LDWF-LED is the lead agency for search and rescue operations during natural disasters and mari-

time 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 GOHSEP 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 (MSRT) 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-LED's federal, state and local partners.

During this period the LDWF-LED MSRT team completed their annual training which consists of:

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

At the end of 2015, MSRT members had completed their annual recertification as Tactical Operators Course in the NASBLA Boat Operations and Training Program.



An agent performs a license and creel check on recreational fishermen.

PREVENTATIVE RADIOLOGICAL AND NUCLEAR DETECTION (PRND)

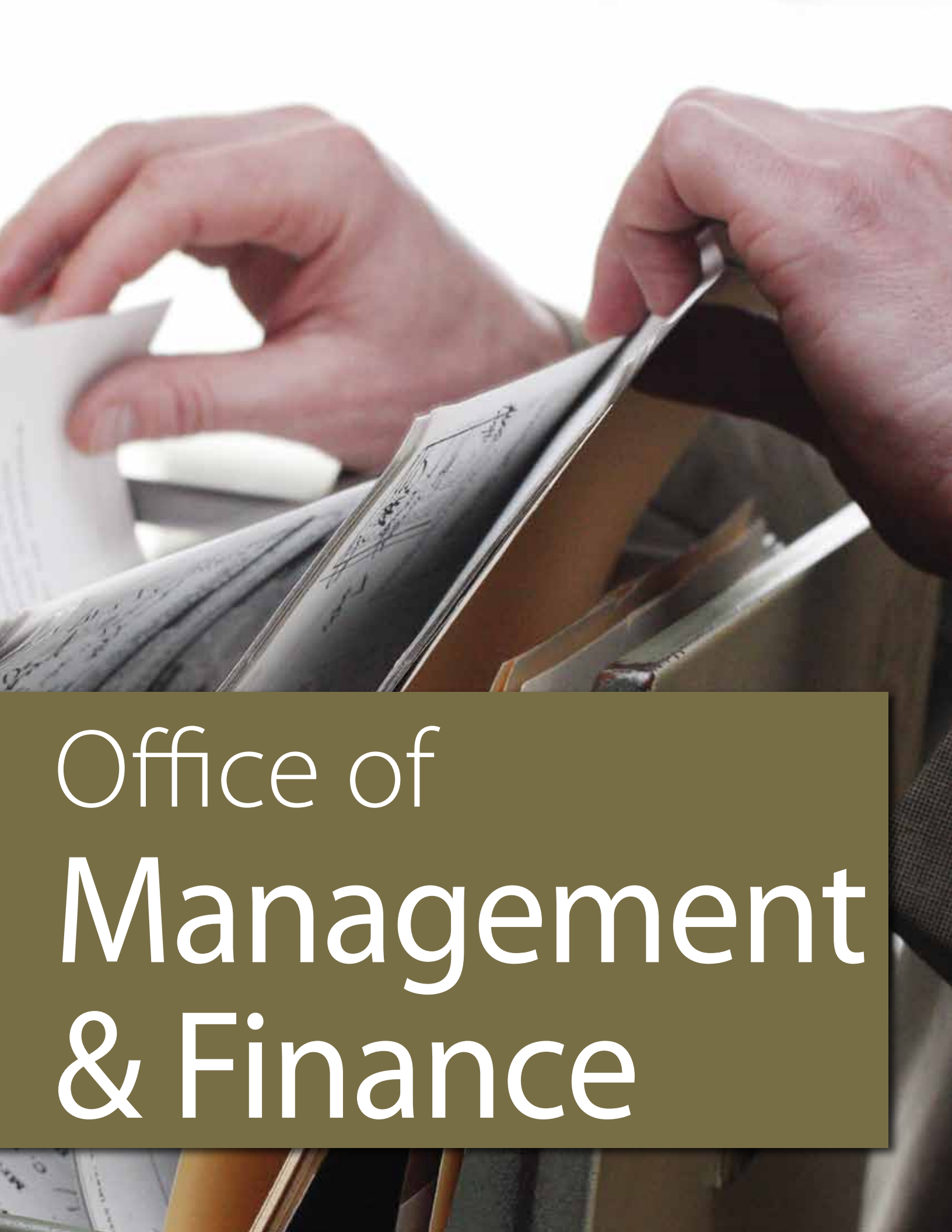
LDWF continues to work with key local, state and federal partners to implement a PRND program in the state of Louisiana. Through our partnership with the Domestic Nuclear Detection Office, the state has developed a statewide concept of operations plan, as well as standard operating procedures for individual agency partners. The state recently completed a table top exercises which is an important piece to the statewide implementation of the PRND program.

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 133 enforcement related press releases during FY 2015-2016. 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.



Office of Management & Finance

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 2.6 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 70,000 lifetime licensees.
- 65,000 commercial licenses sold, representing 12,714 commercial fishermen, 3,000 business entities, 900 charter businesses, and various permits that generate in excess of \$4 million in revenue.
- 222,000 boat registration/title transactions that generated in excess of \$4.7 million in revenue. Maintained boat data in excess of 1 million records - 322,159 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 2.8 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 five full-time employees.

PROPERTY CONTROL PROGRAM

During FY 2015-2016 this program certified a moveable property inventory which consisted of 10,093 items for a total acquisition cost of \$82,188,148. 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 1,070 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 890 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 goal of the Fiscal Section is to achieve compliance with all applicable laws, rules, policies and regulations governing the functions managed. This section develops and implements fiscal controls, provides advice, assistance and training, and standardizes procedures for approximately 875 employees.

The functions include:

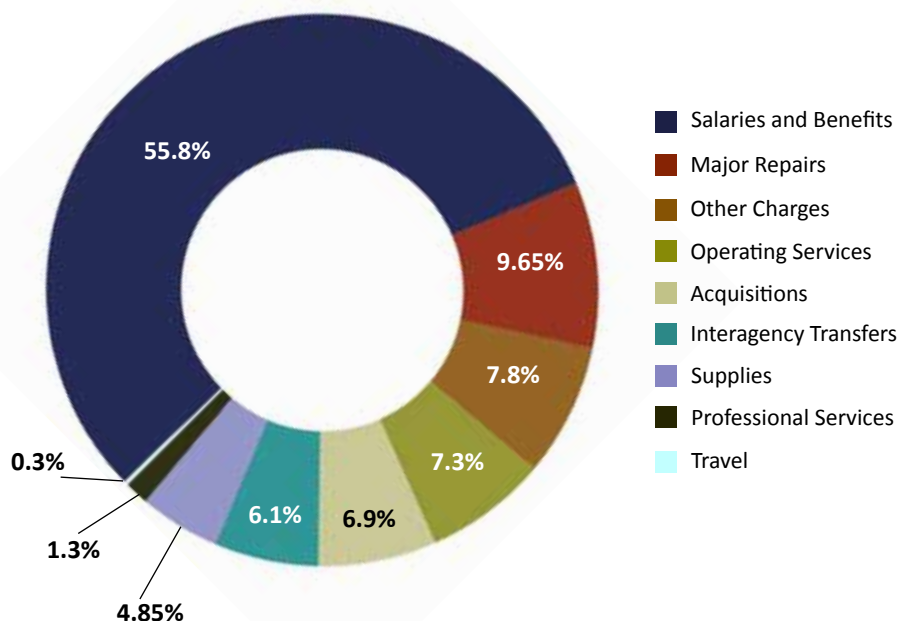
- budget and expenditure control and monitoring.
- federal grant tracking and reporting.
- preparation of all required financial reports.
- reviewing and processing professional and consulting contract payments.
- payment of all vendors.
- receipt and classification of various sources of revenue.
- fund management.
- assessment of civil fines.
- processing of employee travel reimbursements.
- strategic and operational planning.
- financial management of FEMA projects and other disasters.

During FY 2015-2016, the Fiscal Section staff:

- prepared four agency budgets consisting of five programs totaling \$183 million
- audited and processed 586 contract invoices payments with a total amount payable of \$19.2 million.
- processed 9,155 vendor invoice payments.
- audited and processed 16,351 purchasing card transactions.
- audited and processed 1,284 travel reimbursements.
- processed 448 checks through Quick-Books.
- warranted funds and prepared periodic reports for 121 federal grants.
- warranted funds and prepared periodic reports for 12 self-generated agreements.
- warranted funds and prepared periodic reports for 14 interagency agreements.
- deposited \$48.8 million in receipts from various sources on 548 pay in vouchers.

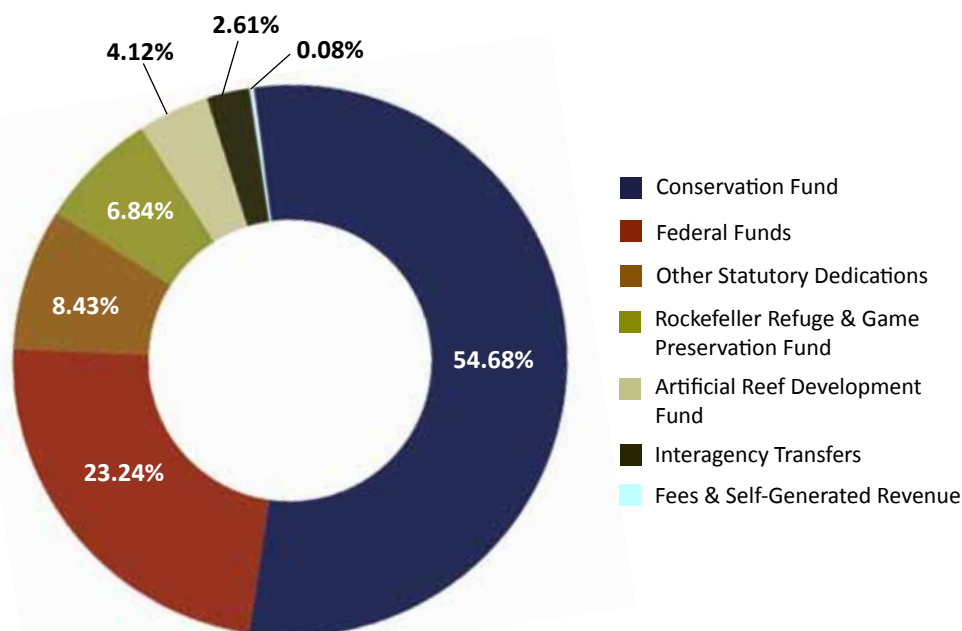
LDWF EXPENDITURES BY CATEGORY (FY 2015-2016)

Total Expenditures: \$135,307,786



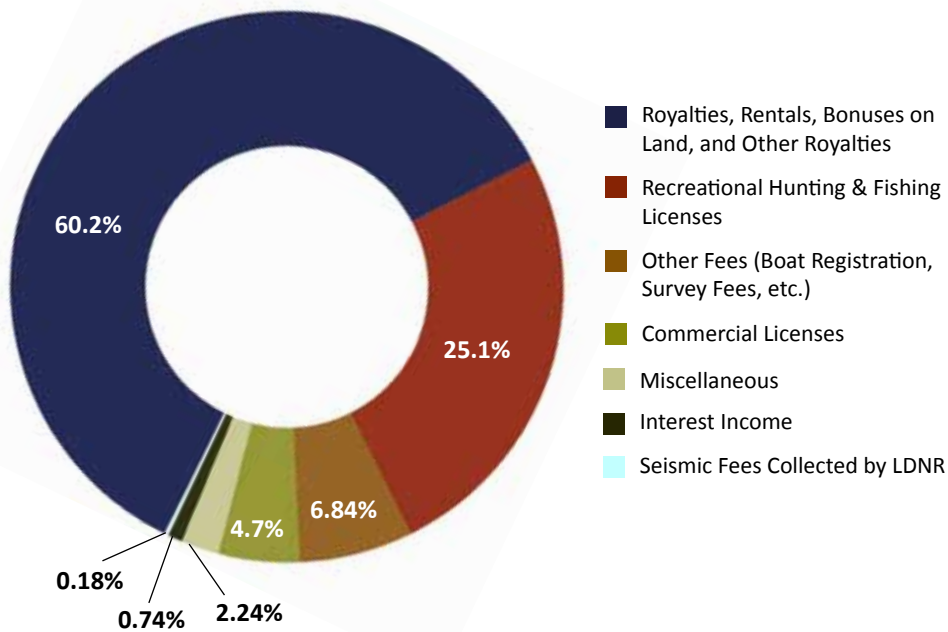
HOW EXPENDITURES WERE FUNDED (FY 2015-2016)

Total Means of Financing: \$135,307,786



SOURCES OF REVENUE TO THE CONSERVATION FUND (FY 2015-2016)

Total Revenue: \$74,654,117

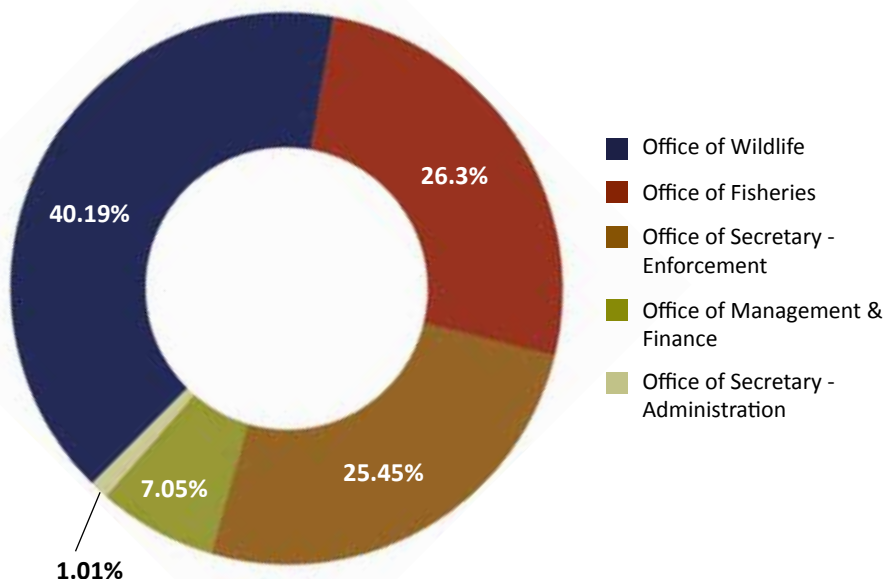


EXPENDITURES BY CATEGORY	
Salaries and Benefits	75,486,538
Major Repairs	13,054,070
Other Charges	10,555,225
Operating Services	9,893,883
Acquisitions	9,330,907
Interagency Transfers	8,208,476
Supplies	6,567,517
Professional Services	1,741,049
Travel	470,121
TOTAL	\$135,307,786

HOW EXPENDITURES WERE FUNDED	
Conservation Fund	73,987,646
Federal Funds	31,446,836
Other Statutory Deductions	11,401,851
Rockefeller Refuge & Game Preservation Fund	9,265,626
Artificial Reef Development Fund	5,576,333
Interagency Transfers	3,527,327
Fees & Self-Generated Revenue	102,167
State General Fund	0
TOTAL	\$135,307,786

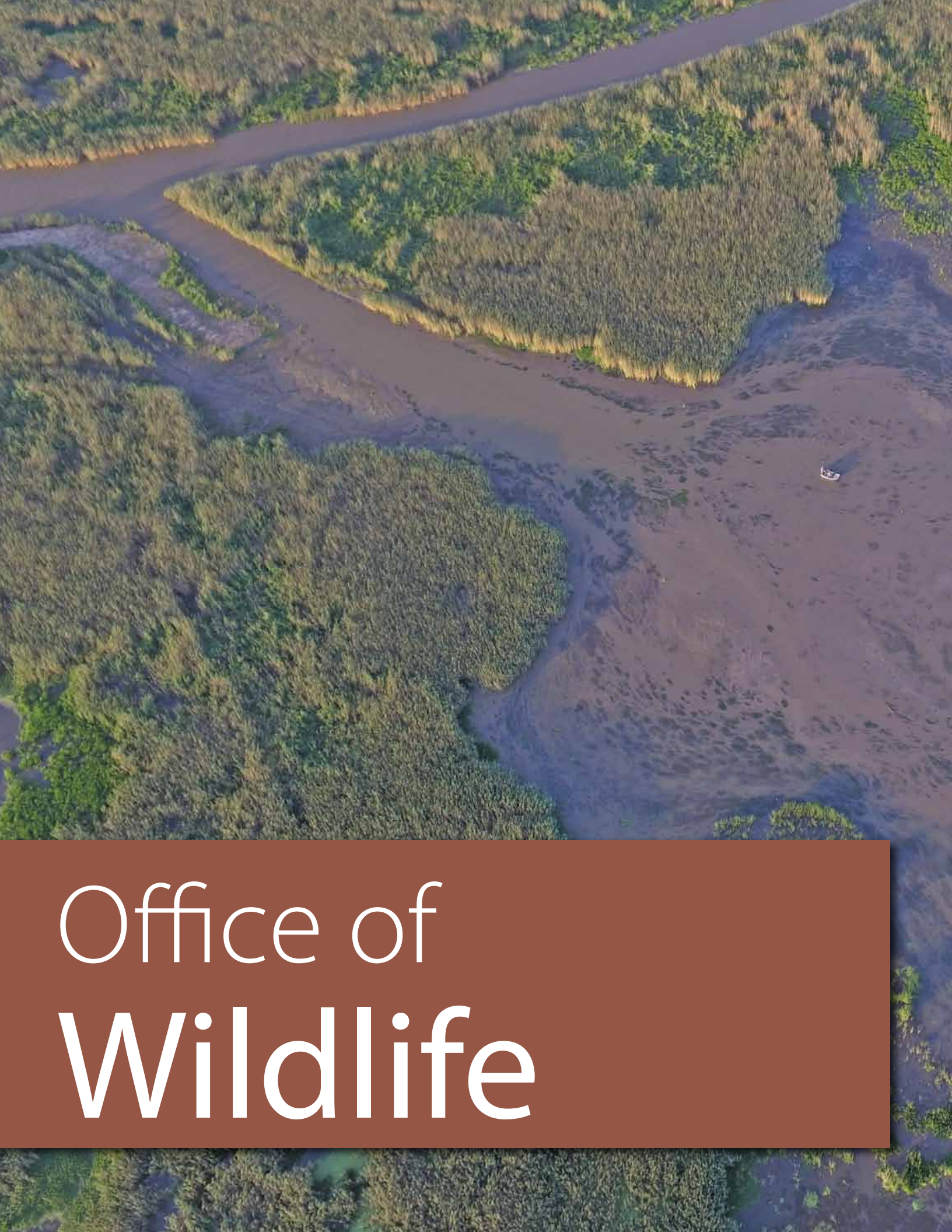
LDWF EXPENDITURES BY PROGRAM (FY 2015-2016)

Total Expenditures: \$135,307,786



SOURCES OF REVENUE TO THE CONSERVATION FUND	
Royalties, Rentals, Bonuses on Land, and Other Royalties	44,921,970
Recreational Hunting & Fishing Licenses	18,745,771
Other Fees (Boat Registration, Survey Fees, etc.)	5,107,959
Commercial Licenses	3,519,286
Miscellaneous	1,672,625
Interest Income	555,729
Seismic Fees Collected by LDNR	130,777
TOTAL	\$74,654,117

EXPENDITURES BY PROGRAM	
Office of Wildlife	54,377,262
Office of Fisheries	35,582,247
Office of Secretary - Enforcement	34,441,443
Office of Management & Finance	9,542,474
Office of Secretary - Administration	1,364,360
TOTAL	\$135,307,786



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. 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 personnel of the Louisiana Department of Wildlife and Fisheries (LDWF) 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 Game Birds, Wild Turkey and Resident Small Game, Waterfowl, Large Carnivore, and Wildlife Disease.

WHITE-TAILED DEER

During the statewide 2015-2016 deer season, 192,200 deer hunters harvested an estimated 156,100* white-tailed deer. The harvest sex ratio was 56 percent male and 44 percent female. The estimated number of harvest and hunters is 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 1,332 deer during the WMA managed deer hunts (down 49 percent). 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 23,141. The number of deer harvested per effort on managed hunts was negatively impacted by weather. Severe thunderstorms and flash flooding during the October WMA managed hunts affected participation and harvest. The November hunts did not fare much better due to the unseasonably warm temperatures. In addition to the managed hunts, WMA hunters are able to pursue deer during the archery, bucks only and primitive firearm seasons. While managed hunt numbers were down, the total WMA

season harvest rebounded slightly. However, the 2015-2016 harvest was down 22 percent overall.

Mandatory tagging and reporting of deer entered the eighth year in 2015. The reporting system tallied 58,479 deer, an increase of 21 percent from the previous year, but still well below the base line year. The total reported harvest, including WMA managed hunts and DMAP lands, was 73,174, up 12 percent from the previous year. If harvest data is under-reported, LDWF biologists and managers cannot make accurate determinations on hunting success and deer population parameters by parish. Compliance appears to be stabilizing after declining each of the first five years of tagging. Comparisons are made each year to the mail survey. While improved compliance is desired, parish specific harvest and deer sex data is being collected. Stabilization in reporting rates will provide managers valuable trend data.

The Deer Management Assistance Program (DMAP) provides detailed statewide harvest information while providing the largest known age sample of physical deer data. The DMAP harvest was 13,511 deer, with a harvest rate of one deer per 121 acres compared to one deer per 110 acres the previous season. There were 725 clubs/cooperators with 1.64 million acres participating in the program. Enrollment was up 3 percent from the previous year. Critical habitat data was also collected in the form of browse surveys. A total of 75 browse surveys were conducted on properties enrolled in DMAP during 2015-2016. Browse availability and utilization is recorded and assessed on the browse transect survey. These indices provide managers an in depth look at the relationship between available browse resources and utilization on the landscape.

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 2015-2016 meeting minimum qualifications for the Louisiana Big Game Records Recognition Program were documented in the annual Deer Program report. A total of 42 bucks met the minimum qualification for the recognition program. In addition, 16 of the 42 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 seven 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, several research projects are ongoing. 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. The results from a three-year fawn survival study on Tensas National Wildlife Refuge (NWR) were published. Researchers were able to determine cause of death for fawns by utilizing DNA analysis. Of 70 fawns, mortality was recorded for 51 with predation being the leading cause (88 percent). Bobcats, coyotes and black bears were all responsible for predation. Information learned will help managers develop management and harvest strategies for white-tailed deer. Additional deer research includes Protocol Validation for Genetic Differentiation of Wild and Pen-raised White-tailed Deer. The protocol will be used in identification of deer with genetic lineages originating from breeding pens, which will allow state agencies to protect wild, native populations from being negatively affected by release of genetically manipulated deer. Tongues from 382 wild Louisiana whitetails were collected for DNA analysis in 2015-2016. Collection sites were predetermined. The last project includes a deer disturbance with dogs used for small game hunting. FY 2015-2016 involved the disturbance of three collared whitetails, and the collaring of an additional five whitetails for FY 2016-2017 disturbance.

Serological tests for Bluetongue virus, Epizootic Hemorrhagic Disease Virus, Leptospirosis, and Brucellosis were conducted for white-tailed deer. An additional 95 Chronic Wasting Disease samples were collected for analysis. This brings the total number of white-tailed deer tested in Louisiana to 7,870 since the inception of the testing program in 2002. The results and prevalence of the previously mentioned disease sampling will be covered in the wildlife disease section of this report.

WEBLESS MIGRATORY BIRDS

DOVE

Mourning dove call counts were conducted along established routes throughout Louisiana. With the new mourning dove harvest strategy, the U.S. Fish and Wildlife Service (USFWS) is no longer collecting dove call count data from states. However, a modified dove call counts is being tested by several states including Louisiana. Louisiana collected dove data along the established dove call count survey routes. In addition to collecting data on mourning dove trends, data on white-winged and collared doves were collected. White-winged doves were detected on two of the 19 routes. Two white-winged doves and 22 collared doves were detected during the counts.

Dove hunting regulations for Louisiana in 2015-2016 were set at 90 days with a bag limit of 15 birds. A survey of resident license holders indicates that approximately 33,000 Louisiana hunters harvested approximately 597,300 doves during the 2015-2016 hunting season. An estimated 45,200 Eurasian collared-doves and 27,100 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 2015, two fields totaling 610 acres were leased. During the opening day hunt, 381 hunters participated, bagging 666 doves.

In the spring of 2003, 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 2,361 doves during July-August 2015 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 in October 2015, a research project examining the wintering ecology of American woodcock was initiated. Two-hundred thirty woodcock were captured and fitted with a U.S. Geological Survey (USGS) aluminum band, and 96 of these were fitted with transmitters. Woodcock will continue to be captured during the 2016-2017 field season and fitted with transmitters. Minimum Convex Polygons will be created for individual birds and habitat data will be analyzed.

LDWF participated in the USFWS Annual Woodcock Wing Bee in 2015. Data derived from aging and sexing about 12,000 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 2,900 Louisiana hunters harvested 15,500 woodcock during the 2015-2016 season.

ANNUAL HUNTER HARVEST SURVEY

Big and small game harvest indices for the 2015-2016 hunting season were obtained through a mail survey based on the purchasers of basic resident hunting licenses or any other resident license that included the basic resident hunting privileges for 2015-2016. The 2015-2016 Game Harvest Survey was mailed to 18,065 (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 3,954 individuals before the cutoff date. The estimated harvest and hunter efforts for the 2015-2016 hunting seasons utilized 2,228 responses. The procedures used to calculate the 2015-2016 estimates were the same as those used for the 2014-2015 harvest estimates. The 2015-2016 harvest estimates were extrapolated based on the current year's license sales of 261,301. Hunter numbers reflect those that hunted a species even if they did not bag. No attempt was made to adjust the statistics to compensate for the lack of residents under 16 years old who are not required to purchase a basic license.

WILD TURKEY

A poult production survey was initiated in 1994 to assess annual brood rearing success and monitor long-term production trends. The 2015 survey indicated an improved hatch in four of the five habitat regions over 2014 data. The Southeast Loblolly, Northwest Loblolly/Shortleaf/Hardwood, Western Longleaf, and Atchafalaya/ Lower Mississippi Delta all experienced an increase in production from



LDWF biologist examining woodcock wing to determine sex and age prior to banding and release.

the previous year. The North Mississippi Delta region remained constant in 2015. Production was below the long-term (1994-present) average in only the North Mississippi Delta management region.

The most recent turkey hunter survey estimated 18,400 turkey hunters harvested 4,900 wild turkeys during the spring of 2016. These numbers do not include youth and exempted hunters. The wild turkey population in Louisiana is estimated at about 50,000 to 60,000 birds.

LDWF is involved in several wild turkey research projects. LDWF supported a wild turkey research project that was completed in 2016 on the Kisatchie National Forest in conjunction with the University of Georgia, with additional support from the National Wild Turkey Federation (NWTf). This project is investigating the movements of female wild turkeys and broods in relation to large scale prescribed burning. In addition, LDWF has also implemented a similar turkey research project 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 the U.S. Forest Service (USFS). LDWF is 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. Information collected to date has helped justify expanded youth hunting opportunities on Kisatchie National Forest.

RESIDENT 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. 2015-2016 harvest survey results indicate that there were approximately 89,300 squirrel hunters in Louisiana, which is an increase of 2.6 percent from 2014-2015. Total harvest estimates also increased 11.3 percent to 1,386,600 squirrels for 2015-2016. The number of rabbit hunters is estimated at 36,800 which is a slight increase from the previous year. However estimated harvests decreased 29.3 percent from the previous year to 247,800.

To expand small game hunting opportunity, LDWF has established Small Game Emphasis Areas on the following WMAs: Big Colewa Bayou, Bayou Macon, Bayou Pierre, Boeuf, Dewey Wills, Richard K. Yancey, Russell Sage, Sandy Hollow, Sherburne, and Walnut Hill. 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.

QUAIL

Statewide fall whistling counts were conducted on 14 randomly located routes and an additional six routes on LDWF WMAs and the Kisatchie National Forest. Fall whistle counts did not differ among the five habitat types for 2015. All regions continue to exhibit significant long-term (1983-2015) declines in calls per stop. A spring bobwhite survey was also conducted on the Sandy Hollow WMA and Hodges Garden State Park. Inferences about population status and habitat conditions were developed based on the combined results of these survey techniques and general observations by LDWF personnel during the breeding season.

A survey of resident license holders indicates that approximately 820 Louisiana hunters harvested 4,900 wild quail during the 2015-2016 season. Hunters were also asked about their harvest of pen-raised quail. About 1,900 hunters harvested over 18,900 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 USFS 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 2016 maintained traditional methods in all surveyed regions and indicated 2.49 mil-

lion ducks and 487,000 geese wintered in coastal marsh and inland areas of the Mississippi Delta. This was 35 percent fewer ducks than 2015 and 36 percent below the most recent 10-year average. However, this was 41 percent more geese than in 2015 but still 30 percent below the most recent 10-year average. Despite a slightly above-average December aerial waterfowl survey conducted early in the month, record high temperatures and rainfall up and down the Mississippi Flyway during December 2015 seemed to halt or even reverse migrations, provided extensive habitat in states north of Louisiana, and created conditions that did not favor large proportions of the population migrating to and staying in Louisiana. Estimates of ducks in coastal Louisiana and Catahoula Lake declined from 2.67 million in December 2015 to only 1.85 million in January 2016. Similarly, the estimate of scaup from lakes Pontchartrain, Borgne and Maurepas declined from 78,000 in December 2015 to only 48,000 in January 2016. This is over twice the 23,000 counted in January 2015, but is well below the 10-year average of 170,000. Geese are only counted in northeast Louisiana prior to January, but counts in that area were about half of average in December and January. However, despite statewide goose counts of only 30 percent below the 10-year average, January 2016 counts of white-fronted geese were the second highest on record at 143,000.

FY 2015-2016 was the fourth consecutive year for Louisiana to employ three zones for waterfowl hunting, but following the hunting season, options were considered for changing the boundaries of those three zones to provide more satisfying season dates in each region of the state. Rice farmers and duck hunters in the rice-growing regions of southwest Louisiana petitioned LDWF for inclusion in the East Zone because the traditionally later season dates would allow for more time to prepare fields for hunters following the second or "ratoon" crop harvest. An adjustment of the zone boundary to include large portions of Acadia, Jefferson Davis, Calcasieu, Evangeline and Vermilion parishes was approved by the Louisiana Wildlife and Fisheries Commission for implementation in the 2016-2017 season. In addition, the Commission approved a boundary change between the West and East Zones in northwest Louisiana to better fit Eco geographic habitat types and satisfy hunters in that region of the state. Waterfowl hunting regulations are traditionally set in August, but the timing changed in 2015-2016 under rules promulgated by USFWS such that seasons will now be set through the Notice-

of-Intent process by LDWF in January through April each year.

Based on federal harvest estimates, 47,000 active duck hunters harvested 846,000 ducks during the 2015-2016 season. Neither of these numbers is reasonable when compared to license sales and harvest reported on LDWF's Big and Small Game Harvest Survey. This is the second time in three years that USFWS estimates of active duck hunters has declined by nearly 30,000 when license sales have either increased or declined only slightly. These federal estimates are 40 percent below last year's estimate of active duck hunters and 55 percent below the estimated total duck harvest. However, the Big and Small Game Survey reported declines of only 3.5 percent in active duck hunters with a total of 81,000; and a decline of only 17 percent in total duck harvest with a total of 2,150,000. USFWS has acknowledged there were problems in 2014, other Mississippi Flyway states reported similarly unreasonable declines in hunter numbers, and changes to those methods have yet to be implemented. Improvements in the federal harvest data are necessary because they provide the species composition and age-ratio of the harvest. State estimates do not include a collection of parts (wings) that allows estimation of species-specific harvest and large-scale reproductive success necessary for most population models. A decline in estimated harvest was expected as hunting success was fair in the early season but dropped off quickly during December's flooding and warm temperatures in all zones. The federal-estimated harvest of 846,000 ducks included 32 percent blue-winged teal, 19 percent gadwall, 17 percent green-winged teal, 6 percent lesser scaup, 4 percent mallards, and 4 percent shovellers. Wood ducks, ring-necked duck, mottled duck, pintail, widgeon, canvasback, bufflehead, and redhead comprised the remainder.

Goose hunters in Louisiana harvested 54,000 geese during the 2015-2016 hunting season, a 54 percent increase from the previous year. The spring breeding habitat conditions were considered to be about average on arctic breeding grounds, and at least average reproduction was expected. The fall staging survey of white-fronted geese remained over 1,000,000, and because the three-year average was over 800,000, liberalization of harvest regulations was allowed for this season. The Commission approved a seven-day increase in season length beginning in 2015-2016. The longer season and the high count of white-fronted geese certainly contributed to the increased goose

harvest. White-fronted geese made up 43,000 or 80 percent of the total goose harvest. Snow and Ross' geese made up the rest of the goose harvest as no Canada geese were reported in federal harvest estimates.

NORTH AMERICAN WATERFOWL MANAGEMENT PLAN

Louisiana continues to play an important role in the North American Waterfowl Management Plan (NAWMP). LDWF strives to maintain ongoing projects and other activities associated with NAWMP. In FY 2015-2016, North American Wetland Conservation Act (NAWCA) project construction was completed on Dewey Wills WMA. Development of the 3,007-acre greentree reservoir included construction of a large canal gate, installation of several weirs and screwgates, and elevating Hunt Road and an ATV trail. Construction was completed during October 2015. Phase 1 of the Wham Brake

NAWCA project was also completed. This project replaced a dilapidated spillway and two large secondary water control structures. Phase 2 will occur during FY 2016-2017 and includes demolition of a large weir with a larger stop-log type structure that will better enable shallow water management for wintering waterfowl.

Prolonged high water levels and disputed land ownership minimized woody vegetation removal treatments on Catahoula Lake during FY 2015-2016. Planned bulldozing activities were not conducted. Ongoing aerial herbicide applications were conducted on Sherburne WMA's Des Ourses Swamp and North and South Farms during fall 2015. Significant progress has been made and we anticipate being able to treat the areas via ground applications during FY 2016-2017. Mechanical, chemical and prescribed fire treatments were also conducted on other WMAs to invigorate wetlands.



Canal gate structure at the new Dewey Wills greentree reservoir.



New water control structure at Wham Brake.



Aerial herbicide application at Sherburne WMA.

We were awarded a NAWCA grant to replace dilapidated water control structures on Pomme de Terre WMA, and install a high capacity pump to deliver water to impoundments on Boeuf WMA. Construction will begin on those areas during summer 2017. Future NAWCA grant applications are being developed for wetland enhancement on Russell Sage and Sherburne WMAs.

WOOD DUCKS

During 2015-2016, LDWF banded 3,243 wood ducks. That is nearly twice the 1,768 banded last year and is the highest banding total since our banding program was established in 1992. LDWF banders had good success statewide, but special credit goes to the NAWMP Coordinator. His efforts included a large number of LSU student volunteers and accounted for over 1,200 banded wood ducks. Pre-season rocket-netting accounted for 2,928 of the total bandings, and 315 hens were captured in nesting boxes. In addition, 2,730 black-bellied whistling ducks were banded during the winter and spring. This is 20 percent lower than the 3,404 banded in 2014-2015, but maintains the continuous banding of large numbers of black-bellies necessary to build/maintain a recapture database. The NAWMP Coordinator continues to expand 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.

The wood duck nest-box program completed its 27th year in 2016. LDWF personnel are maintaining 1,984 boxes currently in use. That is slightly fewer than last year and just under

the target level of 2,000 boxes. Dozens of boxes were lost to flooding in late-winter of 2015-2016. Replacement of those and old boxes, as well as relocating unused boxes to more suitable habitat continue to be primary activities of this program. The program goal is 2,000 boxes, but we expect the number of boxes maintained and monitored through landowners in the Private Lands Program to continue to increase. Utilization was monitored at only 1,545 boxes, primarily due to inaccessibility due to flooding. Utilization has ranged from 45-100 percent in past years with an average utilization of about 80 percent. Because so many boxes could not be monitored, this year's estimate of utilization is not available.

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 eventual delisting of the bear following the reduction or elimination of threats that originally led to listing is the primary purpose of the Endangered Species Act. Therefore, LDWF's bear research efforts to-date have been mostly targeted at long-term monitoring of extant subpopulations to collect the critical demographic, genetic, and spatial information required to effectively evaluate recovery criteria and determine if and when delisting is warranted. This information will also be used to sustainably manage bear populations following del-

isting as part of a seven-year Post-Delisting Monitoring Plan that the Large Carnivore Program and USFWS finalized during 2015. Based on research conducted by LDWF, USGS, USFWS and the University of Tennessee during 2006-2014, the USFWS determined delisting of the Louisiana black bear was warranted and published a Proposed Rule during spring 2015 to remove Endangered Species Act protection from the subspecies. The Final Delisting Rule was published in the spring of 2016.

2015-2016 Bear Research

1. Reproductive Vital Rates -

To collect information on reproductive vital rates, we conducted 22 adult female den visits across all four bear subpopulations during February-March 2016 to count and mark cubs-of-the-year, and to count yearlings. From these efforts, we estimated an average litter size of 1.9 cubs for the metapopulation (i.e., all four subpopulations combined).

2. Survival and Mortality -

To monitor survival and cause-specific mortality, we live-captured 57 bears and outfitted these individuals with VHF or VHF-GPS radio-collars, or marked bears based on sex and age class. Using monthly aerial telemetry, we monitored 58 radio-collared bears (10 males and 48 females) from all four subpopulations during 2015-2016. We documented 51 mortalities during the fiscal year, the majority of which was from roadkill.

3. Abundance, Density and Growth -

To estimate abundance and density and monitor temporal changes in population growth, we conducted our ninth consecutive year of non-invasive hair trapping in the Tensas River and Upper Atchafalaya River Basin subpopulations during May-July 2016. Samples were collected from 209 and 116 sites in both subpopulations, respectively, resulting in 2,670 individual hair samples. All collected samples were sent to Wildlife Genetics International for microsatellite genotyping at eight to 21 markers, depending on study objectives.

4. Demographics and Genetics of a Reintroduced Black Bear Population in Louisiana -

A study to estimate abundance, density, growth rate, reproductive success, and population genetics of the reintroduced Three Rivers Complex subpopulation was concluded. The combined (i.e., both sexes) density estimate for the Three Rivers Complex (0.06 bear/km²) is among the lowest reported for black bear populations in the southeastern United States.

Available habitat within the Three Rivers Complex study area supports approximately 73 bears (95% CI: 39-100) based on the estimated density. This indicates the majority of resident Three Rivers Complex bears were detected during the capture-recapture study. A habitat suitability analysis was conducted at Three Rivers Complex prior to the initiation of reintroduction efforts, which suggested much of the available habitat in the area was of sufficient quality to support at least a small bear population. Habitat availability does appear to possibly be a limiting factor within the immediate Three Rivers Complex area, but habitat quality may also be a restrictor. Estimated female home range size was considerably larger than reported for other Louisiana black bear populations and for bear populations across the southeastern United States.

Abundance estimates for the Three Rivers Complex should be considered conservative. Immigration into the Three Rivers Complex by male bears from the Upper Atchafalaya River Basin has been confirmed, and two radio-collared males are known to have dispersed from Upper Atchafalaya River Basin to Three Rivers Complex during 2014-2015. The rate at which this immigration has or currently is occurring remains unknown; however, these findings indicate the Three Rivers Complex was probably not a closed population during the 2014 capture-recapture sampling. Abundance may therefore be higher during certain times of a given year than others, because of at least temporary immigration by dispersing Upper Atchafalaya River Basin bears. Sampling occurred in late summer during the breeding season, which is when family dissolution occurs, yearling and subadult males disperse from their natal ranges, and male bears often make long-range movements in search of potential mates. As a result, the detections during this capture-recapture study may have accounted for at least some immigration. Given the population growth rate estimated by Laufenberg and Clark (2014) for the Three Rivers Complex, and assuming exponential growth, this population would be expected to number approximately 98 total bears (95% CI: 52-134) within available suitable habitat by 2019 when sampling is repeated, assuming density remains constant over time.

This study provides the first rigorous empirical density and abundance estimates for a reintroduced black bear population immediately after the establishment phase. Sampling occurred just five years following population establishment, and the findings in this study support previous postulations about growth

and sex structure of reintroduced bear populations. Combined with results from Laufenberg and Clark (2014), this study confirms the Three Rivers Complex reintroduction successfully established a resident bear population.

5. Den Selection in Four Subpopulations of Louisiana Black Bears -

A study in coordination with Louisiana Tech University to investigate female bear den selection in all four extant subpopulations during 2001-2016 is ongoing. This project will identify the factors that influence den selection, which fills a research void, and will allow LDWF to determine what habitat characteristics may be required in potential range expansion areas to support sustainable bear populations.

2015-2016 Red Wolf Research

1. Long-Term Genetic Consequences of Red Wolf-Coyote Hybridization and Demographics of a Large Canid in Southwest Louisiana -

The red wolf (*Canis rufus*) is the most imperiled extant wolf species in North America. The species historically inhabited most of the eastern United States, but due to aggressive predator-control programs, red wolves were extirpated from the majority of their range by the turn of the 20th century. Additionally, because of the perceived threats to humans and habitat fragmentation, all other North American large carnivores (i.e., bears, cougars and wolves) in the east were substantially reduced in number and distribution by the early 1900s. This reduction of large carnivores combined with widespread deforestation and fragmentation allowed an ecological invasion of the coyote (*Canis latrans*) into the eastern United States. Remnant populations of red wolves were localized to southeast Texas and southwest Louisiana by the 1960s, but were seemingly unable to locate conspecific mates. Cumulatively, the inability of red wolf populations to maintain self-sufficiency and the rapid expansion of coyotes allowed hybridization between these two canids to occur, which created concerns that the red wolf genome would be lost via admixture and genetic assimilation into the coyote genome.

Our primary objective was to 1.) investigate the genetic characteristics of large canids in southwestern Louisiana, quantifying the potential level of red wolf (*Canis rufus*) genome persistence using canid-specific nuclear DNA microsatellite loci and mitochondrial DNA (mtDNA) sequencing. Our secondary objectives were to 2.) estimate density and abundance of large canids within our three sampling areas in southwestern Louisiana, 3.) evaluate methods

for sampling large canids noninvasively, comparing a novel hair collection technique with scat sampling transects, and 4.) characterize the coyote (*Canis latrans*) genome across the southeastern United States.

We deployed 98 noninvasive, ground-based rub pads at Sabine (n = 20), Cameron Prairie (n = 33) and Lacassine (n = 45) NWRs during December 2015. Each rub pad was checked weekly for eight consecutive weeks (i.e., sampling sessions) from December 2015 to February 2016. We collected 203 total hair samples from large canids during our sampling: 61 samples at Sabine from 19 rub pads (95 percent of pads); 70 samples at Cameron Prairie from 27 rub pads (82 percent of pads); and 72 samples at Lacassine from 34 rub pads (75 percent). We simultaneously surveyed all three national wildlife refuges via scat collection transects for eight consecutive week-long sampling sessions. From December 2015 to February 2016, we collected 338 scat samples from large canids: 61 samples at Sabine; 157 samples at Cameron Prairie; and 120 samples at Lacassine. Personnel from USDA - APHIS/Wildlife Services, LDWF and the University of Kentucky, as well as private landowners, opportunistically collected hair and tissue samples from live-captured, harvested, and road-killed large canids across the southeastern United States. A total of 174 samples were collected between December 2015 and March 2016 from Alabama (n = 16), Georgia (n = 26), Kentucky (n = 96), Louisiana (n = 20), Mississippi (n = 11), and Virginia (n = 5). Samples from Texas (n = 28) and North Carolina (n > 1,000) were previously collected and already housed at the Laboratory for Ecological, Evolutionary and Conservation Genetics (LEECG) at the University of Idaho, which will be included in our study. All collected hair and scat samples were sent to the LEECG during March 2016 for DNA extraction and amplification, gene sequencing, and genotyping. Analyses were initiated by LEECG during May 2016, and are currently in the final stages.

BEAR MANAGEMENT

LDWF personnel responded to 299 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 2015-2016, we captured 22 bears to address human-bear conflict issues reported to LDWF, primarily in the Lower Atchafalaya River Basin subpopulation.

The Large Carnivore Program Manager presented a bear workshop to the LDWF Law Enforcement Cadet Class educating cadets on bear behavior and biology. Similar presentations were also provided to law enforcement personnel in areas experiencing bear range expansion.

The Large Carnivore Program conducted a Bear Attack Response Training in spring 2016. Two Bear Attack Response experts from Wyoming assisted with this in-house training. This training workshop better enables LDWF personnel (biologists and law enforcement) to respond to situations involving bear aggression towards people. The Bear Attack Response Training team is located throughout the state to allow quick response throughout bear range. Work continued with USGS to improve the BearTrak database, and USGS is working to update and add additional features to the online database.

BEAR SAFETY IN MIND (ST. MARY PARISH PROGRAM)

Accomplishments during 2015-2016 include:

- Daily monitoring of bear-resistant garbage cans in St. Mary Parish, and assisting homeowners with conflict resolution.
- Worked with Pelican Waste & Debris to make minor repairs to bear-resistant garbage cans.
- Worked with St. Mary Parish Government and the City of Patterson to pass an ordinance establishing regulations and standards relative to the proper use of Wildlife-Resistant Refuse Containers and providing penalties for the violation thereof.
- Served on the Black Bear Festival board of directors.
- Served on the Keep St. Mary Beautiful board of directors.
- Conducted Black Bear "proofing" presentations for the St. Mary Chamber of Commerce's Leadership Workshop.

- Expanded bear proofing efforts to the Town of Berwick.
- Assisted LDWF biologists with conflict calls in St. Mary Parish.
- Conducted Concerned Citizens Meeting in Patterson to address bear proofing measures and the City of Patterson's efforts to enforce new ordinance for proper use of Wildlife-Resistant Refuse Containers.
- Gave presentations to St. Mary Parish 4-H about bear proofing where they live.
- Worked to expand the bear resistant garbage can use area into Ricohoc and rural residential areas along Highway 182 West.
- Added signs to bear proof dumpsters in use in St. Mary Parish, reminding users to close dumpster doors.
- Worked to add street signs in Patterson and the parish areas of black bear activities.
- Monitor Pelican Waste & Debris, ensuring they follow the guidelines set out in the new waste contract.



ABOVE: Educational display created to inform the public of the Louisiana black bear delisting efforts and successes.

RIGHT: New sign created in September 2015 to inform residents of black bear trapping efforts.



EDUCATION AND OUTREACH

As in previous years, the majority of outreach conducted in FY 2015-2016 centered on exhibition and presentation of bear information to schools and other interest groups around the state. Key outreach events for the year included National Hunting and Fishing Day (Woodworth), Step Outside Day (Sherburne), and Family Adventure Day (Lafayette). Cumulatively, over 2,000 individuals received information pertaining to the Louisiana black bear at these events.

A new sign was created in September 2015 in order to inform residents of black bear trapping efforts and act as a reminder to remain a safe distance from the trap. Additionally, the after-hours communication number is provided so that additional information may be obtained by the public.

As mentioned in FY 2014-2015 report, a large educational display was created in order to inform the public of the Louisiana black bear delisting efforts and successes. Tangible educational items were purchased in order for the public to experience a small part of the Louisiana black bear project while having the opportunity to come within close proximity of a mounted specimen. Black bear items displayed include a track cast, replica skull, telemetry collar, and a track replica. The display pictured travels to schools and area events such as those mentioned previously.

The ultimate intent for this display is to be on a monthly loan basis between area libraries across the state.

Several projects began in FY 2015-2016, however final completion of those initiatives including a newly designed Be Bear Wise sign, revisions to existing signage, updating LDWF website content, and the premiere of the traveling bear display which now rotates on a monthly basis between area libraries will be discussed within the FY 2016-2017 report.

WILDLIFE DISEASE

The statewide Wildlife Disease Program was administered by the State Wildlife Veterinarian and the Assistant State Wildlife Veterinarian.

Chronic Wasting Disease surveillance continued as 95 samples were submitted from all regions of the state to the Southeastern Cooperative Wildlife Disease Study laboratory. Due to cessation of federal funding for this program, only target animals such as neurological or emaciated deer, deer hit by cars, deer harvested adjacent to captive cervid facilities,

and escaped exotic cervids were tested. Sero-surveillance of white-tailed deer continued. Nearly 100 deer were tested for epizootic hemorrhagic disease, blue tongue disease virus and leptospirosis. Forty-five percent were positive for epizootic hemorrhagic disease, 36 percent were positive for blue tongue disease virus, and 41 percent were positive for leptospirosis.

Surveillance of feral swine for Brucellosis and Pseudorabies was continued this year, with over 1,600 animals tested. To date, sampling has revealed a 3.5 percent incidence of Swine Brucellosis and a 13 percent incidence of Pseudorabies. Surveillance efforts will continue.

A study of the gastric contents of feral swine was continued this year. To date, 14 percent of the 106 stomachs examined contained some sort of animal matter. In conjunction to this study, feces from feral swine is being evaluated for the presence of novel parasites, unique to feral swine. Additionally, LDWF cooperated with University of Louisiana at Monroe graduate students and faculty to investigate depredation of alligator nests by feral swine.

Smaller research projects include analysis of coyotes for stomach contents, heartworms, intestinal parasites and serological disease markers. Additionally, a study investigating the prevalence of the zoonotic parasites was continued. Fifty individuals were examined throughout the year, 76 percent were positive for one or more intestinal parasite(s).

The Wildlife Disease Program continued a study into the interaction of waterfowl and feral swine in regards to the transmission of influenza viruses on Catahoula Lake, La.

A cooperative agreement was entered with USDA Wildlife Services to perform surveillance of migratory waterfowl for High-Path Avian Influenza. Six-hundred-twenty-five migratory waterfowl were tested for Avian Influenza during the 2015-2016 hunting season. No High-Path Avian Influenza was discovered in any of the birds tested. Disease investigations included several mortality events involving birds as well as numerous individual mortality events in raccoons, opossums, squirrels, white-tailed deer and Louisiana black bears.

LAND DEVELOPMENT & MANAGEMENT

FORESTRY PROGRAM

The mission of the Forest Management Program is to improve forest and wildlife habitat on WMAs through sound forest management, reforestation practices, and active forest/wildlife research activities. To this end, LDWF has certified approximately 490,000 acres of forestland through the Sustainable Forestry Initiative Program.

General forest inventories and habitat evaluations were conducted to facilitate the development of management prescriptions for Bayou Macon, Boeuf, Dewey Wills, Little River, Russell Sage, and Sandy Hollow 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 Boeuf, Dewey Wills, Richard K. Yancey, and Sandy Hollow WMAs. Harvests to improve wildlife habitat were initiated and/or completed on Boeuf, Dewey Wills and Richard K. Yancey WMAs.

Chemical treatments of invasive/non-native species, primarily Chinese tallow tree, cogon grass and trifoliate orange, were carried out on Alexander State Forest, Big Lake, Sandy Hollow and Grassy Lake WMAs. Prescribed burning treatments were conducted on Alexander State Forest, Boeuf, Lake Ramsay, Little River, Marsh Bayou and Sandy Hollow WMAs to pro-

mote 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



Logs harvested for wildlife habitat treatments are being loaded for delivery to the mill.

mast survey is also used to map local abundance which aids in seed collection efforts.

Our reforestation program inventoried and evaluated hardwood plantations on Boeuf, Buckhorn, Ouachita and Richard K. Yancey WMAs. Research continued on several ongoing studies investigating seedling survival, sapling development, tree growth and wildlife response to various silvicultural treatments. Results from this research were used to develop a decision support tool which will be used in the management of young hardwood stands throughout the southeastern United States.

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. Work continued on the Forest Characterization Database with support from partners of the Lower Mississippi Valley Joint Venture and Gulf Coastal Plains and Ozarks Landscape Conservation Cooperative.

Growth Monitoring Plots were measured on Joyce, Marsh Bayou and Spring Bayou WMAs. These permanent plots are measured every 10 years and aid in monitoring habitat conditions and the long term effects our forest management activities have on the habitat components represented on the WMAs.

A "Monitoring Avian Productivity and Survival" project continued on Pearl River WMA with two stations. Results from this study will aid us in understanding avian use of the various silvicultural treatments applied across WMAs.

Forestry Section personnel performed red-cockaded woodpecker demographic monitoring and management for 15 red-cockaded woodpecker family groups at Alexander State Forest WMA located in Woodworth, La. These activities included annual activity status checks of over 200 red-cockaded woodpecker cavity trees, nest checks, nestling color banding, fledgling checks to determine survivorship, artificial cavity installation and maintenance, and midstory control in 14 red-cockaded woodpecker cluster sites.

Forestry Section personnel performed red-cockaded woodpecker demographic monitoring and management for 39 red-cockaded woodpecker family groups located at Jackson-Bienville WMA and other lands owned by the Weyerhaeuser Company. These activities included adult red-cockaded woodpecker capturing and color banding, nest checks and

nestling color banding, and fledgling checks to determine survivorship.

In addition, Forestry Section personnel provided technical assistance to USFWS staff performing red-cockaded woodpecker demographic monitoring for 20 red-cockaded woodpecker family groups at Big Branch Marsh NWR in Lacombe, La.

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 provided 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 op-

portunities 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 ecoregions - Gulf Coastal Plain (east and west) and Mississippi Alluvial Valley (north and south).

WEST GULF COAST PLAIN (WGCP) WMAs (400,100 acres):

- Alexander State Forest
- Bayou Pierre
- Bodcau
- Camp Beauregard
- Clear Creek
- Elbow Slough
- Fort Polk-Vernon
- Jackson-Bienville (no longer a WMA)
- Loggy Bayou
- Marsh Bayou
- Peason Ridge
- Sabine
- Sabine Island
- Soda Lake
- Walnut Hill
- West Bay

Habitat on these WMAs includes bottomland hardwoods, upland hardwood bottoms, pine plantations, natural pine stands, and mixed pine-hardwoods. Recent land additions increased Peason Ridge WMA. Due to a great effort by the Lake Charles crew the entire new addition boundary was marked with signs and paints, new SCP stations erected,



Bodcau WMA shooting range.



LEFT: Prescribed burning on leased WMAs. **RIGHT:** Wood duck box monitoring and banding on Elbow Slough WMA

and entrance/information signage prior to the opening of hunting seasons. Unfortunately the Jackson-Bienville WMA lease was not renewed and the area ceased being a WMA at the end of FY 2015-2016.

A total of 118,383 user days were estimated for WGCP WMAs during FY 2015-2016. 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 WGCP WMAs resulted in 6,690 hunter efforts accounting for 574 deer harvested.

Youth-only lottery turkey hunts were held on Bodcau, Clear Creek, Ft. Polk-Vernon, Jackson-Bienville, Loggy Bayou and West Bay WMAs. In addition to the regular physically challenged hunts scheduled on several WMAs, two lottery physically challenged hunt were conducted: one on Sabine WMA for the general public and the second on Camp Beauregard WMA for disabled veterans. The Sabine physically challenged hunt is conducted in conjunction with the local organization known as HELP (Hunters Enriching the Lives of People). HELP works in conjunction with a local veteran's motorcycle club to sponsor the Camp Beauregard hunt. Persons participating in the hunts are provided food and transportation to blinds and assisted with recovering/cleaning deer and any special needs. These hunts are intended to get people into the field that may not otherwise have an opportunity to hunt.

Except for Bayou Pierre, Elbow Slough, Marsh Bayou and Walnut Hill, which are owned by LDWF, at least a portion of the remaining WGCP WMAs are leased to LDWF for public use from the landowners (Hancock Timber, Roy O. Martin, U.S. Army, USFS, Forest Investments, Calcasieu Parish School Board, Molpus, Rayonier, Weyerhaeuser, and the State of Louisiana). At present 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 burns were conducted on Bodcau, Clear Creek, Marsh Bayou, Sabine and West Bay WMAs. These burning operations were designed to improve upland habitat for a variety of wildlife species including songbirds, turkey, deer, reptiles, amphibians and small mammals.

Routine trapping and banding of wood duck and mourning dove was conducted on WMAs.

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



Turkey trapping on Fort Polk-Vernon WMA.

WGCP 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. A total of 258 wood duck nesting boxes were maintained and monitored by WGCP WMA personnel.

Lake Charles WMA staff assisted with a joint (USFS, U.S. Army and LDWF) turkey project on Peason Ridge WMA. A total of 44 birds were trapped and banded. Of that total, 34 hens were fitted with tracking transmitters. The project is scheduled to continue into the fiscal year.

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

EAST GULF COAST PLAIN (EGCP) WMAs (207,737 acres)

- 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 69,207 user days were estimated for EGCP WMAs during FY 2015-2016. An alligator season was available on Joyce, Manchac, Maurepas Swamp and Pearl River WMAs with a harvest of 1,034 alligators by 17 commercial alligator trappers. LDWF received \$48,796.14

in revenue from commercial alligator harvest on EGCP WMAs. Recreational alligator harvest opportunities were also made available to the public. To facilitate recreational alligator harvest, 61 additional people were selected by lottery, issued three tags each, and harvested an additional 112 alligators on these four areas.

EGCP personnel maintained existing WMA boundaries, buildings, equipment, roads and trails. Managed public hunts were also conducted on several WMAs. Combined results for managed deer hunts were 1,572 hunter efforts with a total of 104 deer harvested.

On Sandy Hollow WMA, 3 miles of bird dog field trial courses were maintained, as well as six dove fields and 10 acres of food plots for upland birds. Alligator egg collections were monitored by EGCP personnel on Manchac, Pearl River and Maurepas Swamp WMAs. A total of 15,737 eggs valued at \$314,740 were collected.

EGCP personnel maintained 191 wood duck boxes. Personnel also participated in the statewide mourning dove banding program, responded to numerous deer and nuisance animal complaints, provided technical assistance to the public, conducted public meetings, and collected white-tailed deer brain and lymph node samples across the region for Chronic Wasting Disease testing. EGCP personnel continued to work with the deer program manager to collect deer reproductive data to better understand deer breeding periods within the ecoregion.

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, to reduce their numbers. Each year, feral hog blood samples are collected and tested for a variety of diseases.

MISSISSIPPI ALLUVIAL VALLEY - NORTH (MAVN) WMAs

(135,193 acres):

- Bayou Macon
- Ben Lilly
- Big Colewa Bayou
- Big Lake
- Boeuf
- Buckhorn
- Bussey Brake
- Floy Ward McElroy



TOP: Longleaf Pine Savannah on Lake Ramsay WMA.

BOTTOM: Boardwalk on Pearl River WMA.



LEFT: Forest management harvest operation on Russell Sage WMA. **RIGHT:** Successful Youth Lottery Hunter on Floy Ward McElroy WMA.



Burning of dove fields on Boeuf WMA.



Ongoing construction of Wham Brake Water Control Structure.

- Russell Sage
- J.C. Sonny Gilbert

The primary habitat type found on MAVN 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.

The major land ownership activity was the expansion of Russell Sage WMA with the acquisition of the Kennedy Tract. The 2,767-acre parcel was added to the southern portion of the existing WMA property. Also, the Louisiana Wildlife and Fisheries Commission adopted a resolution to rename the Sicily Island Hills WMA for distinguished legislator, farmer and outdoorsman J.C. "Sonny" Gilbert.

MAVN WMA biologists and technicians conducted a wide range of activities including research and surveys involving mourning doves, wood ducks, wild turkey, coyotes, shorebirds and white-tailed deer. These included collecting Chronic Wasting Disease and blood samples from deer, disease research in feral swine, as well as waterfowl sampling for disease surveillance. Biologists and area personnel assisted the large carnivore program with bear management activities, including the hair-snare project, trapping/collaring,

den visits, and handled numerous nuisance complaints. Additional effort was expended conducting public meetings, interacting with various universities as well as parish, state and federal agencies in reference to projects of mutual concern, conducting the alligator management program at the ecoregion level, and various other projects. MAVN staff also performed a variety of development and maintenance functions such as boundary marking, road maintenance, water control structure operation, moist soil management, shorebird management, beaver and other nuisance animal control, farm contract supervision, equipment maintenance, public user data collection, vegetation control, and food plot planting. Staff continued to assist the Forestry Section with forest management activities, including treatment and prescription planning, timber marking, reforestation, invasive woody species control, and timber harvest monitoring. They also conducted managed hunts and research projects. Approximately 235 wood duck nesting boxes were maintained and monitored by MAVN WMA personnel.

Recreational opportunities were provided to thousands of hunters, fishers, campers, sightseers and other public users. A total of 62,404 user days were estimated for MAVN WMAs during FY 2015-2016. Deer hunting was the most popular utilization of these WMAs. Either-sex deer hunts, including mandatory deer checks, self-clearing permit data and youth hunts, were held on the WMAs, with 14,242 user-days recorded and 891 deer harvested. Youth deer and dove hunters on Big Lake, Boeuf, Buckhorn, Russell Sage, J.C. Sonny Gilbert and Floy McElroy WMAs had a successful season. A deer hunt for women who participated in the Becoming an Outdoors Woman program was conducted on Floy McElroy WMA. Deer and waterfowl hunting opportunities were provided for wheelchair confined hunters on Big Colewa Bayou, Buckhorn, Floy McElroy and Russell Sage WMAs. Turkey hunting was provided on Bayou Macon and J.C. Sonny Gilbert WMAs, with 173 hunters harvesting 15 birds. Turkey season was closed on Big Lake and Boeuf WMAs due to the flood in March 2016. Bayou Macon, Big Lake, Boeuf, Buckhorn and Russell Sage WMAs provided quality waterfowl hunting for 9,091 hunters, including some who traveled from out of state. The Wham Brake waterfowl impoundment on Russell Sage WMA was not at full functionality during a portion of the season due to an ongoing water control structure replacement project. A total of 5,925 small game hunters enjoyed hunting on MAVN WMAs.

Major projects being initiated or completed include:

- Completion of the Wham Brake water control structure and bridge replacement project.
- Completion of the Saline/South Trail RTP project on Russell Sage.
- Initiation of planning process for Kennedy Tract.
- Completion of the Ben Lily boat ramp construction.

The “Wish I Could ATV Trail Ride,” an annual one-day ATV trail riding event, was held on Boeuf WMA in June 2016. The event attracted approximately 2,000 ATV riders who entered the WMA to ride the 17-mile long trail. This ATV trail ride is sponsored by a charitable organization and is legislatively mandated. Even though this event is extremely popular, it has caused extensive ecological damage to hundreds of acres of bottomland hardwood habitat, virtually destroying the original ATV trail.

MISSISSIPPI ALLUVIAL VALLEY - SOUTH (MAVS) WMAs

(259,439 acres):

- Acadiana Conservation Corridor
- Attakapas
- Dewey W. Wills
- Elm Hall
- Grassy Lake
- Little River
- 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 four U.S. Army Corps of Engineers (USACE) properties (Bayou des Ourses, Dewey W. Wills tract, Little River tract and Shatters Bayou) are also managed within the MAVS.

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

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

A total of 306,438 user days were estimated for MAVS WMAs during FY 2015-2016.



Water Level Management in Moist Soil Impoundments.



LEFT: Step Outside Day on Sherburne WMA. **RIGHT:** Successful youth lottery participant on Dewey W. Wills WMA.

White-tailed deer is the most popular game animal hunted on the MAVS WMAs. Either-sex deer hunts, with mandatory deer checks were held on the WMAs, with 10,135 user-days recorded and 368 deer harvested. An additional 1,487 deer were harvested during other either-sex, bucks-only, youth/handicapped, archery and primitive weapons hunts, where self-clearing permits were utilized. Turkey hunts were held on seven WMAs, where 19 turkeys were harvested by an estimated 527 users. This includes 27 youth hunters who participated in the Sherburne, Spring Bayou, Grassy Lake and Pomme de Terre WMAs youth lottery hunts, harvesting three turkeys. A member of NWTF or MAVS 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 27,657 user days. Waterfowl hunting is very popular as well on MAVS WMAs in moist soil impoundments, greentree reservoirs, swamps and flooded bottoms. Waterfowl user days totaled over 13,687 for this period. Dove fields are maintained, along with many acres of food plots. Feral hogs have populated many of the WMAs and damaged the resource. Hunting is used as a tool to help reduce feral hog populations. Hog hunting with dogs was allowed under permit.

Biologists and technicians maintain and monitor over 500 wood duck boxes, conduct pre-season wood duck banding, and collect samples for Chronic Wasting Disease, avian influenza and other disease testing. They also assisted with numerous nuisance animal complaints, illegal captive deer and sick deer complaints. Biologists assisted LSU researchers with ongoing research projects.

Youth lottery deer and duck hunts were also held in MAVS, with great success on these hunts. Twelve youth waterfowl lottery hunters harvested 62 ducks, for an average of 5.2 ducks per youth hunter. Ninety-seven youth deer lottery hunters harvested 17 deer on 13 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. Wheelchair-bound waterfowl and deer hunts were utilized by nine different PCHP Wheelchair Hunters on 25 hunts.

Alligator applications were reviewed, and licenses and tags were issued to 64 WMA lottery hunters who filled 192 tags. There were also six WMA alligator hunters who bid on tags on the WMAs. These hunters filled 216 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.

Major projects being completed included:

- Yakey Bridge construction on Richard K. Yancey WMA was completed.
- Completion of Dewey W. Wills ATV Trail Project.
- Planning stages for replacement of Bayou Natchitoches Bridge project.

Routine maintenance activities on MAVS 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. Efforts to improve the road system and camping areas on Dewey Wills WMA continue. Repairs on all WMA roads and trails were made as funding allocations allowed.



Yakey Bridge Project on Richard K. Yancey WMA.

PRIVATE LANDS PROGRAM

The Private Lands Program offers 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. Most Private Lands Program biologists are responsible for three to five parishes, with those along the coast responsible for six to nine parishes.

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 - Natural Resources Conservation Service (NRCS) programs such as the Wetland Reserve Program, Conservation Reserve Program or Environmental Quality Incentives Program. LDWF 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.



Volunteers help LDWF biologist with wood duck banding.

During FY 2015-2016, Private Lands Program biologists made habitat recommendations impacting 939,730 acres by conducting 261 site visits and delivering 45 written habitat management plans. They fielded 6,815 requests for information from the public. Under an agreement with USDA-NRCS, Private Lands Program biologists conducted 418 inspections of Wetland Reserve Easement properties to assess conditions and make recommendations for management. This project provided these biologists an opportunity to impact an additional 122,444 acres of wildlife habitat.

Private Lands Program biologists are actively engaged with other agencies and organizations to coordinate conservation delivery efforts in Louisiana. A program biologist was vice chair of the Louisiana/Mississippi Conservation Delivery Network Steering Committee. Private Lands Program biologists are also active partners on the Texas/Louisiana Longleaf Pine Task Force, West-Central Louisiana Ecosystem Partnership, Louisiana/Mississippi Alluvial Valley Conservation Delivery Network, and other groups focused on natural resource management of private land in Louisiana.

Private Lands Program biologists are also responsible for carrying out activities such as migratory and resident bird 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 700 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 2015-2016, 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 included in the Agricultural Act of 2014. In addition, the program provided training for Private Lands Program staff and de-

veloped 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 2015-2016 included the development of a Working Lands for Wildlife Program that will directly benefit the Endangered Species List Candidate - 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. Another aspect of the program will be to work with agricultural producers to provide shallow water habitats during late summer and early fall, when water is typically scarce across our state. Input was also provided on recommendations to the Farm Service Agency on implementing grassland management practices on Conservation Reserve Program properties that will provide incentives for landowners to manage grazing lands more compatible with the habitat needs of quail and other grassland birds. Staff along with partners from across the country began the process of preparing for the next Farm Bill slated for delivery in 2018 under a new presidential administration.

GRANTS

During FY 2015-2016, 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 over 30 tracts and impacted over 5,000 acres. These activities will continue during the current fiscal year and efforts were successful for procurement of additional State Wildlife Grant funding to continue the program. In addition, the program continued delivery of a National Fish and Wildlife Foundation grant, secured to fund prescribed burning on 7,000 acres of privately owned forestlands in central Louisiana.

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 1.) address pertinent ecological research questions and 2.) 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 1.) providing technical assistance and public outreach and 2.) 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 FEMA to expedite post hurricanes Rita and Ike construction projects.

Maintenance and construction staff continue to clean ditches and maintain levees throughout the marsh on RWR. This annual practice maintains the refuge’s levee system comprised of over 200 miles.

Additional funds were approved FY 2014-2015 to construct the new laboratory and grow-out facility near the storm platform, with staff continuing to work with architects on the design. Review of plans were finalized with the project going out for bid in FY 2016-2017. The construction is anticipated to begin in FY 2016-2017.

During FY 2015-2016, 50,000 feet of terraces were constructed in Unit 6 and Price Lake. The vegetative plantings were conducted through USDA-NRCS and funded by Coastal Protection and Restoration Authority (CPRA) in the spring of 2016.



This four-pipe water control structure, located on the southeastern portion of the refuge, is one of a network of water control along the southern Mermentau Basin.



LEFT: Professional plantings take place on terraces shortly after construction. **RIGHT:** Aerial photo of the professional grass plantings on the Price Lake Road terraces.

FEMA funded projects that were completed in FY 2015-2016 include water control structures and levees. Old Cop-Cop was completed at a cost of \$578,902. The Josephine and Dyson Structure were completed for a cost of \$796,450. The Vermilion 9-pipe Structure was completed for \$3,123,500.

Other FEMA projects include the start of Phase I and Phase II Levee refurbishment, designed by Royal Engineers in FY 2015-2016. Phase I was a 5-mile section awarded to Southern Delta Construction for \$2,099,651. Phase II was 17 miles, also awarded to Southern Delta Construction for \$3,489,000. Estimated completion for both projects is set for FY 2016-2017.

B&J Inc. was awarded a combined total of \$1,598,300 to complete major projects and repairs during FY 2015-2016 (Dyson Plug, Unit

4 Freshwater Introduction Structure, Big and Little Constance and Unit 3 Levee).

The North and East Levee refurbishment was approved as a Capital Outlay Project. The project was designed by Royal Engineers and was awarded to LeBlanc Marine, LLC. for \$2,747,342. Work is scheduled to begin in FY 2016-2017. This includes Unit 1, 8, 10, 13, and the Price Lake Unit.

Plans for the West End Dorm were completed FY 2014-2015 and the bid for the construction of West End Dorm was awarded to Trahan Construction for \$2,413,000. This FEMA project is to replace the original West End Dorm ruined in 2005 by Hurricane Rita. Completion of the Dorm is estimated for summer of 2017.

In addition to FEMA associated projects, RWR and Ducks Unlimited partnered to replace the

two water control structures to manage the Price Lake Unit (collectively called the LSU structure). Both old structures were replaced with a larger, single water control structure. On Oct. 22, 2015, this structure was dedicated as the Tom Hess Water Control Structure, in memory of longtime Rockefeller Biologist Tom Hess. Hess was known for his research as well as his passion for public recreation in the outdoors. The local community along with biologist and conservationists joined to honor the long-time RWR biologist and program manager. The design by Ducks Unlimited used a new box header to accommodate larger flows and a sluice gate option to alleviate large flood events. Along with the structure, fiberglass walkways and piers were installed to provide additional recreational fishing opportunities at the new structure. The project was awarded to Couvillion construction for \$1,397,415 and was completed in FY 2015-2016.

LDWF staff and various partners gather around the Tom Hess dedication stone, located at the new "Tom Hess Water Control Structure," near Joseph Harbor and the Gulf



MINERAL MANAGEMENT

Beginning in October 2011, Chevron began rig setup and exploration for an ultra deep gas venture known as Lineham Creek in the north-western corner of RWR. Due to mounting costs and several failed attempts, it stopped drilling at about 24,500 feet; the rig was demobilized and off site by June 2014. Following the price reduction in oil/natural gas in FY 2014-2015, Chevron plugged and abandoned the site in FY 2015-2016. Remediation of the well site is planned for FY 2016-2017. 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.

Staff continues to recognize the minimal requirements for removing Enlink pipeline on RWR property. However, this project has been delayed due to the low oil/natural gas prices.

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 (or planned to be replaced) for management of water levels throughout RWR. Furthermore, staff have also worked on wetland permit applications with USACE for approximately 76 miles of levee restoration. Hydrologic restoration and unit management have improved as a result of completion of FEMA projects, including the completion of ditch maintenance in Unit 8. In addition to water control, staff per-

formed vegetation control with herbicides via airboat to help improve habitat in Units 1, 2, 3, 4, 6, 9, 10 and 13. Aerial applications were also conducted to assist with vegetation control in Units 9, 10 and 13. Approximately 750 acres were treated on the refuge.

Plans were initiated in FY 2014-2015 to reclaim Unit 9 (about 90 acres) and use it as the second release site for whooping cranes in southwestern Louisiana. Staff completed a prescribed burn in February 2015 and later completed a herbicide application of the unit in May 2015. Staff also installed a water control unit on the east end of Unit 9, completed FY 2015-2016. By June 2016, the unit was complete with functioning levees and pumps. The pen was constructed similar to the initial pen built at White Lake in 2010, with an open-netted portion and smaller top-netted portion. Approximately 200 feet south of the pen is a vegetated levee with two blinds resting upon it. Protective mesh walls running outward from the blind area, block the crane's view to a boat deck and access point for staff and visitors.

Marsh fires during the right time of the year decrease fuel loads of marsh vegetation, prevent catastrophic fires when the marsh is excessively dry during the summer, and also provide new stem growth for migratory waterfowl species. Generally, one-third of the refuge is burned on a yearly basis. However, during FY 2015-2016, water levels along with weather conditions and large-scale construction projects prevented any prescribed burns on the refuge. Minimal lightning fires occurred in Unit 6 and in the unmanaged marsh areas of Rockefeller.

Refuge staff continued monitoring giant salvinia and feral hogs, both species showed signs of population increase in 2012-2014. 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. Little sign of feral hogs were observed in FY 2015-2016, with only five hogs trapped on the refuge. Efforts will continue in FY 2016-2017 to monitor the status of these two invasive species on RWR.

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 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 is due for the acceptance acres within the 4.7- and 66-acre sites. The 107-acre site will be considered for a portion of credits released to LDWF after review of the Vegetative Surveys in FY 2016-2017.

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, new surveys conducted on the Price Lake Unit Shoreline discovered that the coastline eroded 233 feet in nine months. There have also been large "washouts" that blast into the natural beach ridge allowing a small channel of Gulf water to flow in and affect healthy marsh.

In FY 2015-2016 RWR was successful with being awarded \$33 million from the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) on Dec. 10, 2015. This project calls for shoreline protection along a portion of RWR coastline in the form of segmented breakwaters. The project has been designed and is planned to go out for bids in FY 2016-2017.

Another project that is under design by HDR is the Capital Outlay approved Jetty Project. The Jetty Project will protect the outlet of Joseph's Harbor from eroding and silting in. The Joseph's Harbor outlet is the main tidal artery for the established drainage infrastructure to operate for RWR management units and other areas that benefits within the community.

WILDLIFE MANAGEMENT

Alligator Nuisance Harvest

An experimental nuisance alligator harvest was conducted on RWR from Sept. 3-7, 2015 by nine Rockefeller 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 average length of 2015 alligators harvested was 7.72 feet compared to 7.68 feet in 2014. The average price per foot was \$26.32 for 2015, compared to \$27.87 in 2014; 2015 prices were lower than the high of \$38.28 per foot in 2008.

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.

Staff continued efforts in stocking Florida-strain largemouth bass (*Micropterus salmoides v. floridanus*) to supplement populations lost on the refuge due to hurricane impacts and extreme drought conditions; these efforts also improve recreational opportunities for the species on RWR. In the summer of 2016, the rearing ponds at RWR were stocked with 276,900 fry, and later seining of these ponds resulted in approximately 134,713 fingerlings

(48.6 percent survival rate). Approximately 113,745 Florida-strain largemouth bass fingerlings were stocked on RWR in June 2016 with the remaining fingerlings stocked by LDWF Inland Fisheries division at Lacassine NWR (20,968 fingerlings). We hope to continue this cooperative effort to assist Inland Fisheries with their target stocking goals.

WATERFOWL 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 biologists, technicians and student workers. Some of the early analysis of data has shown high variability in survival rates with some mortality attributed to hunting.

Since 1994, the Coastal and Nongame Resources staff have banded 42,244 mottled ducks. Coastal and Nongame Resources biologists completed the 22nd year of the program by banding 2,820 mottled ducks statewide in 2015. In southwest Louisiana, RWR and various private properties yielded 2,426 mottle ducks banded and 115 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 LDWF Waterfowl Biologist Paul Link. During the spring of 2016, refuge biologists banded a total of 279 individuals at three sites in southwestern

Louisiana. These same sites recaptured 142 whistling ducks. 67 color bands were also placed on some of the birds in a cooperative effort with Ducks Unlimited and a color band project.

Winter aerial waterfowl surveys are conducted annually over Coastal and Nongame Resources areas in south Louisiana on a monthly basis from November through January. Transects are flown in each management unit and the unmanaged marsh area, and thereafter, extrapolated to yield an estimate of total ducks on the area. The mean duck survey estimate on RWR during 2015-2016 was approximately 27,167 ducks per survey. This is 15 percent lower than the 2013-2014 average (31,719). The 2014-2015 survey was 106,018 ducks per survey, a much higher count than most years. We anticipate that ongoing marsh management activities will continue to improve waterfowl counts in the upcoming years.

In August 2015 a staff biologist served as the Assistant Crew Leader for the Yorkton, Saskatchewan Waterfowl Banding Station. The Yorkton crew banded a total of 3,757 new birds and a total of seven different species. The Yorkton Banding Station is part of the Western Canada Cooperative Waterfowl Banding Program. This program is a long-term, large-scale, pre-season waterfowl banding program. The program is a joint effort between USFWS, Canadian Wildlife Service, state and provincial wildlife management agencies, the Flyway Councils, First Nations, and non-governmental waterfowl advocacy and research organizations. The Yorkton Station has been staffed by Mississippi Flyway Council states for decades. This banding data has increased our knowl-



LEFT: Refuge staff gather all fingerling with a seine that reaches across the breeding pond. Sample counts are weighed and measured.
RIGHT: Bass fingerlings are measured out in a weighted tub.



LEFT: Department staff band, sex and measure Black-bellied whistling ducks (L to R: Samantha Collins, James Whitaker, Gabe Giffin).

RIGHT: Waterfowl Biologist James Whitaker poses with two banded mallards while in Canada. Whitaker was the LDWF representative at the Yorkton Banding Station, part of the Western Canada Cooperative Waterfowl Banding Program.



edge of waterfowl population dynamics and helped inform management decisions.

Rockefeller staff participated in the state-wide dove banding efforts, banding 490 mourning doves (*Zenaidura macroura*). This information helps with population estimates, annual survivorship estimates and bird distribution/movements.

A staff biologist also participated in the 2016 Mississippi Flyway Waterfowl Wing Bee in Carbondale, Ill. The wing bee provides data used to calculate the species composition and the age and sex of duck species in the harvest. Approximately 30,000 waterfowl wings are identified annually. When this data is combined with banding data, it allows an estimate of reproductive success from the previous year and a measure for the relative harvest rate for each age and sex. The data also provides spatial and temporal information regarding the distribution of the duck harvest.

The Louisiana Waterfowl Project is a cooperative with Ducks Unlimited and LDWF staff. The mission of the Louisiana Waterfowl Project is to provide critical migration and wintering habitat for waterfowl and other wetland-dependent wildlife. Staff biologists were able to enhance over 160 acres of habitat adjacent to the refuge to improve habitat for wintering and resident waterfowl through the Louisiana Waterfowl Project.

RWR worked cooperatively with USFWS on the mid-winter goose survey for the state of Louisiana. The mid-winter goose survey is a nationwide effort to survey geese in areas of

major concentrations on their wintering grounds and provide winter distribution and habitat affiliations. This survey also serves as a primary source of data on population trends for some species that breed in remote Arctic, where traditional methods of surveying are hard to achieve.

A RWR biologist also participated in the Mottled Duck Spring Breeding-Population Survey in coastal Louisiana. This survey is conducted annually each spring in coastal Louisiana and Texas to monitor the western Gulf Coast population of mottled ducks. A staff biologist continues to work with LDWF Waterfowl Program cooperatively on multiple projects including blue-winged teal avian influenza testing, snow goose avian influenza testing and movement ecology, greater white-fronted goose movement ecology, lesser scaup annual survivorship, and black-bellied whistling duck movement ecology. Lastly, a staff biologist cooperatively worked with University of Missouri on evaluating the effects of body condition of snow geese in the Mississippi Flyway.

WHOOPING CRANES

The Whooping Crane Reintroduction Program in Louisiana continued significant positive progress during this reporting period. First, the current population has a 48 percent survival rate (36 of 75 individuals), with the status of two cranes currently unknown. Survival of cranes one year after being released continues to be high with the 2011-2014 cohorts all having 70-75 percent survival at that one year mark, with minimal mortality following this

one year period. To reduce costs associated with satellite PTT transmitters, GSM transmitters were used on four juvenile birds in 2014. This trial continued with three juvenile birds receiving GSM transmitters in the 2015 cohort. There are also three older cranes that have received GSM transmitters. The whooping crane staff will continue to determine their utility in this region.

At the end of the reporting period, 30 cranes were located in Louisiana, four were in Texas, and two were long-term missing. The single wild-hatched chick is not yet counted in the main population but will be once it has fledged. As in previous years, many cranes continue to heavily use the working wetlands - rice and crawfish agriculture - of the historical Cajun Prairie region of southwestern Louisiana (Jefferson Davis, Vermilion and Acadia parishes). We have also seen an expansion of habitats used in the Mississippi River Alluvial Plain of northeastern Louisiana; these habitats were primarily being used by individuals from the 2013 cohort. Habitat use data continues to indicate that whooping cranes in Louisiana are habitat generalists, with likely generalized diets.

We observed increased nesting activity in spring 2016, with five pairs nesting (four pairs re-nested after their initial nest was not successful) creating a total of nine nest attempts. One pair remains infertile, two pairs had fertile eggs but the embryos died, one pair nesting for the first time had one infertile egg, and one pair, also nesting for the first time, hatched two chicks - raised both for one month before one disappeared,



Aerial photo of the new whooping crane pen at Rockefeller Refuge. This is the second pen the Rockefeller staff has constructed.



The entrance to the new whooping crane pen at Rockefeller Refuge. This is the second pen the Rockefeller staff has constructed.

then continued successfully rearing the remaining chick. This marked the first time a whooping crane chick has successfully hatched in the wild since 1939.

The nest locations were located in three parishes (Allen, Avoyelles and Jefferson Davis) in southwestern and central Louisiana. Seven of the nine nest attempts were located in actively fished crawfish fields. Where possible (i.e., non-marsh habitats) we continued intensive and frequent monitoring throughout the incubation period of nesting pairs. The nesting pairs observed exhibited high levels of nest attendance, with seven to eight of the nine nesting attempts being incubated full term. We have not observed any incidence of biting black flies or other horsefly species interrupting observed nesting attempts in the Louisiana flock. We have documented eight breeding

pairs (defined by pair being together for one year or longer, observation of copulation, or building of a nest and/or production of eggs) at the end of the reporting period, with potentially several more pairs forming going into the 2017 nesting season. Therefore, we expect to observe additional nests in 2017.

However, as with prior reporting periods, we were not immune to some setbacks. Unfortunately, we had 14 confirmed/likely mortalities during the reporting period. Sadly, mortalities in 2015-2016 included four via gunshot.

Public education remains a high priority of the reintroduction program. LDWF staff participated in over 40 festivals and events reaching an estimated 3,000 individuals. A major focus of the education efforts centered on three

“Give a Whoop” educator workshops with 52 middle and high school teachers from Louisiana. The Alexandria Zoo (Alexandria, La.) has shown interest in providing education/outreach opportunities to zoo patrons, with LDWF highly supportive of this cooperative effort. LDWF has given a “Crane Trunk” to the zoo which allows the zoo to do its own presentations about the cranes with all the materials and hands-on items LDWF staff has.

The whooping crane public awareness media plan for 2015-2016, funded by a grant from Chevron, included the use of billboard space provided by Lamar Advertising, radio commercial space purchased through the Louisiana Association of Broadcasters, and television commercial space purchased on cable television systems in Alexandria, Lafayette and Lake Charles. Billboards alone were estimated to reach almost 850,000 viewers. In August 2015, a whooping crane Facebook page was created to service dedicated crane fans nationwide. Over 3,000 Facebook fans have “liked” the page which features crane updates, videos on various phases of the program, and other important news related to Louisiana whooping cranes.

We will continue to find new and exciting ways to ensure that this reintroduction succeeds, including activities associated with our management, research and education/outreach programs. During late 2015, a new release pen was constructed on RWR into a refurbished 90-acre marsh unit. This is being completed to facilitate the ability to create additional capacity of future cohorts which we anticipate will be larger, and to determine if cranes released “deeper” into the marsh will avoid venturing to the north where all gunshot mortalities have occurred. By June 2016, the unit was complete with functioning levees and pumps. The pen was constructed similar to the initial pen built at White Lake in 2010, with an open-netted portion and smaller top-netted portion. Cranes expected in the fall of 2016 will be placed at this pen.

The Whooping Crane Program is supported by multiple funding cooperators including Rockefeller Trust Funds, USFWS, State Wildlife Grants, and corporate partners Chevron and Cameron LNG.

WILDLIFE AND FISHERIES RESEARCH

A unique attribute of RWR is the emphasis 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 five research requests and all were approved to use RWR as a study site. Projects included sampling for the federally petitioned Louisiana eyed silkmoth (USFWS), investigating body condition and seasonal origins of light geese (University of Missouri), a post-construction biological assessment of bio-engineered oysterbreak rings (Nichols State University), monitoring nesting productivity of beach nesting birds (Audubon Louisiana), and evaluating larval and adult horsefly populations following the 2010 *Deepwater Horizon* oil spill (LSU).

STAFF RESEARCH AT RWR

Diamondback Terrapin Population Status and Reproduction

During the spring of 2015, staff sampled for terrapins at three sites in Vermilion and Cameron parishes. Forty-one terrapins were captured, including 10 long-term recaptures. Over the six-year study (2011-2016), 903 terrapins (including 39 recaptures) have been captured, marked and released.

In addition to capture data, four females were found in the field to be gravid and were transported to Bayou South Animal Hospital in Lake Charles for radiographic analysis. For 2015-2016 females (n = 20), mean clutch size was 7.15 eggs (range: 4-10), with clutch size similar to other studies reported in other Gulf of Mexico localities. This project is funded through Rockefeller Operating Funds.

Nesting and Utilization of Shell Rake Habitat by Bird Species of Concern

During the spring and summer of 2015, staff surveyed all suitable shell rake nesting habitat for American oystercatchers and colonial nesting seabirds in Cameron and Vermilion parishes. Two pairs of American oystercatchers (*Haematopus palliatus*) were observed around the Calcasieu Lake area and one was observed near Sabine Lake, but no nesting activity was recorded. Seven pairs of American oystercatchers were observed on shell rakes in the Southwest Pass area adjacent to Marsh Island. Six nests from four pairs were monitored in this area from March 31 - July 9, 2016.

One nest hatched three chicks and fledged one chick in this area. Three adults and one chick were captured and banded using color bands with unique numeric combinations.

Five colonies of black skimmers and terns were located and monitored in the Southwest Pass region. The maximum number of tern nests and chicks counted within a colony was 135 and 49, respectively. The maximum number of black skimmer nests counted within a colony was 94. This project is funded through Rockefeller Operating Funds.

Nesting Ecology of Great Egrets in Phragmites

During the spring of 2016, staff counted all egret nests within Unit 14 of RWR by boat or drone. Nests were identified as having eggs, chicks (i.e., hatched), empty or unidentified. The maximum number of nests with chicks during any count was 44, and the maximum number of nests with eggs during any count was 51. Observations were conducted throughout the duration of the nesting season (March - May). A drone was used to do checks throughout the season and gave biologists a great vantage point to view nest contents. This project is funded through Rockefeller Operating Funds.

Nesting Ecology and Habitat Use of Reddish Egrets

During the spring of 2016, staff began placing backpack transmitters on reddish egrets (*Egretta rufescens*). The backpack transmitters track movements of adult and juvenile reddish egrets. During the reporting period, 10 adults were outfitted with transmitter backpacks and 21 total adults were banded. There were six juvenile reddish egrets with transmitters secured and a total of 28 blood samples obtained (22 from adults, six from chicks). Movements of the birds have been recorded in central America. Habitat samples have been collected from "use" points and "random" points using satellite transmitter data to better understand the roost and foraging locations of these birds.

COLLABORATIVE RESEARCH AT RWR

During FY 2015-2016, 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:

- Evaluating the effects of coastal restoration on shorebirds and shorebird habitats in Cameron Parish. W. Selman with

A. Arfman and E. Lyons, McNeese State University (funded by Rockefeller Trust Funds and Gulf Coast Joint Venture).

- Establishing a spring Neotropical songbird migration station located in Nunez Woods. S. Collins with F. Moore, The University of Southern Mississippi (funded by Rockefeller Operating Funds and National Science Foundation funds to F. Moore).
- Population status of diamondback terrapins in Louisiana and the interaction of crab fisheries on population viability. W. Selman with J. Weibe and B. Stultz, LDWF (funded by LDWF Office of Fisheries).
- Pigment variability of diamondback terrapins in Louisiana. W. Selman with B. Reinke, Dartmouth College; S. Pearson and J. Weibe, LDWF (funded by Rockefeller Operating Funds).
- Reproductive physiology of diamondback terrapins in the Gulf of Mexico. W. Selman with J. Donini and R. Valverde, Southeastern Louisiana University (funded by Rockefeller Operating Funds and independent grants to J. Donini).

PUBLICATIONS BY RWR STAFF BIOLOGISTS

Elsey, R.M., M. Miller, D. LeJeune, and W. Selman. 2016. Nesting ecology of Little Brown Skinks (*Scincella lateralis*) utilizing American Alligator (*Alligator mississippiensis*) nests and muskrat (*Ondatra zibethicus*) houses in southwestern Louisiana. *Southeastern Naturalist* 15:653-668.

Elsey, R.M. and W. Selman. 2016. *Alligator mississippiensis* (American Alligator). Diet. *Herpetological Review* 47:660.

Fehrenbach, A.K., I. Louque, S.L. McFadden, C. Huntzinger, E. Lyons, S.H. Shively, W. Selman, and P.V. Lindeman. 2016. Habitat-related variation in body size and reproductive output and an examination of reproductive allometry in the Sabine map turtle (*Graptemys sabinensis*) across three river drainages. *Copeia* 104:458-468.

Selman, W., T.J. Hess Jr., and J. Linscombe. 2016. Long-term population and colony dynamics of brown pelicans (*Pelecanus occidentalis*) in rapidly changing coastal Louisiana, USA. *Waterbirds* 39:45-57.

Selman, W., R. Elsey, J. Boundy, and B. Kreiser. 2016. *Apalone ferox* (Florida Softshell Turtle). Geographic distribution. *Herpetological Review* 47:421.

Gaillard, D.L., W. Selman, R.L. Jones, B.R. Kreiser, C.P. Qualls, and K. Landry. 2015. High connectivity observed in populations of ringed sawbacks, *Graptemys oculifera*, in the Pearl and Bogue Chitto Rivers using six microsatellite loci. *Copeia* 103:1075-1085.

Collins, S.A., F.J. Sanders and P.G.R. Jodice. 2016. Assessing conservation tools for an at-risk shorebird: Feasibility of headstarting American oystercatchers, *Haematopus palliatus*. *Bird Conservation International* 26: 451-465

TECHNICAL ASSISTANCE, OUTREACH AND EDUCATION

In August 2015, RWR hired a Public Information Officer for the first time in refuge history. This allowed the refuge to increase public outreach activities, hosting several events to educate elementary, high school and college students in wildlife, marsh ecology and coastal erosion. RWR staff also participated in guided tours for a number of organizations and groups (1,443 technical assistance contacts, 1,800 general information contacts, and 2,136 group contacts). Along with outreach at the refuge, the new position allows for a representative to visit the public and private sectors. During the reporting period, the CWPPRA Project ME-18 was passed. Various outreach efforts were launched to educate the public about the upcoming CWPPRA vote. This included visits to local Rotary Clubs and Police Juries, radio interviews, videos produced in-house, and Facebook posts related to the upcoming vote.

One of the largest groups the refuge hosts each summer is the 4-H Marsh Maneuvers Camp. In 2015, 61 high school students from 17 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.

In addition to formal education and outreach opportunities, a new refuge website (www.rwrefuge.com) was completed in June 2015 to display the different ongoing refuge activities. The main topics presented on the website include public use, management and research, with the latter serving as a reposi-

tory for the 500+ publications, reports and conference abstracts by RWR staff since 1955. The public use section has provided much improved information for visitors, particularly recreational fishermen.

Examples of other technical assistance provided by RWR staff include:

- conducted winter raptor surveys for the Hawk Migration Association of America.
- participated in the Christmas Bird Count.
- assisted the Natural Heritage 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.
- completed mourning dove banding for the statewide dove monitoring program.
- assisted private landowners in assessing marsh conditions and management for waterfowl.
- hosted personnel from the International Crane Foundation to tour potential whooping crane pen sites on RWR, observe nesting pairs, and tour landscape.
- served as co-chair for the Gulf of Mexico region of the Diamondback Terrapin Working Group and organized a regional meeting in Lafayette.
- conducted peer-review and editorial duties for scientific journals; reviewed graduate student theses.
- served as student presentation judge at international meeting.
- participated in guided tours to the whooping crane pen site and Nunez Woods Bird Sanctuary.
- presented on the whooping crane reintroduction to multiple grade school, college, local, and professional groups, as well as providing an informational table at multiple local and state festivals.
- presented on coastal ecology and ecosystem services to the Southwest Louisiana Economic Alliance Leadership group.
- presented lectures to visiting college and university students on wetlands ecology, wetlands management, waterfowl ecology, and conservation research.
- reviewed research and grant proposals for university students and faculty.
- participated in career fairs for Cameron Parish School District and the LSU AgCenter.

RECREATIONAL USE

Marsh management units, and more specifically water control structures, continue to be very popular with sport fishermen. For the third consecutive year since hurricanes Rita and Ike, all water control structures via Joseph Harbor boat launch were fully operational; we were able to enhance the fishing opportunities while also maintaining adequate salinity levels. New recreational opportunities include the new Tom Hess Structure (dedicated October 2015) that manages the Price Lake Unit. Other recently completed projects - such as the new boat launches and bulkheading at Joseph Harbor (FY 2012-2013) and new fishing piers on Price Lake Road (FY 2012-2013 and FY 2013-2014) - have continued to be a great attraction for local and regional fishermen. The new recreational projects completed over the last five years have greatly enhanced the fishing opportunities at these already popular recreational areas.

In FY 2015-2016, 101,074 vehicles (approximately 236,513 person use days) were counted entering the refuge, which is approximately 30 percent higher than 2014-2015 data (77,798 vehicles and 182,225 people use days). New road counters were installed during the reporting period, to obtain more precise counts of refuge activity and require less calculation in order to verify numbers.

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 nine 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 five 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 1,500 acres of rice planted in 2016. There were approximately 900 acres of crawfish ponds on the property in 2016.

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 a total of 383 alligator tags issued for the 2015 alligator trapping season. The average size of the alligators trapped was 6.65 feet, with an average live length value of \$21.52 per foot.

There was a contract negotiated for the collection of alligator eggs from the WLWCA property in 2015 for a three-year period. In 2015, WLWCA received a payment of \$36.67 per egg. A total of 4,904 eggs were collected.



Releasing farm alligators

Fur trapping did not occur on WLWCA this year due to the continued low numbers of fur-bearers on the property. There has been no fur trapping on this property for over 30 years because of the low numbers of fur-bearers.

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

2015 - Eighty-two 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, 2015

2016 - 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, 2016

WATERFOWL LOTTERY

Waterfowl Hunting (2015-2016 Season)		
	Total Hunts	Participants
Teal Lottery Hunts	9	102
Marsh Lottery Hunts	16	192
Youth Hunts	2	14
Rice Field Lottery Hunts	30	235
Group Hunts	6.5	76

Waterfowl Hunting Results (2015-2016 season)		
	Marsh	Rice Field
Total Ducks Harvested	1779	455
Average Kill/Hunter (ducks)	5.41	1.95
Total Geese Harvested	77	45
Average Kill/Hunter (geese)	0.23	0.19



Group hunt waterfowl harvest.

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, 2016. Site use was 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 no scheduled non-consumptive groups during FY 2015-2016.

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 boundary of the property where LA-91 ends. Birding paths, a parking area, access bridges, a birding tower

and a picnic pavilion are open to the public. There were approximately 110 logged names in our visitor's guest book in FY 2015-2016.

EDUCATION, OUTREACH AND RESEARCH

MARSH MANEUVERS

During December 2015, WLWCA was host to a group of 16 high school 4-H students for three days. The three-day camp was designed to educate the students on the importance of coastal erosion, restoration, conservation and ecology. They were also able to go on a morning marsh tour and were taught waterfowl identification techniques. They participated in a sporting clay shoot where they were instructed on gun safety and the proper use of a shotgun.

COASTAL PRAIRIE

There is approximately 200 acres of coastal prairie on the WLWCA property located south of the Gulf Intracoastal Waterway and west of the Florence Canal. For the past couple of years the Louisiana Natural Heritage 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 Louisiana Natural Heritage Program that includes prescribed fire and herbicide appli-



LEFT: Marsh Maneuvers boat ride. **RIGHT:** Controlled burn on the coastal prairie.



LEFT: Vegetation survey on the coastal prairie. **RIGHT:** Intern banding wood duck.



cation to reduce woody encroachment. This project is funded through the State Wildlife Grants Program.

WHOOPING CRANE RE-INTRODUCTION PROJECT

WLWCA assisted the Whooping Crane Reintroduction Project by providing office space, staff and vessel support. In addition, WLWCA staff maintained the 700-acre impoundment located approximately 3.5 miles north of the existing pen location.

WOOD DUCK PROJECT

WLWCA continued a wood duck banding program to compliment the LDWF statewide banding program. In addition to banding birds, staff monitored nest boxes and collected data for potential survivability and recruitment studies.

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, all of which are operated, managed and maintained by WLWCA personnel. Objectives of maintenance and manipulation of the refuge's system of levees and water control structures vary somewhat by management unit, but generally goals are to maintain marsh health, provide conditions favorable for production of waterfowl food plants, and incorporate multi-species management when possible.

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

AGRICULTURAL MANAGEMENT

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

MINERAL MANAGEMENT

There are three producing oil and gas fields on the WLWCA property that were once operated by Amoco Production Company. Amoco sold the subsurface rights in these fields and all the facilities associated with these fields in the latter part of the 1990s to Hilcorp Energy Company. Hilcorp has since sold these fields, and for a period of time they were operated by three separate owners/operators: the West White Lake Field (approximately 1,500 acres) was owned and operated by Energy Quest; the Florence Field (approximately 1,920 acres) was owned and operated by Dune Energy Company; and the South Kaplan Field (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 four mud boats were dry-docked and repainted, and other routine annual maintenance was done.



Oil operators repairing levees.



Cleaning lodge flowerbed.

2015-2016 FINANCIAL REPORT

Totals	
Beginning Fund Balance 2015-2016	\$2,269,437
Total Revenue	\$1,248,375
Total Expenditures	-\$1,140,811
Ending Fund Balance 2015-2016	\$2,377,001

Revenue	
Group Hunt Trip Fees	\$67,291
Group Hunt Charitable Contributions	\$126,000
Agricultural Leases	-
Alligator Egg Collection	\$179,830
Lottery Hunt Fees	\$71,050
Alligator Trapping Income	\$21,941
Interest Income	\$5,018
Mineral Bonuses	-
Right of Way	\$24,731
Surface Leases	\$743,707
Surplus Property	\$3,942
FEMA Reimbursements	-
Oil and Gas Royalty	-
Non-Consumptive Trips	-
Fishing Lottery	\$4,865
Total	\$1,248,375

Expenditures	
Salaries	\$383,150
Wages	\$92,560
Related Benefits	\$235,883
Travel	-
Operating Services	\$102,590
Supplies	\$129,458
Professional Services	\$24,335
Other Charges	-
Acquisitions	\$16,476
Major Repairs	114,157
Interagency Transfers (insurance)	\$42,202
Total	\$1,140,811

LOUISIANA NATURAL HERITAGE PROGRAM

The Louisiana Natural Heritage Program (LNHP) is responsible for the conservation of Louisiana's rare, threatened and endangered species, nongame birds, and habitats. LNHP staff conducts research on nongame birds, rare species and habitats of conservation concern, and works with landowners that have rare species and habitats to promote the future survival of those elements. Data concerning rare elements are collected and stored in the Biotics database system. These data are then used to determine potential adverse impacts to the environment. LNHP is composed of four main sections: Data; Botany/Community Ecology; Zoology; and Wildlife Action Plan/State Wildlife Grants.

LANDSCAPE CONSERVATION COOPERATIVES

We have continued to commit time and resources to participating in the Gulf Coast Prairie and the Gulf Coastal Plain and Ozarks Landscape Conservation Cooperatives (LCCs). LNHP staff participate both as members of the Steering Committee and Science Teams.

The LCC Science Teams have prepared a Science Agenda and Work Plan and are working on determining high priority needs and desired ecological states for priority habitat systems. The Gulf Coastal Plain and Ozarks LCC teams have also prepared and ranked science needs, reviewed action maps and focal area maps, and provided and ranked research funding ideas to be included in the Research Funding Opportunity Call for Pre-proposals. Ongoing projects developed by the Gulf Coastal Plain and Ozarks LCC include identifying desired ecological conditions for managed open pine habitats, a Southeast Conservation Adaptation Strategy, and alligator snapping turtle, Louisiana pearlshell mussel, Louisiana pinesnake, and gopher tortoise conservation efforts. Ongoing projects developed by the Gulf Coast Prairie LCC include a coastal prairie decision support tool, coordination of *Quadrula* species research, impacts to oysters from sea level rise, and alligator gar recruitment using river state specific floodplain inundation models.

EAST GULF COASTAL PLAIN JOINT VENTURE

LDWF LNHP continued to participate as a board member in the East Gulf Coastal Plain Joint Venture. The LNHP program manager continued to serve as chair of the Prescribed Fire Committee and coordinated the implementation of the Prescribed Fire Communications Plan. The East Gulf Coastal Plain Joint Venture's vision for prescribed fire in the Southeast is to maintain and restore fire regimes through an increased use and acceptance of prescribed fire, since fire has historically and evolutionarily played a critical role in the health of East Gulf Coastal Plain upland systems and marshes. Specifically, communications and partnerships will increase the safe use of prescribed fire to restore, improve and sustain the ecosystem health of fire-dependent systems such as shortleaf and longleaf pine, mixed pine woodlands, oak woodlands and savannas, native warm season grasses and distinct climax grasslands such as the Black Belt Prairies of Mississippi/Alabama and Big Barrens of Kentucky/Tennessee.

LNHP staff provided significant content and edits to a new pocket guide to birds of fire-maintained grassland and pine habitats of the Southeast. The ornithologist authored nine bird species' accounts - Swallow-tailed Kite, Red-tailed Hawk, Red-shouldered Hawk, Eastern Whip-poor-will, Chuck-will's-widow, Red-headed Woodpecker, American Kestrel, Eastern Bluebird, and Prairie Warbler. Botanists authored several habitat descriptions and provided substantial edits to the text.

SOUTHEASTERN ASSOCIATION OF FISH AND WILDLIFE AGENCIES: WILDLIFE DIVERSITY COMMITTEE

The Southeastern Association of Fish and Wildlife Agencies (SEAFWA): Wildlife Diversity Committee's mission is to determine whether federal candidates and petitioned species warrant listing under the Endangered Species Act. This committee is composed of southeastern state representatives and USFWS personnel. LNHP staff continued to represent Louisiana on the Wildlife Diversity Committee and attended the annual SEAFWA conference in

October 2015. Staff also attended the winter Wildlife Diversity Committee meeting in Mansfield, Ga. During FY 2015-2016, this committee worked on the following: competitive State Wildlife Grant (SWG) proposal that included all southeastern states, worked with the committee's SE At Risk Species data coordinator on upcoming year's planned work and agreement on priorities and timelines for completion, developed a post-multi-district-litigation work plan for species and status assessments, ranked project proposals for the SE At-risk Species grants program, committee-endorsed process for reporting/publishing assessments and findings for non-candidate species, and draft work plan and schedule for species assessments.

LNHP COMMITTEE PARTICIPATION

LNHP staff participates in a myriad of organizations both at the state and national level. Below is a list of groups that LNHP is associated with:

- Wildlife Diversity Program Manager Working Group (national Teaming With Wildlife coalition)
- East Gulf Coastal Plain Joint Venture Management Board
- East Gulf Coastal Plain Joint Venture Prescribed Fire Team
- Coastal Prairie Conservation Partnership
- USDA-NRCS State Technical Committee
- LA Association Professional Biologists
- LA Forestry Association Recreation & Endangered Species Committee
- LDWF Turtle Regulations Committee
- LA Gulf Coast Herpetological Society Advisory Board
- LA Wildlife Federation
- SEAFWA Wildlife Diversity Committee
- The Association of Fish and Wildlife Agencies State Wildlife Action Plan Coordinators Committee
- Dusky Gopher Frog Recovery Team
- LA Amphibian Monitoring Program
- Gulf Coastal Plains & Ozarks LCC
- Committee on Standard English and Scientific Names of reptiles and amphibians
- Gulf Coastal Plains & Ozarks LCC Alligator Snapping Turtle/LA Pinesnake/LA Pearlshell Mussel Groups
- CORA and MYAU Conservation Strategy Development Team

- LA Pinesnake Conservation Committee
- North American Field Herpers Association
- LA Pinesnake Reintroduction Committee
- Gopher Tortoise Bank Review Team
- White-nosed Syndrome Committee: Southeastern Partners
- LA Pearlshell Mussel Conservation Committee
- LDWF State Wildlife Grants Committee
- Gulf Coastal Plains & Ozarks LCC Adaptation Science Management Team
- Gopher Tortoise Council
- Gopher Tortoise Minimum Viable Population Working Group
- Gopher Tortoise Rangewide Conservation Strategy Working Group
- Gopher Tortoise Rangewide Waif/Disease Working Group
- Gopher Tortoise Candidate Conservation Agreement Working Group
- Southeast Partners in Amphibian and Reptile Conservation Committee
- Northern Gulf Manatee Stranding Network
- American Oystercatcher Working Group
- Barataria-Terrebonne National Estuary Program (BTNEP) Invasive Species Action Team
- LA Native Plant Society
- The Association of Fish and Wildlife Agencies Bird Conservation Committee
- BTNEP Bird Project Committee
- Gulf Coast Joint Venture Landbird Monitoring, Evaluation and Research Team
- Gulf of Mexico Alliance Wildlife Technical Group
- Gulf of Mexico Avian Monitoring Network
- Mississippi Flyway Council Nongame Technical Committee
- Natural Resource Damage Assessment Avian Restoration
- Southeast Partners In Flight
- Swallow-tailed Kite Conservation Alliance (Working Group)
- Prothonotary Warbler Working Group
- Loggerhead Shrike Working Group
- RESTORE Technical Science Review Team
- Standard English and Scientific Names Committee, Joint Societies: ASIH, HL, and SSAR
- Secretive Marsh Bird Working Group
- Gulf Coast Prairie LCC Science Team
- Southwest LA Association of Master Naturalists Chapter Board
- LA Master Naturalists of Greater Baton Rouge Steering Committee
- Region 4 Wildlife TRACS Working Group
- LSU Sustainable Bioproducts Initiative Advisory Committee

LNHP OUTREACH PRESENTATIONS AND PUBLIC EVENTS

- "Field Studies in Wildlife Habitat" (RNR 3005) course at LSU
- "Flora of the Central Gulf Coast" (BIOL 4055) course at LSU
- "Current Topics and Techniques in Conservation Science" (RNR 7016) course at LSU
- Louisiana Master Naturalists of Greater New Orleans training courses
- Louisiana Master Naturalists of Greater Baton Rouge training courses
- Louisiana Master Naturalists of Acadiana training courses
- Southwest LA Association of Master Naturalists training courses
- Birds, Bogs and Butterflies presentation and nature walk
- Louisiana Environmental Education Commission Convention
- Louisiana Heritage Cook-off Festival
- BREC Blackwater Conservation Area Bioblitz
- Louisiana Wildlife and Fisheries Foundation Auction Bird Tours
- Grand Isle Migratory Bird Festival
- Audubon Endangered Species Day
- National Hunting and Fishing Day
- Yellow Rails and Rice Festival
- Palmetto Island State Park Stir the Pot Festival



Youth outreach efforts at National Hunting and Fishing Day.

- St. Amant Middle School Career Fair-Rare, Threatened and Endangered Species & Habitats
- Prairieville Middle School Career Fair-Rare, Threatened and Endangered Species & Habitats
- St. Gabriel Science Fair- Science Judge
- Project E-Steam- Deepwater Horizon Oil Spill and Rare, Threatened and Endangered Species
- Louisiana ENVIROTHON - Invasive Species
- Louisiana Master Naturalists of Greater Baton Rouge- Birds, Mammals, Herps, & Rare, Threatened and Endangered Species Lectures
- Rare, Threatened and Endangered species lecture to Runnels High School Environmental Science class
- LNHP and Nongame birds lecture to Orleans Audubon Society
- Animal camouflage, aposematism, and mimicry lecture to Live Oak Elementary
- Animals that lay eggs lecture to Live Oak Elementary
- Bird sounds presentation to Zachary School District
- Revised Louisiana Wildlife Action Plan to Louisiana Forestry Association
- Bird Study Merit Badge class to local Boy Scout troop
- Benefits of Longleaf pine forests to wildlife class to attendees of Longleaf 101 workshop
- Candidate Conservation Agreement with Assurances for the Louisiana pinesnake to Roy O. Martin Timber personnel
- Alligator Snapping Turtle Head Start Program to Louisiana Amphibian and Reptiles Enthusiasts group
- How to safely deal with wildlife i.e. snakes and alligators to Golden Nugget Resort personnel
- Various news outlet coverage of alligator snapping turtle restocking efforts
- Various news outlet coverage of Bald Eagle nest surveys
- Annual Gopher Tortoise Council Meeting and Spring and Fall Business Meetings
- Field lecture to Biology class at SE LA University
- Field demonstration of Louisiana pinesnake trapping to Hancock Forest Management personnel
- Southeast Partners in Amphibian and Reptile Conservation Annual Meeting
- Lake Charles KPLC interview regarding ducks disappearing from lakefront

- Lake Charles KPLC interview regarding two-headed turtle
- Press release on rare bird state record
- SEAFWA conference and Wildlife Diversity Committee meetings
- Annual Gopher Tortoise Candidate Conservation Agreement meeting
- Gopher Tortoise Minimum Viable Population Coordination meeting
- Louisiana Amphibian Monitoring Program Annual Meeting

LOUISIANA'S WILDLIFE ACTION PLAN AND STATE WILDLIFE GRANTS PROGRAM

In November 2001, Congress created the State Wildlife Grants (SWG) Program. According to the federal legislation that created the program, SWG was established “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 is a crucial aspect of the SWG program, as many of these species previously had no existing source of funding. The SWG program is now the primary funding source for non-game conservation nationwide, with the stated goal of preventing species from being federally listed as threatened or endangered.

WILDLIFE ACTION PLAN REVISION

Congress stipulated that each state fish and wildlife agency that wished to participate in the SWG program develop a Comprehensive



Louisiana Wildlife Action Plan report cover.

Wildlife Conservation Strategy (Wildlife Action Plan) by October 2005. In response, LDWF developed a Wildlife Action Plan (WAP) to establish conservation needs and guide the use of SWG grant funds for the next 10 years. A crucial aspect of the WAP is the identification of Species of Greatest Conservation Need (SGCN), which are those species most in need of conservation action as identified by each state. The WAP was submitted for approval to the National Advisory Acceptance Team and was subsequently approved in December 2005. The WAP is the roadmap for non-game conservation in Louisiana, and must be reviewed and revised every 10 years to ensure that it remains an effective tool for conservation planning and implementation.

The first comprehensive revision of the Louisiana WAP was completed during FY 2015-2016 and was submitted to USFWS prior to Oct. 1, 2015. The final draft of the 2016 WAP was 698 pages, compared to the 473 page 2005 WAP (47 percent Increase in content). A total of 10 WAP revision meetings were held before October. The SWG coordinator devoted 354 hours to the revision from July 1 to Oct. 1. Specific tasks completed during FY 2015-2016 included:

- Completed the Climate Change and Conservation Opportunity Areas chapters and posted final drafts on the LDWF website, along with three additional appendices for public review and comment.
- Wrote the Acknowledgements, Executive Summary and Summary of Changes.
- Wrote threats assessments for all taxa groups for inclusion in Chapter 4 (Species Conservation).
- Received, reviewed and incorporated comment from conservation partners and the general public.
- Along with LNHP staff and Public Information developed and finalized the cover for the 2015 WAP.
- Proofread, edited and formatted the entire 2015 draft WAP prior to submission to the Office of State Printing.
- Submitted two printed copies as well as an electronic copy of the draft 2015 WAP to USFWS for review.
- Provided multiple interviews and webinars regarding the draft 2015 WAP.

FY 2015-2016 SWG FUNDING CYCLE AND GRANT MANAGEMENT ACTIVITIES

The SWG 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

TABLE 1.

New Louisiana State Wildlife Grants Opened During FY 2015-2016
Productivity and Survivorship of Landbirds in Bottomland Hardwoods
Wildlife Habitat Inventory Initiative
SWG and WAP Coordination
Promotion of Prescribed Burning in the EGCP
Alligator Snapping Turtle Headstart Program
Promotion of Prescribed Burning in the WGCP
Status, Abundance and Distribution of Saltmarsh Topminnow
Surveys for Rare Amphibians and Reptiles
Natural Areas Registry Program for SGCN
Population Genetics and Life History of the Sarracenia Spiketail
Influence of Vegetation and Soil on Density of Baird's Pocket Gophers

each state. Since the inception of the SWG program, the state of Louisiana has received approximately \$13.5 million in federal SWG funding, with an apportionment of \$700,000 in FY 2015-2016. Louisiana has funded 150 projects through the SWG program to date. Funded SWG projects have included biological inventories, research projects, habitat management, and the development and maintenance of databases. A wide range of SGCN have benefited from SWG funding in Louisiana, including the Louisiana black bear, whooping cranes, swallow-tailed kites, red-dish egrets, alligator snapping turtles, freshwater mussels, and neo-tropical migrant songbirds.

SWG proposals are accepted by LDWF on an annual basis, and include projects developed by LDWF personnel, non-governmental organizations and universities. SWG proposals are reviewed by LDWF's SWG Committee, consisting of 17 biologists representing the Coastal and Nongame Resources Division, Inland Fisheries, Marine Fisheries, and Wildlife Division.

During FY 2015-2016, 29 new project proposals were received for funding consideration, the most received within the past six fiscal years. This demonstrates both the importance of SWG funding to non-game conservation and research, as well as the success of ongoing efforts to better publicize the SWG program. Eleven proposals received approval by the SWG Committee by the end of FY 2015-2016 (*Table 1*), and had been submitted to USFWS for approval, along with all

TABLE 2.

Louisiana State Wildlife Grants Closed During FY 2015-2016	
T-12-3	Database for Tracking S1, S2, and S3 SGCN
T-76	Nongame Winter Bird Projects
T-80	Preparations for Eventual WAP Revision
T-84	Inventory of SGCN and Rare Habitats on or Adjacent to Scenic Rivers
T-91	Assessment of Fish Assemblages at Manmade Structures in the Northern Gulf of Mexico
T-93	Reintroduction of Whooping Cranes to Louisiana – Phase 1
T-93-2	Reintroduction of Whooping Cranes to Louisiana – Phase 2
T-104	Calcasieu Painted Crawfish Distribution and Ecology
T-320	Coastal Prairie Conservation and Research
T-822	Surveys for Rare Mollusks at the Chandeleur Islands
T-726	Surveys for the Northern Long Eared Bat in Louisiana

TABLE 3.

Grant	Citation
T-90	Vasseur, P.L. and P.L. Leberg. 2015. Effects of habitat edges and nest-site characteristics on Painted Bunting nest success. <i>Journal of Field Ornithology</i> 86(1):27-40.
T-94	Lindeman, P.V., Louque, I., Huntzinger, C., Lyons, E., Shively, S.H., and Selman, W. 2015. Eye color and chin pattern in the turtle <i>Graptemys pseudogeographica</i> in the Calcasieu River drainage of Louisiana, with comparison to adjacent drainages. <i>Herpetological Review</i> , 46(2), 179-185.
T-94	Fehrenbach, A.K., I. Louque, S.L. McFadden, C. Huntzinger, E. Lyons, S.H. Shively, W. Selman, and P.V. Lindeman. 2016. Habitat-related variation in body size and reproductive output and an examination of reproductive allometry in the Sabine map turtle (<i>Graptemys sabinensis</i>) across three river drainages. <i>Copeia</i> 104(2):458-468.
T-98	Smith, N.R., Afton, A.D., and Hess Jr., T.J. 2016. History and nesting population of Bald Eagles in Louisiana. <i>Southeastern Naturalist</i> 15(1):12-25.
T-98	Smith, N.R., Afton, A.D., and Hess Jr., T.J. 2016. Morphometric sex determination of After-hatch-year Bald Eagles in Louisiana. <i>Journal of Raptor Research</i> 50(3): 301-304.

required documentation. After grant closings on June 30, 2016, there remained 42 ongoing SWG-funded projects.

During FY 2015-2016, 11 SWG grants were closed (Table 2). Copies of final reports for all closed SWG grants are available to interested parties upon request. Thirty grant amendments were submitted to USFWS during FY 2015-2016, and 41 grant reports were submitted to USFWS during the fiscal year.

STATE WILDLIFE GRANTS FUNDED RESEARCH PRODUCTS

Since the inception of the SWG 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. During FY 2015-2016 Louisiana SWG produced five peer-reviewed publications, representing three different grants (Table 3).

DATA SECTION

LNHP gathers occurrence information for rare, threatened and endangered wildlife species. Heritage data are integral in determining the status and state rankings for SGCN, which drives the direction of non-game species research and conservation for the state of Louisiana. The information is stored in easily accessed GIS computer database files known as Biotics, which was developed by the Natural Heritage Network's parent organization, NatureServe. During FY 2015-2016, a total of 535 Element Occurrence Records (EORs) were added and/or updated in Biotics along with the associated information including location, species population status, and habitat condition. The Bald Eagle dataset received significant updates, modifications and additions in Biotics from information gathered during flight surveys conducted in 2015. This was the first comprehensive bald eagle survey by LDWF since 2008 and resulted in nine bald eagle records that were updated or modified and 57 new bald eagle records that were added to the database. In February 2015, a subset of the bald eagle nests was re-flown in order to assess productivity for the 2014-2015 breeding season. As a result, 46 bald eagle records were updated with productivity information.

The Waterbird Nesting Colony dataset underwent quality assurance and quality control procedures. Waterbird surveys are typically conducted every other year and are primarily focused on coastal Louisiana. The LNHP ornithologist surveys each known colony and records all species present and the number of nesting pairs for each species. Data are also recorded for any new waterbird colonies observed during the flight. These data are then used to update existing EORs and to create new waterbird records in the LNHP database.

In years past, in addition to updating and adding new waterbird records to the database, individual species records were also created for Caspian tern, glossy ibis, gull-billed tern, reddish egret and roseate spoonbill. These individual species records were created using the exact GPS location of the waterbird colony in which the species were originally recorded. This resulted in duplicated information and multiple EORs of the same breeding pairs.

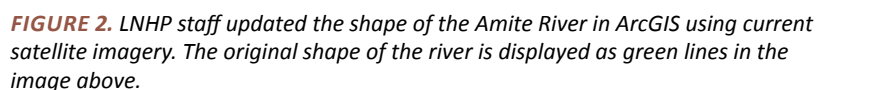
In an effort to clean up the database and eliminate duplicate records, all Caspian tern, glossy ibis, gull-billed tern, reddish egret and roseate spoonbill EORs were compared to waterbird EORs. If the individual species record was associated with a waterbird colony EOR, the information contained within the individual species record was merged into the waterbird record. The species record was then deleted out of the LNHP database. As a result of this process, 104 species records were consolidated and removed from Biotics.

The Biotics database is used daily by LNHP staff to review construction activities and development projects planned by government and private entities throughout the state. These activities range from small to large-scale projects including residential, commercial and industrial development, and the development of pipelines and roads. These activities repeatedly threaten SGCN and natural habitats across the state, and the LNHP is tasked with reducing and limiting these threats as much as possible.

Throughout the year, government and private entities will request species and habitat reviews for projects occurring in Louisiana. These reviews are collectively referred to as private consultant projects. The requesting organization submits a description of the proposed project to LNHP and a query of the LNHP database is run against the proposed project area. The results of the query show 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 WMAs occurring within 400 meters of the project area.

In addition to data agreements produced for public and private entities, the Database Section worked in-house with the Seismic Section on three large-scale seismic and micro-seismic projects occurring throughout the state. These projects were reviewed by the LNHP and comments were submitted to the Seismic Section

FIGURE 1. This image represents a snapshot of the data input into the Marsh Bird Access Database from information collected during surveys conducted in July 2012.



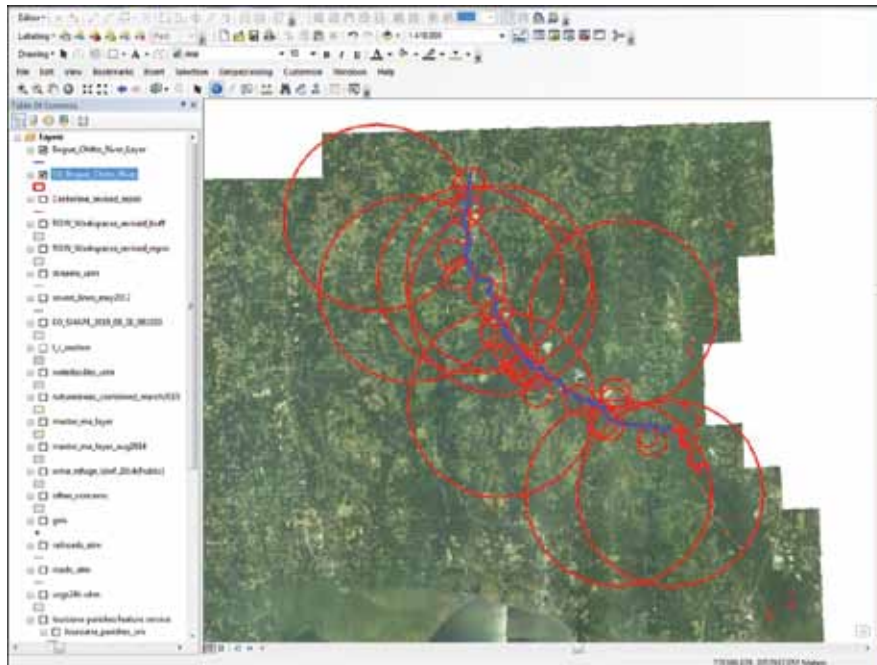


FIGURE 3. This ESRI project shows all EORs (displayed as red circles) within 400 meters of the Bogue Chitto River (displayed as a blue line).

indicating potential impacts of these projects to SGCN and natural communities.

PROJECTS

- The Database Section provided comments on a proposed Mississippi River Diversion project. This project would divert water from the Mississippi River over to Texas and would span a 50-year time period. LNHP comments were incorporated into a Louisiana State Agency response letter and sent to the Arkansas Natural Resources Commission. The comments addressed potential impacts - both immediate and long-term - to LNHP SGCN and natural communities in the state.
- The Database Section entered Secretive Marsh Bird information into an Access Database. This information was collected during surveys conducted from 2012-2015.
- The Database Section worked on the SWG Scenic Rivers project (T-84)
 - LNHP staff continued to update the shape of each scenic river using current satellite imagery.
 - The Database Section began conducting desktop surveys for all elements occurring within 400 meters

	A	B	C	D	E	F	G	H
1	Common Name	Scientific Name	Federal Status	State Status	Global Rank	State Rank	Species Status	Notes
2	*Alabama Shad	<i>Alosa alabamae</i>	Candidate		G2G3	S1	Unlikely	All EORs listed as historical, no recent records
3	Alligator Snapping Turtle	<i>Macrochelys temminckii</i>			G3G4	S3	Likely	Species is widespread and this scenic river is suitable habitat
4	*Bluenose Shiner	<i>Pteronotropis welaka</i>			G3G4	S2		
5	*Gopher-apple	<i>Licania michauxii</i>			G4G5	SH	Unlikely	Listed as historical in the state
6	*Gulf Coast Mud Salamander	<i>Pseudotriton montanus</i>			G5	S1	Somewhat Unlikely	Record is historical, suitable habitat may be present as indicated by Southern Red Salamander records
7	*Harlequin Coral Snake	<i>Micruis fulvus</i>			G5	S2	Somewhat Unlikely	Record is historical, species is uncommon
8	*Lady Lupine	<i>Lupinus villosus</i>			G5	S2		
9	*Maryland's Black Snake-root	<i>Sanicula marilandica</i>			G5	SH	Unlikely	Listed as historical in the state
10	*Michaux Milkweed	<i>Asclepias michauxii</i>			G4G5	S2		
11	*Ornate Chorus Frog	<i>Pseudacris ornata</i>			G5	SH	Unlikely	Listed as historical in the state
12	*Pearl Darter	<i>Percina aurora</i>	Candidate		G1	SH	Unlikely	Listed as historical in the state
13	*Riverside	<i>Podostemum ceratophyllum</i>			G5	S1		
14	*Southeastern Blue Sucker	<i>Cycoreus meridionalis</i>			G3G4	S1		
15	*A Golden Aster	<i>Chrysopsis gossypina</i> ssp. <i>hyscophila</i>			G6T3T5	S1		
16	*A Wild Coco	<i>Pteroglossaspis ecistata</i>			G2G3	S2		
17	Alabama Hickorynut	<i>Obovata unicolor</i>			G3	S1		
18	American Swallow-tailed Kite	<i>Elanoides forficatus</i>			G5	S1S2B	Likely	Recent surveys have documented species presence near the Bogue Chitto.
19	Bachman's Sparrow	<i>Ammodramus aestivalis</i>			G3	S3	Likely	Apparent presence of suitable habitat
20	Carpenter's Ground-cherry	<i>Physalis carpenteri</i>			G3	S1		
21	Coastal False-asphodel	<i>Tofieldia racemosa</i>			G5	S2S3		
22	Crystal Darter	<i>Crystallaria asprella</i>			G3	S2		
23	Dwarf Filmy-fern	<i>Trichomanes petraeii</i>			G4G5	S2		
24	Eastern Hillaide Seepage Bog	Eastern hillaide seepage bog			G2	S1		
25	Ebonyshell	<i>Fusconia ebena</i>			G4G5	S3		
26	Elephant-ear	<i>Elliptio crassidens</i>			G5	S3		
27	Fairy Wand	<i>Chamaelirium luteum</i>			G5	S2S3		
28	Flame Flower	<i>Macranthera flammula</i>			G3	S2		
29	Frecklebelly Madtom	<i>Noturus munitus</i>			G3	S1		
30	Freckled Darter	<i>Percina leucicula</i>			G3	S1		
31	Fringed Yellow-eyed Grass	<i>Xyris fimbriata</i>			G5	S4		
32	Gopher Tortoise	<i>Gopherus polyphemus</i>	Threatened	Threatened	G3	S1	Likely	Recent surveys have documented species presence near the Bogue Chitto.
33	Gulf Sturgeon	<i>Acipenser oxyrinchus desotoi</i>	Threatened	Threatened	G3T2	S1	Likely	Relatively recent records; Bogue Chitto River is part of core range
34	Hardwood Slope Forest	Hardwood slope forest			G2G3	S3		
35	Indian Cucumber-root	<i>Medeola virginiana</i>			G5	S1		
36	Mixed Hardwood-toblotly Forest	Mixed hardwood-toblotly forest			G3G4	S3		

FIGURE 4. This table shows all of the LNHP tracked species and communities within 400 meters of the Bogue Chitto River.

of each LDWF scenic river. Using current satellite imagery, data in Biotics Tracker and Mapper, and expert opinion, each element was given a species status. The status indicates the likelihood that each element still occurs within the 400 meter designation.

- Reports were generated listing all LNHP tracked species and communities occurring within 400 meters of each scenic river. Once the desktop survey was conducted, the species status and notes were populated for each element in the table.
- During FY 2015-2016, the Data Section provided considerable assistance on the WAP including:
 - Completion of Conservation Opportunity Area maps in Chapter 8.
 - Completion of all maps for Chapter 2.
 - Creation of SGCN tables for the Habitat chapter.
 - Worked on picture borders for the Habitat chapter.
 - Reviewed and submitted comments and edits on the Conservation Opportunity Areas chapter.
 - Reviewed and submitted comments and edits on the Climate Change chapter.
 - Reviewed and submitted comments and edits on the Summary of Changes document.
 - Creation of the List of Tables, List of Figures, and Table of Contents.
 - Completion of the List of References
 - Completion of the Master List of Acronyms.
- Worked on the Section 6 Environmental Review Tool Project
- Compiled information and created maps for the LDWF NRDA Section.
- Assisted LNHP staff with field work for projects including:
 - Vegetation Surveys
 - Coastal Prairie Burns
 - Gopher Tortoise Surveys
 - Piping Plover Surveys
 - Shrike Trapping
 - Breeding Bird Surveys
 - Beach Nesting Bird Surveys
 - Pine Snake Trapping
 - School Presentations
 - Boy Scout Camps
 - Stir the Pot Festival
 - National Hunting and Fishing Day
 - Science Fair Judge
- The Database Section updated the Natural Areas Registry ArcGIS geodatabase and map.



FIGURE 5. This map indicates all SGCN and natural communities within Cameron and Calcasieu parishes that may be impacted by future oil spills.

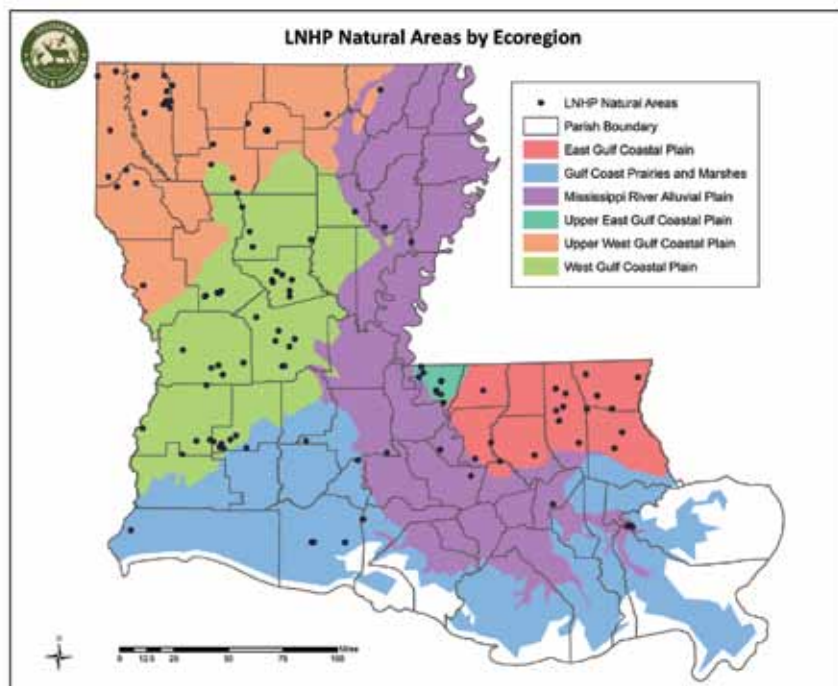


FIGURE 6. This map shows all LNHP Natural Areas by Ecoregion in Louisiana as of May 2016.

- The Database Section worked on the ENVIROTHON - a competition for students in 6th-12th grades. This competition allows students to demonstrate their knowledge of environmental science and natural resource management. Database Section Involvement in the ENVIROTHON included:
 - Preparation and Moderation of a Study Session.
 - Development of test questions.
 - Creation of an Invasive Species scenario.
 - Attending and Administering the Invasive Species Test at the ENVIROTHON competition.

BOTANY/COMMUNITY ECOLOGY SECTION

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

- Determining which plant species and natural communities (habitats) are rare in Louisiana.
- 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.
- Conducting education and outreach activities to promote understanding and appreciation of Louisiana's biological diversity.
- Providing curriculum guidance and training for Louisiana Master Naturalist Program.
- Providing plant identification services to LDWF staff, natural resources professionals with other organizations, and the public.
- Contributing expert knowledge on Louisiana ecology and flora to conservation decision processes including environmental impact review, conservation planning, and habitat management.

GRANT SUPPORT

Much of the work conducted by the Botany/Community Ecology Section is funded by external grants. Most of these are SWGs, for which matching funds of 35 percent of the total project cost are supplied by LDWF. Toward the end of FY 2015-2016, two grants were obtained to continue coastal prairie conserva-

tion momentum. One grant was awarded by the Environmental Protection Agency's Gulf of Mexico Program through their competitive Cooperative Agreements program; this grant amount is \$278,821.00. Another grant was obtained by the Environmental Protection Agency's Gulf of Mexico Program through their Interagency Agreements program. This grant was shared between LDWF and USGS, with the LDWF allotment totaling \$59,384.

Grant-funded Botany/Community Ecology projects

- Coastal Prairie Research and Stewardship (SWG); completed during FY 2015-2016.
- Ft. Polk New Lands Botanical and Ecological Survey (U.S. Department of Defense/USACE); completed in May 2016.
- Natural Areas Registry (SWG); in progress, additional funding was received in spring 2016.
- Coastal Prairie Stewardship on White Lake Wetlands Conservation Area (SWG); in progress.
- Wildlife Habitat Inventory Initiative (SWG); awarded spring 2016, project began in FY 2016-2017.
- Coastal Prairie Stewardship in Southwest Louisiana (Environmental Protection Agency's Gulf of Mexico Program); awarded in spring 2016, project began in FY 2016-2017.
- Enhancement of Pollinator Habitat on Coastal Prairie Rangelands (Environmental Protection Agency's Gulf of Mexico Program/USGS); awarded summer 2016, project began in FY 2016-2017.

BOTANICAL AND ECOLOGICAL SURVEY OF NEW FT. POLK LANDS

Botany/Community Ecology Section staff completed an intensive survey for rare plants and communities and invasive plants on approximately 45,000 acres of land recently acquired by Ft. Polk Military Reservation for expansion of military training. This project was funded by the U.S. Department of Defense. The final product for this work was delivered in May 2016. Deliverables included geographic information presenting locations and attributes of target elements and depicting current and estimated historical vegetation types. Most of the new Ft. Polk lands were acquired from forest products companies and therefore supported dense, fire-suppressed, loblolly pine plantations. The Ft. Polk Environmental and Natural Resources Management Division will use information generated from the survey to

plan appropriate ecological restoration management actions.

Even though this site was dominated by loblolly pine plantations, there were several remnant natural communities discovered during this survey. Streams on the property featured riparian areas that have remained relatively intact through the incorporation of Streamside Management Zone practices. Vegetation types found in stream corridors included baygall, sandy riparian hardwood forest, and clay riparian hardwood forest. Riparian habitats, which occupied approximately 3,000 acres, will serve as important sources of food, cover, and water as the adjacent upland sites are restored to more natural states.

Areas dominated by grasses and herbaceous forbs were also documented during this survey. Natural grasslands included calcareous prairie (72 acres), longleaf pine flatwoods savanna (62 acres), and hillside seepage bog (3 acres). These communities are rare in Louisiana. Discovery of these habitats on the new Ft. Polk lands provide opportunities for these areas to be enhanced and expanded with beneficial management practices such as prescribed burning and removal of off-site woody vegetation.

Four plant species tracked by LNHP including red milkweed (S3, G5), small-tooth sedge (S3, G4), Missouri cone flower (S2, G4G5), and Drummond's yellow-eyed-grass (S3, G3) were documented on the new Ft. Polk lands. Red milkweed and Drummond's yellow-eyed grass occur in bogs and baygalls, while small-tooth sedge and Missouri cone flower are calcareous prairies species. Identification of these unique habitat types and associated elements will allow LNHP and the Ft. Polk Environmental staff to guide restoration actions in such a fashion that habitat for these species is further enhanced. The ultimate management goal is for these species to no longer requiring monitoring.

NATURAL AREAS REGISTRY

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 in-

tegrity of their properties, thereby safeguarding the best remaining examples of the state's natural heritage. Enrollment of properties in the registry involves a voluntary, non-binding agreement between landowners and LDWF. The Natural Areas Registry is coordinated by the LNHP Botany/Community Ecology Section. To date, 121 properties are enrolled in the registry. These properties capture 48,719 acres and are distributed in 36 of Louisiana's 64 parishes. Thirty-three different natural communities and numerous populations of rare animals and plants are found on Natural Areas.

Responsibilities of LDWF to the Natural Areas Registry include:

1. Assessing habitats on existing Natural Areas and providing information to landowners.
2. Providing technical assistance regarding species and habitat ecology and management to landowners.
3. Directing landowners to funding opportunities to implement habitat stewardship.
4. Advocating Natural Areas protection.
5. Modifying agreements and deactivating Natural Areas for various reasons (e.g. ownership changes).
6. Evaluating properties for potential inclusion in the Natural Areas Registry.
7. Enrolling new properties in the Natural Areas Registry.
8. Distributing a regular newsletter (Blue-STEM) to registry participants and others interested in Natural Areas.

During FY 2015-2016, site visits were made to six active Natural Areas. Information and technical assistance was provided to landowners during these visits and in follow-up correspondence. Five properties were assessed for potential enrollment in the Natural Areas Registry; of these, three met the criteria for inclusion in the registry and agreements with their respective owners will be pursued in the near future. One new Natural Area was enrolled during FY 2015-2016.

Protection advocacy is an important role played by LDWF. During this reporting period, Botany/Community Ecology staff members provided letters of support to owners and other entities to neutralize threats to three Natural Areas. Threats included habitat disturbance caused by trespassers, loss of habitat to development, and disturbance associated with mineral exploration. The outcome of the conflict involving mineral exploration was resolved with satisfaction, while the other two engagements are ongoing.

Additional funding through SWG obtained in spring 2016 will increase the conservation impact of the Natural Areas Registry. Often, landowners lack the funds to perform important management actions such as prescribed burning and invasive species control. To address this reality, a portion of the new funding was explicitly dedicated to assisting landowners with stewardship implementation. The stewardship capacity of the Natural Areas Registry will be online by spring or summer of 2017.

COASTAL PRAIRIE RESEARCH AND STEWARDSHIP

Coastal prairie is an extension of tall-grass prairie from the eastern Great Plains. This grassland historically occupied 2.5 million acres in southwest Louisiana. Because of modern agriculture, only 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 the Louisiana. Calcasieu and Cameron parishes still feature a considerable amount of grazing lands, in contrast to the prairie region of Acadiana which is practically entirely under rice or sugarcane cultivation. The newly discovered prairie remnants are used as rangeland. While "passive" farming has been carried out on some this prairie acreage, most of the rangeland prairies have never been plowed.

Relationships between LDWF and three family-owned ranches have been established. The goal of these partnerships is to enhance coastal prairie habitat through stewardship and grazing optimization. The Coastal Prairie Research and Stewardship SWG grant provided a vigorous start to LDWF's cooperative prairie conservation work. The SWG grant resulted in the establishment of a long-term field experiment to determine the recovery potential of a coastal prairie that has experienced historical episodes of heavy grazing. Treatments employed in the experiment



LEFT: Botany/Community Ecology staff member tending prescribed fire on coastal prairie rangeland in February 2016. **RIGHT:** Marsh-fringing coastal prairie on White Lake Wetlands Conservation Area in April 2016. The prairie was burned by White Lake staff in August 2015.

consist of combinations of grazing exclusion, prescribed fire and chemical brush control. Change in quality is being measured by Floristic Quality Indices. Early results do not present much signal, which was expected since coastal prairie flora (and some members of the weed flora) is composed of long-lived perennials that respond slowly to environmental change. This experiment will be run for a minimum of 10 years. The stewardship component of the project consisted of prescribed fire and targeted herbicide application to fire-proof encroaching brush. Since March 2014, a total of 2,420 acres among four prairie remnants were burned by LDWF staff, including 550 acres between two sites burned during FY 2015-2016. Portions of two prairies capturing 180 acres received chemical brush control.

The Coastal Prairie Research and Stewardship SWG grant enabled a successful start to LDWF's long-term coastal prairie conservation commitment. In addition to being intrinsically impactful, this project strengthened partnerships between LDWF and prairie landowners. Two grants from the Environmental Protection Agency's Gulf of Mexico Program totaling \$338,205 were awarded to Botany/Community Ecology Principal Investigators in 2016. These funds will allow continuation of LDWF's coastal prairie conservation work for another three years. Actions to be completed on coastal prairie rangelands in the near future include targeted herbicide application to encroaching brush on ca. 1,300 acres, mechanical grinding of brush on at least 100 acres, and prescribed burning of 1,000 acres per year.

White Lake Wetlands Conservation Area supports an example of the wettest expression of coastal prairie. The coastal prairie at White Lake is situated on Deer Ridge, which is elevated slightly above the surrounding freshwater marsh. Invasion by Chinese tallow tree was identified as a threat in 2013. To address this problem before the invasion gets out-of-hand, SWG funds were acquired by Botany/Community Ecology and White Lake staff to support herbicide application to treat fire-proof trees and dense thickets of Chinese tallow tree and prescribed burning. A herbicide application was performed in September 2014. This action, combined with prescribed fires in April 2014 and August 2015, reduced woody cover from 25 percent to under 5 percent. A persistent Chinese tallow thicket that was missed in the 2014 herbicide application will be treated in 2017. Data will be recorded from vegetation sampling plots in 2017. This project will terminate at the end of FY 2016-2017.

EDUCATION/OUTREACH

- "English composition (special emphasis: writing for the outdoors)" course at LSU, presentation on Louisiana ecology and rare plants and habitats.
- "Field studies in wildlife habitat" (RNR 3005) course at LSU, plant identification training.
- New Orleans Area Master Naturalist class, plant identification training.
- Greater Baton Rouge Master Naturalist plant class, identification training.
- Ascension Master Gardeners, presentation on Louisiana ecology and rare plants and habitats.
- Pocket guide to birds of the Southeastern Coastal Plain and adjacent Piedmont (East Gulf Coastal Plain Joint Venture), contribution to habitat descriptions.
- Second grade classes at the Northwestern State University Elementary Lab School, presentation on the importance of pollinators.
- Stir the Pot Festival at Palmetto Island State Park in Abbeville, distribution of information about Louisiana ecology and rare plants.
- LSU AgCenter agro-tourism workshop, presentation on the Louisiana Natural Areas Registry.
- Louisiana ENVIROTHON held at LSU AgCenter's Burden Plantation, judgement of student oral presentations on the topic of coastal prairie restoration.
- Cajun Prairie Habitat Preservation Society, presentation on coastal prairie rangeland conservation.

CONFERENCE AND TECHNICAL PRESENTATIONS

- Doffitt, C. Ft. Polk new lands vegetation survey update. Integrated Natural Resources Management Plan (INRMP) meeting. Ft. Polk, LA. 22 September 2015.
- Reid, C. Research and stewardship on coastal prairie rangelands in southwest Louisiana: progress and future potential. Southern Plains and Prairies Conference. Houston, TX. 12 November 2015.
- Reid, C. Nature and distribution of coastal prairie in southwest Louisiana. Wetland Mitigation Banking Interagency Review Team (IRT) workshop. Baton Rouge, LA. 19 November 2015.

TRAINING COMPLETED BY BOTANY/COMMUNITY ECOLOGY STAFF

- Pesticide applicator workshop and certification offered by LSU AgCenter. 7-8 July 2015. Certification was successfully attained.
- Identification and Ecology of Tallgrass Prairie Bees Workshop. USGS National Wetlands Research Center, Lafayette, LA. 14-18 December 2015.
- "Longleaf 101" offered by The Longleaf Alliance. Camp Hardtner, Pollock, LA. 12-14 January 2016.



Botany/Community Ecology staff member presenting on the importance of pollinators to a second grade class at the Northwestern State University Elementary Lab School on Feb. 4, 2016.



LEFT: Participants in the Identification and Ecology of Tallgrass Prairie Bees Workshop help at USGS Wetland and Aquatic Research Center in Lafayette from Dec. 14-18, 2015. Among the scientists receiving this intensive training were three members of LNHP: Charles Battaglia, Keri Landry, and Sairah Teta. **RIGHT:** Work station at the bee workshop.

PLANT IDENTIFICATION

An important contribution of LNHP's Botany/Community Ecology Section is plant identification services provided to other LDWF biologists, natural resources professionals outside the agency, and to members of the public. During this reporting period, 206 plant identifications were provided to clients by Botany/Community Ecology staff members. These identifications were based on images and specimens provided by clients. Plant identification assistance and training was provided in the field to LDWF's Forestry Section and WMA biologists at Sicily Island Hills and Sandy Hollow WMAs. Assistance with performing an ecological assessment of a whooping crane nest site was provided to LDWF's biologists managing the reintroduction of that species. Field botanical assistance was also given to two wetland mitigation bank sponsors who are restoring coastal prairie.

LDWF HQ NATIVE PLANT LANDSCAPING

In fall 2014 LDWF redesigned the landscaping at its headquarters in Baton Rouge by installing native plants distributed among seven ecological themes. This transformation was motivated by the desire for LDWF's landscaping to be as natural as possible, providing a diverse "ecosystem" for insects, including pollinators, birds and other wildlife. The landscaping will showcase a diverse and attractive assemblage of native plants. Signage will be installed in 2017 which will explain the landscaping and present information about the benefits of landscaping with native plants to HQ visitors.

LDWF's native plant landscaping is likely the most ambitious effort in Louisiana.

Staff members of Botany/Community Ecology Section have contributed to LDWF's HQ landscaping make-over by influencing the landscape design, selecting plant species and acquiring plant materials, coordinating plantings, and overseeing landscape maintenance. Redesigning the LDWF HQ landscaping involved adding soil and reshaping surfaces to simulate field ecological conditions to the extent possible. Following the initial installation of plant materials in 2014 and early 2015, the landscaping had a great deal of open space. Additional plant materials were installed in December 2015. Following this addition of plants, over 70 native plant species were represented. There is still considerable room for more plants. Additional plant materials will be introduced and informational signage erected in early 2017.

ZOOLOGY SECTION: ENDANGERED SPECIES, REPTILE AND AMPHIBIAN PROGRAM, NONGAME BIRD PROGRAM AND PERMITS COORDINATION

LNHP administered federal aid grants for Species of Greatest Conservation Need through the Endangered Species Act Section 6 Pro-

gram, Multi-state SWG, and Louisiana's SWG 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 National Oceanic and Atmospheric Administration (NOAA).

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

- Coordination with USFWS to develop ranking maps for threatened and endangered species through the Wetland Reserve Program.
- SEAFWA committee to address At Risk species in the southeast.
- LNHP continued to partner with USFWS and USDA-NRCS on Endangered Species Act coordination.
- Prescribed burning of public and private properties.
- White-nose syndrome surveillance, coordination and response plan.
- Conservation genetics of Louisiana pinesnakes (*Pituophis ruthveni*).
- Louisiana pinesnake detection using camera traps.
- Partnering with state and federal wildlife agencies to assess the status of the northern long-eared bat rangewide.
- Coordination with USFWS Law Enforcement staff to assist with the confiscation of seven gopher tortoises and 13 ringed map turtles in Illinois.
- Coordination with USFWS and LDWF Law Enforcement staff for assessment

of illegal trapping of map turtles on the Bogue Chitto River.

- Coordination with Stennis Space Center and Savannah River Ecology Lab staff for field status assessment of nesting beaches and map turtle populations along the West Pearl River.
- Participation on the Dusky Gopher Frog Recovery Team.
- Gopher tortoise population assessment, habitat improvement and public outreach.
- Partnering with private landowners for gopher tortoise status and potential habitat restoration.
- Habitat restoration at Sandy Hollow WMA for gopher tortoise and quail.
- 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.
- Use of autonomous recording units and playback for black rail surveys
- Louisiana pinesnake research and monitoring.
- The manatee sighting database was maintained and staff responded to stressed/dead manatees when reported.

ONGOING STATE WILDLIFE GRANT PROJECTS

Zoological projects funded through SWG included:

- Monitoring Avian Productivity and Survivorship Program
- Winter Bird Atlas
- Rusty Blackbird Surveys
- Breeding Bird Surveys
- Calcasieu Painted Crawfish Surveys
- Winter Plover Surveys
- Secretive Marsh Bird Callback Surveys
- Christmas Bird Counts
- Bald Eagle Nesting Surveys
- Aerial Surveys for Colonial Nesting Waterbirds
- Distribution, Abundance, Nesting and Movements of Reddish Egrets in Louisiana
- Multi-state Sandhills/Upland Longleaf Restoration Project
- Alligator Snapping Turtle Headstart Program

GOPHER TORTOISE

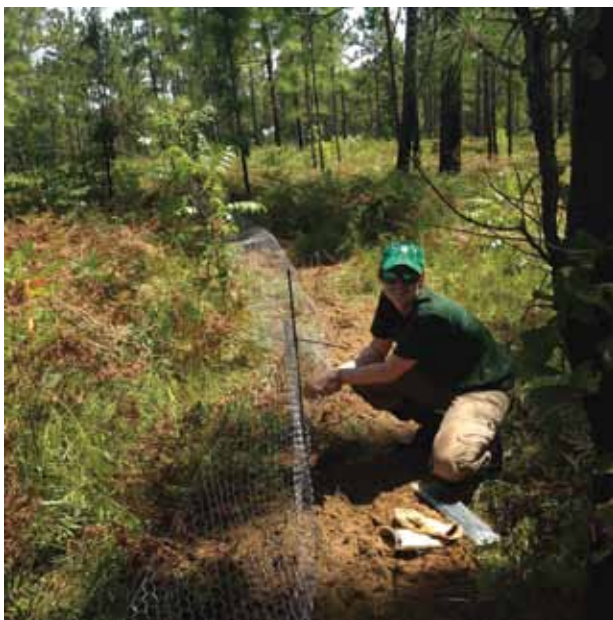
LNHP continues to partner with state and federal agencies in other states in the tortoise's range on the Gopher Tortoise Range-Wide Conservation Strategy to prioritize threats to the species and implement action items. The LNHP tortoise biologist is continuing to work on updating existing records and surveying new properties. A 50-acre private longleaf restoration site in St. Tammany parish was surveyed and no burrows or tortoises were found. This site is a registered Natural Area under LNHP's Natural Areas Registry and re-

ceived a prescribed burn treatment through Phase 3 of the Multi-state Sandhills/Upland Pine Restoration Grant in spring 2016 which may provide more suitable habitat for tortoises. Several private properties near Sandy Hollow WMA will be surveyed to assess tortoise populations and habitat conditions. LNHP will continue to build a partnership with private landowners to survey new properties and assist with habitat restoration efforts to increase the amount of quality habitat for tortoises. The LNHP tortoise biologist is very active in developing partnerships with private industry and participation on multi-state committees pertaining to gopher tortoise management, research and conservation.

Through Phase 3 of the Multi-state Sandhills/Upland Pine Restoration Grant and with cooperation from the NWTf, successful prescribed burning treatment was conducted on nine individual properties totaling 1,597.5 acres (longleaf pine - 500 acres, loblolly pine - 1,097.5 acres) surrounding Sandy Hollow WMA during February-May 2016. A 50-acre longleaf restoration site in St. Tammany parish also received prescribed burning under this grant. Prescribed burning was conducted during May 2016 on the portion of Bogue Chitto NWR that currently has tortoises. A field meeting took place during March 2016 with Weyerhaeuser regional and local staff to discuss the importance of open canopy forests and habitat restoration activities on Bens Creek property for tortoises and upland game birds. LNHP will continue to work with private landowners interested in prescribed burning within the gopher tortoise range in Louisiana



LEFT: New active gopher tortoise burrow found on Ben's Creek property. **RIGHT:** Gopher tortoise found in burrow within a pipeline replacement project area in Washington Parish. No tortoises were impacted or required translocating during this project.



LEFT: LNHP staff participated in the LSU Applied Scholars Program and mentored an undergraduate student providing various opportunities for field experience with fauna and flora surveys; Intern Shanna Lambert assisted with installation of gopher tortoise release pen and release of “waif” gopher tortoises. **RIGHT:** Newly constructed burrow in release pen at Sandy Hollow WMA by “waif” gopher tortoise.



Prescribed Burn Workshop for Private Landowners at Sandy Hollow WMA with live burn conducted for attendees

through other funding sources. The LNHP endangered species biologist is also working in coordination with the LDWF turkey study leader to prioritize and implement habitat restoration on Sandy Hollow WMA to provide optimal habitat for tortoises and quail.

LNHP continues to work with other states in the gopher tortoise’s range as part of a “waif” tortoise working group to develop a program to address this issue. LNHP has constructed the fourth release pen for waif tortoises on Sandy Hollow WMA and received six waif tortoises during the past fiscal year.

Health assessments and samples for Upper Respiratory Tract Disease testing were performed by the LSU School of Veterinary Medicine Wildlife Hospital for three of the tortoises. All three tortoises tested negative and two were released at Sandy Hollow in a new pen constructed of hog wire buried 6 inches deep and covered with silt fence cloth and provided starter burrows. Both tortoises were not found in the pen within five days of being released and leaving no evidence of an escape route. It is still unknown if these tortoises escaped or if they were taken illegally. One tortoise was released at point of capture near Sun, La., due

to it being removed from natural habitat. The other three tortoises will remain in a temporary home during winter 2016-2017 and will be released in spring 2017. Potential land acquisition of Lee road (House Creek) property in St. Tammany Parish was discussed and coordinated with USFWS staff, and the need to acquire property to use as a re-stocking site is critical to the conservation of gopher tortoises in Louisiana. This property currently has gopher tortoises and significant habitat improvement potential through longleaf pine restoration.

The LNHP endangered species biologist, along with multiple state and federal partners, planned and provided a prescribed burn workshop in March 2016 for private landowners within the gopher tortoise range in Louisiana. This workshop was very successful with over 50 attendees exposed to various presentations educating them on gopher tortoise conservation, the need and benefits of prescribed burning, available resources as well as participating in a live burn. The LNHP endangered species biologist also coordinated with regional state and federal agency staff and the Gulf Coastal Plain and Ozarks LCC staff to discuss priority areas for gopher tortoise conservation.

Cooperative planning efforts were made to host, for the first time in Louisiana, the 37th Annual Gopher Tortoise Council Meeting and the Annual Southeast Partners in Amphibian

and Reptile Conservation Meeting in Covington, La. The LNHP tortoise biologist serves as the Louisiana state representative for both organizations as well as co-chair for the Gopher Tortoise Council. The tortoise biologist planned and organized both meetings and several LDWF and LNHP staff gave oral presentations on current species and habitat conservation projects at both meetings and assisted with meeting logistics and field trips. Both meetings were a huge success. Each meeting had over 100 attendees with a full agenda of excellent oral and poster presentations, tasks teams, working groups, networking socials, and a shrimp boil with Cajun Zydeco music.

LNHP staff participated in Project E-Steam, an educational camp for youth, and provided a presentation and activities on gopher tortoises, their habitat as well as other threatened and endangered species. The endangered species biologist provided lectures and activities in fall of 2015 and spring of 2016 for each the Mammals and rare, threatened and endangered species of Louisiana series of the Louisiana Master Naturalist of Greater Baton Rouge Workshops. The LNHP tortoise biologist filmed a television show with “Get Outside St. Tammany” to provide awareness to citizens within St. Tammany parish on the importance of gopher tortoise conservation. Gopher Tortoise Day was officially designated as April 10 through coordination with the Gopher Tortoise Council Education Committee.

LOUISIANA PINESNAKE

The Louisiana pinesnake (*Pituophis ruthveni*) has been proposed for listing on the federal list of threatened and endangered species in

2017. The decline of this species is largely due to habitat destruction and fire suppression. The majority of these snakes reside on industrial forest lands, and LNHP has been actively working with the timber industry to increase habitat quality by facilitating controlled burning through various grant programs. LNHP has been working with our federal partners to develop a programmatic Candidate Conservation Agreement with Assurances. This Candidate Conservation Agreement with Assurances will promote forest management practices that bolster the pinesnake populations and are compatible with timber harvest/production. Private entities that meet the requirements of the Candidate Conservation Agreement with Assurances can enter into a Certificate of Inclusion with LDWF for the pinesnake. This program will increase quality habitat; as well as, protect private landowners from future regulations in the event the species was to become listed.

Below are several federally funded research projects that are underway aimed at producing information needed for population monitoring and recovery:

- Use of camera traps to detect Louisiana pinesnake
- Louisiana pinesnake radio telemetry study Louisiana pinesnake habitat preferences
- Louisiana pinesnake food habits
- Louisiana pinesnake reintroduction feasibility

ALLIGATOR SNAPPING TURTLE

The alligator snapping turtle (*Macrochelys temminckii*) has experienced significant pop-

ulation declines throughout its range due to multiple factors, including harvest pressures (Sloan and Lovich 1995). The alligator snapping turtle is listed as vulnerable by the International Union for Conservation of Nature and is listed under Appendix III of CITES (CITES 2006, IUCN2007). It is an SGCN (S3) in the state of Louisiana, and is listed as an SGCN in the WAP (Holcomb et al. 2015). 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. Efforts are currently underway in Louisiana to gather sufficient data to preclude listing. Commercial harvest of this species has been banned since 2004 in Louisiana, although recreational take is still allowed within the state. It appears that the greatest threat to alligator snapping turtle populations in the state is the lack of juvenile recruitment. This is in large part due to predation of nests and hatchlings, primarily by imported red fire ants (*Solenopsis invicta*) and raccoons (*Procyon lotor*) (Holcomb and Carr 2011, Holcomb and Carr 2013).

Since 2012, LDWF has operated a headstart facility for alligator snapping turtles at the Monroe hatchery facility. The purpose of this facility is to ensure a reliable source of turtles for release to supplement populations in the wild. By headstarting these animals in captivity, survival rates should increase significantly from the low rates (2.4-21.9 percent) estimated for hatchlings in a north Louisiana study (Bass 2007), as the headstarted animals will be too large for many potential predators. Release locations are determined from data generated from one recently completed (T-106)



LEFT: LNHP staff trapping for the elusive Louisiana pinesnake. **RIGHT:** LNHP staff assessing and preserving alligator snapping turtle nest on the West Pearl River with Savannah River Ecology Lab staff and Stennis Space Center staff.

and one ongoing (T-305) SWG. The objectives of the alligator snapping turtle project are to headstart hatchling alligator snapping turtles at the Monroe fish hatchery for three years per cohort, with the goal of providing a minimum of 50 turtles for release each year beginning in the fall of 2015, collect growth data for a subset of turtles per cohort, and conduct food preference studies to maximize production of headstarted turtles. Temperature preferences, health analysis, telemetry studies and survival rate studies are also conducted as part of the program to provide insight on ways to improved captive rearing success. The supplementation of depleted wild populations in Louisiana will hopefully offset the apparent lack of natural recruitment. This project will also provide life-history data for the review of alligator snapping turtles as an endangered species by USFWS potentially helping to preclude the need to list the alligator snapping turtle under the Endangered Species Act.

A total of 117 alligator snapping turtles have been released into the wild since the programs establishment. In March 2016, heavy flooding led to the complete inundation of the Monroe hatchery facility causing the fences of the alligator snapping turtle's pond to be overtopped. Despite floodwaters joining Black Bayou and Bayou Desiard to all of the hatchery ponds, an intense recovery effort lead to 90 of those alligator snapping turtles being recaptured and subsequently released into south-west Louisiana.

AMPHIBIAN AND REPTILE PROGRAM ACTIVITIES

Turtles

Turtle export data from the Federal Law Enforcement Management Information System were tabulated and summarized for the years 2003-2014. There was a general trend in decrease in exports of basking and softshell turtles during the 12-year period, and a late (post 2010) increase in export of bottom-dwelling species, particularly snapping and musk turtles.

The steep increase in harvest and export of razor-backed musk turtles from Louisiana led to a Notice of Intent for a moratorium of wild take of the species, which was presented to, and adopted by, the Wildlife and Fisheries Commission in January 2016. The rule took effect in November 2016.

Turtle farms were queried about numbers of turtles they acquired in 2014 and 2015 to

restock ponds. Most stocking was from razor-back musk turtles (55,185), red-eared sliders (33,402) and stinkpots (20,439). Six other species totaled 5,055 turtles.

Meetings with personnel from the Office of Fisheries resulted in the return of turtles (and other amphibians and reptiles) to the Trip Ticket System (Act 114). Mandatory reporting is to begin in August 2016.

Staff prepared a response to proposed listings of snapping and softshell turtles to CITES, and a response to a USFWS inquiry regarding non-detrimental take of diamondback terrapins.

Education

Staff worked with the webmaster to create a website page on the snakes of Louisiana, and worked with hospital staff in planning an internet application for the identification of Louisiana snakes by medical professionals.

Snake safety talks for Motiva and Entergy were presented and gave general amphibian and reptile talks to the Money Hill Trails Club, four elementary schools, and members of the Hilltop Arboretum. Two lectures and field trips for the Louisiana Master Naturalist Program were conducted, and gave a lecture for the vertebrate course at LSU's School of Renewable Natural Resources, on Louisiana's Amphibians and Reptiles.

The biologist also led a herpetology survey for the annual BREC Bioblitz at Forest Park.

Meetings/Scientific Conference Presentations

Invited to attend and speak at the 25th annual meeting of the East Texas Herpetological Society in Houston.

Miscellaneous Professional Duties

- Reviewed two papers for Herpetological Review (snake nomenclature and softshell turtles), and one paper for Herpetologica (a new species of South American snake).
- Reviewed SEPARC priorities for Partners in Amphibian and Reptile Conservation
- Prepared a draft for State Wildlife Grant Herpetofaunal surveys.
- Edited Department of Defense herpetofauna lists for Camp Villere, Camp Beauvoir, Fort Polk, and Barksdale A.F.B.
- Hosted the annual Louisiana Amphibian Monitoring Program meeting at Woodworth.
- Compiled a comprehensive list of amphibian and reptile EORs for 48 Species of Conservation Concern for the Natural Heritage Program database.
- Met with the East Carroll Parish Sheriff's Office to discuss the objectives of the Lake Providence snake rodeo, then monitored the operation and data-gathering process during the rodeo.
- Restricted Snake Permits issued - 113



LNHP staff checking hoop nets for basking map turtles and assessing the status of nesting beaches on the East Pearl River with Savannah River Ecology Lab and Stennis Space Center staff.

Publications

J. Boundy and J. Carr. Amphibians and Reptiles of Louisiana. Completed manuscript submitted to LSU Press.

L. Wilson and J. Boundy. 2015. Obituary: Douglas Athon Rossman 1936–2015: The gentle renaissance man of herpetology. *Herpetological Review* 46:716–719.

J. Boundy. 2016. Is that snake worth anything? *Bluestem*, spring/summer 2016:2–3.

Field Work

Twelve herpetofaunal surveys were conducted on private lands, nine surveys on BREC park properties, one on Federal lands, 14 on WMAs/LDWF sites, one survey on LSU lands, and seven in state parks. One-hundred-thirty-four incidental surveys and observations were also made. Observed were 74 species (50 percent of the species in the state) and 1,490 individual amphibians and reptiles (*Table 4*).

Species of Greatest Conservation Need are in bold font.

WEST INDIAN MANATEE

LNHP endangered species biologist coordinated with USGS, USFWS, Florida Fish and Wildlife Conservation Commission, Alabama Department of Natural Resources, Dauphin Island Sea Lab, Audubon Zoo, and Texas Parks and Wildlife staff for information exchange on manatee sightings across the range and developed a sighting and response plan for manatee conservation during cold weather season.

Manatees reported traveling through Louisiana, citizen concerns and location of warm water sources were assessed. No injured or dead manatees were reported during 2015–2016. LNHP staff continued to document sightings and update the database; five sightings total (four adults in St. Tammany and one adult in Cameron Parish).

NONGAME BIRD PROGRAM AND PERMITS COORDINATION

The Nongame Bird Section, currently consisting of one full-time biologist, is responsible for directing research, monitoring and conservation needs of all nongame birds in our state, as well as providing peer-review for scientific and layman products. Louisiana's diverse avifauna - more than 475 species in total - includes more than 400 nongame species. The bulk of the nongame ornithologist's job is coordinating or participating in scaled-down monitoring that feeds into national or regional datasets; surveys include USGS Breeding Bird Surveys, Christmas Bird Counts, International Piping Plover Censuses, Secretive Marsh Bird Callback Surveys, Waterbird Nesting Colony Surveys, Bald Eagle Nesting Surveys, the Institute for Bird Populations' Monitoring Avian Productivity and Survivorship Program, Bird Studies Canada Motus Wildlife Tracking System 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 the Louisiana Wildlife and Fisheries Foundation and federal aid grant opportunities such as the SWG program. SWGs have contributed, in part, to the majority of the projects above; and with such funding, 96 percent of USGS Breeding Bird Survey routes in Louisiana were assigned to active observers in the 2016 season. LNHP biologists documented many rare birds which were submitted for verification and inclusion into datasets including eBird, the LSU Museum of Natural Science Important Bird Record Program, and the Louisiana Bird Records Committee, thereby contributing to the ever-evolving understanding of bird status and distribution in Louisiana. Highlights included a greater scaup, sooty terns, "Chandeleur" gulls, a leucistic (almost completely white) killdeer, multiple Vermilion flycatchers and ash-throated flycatchers, a state first Pyrrhuloxia, and a plethora of out-of-season records. During Christmas Bird Counts, LNHP biologists observed state-rare crested caracaras and sandhill cranes (5,000 individuals), more than 40,000 snow geese, an eastern whip-poor-will (very rare in winter), and the aforementioned Pyrrhuloxia in the Cajun Prairie Region. These and results from other Christmas Bird Counts in the region continue to highlight the critical need of preserving rice cultivation and culture for both the human and bird communities of the region.

During FY 2015–2016, LDWF biologists received critical training including NatureServe Core Methodology training, capture and instrumentation of reddish egrets using noose carpets and satellite tags, and capture and instrumentation of red knots and sanderlings using cannon nets and nanotags with David Newstead (Coastal Bends and Bays National Estuary Program). Newstead also taught our biologists how to safely handle, band and auxiliary tag the red knots (federally threatened) and sanderlings. In addition, LDWF biologists received intra-departmental training on rocket net deployment. LNHP biologists also contributed to partner projects including aforementioned capture of knots and sanderlings (to assist Canadian researchers), collaborated with BTNEP and USGS on the USGS International Piping Plover Census (nonbreeding region), and partnered with the Louisiana Wildlife and Fisheries Foundation, BTNEP, and USFWS on the LNHP flagship VHF Receiver Network project. During this fiscal year, the Nongame Ornithologist was invited to the Water Institute's Social and Ecosystem Technical Workshop to represent wildlife; he



West Indian manatee sighting near Mandeville Yacht Club in Lake Pontchartrain, LNHP staff record and track manatee sightings throughout south Louisiana.

TABLE 4.

Species Observed	# Observed	Species Observed	# Observed
<i>Amphiuma tridactylum</i>	3	<i>Pseudemys concinna</i>	2
<i>Notophthalmus viridescens</i>	1	<i>Terrapene carolina</i>	9
<i>Ambystoma opacum</i>	16	<i>Trachemys scripta</i>	139
<i>Ambystoma texanum</i>	1	<i>Apalone spinifera</i>	8
<i>Desmognathus auriculatus</i>	1	<i>Hemidactylus turcicus</i>	44
<i>Desmognathus conanti</i>	17	<i>Anolis carolinensis</i>	367
<i>Eurycea cirrigera</i>	1	<i>Anolis sagrei</i>	2
<i>Eurycea guttolineata</i>	5	<i>Sceloporus consobrinus</i>	5
<i>Eurycea quadridigitata</i>	10	<i>Plestiodon fasciatus</i>	53
<i>Hemidactylum scutatum</i>	2	<i>Plestiodon inexpectatus</i>	9
<i>Plethodon mississippi</i>	13	<i>Plestiodon laticeps</i>	13
<i>Pseudotriton ruber</i>	1	<i>Scincella lateralis</i>	120
<i>Bufo charlesmithi</i>	2	<i>Farancia abacura</i>	2
<i>Bufo fowleri</i>	10	<i>Diadophis punctatus</i>	27
<i>Bufo nebulifer</i>	83	<i>Nerodia cyclopion</i>	1
<i>Bufo terrestris</i>	larvae	<i>Nerodia erythrogaster</i>	8
<i>Acris blanchardi</i>	3	<i>Nerodia fasciata</i>	24
<i>Acris crepitans</i>	76	<i>Nerodia rhombifer</i>	3
<i>Acris gryllus</i>	59	<i>Regina grahamii</i>	2
<i>Hyla chrysoscelis</i>	4	<i>Storeria dekayi</i>	7
<i>Hyla cinerea</i>	2	<i>Storeria occipitomaculata</i>	2
<i>Hyla femoralis</i>	heard	<i>Thamnophis proximus</i>	19
<i>Hyla squirella</i>	3	<i>Thamnophis saurita</i>	4
<i>Pseudacris crucifer</i>	5	<i>Thamnophis sirtalis</i>	5
<i>Pseudacris fouquettei</i>	1	<i>Opheodrys aestivus</i>	2
<i>Eleutherodactylus cystignathoides</i>	12	<i>Coluber constrictor</i>	33
<i>Eleutherodactylus planirostris</i>	2	<i>Masticophis flagellum</i>	1
<i>Rana catesbeiana</i>	13	<i>Pantherophis guttatus</i>	5
<i>Rana clamitans</i>	68	<i>Pantherophis obsoletus</i>	1
<i>Rana sphenoccephala</i>	33	<i>Pantherophis spiloides</i>	7
<i>Gastrophryne carolinensis</i>	9	<i>Lampropeltis holbrooki</i>	4
<i>Alligator mississippiensis</i>	19	<i>Lampropeltis nigra</i>	19
<i>Chelydra serpentina</i>	3	<i>Lampropeltis gentilis</i>	1
<i>Kinosternon subrubrum</i>	4	<i>Lampropeltis elapsoides</i>	1
<i>Sternotherus odoratus</i>	5	<i>Agkistrodon contortrix</i>	5
<i>Chrysemys dorsalis</i>	3	<i>Agkistrodon piscivorus</i>	36
<i>Graptemys pseudogeographica</i>	1	<i>Crotalus horridus</i>	9

provided insight into barrier island systems and their importance to wildlife and offered metrics to gauge recovery of ecosystems.

VHF RADIO TELEMETRY RECEIVER STATION NETWORK

Funded by Louisiana Wildlife and Fisheries Foundation, BTNEP, and Rockefeller Trust, LNHP and BTNEP biologists are establishing at least 15 VHF telemetry receiver stations throughout coastal Louisiana and its adjacent waters within the next two years. This passive network will allow tracking of hundreds of organisms at once provided those nanotagged organisms move through the approximately 7-mile detection radius of at least one receiver station. The potential for such a network of stations to contribute to our current knowledge level concerning SGCN is substantial and is identified as a strategy for the conservation of landbirds in the Louisiana WAP (Holcomb et al. 2015). In addition, this network contributes to the projects of countless other scientists currently utilizing Bird Studies Canada Motus Wildlife Tracking System. In fact, our Grand Isle receiver has already detected more than 20 research birds including red knots (federally threatened), sanderlings, gray-cheeked thrushes and a Swainson's thrush; the thrushes were instrumented with nanotags on their wintering grounds in Colombia. Clearly, this work has almost limitless potential for partnering with other agencies, industry, nonprofits, academia, and others from across the Western Hemisphere. As of June 2016, receiver stations were active at the Grand Isle Marine Lab Facility, Pointe-Aux-Chenes WMA and Pass-A-Loutre WMA; additional sites across our coast have been chosen for deployment - Sabine NWR, Cameron Prairie NWR, Rockefeller State Wildlife Refuge, Marsh Island Refuge, several islands in the BTNEP region, and a site along the shores of Lake Pontchartrain.

BEACH-NESTING BIRD SURVEYS

During the summer of 2015, LNHP staff and partners utilized SWG funds to survey more than 200km of coastline for nesting shorebirds, seabirds and landbirds. Several beach-nesting birds are SGCN or are otherwise difficult to survey during LNHP aerial surveys, necessitating the need for ground surveys. Species and (counts) include American oystercatcher (39), black skimmer (2600+), Caspian tern (450+), "Chandeleur" gull (19), common nighthawk (940+), common tern (67), gull-billed tern (130+), laughing gull (650+), coastal least tern (1000+), royal tern (15,000+), sandwich tern (15,000+), sooty tern (1), and Wilson's plover (650+). Of special note, the "Chandeleur" gull, discovered on the Chandeleurs in 1989, is a hybrid swarm of herring gull and kelp gull (a South American species) that had not been seen in Louisiana since the early 2000s; this survey proved breeding of "Chandeleur" gull continues off our coast, the only known breeding site for this hybrid in the world. In addition, though suspected, nesting common terns had also not been detected in Louisiana for many years. The single, empty nest scrape of a sooty tern was also a surprise to surveyors; sooty terns were once regular nesters in Louisiana, but only recently reappeared in very small numbers within the last decade after a complete absence following multiple hurricane impacts in the late 1990s/early 2000s.

NONGAME AVIAN CONSULTATIONS

In addition to field data collection and compilation, the Nongame Bird Section provides reviews, comments and data for various entities including USFWS, Joint Ventures, LCCs, species- or guild-specific working groups, environmental consultants, the public, and others. As the nongame bird technical representative for LDWF, the Nongame Ornithologist provides official comments on Federal Registry notices concerning nongame birds to the Mississippi Flyway Council and, in 2015, reviewed and provided comments on the Gulf Coast Vulnerability Assessment's Standardized Index of Vulnerability and Value Assessment document of the Gulf Coast LCCs; he had previously scored vulnerability of black skimmer, Wilson's plover and clapper rail for the Gulf Coast LCCs. The nongame ornithologist and Gulf-wide partners continued the development of the Gulf of Mexico Avian Monitoring Network during this period; this collaborative, comprehensive network of federal, state, academic and non-governmental organization partners, undoubtedly, will be a major driving force in bird monitoring and research in our region in the coming years, and representation by LNHP on such committees ensures that Louisiana's needs are well articulated and met.

The Nongame Bird Section played a vital role in the revision of the Louisiana WAP. In addition to serving on the Core Committee and several subcommittees, the nongame ornithologist assisted the LNHP grants coordinator with edits provided by the public and outside subject matter experts. As the state's bird expert, the nongame ornithologist peer-reviewed several internal and external bird manuscripts and proposals and coauthored a manuscript (in review) about Louisiana bird populations. The Nongame Bird Section continued to provide consultation to LDWF on all bird matters pertaining to the 2010 *Deepwater Horizon* oil spill and recovery and restoration.

NONGAME AVIAN MEETINGS

As Chair of Southeast Partners in Flight, the nongame ornithologist and a former co-chair organized and hosted the Southeast Partners in Flight Annual Meeting in Lafayette, La., in 2015. More than 90 attendees participated in the plenaries, the pre-conference working group meetings, and the invited and contributed poster and oral presentations. LNHP biologists also led or co-led field trips that maximized attendees' abilities to experience our state and its avifauna. The meeting was a huge success, in no small part to the sup-

port of LDWF, and the provided feedback was very positive. One commenter offered, "This meeting should become the new standard for future SEPIF meetings."

NONGAME AVIAN OUTREACH

Outreach to multiple end-users of all ages is a means that is particularly relevant in conservation of birds; there is no wildlife group with as dedicated a fan base as birds. As such, LNHP has promoted public birding and bird banding activities whenever possible. The Grand Isle Migratory Bird Festival, National Hunting and Fishing Day, the Yellow Rails and Rice Festival, and the Waders in Working Wetlands: Shorebird Extravaganza in Thorneville are all partially staffed by LNHP biologists. LNHP biologists also participated in the development of the Louisiana Master Naturalists of Greater Baton Rouge curriculum, particularly the ornithology section, and taught four lectures to this group during this fiscal year. The nongame ornithologist lectured Louisiana Master Naturalists of Greater New Orleans and of Acadiana as well.

Several presentations this period showed the range of the Nongame Bird Section - a high school talk on rare, threatened and endangered species, two elementary school talks (one on animal camouflage, aposematism and mimicry and one on egg-laying animals), a workshop on bird sounds to a school district, and an update on LNHP and bird projects to colleagues at Orleans Audubon Society. In addition, the Louisiana Wildlife and Fisheries Foundation auctions birding tours which are led by the nongame ornithologist each year as part of its fundraising ventures; this year, a second tour was led by an LDWF colleague. The nongame ornithologist also donated more than 30 hours of screen printing services and materials to the Gopher Tortoise Council and Southeast Partners in Flight. During this period, more than 200 technical phone calls and more than 1,550 technical emails were fielded by the nongame ornithologist.

SCIENTIFIC COLLECTING PERMITS AND OTHER PERMITS

Scientific Collecting Permits, Eagle Nest Take Permits and Interstate Bird Travel Permits are also housed within the Nongame Bird Section, and issuance is the responsibility of the nongame ornithologist after consultation with specialized zoologists. Scientific Collecting Permits are utilized by many researchers from bird banders to mussel surveyors. During this fiscal year, 116 Scientific Collecting Permits were is-

sued to academic institutions, museums, consultants, private individuals and others. Interstate Bird Travel Permits are issued to those bringing wild (otherwise, protected, migratory) birds into the state for educational demonstrations; one such permit letter was issued during this period. Eagle Nest Take Permits are issued on very rare occasions - when nests are in dangerous locations for birds or the public - and the removal must be mitigated. No permit was issued for eagle nest take this period.

PUBLICATIONS

Gregory, B. B. 2015. *Sternotherus odoratus*. (Eastern Musk Turtle). Geographic Distribution. *Herpetological Review*: 46 (4):566

SCIENTIFIC CONFERENCE PRESENTATIONS

A Programmatic Candidate Conservation Agreement with Assurances for the Louisiana Pinesnake. Louisiana Association of Professional Biologists annual meeting, Baton Rouge, LA, August 2015

A Programmatic Candidate Conservation Agreement with Assurances for the Louisiana Pinesnake. Louisiana Pinesnake Stakeholders annual meeting, Baton Rouge, LA, August 2015

Louisiana Pinesnake Conservation Efforts on both Public and Private Lands in Louisiana. Gopher Tortoise Council Annual Meeting Covington, La. October 17, 2015

Louisiana's Gopher Tortoise Conservation Efforts. The 37th Annual Gopher Tortoise Council Meeting. Covington, LA. Oct. 17, 2015.

Louisiana Pinesnake Reintroduction Efforts. Southeast Partners for Reptile and Amphibian Conservation annual meeting, Nauvoo, AL, February 2016

Health Assessment of captive-raised alligator snapping turtles (*Macrochelys temminckii*) in a conservation initiative in Louisiana, USA: Poster. LDWF Wildlife Symposium, Baton Rouge, LA, May 2016

Louisiana Pinesnake Reintroduction Efforts. LDWF Wildlife Symposium, Baton Rouge, LA, May 2016

OIL SPILL PROGRAM

Program Manager - Jon J. Wiebe

Program Assessment Lead -

Steven Pearson, PhD

Program Response Lead - Laura Carver

OVERVIEW

LDWF's Oil Spill Program documents and evaluates biological and ecological impacts associated with oil spills throughout Louisiana. These efforts were significantly enhanced through the incorporation of additional trained personnel with direct knowledge and experience from the 2010 *Deepwater Horizon* oil spill. The program continues to improve upon existing programmatic strengths as well as support development of novel means to characterize oil spill injury (short and long-term), an essential metric to support future restoration of the state's natural resources. These efforts continue to be fortified through strong collaborations with a variety of LDWF programs as well as federal and state Natural Resource Trustee agencies.

RESPONSE

LDWF's Oil Spill Program monitors and responds to reports of oil spills throughout Louisiana. This fiscal year our program received 10,032 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. For many of the spills (83 spills), personnel simply coordinated with other responding agencies to gain information on the necessity of further action. For others, response personnel led by Program Response Lead Laura Carver were on site performing regimented evaluations of injury to wildlife and associated habitats. When encountered, personnel documented and recovered live, oiled wildlife for rehabilitation and subsequent release as well as wildlife killed during the incident.

During FY 2015-2016, LDWF's Oil Spill Program performed 33 site investigations based on available information and risk to natural resources. Of note, many of these spills required multiple site visits to ensure complete injury documentation and cleanup oversight. Further, select spills required extensive assistance from HAZWOPER-trained (nationally recognized spill response training) personnel from LDWF's Office of Wildlife (Coastal and Nongame Resources and Wildlife Divisions) and Office of Fisheries. Several representative examples include:

- **Belle Island:** This incident was reported as a release of 25 bbls of condensate and 100 bbls of salt water. Trustees' utilized a controlled *in situ* burn to limit potential oiling impacts to wildlife and habitat (Location: Belle Island, La., St. Mary Parish).

- **Jena:** This incident was reported as a release of approximately 10 bbls of crude oil into a dry creek/ditch (~ 900 feet in length) that runs into Catahoula Lake, an important waterbody for a host of wildlife species including migratory waterfowl (Location: Jena, La., LaSalle Parish).
- **Fields (2015):** This incident was reported as the release of approximately 15 bbls of crude oil due to a mechanical failure of a storage tank (Location: near Fields, La., Beauregard Parish).
- **Meraux:** This incident was reported as the release of crude oil in relation to a pinhole leak in a line (Location: Meraux, La., St. Bernard Parish). Program personnel in collaboration with designated rehabilitation services manually captured, rehabilitated and released a significant number of freshwater turtles.
- **Main Pass Block 75:** This incident was reported as a significant sheen event (estimated at 31,680 feet long and 250 feet wide) from a 12-inch transfer pipeline spanning 26 miles within the Main Pass Block 75. The release was initially estimated to be as much as 738 bbls (based on pipeline capacity). Upon further assessment of aerial imagery, responders revised the estimate to a total of 20-60 bbls.
- **Salvador WMA:** This incident was reported as the release of an unknown volume of crude oil within Lake Salva-



LEFT: Jena - Program personnel documented crude oil within a dry creek/ditch (~ 900 feet) that eventually entered a section of Catahoula Lake, a waterbody historically utilized by a host of endemic and migratory wildlife. **RIGHT:** Fields (2015) - Program personnel documented emulsified oil within natural collection points at the base of the spill location, roadside ditches as well as a wooded drainage ditch.



LEFT: Lake Salvador WMA - Program personnel documented oiling within marsh grasses and aquatic vegetation within incident location.
RIGHT: White Lake WMA - Program personnel documented visible crude oil within the boomed area surrounding the facility.



Bayou Sorel - Tank fire with the potential (maximum holding capacity) of releasing approximately 600-800 bbls of crude oil at Bayou Sorrel within the Atchafalaya Basin.



St. James - Program personnel documented oiled Amphiuma within adjacent ditch.

dor WMA (Location: near Luling, La., St. Charles Parish). Federal and state representatives identified the responsible party and organized oil cleanup.

- **White Lake WCA:** This incident was reported as the release of approximately 10 bbls (later revised to be approximately 50 bbls) of crude oil into a keyhole canal within LDWF's White Lake WCA (Location: Gueydan, La., Vermilion Parish).
- **Bayou Sorrel:** This incident was reported as tank fire with the potential of releasing approximately 600-800 bbls (maximum holding capacity) of crude oil from the RP's Bayou Sorrel facility (Location: Atchafalaya Basin, Iberville Parish).
- **Bayou Teche:** This incident was reported as the release of 30 bbls (later revised to 300 bbls) of crude oil into Bayou Teche (Location: near Jeanerette, La., St. Mary Parish). Impacted wildlife was observed and collected throughout the bayou and, transferred to Wildlife Response Services for rehabilitation and release.
- **St. James:** This incident was initially reported as the release of approximately 80 bbls (later revised to approximately 123 bbls) (Location: St. James Parish). Impacted wildlife was observed and collected within the ditch and, transferred to Wildlife Response Services for rehabilitation and release.
- **Fields (2016):** This incident was reported as the release of approximately 38-42 bbls of crude oil (Location: Fields, La., Beauregard Parish).



LEFT: Bayou Teche - Program Response Lead Laura Carver assisting in the rehabilitation of a heavily oiled wood duck.

RIGHT: Bayou Teche - Program Spill Responder Matthew Hollis performing daily wildlife searches along established transects.



Fields (2016) - Program personnel documented visible crude oil within natural collection points at the base of the spill location, roadside ditches, and wooded drainage ditch

These and other spills presented many unique challenges during FY 2015-2016. Our ability to effectively and safely engage on these and other spill-related issues stems from a programmatic commitment that all personnel maintain HAZWOPER certification, reinforcing these training principles among partner agencies (Unified Response Drills and Planning Sessions), as well as continually developing and memorializing novel approaches (developing LDWF's Oiled Wildlife Response Plan) to defensibly characterize natural resource injury. In total, information generated from LDWF's Oil Spill Program's response activities continues to be an invaluable resource for state and federal trustees to develop potential preassessment and/or Natural Resource Damage Assessment (NRDA) processes as well as scale future restoration activities.

PREASSESSMENT AND NRDA ACTIVITIES

Within FY 2015-2016, LDWF's Oil Spill Program continues to make concerted efforts within three principal areas:

1. Case Management of Active NRDA cases,
2. Development and Implementation of Cooperative Preassessment Field Activities and,
3. Development of Novel and Defensible Means to Characterize Natural Resource Injury through Programmatic Research Collaborations.

CASE MANAGEMENT OF ACTIVE NRDA CASES

Program personnel spent extensive time engaging state and federal trustee partners with the intent of both streamlining as well as final-

izing select NRDA assessment case activities. Much of this initial activity involved review and analysis of existing response and pre-assessment information to clearly identify the type(s) and extent of resource injury. This activity was followed by our program's active engagement of potential collaborators to identify both their interest and available resources to facilitate timely injury assessment as well as identification of restoration alternatives, two critical components which have historically hindered this important process in the past.

DEVELOPMENT AND IMPLEMENTATION OF PREASSESSMENT FIELD ACTIVITIES

Following each spill response our program and state Natural Resource Trustees critically evaluate the nature and extent (short and long term) of potential natural resource injury. If trustees determine that additional information is required, a preassessment activity (a preliminary fact-finding exercise that provides the information necessary to determine whether to pursue restoration planning) may be implemented. This activity is critical as trustees must be able to meet or exceed established threshold injury criteria (ref. Oil Pollution Act of 1990) to initiate the formal NRDA process. Several examples are provided below:

- **Mooringsport:** In 2015-2016 our program was the lead trustee in the development and implementation of preassessment activities associated with the Milepost 51.5 release, a large spill located in Mooringsport, La., adjacent to Caddo Lake. During the associated spill

response activities, extensive wildlife and habitat injury was documented by program personnel. Utilizing this information (qualitative and quantitative), Dr. Steven Pearson developed a regimented preassessment work plan that informed trustees as to the nature and extent of the associated injury. The plan was reviewed by state trustees and agreed to by the Responsible Party whose representatives actively participated in all scheduled activities. Program personnel are currently utilizing information generated from response and preassessment activities to facilitate habitat and resource injury analyses as well as aid in identifying representative restoration projects.

Bay St. Elaine: In 2015-2016 our program was the co-lead trustee (with CPRA) in the development and implementation of preassessment activities associated with an incident that occurred in Bay St. Elaine, a large spill located within Terrebonne Bay. During the associated spill response, extensive habitat injury was initially documented by program personnel. Upon further evaluation, Louisiana Oil Spill Coordinator's Office and LDWF personnel identified associated wildlife injury specifically adult diamondback terrapin, an estuarine turtle species that occupies the northern Gulf and Atlantic coasts, in association with this incident. Utilizing programmatic research (coastwide terrapin distribution and abundance as well as reproductive productivity), Program Assessment Lead Dr. Steven Pearson developed a systematic sampling plan which was reviewed

by state trustees and agreed to by the Responsible Party whose representatives actively participated in all scheduled activities. Collectively, response and preassessment information was utilized to develop the injury assessment (acute and sub-acute species mortality and foregone production) as well as scale potential restorative actions designed to compensate the general public for natural resource loss or impairment.

DEVELOP NOVEL AND DEFENSIBLE MEANS TO CHARACTERIZE NATURAL RESOURCE INJURY THROUGH PROGRAMMATIC RESEARCH COLLABORATIONS

LDWF's Oil Spill Program continues to develop novel means to address targeted areas within oil spill injury assessment, with many principal concepts stemming from "lessons learned" in the 2010 *Deepwater Horizon* oil spill and other oil spill cases. Greater emphasis has been placed on developing defensible tools to promote a more representative assessment process. Some examples include: 1.) characterization of representative species, species in which we have a broad understanding of life history and physiology, as a means of clearly quantifying associated injury, and 2.) development and implementation of validated and defensible wildlife and habitat sampling methodologies. The development of these and other decision making tools remains a critical component for our program's current and future ability to defensibly characterize injury within spill response and preassessment/NRDA assessment.

2010 DEEPWATER HORIZON OIL SPILL

Within FY 2015-2016, Oil Spill Program personnel dedicated significant effort towards developing a more comprehensive and representative 2010 *Deepwater Horizon* oil spill avian injury assessment within coastal Louisiana in partnership with CPRA and in conjunction with the Department of Interior. These efforts incorporated historic coastwide LDWF survey information, reanalysis of existing 2010 *Deepwater Horizon* oil spill injury information as well as implementation of state-only assessment efforts to address case-specific



Mooringsport - Program Assessment Lead Dr. Steven Pearson documents a box turtle within a forest assessment transect.



LEFT: Mooringsport - Program biologist Charlie Wahl identifies macroinvertebrates during stream assessment. **RIGHT:** Mooringsport - Program biologists sampling freshwater turtles within a designated bayou reach.



Bay St. Elaine - Terrapin carcass documented during systematic walking surveys.

assessment needs. Collectively, these efforts clearly demonstrated that the spill-related avian injury was significantly larger and more geographically widespread than originally estimated. In total, this information continues to facilitate State Trustees' ability to implement representative restoration for injured avian resources.

On April 4, 2016, a federal court in New Orleans entered a consent decree resolving civil claims against BP arising from the April 20, 2010 Macondo well blowout and the oil spill that followed in the Gulf of Mexico. This historic settlement resolves the United States government's civil penalty claims under the Clean Water Act, the governments' claims for natural resources damage claims under the Oil Pollution Act, and also implements a related settlement of economic damage claims of the Gulf States and local governments. Taken together this resolution of civil claims is worth more than \$20 billion and is the largest settlement with a single entity in the history of federal law enforcement (Department of Justice website). As part of this settlement, trustees' were responsible under the Oil Pollution Act to develop a Programmatic Damage Assessment and Restoration Plan, a document intended to broadly characterize natural resource injury as well as high level restorative actions.

As Louisiana incurred the majority of the spill-related injury, it factors prominently in receiving vital resources required to support ecosystem-scaled coastal restoration priorities as identified within the State's Coastal Master Plan. Within these broad and expansive projects, enumerable sensitive habitats were

damaged, some to the point of completely subsiding and eroding away. These habitats are/were critically important as they provide a broad array of services for endemic and migratory wildlife species. As such, Oil Spill Program personnel factored prominently in LDWF efforts to identify and prioritize coastal restoration projects (i.e., exemplars) as well as design effective monitoring and adaptive management strategies with a clear nexus towards addressing spill-related natural resource injury. Moving forward, LDWF and its Oil Spill Program will play a significant role in the development and implementation of 2010 *Deepwater Horizon* oil spill coastal restoration as a member of the Louisiana Trustee Implementation Group, the trustee body (state and federal) responsible for the selection and management of 2010 *Deepwater Horizon* oil spill restoration projects within Louisiana.

COASTAL OPERATIONS PROGRAM

Program Managers -
Lance Campbell & Cassidy Lejeune

The Coastal Operations Program is responsible for the stewardship of 11 coastal WMAs and refuges: Atchafalaya Delta WMA, Biloxi WMA, Isle Dernieres Barrier Islands Refuge, Lake Boeuf WMA, Marsh Island Refuge, Pass-a-Loutre WMA, Pointe-aux-Chenes WMA, Salvador WMA, State Wildlife Refuge, St. Tammany Refuge and Timken WMA. Management of these coastal properties encompasses the oversight of all daily activities on these areas. Responsibilities include (but are not limited to) marsh management and restoration, facility and equipment maintenance, data collection, assistance with research, habitat enhancement, coordinating managed hunts, oversight/monitoring of projects such as oil/gas activities and maintenance dredging of federal navigation channels, posting of properties, management of fur and alligator resources on properties, and education/outreach.

The Coastal Operations Program oversees and operates heavy equipment (excavators, bull dozers, a tugboat, a push boat, barges and other equipment) to aid with restoration and management on coastal properties. Coastal Operations staff replaced an old amphibious excavator in extremely poor/deteriorated condition this year. The construction of the new amphibious excavator was completed in September. Sandblasting, painting and repairs were completed on the A. Wigeon (WLF400) deck barge and tug boat M/V Brant in April. Staff continued to properly maintain its heavy equipment since this equipment is crucial for the Coastal Operations Program to accomplish restoration and management activities on its properties.

Since most Coastal Operations Program properties are only accessible by boat, staff frequently provide assistance to stranded boaters and users of its WMAs/refuges. Coastal Operations staff provided emergency assistance to many boaters this year on our remote areas.

Overall, the Coastal Operations Program had a very successful year of numerous accomplishments. These accomplishments were aimed at improving refuges and WMAs for the good of the public and the natural resources that are present at these coastal areas. The Coastal Operations Program strives to provide excellent recreational opportunity, conserve coast-

al marsh habitats, and implement restoration projects to improve habitat conditions for wildlife and fishery resources.

WATERFOWL

The 2015-2016 waterfowl season was from Nov. 7, 2015 - Jan. 17, 2016 (closed Dec. 7-18) on coastal WMAs. Coastal Operations staff conducted hunter participation/harvest surveys on 11 days during the season on four coastal WMAs (Atchafalaya Delta, Pass-a-Loutre, Pointe-aux-Chenes and Salvador WMAs). An estimated 5,040 duck hunters visited the WMAs during the 11 survey dates and averaged 2.2 ducks per attempt. Hunters also harvested approximately 3,429 coots, 155 gallinules, 34 mergansers, and approximately 26 geese during the survey dates. The Limited Access Areas (LAAs) were the most successful hunting locations on Atchafalaya Delta (Main Delta), Pointe-aux-Chenes and Pass-a-Loutre WMAs.

TEAL SEASON

The 2015-2016 teal season was from Sept. 12-27, 2015. Coastal Operations staff conducted hunter participation/harvest surveys on four days during the season on four coastal WMAs (same as above). An estimated 1,255 teal hunters visited the WMAs this year during the four days that waterfowl bag checks were performed. These hunters harvested an estimated 1,941 teal for a success of 1.5 teal per hunter effort.

DEER

Self-clearing permits and hunter check in of harvested deer revealed that 4,352 hunter efforts were expended to harvest 204 deer during the 2015-2016 hunting season on Atchafalaya Delta, Pass-a-Loutre, Pointe-aux-Chenes, Lake Boeuf and Salvador WMAs. This equates to a success of one deer for every 21.3 efforts. Ninety-four percent of the effort and 92 percent of the harvest was on Atchafalaya Delta WMA.

HOGS

According to self-clearing permits and hunter interviews, approximately 206 hunter efforts were successful in removing 41 hogs for a success of one hog per five efforts. These statistics are for Pass-a-Loutre, Pointe-aux-Chenes, Salvador/Timken and Lake Boeuf WMAs only. Sixty-nine percent of the effort and 90 percent of the harvest was on Pass-a-Loutre WMA. Nineteen hogs were reported harvested from Atchafalaya Delta WMA during the 2015-2016

hunting season. Hog harvest at Atchafalaya Delta most always occurs while pursuing other species such as deer and rabbits.

COASTAL OPERATIONS' WMAS AND REFUGES

ATCHAFALAYA DELTA WMA

Area Biologists -
David LeBlanc & Lance Campbell

Atchafalaya Delta WMA is the largest WMA in the state at 137,000 acres and is located in southern St. Mary Parish. The WMA is owned by the state and has been managed by LDWF since 1978 under a lease agreement with the Louisiana State Lands Office. The habitat is dominated by fresh tidal marshes and extensive shallow water flats. This WMA includes a diverse range of ecotypes from broad upland ridge habitat to brackish marshes.

Atchafalaya Delta WMA is comprised of two active deltas that continue to accrete new wetlands. The Wax Lake Outlet Delta is located on the western portion of the WMA and was created as a result of a man-made channel dredged in the 1940s for flood protection purposes. This flood protection measure resulted in the creation of a phenomenal delta system that is of interest to a wide variety of users. One user group that is very intrigued by the Wax Delta is the community of professionals that study, construct and promote river diversions. The Main Delta is located on the eastern portion of the WMA and at the mouth of the Atchafalaya River. Many areas on this delta have been created/enhanced by beneficial using of dredge material.

WMA staff continued to work closely with USACE on multiple issues related to the maintenance of the lower Atchafalaya River Federal Navigation Channel. See information below for specifics on projects and activities:

- USACE awarded a contract to Weeks Marine to dredge a portion of the Bar Channel south of Eugene Island in 2015. As part of this project, Weeks Marine beneficially used dredge material to the increase size and elevation of Aves Island. Aves Island is located on the west side of the channel south of Bird Island West and was created last year through beneficial use of dredge material as well. Dredge material quality was

pretty good but did spread out laterally as it was discharged. Aves Island doubled in size with elevations being several feet above water levels. Extremely high tides and strong southerly winds in the spring subsequently flattened out the island and decreased elevations. However, this island has formed a great foundation for future dredging contracts/projects.

- Coastal Operations staff also coordinated with USACE personnel about selecting locations for the placement of beneficial use material adjacent to the river in the Bay Channel. Due to budgetary issues, USACE was only able to bid out a small contract for the Bay Channel. USACE contracted with Manson Construction to dredge about 5,000 feet of the Bay Channel between Big Island and East Pass. Dredging began in May and was completed in early June. All dredge material was beneficially used and placed adjacent to the northeastern portions of Big Island.
- Coastal Operations staff continued to provide multiple options for beneficial use of dredge material ranging from small areas adjacent to Big Island and headquarters to large areas of open water that could accommodate millions of cubic yards of material.
- The Deer Island Pass Coastal Impact Assistance Program Project was initiated last fiscal year. Coastal Operations staff continued to coordinate with St. Mary Parish and CB&I (consultant) regarding this project. The project included the construction of a 3,900-foot long by 10-foot deep channel connecting the Atchafalaya River to the east side of the Main Delta. It also included approximately 80 acres of marsh creation near Plumb Island Point. The project was awarded during the fall of 2015 and construction began in late 2015. Construction was halted and the project suspended in January 2016 due to abnormally high river levels caused by extreme rainfall in northern United States. We anticipate the project to proceed in FY 2016-2017.

The Atchafalaya Delta WMA houseboat mooring lottery and lease program continued during the 2015-2016 hunting season. Four houseboat leases were not renewed this year. Lease fees collected for houseboat mooring on the WMA totaled \$24,001 in FY 2015-2016. The remaining mooring areas were issued by computerized lottery drawing. Fees collected for lottery permits generated \$23,500. A total of 70 houseboat permits (lease and lottery) were



RIGHT: WMA staff posting restricted areas on Atchafalaya Delta WMA. **BELOW:** One of the new replacement boat docks at the Main Delta campground at Atchafalaya Delta WMA.



issued for the 2015-2016 hunting season. The fees collected were deposited into a houseboat mooring account that will be made available for future maintenance of mooring sites.

Coastal Operations staff assisted LDWF Minerals Management staff with coordinating oil and gas activities at Atchafalaya Delta WMA. Some oil/gas related activities for Coastal Operations staff included reviewing and commenting on proposals for proposed well locations, proposed pipelines, and plug/abandonment projects. Staff also prepared special use permits for oil/gas activities as needed on the WMA.

Staff continued to maintain facilities, campgrounds and Big Island to a high standard this year. Staff also constructed two new boat docks, repaired embankments near bathroom, stockpiled/spread fill material and replaced some picnic tables at the Main Delta campground to provide better public access/accommodations. Projects completed to improve facilities included the completion of ma-

jor renovations to the WMA's living quarters (houseboat). Atchafalaya Delta WMA staff moved into the houseboat living quarters and plan to assess the condition of the old living quarters. The old living quarters will be repaired or replaced to provide housing and a meeting area for researchers, non-governmental organizations, other LDWF staff, etc.

Staff continues to support a wide variety of research and monitoring projects by granting access permits, providing lodging and assisting with logistics and information. Example projects are:

- LSU and USACE's remote sensing research of dredge material deposition associated with the Big Island Mining CWPPRA Project.
- CPRA monitoring Big Island Mining and Atchafalaya Delta Sediment Delivery Projects.
- USGS monitoring of sediment transport, deposition and trapping efficiency in marshes at the Wax Delta.

- LSU, University of Texas and University of Minnesota's National Science Foundation "Delta Observatory" Project designed to improve modeling and forecasting of delta growing processes that can support restoration and resource management.
- Coastal Estuary Services' efforts to monitor Coast-wide Reference Monitoring System sites.
- Water Institute of the Gulf's sampling of nekton in submerged aquatic vegetation at the Main Delta.
- Coastal Operations staff assisted USGS and LDWF ornithologists by conducting winter plover surveys at the Main Delta again this year.

Recreational use of the WMA totaled approximately 21,210 visitors. Total rainfall for the year was 52 inches.

Hunting Statistics

Teal Season

During the four bag checks conducted this year an estimated 490 hunters harvested 702 teal for an average success of 1.4 teal per hunter.

Waterfowl Season

During the 11 waterfowl bag checks conducted, an estimated 2,040 hunters averaged 2.4 ducks per hunter. Average hunter success was very similar across the WMA with less than 0.1 duck per hunter differences between LAAs and non-LAAs. The top three species harvested on the WMA were blue-winged teal, green-winged teal and gadwall. Also harvested were 329 coots, 10 gallinules, 11 mergansers, 20 snow geese, and five speckled belly geese.



Youth hunt participant with his first deer harvested (Atchafalaya Delta WMA).



Youth hunt participant with his first hog harvested (Atchafalaya Delta WMA).



RIGHT: Youth hunt participant with his first deer harvested (Atchafalaya Delta WMA). **RIGHT:** Group photo from youth deer hunt at Big Island on Atchafalaya Delta WMA.

Deer Season

Archery Season	
Efforts	4,099
Harvest	188 deer (91 bucks, 97 does)
Success	1 deer/22 efforts
Youth Hunts	
Youth Participants	30
Efforts	57
Harvest	5 deer (4 bucks, 1 doe)
Success	1 deer/11 efforts
Total Season	
Efforts	4,156
Harvest	193 (95 bucks, 98 does)
Success	1 deer/22 efforts

Hog Season

Nineteen hogs were reported harvested from Atchafalaya Delta WMA during the 2015-2016 hunting season. Hog harvest at Atchafalaya Delta most always occurs while pursuing other species such as deer and rabbits. Hunters reported an interest in harvesting hogs during roughly 1,300 hunts on Atchafalaya Delta WMA.

Rabbit Season

During the two rabbit bag checks (first two Saturdays of season) conducted, hunters averaged 1.6 rabbits per effort. WMA staff surveyed 73 hunters at the Main Delta but did not encounter any hunters at the Wax Delta.

Alligator Season

A total of 240 alligator tags were issued to Atchafalaya Delta WMA commercial (210 tags) and lottery (30 tags) alligator hunters for the 2015 season. A total of 239 tags were filled. LDWF generates operating budget as a result of alligator harvests on coastal WMAs.

BILOXI WMA

Area Biologist - Shane Granier

Biloxi WMA is owned by the Biloxi Marsh Land Co. and has been managed by LDWF since 1957. This 42,747-acre WMA located in St. Bernard Parish is dominated by brackish smooth cordgrass and black needle rush. Along its southern boundary is Bayou Loutre which was the historic path of the Mississippi River. This WMA has very diverse habitat from low saline marshes in the northeast to freshwater ridges in the south.

A new vessel restriction regulation went into effect on Biloxi WMA for the 2015-2016 hunting season. The new regulation only allows the use of "mud boats or air cooled propulsion vessels can only be powered by straight shaft (long-tail) air-cooled mud motors that are 25 total horsepower or less". LDWF staff posted signs at major entrances to the WMA reminding the public of this regulation change, and worked with the LDWF Enforcement Division on enforcing the new regulation. Staff fielded many phone calls and emails from the public, and compliance appeared to be high, with only a few warning citations issued.

As per the landowner's request (Biloxi Marsh Land Corporation), LDWF through the Office of State Procurement contracted DQSI, LLC. of Covington, La., to remove an old, abandoned weir that had become a navigational hazard to boaters. The weir was once located in a bayou,



Abandoned weir that was removed on Lake Borgne at Biloxi WMA.



LDWF staff posting boundaries at Biloxi WMA.

but is now 200 yards out in Lake Borgne due to shoreline erosion. The contract amount was for \$33,500 and was completed in May 2016.

LDWF worked with USFWS to sponsor a CWPPRA project on Biloxi WMA this year. The project included 43,000 linear feet of shoreline protection on Lake Borgne, and 15 acres of inland terraces. The project ultimately did not receive any CWPPRA funding.

ISLES DERNIERES REFUGE

Area Biologists -

Tyson Crouch & Lance Campbell

This refuge is a series of barrier islands in Terrebonne Parish including Raccoon Island, Whiskey Island, Trinity Island, East Island and Wine Island. This refuge has been managed by LDWF since 1992, and ownership of the islands was transferred to the department in 2000. The refuge is saline marsh/dune habitat and home to the largest colonial water bird colony in Louisiana (Raccoon Island).

Multiple large scale restoration projects are being pursued for future implementation on Isle Dernieres Barrier Islands Refuge. Plans for the NRDA TE-100 Caillou Lake Headlands Beach & Dune Restoration Project (Whiskey Island) have proceeded towards project implementation. This project is estimated to cost \$100 million. Construction is set to begin in the winter of 2016/2017. LDWF, USDA-NRCS, and CPRA discussed plans for elevating the rock breakwaters and the removal of geotextile fabric on the containment levee associated with the Raccoon Island Shoreline Protection and Marsh Creation Project (CWPPRA - TE48).



T. Crouch unloading trays of black mangrove seedlings for planting on Raccoon Island (Isle Dernieres Refuge).

LDWF hosted multiple site visits for the monitoring of past projects. Nicholls State University and Coalition to Restore Coastal Louisiana staff participated in trips to the refuge to monitor past planting and sand fence projects as well as discussions on future plans. CPRA and USDA-NRCS conducted annual inspections of TE-48 and TE-29. USDA-NRCS also made multiple trips to Raccoon Island to begin their second phase of vegetative plantings of TE-48, which included soil samples and staking out areas to be planted within the marsh creation area.

Various restoration projects were implemented this year including:

- The Soil and Water Conservation District sponsored an effort to plant sand live oaks (approximately 100 trees) at Trinity Island.
- Coastal Operations staff assisted with Nicholls State University's annual Calypseaux trip. Approximately 2,000 black mangrove seedlings were planted on the marsh creation area of TE-48 on Raccoon Island for this project. Black mangrove propagules were collected from Whiskey Island to aid in future planting projects.
- USFWS conducted background bird carcass study at Whiskey and Trinity/East islands as part of the 2010 *Deepwater Horizon* oil spill NRDA assessments.
- CPRA/University of New Orleans obtained soil sediment samples on all islands for Barrier Island Comprehensive Monitoring project.
- CPRA/Morris P. Hebert conducted bathymetry surveys for monitoring coastal restoration projects.

- CPRA/T. Baker Smith conducted surveys of TE-29/TE-48 breakwaters on Raccoon Island for future maintenance project.

The refuge was host to multiple research and educational projects including:

- Nicholls State University continued with their 2015-2016 field season for their breeding water bird research project involving black skimmers and tern species. Nicholls State University staff also conducted research and barrier island monitoring via unmanned aerial vehicles.
- University of Louisiana - Lafayette conducted research on brown pelicans, mammalian predators, as well as using an unmanned electric aerial vehicle to assist in counting nesting colonial water birds.
- BTNEP continued its monitoring of solitary and colonial nesting birds.
- USGS, with the help of LDWF staff, accessed the refuge to conduct piping plover surveys, winter plover surveys, and prey base monitoring as part of an extension from research starting in 2012.
- Personnel from Nicholls State University, Southeastern Louisiana University, LSU, as well as Eastern Carolina University hosted multiple educational field trips at Trinity Island.

Coastal Operations staff provided a special use permit for the "Colonial Waterbird Response to Predator Removal on Barrier Islands" research project conducted by Nicholls State University (across all islands of the refuge).

The winter of 2016 was the second year of implementation, and the trapper removed 191 nutria and six coyotes from the refuge.

LAKE BOEUF WMA

Area Biologist - Shane Granier

Lake Boeuf WMA is an 802-acre WMA located in Lafourche Parish just south of Lake Boeuf. This WMA is dominated by cypress/tupelo swamp and has an extensive freshwater marsh dominated by bull tongue and maiden cane.

Deer Season

Self-clearing permits revealed that 34 hunter efforts were made with no deer harvested.

Hog Season

Self-clearing permits revealed that three hunter efforts were made with no hogs harvested.

Alligator Season

A total of six alligator tags were issued to Lake Boeuf WMA lottery alligator hunters for the 2015 season. A total of four tags were filled. LDWF generates operating budget as a result of alligator harvests on coastal WMAs.

MARSH ISLAND REFUGE

Area Biologists -

Tyson Crouch & Lance Campbell

Marsh Island Refuge is a 76,664-acre refuge located in southern Iberia Parish. The refuge was donated to the state in 1920 making it one of the oldest and largest refuges in Louisiana. The refuge was donated to LDWF by the Russell Sage Foundation which was established by Margaret Olivia Sage in honor of her late husband. The donation came with a strict set of management stipulations which are audited annually by the Russell Sage Foundation.

NRCS and Coastal Operations staff continued to pursue funding for restoration work at the refuge via the CWPPRA program. During this fiscal year, the Lake Sand Shoreline Protection and Marsh Creation Project was proposed by NRCS at the CWPPRA Regional Planning Team meeting. While it did have some strong support it did not make it through "Coastwide Electronic Votes" for further consideration. This project will be proposed next year with possible modification. Coastal Operations staff provided technical support for the project. If funded, the project would result



Contractor lifting levees for FEMA levee repairs at the Big Impoundment on Marsh Island Refuge.



Smooth cordgrass plugs planted at Yute's Cut during SWCD/LDWF planting project on Marsh Island Refuge.



Marsh Island staff conducting bird nesting surveys on the Bayou Platte bird nesting islands.

in armoring an extremely vulnerable section of shoreline near Lake Sand on the refuge's northeastern boundary with East and West Cote Blanche bays.

LDWF continued to pursue improvement to facilities and infrastructure at Marsh Island Refuge headquarters during FY 2015-2016:

- Since no bids were submitted by contractors and the subsequent estimated costs increased substantially, the Marsh Island FEMA Consolidation Project was reconsidered. LDWF subsequently requested to deconsolidate the boat sheds and living quarters, with boat sheds being rebuilt as original scope of work. This project still includes the construction of a new airboat shed. Staff continued to work with Facility Planning and Control (FP&C) and GOHSEP to move this project forward and are currently waiting FEMA approval to proceed. As part of this

FEMA project, asbestos removal from the boat shed and living quarters was completed in January.

- Coastal Operations staff continued to assist with development of two bulkhead replacement projects. One project was to replace approximately 110 feet of bulkhead on the northwestern portion of the headquarters island that was damaged by a barge during Tropical Storm Lee. This project was awarded (through bids) to Broussard Brothers, Inc. and the notice to proceed was received in June. Construction should begin in July 2016. The second project was a FEMA bulkhead replacement project on the southeastern portion of the headquarters island. This project was to replace approximately 80 feet of bulkhead that was damaged by Hurricane Ike. Athena Construction was awarded the contract (through bids) for this project. The project included the construction of two concrete blocks (deadman) tiebacks. Concrete had to be poured three times for one tieback and twice for the second tieback before concrete met specifications. Other than concrete issues construction went really well and was completed in March.
- Coastal Operations staff also met with architects, engineers and FP&C several times to further the development of the Marsh Island "Master Plan" Capital Outlay project at the refuge. The Master Plan project will address infrastructure needs (non-FEMA) at the headquarters (bulkhead, infill, buildings, docks, etc.). Preliminary cost estimates provided by designer were over the capital outlay budget authority for this project. In addition the funds available for this project were subsequently reduced. For these reasons, LDWF requested that the designer proceed with design of "Phase 1" of the Master Plan to replace approximately 560 feet of bulkhead on the eastern portion of the headquarters island. Design and bidding should be completed during next fiscal year.

Multiple restoration and research projects on the refuge are in the planning stages, underway or in the monitoring stages:

- Marsh Island Chenier Restoration Project was funded by the CPRA Coastal Forest Conservation Initiative and is designed to restore chenier habitat, via the planting of tree species such as live oak and hackberry, historically found

on the refuge. Ecological Restoration Services, LLC. was awarded the contract for the chenier restoration project. In March, approximately 5,000 seedlings (live oaks and hackberry) were planted across three sites (two historical cheniers and one experimental chenier) on Marsh Island.

- Bayou Platte Bird Island Project was funded through a \$150,000 match grant from the National Fish and Wildlife Foundation/Shell Marine Habitat Program and was completed last fiscal year. LDWF received much media attention after it hosted a dedication for this project in May. Staff subsequently provided logistics, information and interviews for several media journalists/reporters about this project. Marsh Island staff maintained the bird nesting islands for optimal nesting conditions. Surveys conducted by staff indicated that 2,000 nesting pairs of black skimmers, gull-billed terns, laughing gulls and other species were nesting on the island this year. This number far exceeds the target goal of breeding bird pairs (550) again this fiscal year. This rookery is also the largest known gull-billed tern colony and the largest artificial rookery in Louisiana.
- Two FEMA levee repair projects were implemented this fiscal year on the refuge. Staff worked regularly with designer and contractor on these projects as well as provided logistics for inspections. The smaller project was to plug and repair two breaches on Yute's Cut near the Big Dam. The second project was much larger and encompassed repairing and re-lifting over 7 miles of the Big Impoundment levee (west of the eastern water control structure). Berry Brothers General Contractors, Inc. was awarded the contract for both projects (through bids) and began construction in October. Construction was substantially completed by the end of this fiscal year. After fill material settles Berry Bros. will have to re-lift the two breaches cut in the Big Impoundment. This project should be completed by the end of 2016.
- Coastal Operations staff also met with and provided information/logistics to architects, engineers and FP&C about the development of the Marsh Island Water Control Structure Capital Outlay project. This project is to replace an eight barrel water control structure in the Big Impoundment (west). Since preliminary cost estimates were over

the capital outlay budget authority, requested and received additional capital outlay budget authority for this project. Geotechnical analysis, surveys and most of the preliminary design for this project were completed this fiscal year. Design and bidding should be completed during next fiscal year.

- The Natural Resources Conservation Service, the Soil and Water Conservation District, and LDWF conducted a collaborative effort to plant nearly 10,000 plugs of smooth cordgrass on the shoreline and mudflats of Joe Aucoin Bayou and the spoil banks along Yute's Cut.
- Coastal Operations heavy equipment operators repaired/re-lifted degraded levee systems as per below.
 - Repaired over 1 mile of levees and two breaches in Yute's Cut. This levee system is a part of the Big Dam unit and will assist in the functionality of this water management unit.
 - Repaired sink holes and washouts in levee at Big Impoundment (west) water control structure. This damage caused by continued deterioration of water control structure.
 - Repaired large breach at Joe Aucoin Canal. This levee system is a part of the Northeast Unit and will assist in the functionality of this water management unit.
 - Repaired other breaches on the Big Dam Unit levee system which will assist in the functionality of this water management unit.
 - Repaired 12 different areas of breaches or levee degradation on Belly Dam Canal, Bird Island Bayou, Lake Long Canal and Oyster Bayou. This damage was caused by several abnormally high water events in the fall. Repairs were crucial to maintain functionality of the Southeast and Northeast Units.
- The third and final full year of the nutria program concluded this year, and the selected trappers were allowed to hunt/trap from Dec. 15, 2015 through March 31, 2016. Four of the original six trappers returned from the previous year, though only two trappers finished the season. Their respective sections were redrawn to accommodate the remaining trappers. In those three months, these hunters harvested approximately 1,600 nutria.
- Research conducted on Marsh Island included a coastwide look at disease in blue crabs, disease research on nutria,

American oystercatcher surveys, and winter plover surveys. Also, Coastal Operations staff banded approximately 60 mottled ducks on the refuge.

- Refuge staff prescribe burned just over 5,500 acres this year.

Refuge staff posted and maintained boundary signs throughout the year and continued to maintain the headquarters, grounds, facilities and public use areas.

Recreational use of the refuge totaled approximately 9,525 visitors. Rainfall data collected for the year was 26 inches.

PASS-A-LOUTRE WMA

Area Biologist - Shane Granier

Technician Supervisor - Trebor Victoriano

Pass-a-Loutre WMA is 115,000 acres and was established in 1921 by an act of State Legislature. It was designated as a "state shooting ground" which was the precursor to today's WMA. It is Louisiana's oldest WMA and one of the first in the country. Pass-a-Loutre WMA was Governor John Parker's response to public outcry that the best hunting areas were all being leased by wealthy hunters, and that the common man did not have quality hunting opportunities. The WMA is dominated by freshwater Roseau cane marsh and fringed by a brackish vegetation community. The WMA lies within the Mississippi River Delta in Plaquemines Parish.

Coastal Operations staff continued with feral hog eradication, research and monitoring efforts this year. Staff assisted veterinary staff with retrieval of satellite/radio collars from hogs as part of a telemetry project at Pass-a-Loutre WMA to monitor daily movement/habitat use via satellite and radio telemetry technologies. Hog harvests took place in August and March of this fiscal year via the assistance of Jesuit Bend Helicopters. A total of 100 hogs were harvested as a result of these eradication efforts. Previous feral hog eradication and habitat monitoring projects on Pass-a-Loutre WMA have shown that aerial hog eradication efforts can significantly reduce habitat damage and subsequently create significant measurable improvements in habitat conditions in coastal marshes of Plaquemines Parish.

Pass-a-Loutre WMA has historically been a hotspot for mineral exploration and production. WMA staff continued to monitor mineral



Pass-a-Loutre WMA tree planting project with Restore the Earth Foundation.



Excavator constructing a new crevasse on Johnson's Pass at Pass-a-Loutre WMA.



Movements of a satellite/radio collared feral hog at Pass-a-Loutre WMA.

facilities and when appropriate respond to oil spills on the Mississippi River Delta. WMA staff work very closely with the Mineral and Oil Spill Programs on many projects such as construction and maintenance of production facilities, drilling of new wells, plug and abandonment projects to remove decommissioned infrastructure, oil spill response, etc. Pass-a-Loutre WMA staff also assists with any necessary planning and permitting associated with these projects.

Coastal Operations staff continued to coordinate with USACE related to maintenance dredging operations in the lower Mississippi River federally authorized navigation channels. Coastal Operations staff also coordinated with USACE about future plans for beneficial use activities and disposal protocols on Pass-a-Loutre WMA. As part of that effort, a right of entry permit was developed for the dredging of South Pass that included locations and compliance requirements for pumping dredge material on Pass-a-Loutre WMA. USACE staff hopes to secure funding to re-dredge South Pass in the coming years. If this occurs, a considerable amount of marsh creation will occur on the WMA.

There are a few restoration projects that were implemented or designed this year:

- Coastal Operations staff continued to coordinate repairs to the Freshwater Reservoir Water Management Unit adjacent to Dennis Pass. Levees surrounding the northern cell of the Pass-a-Loutre WMA Freshwater Reservoir were in need of repairs due to severe damages caused by Hurricane Gustav. Leblanc Marine, LLC. was awarded the contract and began construction in May/June. Construction will continue into the next fiscal year. FEMA funds will be used for this project.
- Coastal Operations heavy equipment operators dredged the head of Johnson's Pass for access and to increase flow for Johnson Pass Crevasse Project. Operators also dredged a new crevasse on Johnson's Pass just south of the headquarters. This project should facilitate accretion and subsequent marsh creation in open water areas. This project will also serve as match for the South Pass NAWCA Project
- Ducks Unlimited was successful at obtaining funding from NAWCA for the South Pass crevasse project. Coastal Operations staff continued to coordinate with Ducks Unlimited on the devel-

opment of this project. The South Pass NAWCA Project will include cleaning out two existing crevasses (on the western side of South Pass) with a hydraulic dredge and using the spoil material to create bird nesting islands in East Bay. Construction on the project will begin next fiscal year.

- The Restore the Earth Foundation facilitated the donation and planting of 4,000 Bald Cypress trees on the WMA this year. Citgo Petroleum Corporation donated time and money to get this project accomplished as part of the company's commemoration of the 10 year anniversary of Hurricane Katrina. Five-hundred trees were planted by Citgo employee volunteers, and 3,500 trees were planted by employees of Ecological Restoration Services. Coastal Operations staff provided guidance on placement and logistical support for both the volunteer and contractor efforts.

Improvements and maintenance to WMA facilities/infrastructure continued this year. Some of the larger projects underway or completed are as follows:

- Leblanc Marine, LLC. was awarded a contract to blast, treat and repaint two Quonset huts at the WMA headquarters. This project was done to lengthen the useful life of the buildings that are suffering from extensive rusting. Notice to proceed was issued in May and project was under construction at the end of this fiscal year. Construction should be completed within first several months of next fiscal year.
- Staff maintained the dove field, shooting lanes and trails, planted food plots for deer season, and planted summer crops. The food plots were planted to supplement the dietary needs of deer at Pass-a-Loutre WMA.
- Staff spent a considerable amount of time maintaining the headquarters facilities this fiscal year. Of significant note staff hired the services of a bee keeper to remove several bee hives from the lab building.
- Constructed bank stabilization/wave break structure at South Pass Campground.
- Coastal Operations' heavy equipment operators dredged access at multiple campgrounds (Loomis Pass, Southeast Pass, South Pass) on Pass-a-Loutre WMA. This will provide additional access for the public and enhance experiences on the WMA.

- Coastal Operations' heavy equipment operators also stockpiled fill material at the Pass-a-Loutre WMA headquarters for yard repairs.
- WMA staff maintained boundary markers throughout the WMA and the LAA this year prior to waterfowl season to clearly delineate the public/private land boundary. Additionally, administrative staff began discussions with the Delesdernier Heirs over a disputed boundary line at the corner of Pass-a-Loutre and Southeast Pass. This matter is ongoing.

The Pass-a-Loutre WMA headquarters continued to serve as a field facility for multi-day field meetings, university research and educational events. This year the facility hosted numerous guests including but not limited to Zambia ecologists learning techniques and concepts for studying avian fauna, Loyola researchers collecting data for a larval blue crab study, and LSU ecological students gaining field experience as part of college course work. The facility also hosted a wide variety of LDWF employees such as LDWF Enforcement Division staff conducting patrols, Wildlife Division staff working on duck and hog telemetry projects, Natural Heritage Program staff conducting secretive marsh bird call back surveys, and Office of Fisheries staff collecting fisheries data. Coastal Operations staff provided housing, logistical support, and/or information about Pass-a-Loutre WMA for these events.

Several research/monitoring projects are underway on the WMA including the following:

- Hog Enclosures and Vegetative Response (LSU)
- Fisheries Research and WMA Monitoring (Loyola University)
- Deer Tagging Project (survival, movement, home range) (LDWF)
- Wilson's Plover Monitoring Project (nesting success, hog depredation, nesting utilization of beach habitat) (LDWF)

WMA staff made a few attempts to band waterfowl and gallinule on the WMA this year, but success was limited and only resulted in the banding of two mottled ducks, and 14 gallinule (two of which were purple gallinule). The black-bellied whistling ducks did not show up in great numbers this summer as in years past, and thus no great effort was made to net any black-bellied whistling ducks this year.

The headquarters recorded 355 visitors this year. Recreational use of the WMA was estimated to be 17,100 visitors. Total rainfall for the year was 53.7 inches.

Hunting Statistics

Teal Season

During the four bag checks conducted this year an estimated 125 hunters harvested 396 teal for an average success of 3.2 teal per hunter.

Waterfowl Season

An estimated 610 hunters using the WMA during the 11 waterfowl bag check dates averaged 3.6 ducks per hunter effort. The LAA averaged 5.5 ducks per hunter effort. The top three species harvested were gadwall, blue-winged teal and green-winged teal. Hunters also harvested 190 coots.

Deer Season

Self-clearing permits revealed that 44 hunter efforts were made to harvest five deer (all bucks). This equates to one deer per 8.8 efforts.

Hog Season

Hunter interviews and self-clearing permits recorded 142 hunter attempts which resulted in the harvest of 37 hogs for a success of one hog for every 3.8 hunts.

Alligator Season

A total of 377 alligator tags were issued to Pass-a-Loutre WMA commercial (350 tags) and lottery (27 tags) alligator hunters for the 2015 season. A total of 375 tags were filled. LDWF generates operating budget as a result of alligator harvests on coastal WMAs.

POINTE-AUX-CHENES WMA Area Biologists - Jarrod Galloway & Shane Granier

Pointe-aux-Chenes WMA is a 33,488-acre WMA located in southern Terrebonne and Lafourche parishes. It was purchased from the Exxon Company in 1968 at a cost of \$21 per acre and marked the first purchase of marsh land by the Wildlife and Fisheries Commission. It was purchased along with Salvador WMA. The habitat of this WMA is primarily brackish and intermediate marsh dominated by smooth cordgrass and wire grass. Point Farm is a 1,000-acre bottomland hardwood ridge that is also located on the WMA.

Terrebonne Levee and Conservation District continued to design and construct flood protection and mitigation projects on the WMA. LDWF staff frequently coordinated with Terrebonne Levee and Conservation District staff regarding these projects. Some of the accom-



LEFT: Contractor adding rip rap to a water control structure at Pointe-aux-Chenes WMA to prevent scouring. **RIGHT:** One of the water control structures at Pointe-aux-Chenes WMA that was blasted and painted to prolong life of structure.

plishments of the Terrebonne Levee and Conservation District include:

- Terrebonne Levee and Conservation District continued to construct the J-2 Reach of the “Morganza to the Gulf” hurricane protection levee during FY 2015-2016. This section of levee stretches from Montegut to the east side of Point Farm.
- Terrebonne Levee and Conservation District continued to building terraces in and around the Pointe-aux-Chenes/Ducks Unlimited and Montegut units. These terraces are built as mitigation for wetland impacts from several levee projects.

Coastal Operations staff continued to coordinate with South Lafourche Levee District this fiscal year regarding Reach K of the Morganza to the Gulf hurricane protection levee. Staff worked with South Lafourche Levee District to finalize a right-of-entry agreement allowing for levee improvements on the west bank of Grand Bayou from the Grand Bayou Marina to the northern boundary of the WMA. South Lafourche completed nearly all of the regulatory requirements. Construction contracts should be awarded in early FY 2016-2017.

USDA-NRCS and Coastal Operations staff pursued funding for restoration work at Pointe-aux-Chenes WMA via the CWPPRA program. During this fiscal year, the Bayou Terrebonne Freshwater Introduction Project was proposed by USDA-NRCS at the CWPPRA Regional Planning Team meeting. “Coastwide Electronic Votes” resulted in this project proceeding to the CWPPRA Technical Committee for further

consideration as a possible top 10 project. The CWPPRA Technical Committee initially voted this project as the fifth highest candidate project. Unfortunately, it did not make it through the second round of voting by the CWPPRA Technical Committee for funding consideration by the CWPPRA Task Force. This project will be proposed next year. Coastal Operations staff provided technical and logistical support for the project. This project planned to use existing parish forced drainage infrastructure along with the addition of some mechanical pumps to provide a reintroduction of freshwater to wetlands on the WMA.

Multiple restoration projects were completed or were in the planning phase this year. The following list contains some of the larger projects:

- NRCS completed the planting of 4,000 California bulrush plants (in trade gallons) on the WMA this year as part of the LA-39 Coastwide Vegetative Planting CWPPRA Project. The area enhanced by this project is approximately 100 acres and located in the Ducks Unlimited/Pointe-aux-Chenes Unit north of the Sonat Road.
- Coastal Operations staff continued to support the LSU AgCenter’s Coastal Roots Program. Students from local grade schools assisted with the planting of cypress trees and various bottomland hardwood species at Point Farm this year.
- Ducks Unlimited and Coastal Operations staff continued to develop plans and pursue funding for the creation of a moist soil unit on the lower end of Point Farm.

- The Restore the Earth Foundation began seeking funding to attempt to restore 4,000 acres of swamp habitat on the WMA. This project kicked off with several small volunteer projects with employees of many of the company’s donating money to the project. Donated funds will also go to a much larger effort of planting trees done by contractors from Ecological Restoration Services. Restore the Earth Foundation is also working to donate a Marsh Master marsh buggy to LDWF for use on the project long term. The project is the beginning of a much larger project being initiated across the country by Restore the Earth with a goal of restoring 1 million acres of habitat in the Mississippi River basin.
- Coastal Operations staff worked with FP&C and designer (J. Wayne Plaisance, Inc.) to develop plans for the replacement of the S1 and S3 water control structures in the Pointe-aux-Chenes Unit. Both structures are damaged and in poor condition. J. Wayne Plaisance, Inc. continues to prepare designs for the replacement of these structures. Project design should be completed and bid out next fiscal year.

Coastal Operations staff assisted with the annual Terrebonne Aquatic Education Clinic which teaches all 4th grade students in Terrebonne Parish how to fish. To improve the clinic, Coastal Operations staff assisted with the construction of a pavilion at the Pointe-aux-Chenes WMA headquarters this year. The clinic was held in April 2016.

Similar to last fiscal year, Coastal Operations staff allocated much time to coordinating improvements, maintenance and repairs to facilities/infrastructure at Pointe-aux-Chenes WMA. Coastal Operations staff made significant progress on multiple projects this fiscal year. Some of the larger projects underway or completed are as follows:

- Repairs to the Ducks Unlimited/Pointe-aux-Chenes Unit were completed by Lowland Construction in July 2015. This FEMA project included levee repairs at several eroded sections, and installation of rip rap at the S3 structure to reduce additional scouring. Leonard Chauvin was the designer/engineer for the project.
- Construction of two new 100-foot piers at the Grand Bayou Boat Launch on LA Hwy. 665 was completed this year and



LEFT: One of the piers constructed for public use at the Grand Bayou Launch at Pointe-aux-Chenes WMA. **RIGHT:** Pointe-aux-Chenes WMA tree planting project with Restore the Earth Foundation.

funded by FEMA. These piers were constructed by Lowland Construction on the Bayou Pointe-aux-Chenes side of land- ing and will provide safe access for the general public for recreational activities. The piers were also designed to increase launching efficiency especially during peak use in waterfowl season. Use of the docks by the public is extremely high and appreciated by the public.

- Coastal Operations and WMA staff worked with FP&C to proceed with replacement of the long damaged Quon- set hut. Staff provided comments to designs and specifications developed by Duplantis Design Group in June. This project is funded by FEMA and should be bid out and move to construction next fiscal year.
- S1 and S2 water control structures in the Pointe-aux-Chenes Unit were blasted and painted. Eagle Industrial, LLC. was the contractor and completed construc- tion in March.
- Coastal Operations and WMA staff con- tinued to work closely with FP&C to move repairs and renovations to the Pointe-aux-Chenes WMA headquarters complex forward. Designer will be se- lected in July of FY 2016-2017. Plans, designs and specifications should be completed next fiscal year. This project includes repairs to the residence, repairs and additions to the office/dorm and de- molition of storage buildings. All build- ings have been surveyed for asbestos

contamination and plans developed for remediation of contaminants. Removal should be completed next fiscal year.

- Heavy equipment operators completed elevation of the road leading to the southern end of Point Farm.

Staff spent a considerable amount of time pre- paring for hunting season at Point Farm. Staff planted and fertilized the dove fields, planted food plots for deer season, and added two new deer stands for the 2016 youth hunts.

Mineral activities were minimal this fiscal year, the main projects included the removal of the well location pad and cleanup of the BTA well site at Point Farm, and a wireline project by Tellus on Point Farm.

Lack of observed mottled ducks and other issues hampered the staff's ability to make many attempts at banding mottled ducks this fiscal year. Staff are optimistic about future banding attempts.

Recreational use of the WMA was estimated at 26,400 users. Total rainfall for the year was 76.1 inches.

Hunter Statistics

Teal Season

During the four bag checks conducted this year an estimated 585 hunters harvested 754 teal for an average success of 1.3 teal per hunter effort.

Waterfowl Season

During the 11 waterfowl checks conducted for the season an estimated 2,230 hunt- ers had an average success of 1.7 ducks per hunter attempt. The top three species har- vested were lesser scaup, blue-winged teal and gadwall. Hunters also harvested 2,790 coots, 90 gallinule, 23 mergansers and one snow/blue goose. Hunters using the Monte- gut and Pointe-aux-Chenes LAAs continued to have better success than non-LAA hunters. The LAAs averaged 2.5 ducks per hunter while the rest of the WMA averaged 1.7 ducks per hunter.

Deer Season

Fifty-three reported bow hunt efforts and 40 youth hunt efforts resulted in the harvest of four deer (two bucks and two doe). This equates to one deer per 23.3 hunter efforts.

Hog Season

Sixty-one hunter efforts revealed by self- clearing permits and 40 youth hunt efforts resulted in the harvest of five hogs. This equates to one hog per 20.2 hunter efforts.

Dove Season

Hunter surveys on opening day revealed that 151 hunter efforts (43 youth hunters) result- ed in the harvest of 110 doves for an average of 0.7 doves per effort.

Rabbit Season

Limited reporting revealed that hunters aver- aged 0.9 rabbits per effort.

Squirrel Season

Limited reporting revealed that hunters averaged 2.5 squirrels per effort.

Alligator Season

A total of 224 alligator tags were issued to Pointe-aux-Chenes WMA commercial (200 tags) and lottery (24 tags) alligator hunters for the 2015 season. A total of 223 tags were filled. LDWF generates operating budget as a result of alligator harvests on coastal WMAs.

SALVADOR/TIMKEN WMAS

Area Biologists -

Jarrold Galloway & Shane Granier

Salvador WMA is a 35,121-acre WMA located in southern St. Charles Parish. It was purchased from Exxon in 1968 at a cost of \$21 per acre, and marked the first purchase of marsh land by the Wildlife and Fisheries Commission. It was purchased along with Pointe-aux-Chenes WMA. This WMA is a freshwater marsh dominated by bull-tongue and maiden cane. Just to the east of Salvador is the 3,920-acre Timken WMA. It is owned by the New Orleans City Park Improvement Association and has been leased to LDWF since 1995. Both of these WMAs are currently the beneficiary of one of the largest restoration projects in the state. The Davis Pond freshwater Diversion Project diverts freshwater from the Mississippi River into the northern portion of Salvador WMA then drains into Lake Cataouatche.

LDWF staff worked with Ducks Unlimited to acquire a new tract of land to be added to the WMA this year. The White Tract is an approximately 1,700 acre tract on the northeast border of the Salvador WMA. The tract will be purchased using NAWCA funds, LDWF funds, and private donations. The final transactions will occur next fiscal year.

LDWF and FP&C staff continued to work together to move forward projects associated with the buildings at the headquarters facility at Salvador WMA. LDWF and FP&C plan to use available FEMA funds from multiple project worksheets to renovate the "Caretaker's Camp" (i.e., current living quarters). In tandem with the FEMA project, LDWF plans to use operating budget to renovate the boat house, construct a new generator shed/fuel dock, and build a platform for a shipping container that will be used for storage. All buildings have been surveyed for asbestos contamination. LDWF contracted with the Aims Group, Inc. to develop plans for contaminant remediation. The plan also includes the demolition of

the other deteriorated buildings at the facility such as the old headquarters, tractor shed and tool shed once remediation is completed. Once all necessary FEMA approvals are received, staff will proceed with construction/renovation projects.

Coastal Operations staff worked with USACE in developing mitigation projects for the USACE Hurricane Protection Levee System for the West Bank of St. Charles, Jefferson and Plaquemines parishes. Project proposals included the potential creation of several hundred acres of fresh marsh, swamp and bottom land hardwood habitats on the WMAs. This project is still only in the early development stages and still has many hurdles to overcome before implementation.

The WMAs have experienced ever increasing problems with aquatic weed proliferation over the last several years. Staff acquired a vessel equipped for herbicide applications of aquatic weed from the Office of Fisheries. This vessel will be used by WMA staff to attempt to control aquatic weeds on some areas on the WMAs.

Coastal Operations staff based at Pointe-aux-Chenes WMA continued to maintain the facilities and equipment at Salvador WMA. Staff routinely visited the WMA headquarters to perform needed work such as yard maintenance, building repairs and improvements, and generator maintenance. Staff also replaced numerous missing boundary signs at the WMAs.

An estimated 7,940 recreational users visited the WMAs this year.

Hunting Statistics

Teal Season

During the four bag checks conducted this year an estimated 55 hunters harvested 89 teal for an average success of 1.6 teal per hunter effort.

Waterfowl Season

During the 11 waterfowl bag checks conducted this season an estimated 160 hunters averaged 0.9 ducks per hunter effort. The Davis Pond diversion outfall area experienced the highest average hunter success with one duck per hunter. Coastal Operations staff will recommend removal of the Salvador WMA LAA next year due to continued low hunter utilization and success. The top three duck species harvested were blue-winged teal, green-winged teal and lesser scaup. Hunters

also harvested an estimated 120 coots and 55 gallinules during bag checks.

Deer Season

Self-clearing permit data showed that 122 hunter efforts resulted in the harvest of nine deer (three bucks, three doe and three unknown). Hunter success was one deer per 13.6 efforts.

Hog Season

Self-clearing permits revealed that there were no hunter efforts for FY 2015-2016.

Rabbit Season

Limited reporting revealed that hunters averaged 2.4 rabbits per effort.

Alligator Season

A total of 486 alligator tags were issued to Salvador/Timken WMA commercial (456 tags) and lottery (30 tags) alligator hunters for the 2015 season. A total of 483 tags were filled. LDWF generates operating budget as a result of alligator harvests on coastal WMAs.

ST. TAMMANY REFUGE

Area Biologist - Shane Granier

St. Tammany Refuge is a 1,310-acre refuge located on the north shore of Lake Pontchartrain in St. Tammany Parish. The refuge was purchased by the state in 1935 from the Great Southern Lumber Co. The refuge is managed in cooperation with the USFWS along with Big Branch NWR.



J. Galloway applying herbicide to nuisance aquatic weeds at Salvador WMA.

Due to USFWS' oversight, Coastal Operations staff had relatively little to no participation in the daily management of the refuge this fiscal year.

STATE WILDLIFE REFUGE

Area Biologists -

Tyson Crouch & Lance Campbell

State Wildlife Refuge is a 13,000-acre refuge located in southern Vermilion Parish. It was donated to the state in 1911 by Mr. Edward McIlhenny and Mr. Charles Ward to be managed as a wildlife refuge. This is the oldest refuge in the state and one of the oldest in the country.

NRCS, Environmental Protection Agency, and Coastal Operations staff continued to pursue funding for restoration work at the refuge via the CWPPRA program. During this fiscal year, the West Vermilion Bay Shoreline Protection and Marsh Creation Project was proposed as a cooperative effort between NRCS and Environmental Protection Agency at the CWPPRA Regional Planning Team meeting. "Coastwide Electronic Votes" resulted in this project proceeding to the CWPPRA Technical Committee for further consideration as a possible top ten project. The CWPPRA Technical Committee voted this project as the eleventh highest candidate project and therefore did not move on for further consideration. This project will be proposed next year. Coastal Operations staff provided technical support for the project. If funded, the project would result in the creation of marsh near Hog Lake and the ar-

moring of three sections of shoreline on the western edge of Vermilion Bay.

Coastal Operations staff continued to support efforts to repair/replace infrastructure at State Wildlife headquarters that was damaged during hurricanes Rita and Ike. Staff continued to assist with the development of the FEMA bulkhead repair project this fiscal year. This project was to replace approximately 120 feet of bulkhead adjacent to the boat shed. The project also included replacing walkways/docks and limestone work. B & J, Inc. was awarded the contract (through bids) for the project and completed construction in April. Staff also assisted with an asbestos assessment project for the demolition of the old living quarters, which is part of a pending FEMA claim. Coastal Operation staff provided input and logistical support for both of these projects. Staff continued to provide input for repairs of the small and large boat sheds and the lookout tower as well as the replacement of the tractor, tool, trapper's and pump sheds.

LDWF acquired the necessary Clean Water Act Section 404 permit from USACE for the Ducks Unlimited Tom's Bayou Water Control Structure project. The Tom's Bayou project, a rock weir funded through NAWCA, was constructed by Luhr Brothers. Also funded as part of this project, Berry Brothers Construction dredged access through Lake Fearman. LDWF staff also assisted in the early stages of access dredging through Lake Fearman. All construction was completed in May. Some on the NAWCA funds associated with this project remained unspent. Therefore, Ducks Unlimited will request

approval to replace the Prien Bayou water control structure. If approved construction should begin next spring. Coastal Operations and Ducks Unlimited staff collected preliminary field information for the project.

Coastal Operations staff participated in an annual operations and maintenance inspection trip of the Lake Portage Land Bridge CWPPRA Project (TV-17). The project has successfully maintained itself over the years and there are no current plans for any modifications or repairs.

Coastal Operations staff based at Marsh Island Refuge continued to maintain the facilities and equipment at State Wildlife Refuge. Staff routinely visited the refuge to perform needed work such as maintenance to facilities and public use areas. Staff completed considerable repair work, upgrades and maintenance to the facilities of the refuge. These works included replacing the camp's outdoor plumbing, exterior painting, set up of a standby generator, installation of a Tug Boat electric hook up, and other necessary building and grounds projects.

An estimated 6,485 recreational users visited the refuge this year.



New bulkhead and dock at State Wildlife Refuge.

FURBEARER MANAGEMENT

MONITORING FUR HARVEST

The 2015-2016 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. 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 2,375 trapping licenses were sold during the 2015-2016 trapping season. Of these, 2,250 were adult residential licenses, 32 were adult non-residential trapping licenses, and 93 were youth residential licenses. These figures show a decrease in trapping licenses sold when compared to the previous season (2,559).

A total of 2,447 animals were harvested for fur (all species), which was a decrease of 6,626 from the previous season's total of 9,073. The total value of the 2015-2016 fur harvest to the state's trappers was estimated at \$16,215.99. This total value was a decrease from the previous season's total of \$76,266.58.

The nutria harvest (349,235) increased by 7,527 from the previous season's total of 341,708. 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 Coastwide Nutria Control Program by registered participants.

COAST-WIDE NUTRIA CONTROL PROGRAM

The Coast-wide Nutria Control Program (CNCP) is funded by the CWPPRA. The objective is to decrease nutria-induced damage to coastal vegetation by increasing the incentive for harvest. During the 2015-2016 season, a total of 349,235 nutria tails, worth \$1,746,175 in incentive payments, were collected from 274 participants. Eighty participants (29 percent) turned in less than 200 tails, 49 participants (18 percent) turned in 200-499 tails, 35 participants (13 percent) turned in 500-799 tails, 56

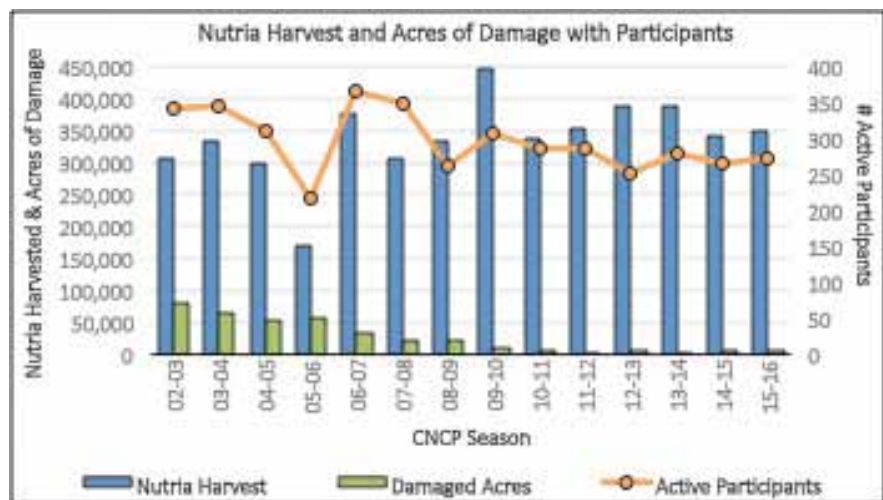


FIGURE 7. Nutria Harvest and Acres of Damage with Participants.

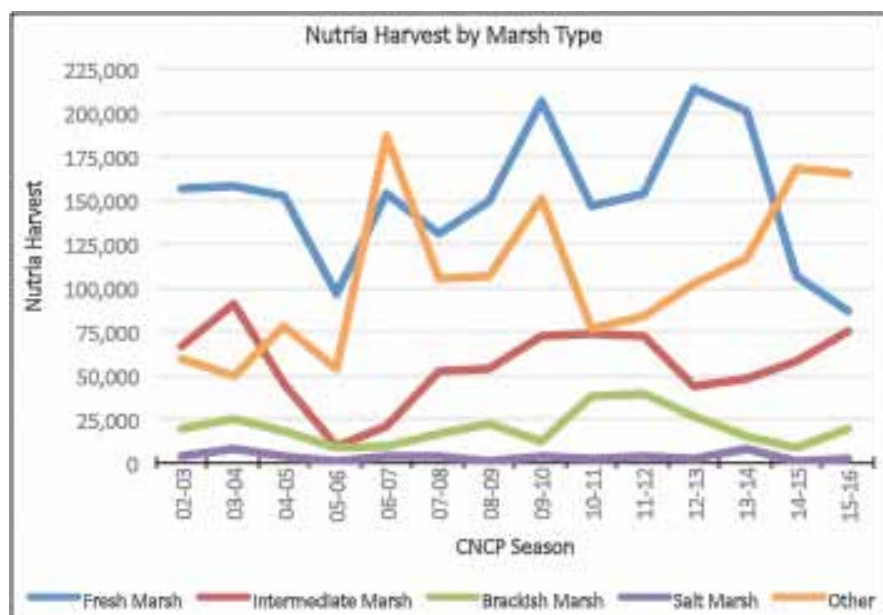


FIGURE 8. Nutria Harvest by Marsh Type.

participants (20 percent) turned in 800-1,999 tails, 18 participants (7 percent) turned in 2,000-2,999 tails, 13 participants (5 percent) turned in 3,000-3,999 tails, and 23 participants (8 percent) turned in 4,000 or more tails.

TOTAL NUMBER OF NUTRIA HARVESTED BY METHOD OF TAKE IN 2015-2016

Nineteen parishes were represented in the 2015-2016 program season with harvests ranging from 341 to 93,301 nutria per parish. The greatest number of tails (93,301) were collected from Terrebonne Parish, followed by St. Martin (50,202) and Plaquemines parishes (46,672).

February was the most active month for harvesting nutria (116,031 tails) while November was the least active month (8,729 tails). (See CNCP 2015-2016 Report, CWPRA Project LA-03b.)

VEGETATIVE DAMAGE CAUSED BY NUTRIA

As a monitoring requirement of CNCP, a coast-wide aerial survey was conducted in April 2016 covering the coastal parishes of Louisiana. The total number of sites visited in 2016 was 11, all of which were identified as having nutria damage in 2015. All 11 nutria damage sites identified in 2016 were classified as old nutria damage, none were considered recovered, and no new sites were identified.

The 11 nutria-damaged sites observed along transects during the 2016 survey had a total of 1,732 acres impacted by nutria feeding activity (6,496 extrapolated). This is approximately an 8.2 percent increase in acres impacted by nutria since the 2015 survey (1,602 acres, extrapolated to 6,006 acres coastwide). CNCP continues to be a successful means of controlling the nutria population with over 300,000 animals harvested annually. Despite the increase in nutria-induced marsh damage observed during the 2016 survey, the number of nutria-impacted acres in Louisiana's coastal marsh has decreased significantly over the 14 seasons of the program.

TABLE 5.

10-YEAR AVERAGE VALUE FOR EACH SPECIES	
River Otter	\$59,593.22
Raccoon	\$34,558.06
Bobcat	\$19,891.84
Nutria	\$16,831.58
Beaver	\$12,924.55
Mink	\$5,743.99
Grey Fox	\$5,653.88
Muskrat	\$2,682.55
Red Fox	\$940.45
Coyote	\$490.81
Opossum	\$145.17

FIGURE 9. COMPARATIVE TAKE OF FUR ANIMALS IN LA 10-YEAR AVERAGE (2006/2007 - 2015/2016)

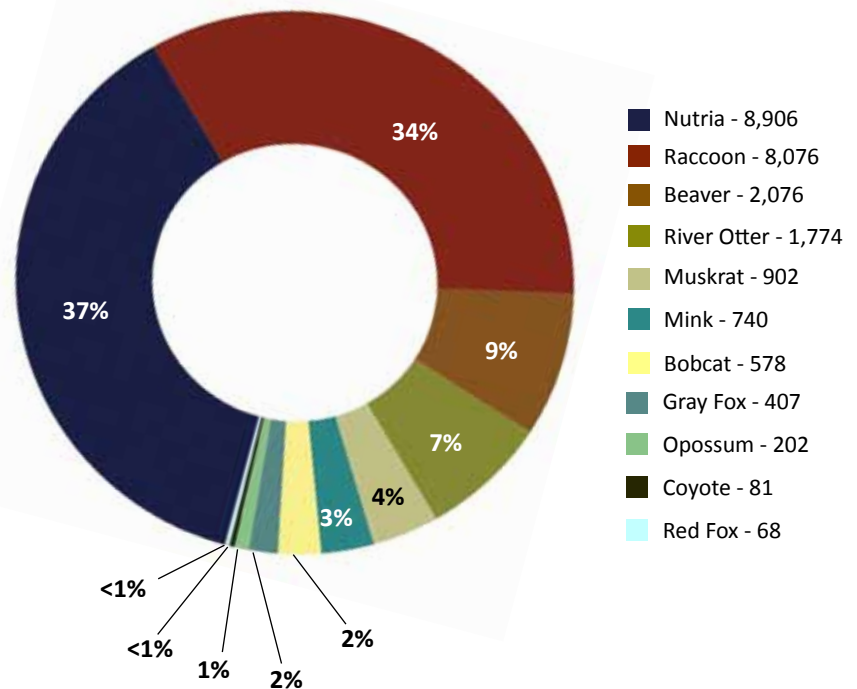
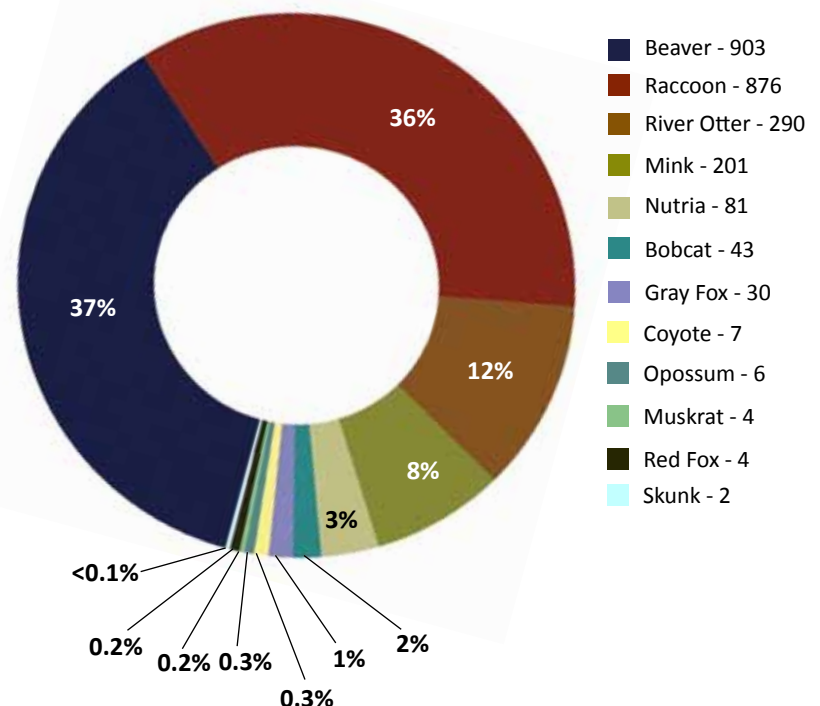


FIGURE 10. TOTAL FUR HARVEST BY SPECIES (FY 2015-2016)
Total Harvest: 2,447



FUR ADVISORY COUNCIL

The Fur Advisory Council has continued to focus on three major goals this year. The first goal is 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 is to educate both new and experienced trappers on state regulations, best management practices and handling fur from the field through the fur shed. Better trapping and fur handling skills leads to the third goal by putting a better product on the market. The third goal is to bolster Louisiana's fur industry through marketing and trade shows.

The Fur Advisory Council has continued to interface with the public through local events such as the Cameron Wildlife Festival, Future

Farmers of America events, JAKES days (Juniors Acquiring Knowledge, Ethics and Sportsmanship), and National Hunting and Fishing Day events. The council has also coordinated with other groups such as the National Turkey Federation and the Louisiana Wildlife Federation to promote trapping as a tool for land and species management. The council website carried the educational story to a much broader audience.

The international fur market has continued to decline during FY 2015-2016 with political unrest and economic crisis in Eastern Europe. Mainland China still holds the largest market for Louisiana furs. The Fur Advisory Council attended fur shows in mainland China in 2015-2016, and Chinese buyers purchased furs from

Louisiana. The council has contracted with a new fur marketing company to broaden the impact of international trade shows.

Louisiana dealers are developing the infrastructure necessary to expand the fur harvest locally in the future. The marketing contractor visited Louisiana to speak with local fur dealers about the international market. The council has worked to make sure that the art of fur trapping continues as part of Louisiana's living heritage. Two trapping workshops were held this year. Students learned about trap preparation, skinning and hide care, and laws and best management practices.

ALLIGATOR PROGRAM

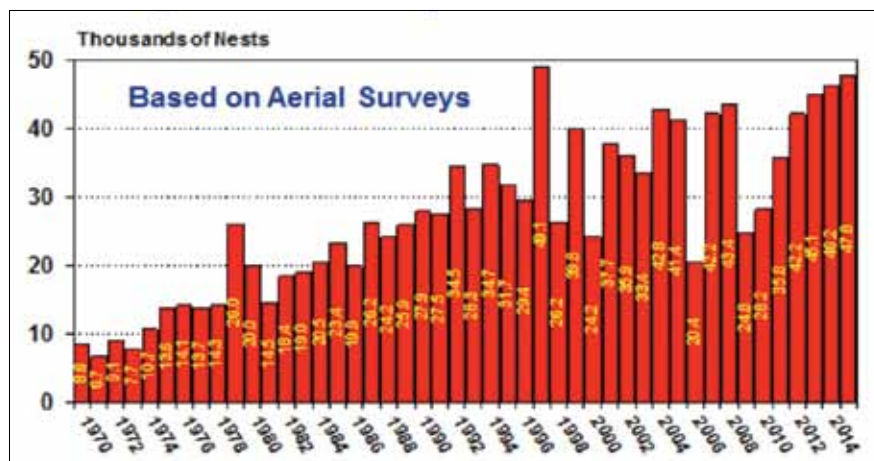
Louisiana's Alligator Management Program consists of two complex segments: research/management of the wild population and a statewide farm/ranch program. The program is funded by alligator industry generated revenues (alligator hide tag fees, shipping label fees, alligator hunting license fees, alligator 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 summer 2015 we estimated that 47,760 alligator nests were present in the coastal marsh habitats; an increase of 3 percent from 2014 (*Figure 11*).

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.

FIGURE 11. LOUISIANA COASTAL MARSH ALLIGATOR NEST PRODUCTION (1970-2015)

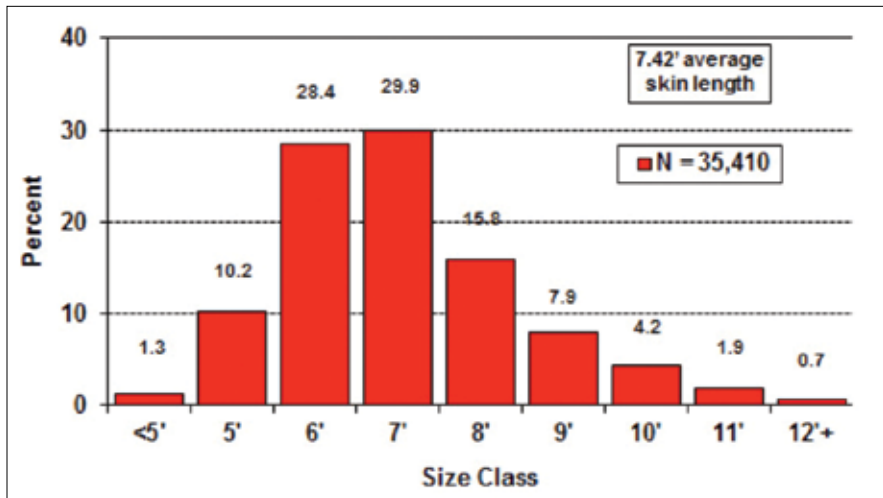


The majority of the lands enrolled in the wild alligator harvest program have been entered in the GIS system for property ownership and habitat assessment.

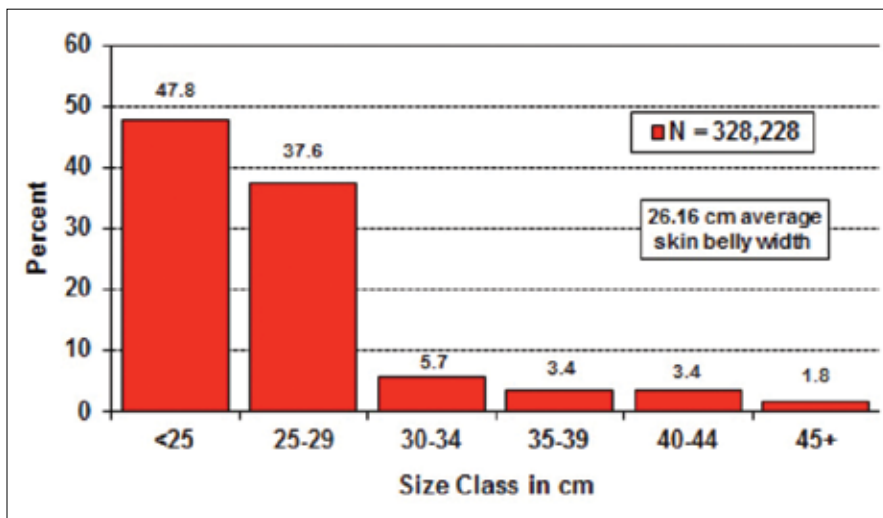
Each year the alligator program staff works closely with landowners and alligator hunters to provide assistance regarding alligator management on their respective properties. We have provided numerous habitat base maps to landowners for their use in participation of both the wild and alligator egg harvest 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 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 2015 wild season, a total of 35,410 alligators were harvested by 3,109 licensed alligator hunters. Alligators harvested averaged 7.42 feet in length (*Figure 12*), with an estimated value of \$11.6 million. Adult-sized alligators (those 6 feet and larger) comprised the majority of the harvest (*Figure 12*).

**FIGURE 12. LOUISIANA WILD ALLIGATORS HARVESTED
(2015 REGULAR HARVEST SKIN LENGTHS)**



**FIGURE 13. LOUISIANA FARM ALLIGATORS HARVESTED
(2015 SKIN BELLY WIDTHS)**



LDWF provided additional alligator harvest opportunities for the general public by continuing its lottery alligator harvest program. In 2015 the lottery alligator harvest program provided opportunities for 349 alligator hunters to harvest 897 alligators. Lottery alligator harvests were conducted on 45 public areas (WMAs and public lakes) throughout the state.

FARM ALLIGATOR PROGRAM

The January 2016 statewide farm/ranch inventory totaled 807,986 alligators, up from 799,047 alligators in January 2015, and surpassing the record of 799,047 in January 2015. The decline in 2012 was due in large part to the worldwide economic recession,

and to farmers voluntarily limiting their egg collections significantly in summer 2009; then collecting about half the usual amount in 2010 (205,261 eggs) as markets and demand slowly improved. Market conditions continued to improve in 2012-2013 as both skins and meat were in high demand.

WILD ALLIGATOR EGG COLLECTIONS BY ALLIGATOR FARMERS (2011-2015)		
Year	Wild Alligator Eggs Collected	Hatchlings Yielded
2011	353,176	300,546
2012	413,648	349,514
2013	498,285	432,386
2014	528,719	468,142
2015	465,100	394,231

During the 2015 tag year (January 2015 through December 2015) an estimated 328,228 farm-raised alligators were harvested, averaging 26.16 cm belly width (Figure 13). The total estimated value of these alligators was \$71.4 million.

Farmers participating in the wild alligator egg collection program are required to return 12 percent of the eggs hatched as 4-foot alligators, which compensates the wild alligator population for the collection of eggs. The remaining animals can be sold by the farmer. During FY 2015-2016, a total of 51,316 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 2015, 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. 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 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 2015-2016, a total of 55 nuisance alligator hunters were enrolled in the program; annually the nuisance hunters respond to several thousand complaints and harvest approximately 2,500 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 2015-2016.

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 14 percent release rate to 12 percent, it is imperative to monitor survival closely. The 12 percent return rate started with the 2007 permits (releases "due" in 2009). 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 now have contractors from LSU's School of Renewable Natural Resources providing input as to analyses on this project, which includes a graduate student Master's degree project. The graduate student has made several presentations of preliminary results at scientific conferences.

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 2015

wild season staff collected sex ratio data on 16,028 alligators (65.81 percent males, 34.19 percent females) which represented a significant percentage of the total alligators harvested. This project, coupled with coastwide 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 coastwide 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.

5. West Nile Virus -

LDWF, in conjunction with LSU School of Veterinary Medicine (LSUSVM), 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 2015-2016 we continued to have expertise from staff at LSUSVM available if needed to collect samples from farm alligators to monitor for any health concerns, provide diagnostics as needed, and assist with other health surveillance parameters. After several years of research, development, and testing, a West Nile virus vaccine was developed, gained conditional approval by the USDA and became available to farmers in October 2011. Several farmers have taken advantage of this new proactive technology to prevent West Nile virus in captive hatchling and yearling alligators.

6. Best Management Practices -

LDWF and the LSUSVM 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 up-

dated and distributed in January 2013 and again in January 2016 as new information regarding euthanasia was investigated, and will be updated as any pertinent topic to alligator farming becomes available. The intent of this document is to ensure that licensed alligator farms/ranches are employing humane methods of working with alligators. Through industry contributions, Dr. Nevarez at LSUSVM has continued to work with LDWF staff to update Best Management Practices as needed. LDWF staff assisted with review of a detailed document on Best Management Practices for all farmed crocodilians this fiscal year.

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. Reigh by LDWF from eggs collected and incubated at Rockefeller Refuge for continued 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. Eggs were also provided for detailed studies on the effects of supplemental oxygen provided during egg incubation.

Contracts

1. Diagnostic Services (LSUSVM - Dr. Nevarez) -

Dr. 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 LSUSVM 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 be-

ing prepared. Dr. Nevarez and pathologists at LSUSVM have also assisted with necropsy and research findings for publications co-authored with LDWF alligator program staff members.

2. LSU School of Natural Resources -

The LSU Department of Experimental Statistics was under contract to provide technical statistical expertise for numerous alligator projects; most importantly the evaluation of survival of farm-released alligators, population trends from nesting survey data, and more recently with hide grade/length correlations. Last fiscal year we transitioned to new statisticians (faculty with the School of Renewable Natural Resources) due to the pending retirement of current contract statistician and research associate. A graduate student was recruited and is currently completing her thesis work on modeling survival of farm-released alligators.

3. Nutrition Research (LSU AgCenter, Aquaculture Research Station) -

A research contract was established for aquaculture nutritionist Dr. Reigh and his research associate to conduct digestibility studies continue to aid farmers in their farm management; industry support from feed manufacturers at Cargill have been instrumental in this process.

On May 25 a research committee meeting was held, and the following projects were outlined for study:

1. Effects of environmental oxygen concentration on egg hatching success
 - Three O² concentrations (treatments): 21 percent (control), 24 percent and 28 percent.
 - Three replicates per treatment: Each replicate will be 52-quart cooler containing approximately 30 eggs in single layer on bed of moistened sphagnum; total of nine coolers.
 - Control will be open to ambient air; oxygen treatments will be supplied to sealed coolers as compressed gas; O² concentrations will be continuously monitored by electronic sensors.
 - Eggs in cooler will be numbered and separated by clutch and date of collection.
2. Effects of environmental oxygen concentration during egg incubation on first-year growth rate
 - Hatchlings from each replicate (cooler) in the egg incubation experiment will be moved to 4 x 8 tanks in the production facility for one-year growth trial: nine tanks with 10 hatchlings per tank.
 - Hatchlings will be fed standard Cargill

diets for growth trial.

- Weight, length and girth will be measured at 60-day intervals.
3. Feeding trial
 - Current feeding trial is determining the effects of three concentrations of dietary fish meal on growth of large alligators; Cargill is providing the diets free of charge; ingredient compositions of these diets are proprietary, so only Cargill will have the information needed to understand the results.
 - Between now and the end of the current study, we will develop the next feeding trial (non-proprietary) to be conducted in 15 tanks in the production facility; this will involve 150 hatchlings.

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 of North Texas, University of California at San Bernardino, University of Southern California, and Montana State University) were hosted at Rockefeller in 2015-2016 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 as listed below.

In the summer of 2015 and 2016 we made collections of a series of embryos for further collaborative studies. We collected and preserved these embryos for several research teams.

We published several abstracts and full papers this year, two of which were selected for Publication Awards by the Louisiana Association of Professional Biologists. A staff member made a presentation on alligator research at the LDWF's research and education symposium in Baton Rouge in May 2016. Some manuscripts published in fiscal year 2015-2016 include:

Chabert, T., A. Colin, T. Aubin, V. Shacks, S. L. Bourquin, R. M. Elsey, J. G. Acosta, and N. Mathevon. 2015. Size does matter: crocodile mothers react more to the voice of smaller offspring. *Scientific Reports*. doi: 10.1038/srep15547.

Dacke, C. G., R. M. Elsey, P. L. Trosclair, III, T. Sugiyama, J. G. Nevarez and M. H. Schweitzer. 2015. Alligator osteoderms as source of labile

calcium for eggshell formation. *Journal of Zoology*. (297):255-264.

Elsey, R. M., P. L. Trosclair, III, S. F. Dartez, and F. Seebacher. 2015. *Alligator mississippiensis* (American Alligator). Telemetry unit retention. *Herpetological Review*. 46(3):428-429.

Elsey, R. M., C. Wall, and M. Wall. 2015. *Alligator mississippiensis* (American Alligator). Nesting by a reintroduced female. *Herpetological Review*. (46):622-623.

Hamilton, M., J. W. Finger, Jr., R. M. Elsey, and T. D. Tuberville. 2015. (Abstract). Measuring long-term stress in American alligators (*Alligator mississippiensis*): a validation study. SSAR meeting July 30 – Aug 2, 2015, Lawrence, Kansas. Poster presentation.

Shirley, M. G. and R. M. Elsey. 2015. American alligator production: an introduction. Southern Regional Aquaculture Center Publication No. 230. 4 pp.

Camarata, T., A. Howard, R. M. Elsey, S. Raza, A. O'Conner, B. Beatty, J. Conrad, N. Solunias, P. Chow, S. Mukta, and A. Vasilyev. 2016. Post embryonic nephrogenesis and persistence of Six2-expressing nephron progenitor cells in the reptilian kidney. *PLoS ONE*. 11(5):e0153422. doi: 10.1371/journal.pone.0153422

Camarata, T., A. Howard, R. M. Elsey, S. Raza, A. O'Conner, B. Beatty, J. Conrad, N. Solunias, P. Chow, S. Mukta, and A. Vasilyev. 2016. Post-embryonic nephrogenesis in the reptilian kidney. Presentation at the 5th Annual Northeast Regional Vertebrate Evolution Symposium. Adelphi University, Garden City, NY. 1 April 2016.

Elsey R. M. and Phillip L. Trosclair, III. 2016. The use of an unmanned aerial vehicle to locate alligator nests. *Southeastern Naturalist*. 15(1):76-82.

Elsey, R. M. 2016. Louisiana's alligator management and research program: an update. (Abstract). Presentation at the LDWF Office of Wildlife's Research, Management and Education symposium. May 31, 2016. Baton Rouge, Louisiana.

Gonzalez, E., J. Doyle, M. Noriega, A. Hocson, N. Membreno, R. M. Elsey, T. Owerkowicz. 2016. (Abstract). Variability in the post-hatching growth trajectory of alligator hatchlings incubated with and without the eggshell. Poster presentation at the Experimental Biol-

ogy meetings, April 2-6, 2016, San Diego, California. 779.16

Hamilton, M., J. W. Finger Jr., R. M. Elsey, and T. D. Tuberville. 2016. (Abstract). Evaluating capture stress in the American alligator (*Alligator mississippiensis*): Characterizing short-term stress and immune parameters. Warnell Graduate Student Symposium, 22 January 2016.

Hamilton, M., J. W. Finger Jr., R. M. Elsey, G. F. Mastromonaco, and T. D. Tuberville. 2016. (Abstract). Using crocodilian scute tissue as a long-term integrative approach to investigating environmental stressors. Presentation at the Southeast Partners in Amphibian and Reptile Conservation annual meeting. Feb 18 – 21, 2016. Nauvoo, Alabama.

Hamilton, M., J. W. Finger Jr., R. M. Elsey, G. F. Mastromonaco, and T. D. Tuberville. 2016. Using crocodilian scute tissue as an integrative approach to investigate long-term stressors. Presentation at the 2016 Palmetto Alligator Research and Management Symposium, Clemson University, Georgetown, South Carolina. March 11, 2016.

Jensen, B., M. Elfving, R. M. Elsey, T. Wang, and D. A. Crossley II. 2016. Coronary blood flow in the anesthetized American alligator (*Alligator mississippiensis*). Comparative Biochemistry and Physiology A. (191):44-52.

Lance, V. A., A. R. Place, and R. M. Elsey. 2016. (Abstract). Surgical removal of the abdominal fat body (steatotheca) of the American alligator with observations on the effect of insulin injections. Presentation at the 24th Working Meeting of the Crocodile Specialist Group, May 2016, South Africa.

Mathevon, N., T. Aubin, V. Shacks, S. L. Bourquin, R.M. Elsey, J. G. Acosta. 2016. (Abstract). The code size: Behavioral response of crocodile mothers to offspring calls depends on the emitter's size, not on its species identity. Presentation at the 24th Working Meeting of the Crocodile Specialist Group, May 2016, South Africa.

Membreno, N., R.M. Elsey, and T. Owerkowicz. 2016. (Abstract). Effect of embryonic calcium constraint on post-hatching growth and bone microstructure in the American alligator (*Alligator mississippiensis*). Presentation at the International Congress of Vertebrate Morphology, Bethesda, Maryland 24 June - 3 July 2016.

Tate, K. B., T. Rhen, J. Eme, Z. F. Kohl, J. Crossley, R. M. Elsey, and D. A. Crossley II. 2016. Periods of cardiovascular susceptibility to hypoxia in embryonic American alligator (*Alligator mississippiensis*). American Journal of Physiology. 310:R1267-R1278.

One staff member is serving on two graduate student committees; we also have several manuscripts currently in press or in review; and we serve as manuscript reviewers for multiple scientific journals and review numerous manuscripts each year.

Our research efforts 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. Our biological staff constructed a cover/awning to the semi-repaired holding tanks, which has helped. Initial work done to supply adequate heat to holding tanks was completed in spring 2009 and minor repairs continued this fiscal year. Frequent water lines breaks occur and holding tanks leak continuously; and temperature control is sporadic and inconsistent. We met several times again this year to discuss schematic drawings for a new lab and holding facility; budgetary issues have limited progress thus far. Construction of the new laboratory building and improved alligator holding facilities will aid our research progress in the future.

ALLIGATOR ADVISORY COUNCIL

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, and develops markets for sustainable Louisiana products.

The council has continued to monitor California legislative bill AB2075 and public opinion related to animal use. 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. California has historically been a strong pro-animal rights state. The Council continues to discuss the importance of

exempting alligators from the anti-wildlife trade laws with the bill sponsor, Luis Alejo. The goal is to eventually remove the sunset clause and to maintain a permanent exemption status in California for crocodilians legally traded under CITES regulations.

The council worked with the World Organization for Animal Health to include the humane harvest guidelines for alligators into the World Organization for Animal Health guidelines. The Input from Louisiana through LSU veterinarians and the American Veterinary Medical Association was included on the Expert Panel on the Humane Killing of Reptiles and was sent for peer review by the Swiss Chaired Panel.

The council's participation in CITES, CGS and IACTS monitoring continues to provide a strong foundation for sustainable international trade.

At the last two CSG Steering Committee meetings, it was decided to prepare a Best Management Practices Guideline for the crocodilian trade. This is a much needed pro-active industry initiative.

The Alligator Advisory Council worked with the LSU School of Human Ecology to promote the use of lower grade alligator skins. LSU student garments were showcased at the Marsh on the Catwalk Alligator Competition in May 2016. Students from the Beijing Institute of Fashion Technology also worked with grade-3 alligator leather and showcased their products at the Beijing Fashion Week. The council has worked to develop a long-term collaboration to establish an alligator skin product design studio in Beijing to promote Louisiana alligator skins.

HUNTER AND AQUATIC EDUCATION

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

Staffing for the Education Program consists of 12 educators who work in the field, three supervisors who have field responsibility in addition to their supervisory duties, one hunting heritage coordinator, one administrative specialist, one education manager, and one education program manager. The Archery in Louisiana Schools (ALAS) program has one supervisor, one regional coordinator and two part time employees. 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 bowhunter education classes cover firearm safety and operation, hunter ethics, principles of wildlife management, outdoor survival, and treestand 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 mandato-

ry 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 1,600 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 2015-2016, 133 new volunteer instructors were trained through 14 instructor courses. A volunteer instructor workshop was held at Camp Grant Walker in Pollock, La., with 140 instructors in attendance. Service and performance awards were presented to volunteer instructors. The time volunteered by hunter education instructors, volunteer range officers and ALAS 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 2015-2016, vol-

unteers contributed 31,104 hours of service time.

STUDENT CERTIFICATION

Total hunter education certifications declined slightly from last fiscal year (15,057 in FY 2014-2015). The online/field day course continues to increase in popularity as the number and proportion of students choosing this option increased in FY 2015-2016 (3,915 students for 26 percent in FY 2014-2015). Demand for bowhunter education remains low as this requirement is no longer mandatory to hunt with archery equipment on national wildlife refuges in Louisiana. Certification details are as follows:

HUNTER EDUCATION

Hunter Education			
Course Type	# Courses	# Students	Percentile
Classroom Course	326	10,584	73%
Home Study/ Field Day	139	3,960	27%
Total	465	14,544	

BOWHUNTER EDUCATION

Five bowhunter education classes were offered, with 48 students certified.

HUNTING INCIDENTS

During FY 2015-2016, there were 15 reported hunting incidents involving injury or death. One of the 15 resulted in fatality. Six of the incidents (including the fatality) involved falls from an elevated stand. 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 treestand safety in their hunter education classes and field days.

Primary causes for these incidents were as follows:

Hunting Incidents (FY 2015-2016)	
Type	# Victims
Shooter Swinging on Game	3
Careless Handling of Firearm	2
Failure to Use a Fall Restraint Device	2
Victim Out of Sight of Shooter	1
Failure to Check Beyond Target	2
Fall While Climbing in/out of Position	4
Shooter Stumbled & Fell	1
Total Incidents	15

SHOOTING RANGE/ TRAINING FACILITIES

Two education centers and four shooting ranges are available to the public and managed by the LDWF Education Program.

BODCAU SHOOTING RANGE

This range is located in Bossier Parish on the Bodcau WMA. Accommodations for public use include 25 shooting points on the rifle/handgun range and a shotgun range with four manual and one remote controlled clay target thrower. The range is open to the public three days a week and is staffed by one technician.

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. The range is staffed by one wildlife technician and a part-time range officer with assistance provided by the manager.

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 operated by one technician and is open to the public seven days per week.

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. The facility is staffed by one manager and one technician.

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. (SELS). SELS is a non-profit organization staffed by volunteers that maintains and operates the range for public use. Shotgun, rifle and handgun shooting opportunities are available to the public. The range is open to the public three days per week. There is a \$6 per day fee to use the range that is collected by SELS. Some of the SELS volunteers also serve as hunter education instructors and offer hunter education courses at the range.

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. Aquatic education programs are delivered by Education Program staff and volunteers. During FY 2015-2016, volunteer aquatic education volunteers provided 9,708 hours of service which was used as in-kind match for the aquatic education federal grant.

FISHING CLINICS

Seventy-six aquatic education clinics were held across the state, with 6,378 people participating. Subjects covered in aquatic education

clinics include outdoor ethics, fish identification, tackle selection, casting and fishing techniques. Participants also had an opportunity to go fishing. A week-long fishing day camp for youth aged 10-15 was held for the fourth time at the Woodworth Outdoor Education Center. Twenty youths participated and learned about fishing techniques, fish identification, fish cleaning, boating basics and aquatic ecology.

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" - 8,800 distributed
- "Let's Go Fishing" - 7,093 distributed
- "Finnie the Fingerling" - 6,199 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 school and high school students. The goal of the Native Fish in the Classroom project is to develop an 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. Teachers then participated in the spring paddlefish spawn where they received paddlefish eggs to hatch and raise in their classrooms. The paddlefish fingerlings were then returned to the LDWF Booker Fowler Fish Hatchery. Schools brought students on a field trip to the hatchery to return their classroom raised fish. The hatchery then released the student-raised paddlefish into suitable aquatic habitats. During the 2015-2016 school year, 23 teachers and 2,100 students participated in the Native Fish in the Classroom project.

GENERAL WILDLIFE EDUCATION AND OUTDOOR SKILL DEVELOPMENT

Education Program staff are involved in a variety of activities beyond hunter and aquatic education. 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, fishing and the shooting sports. In recognition that funding and support for conservation is directly linked hunters, fishers 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 shooting and fishing equipment. Four LDWF-sponsored events were held at the following locations: Bodcau WMA, Monroe Field Office, Woodworth Outdoor Education Center and Waddill Outdoor Education Center and Refuge.

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 2015-2016 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 through a weekend of staff-led outdoor activities. Family members are introduced to archery, rifle and shotgun shooting, kayaking, fishing and camping. The education staff participated in two FUN Camps during FY 2015-2016. One camp was Mother/Child and the other was Father/Child.

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. One-hundred-sixty-four schools are currently participating in the program impacting an estimated 19,680 students. Two regional and one

state tournament were held in FY 2015-2016. A 3-D competition was added to the state tournament format for the first time this fiscal year. Forty-four schools participated in the regionals and 37 of those participated in the state tournament. Total tournament participation was 1,916 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 six 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.

LOUISIANA HUNTING HERITAGE PROGRAM

The Louisiana Hunting Heritage Program is a program to recruit and develop new hunters by matching individuals who want to learn to hunt (apprentices) with experienced hunters (mentors). Many individuals have an interest in hunting but lack the social network to become involved. Once accepted in the program a pairing is made of an apprentice with a mentor who agrees to take the apprentice under their guidance. Since the program began 128 apprentices and 44 mentors have signed up, with seven new pairings being made for FY 2015-2016.



LEFT: 2016 ALAS State Tournament held in Alexandria, La. **RIGHT:** 2015 National Hunting and Fishing Day in Woodworth, La.

ENVIRONMENTAL EDUCATION

The primary objective of the Environmental Education Section is to provide current, accurate information and resources to PK-16 educators and students in the state. This section, consisting of two full time and one part time staff member, acts on behalf of the governor-appointed Louisiana Environmental Education Commission (LEEC) and acts under the legal authority and funding granted in R.S. 30:2503 et seq. This section also received \$124,500 in FY 2015-2016 from outside funding sources (NOAA and Alcoa Foundation grants, plus smaller donations) to support current programming. In FY 2015-2016 the Environmental Education Section administered six primary programs: Grants; Green Schools; Professional Development; State Conference; Environmental Awareness Contest; and Outreach.

GRANTS PROGRAM

The LEEC Grants Program supports curriculum based on sound scientific principles, having an environmental focus, and impacting Louisiana students, educators or Louisiana issues. Teachers, university students and informal educators apply for these competitive mini-grants ranging from \$1000 - \$5000. Environmental Education staff solicits assistance from professionals in the greater science community to review and score the grants in a competitive, anonymous award process. Staff then monitors the grants and provides technical guidance and oversight as needed. Posters submitted by research students to various symposia are also monitored.

EDUCATOR GRANTS

Six Louisiana teachers implemented LEEC Educator grants during FY 2015-2016, impacting 1,597 K-12 students. Programs implemented included the establishment of a butterfly garden and an outdoor classroom, composting of cafeteria waste, wind turbines in the classroom, wetlands investigation, and stewardship initiatives.

Educator grants were awarded to eight PK-12 schools in Louisiana this year to support class-



KIPP Central City Primary School implements their Green School Grant.

room science programs directly impacting students. Supported projects included the development of outdoor classrooms, schoolyard gardens, a composting station, an aquaponics program, recycling programs, desktop ponds, a butterfly garden, an LSU Coastal Roots program, a digital media program, and 4-H program experiences. Recipient teachers estimate that over 1,080 students will be impacted by these programs in the current school year.

GREEN SCHOOL GRANTS

Green School grants support school-wide initiatives that fall under the broad categories of reducing environmental impacts and costs, improving student and staff health and wellness, and providing effective environmental and sustainability education. Four grants were awarded during FY 2014-2015 and completed implementation during the 2015-2016 school year. Approximately 1,614 students were impacted by these grants and project topics included water literacy, recycling and soil studies.

Three grants were awarded in the spring of 2016 for implementation in the current school year. Approximately 2,200 students will be impacted by the projects that these grants

support. This year's school grantees are using their funds to implement recycling and waste reduction projects and curricula, install school gardens and outdoor classrooms, and provide water quality testing and watershed and wetland modeling to students.

PROFESSIONAL DEVELOPMENT GRANTS

Three nonprofit organizations received funding to support professional development of teachers in the current school year. BTNEP received funding for a seven-hour workshop for 20 educators who will receive information and training on Louisiana wetlands. Sci-Port Discovery Center received funding in support of a six-hour workshop to train approximately 12 teachers on the importance of watersheds, wetlands and water quality. The Academic Distinction Fund, awarded in both 2015 and 2016, use their grant monies for the ongoing professional development of preschool teachers in the Baton Rouge area. Eighteen teachers received continuing education in FY 2015-2016 and 20 more plan to receive similar training in FY 2016-2017.

UNIVERSITY RESEARCH GRANTS

Nine university students attending Tulane, Southeastern or LSU and pursuing their Masters or PhD conducted research supported by LEEC grants during FY 2015-2016. The research topics pursued included:

- The role of fungi, nutrient availability and competition in wetland plant invasions
- Spatial and temporal trends in a freshwater wetland seed bank
- Assessing the impact of flooding and nutrients on three wetland plant species found along the Louisiana Gulf Coast
- The effects of predation on disease transmission in soybean loopers (*Pseudoplusia includens*)
- Effects of ocean acidification on intermolt duration and growth of the juvenile blue crab in the Northern Gulf of Mexico

- Different forms of density dependent dispersal and their effects on population dynamics
- Assessment of wetlands on the Louisiana coast using baseline microbial community structure and developing microbial indices
- Effect of spatial pattern of a dominant competitor on community assembly processes
- Assessment of stable isotopes of dissolved oxygen and dissolved inorganic carbon in Catahoula Lake

Six grants were awarded in FY 2015-2016 to university students in support of their Masters or PhD research. All of the current grantees attend LSU. Funding supports the following research:

- Characterizing the fungi community of *Phragmites australis*: geographic and genotypic variation
- Carbon Transport and transformation in the Mississippi-Atchafalaya Rivers
- The effects of predation on disease transmission in the soybean looper
- Life history traits of native insects *Ischnodemus falcatus* and *Prokelisia marginata*
- Development of spatial patterns in dominant bunchgrasses at a pine savanna restoration site
- Assessing sediment availability in the lowermost Mississippi River for Louisiana coastal restoration.

Research students are required to share their findings with PK-12 educators at the Louisiana Environmental Education Symposium.

GREEN SCHOOLS

The Louisiana Green Schools program supports schools seeking to reduce their environmental impacts and costs, improve student and staff health and wellness, and provide effective environmental and sustainability education. The program's goals are achieved through administering of Green School Grants (as outlined above), providing professional development and outreach, and by administering the U.S. Department of Education Green Ribbon School Award for the state in partnership with the Louisiana Department of Education.

PROFESSIONAL DEVELOPMENT AND OUTREACH

The Green Schools coordinator provides program information and technical assistance to educators, school administrators and custodial staff through field visits, phone calls and emails. The Green Schools coordina-

tor also presented a session on the topic of green schools at the joint Louisiana Science Teachers Association/Louisiana Association of Teachers of Mathematics conference, hosted a workshop with support from Aramark on the educational achievement impacts of green schools, and facilitated a roundtable discussion at the U.S. Green Building Council, Louisiana Chapter's FORWARD event in New Orleans. The Green Schools coordinator also serves as a resource for students, and was requested to become a green school mentor for Westdale Heights Academic Magnet school as they participated in an environmental challenge (which they subsequently won) and as an evaluator for student senior projects at Patrick F. Taylor High School in New Orleans.

GREEN RIBBON SCHOOL AWARDS

The U.S. Department of Education Green Ribbon School award is a national program that recognizes schools that have made significant contributions to improving their environmental sustainability. This award is a mechanism to not only share these schools' achievements, but to communicate the best practices and programs that can be replicated at other school sites. Louisiana Green Schools and the Louisiana Department of Education submitted five schools for consideration, of which four were confirmed as Green Ribbon Schools by the U.S. Department of Education. The awarded schools include Baton Rouge Magnet High School, Benjamin Franklin High School (New Orleans), University of Louisiana at Lafayette, and Westdale Heights Academic Magnet School (Baton Rouge). A total of 2,823 K-12 students and 17,508 collegiate students were impacted by this program. Additionally, delegates from the U.S. Department of Education Green Ribbon School awardees were invited to Washington D.C. for an awards ceremony.

PROFESSIONAL DEVELOPMENT AND CURRICULUM

WATERSHED WEBS

LDWF's Environmental Education staff secured a \$90,000 NOAA grant to administer Watershed Webs, which is a two-year program aimed at educating teachers and students about watersheds and the impacts of trash in our waterways. This program includes the development of the Watershed Experience Tracker app, development of classroom curriculum, teacher workshops, and student field experiences.

1. DEVELOPMENT OF WATERSHED EXPERIENCE TRACKER (WET) PORTAL

Environmental Education staff envisioned a method for tracking trash collected in waterways so that data could be used by schools up- and downstream. This tracking method would help students grasp the concept of watersheds and how our local actions have regional impacts. LDWF Environmental Education and GIS staff therefore developed the WET app, which could be populated with this data and used by schools throughout the Gulf region. It was tested extensively and adjustments made accordingly prior to release. Parameters were developed to best fit collection data and the app was populated with existing information from prior workshops for reference. Parameters included in the final version are: location data, images and the number of pieces of plastic, metal, foam, paper, fishing gear and miscellaneous materials collected at teacher workshop beach cleanups and student field experience cleanups in the schools' communities.

2. DEVELOPMENT OF CLASSROOM LESSONS

Environmental Education staff worked with LSU and University of New Orleans contractors to develop classroom lessons to complement the information to be presented at the teacher workshops. The Mapping Watershed Debris lesson allows users to use online mapping tools to explore their watersheds and trace the potential routes of pollutants from their source in a watershed to the Gulf of Mexico. "How Long Does it Last?" encourages students to make predictions on how long an item will remain in the environment before degrading. Data Collection of Debris uses standardized field methods to collect debris data from a waterway sweep stewardship activity. Students learn to scientifically collect data using various quantification techniques.

3. FACILITATION OF PROFESSIONAL DEVELOPMENT WATERSHEDS WORKSHOPS

Environmental Education staff facilitated a four-day professional development workshop for middle and high school teachers in June 2016. Fourteen teachers from coastal communities within the Gulf States (Texas, Louisiana, Mississippi, Alabama and Florida) each received 32 professional development contact hours for their participation. The workshop was held at Rockefeller Refuge, where teach-



Watershed Webs Educator four-day Workshop at Rockefeller Refuge.

ers participated in four days of activities, lessons, labs and a beach sweep held on a remote section of the refuge. Participants were given a rare chance to see just how much trash collects on a beach that the public does not have access to; helping them to understand that as much as 80 percent of the trash found in our oceans actually originates from land sources and waterways. Teachers were also trained in how to conduct water quality testing and received over \$300 worth of equipment and materials for their classrooms. Per this grant, participating teachers are also eligible to receive up to \$700 in tiered stipends to encourage classroom engagement and implementation.

A one-day version of Watershed Webs was also held in conjunction with the 2016 Environmental Education State Symposium. This workshop took place at LDWF headquarters because of its proximity to Dawson Creek, an urban waterway running through the heart of Baton Rouge. Fourteen teachers were in attendance and each earned seven professional contact hours.

4. FACILITATION OF STUDENT FIELD EXPERIENCES

Teachers participating in Watershed Webs qualify to have a similar one-day field experience conducted with their students in grades 5-12. Environmental Education staff will travel to the schools' communities to help facilitate the field experiences. These field experiences will be held during the 2016-2017 school year.

TEACHER LEADER SUMMIT

Environmental Education staff was invited by Louisiana Department of Education to submit proposals for the Louisiana Teacher-Leader Summit, which is attended by approximately 4,000 educators. Environmental Education

staff presented information on online mapping curricula using the WET portal and a lesson from endangered species outreach about whooping cranes. Additionally, Environmental Education staff presented information about green schools, and information and a lesson on how to conduct an energy audit.

DISCOVERING BIODIVERSITY

Developed by LDWF's Environmental Education and Outreach staff and funded by Alcoa Foundation, this workshop featured threatened and endangered Louisiana animals, plants and habitat types. LDWF biologists joined Environmental Education staff members in presenting a variety of hands-on lessons, including birdwatching, plant identification and specimen preparation, insect inventory, and red-cockaded woodpecker information. Attendees received eight hours of instruction, over \$100 worth of equipment and materials for their classroom, and a binder of Louisiana-specific lesson plans and activities designed to educate their students about the unique habitats and wildlife present in the Bayou State.

STATE CONFERENCE

Environmental Education staff organizes and facilitates the annual Louisiana Environmental Education State Symposium, which is the premier state conference for formal and non-formal environmental educators, science teachers, pre-teachers and government staff working in complementary fields. This professional development opportunity for educators stimulates new classroom ideas and techniques, provides an opportunity for educators to network, and offers additional information on other professional development and classroom opportunities. The 2016 theme was "Exploring the Natural World," creating a

focus on ways to encourage students to engage in their natural environment. This two day event, with 225 educators in attendance, included day-long short courses, concurrent sessions, exhibits and keynote address.

SHORT COURSES

Five optional short courses were offered to participants. Leading Preschoolers in Exploration was led by Dr. Brenda Nixon, Co-Director of the Gordon A. Cain Center for Science, Technology, Engineering and Mathematics Literacy at LSU, and was held at Bluebonnet Swamp Nature Center. LDWF Green Schools Coordinator Brian Gautreau led the Green Schools Tour, which toured two Baton Rouge schools that were nominated (and subsequently awarded) the Green Ribbon School Award from the U.S. Department of Education as well as LSU's Cypress Hall, which has been built to LEED standards. Watershed Webs was co-facilitated by Dinah Maygarden, University of New Orleans Pontchartrain Institute for Environmental Sciences Coastal Education Program Educator, and Thomas Gresham, LDWF Environmental Education Assistant Coordinator. Discovering Biodiversity was led by LDWF Threatened and Endangered Species Outreach Coordinator Carrie Salyers and held at Waddill Outdoor Education Center. LUMCON Senior Marine Educator Murt Conover facilitated Ocean Exploration at the conference hotel.

CONCURRENT SESSIONS

Twenty-four 50-minute concurrent sessions demonstrating hands-on activities, exemplary programs and lesson demonstrations were offered to pre-K through college level educators. A wide variety of topics were covered: wetlands and coastal issues, identifying skulls, animal adaptations, thermal systems,



LEFT: Louisiana Environmental Education State Symposium. **RIGHT:** Art and Language Arts Contest winner from the Magnet Academy of Cultural Arts in Opelousas



food webs, teaching with interactive maps, grant writing, the value of bees and butterflies, invasive species, sustainability, student leadership, fisheries science, water quality, composting, watersheds, toxicology, and data-driven decision making. The post-event evaluations scored excellent (4.8/5.0) overall.

EXHIBIT HALL

Twenty exhibitors provided informational displays throughout the event in the exhibit hall. Eight university students attended and displayed research posters during the Friday evening poster session. Nine Bayou Builders Robotics Team members from Oaks Montessori School, along with their teacher/mentor, exhibited a robotics project in the exhibit hall on Saturday. Environmental Education staff also arranged for an educational scavenger hunt activity to encourage attendee interaction with the exhibitors.

KEYNOTE PROGRAM

Environmental Education staff arranged for C.C. Lockwood, photographer and author of international acclaim, to deliver the keynote address. The new Green Ribbon Schools recognitions program was also held during the event to honor the five Louisiana awardees who were nominated for the U.S. Department of Education Green Ribbon Schools awards. Jill Cowart, Louisiana Department of Education Science representative, presented the awards.

ENVIRONMENTAL AWARENESS CONTEST

In the fall of 2015, LEEC announced its 14th Annual Environmental Awareness Student Art

and Language Arts Contest. Open to public, private and homeschool students around the state from ages 5-18, the art and language arts contest invites applicants to submit paintings, drawings, poetry, fictional stories, and non-fiction accounts based on an environmental theme chosen by the commission. The 2016 theme was Exploring the Natural World. First, second and third place winners received cash prizes in the amounts of \$200, \$100 and \$75, respectively, at an awards reception at the Louisiana Governor's Mansion in June 2016. In addition, each entry that placed in the prior year was featured in the 2016 Louisiana Environmental Education Calendar. First place art winners' artwork was featured on billboards in their communities and language arts winners were featured in their local newspapers. About 500 students from 24 parishes around the state (Figure 1) submitted entries. This event was sponsored by a \$20,000 grant from the Alcoa Foundation.

FIGURE 1. Louisiana's 14th Environmental Awareness Student Art & Language Arts Contest. (2016 Theme: Exploring the Natural World)



OUTREACH

EXHIBITS

Environmental Education staff exhibit at various events to disseminate environmental education information and current programming. Exhibit venues in FY 2015-2016 included: Louisiana Science Teachers Association/Louisiana Teachers of Mathematics State Conference, Keep Louisiana Beautiful Conference, Ocean Commotion, Louisiana Earth Day, Archery in Louisiana Schools Championship, and National Hunting and Fishing Day.

ELECTRONIC DISSEMINATION

The Environmental Education Section published 45 electronic newsletters and bulletins to the LDWF website in FY 2015-2016. The newsletter promotes Louisiana Environmental Education programs and environmental news, professional development opportunities, grants and student competitions. The newsletters were distributed to more than 1,300 formal, non-formal and informal environmental educators from Louisiana and surrounding states.

WEBPAGE

A current, informative webpage benefitting educators and the general public is maintained on the LDWF website. Applicable educational resource links, grants information, and current programs are highlighted. The website is updated regularly to provide up-to-date information on programs, events and resources.

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. In FY 2015-2016 the Habitat Section was comprised of the four following programs: Statewide Environmental Investigations; Louisiana Natural and Scenic Rivers Program; Permits Coordination; and Seismic Section.

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 received, reviewed and provided comments to 1,336 state and federal permit applications during FY 2015-2016. It was determined that compensatory mitigation was required on approximately 28 percent of the 1,336 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.

As seen in the past several years, 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 for-

mations. 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.

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 2015-2016, staff conducted 203 on-site field inspections and participated in 114 meetings with applicants, agents and regulatory agency personnel. Staff gave two presentations to nongovernmental organizations and citizens and coordinated a technical workshop aimed at providing regulators a deeper understanding of fire dependent habitats.

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 2015-2016, staff evaluated, inspected and provided technical comments and recommendations on dozens of wetlands mitigation banking proposals, mitigation banking instruments and mitigation banking monitoring plans. A total of six wetland mitigation banks were approved and authorized in Louisiana during FY 2015-2016, totaling over 960 acres statewide. Staff attended all Interagency Review Team meetings and nearly all of the site investigations.

Staff continued to provide technical assistance to USACE related to levee refurbishment, planning of improved hurricane protection systems, and identification of suitable compensatory mitigation to offset implementation of such systems.

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 52 water bottom assessments reviewed and approved by agency staff during FY 2015-2016.

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; Housing and Urban Development; Louisiana Department of Transportation and Development; LDNR; LDEQ; the Louisiana Department of Culture, Recreation and Tourism; Louisiana National Guard; and the Louisiana Division of Administration, Office of Community Development.

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 2015-2016 to receive reports on progress of implementing the recommendations of the initial plan. As the commission continues its work, our role will be to ensure that the conservation of fish, wildlife and their supporting habitats are an important consideration when making water management decisions.

LANDSCAPE CONSERVATION COOPERATIVES

We have continued to commit time and resources to participating in the Gulf Coast Prairie LCC. The LCC, comprised of state and federal agencies, universities and non-gov-



FIGURE 1. Gulf Coast Prairie Landscape Conservation Cooperative map.

ernmental organizations, is charged with providing the best available science as the foundation in delivering a coordinated approach to meeting conservation needs across the Gulf Coast Prairie LCC landscape (Figure 1). LDWF participates as both a Steering Committee member and Science Team member. This past year the LCC funded several priority research projects, developed an LCC Operations Plan, and continued Landscape Conservation Design efforts for the tallgrass prairie and Edwards Plateau to the Gulf of Mexico.

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 2015-2016 we replied to a total of 1,502 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 2015-2016. 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. The website and forms continue to be updated and modernized.

Staff has continued work on the SWG project which funded the development of several Scenic Rivers Management Plans.

Each Scenic River Management Plan aims to accomplish the following:

- Identify important features to be protected and preserved.
- Identify potential issues, problems and needs that impact the river.
- Recommend measures for enhancement and reclamation of resources.

- Set forth management goals for the preservation of the river.
- Provide for continuing public involvement.

Several enforcement actions were initiated in FY 2015-2016. These included issuance of four Compliance Orders and the forwarding of 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 Rivers staff also coordinated more closely with LDEQ, to address some of the construction site stormwater issues impacting several system streams. We initiated joint site inspections with LDEQ Water Quality staff, bringing their expertise to bear.

During surveys, Scenic River staff continued efforts to document derelict vessels, attempt to locate responsible parties and have the vessels removed by whichever means prudent. Staff also began conducting outreach, attempting to notify houseboat owners of recently amended Scenic River regulations pertaining to the mooring of houseboats on system streams. On the West Pearl alone, staff reached out to 80 houseboat owners. We also spoke at a town hall meeting and fielded countless questions and concerns over the weeks and months that followed.

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. In efforts to promote recreational use of several system streams, staff joined the St. Tammany Blueway Committee, working closely with the National Park Service, non-governmental organizations and local governments to establish a paddling trail encompassing segments of the Abita, Tchefuncte and Bogue Falaya rivers.

A total of 33 Scenic River Permits were issued during FY 2015-2016. During that period an additional three applications were withdrawn. In addition to considering permits, Scenic Riv-



One of 80 houseboats staff inspected during our West Pearl River outreach. Like this vessel, many were suspected to be abandoned or derelict.

ers staff made 36 determinations of “no permit required” for activities undertaken near scenic rivers but with no potential to significantly degrade the ecological integrity of a scenic river. The coordinator and staff conducted numerous site visits and field investigations statewide, surveying approximately 275 stream miles, with a large portion of the sections 114 meetings being 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 2015-2016, the permits coordinator received, processed, tracked and disseminated responses to 1,336 permit notices.

SEISMIC SECTION

The LDWF Seismic Section was created in 1939 specifically to protect fish, oysters, shrimp, wildlife and other areas of concern from the effects of seismic exploration. Seismic exploration uses energy waves to generate a profile of sub-surface reflective layers that help define potential oil and gas traps. The energy waves can be produced by explosives detonated below the ground, by air guns that emit a burst of air at the surface of water bodies, by large vibrating pads placed on the surface, or other energy sources. These projects can occur in sensitive wetlands, water bodies and upland 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 2015-2016 are:

- Monitored 10 seismic projects throughout the state.
- Four public meeting was conducted to inform landowners and user groups of seismic surveys beginning in there area.
- Six meetings with seismic survey companies were held to better minimize impacts to fish and wildlife resources.
- 145 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.

LONG-TERM MONITORING OF MC 252 IMPACTS

Following the declared end of all “active” 2010 *Deepwater Horizon* oil spill response, due to remaining State concerns regarding residual oiling within sensitive habitats, Louisiana negotiated a continued monitoring and treatment agreement with BP Exploration and Production. A member of the Habitat Section staff familiar with the 2010 *Deepwater Horizon* oil spill response was selected to coordinate the state’s efforts. Working closely with the Louisiana Oil Spill Coordinator’s Office, CPRA, LDEQ and LDNR, we developed sampling protocols, reporting templates, mitigation guidance, standard operating procedures and best management practices for the effort. As the second year of monitoring approached, working with the Louisiana core group (including representatives from CPRA, Louisiana Oil Spill Coordinator’s Office and LDEQ), staff successfully defended the continued monitoring of 43 impacted shoreline segments. We coordinated the final two rounds of monitoring during the latter half of 2015 (The first occurring In August 2015 and the final in late September 2015 through early October 2015), seeing the MC 252 monitoring through to its end. Throughout the monitoring effort, the Habitat Section ensured that LDWF properties and other sensitive habitats containing residual *Deepwater Horizon* oiling received continued monitoring and we pursued treatment when appropriate.

MINERALS MANAGEMENT

The Minerals Management Program, hereafter called Mineral Program, is responsible for ensuring that mineral activities on all LDWF properties are compatible with the environment, and that WMA/refuge goals and objectives are met. Mineral Program staff reviewed and evaluated 44 well locations, pipeline projects and other mineral exploration related permits on LDWF properties. The program also issued 12 rights-of-way, surface leases, surface/subsurface leases and three mineral leases were allowed on LDWF properties during FY 2015-2016. All of these projects are reviewed and coordinated with field personnel to ensure that they are compatible with LDWF management area programs.

In FY 2015-2016 the Mineral Program continued to generate significant revenues for LDWF, which includes mineral royalties, rights-of-way, surface leases and seismic fees. In addition, the Mineral Program staff issued 73 airboat/marsh buggy permits for various activities on LDWF properties. 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. The Mineral Program continued to ensure regulatory compliance and coordinate credit sales for LDWF's two wetland mitigation banks located on Rockefeller Wildlife Refuge and Boeuf WMA. The Mineral Program also represented LDWF at each monthly meeting of the State Mineral and Energy Board.

In addition to the above mentioned duties, the Mineral Program has continued to administer LDWF's Dredge Fill Program. This program issues approximately 75 to 100 dredge licenses annually, generating approximately \$1 million in annual revenue. This past fiscal year commercial dredge fill pits were inspected to ensure operator compliance with program regulations.

The Mineral Program also applied for and received five USACE permits which authorized LDWF to undertake management actions on LDWF properties.



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 others 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.

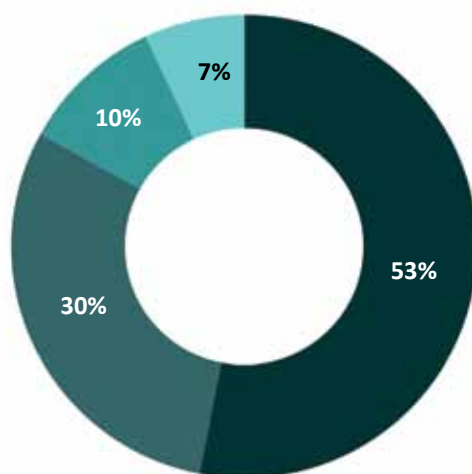
ORGANIZATION

The Office of Fisheries structure is comprised of the following sections:

- Marine Fisheries - to manage the marine (saltwater) fisheries resources of the state.
- Inland Fisheries - to manage the inland (freshwater) fisheries resources of the state.
- Fisheries Management - to provide technical and scientific research in support of fisheries management.
- Fisheries Oversight - to provide guidance and assistance to Louisiana's valuable commercial fishing industries.
- Fisheries Extension – to provide fishery management information to the recreational fishing sector through hatcheries, improved fishing and boating access, aquatic outreach and volunteer activities.

FISHERIES FUNDING

**FISHERIES FUNDING SOURCES
(APPROPRIATED FUNDING)**



- Statutory Deductions - \$36,394,230
- Federal Funds - \$20,841,964
- Interagency Transfer - \$6,994,271
- Self-Generated Funds - \$4,677,309

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, marine fisheries monitoring and research 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, research related to species utilizing artificial reef structures, operations of the Artificial Reef Program, and other research and monitoring needs of the department.

Federal funds used by LDWF come from various federal entities, such as the U.S. Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration (NOAA) and Gulf States Marine Fisheries

Commission (GSMFC). Funds from USFWS are primarily from federal assistance in 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 collected offshore fisheries independent data and commercial fisheries dependent data. The funds from GSMFC 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 freshwater diversions, 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 projects include fisheries monitoring following the 2010 *Deep-water Horizon* oil spill and funding for marine mammal stranding response and mapping.

ONGOING MONITORING OF 2010 DEEPWATER HORIZON OIL SPILL

MARINE MAMMAL AND SEA TURTLE PROGRAM

The LDWF Marine Mammal and Sea Turtle Stranding and Rescue Program is the lead marine mammal and sea turtle stranding and rescue response organization in Louisiana. The Office of Fisheries continues to receive and investigate all reports of live and dead marine mammals and sea turtles. Fisheries biologists work closely with our federal counterparts and staff at NOAA - National Marine Fisheries Service (NMFS) and USFWS to investigate the cause of strandings and deaths, following established protocols for consistency in data collection to provide standard and accurate data. Until the settlement agreement regarding the 2010 *Deepwater Horizon* oil spill Incident being reached in April 2016, staff maintained all samples, carcasses and evidence under a formal Chain of Custody Form, as required by the Oil Pollution Act (33 U.S.C. § 2701 et seq.) Natural Resource Damage Assessment (NRDA) process. Following the settlement, LDWF staff are now able to dispose of carcasses via methods such as incineration following necropsies which simplifies the process. During this fiscal year, all sea turtle carcasses were recovered for a necropsy to be performed. Where logistically possible and appropriate, marine mammal carcasses are also recovered for necropsies or are necropsied in the field. LDWF has a Memorandum of Understanding with the LSU School of Veterinary Medicine: Louisiana Animal Disease Diagnostics Laboratory in which space in their new BSL-3 Laboratory is available for LDWF to utilize to perform necropsies on marine mammals, and many necropsies have been performed utilizing this state of the art facility.

The Northern Gulf of Mexico endured the longest and largest marine mammal Unusual Mortality Event in the history of the Gulf of Mexico, beginning in 2010. 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" (NOAA). LDWF received notification in May 2016 that NOAA headquarters signed off on closing the Northern Gulf of Mexico Cetacean Unusual Mortality Event following recommendation by the Unusual Mortality Event Working Group, with the modification of the start date from Feb. 1 - March

1, 2010 and official end date of July 31, 2014. LDWF staff are utilizing a more recent Post Unusual Mortality Event Monitoring Sampling Checklist that will be utilized for necropsy sampling going forward with the closure of the Northern Gulf of Mexico Cetacean Unusual Mortality Event.

In FY 2015-2016, 47 marine mammal strandings (four alive) and 87 sea turtle strandings (six alive including incidental captures) have been covered. LDWF Office of Fisheries staff continued to perform necropsies on marine mammal carcasses and completed evidence, sample and carcass transfers to NOAA for marine mammals during this period. Thirteen marine mammal necropsies have been performed by LDWF Fisheries staff. An interesting sea turtle stranding to note is a dead leatherback that was in Lake Pontchartrain which was field necropsied by LDWF in May 2016. A live sub-adult to adult sized loggerhead was found in a moon pool of a drilling ship located at Green Canyon Block 609, the animal escaped the moon pool on its own. A green sea turtle that was rescued by a member of the public in April 2015 was able to be released this year following its time undergoing rehabilitation. This turtle was rescued from Leeville behind Terry's Live Bait Shop as it was observed floating and unable to dive down on its own. On Sept. 21, 2016, this live juvenile green sea turtle was able to be returned off the coast of Louisiana. The animal received an internal PIT tag and was flipper tagged with external tags on both front flippers.

A live neonate dolphin was found stranded on Grand Isle Beach and reported by a member of the public on March 24, 2016. The public brought the animal out to deeper water a couple of times prior to reporting it to LDWF, the animal re-stranded and was reported to be exhausted. An LDWF Enforcement agent working in the area responded to the animal while Fisheries Stranding and Rescue biologists were en route, but unfortunately the animal died on site.

Another rescued live dolphin was an out of habitat animal located in a shallow water duck pond in Golden Meadow, La. It was reported to LDWF late on a Sunday evening when a duck hunter who had been hunting on his lease over the weekend first observed the animal and reported it when he returned home and back to cell phone service. LDWF Fisheries bi-

ologists and Enforcement agents responded the next morning, and after observing the animal for a bit, and following consultation with the NOAA Southeast Region Stranding coordinator, it was determined that staff should attempt to herd the animal towards the access channel. Staff had to work from the bow of one of the LDWF Enforcement Division mud boats and from the harder higher ground along the shallow water access canal due to the extremely soft muddy bottom preventing staff from being able to maintain footing and work from the water. Staff encouraged the animal to move forward through the access channel very slowly, and were to apply a Roto tag to the dorsal fin of the animal while holding it minimally from the bow of the boat just before getting into deeper water in the access canal. Once the animal got into enough water, it swam away briskly. This was a great example and a successful rescue with several entities including LDWF Enforcement agents, LDWF biologists, NOAA Southeast Region Stranding staff and the member of the public who guided us into his lease area to show us where the dolphin was located. Everyone communicated and worked together to develop a plan and adapted the plan as necessary so that this animal could be rescued. This instance was the first time that LDWF staff Roto-tagged an animal on their own following extensive exposure to doing so in association with Live Dolphin Health Assessments performed in Barataria Bay in years past.

Additionally, LDWF biologists responded to a live dolphin rescue on Grand Isle Beach Oct. 26, 2015. This live dolphin was stranded high up the beach approximately 10-15 feet from the sand dunes due to the heavy rain, high waters and strong winds associated with what was once Hurricane Patricia. The dolphin was reported by a member of the public who happened to locate the animal while going out to the beach to see how rough the conditions were associated with the storm. Staff were in 5-to-6-foot waves breaking at the beach to attempt a soft release of the animal, but the animal was not strong enough at the time. It was determined that the animal needed to be brought in for rehabilitation due to the very short window of time that was available prior to road closures associated with heavy flooding. LDWF staff assisted with watches of the animal at



Collaborative effort between Audubon Nature Institute and LDWF in sea turtle stranding response and rehabilitation.

the rehabilitation facility and worked with NOAA Southeast Region staff regarding plans for release of the animal. Following some time at rehab at Audubon Nature Institute, NOAA deemed that this animal could be conditionally released on April 28, 2015 with post release follow-up monitoring outlined by Southeast Region staff. Staff were trained by Dr. Randy Wells, Chicago Zoological Society's Sarasota Dolphin Research Program, on how to utilize the tracking gear including handheld antenna and receiver to detect beeps transmitted from the satellite tag attached to the dorsal fin of the animal. LDWF staff led by Mandy Tumlin (covered under NMFS Permit 18786), performed post-release monitoring outlined as part of the conditional release, and LDWF staff utilized vessels and 4x4 trucks along beaches to monitor and track this animal through the end of May 2016. As this was the first time that our staff were associated

with this effort, as well as the first time that a marine mammal was released along the coast of Louisiana, a tremendous amount of effort was utilized to monitor this animal as well as plan for his release. LDWF routinely communicated with Southeast Region staff regarding planning, efforts and findings and prepared summaries to send out to a larger distribution list to keep everyone posted regarding the efforts associated with tracking and monitoring.

Beginning in December 2014, LDWF partnered with researchers from the U.S. Geological Survey to initiate a long term mark recapture survey of live sea turtles in Louisiana. Capture efforts were deployed as part of this effort in December 2014, May 2015, December 2015 and May 2016. During these efforts a total of 89 turtles were captured, with 78 first-time captures and 11 recaptures. All captures were green sea turtles other than a one-time cap-

ture sub-adult loggerhead sea turtle. LDWF Office of Fisheries staff will continue to perform these field efforts working with our continued partnership with fellow sea turtle researchers at the U.S. Geological Survey. Three LDWF staff members traveled to Charleston, SC to participate in sea turtle trawling training with the South Carolina Department of Natural Resources this summer. LDWF continues to obtain training and experience for staff to continue to grow the Marine Mammal and Sea Turtle Program.

As mentioned in the Annual Report for last year, on June 29, 2015, LDWF investigated a report from a Grand Isle Beach sweeper that a sea turtle nesting crawl was discovered on Grand Isle Beach. Upon investigation working under directives from USFWS, LDWF staff confirmed a loggerhead sea turtle nest on the western end of Grand Isle Beach not far from Caminada Pass. LDWF Fisheries staff began performing nightly surveys following the discovery of "false crawls" (when a female sea turtle crawls up the beach to nest but for some reason doesn't actually lay eggs) on June 30, and discovered another sea turtle nest on the eastern end of Grand Isle in the State Park near the fishing pier on July 4, 2015. Both nests were caged to protect the eggs from any predators during the time of incubation. Following the incubation period and a period of monitoring, both nests were excavated, approved by USFWS, to determine if hatchlings emerged. Both of these loggerhead sea turtle nests were confirmed to have had successful nesting and LDWF hopes that these nesting females return to the area to build additional nests in the coming years.

LDWF plays a vital role in protecting marine mammals and sea turtles that inhabit the waters of Louisiana. These efforts are critical to monitoring marine mammals and sea turtles and mortalities along the coast of Louisiana while under enhanced sampling protocols associated with the Northern Gulf of Mexico Unusual Mortality Event, now the Post Unusual Mortality Event Sampling Checklist for marine mammals, as well as the litigation hold requirements associated with the 2010 *Deepwater Horizon* oil spill Investigation. LDWF will continue to work with research partners such as the U.S. Geological Survey, NOAA, USFWS and others to gather additional scientific data regarding these species along the Louisiana coast and to obtain any additional trainings which may aid in continued growth of the LDWF Marine Mammal and Sea Turtle Program.

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, salinity and water temperature) are collected with each biological sample, as are wind direction and speed. 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 2015-2016. In inshore waters, 289 6-foot and 1,775 16-foot trawl samples were collected. In state offshore territorial

waters, 281 20-foot trawl samples were collected. Information crucial to setting the closing dates of the 2015 spring inshore shrimp season, opening dates of the 2016 spring inshore shrimp season, opening and closing dates of the 2015 fall inshore shrimp season, and the closing and reopening of shrimping in portions of state territorial waters in 2015 and 2016 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. Over 500 square-meter samples are collected each July, and approximately 2,800 dredge samples are collected during each calendar year. In February 2014, replication for the dredge sampling program decreased from three replicate samples per station to two per station.

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.

Annual Oyster Stock Survey

The 2015 Oyster Stock Survey results indicated a 40 percent decrease in statewide oyster resource availability on the public oyster seed grounds, and stocks still remain well below the long-term average. The overall statewide oyster stock assessment for 2015 showed approximately 1.12 million barrels of oysters (seed-size and market-sized oysters combined) available.

Sustainable Oyster Shell Stock Modeling

Under contract and through collaboration with LDWF, a research team led by Dr. Tom Soniat at the University of New Orleans continued working with LDWF to test a sustainable oyster shell stock 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 2015 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 and estimated commercial harvest rates, the model estimates the amount of oyster harvest that can be allowed while preserving the reef mass. The model was tested statewide and showed promising results. It continues to be tested and strengthened utilizing updated data each year.

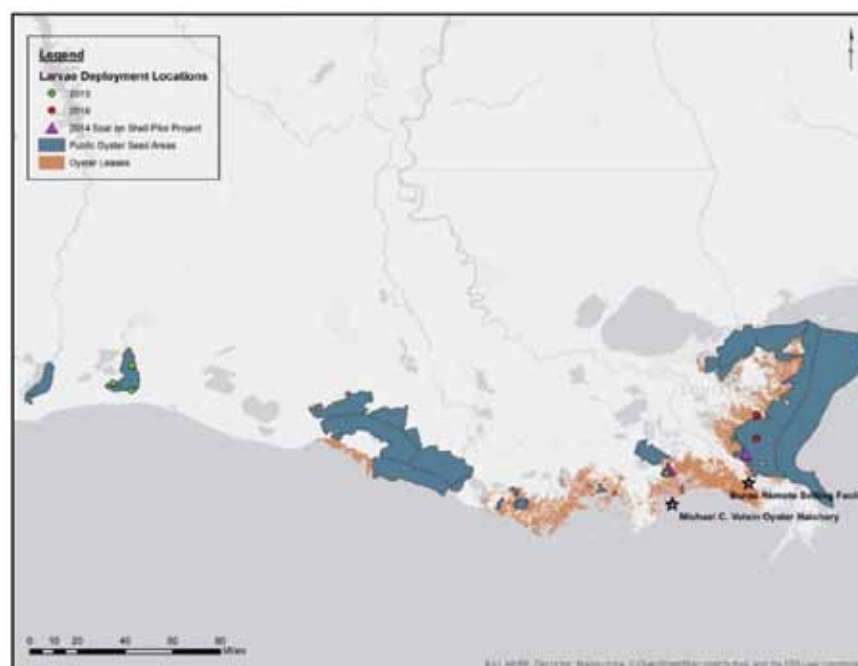


FIGURE 1. Locations of hatchery product deployments

Cultch Planting

There were no new cultch plants constructed during FY 2015-2016. Monitoring of existing cultch plants and planning for future cultch plants continues.

Oyster Hatchery and Research

LDWF has continued its involvement and collaboration with Louisiana SeaGrant at the existing oyster hatchery on Grand Isle and assisted with oyster larvae production. In 2015, approximately 184 million oyster larvae and 1.25 million seed were deployed in Calcasieu

Lake. In May 2016, approximately 162 million oyster larvae were deployed in the Breton Sound area (*Figure 1*).

Beginning in the summer of 2014, hatchery-produced, spat-on-shell deployments were performed as a remote setting pilot project to test the efficacy of building reefs using hatchery-raised spat. As larvae were produced by the hatchery, LDWF staff set competent pediveliger larvae on whole oyster shell. This spat set on whole oyster shell were deployed onto a public oyster reef and cultch plant site at Hackberry

Bay. The spat were monitored for growth and survival at month 1 and 2, and post deployment (months 6 and 12). The data are still being analyzed and compiled into a report.

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.

LDWF is working closely with Plaquemines Parish on the Remote Setting Program and is utilizing Buras Boat Harbor as the program's work site. Site improvements and the construction of work areas and the remote setting tanks are currently under way. Funding for the project comes from LDWF, Coastal Protection and Restoration Authority, and a Community Development Block Grant through Plaquemines Parish. Site construction includes a new concrete bulkhead, an oyster shell staging area, and six remote setting tanks. It is anticipated that construction will be complete by December 2016 and oyster larvae from the hatchery on Grand Isle will begin to be utilized for remote setting in Buras by the summer of 2017.



Assistant Secretary Patrick Banks preparing for square meter diving during the annual Oyster Stock Assessment.



LEFT: Spawning oysters in individual dishes, to separate males from females. When the oysters are done spawning the eggs are pooled together in an 18 liter bucket and fertilized. Once fertilized, they go into 4,500 liter hatching tanks to grow into their first larval stage. When the larvae are around 70 microns in size they are transferred to a High Density Larval Rearing System (row of white tanks to the right of the oysters) and stocked at 40 million larvae per tank. **RIGHT:** Sarah Woolley and Jenessa Kay transfer microalgae cultures into hanging bags in the Algal Production Room at the Michael C. Voisin Oyster Hatchery. Red and blue LED lights promote algal growth and survival. Approximately 1,800 liters of algae is produced daily and is used to feed millions of oyster larvae raised at the hatchery.



LDWF is also collaborating with the Coalition to Restore Coastal Louisiana to collect and stockpile oyster shell at the Buras site. Oyster shell is the material of choice for setting larval oysters. This program began during FY 2013-2014, and the coalition began delivering shell to the Buras site for storage. By June 2016, approximately 1,800 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.



LEFT: Robert Boothe conducting CPRA castnet samples. **RIGHT:** Biologist Supervisor Greg Laiche sorting fisheries independent trawl samples during shrimp “crash” trawl week.



Bill Hano, Matt Duplesis, and Jonathan Winslow electrofishing in Barataria Bay as part of a cooperative Inland and Marine Fisheries project for marsh fish species.

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 2015-2016, the fishery-independent finfish sampling program collected 936 (100 percent) gill net samples, 1,225 (100 percent) seine samples, and 271 (100 percent) trammel net samples for a 100 percent overall completion rate statewide.

FRESHWATER FINFISH SAMPLING

Freshwater fisheries resources are monitored and managed through various sampling methods. In FY 2015-2016, biologists estimated relative abundance, age, growth and mortality, size class structure, species composition, and genetics of sportfish populations in addition to physiochemical characteristics of the water on 93 lakes, rivers and streams. Sampling sites on inland lakes, reservoirs and rivers are predetermined and selected to represent available aquatic habitats within the various water bodies. Sampling protocol is standardized to the extent possible to allow for comparison of data over time.

One means of freshwater sampling is through electrofishing. Samples are collected in both spring and fall to provide a measure of population trends including abundance, size, distribution, age structure and genetic composition. A total of 522 stations were sampled for 174 hours of timed electrofishing during





LEFT: Example of a fisheries independent net sample. **RIGHT:** Female blue crab tagging study partnership with Nichols State University.



A black drum caught in fisheries independent sampling gear.

the fiscal year. Sampling included largemouth bass and crappies in the spring and fall, with fish community assemblage samples of all species also collected in the fall.

Seine samples are also taken to determine fish community relative abundance and young-of-the-year recruitment of popular sport fishes. Sixty-three seine hauls were made during the fiscal year.

Entanglement and trap net webbing are also fished in a standardized manner to collect crappies, catfishes and sunfishes. A total of 144 gill net samples were taken on various lakes and rivers, while 218 lead net and hoop net samples were fished during the fiscal year.

Special largemouth bass age, population assessment studies started or continued on 12 water bodies during FY 2015-2016, while crappie age, population assessment studies started or continued on 11 lakes. The extensive data collected for the population assessments will be used in consideration of existing and proposed harvest regulations.

Water quality data is generally collected each time a fisheries sample is collected on a waterbody. In FY 2015-2016, approximately 130 water quality stations were sampled for physical and chemical criteria including temperature, dissolved oxygen, pH, salinity and conductivity. Additionally, at least one waterbody in each district is sampled monthly for one year in order to develop stratification profiles to determine thermocline formation and position.

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 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 the Department to redefine the rules and regulations relating to the leasing of water bottoms.

Currently, there are 8,028 leases covering 403,383 acres of water bottom which accounts for 1.2 million dollars 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.

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 14,000 commercial fishermen and 6,456 seafood dealers/processors and bro-

kers 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 over 253,000 commercial fishing trips reported last year producing in excess of 183 million pounds of seafood.

Beginning in May 2000, a computerized electronic trip ticket program was developed and made available to dealers. To date, roughly 200 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.

Along with the collection of commercial landings data, LDWF also conducts trip interviews of commercial fishermen to gather detailed information about a specific fishing trip. The federally funded program focuses on species of greatest state and federal interest.

Shrimp are the state's most valuable fishery. In 2015, total shrimp landings measured approximately 97 million pounds (all species combined/heads on weight) and had a dockside value of \$121.5 million. Brown shrimp landings in 2015 measured over 41 million pounds (heads off) while white shrimp landings in 2015 measured over 64 million pounds (heads-off) weight. Although landings of both brown and white shrimp were below the 2000-2014 annual average, dockside values were considerably above annual averages (Figure 2).

Louisiana commercial blue crab landings for 2015 totaled approximately 41.4 million pounds and had a dockside value of approximately \$58.5 million (Figure 3).

Louisiana regularly leads the nation in the production of oysters and continues to account for approximately one-third of the nation's oyster landings. Among Gulf of Mexico states, Louisiana consistently ranks first in landings, accounting for over 50 percent of all oysters landed (Figure 4).

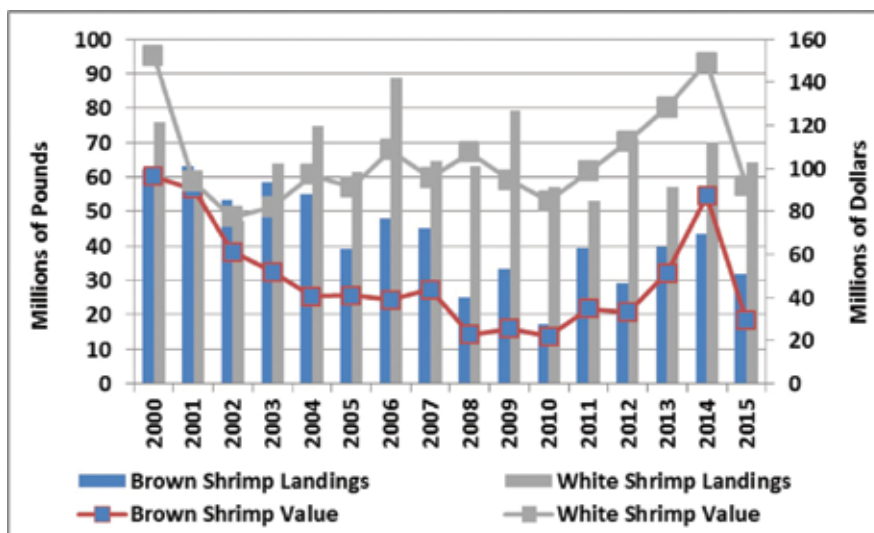


FIGURE 2. Annual white and brown shrimp landings and value (Source: LDWF trip ticket data).

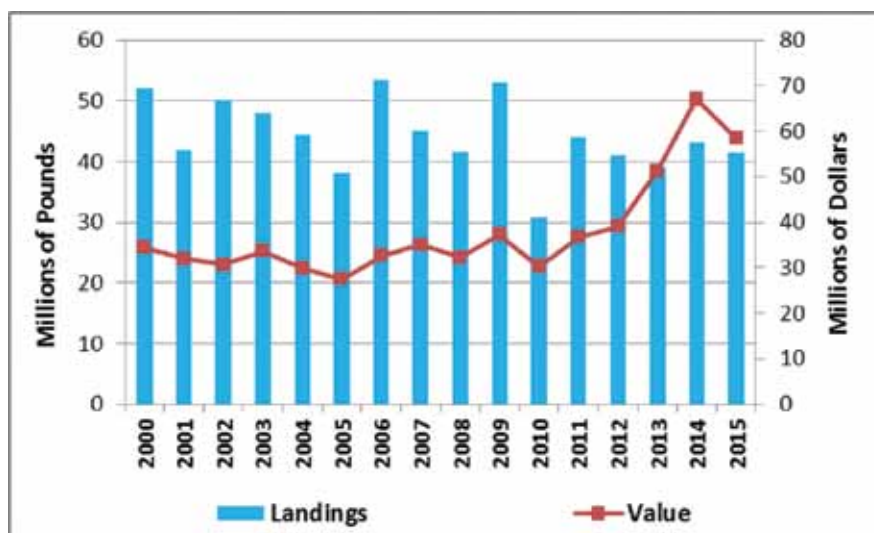


FIGURE 3. Annual blue crab dockside landings and values (source: LDWF trip ticket data).

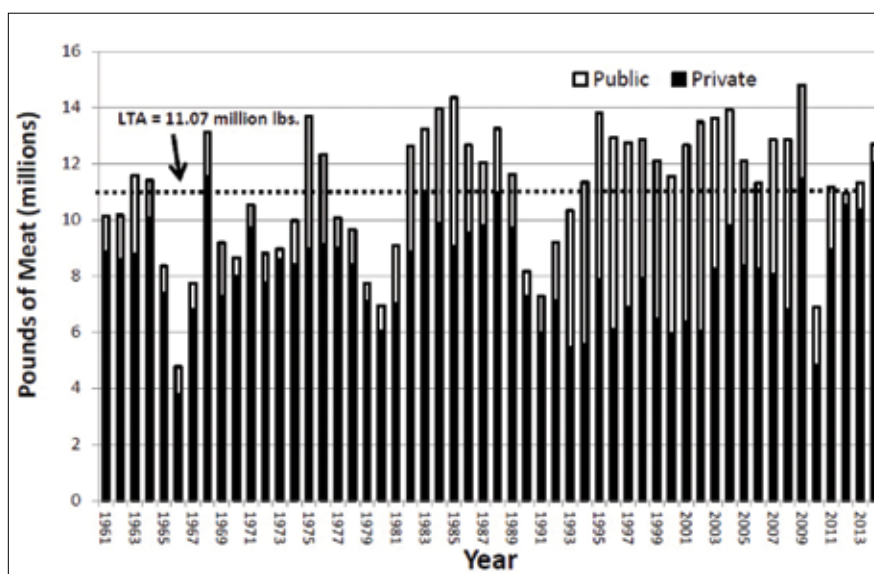


FIGURE 4. Historical Louisiana oyster landings from private oyster leases and public oyster areas.

Louisiana commercial freshwater finfish landings for 2015 totaled approximately 12.6 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 \$5.6 million. Wild caught crawfish landings in Louisiana for 2015 was approximately 5.5 million pounds with a dockside value of 6.9 million.

RECREATIONAL HARVEST

LDWF now monitors recreational fisheries through its own LA Creel Program and inland creel surveys. The LA Creel Program uses dockside interviews of recreational anglers to determine catch and a telephone survey to determine fishing effort.

During the second half of 2015, fisheries biologists worked a total of 787 LA Creel assignments and conducted approximately 6,574 interviews of recreational fishing trips along Louisiana's coast through the LA Creel program. This resulted in a total of 16,925 anglers being surveyed and 48,548 fish being counted during the second half of 2015. During the second half of 2015, 25,573 private angler effort phone call or email attempts were conducted to estimate effort. Of those attempts, 25,103 resulted in completed surveys. Approximately 850 charter captains were monitored with a total of 1,822 charter angler trips taken during the first half of 2015. At the end of 2015, using LA Creel data, it was estimated that a total of 2,424,909 recreational angler trips were taken.

During the first half of 2016, fisheries biologists worked a total of 787 LA Creel assignments and conducted approximately 5,224 interviews of recreational fishing trips along Louisiana's coast through the LA Creel program. This resulted in a total of 13,604 anglers being surveyed and 37,683 fish being counted in the first half of 2016. During the first half of 2016, 16,779 private angler effort phone call or email attempts were conducted to estimate effort. Of those attempts, 16,417 resulted in completed surveys. Approximately 850 charter captains were monitored with a total of 2,858 charter angler trips taken during the first half of 2016.

In order to benchmark the LDWF LA Creel program against the NMFS Marine Recreational Information Program, the two entities agreed to conduct both surveys simultane-

ously for the entire 2015 calendar year. During the second half of 2015, fisheries biologists conducted approximately 4,371 interviews of recreational fishermen along Louisiana's coast through Marine Recreational Information Program surveys. In the Marine Recreational Information Program, the number of interviews equals the number of anglers surveyed, which, again, is approximately 4,371 working 367 assignments in the same time period.

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 freshwater fish harvested. Nine recreational creel surveys were conducted on inland waters during FY 2015-2016. These lakes and rivers include Bundick, Caney Creek, Cane River, Grand Bayou, Lake Louis, Larto Lake, Raccourci Lake, Lake Fausse Pointe and Sibley Lake.

During FY 2015-2016, fisheries biologists conducted 1,263 interviews of 1,458 recreational bass and crappie anglers on Louisiana's freshwater lakes and rivers. Fishing trips averaged 4.26 hours in length and all recreational anglers caught an average of 5.9 fish per trip.

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 update stock assessment of striped mullet was completed and presented to the Louisiana Wildlife and Fisheries Commission for transmittal to the Louisiana Legislature in February 2016. 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 occurring and the stock is not considered overfished. Further, an updated stock assessment of blue crab in Louisiana waters was also completed in early 2016 using a stage-structured model to describe the species population dynamics. Based on results of this assessment the stock is currently con-

sidered overfished. Final reports (citations below) are available at <http://www.wlf.louisiana.gov/fishing/stock-assessments>.

West, J. and J.E. Powers. 2016. Update Assessment of Striped Mullet *Mugil cephalus* in Louisiana Waters - 2016 Report. Report to the Louisiana Legislature by the Wildlife and Fisheries Commission.

West, J., H. Blanchet, J. Marx, and J.E. Powers. 2016. Update Assessment of Blue Crab *Callinectes sapidus* in Louisiana Waters. Louisiana Department of Wildlife and Fisheries.

LA Creel

The stock assessment section continues to provide weekly marine recreational landings estimates from the LA Creel Survey to marine fishery managers.

Inland

Fishery-independent and fishery-dependent surveys are being conducted on Louisiana waterbodies with important largemouth bass and crappie fisheries to provide information to inland fishery managers to make sound science-based management decisions (Tables 1 & 2). 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 age-structured population models to simulate each fisheries response to multiple 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.

Allgood, T. and J. West. 2016. Lake Bruin Largemouth Bass: Population and Fishery Characteristics with Size Limit Simulations. Louisiana Department of Wildlife and Fisheries.

Allgood, T. and J. West. 2016. Iatt Lake Largemouth Bass: Population and Fishery Characteristics with Size Limit Simulations. Louisiana Department of Wildlife and Fisheries.

TABLE 1. Schedules of Louisiana Largemouth Bass Stock Assessments - 25 waterbodies

WATERBODY	YEARS CONDUCTED	STATUS
Atchafalaya Basin	2009-2011	Completed
Bistineau	2016-2018	Ongoing
Black-Clear	2010-2012	Completed
Bruin	2013-2015	Ongoing
Bundick	2015-2017	Ongoing
Caddo	2011-2013	Completed
Calcasieu	2012-2014	Ongoing
Cane River	2015-2017	Ongoing
Caney	2014-2016	Ongoing
Cataouatche	2010-2012	Completed
Chicot	2010-2012	Completed
Concordia	2010-2012	Completed
Cross	2010-2012	Completed
D'Arbonne	2010-2012	Completed
False River	2010-2012	Completed
Grand Bayou	2015-2017	Ongoing
Grassy, Verret, Palourde	2015-2017	Ongoing
Iatt	2013-2015	Ongoing
Larto	2016-2018	Ongoing
Poverty Point	2010-2012	Completed
Raccourci	2015-2017	Ongoing
Red River (Pools 1-5)	2013-2015	Ongoing
Toledo Bend	2010-2012	Completed
Turkey Creek	2016-2018	Ongoing
Vernon	2010-2012	Completed

TABLE 2. Schedules of Louisiana Crappie Stock Assessments - 20 waterbodies

WATERBODY	YEARS CONDUCTED	STATUS
Bistineau	2016-2018	Ongoing
Bruin	2013-2015	Ongoing
Bundick	2015-2017	Ongoing
Caddo	2010-2012	Completed
Cane River	2015-2017	Ongoing
Caney	2014-2016	Ongoing
Cross	2010-2012	Completed
D'Arbonne	2010-2012	Completed
Fausse Point	2013-2015	Ongoing
Grand Bayou	2015-2017	Ongoing
Iatt	2013-2015	Ongoing
Larto-Saline	2009-2012	Completed
Louis	2013-2015	Ongoing
Poverty Point	2010-2012	Completed
Raccourci	2009-2013	Completed
Red River (Pool 5)	2013-2015	Ongoing
Sibley	2015-2017	Ongoing
Toledo Bend	2009-2011	Completed
Turkey Creek	2016-2018	Ongoing
Vernon	2009-2011	Completed

Allgood, T. and J. West. 2016. Calcasieu River Largemouth Bass: Population and Fishery Characteristics with Size Limit Simulations. Louisiana Department of Wildlife and Fisheries.

Allgood, T. and J. West. 2016. Red River Largemouth Bass: Population and Fishery Characteristics with Size Limit Simulations. Louisiana Department of Wildlife and Fisheries.

Allgood, T. and J. West. 2016. Lake Bruin Crappie: Population and Fishery Characteristics with Size Limit Simulations. Louisiana Department of Wildlife and Fisheries.

Allgood, T. and J. West. 2016. Lake Fausse Point Crappie: Population and Fishery Characteristics with Size Limit Simulations. Louisiana Department of Wildlife and Fisheries.

Allgood, T. and J. West. 2016. Red River (Pool 5) Crappie: Population and Fishery Characteristics with Size Limit Simulations. Louisiana Department of Wildlife and Fisheries.

MANAGEMENT PLANS

INLAND WATERBODY MANAGEMENT PLANS

Waterbody Management Plans are a compilation of lake description, history, authorities, synopsis of fisheries and vegetation sampling data, analyses, corrective measures needed, and recommended actions. During FY 2015-2016, the 23 management plans below were completed and/or updated and approved. A total of 77 management plans are now available to the public on the LDWF website.

Waterbody management plans completed during FY 2015-2016 and available to the public on the LDWF website:

- Atchafalaya Basin
- Anacoco Lake
- Barataria Basin
- Bistineau Lake
- Black Bayou Lake
- Blind River
- Bayou Bonne Idee
- Caney Creek Reservoir
- Claiborne Lake
- False River
- Henderson Lake
- Iatt Lake
- Indian Creek Reservoir
- Kepler Lake
- Lacassine Pool
- Lake Louis

- Pearl River
- Poverty Point Reservoir
- Rodemacher Lake
- Spring Bayou
- Toledo Bend Reservoir
- Turkey Creek Lake
- Vernon Lake

MARINE FISHERY MANAGEMENT PLANS

LDWF began 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 above, LDWF staff have completed new fishery management plans for blue crab and shrimp and are working on completing a new plan for oyster, to be completed in late 2016. 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. 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 be 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.
- Using the guidance document referenced above, LDWF staff completed a draft of the new fishery management plan for oyster in the spring of 2016.

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. LDWF will prioritize development of additional new fishery management plans for other species based on commercial, recreational, and ecological significance and management needs.

MANAGEMENT RECOMMENDATIONS

Through utilization of the previously mentioned recreational and commercial sampling techniques, fisheries managers then analyze the resulting data to develop recommendations to manage and enhance fish populations. The information collected is used to produce recommendations for setting seasons and harvest limits and to monitor the species found in an area over time.

SHRIMP MANAGEMENT

Greater flexibility in managing the shrimp resource is now provided through the use of a basin type management approach, as opposed to the historical zone approach. Louisiana's major estuarine basins include the Pontchartrain Basin, Mississippi River Basin, Barataria Basin, Terrebonne Basin, Atchafalaya River Basin, Vermilion-Teche River Basin, Mermentau River Basin, Calcasieu Basin and Sabine River Basin.

Based on analysis of historic 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 2015-2016.

Lake Pontchartrain Basin and Portions of Mississippi River Basins 2015 - Spring Inshore Shrimp Season

Opened at 6:00 a.m. May 18, 2015, from the MS/LA state line westward to South Pass of the Mississippi River

Closed at 6:00 a.m. June 19, 2015, except for the following waters:

- That portion of Mississippi Sound beginning at a point on the Louisiana-Mississippi Lateral Boundary at latitude 30°09'39.6" N and longitude -89°30'00" W; thence southeasterly to a point at latitude 30°03'12" N and longitude

-89°21'30" W; thence northeasterly to the most easterly point on Isle Au Pitre at latitude 30°09'20.5" N and longitude -89°11'15.5" W, which is a point on the double-rig line; thence northerly along the double-rig line to a point on the Louisiana-Mississippi Lateral Boundary at latitude 30°12'37.9056" N and longitude -89°10'57.9725" W; thence westerly along the Louisiana-Mississippi Lateral Boundary to the point of beginning.

- Lake Borgne and the open waters of Breton and Chandeleur sounds as described by the double-rig line.

Closed at 6:00 a.m. July 3, 2015, the remaining inshore waters.

2015- Fall Inshore Shrimp Season

Opened at 6:00 a.m. Aug. 17, 2015, from the MS/LA state line westward to South Pass of the Mississippi River.

Closed at official sunset Dec. 21, 2015, except in the following areas:

- The open waters of Breton and Chandeleur sounds as described the double-rig line in R.S.56:495.1(A)2.
- That portion of Mississippi Sound north of a line beginning at 30 degrees 05 minutes 00.0 seconds north latitude and -89 degrees 30 minutes 00 seconds west longitude; thence southeasterly to a point on the western shore of Three-Mile Pass at 30 degrees 03 minutes 00 seconds north latitude and -89 degrees 22 minutes 23 seconds west longitude; thence northeasterly to a point on Isle Au Pitre at 30 degrees 09 minutes 20.5 seconds north latitude and -89 degrees 11 minutes 15.5 seconds west longitude, which is a point on the double-rig line as described in R.S. 56:495.1(A)2
- Lake Pontchartrain and Lake Borgne.

Closed at official sunset Jan. 25, 2016, except in the following areas:

- The open waters of Breton and Chandeleur sounds as described the double-rig line in R.S.56:495.1(A)2.

2016 - Spring Inshore Shrimp Season

Opened at 6:00 a.m. May 23, 2016, from the MS/LA state line westward to South Pass of the Mississippi River.

Closed at 6:00 p.m. July 3, 2016, except for the following waters:

- That portion of Mississippi Sound north of a line beginning at 30 degrees 05 minutes 00.0 seconds north latitude and -89 degrees 30 minutes 00 seconds west longitude; thence southeasterly to a point on the western shore of Three-Mile Pass at 30 degrees 03 minutes 00 seconds

north latitude and -89 degrees 22 minutes 23 seconds west longitude; thence northeasterly to a point on Isle Au Pitre at 30 degrees 09 minutes 20.5 seconds north latitude and -89 degrees 11 minutes 15.5 seconds west longitude, which is a point on the double-rig line as described in R.S. 56:495.1(A)2

- The open waters of Breton and Chandeleur sounds as described by the double-rig line.

Closed at 6:00 p.m. Aug. 1, 2016, except for the following waters:

- The open waters of Breton and Chandeleur sounds as described by the double-rig line.

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

2015 – Spring Inshore Shrimp Season

Opened at 6:00 a.m. May 18, 2015, from the eastern shore of South Pass of the Mississippi River westward to the westward shore of Freshwater Bayou

Closed at 6:00 a.m. June 19, 2015, from South Pass of the Mississippi River to the western shore of Freshwater Bayou except in the following areas:

- Those inside waters south of 29 degrees 26 minutes 00 seconds north latitude from 89 degrees 50 minutes 30 seconds west longitude westward to the western shore of the Barataria Waterway.
- Those inside waters south of 29 degrees 13 minutes 00 seconds north latitude from 90 degrees 18 minutes 00 seconds west longitude westward to 90 degrees 34 minutes 00 seconds west longitude, and those inside waters south of 29 degrees 06 minutes 00 seconds north latitude from 90 degrees 34 minutes 00 seconds west longitude westward to 90 degrees 46 minutes 00 seconds west longitude

Closed at 6 p.m. July 3, 2015, the remaining open areas.

2015 – Fall Inshore Shrimp Season

Opened at 6:00 a.m. Aug. 17, 2015, from South Pass of the Mississippi River westward to the western shore of Freshwater Bayou.

Closed at official sunset Dec. 21, 2015, from the eastern shore of South Pass of the Mississippi River westward to the western shore of Freshwater Bayou.

2016 - Spring Inshore Shrimp Season

Opened at 6:00 a.m. May 23, 2016, from the eastern shore of South Pass of the Mississippi

River westward to Freshwater Bayou Canal.

Closed at 6:00 p.m. July 3, 2016, from the eastern shore of South Pass of the Mississippi River westward to the western shore of Freshwater Bayou Canal.

Mermentau, Calcasieu and Sabine River Basins

2015 – Spring Inshore Shrimp Season

Opened at 6:00 a.m. May 18, 2015, from the western shore of Freshwater Bayou Canal westward to the LA/TX state line.

Closed at 6:00 p.m. June 19, 2015, from the western shore of Freshwater Bayou Canal westward to the LA/TX state line.

2015 – Fall Inshore Shrimp Season

Opened at 6:00 a.m. Aug. 17, 2015, from the western shore of Freshwater Bayou Canal westward to the LA/TX state line.

Closed at official sunset Dec. 21, 2015, from the western shore of Freshwater Bayou Canal westward to the LA/TX state line.

2016 – Spring Inshore Shrimp Season

Opened at 6:00 a.m. May 23, 2016, from the western shore of Freshwater Bayou Canal westward to the LA/TX state line.

Closed at 6:00 p.m. July 15, 2016, from the western shore of Freshwater Bayou Canal westward to the LA/TX state line.

Offshore Shrimp Seasons

Closed at official sunset Jan. 25, 2016, in the following waters:

- That portion of state outside waters extending a distance of three nautical miles seaward of the inside/outside shrimp line from the northwest shore of Caillou Boca at -90 degrees 50 minutes 27 seconds west longitude westward to Freshwater Bayou Canal at -92 degrees 18 minutes 33 seconds west longitude.

Opened at 6:00 a.m. April 22, 2016, in the following waters:

- That portion of state outside waters, south of the inside/outside shrimp line from the northwest shore of Caillou Boca at -90 degrees 50 minutes 27 seconds west longitude westward to the Atchafalaya River.

Opened at 6:00 a.m. May 23, 2016, in the following waters:

- That portion of state outside waters extending a distance of three nautical miles seaward of the inside/outside shrimp line from the Atchafalaya River westward to Freshwater Bayou Canal at -92 degrees 18 minutes 33 seconds west longitude.



FIGURE 6. 2015 Spring Shrimp Season Opening Map.



FIGURE 7. 2015 Fall Shrimp Season Opening Map.



FIGURE 8. 2016 Spring Inshore Shrimp Season Opening Map.

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 41.7 million pounds from 2011-2015. The dockside value of the harvest over that same time period averaged \$50.5 million dollars.

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 2016 to satisfy the Marine Stewardship Council's Seafood Sustainability Certification. The assessment indicated that the Louisiana blue crab stock had 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. 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.

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 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 autho-

rized to extend the season beyond April 30, provided sufficient stocks are available for harvest. The secretary of LDWF may close seasons on an emergency basis if oyster mortality occurs. The secretary can also delay the season or close certain areas where significant spat catch has occurred with good probability of survival, or if an excess amount of shell in oyster loads occurs. Management practices often use rotational openings of the four oyster seed reservations in alternating years. The public 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.

In FY 2015-2016, the oyster season on most of the public grounds opened on Sept. 9 or Oct. 19, 2015 (*Table 3*). The season again produced low amounts of harvest as oyster availability was generally low statewide. Based on harvest estimates from fishermen interviews on the water, the public oyster areas produced approximately 232,000 barrels of oysters (seed and market-size oysters combined) during the season (one barrel = two sacks). The majority of harvest came from the Mississippi Sound area of the public grounds. During that short

TABLE 3. 2015-2016 Oyster season opening and closing dates on the public oyster areas of Louisiana.

PUBLIC OYSTER AREA	SEASON OPENING	SEASON CLOSURE
Primary Public Grounds East of MS River and North of MS River Gulf Outlet, including Lake Borgne: SEED	Oct. 19, 2015	Nov. 30, 2015
Primary Public Grounds East of MS River and North of MS River Gulf Outlet, including Lake Borgne: SACK	Oct. 19, 2015	Dec. 7, 2015
Primary Public Grounds East of MS River and North of MS River Gulf Outlet, including Lake Borgne: TRANSPLANT	April 1, 2015	April 14, 2015
Primary Public Grounds East of MS River and South of MS River Gulf Outlet: SEED	Oct. 19, 2015	Dec. 11, 2015
Primary Public Grounds East of MS River and South of MS River Gulf Outlet: SACK	Oct. 19, 2015	April 30, 2016
Hackberry Bay Public Oyster Seed Reservation: SEED	Oct. 19, 2015	Oct. 23, 2015
Hackberry Bay Public Oyster Seed Reservation: SACK	Oct. 19, 2015	Nov. 9, 2015
Barataria Bay, Little Lake, Lake Tambour, Deep Lake, Vermilion/East & West Cote Blanche/Atchafalaya Bay Public Oyster Seed Grounds	Sept. 9, 2015	April 30, 2016
Lake Chien Public Oyster Seed Ground	Oct. 19, 2015	Nov. 30, 2015
Lake Felicite and Lake Mechant Public Oyster Seed Grounds	Oct. 19, 2015	April 30, 2016
Sister Lake Public Oyster Seed Reservation: SEED	Oct. 19, 2015	Oct. 28, 2015
Sister Lake Public Oyster Seed Reservation: SACK	Oct. 19, 2015 April 4, 2016	Nov. 13, 2015 April 14, 2016
Calcasieu Lake - West Cove	Nov. 1, 2015	April 30, 2016
Bay Junop, Calcasieu Lake - East Side, Sabine Lake	CLOSED	

opening, approximately 122,000 barrels were harvested. Sister Lake in southwestern Louisiana also produced a sizeable share of the total harvest, as fishermen harvested approximately 71,000 barrels of oysters.

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 2015-2016:

July 2015

- Commercial king mackerel season opened on July 1 at 12:01 a.m., concurrent with a federal opening of the 2015-2016 harvest season.
- Commercial fisheries for small coastal sharks re-opened July 1 following an annual seasonal closure from April 1 - June 30.
- Commercial greater amberjack season closed on July 19 at 12:01 a.m., concurrent with a federal closure.

August 2015

- Recreational season for the harvest of greater amberjack and gray triggerfish re-opened on Aug. 1 after a seasonal closure between June 1 and July 31.

September 2015

- Recreational season for the harvest of red snapper closed in state waters at 12:01 a.m. on Sept. 8.

October 2015

- Commercial season for the harvest of striped mullet opened on Oct. 19.

November 2015

- Recreational season for the harvest of red snapper re-opened on Nov. 20.

December 2015

- The Louisiana Wildlife and Fisheries Commission adopted a Declaration of Emergency to modify the daily harvest limits for commercially harvested large coastal sharks from 33 sharks per day to 45 sharks per day for the 2016 harvest season.

- Commercial fishery for the harvest of spotted seatrout closed on Dec. 31.
- Recreational fishery for the harvest of gag closed on Dec. 31.

January 2016

- Recreational fishery for the harvest of red snapper closed at 12:01 a.m. on Jan. 1.
- Commercial fishery for small coastal sharks opened at 12:01 a.m. on Jan. 1.
- Commercial fishery for non-sandbar large coastal sharks opened at 12:01 a.m. on Jan. 1.
- All Louisiana waters closed to the commercial harvest of striped mullet with a mullet strike net on Jan. 18.
- The Louisiana Wildlife and Fisheries Commission set the 2016-2017 commercial king mackerel season to open July 1, consistent with the federal season.
- Commercial fishery for the harvest of spotted seatrout opened on Jan. 2.
- Commercial fishery for the harvest of king mackerel for the 2015-2016 season closed on Jan. 7.
- Recreational fishery for the harvest of red snapper opened at 12:01 a.m. on Jan. 8.

February 2016

- The annual stock assessment for striped mullet was presented to the Louisiana Wildlife and Fisheries Commission for transmittal to the Louisiana Legislature.
- The Louisiana Wildlife and Fisheries Commission adopted a Notice of Intent to modify the commercial and recreational harvest limits for greater amberjack. Proposed modifications include a commercial trip limit decrease to 1,500 pounds whole weight and a recreational size limit increase to 34 inches fork length. Comments on the proposed rule were taken until April 7, 2016.
- The Louisiana Wildlife and Fisheries Commission passed a resolution to clarify the effects of the extension of the state water boundary from three to nine nautical miles for reef fish management purposes, as established by the 2016 Consolidated Appropriations Act. The resolution states that fishing gear used by reef fish fishermen in the commercial and recreational sectors will not change within these new boundary waters.

March 2016

- The Louisiana Wildlife and Fisheries Commission adopted a Notice of Intent to establish management reference points for black drum, sheepshead, and southern

flounder as authorized through Act 205 of the 2015 regular session of the Louisiana Legislature. Comments on the proposed rule were taken until May 5, 2016.

- Commercial fishery for the harvest of large coastal sharks closed on March 15.

April 2016

- Louisiana waters closed to the recreational and commercial harvest of all sharks on April 1, consistent with an annual state closed season that is from April 1 through June 30.

May 2015

- At its May 5, 2016 meeting, the Louisiana Wildlife and Fisheries Commission passed a Notice of Intent to modify recreational gag and black grouper season and size regulations. The proposed Notice of Intent increases the minimum recreational size limit for gag and black grouper to 24 inches total length. The proposed rules also modified the recreational season for the harvest of gag to be closed from Jan. 1 - May 31 of each year. Public comment was taken on the Notice of Intent until Aug. 4, 2016. In a related action, the Louisiana Wildlife and Fisheries Commission passed a Declaration of Emergency to increase the minimum size limits of gag and black grouper effective immediately and to open the recreational season for the harvest of gag on June 1.

June 2016

- Federal waters opened to the recreational harvest of red snapper at 12:01 a.m. on June 1 and closed on June 12 at 12:01 a.m..
- Recreational season for the harvest of greater amberjack closed on June 1.
- Recreational season for the harvest of gray triggerfish closed on June 1.
- Recreational season for the harvest of gag opened on June 1.

FRESHWATER FINFISH MANAGEMENT

Revisions were made to regulations for largemouth bass on the Sabine River and include the following:

- The change sets a minimum size limit of 12 inches (amended from 14 inches) for largemouth bass (*Micropterus salmoides*) on the lower Sabine River, in Beauregard, Calcasieu, Sabine and Vernon parishes on the eastern side of the Sabine River along the state boundary with Texas from the Toledo Bend dam down to the I-10 bridge.



LDWF biologists empty a 42-foot SEAMAP Groundfish trawl into a basket (left) and then sort the catch by species (right).

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 EEZ) 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, ic-

thyoplankton, vertical line, and bottom long-line. The surveys are conducted by teams of five 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 2015 calendar year. Several changes were made to the survey design in 2016, but those changes will be reflected in next year's report.

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 Loui-



The SEAMAP Plankton cruise utilizes two different net types. Neuston nets (left) are towed continuously at the surface, while Bongo nets (right) are lowered to depth and towed slowly as they are lifted through the water column. Both provide information on the occurrence, abundance, and distribution of eggs, larvae, and juvenile fishes and invertebrates.

siana coast. Ichthyoplankton 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. Ichthyoplankton samples are field processed and transferred to the NMFS 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 NMFS as required. In 2016, 40 shrimp/groundfish stations were sampled by LDWF personnel. Depths ranged from 3 to 45 meters (latitudes 28.50° to 29.70° and longitudes -88.50° to -93.92°). Twelve plankton stations were sampled during the summer survey (plankton no longer surveyed on the fall survey), with locations ranging from latitudes 28.50°-29.01° and longitudes 88.50°-91.50°.

SEAMAP Ichthyoplankton Survey

SEAMAP Ichthyoplankton 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. Ichthyoplankton sampling is conducted in conjunction with the NMFS SEAMAP spring and fall Ichthyoplankton Surveys, and stations are selected from the NMFS ichthyoplankton grids. Sampling is conducted using 60-cm bongo nets and 1x2m neuston nets. Samples are field processed, preserved and transferred to the NMFS Pascagoula Laboratory for transshipment to the Polish Sorting and Identification Center. During 2016, nine stations were sampled during the fall survey (between the latitudes 28°29.98 and 29°25.27, longitudes -89°33.60 and 92°26.83). No spring survey was conducted.

SEAMAP Vertical Line Survey

The SEAMAP Vertical Line Survey is conducted monthly from April to October to collect infor-

mation 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 GSMFC with predetermined depth ranges and structure types, ranging in depth from 60 to 360 feet. The sampling encompassed sites from the South Pass of the Mississippi River to the Texas/Louisiana 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 are removed and processed in the lab for age and growth. In 2016, 66 vertical line stations were sampled, landing 357 fish, of which 303 were red snapper (84.87 percent).



LEFT: Larval fishes and invertebrates as a result of an ichthyoplankton net tow. **RIGHT:** Catch from one sampling site during a SEAMAP vertical line survey, which uses 'bandit gear' to help determine distribution and abundance of reef-associated species.



LEFT: SEAMAP vertical line survey bandit reel. **RIGHT:** Otolith (ear bone) being removed from a red snapper to be used to determine fish age.

SEAMAP Bottom Longline Survey

The SEAMAP Bottom Longline Survey collects information on the abundance and distribution of elasmobranchs and bottom feeding species with standard one nautical mile longline sets. Stations are generated by the GSMFC, 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 2016, LDWF completed 74 longline sets in Louisiana's territorial waters. Longline efforts resulted in 1,734 captures. Elasmobranchs consisted of 57 percent of the catch and teleosts the remaining 43 percent. Elasmobranchs were represented by 12 species and teleosts were represented by eight species. The most frequently captured shark was the blacktip shark, comprising 41.4 percent of the total shark captures, followed by the bull shark (24 percent), and the Atlantic sharpnose shark (10.7 percent). The most frequently captured teleost was the gafftopsail catfish, comprising 79.5 percent of the teleost captures, followed by the red drum (17 percent). Five-hundred-and-nine sharks were tagged with either a dart or metal tag (236 dart tags, 270 metal tags, and three Mississippi generated M-tags).



LDWF biologists prepare to deploy a 1 mile, 100 hook bottom longline adjacent to the rocks near the mouth of the Southwest Pass of the Mississippi River during a recent SEAMAP bottom longline survey.



Biologists board a hammerhead shark captured on a SEAMAP bottom longline survey.



LEFT: LDWF biologists Clint Edds and Michael Coulon work together to contain a feisty blacktip shark that is to be weighed and measured during a SEAMAP bottom longline survey. **RIGHT:** This large bull shark was weighed, measured, tagged and released during a SEAMAP bottom longline survey.



Since large sharks are not typically brought aboard the survey vessel, this tiger shark was weighed and measured in a specially designed lifting cradle alongside the vessel.

Fisheries Management Research Projects

Assessment of Fish Assemblages on Artificial Structures in the Northern Gulf of Mexico

This project operated under a three-year State Wildlife Grant which began in October 2010. Monitoring and response activities associated with the MC-252 incident delayed the start of the project. Extensions were requested and approved in 2012 and 2013. Sampling began

in May 2012 and was completed in December 2015. Data analysis and report writing began in March 2016 and final report was submitted in September 2016.

The primary objective of this study was to characterize and determine species richness and relative abundance of fish assemblages at select standing platforms in shelf waters south of Louisiana. This study also allowed LDWF to develop survey techniques for continued monitoring programs at similar structures as well as artificial reefs from the "Rigs to Reef" program. The study focused on three standing platforms adjacent to the continental shelf-edge approximately 30-40 nautical miles south/southwest of Grand Isle, La. The sites were selected based on water depth, isolation from other structures, and similarity of the selected platforms. Scientific divers performed surveys of the structure using the Roving Diver Technique. Surveys were broken up into 15-foot depth increments to a max depth of 120 feet. During surveys teams of two divers identified fish to the lowest possible taxon with order-of-magnitude counts. Observations were supported by photographs and video. A total of 51 Roving Diver Technique surveys were completed during the summer months of 2012 and 2014, with additional opportunistic surveys conducted in spring of 2014 and fall/winter of 2015. Species richness accounted for 28 families and 84 fish species. There were 18 species found at 50 percent or more of the survey sites. Important federally managed species reported with high frequency include snappers (*Lutjanus griseus*: 75 percent; *Lutjanus campechanus*: 60 percent; *Rhomboplites aurorubens*: 10 percent), groupers

(*Mycteroperca microlepis*: 15 percent; *Mycteroperca phenax*: 12 percent; *Mycteroperca interstitialis*: 10 percent), gray triggerfish (*Balistes capriscus*: 52 percent), and greater amberjack (*Seriola dumerili*: 35 percent). The recreationally popular Cobia (*Rachycentron canadum*) was observed in 21 percent of surveys and invasive lionfish (*Pterois volitans*) was observed in 63 percent of surveys.

This study was able to provide a methodological framework for opportunistic monitoring that can be applied by divers of various skill sets. We reported on several important species for commercial and recreational management and noted the dominate presence of the invasive lionfish and orange cup coral. Continued monitoring of these platforms is suggested so that fisheries managers can be made aware of community composition change over time.

Reproductive Strategies in Gulf of Mexico Greater Amberjack

LDWF biologists from the Grand Isle Fisheries Research Lab began collecting greater amberjack as part of a collaborative research project with the University of Florida. The goal of the project, which will continue through 2017, is to evaluate if large female amberjack contribute more to spawning stock biomass than smaller females, and if so, whether alternate management strategies might be more effective for the rebuilding of this stock, which has been identified as both overfished and undergoing overfishing. In 2016, 443 greater amberjack were collected. Following dock work-ups, gross histology was performed at the Grand Isle Fisheries Re-



This Greater amberjack was collected as part of a collaborative research project with the University of Florida to help evaluate reproductive strategies of this important recreational and commercial species in the Gulf of Mexico.

search Lab Histology Lab and assessments of age, condition and fecundity were performed at the University of Florida. LDWF biologists will participate in an amberjack reproductive biology workshop later this year and sampling for this project will be completed by the end of June 2017. It is expected that the results from this study will be of immediate use to inform managers of this federal fishery on effective management alternatives.

Capture Mortality and Post-Release Survival of Blacktip Sharks in the Gulf of Mexico Fishery

Working in collaboration with scientists from Texas A&M Galveston, the University of Southern Mississippi, and Florida International University, LDWF biologists have been taking blood samples from blacktip sharks to help evaluate capture and release condition in an attempt to better estimate the survival of blacktip sharks when they are released from fishing gear. Additionally, some blacktip sharks have been fitted with satellite tags to document survival and movement. During FY 2015-2016, 42 blood samples were taken and seven pop-up satellite tags deployed on blacktip sharks off the coast



TOP, MIDDLE & BOTTOM: As part of a study to better estimate the post-release survival of blacktip sharks caught on recreational gear, blacktip sharks were caught on rod and reel gear (top right), fitted with satellite tags to track sharks and document survival rates (middle), and sampled for blood chemistry analysis to help link survival with release condition.



A large yellowfin tuna is netted before being transferred to a padded cradle inside the boat where it will be fitted with an electronic tag.



Internal archival tags are surgically implanted in the abdomen of yellowfin tuna as part of an on-going research project.



Pop-up satellite archival tags (PSATs) are also attached to some yellowfin tuna in the current study. Both internal and pop-off tags note that anglers should call the LDWF electronic tag return line if they encounter these tags.

of Louisiana. This work is important because there is currently no estimate available for the survival of blacktip sharks when released from recreational gear. The current stock assessment is based on a rate calculated from a different species, the Atlantic sharp nose shark, which is generally believed to have a lower release survival rate than blacktips. Since the blacktip shark is an important commercial and recreational species along the Gulf Coast, we expect this study to produce data immediately relevant to management of this species.

Yellowfin Tuna Internal Archival Tagging

Yellowfin tuna are an important recreational and commercial species for Louisiana-based user groups, with the majority of both recreational and commercial catches in the northern Gulf being landed from Louisiana. In order to better understand the long-term movements and habitat use of these highly migratory fish, LDWF has been surgically implanting internal archival tags in yellowfin tuna since 2013. Internal archival tags are tiny computers that record depth, temperature and location. By making a small incision in the body wall, inserting the double-A battery-sized tag, and closing the incision with two quick sutures, LDWF biologists implant these tags in the abdominal cavity of yellowfin tuna. However, biologist cannot get the data back from these tags without the help of anglers, who are asked to return the tags to LDWF upon capture of a tagged fish. To date 30 of the 165 internal tags deployed in yellowfin have been returned, some of them having been at large for up to 1,017 days. While the tagging and data analysis for this project is still underway, preliminary results have been shared with the public in both the 2016 winter edition of "Louisiana Conservationist" and the February 2017 edition of "Sportfishing Magazine." Those preliminary results indicate that while yellowfin tuna are a highly migratory species, individuals tagged in the northern Gulf of Mexico do tend to remain in the northern Gulf for extend periods of time.

Origin of Yellowfin Tuna in the Western Atlantic Ocean

Natural chemical 'tags' from the ear bones of yellowfin tuna were used to determine the nursery origin of adult yellowfin tuna caught in the Louisiana recreational fishery. From 2012-2015, researchers from Texas A&M collected young-of-the-year yellowfin tuna (i.e., less than 1 year old) from known yel-



This small blackfin tuna was captured during sampling targeting young-of-the-year yellowfin tuna so that the chemical signatures in the baby tunas from the Gulf nursery could be characterized and then used to determine natal origin of adult tuna.

lowfin nursery areas throughout the Atlantic Ocean, and LDWF biologists collected young-of-the-year yellowfin from locations offshore of Louisiana as well as ear bones from adult yellowfin from Louisiana fishing docks. Because the tuna ear bones incorporate unique chemical signatures in these different nursery areas, researchers were able to compare this young-of-the-year ‘baseline’ chemical signature to the signature found in the very center (corresponding to the first year of life) of adult yellowfin ear bones collected in Louisiana and assign these “locally caught” adults

a nursery origin. Interestingly, the majority of adults in the study were in fact from distant nurseries, particularly the west coast of Africa, though local production (i.e. spawning in the Gulf of Mexico) did account for almost a third of the adults sampled. Because of the success of this study, LDWF is now participating in a federally funded project attempting to assess the nursery origin of the United States fishery. For 2016-2018, LDWF will continue collections of young-of-the-year and adult yellowfin from near Louisiana, while NOAA and Texas A&M University at Galveston collect from the dis-

tant nurseries as well as other known United States fisheries, like North Carolina and Puerto Rico.

Movement and Oceanographic Preferences of the Scalloped Hammerhead in the Gulf of Mexico

In conjunction with federal and university scientists, LDWF has been attaching satellite position only tags (SPOT) to the dorsal fin of scalloped hammerhead sharks in the Gulf of Mexico to study the movements and oceanographic preferences of this species, which has been documented to be heavily overfished in some areas of the ocean. Scalloped hammerheads are good candidates for this tag type, which can provide multiple precise positions per day, because of the amount of time they spent at or near the surface. Since the project began in 2013, 33 scalloped hammerheads have been tagged in the northern Gulf of Mexico, 17 of which were tagged by LDWF biologists. The tagging for this project was completed in 2015 and data analysis is underway. Preliminary results were presented at this year’s 69th Meeting of the Gulf and Caribbean Fisheries Institute, indicating a strong preference for continental shelf-edge habitat and differences in habitat use between males and females.

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



LDWF biologists used both rod and reel fishing (left) and bottom longline gear (right) to capture scalloped hammerheads and attach satellite position only tags (SPOT) during a recent study on the habitat use of scalloped hammerheads in the Gulf of Mexico.

spawning stock biomass based on limited data sets. New information has allowed for greater data resolution, which allows for more accurate estimates within the assessment model. Production estimates of the spawning stock are important inputs into the stock assessment model. Reproductive histological analysis has been completed on 209 seatrout ovaries from the 2015 spawning season and 334 females have been collected through June of the 2016 spawning season for future analysis. All of these fish have been aged and 11 batch fecundity estimates have been calculated thus far. The calculation of annual fecundity within age will allow for a more accurate representation of the spawning stock as a production input into the model and will more accurately assess the status of the Louisiana spotted seatrout spawning potential ratio. Future collections will focus on older spotted seatrout (ages 3+) and obtaining females in spawning condition.

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 collected ear bones from 1,106 yellowfin tuna from recreational fishing catches through 2015. Yellowfin tuna in the Atlantic are managed by the International Commission for the Conservation of Atlantic Tunas, which assesses this stock every five years. During the previous assessment (2011), the need for better and age-specific ageing 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 ageing yellowfin tuna and generate an updated growth curve for yellowfin from the Gulf of Mexico. While the results of the most recent Atlantic yellowfin tuna stock assessment (2016) have not been published yet, the data generated by LDWF from Louisiana recreational catches was considered in this most recent assessment.

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 28 ovaries within spawning season and 176 otoliths with lengths. The Baton Rouge age and growth lab has sectioned and read 97 female, 30 male, and three unknown (a total of 130) wahoo from the Louisiana coast. Fork length (cm) of aged individuals ranged from 86-176cm for females with a mean ($\pm$ SE) of 136.7($\pm$ 16.53) cm and 91-154cm for males with a mean

($\pm$ SE) of 133.3($\pm$ 17.41) cm. Ages ranged from 0.64-4.69 years for females with a mean ($\pm$ SE) of 2.25($\pm$ 0.10) years and 0.55-3.61 years for males with a mean ($\pm$ SE) of 2.19($\pm$ 0.15) years. All wahoo were sampled from the charter boat or recreational private boat fishery. Although some of the 28 ovaries collected within the spawning season indicate the occurrence of spawns in the short term, none of the ovaries were ripe, which does not allow for estimates of fecundity. Our future goal is to target fishing rodeos for wahoo during the spawning season in order to obtain possible fecund individuals.

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McLaughlin, P. LDWF's SEAMAP Vertical Line Survey. Fisheries Management Seminar, Grand Isle Fisheries Research Lab, March 23 2016, Grand Isle, LA.

Seither, C. LDWF's SEAMAP Bottom Long-line Survey. Fisheries Management Seminar, Grand Isle Fisheries Research Lab, March 23 2016, Grand Isle, LA.

Steen, ME. A characterization of greenstick catch in the northern Gulf of Mexico: Implications for bycatch reduction and economic viability. Louisiana Chapter of the American Fisheries Society, June 2-3, Baton Rouge, LA.

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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 15 species of fish. Monitoring is done through

the collection of otoliths and spines (gray triggerfish) for aging purposes. Coastal Study Area biologists record length, weight, gender and location when fish are collected in the field. The 15 fish species consist of 12 saltwater and three freshwater species. The freshwater species are black crappie, white crappie and largemouth bass. The saltwater species are black drum, gray snapper, greater amberjack, gray triggerfish (spines), king mackerel, red drum, red snapper, sheepshead, southern flounder, spotted seatrout, striped mullet and Vermilion snapper. Tripletail and yellowfin tuna are also sampled by Coastal Study Area biologists. These are considered research species because they were added to this list to gain new fishery information through field dependent collection along with developing an ageing protocol. The Venice lab is in charge of collecting and processing the tripletail and yellowfin tuna otoliths, but the Baton Rouge Age and Growth Lab assists with some of the reading and sectioning. All saltwater otoliths/spines are obtained through fisheries dependent sampling, except for tripletail, which are collected by both dependent and independent sampling methods. 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. Freshwater otoliths are obtained through independent sampling, requiring Inland field biologists to target a particular species. The lab usually receives otoliths (and spines) throughout each month of the year.

During FY 2015-2016, the Age and Growth Lab in Baton Rouge received 15,129 otoliths and six gray triggerfish spines. Out of those 15,135 structures received, 14,396 were aged. Within that total, 2,918 of those otoliths were freshwater, and all of those have been 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 as follows:

- Black Drum - 1,552
- Black Crappie - 676
- Gray Snapper - 207
- Greater Amberjack - 75
- Gray Triggerfish - 6
- King Mackerel - 3
- Largemouth Bass - 1,895
- Red Drum - 1,928
- Red Snapper - 1,533
- Sheepshead - 636
- Southern Flounder - 1,060
- Spotted Seatrout - 4,323

- Striped Mullet - 800
- Vermilion Snapper - 94
- White Crappie - 347

Otoliths were also collected from the two research species, tripletail and yellowfin tuna. As mentioned earlier, the Venice lab spearheads the sampling and processing of tripletail and yellowfin tuna. The total for those two species are:

- Tripletail - 9
- Yellowfin Tuna - 430

The season for striped mullet, black and white crappie collection is typically during the fall. Largemouth bass sampling is mostly done during the spring and early summer months.

Otolith sampling quotas were adjusted in early 2016 from the previous year. The number of marine otoliths has slightly increased compared to last year's numbers. All otoliths received during this time period have been processed, meaning they were cataloged, prepared for sectioning and first read.

During FY 2015-2016, the Age and Growth Lab received the reference set for black drum, gray snapper, gray triggerfish, greater amberjack, red drum, red snapper, sheepshead and Vermilion snapper. The annual GSMFC Otolith Processor's Workshop in May is held in St. Petersburg, Fla., and hosted by Florida Fish and Wildlife Research Institute. The reference sets are used to help sharpen Age and Growth biologists' otolith ageing skills. The sets are also used to ensure all labs base their ages on the correct criteria.

OTHER RESEARCH

ACOUSTIC TELEMETRY TAGGING

LDWF is leading a collaborative research project in Lake Pontchartrain to study the movements and habitat preferences of important fish species using acoustic telemetry technology. Fish are surgically implanted with acoustic transmitters, enabling tagged fish to be detected when swimming near receivers deployed throughout various habitats in the lake. The receiver array is used to cooperatively track red drum, spotted seatrout and bull sharks tagged by LDWF, spotted seatrout tagged by LSU, red drum and bull sharks tagged by the University of New Orleans, and Gulf sturgeon tagged by USFWS and the U.S. Army Corps of Engineers.

During FY 2015-2016 a total of 26 spotted seatrout, eight red drum and six juvenile bull



Relative positions of acoustically tagged spotted seatrout and red drum in Lake Pontchartrain in response to the Bonne Carre spillway opening. Fish location images come from the publicly available LDWF fish tracking website, and are overlaid with the MODIS satellite imagery of the Mississippi River water plume.



Juvenile bull shark being released after short surgical procedure to implant acoustic transmitter tag which will be used to monitor the habitat utilization and seasonal migrations of this apex predator in the Lake Pontchartrain nursery.

sharks were acoustically tagged. Two tagging events were held during FY 2015-2016 where volunteer anglers partnered with biologists to collect and transport live red drum and spotted seatrout to an LDWF surgery boat. In November 2015, 22 spotted seatrout and two red drum were acoustically tagged. In January 2016, just prior to the Bonnet Carré Spillway opening, an additional four spotted seatrout and six red drum were tagged, exhausting the acoustic tag supply. At the time of the spillway opening, 26 spotted seatrout and 28 red drum were present in Lake Pontchartrain with active acoustic tags, thus serving as an unprecedented monitoring tool to understand the

response of these species to such a large scale environmental change.

The six juvenile bull sharks were acoustically tagged in June 2016, and all had umbilical scars indicating recent pupping. Tissue samples were collected from sharks prior to release, and subsamples were sent to the University of Southern Mississippi and Texas A&M Galveston for a population study.

Data from the receiver array have been downloaded regularly throughout the fiscal year, filtered corresponding to tagging organization, and sent to our collaborating partners for

analysis. Additionally, data is uploaded onto a website developed in collaboration with the University of New Orleans Technology Group that allows the public to visualize the movements of acoustically tagged fish (<https://louisianafisheries.net/telemetry/>). Site visitors are able to sort fish by species, weight, size or sex and track their movements throughout Lake Pontchartrain. While fish are moving, the date, time, temperature, salinity, tide and lunar cycle are displayed, allowing visitors the opportunity to observe seasonal migrations, habitat preferences and response to environmental changes.

Detailed analysis of acoustically tagged fish is ongoing. One LSU graduate student successfully defended her master's thesis on the habitat preferences of adult spotted seatrout that were acoustically tagged in Lake Pontchartrain. She compared hot spot analysis of fish location to bottom characterization and water quality parameters, and determined salinity was the major influence on seatrout presence in the lake. Two other LSU graduate students continue their analysis and hope to graduate in the following fiscal year.

Publications

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TAG EVALUATION STUDY

The tag evaluation study has expanded into a field trial to compare reported recapture rates for red drum and spotted seatrout tagged with either T-bar tags or traditional dart tags. Thirty-two active taggers participated in the tag retention field study during FY 2015-2016, including 30 citizen scientists and two LDWF groups (CSA 3 and Extension). Citizen scientists participating in this study were selected based on their elite status in the Cooperative Tagging Program, having tagged over 100 fish in the previous year. Experimental tagging kits were distributed at hands-on training workshops held in a series of locations.

During FY 2015-2016, over 3,000 fish were tagged with T-bar tags as part of the tag evaluation study. There were 578 red drum tagged with T-bar tags, of which 36 were recaptured for a 6.2 percent reported recapture rate; additionally three of those fish were recaptured a second time and released again. There were 2,485 spotted seatrout tagged with T-bar tags, and 137 recaptured resulting in a 5.5 percent reported recapture rate. This comparison study is ongoing.

Presentations

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LOUISIANA COOPERATIVE MARINE SPORT FISH TAGGING PROGRAM

The Louisiana Cooperative Marine Sport Fish Tagging Program is a collaborative initiative between the Office of Fisheries, the Coastal Conservation Association (CCA) of Louisiana, universities and non-profit organizations.

One of the main goals of the program is to maintain a volunteer marine fish tagging program. Participation in the tagging program offers anglers a unique opportunity to act as citizen scientists, working alongside biologists for a common goal - to improve the understanding of marine fish movements and patterns of habitat use. The program's success can be attributed to a dedicated base of volunteer an-



Red drum tagged and released as part of the Louisiana Cooperative Marine Sport Fish Tagging Program

glers who serve as citizen scientists by tagging fish and providing valuable data that can be difficult and expensive to obtain by other means. Fish tagging is an exciting and rewarding way for anglers to give back to the resource they treasure. Information obtained through fish tagging is useful for fisheries conservation.

Dedicated volunteer anglers are essential to the success of any tagging study. In FY 2015-2016, the tagging program was promoted at CCA and LDWF events across coastal Louisiana. Anglers interested in participating in the tagging program can submit an application by phone, mail, email, Facebook message, www.taglouisiana.com or in person. CCA or LDWF personnel will collect this information and assign the angler a unique ID number, tagging kit and 10 starter tags. The "Tag Louisiana" Facebook page, which has over 2,500 friends, provides a quick and easy means of communication between anglers and program administrators. Volunteer anglers can share the program's Facebook page with their friends and post pictures of their fish tagging efforts. Continued maintenance of the program's Facebook page has fostered a sense of camaraderie between volunteer anglers and researchers while increasing interest and awareness for the tagging program.

Tagging Program Statistics

The tagging program experienced an increase in participation from year 11 (FY 2014-2015) to year 12 (FY 2015-2016). Seven-hundred-ninety-two anglers tagged at least one fish. Active participants (tagged at least 10 fish per year) in the tagging program increased from 343 to 354 anglers, and there was a slight increase in total number of fish tagged, from 30,328 to 33,112. Program totals since the program's inception in 1988 are over 250,000 fish tagged, of which over 10,000 have been recaptured.

Of the 33,112 fish tagged during year 12, 14,080 were red drum, 17,483 were spotted seatrout, 23 were yellowfin tuna, 446 were red snapper and 1,080 were non-target species. Fish were tagged and recaptured throughout the Gulf of Mexico, in every Gulf state from Texas to Florida, with the majority occurring in the state of Louisiana. During year 12, 1,386 fish were reported as recaptured. This includes fish that were tagged in year 12 and recaptured again in year 12. Of the 1,386 reported recaptures, 859 were red drum, 392 were spotted seatrout, 33 were red snapper and 98 were non-target species. There were 34 fish that were recaptured a second time.

The recapture rate for red drum tagged during year 12 was 6.1 percent, spotted seatrout was 2.2 percent, red snapper was 7.4 percent and yellowfin tuna was 17.4 percent.

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. 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. Two boating access projects were completed in FY 2015-2016. An additional five projects are in the planning or construction phase. One fishing access project is in the planning and design phase.

BOATING ACCESS PROJECTS COMPLETED

- **Bonnabel Boat Launch** - Project plans include renovating the existing four lane boat ramp.
- **Ben Lilly Conservation Area Kayak Launch** - Project includes road access, parking area and boat launch construction designed for kayaks.

BOATING ACCESS FACILITIES PLANNED OR UNDER CONSTRUCTION

- **Port O'Bistineau Landing** - Project plans include an extension of the existing boat ramp by 60 feet to provide convenient access to Lake Bistineau during times of low water levels. Plans also include renovations to existing structures at the facility and expansion of the parking area. This project is near completion; however, a flood event in the spring of 2016 postponed progress.
- **Slidell Municipal Marina, BIG-P, Tier II** - Project plans include upgrading an existing facility to include accommodations for boats greater than 26 feet.
- **West End-Breakwater Drive Boat Launch** - Project includes renovating the existing two-lane boat ramp and parking area.

- **Venice Marina, BIG-P, Tier I** - Project plans include upgrading electrical pedestals and fuel pumps to accommodate large transient vessels.
- **Lee's Landing Boat Launch** - Project plans include renovating an existing launch to provide safe boat ramp and parking area.

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.
- **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.

NUISANCE AQUATIC VEGETATION

Control of nuisance plant species is also necessary in providing 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 2015-2016 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 rec-

ommendations and information to provide to the lake authorities and the public. In FY 2015-2016, the Aquatic Plant Control Program completed 71 Vegetation Management Plans for Louisiana public waterbodies.

In FY 2015-2016, herbicides were applied to 57,123 acres of nuisance aquatic vegetation, and the majority of these efforts included control of 27,097 acres of water hyacinth, 19,065 acres of giant salvinia, 4,194 acres of alligator weed, and 1,587 acres of common salvinia. In addition, approximately 505,657 adult giant salvinia weevils and 128,100 adult common 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 2015-2016 (*Table 4*).

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. At Joe Brown Park in New Orleans, summer camps rely on the lagoon system in the park for fishing and canoeing. In 2014, park personnel reached out to the LDWF for help with the excessive vegetation

TABLE 4. Drawdowns conducted in FY 2015-2016.

LAKE NAME	PURPOSE OF DRAWDOWN	DATES
Bistineau Lake	Giant salvinia control as needed	Aug. 3, 2015 - Jan. 15, 2016
Bussey Brake	Lake Renovation	July 22, 2013 - until project completion
Cheniere Lake	Vegetation control; bottom oxidation	Sept. 8 - Jan. 15, 2016
Cotile Lake	Aquatic veg control/bottom oxidation	Sept. 8 - Jan. 15, 2016
Lake Louis	Bottom oxidation	Sept. 8 - Feb. 15, 2016
Iatt Lake	Vegetation control; bottom oxidation	July 27 - Oct. 21, 2015
Chicot Lake	Vegetation control; bottom oxidation	Sept. 8 - Jan. 15, 2016
Henderson Lake	Vegetation control	LDWF recommendation: Aug. 1 - Jan. 1
Clear-Smithport	Aquatic vegetation/ bottom oxidation	Oct. 12, 2015
Grand Bayou Reservoir	Vegetation control	Sept. 18, 2015 - Feb. 1, 2016
Saline Lake	Vegetation control; bottom oxidation	Nov. 19, 2015 - Jan. 28, 2016

growing in the lagoons. Upon investigation, LDWF biologists discovered that the pond was almost 100 percent covered with coontail (*Ceratophyllum demersum*) and duckweed (*Lemna spp.*). LDWF treated the pond and has followed up with additional treatments to combat nuisance aquatic plants, including water hyacinth.

This fiscal year, a total of 34 acres of nuisance aquatic vegetation were treated in Joe Brown Park. This included 26 acres of duckweed treated with flumioxazin at a rate of 12 oz. per acre, and 2 acres of water hyacinth treated with 2,4-D at a rate of 0.5 gallons per acre. Separate applications were made throughout FY 2015-2016.

Results were excellent. LDWF personnel assessed the pond frequently and made applications as necessary. The pond was able to remain open and accessible to the public year-round.

Terrebonne Marsh Water Hyacinth Control

For many years, the U.S. Army Corps of Engineers Removal of Aquatic Growth Program was responsible for water hyacinth control in the freshwater marshes located in the Terrebonne Basin. In 2010, the Removal of Aquatic Growth Program lost its funding, and its plant control efforts had completely ceased by the end of the year. Since that time, LDWF has assumed the responsibility of maintaining boating access in this area. This vast coastal freshwater area fills with water hyacinths each year, and main bayous can be completely blocked by the vegetation if left untreated. These plants inevitably get deposited into the

public bayous and canals by tidal action and changes in wind direction. When large rafts of water hyacinths form blockages in the canals, it impedes both recreational and commercial activities. In order for the Aquatic Plant Control Program to maintain open canals and bayous in the Terrebonne marsh, herbicide applications usually begin in April and continue into December. In FY 2015-2016, LDWF treated 6,642 acres of hyacinth in the Terrebonne marsh. These concentrated efforts have been successful in providing both recreational and commercial use to the public throughout the year.

Evaluation of Giant Salvinia Control Methods

Since 2006, giant salvinia has spread to waters throughout much of Louisiana. As a result, identifying and implementing all efficient and effective control methods for this invasive aquatic weed has been a priority for the Aquatic Plant Control Program. Introduction and establishment of giant salvinia weevils, a species-specific biological control, has been a major focus of the program since that time. Most recently, salvinia weevil research has focused on finding a cold tolerant weevil in order to ensure overwintering in the northern part of the state. In recent years, LDWF has evaluated the effectiveness of several mechanical control devices including the WaterMower, bucket boats, mashers, harvesters and weed cutters. Unfortunately, mechanical control options are typically slower, more labor intensive and more expensive than LDWF's current giant salvinia control approach, which includes herbicide applications, water level manipulation and weevil establishment. Although herbicide applications remain a major part of the

salvinia control efforts, the Aquatic Plant Control Program continues to search for more effective and cost efficient chemicals available for use in aquatic systems. Since 2012, LDWF has worked closely with U.S. Army Corps of Engineers 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 2015-2016, focusing on the effectiveness of alternative adjuvants containing methylated vegetable oil and organosilicone components. These efforts will continue as new herbicides become available and could lead to more effective control of giant salvinia in the future.

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

"Get Out & Fish!," a community fishing program was developed and 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

Three new locations were added in FY 2015-2016, including Zemurray Park in Hammond, Sidney D. Torres Memorial Park in Chalmette,

and BREC's Burbank Park in Baton Rouge. Adult size rainbow trout and channel catfish were stocked throughout the year as shown in *Table X*.

Additional Sites

LDWF biologists completed several site visits of potential locations to be added in FY 2016-2017 to the "Get Out & Fish!" program. Five additional sites are being considered to be added to the program by the end of FY 2017-2018.

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 SeaGrant, 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 2015-2016, the program enhanced eight offshore reefs with 12 oil and gas platforms and received \$5.9 million in donations from oil company participation.

The Louisiana Artificial Reef Program has successfully enhanced two existing inshore artificial reef sites, and created a new reef site in FY 2015-2016. The enhanced sites include Redfish Point in Vermilion Bay, and Independence Island in Barataria Bay. The Redfish Point reef site enhancement included the addition of over 4,000 tons of crushed limestone and was completed in November 2015. The Independence Island reef site enhancement included the addition of over 6,700 tons of limestone

and was completed in December 2015. The new inshore artificial reef was created in May 2016 on the south shore of Lake Pontchartrain (West End reef site) using over 2,200 tons of crushed concrete and limestone in distinct areas of the 10-acre permit area.

The locations of all of Louisiana's artificial reefs can be found on the LDWF website, including an Interactive GIS-based map (direct link - http://gis.wlf.la.gov/flexviewers/artificial_reef_map/).

Presentations

Gothreaux, C. 2016. Nearshore Planning Areas. Shrimp Task Force Meeting, Houma, La.

Gothreaux, C. 2015. Nearshore Planning Areas. Shrimp Task Force Meeting, Houma, La.

Gothreaux, C. 2015. Nearshore Planning Areas. Calcasieu Oyster Task Force Meeting, Cameron, La.



Crushed limestone and recycled concrete are deployed at the West End reef site in Lake Pontchartrain. The reef site was created in conjunction with planned renovation of the boat launch and new fishing pier facilities.

TABLE X. *Get Out and Fish! Stocking Schedule*

		OCTOBER 2015	NOVEMBER 2015	DECEMBER 2015	JANUARY 2016	MARCH 2016	APRIL 2016	JUNE 2016
Girard Park, Lafayette	Channel Catfish		200 lbs.			300 lbs.		200 lbs.
	Rainbow Trout			300 lbs.				
Zemurray Park, Hammond	Channel Catfish	600 lbs.				600 lbs.		200 lbs.
	Rainbow Trout				600 lbs.			
Sidney D. Torres Memorial Park, Chalmette	Channel Catfish							600 lbs.
	Rainbow Trout				600 lbs.			
BREC's Burbank Park, Baton Rouge	Channel Catfish						1000 lbs.	400 lbs.
	Rainbow Trout							

Important Figures for FY 2015-2016

- 76 Total established offshore artificial reef sites
 - 48 planning area reefs
 - 18 special artificial reef sites
 - 10 deepwater reefs
- Offshore structures converted to permanent habitat
 - 370 platform jackets
 - 8 drill rig legs
 - 12 oil and gas structures deployed
- 5 established nearshore reefs
- 33 established inshore reefs contained within 29 reef sites

FRESHWATER FISH HATCHERY PROGRAM

The Louisiana Hatchery Program partners with local, state and federal agencies to produce and stock 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 according to the department's "Resource Enhancement through Stocking" guidelines. The program also provides support services for outreach and education activities.

FISH STOCKING

This year, in partnership with the USFWS, the City of Shreveport's Cross Lake Fish Hatchery, LDWF's Rockefeller State Wildlife Refuge, LDWF's Aquatic Plant Control Program, the Red River Waterway Commission, and the Cheniere Brake Lake Association, over 7 million fish were released in 84 water bodies around the state. *Table 5* provides comprehensive list of fish stocked in Louisiana waters during FY 2015-2016.

HATCHERY AND FISHERIES OUTREACH/ EDUCATION

The hatchery program continued to provide support for departmental education and outreach programs. Support includes providing fish and/or fish transportation for community fishing and outreach events, spawning demonstrations/workshops, and hatchery presentations and tours. The hatchery program transported 2,700 pounds of catfish for U.S. Forest Service fishing derbies and 1,500 pounds of catfish for Fort Polk fishing derbies. Hatchery biologists also assisted private pond owners with technical advice and pond water quality testing.

INVESTIGATIONAL NEW ANIMAL DRUG PROGRAM PARTICIPATION

LDWF hatcheries continued to participate in the USFWS National Investigational New Animal Drug Program. This program provides "a means through which federal, state, tribal and private agencies or organizations located throughout the United States are 1.) allowed to use certain critical drugs necessary to maintain the health and fitness of aquatic species under Investigational New Animal Drug exemptions, and 2.) contribute important drug efficacy and safety data needed to support the future approval of new drugs for use in aquatic species."

(<http://www.fws.gov/fisheries/aadap/programPDFs/NIP%20Standards%20April%202011.pdf>)

**TABLE 5. FISH STOCKING BY WATERBODY
7/1/2015 - 6/30/2016**

WATERBODY	SPECIES	SIZE	NUMBER STOCKED
Anacoco Lake	Florida Largemouth Bass	Fingerlings	53,943
Anderson Pond	Channel Catfish	Adults	350
Bartholomew Lake	Triploid Grass Carp	Adults	700
Bayou Choctow	Florida Largemouth Bass	Fry	793,800
Bayou D'Arbonne Lake	Florida Largemouth Bass	Fingerlings	300,137
Bayou des Glaisses	Channel Catfish	Fingerlings	1,607
Bayou Desiard	Triploid Grass Carp	Adults	53
Bayou Huffpower	Channel Catfish	Fingerlings	307
Beaver Park Pond	Channel Catfish	Fingerlings	298
Black Bayou Lake	Florida Largemouth Bass	Fingerlings	38,840
Black Bayou and Black Bayou Reservoir	Florida Largemouth Bass	Fingerlings	11,175
Black Lake and Clear Lake	Florida Largemouth Bass	Fry	551,100
Black River Lake	Hybrid Striped Bass	Fingerlings	17,420
BREC - Burbank	Channel Catfish	Adults	700
BREC - Central Community Park	Channel Catfish Florida Largemouth Bass	Fingerlings Phase 2 Fingerlings	203 100
BREC - Doyles	Channel Catfish	Fingerlings	155
BREC - Flanacher	Channel Catfish	Fingerlings	74
BREC - Greenwood Park	Channel Catfish Florida Largemouth Bass	Fingerlings Phase 2 Fingerlings	452 180
BREC - Palomino	Channel Catfish	Fingerlings	100
Bundicks Lake	Florida Largemouth Bass	Fingerlings	35,200
Caddo Lake and James Bayou	Florida Largemouth Bass	Fingerlings	151,214
Cameron Prairie NWR Pond	Channel Catfish Fathead Minnows	Adults Adults	165 16,000
Caney Lake, Lower	Channel Catfish	Fingerlings	2,211
Caney Lake, Upper	Channel Catfish	Fingerlings	1,407
Chicot Lake	Bluegill Florida Largemouth Bass Florida Largemouth Bass Golden Shiner Threadfin Shad	Fingerlings Fingerlings Phase 2 Fingerlings Fingerlings Fingerlings	5,002 13,697 13,890 21,430 111,869
Corney Lake	Channel Catfish Florida Largemouth Bass	Fingerlings Fingerlings	12,194 8,800
Cotile Lake	Florida Largemouth Bass	Fingerlings	23,992
Cross Lake	Florida Largemouth Bass	Fingerlings	67,557
Cypress Bayou Reservoir	Florida Largemouth Bass	Fingerlings	36,942
Dubuisson Lake	Channel Catfish	Fingerlings	6,006
Eunice City Lake	Channel Catfish Florida Largemouth Bass	Fingerlings Adults	4,608 100

WATERBODY	SPECIES	SIZE	NUMBER STOCKED
False River	Alligator Gar	Fingerlings	43
	Florida Largemouth Bass	Fingerlings	6,760
	Hybrid Striped Bass	Fingerlings	26,000
Fort Polk Ponds	Channel Catfish	Adults	750
Fullerton Lake	Channel Catfish	Adults	400
Georgetown Lake	Bluegill	Fingerlings	22,572
	Florida Largemouth Bass	Fingerlings	2,441
	Golden Shiner	Adults	6,511
	Threadfin Shad	Fingerlings	5,160
	Triploid Grass Carp	Adults	150
Girard Park Pond	Channel Catfish	Adults	266
	Rainbow Trout	Adults	600
Grand Bayou Reservoir	Channel Catfish	Fingerlings	41,191
	Florida Largemouth Bass	Fingerlings	31,701
Gum Springs	Channel Catfish	Fingerlings	268
Hardwater Lake	Florida Largemouth Bass	Fingerlings	10,142
Holbrook Park Pond	Bluegill	Fingerlings	3,180
Iatt Lake	Triploid Grass Carp	Adults	49,001
Indian Creek Reservoir	Florida Largemouth Bass	Fry	480,900
	Triploid Grass Carp	Adults	3,004
Ivan Lake	Triploid Grass Carp	Adult	250
Jackson VA Home	Channel Catfish	Fingerlings	165
Kincaid Lake	Channel Catfish	Fingerlings	19,998
Kiroli Park	Channel Catfish	Fingerlings	801
Lacassine Pool	Florida Largemouth Bass	Fingerlings	131,874
Lamar Dixon 11-acre Pond	Channel Catfish	Adults	500
	Channel Catfish	Fingerlings	509
Lake Arthur and Mementau River	Paddlefish	Fry	133,808
	Paddlefish	Fingerlings	2,583
Lake Bruin	Alligator Gar	Fingerlings	374
	Florida Largemouth Bass	Fingerlings	20,256
	Hybrid Striped Bass	Fingerlings	30,000
Lake Buhlow	Channel Catfish	Fingerlings	3,003
Lake Claiborne	Hybrid Striped Bass	Fingerlings	64,000
Lake Concordia	Hybrid Striped Bass	Fingerlings	10,500
Lake LaFourche	Florida Largemouth Bass	Fry	524,700
Lake Providence	Alligator Gar	Fingerlings	381
Lake St. John	Florida Largemouth Bass	Fingerlings	18,330
	Hybrid Striped Bass	Fingerlings	21,000
Larto Lake	Florida Largemouth Bass	Fingerlings	81,650
LDWF Woodworth Outdoor Education Center	Bluegill	Adults	160
	Channel Catfish	Fingerlings	499
Martin Lake	Triploid Grass Carp	Adults	2,680
Millers Lake	Florida Largemouth Bass	Fingerlings	32,004
Moore Park	Channel Catfish	Fingerlings	298
N.O. City Park	Florida Largemouth Bass	Adults	100

WATERBODY	SPECIES	SIZE	NUMBER STOCKED
Perez Park Pond	Bluegill	Adults	300
Pierson Lake	Bluegill	Fingerlings	26,500
	Channel Catfish	Fingerlings	1,204
Poverty Point Reservoir	Florida Largemouth Bass	Fingerlings	20,131
	Hybrid Striped Bass	Fingerlings	30,000
Red River Pool 1	Florida Largemouth Bass	Phase 2 Fingerlings	8,000
Red River Pool 3	Florida Largemouth Bass	Phase 2 Fingerlings	8,000
Red River Pool 4	Florida Largemouth Bass	Phase 2 Fingerlings	8,000
Red River Pool 5	Florida Largemouth Bass	Fingerlings	134,800
	Florida Largemouth Bass	Phase 2 Fingerlings	8,000
Rockefeller Refuge	Florida Largemouth Bass	Fingerlings	113,745
Sam Houston	Triploid Grass Carp	Adults	200
Sicily Island WMA	Channel Catfish	Fingerlings	1,005
Sidney Hutchinson Pond	Bluegill	Fingerlings	2,650
	Channel Catfish	Adults	200
Sherburne WMA Pond	Channel Catfish	Fingerlings	304
Spanish Lake	Alligator Gar	Fingerlings	557
	Blue Catfish	Fingerlings	16,571
	Channel Catfish	Fingerlings	61,066
	Hybrid Striped Bass	Fingerlings	12,000
Spring Bayou	Florida Largemouth Bass	Fingerlings	27,308
	Triploid Grass Carp	Adults	1,500
St. Tammany Parish Coroner's Office Pond	Bluegill	Adults	900
	Channel Catfish	Adults	136
Stuart Lake	Channel Catfish	Adults	250
Tensas NWR	Florida Largemouth Bass	Fingerlings	308
Thistlethwaite WMA	Channel Catfish	Fingerlings	304
Torres Park Pond	Channel Catfish	Adults	300
	Rainbow Trout	Adults	1,055
Toledo Bend	Florida Largemouth Bass	Fry	1,253,700
	Florida Largemouth Bass	Fingerlings	813,341
	Florida Largemouth Bass	Phase 2 Fingerlings	7,546
Valentine Lake	Channel Catfish	Adults	350
Vernon Lake	Florida Largemouth Bass	Fingerlings	84,021
Veterans Park	Channel Catfish	Fingerlings	204
Waddell Ponds	Channel Catfish	Fingerlings	984
West Feliciana Parish Sports Park	Channel Catfish	Fingerlings	375
Woolen Lake	Channel Catfish	Fingerlings	1,000
	Florida Largemouth Bass	Fry	492,300
Zemurray Park Pond	Bluegill	Adults	300
	Channel Catfish	Adults	400
	Rainbow Trout	Adults	763
TOTAL			7,244,019

For Non-Florida Largemouth Bass: Fry<0.25"; Fingerlings = 1-<12"; 1Yr-Old – 1 year old in age (length varies); Adult – sexually mature (length varies)

For Florida Largemouth Bass: Fry <0.25"; Fingerlings = 2-3"; Phase 2 Fingerlings = 3"+; 1 Yr Old – 1 year old in age (length varies);

Adult – sexually mature (length varies)

FISHERIES OUTREACH AND EDUCATION PROJECTS

OUTREACH

The Aquatic Outreach and Education Program is designed to inform the public about the 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 over 80,000 Louisiana citizens in FY 2015-2016.

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

LDWF staff also worked effortlessly to gain the interest of women new to the outdoors with the desire to fish. A partnership between LDWF, CCA of Louisiana, Cabela's and National Wildlife Federation afforded many women an opportunity to attend a one-day Women's Fish Tagging Workshop to provide them with the tools to be confident enough to fish on their own. Upon completion of the one-day workshop, participants were entered into a lottery drawing for an opportunity to attend a Women's Fishing Weekend in Grand Isle.

Fisheries Extension also partnered with Wildlife's Education division to expand on LDWF's Aquatic Education program. With the creation of the Aquatic Volunteer Instructor Program, numerous 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 provides activity guides, lesson plans and LDWF resources for volunteers to utilize. In addition, loaner kits with equipment necessary to offer the activities and lessons are available to all certified volunteer (*Table 6*).

LDWF organized three "Get Out and Fish!" events this year at community parks that are new to our Community Fishing Program. Each of the parks (Zemurray Park in Hammond, Sidney Torres in Chalmette, and BREC's Burbank Park in Baton Rouge) hosted a "Get Out and Fish!" event with the initial stocking of adult size fish in their community pond. The events were led by LDWF staff and volunteers. Each event offered a fishing competition as well as "how to" demonstrations for everything necessary to fish successfully at that location. Over 1,000 participants enjoyed fishing and hands-on lessons to help them gain knowledge to return and fish at these easily accessible sites.

LDWF hosted a Family Fish Fest which provides exciting activities such as fishing, fish tagging, fish aging, fish identification, casting instruction, seining, cast netting, knot tying and more. Participants are provided with applicable literature and materials ranging from fishing regulations to basic fishing tackle.

Our fisheries biologists also work 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.

This fiscal year, staff utilized several educational resources including a casting inflatable, mobile touch tank, mobile aquariums and LDWF's mascot, "Robbie the Redfish."

LOUISIANA SALTWATER SERIES

The Louisiana Saltwater Series was created by the Louisiana Wildlife and Fisheries Foundation to promote the conservation and enhancement of Louisiana's saltwater sport fish resources, while providing a competitive opportunity for avid fishermen and newcomers alike. The Louisiana Saltwater Series events also feature a youth division, and are used to encourage participation in the Louisiana Cooperative Marine Sport Fish Tagging Program, presenting the unique opportunity to tag and release large numbers of fish at one time and location.

Louisiana Saltwater Series events occurring during FY 2015-2016 span the last three tournaments of the 2015 series, including the championship, as well as the first four tournaments of the 2016 series (one of which was cancelled due to severe weather). LDWF biologists staff each tournament and tag fish when the Aquarium of the Americas tagging crew is unavailable. The Audubon Aquarium of the Americas staff attended the Louisiana Saltwater Series championship event in Venice, tagging fish and provided technical support and information to the anglers regarding best fish handling practices.

There were a total of 523 redfish tagged at Louisiana Saltwater Series events in FY 2015-2016, with an overall reported recapture rate of 10.7 percent (*Table 7*). The recapture rates are variable for each tournament, with the overall rate consistently higher than typical results observed in the Cooperative Tagging Program. The event with the highest reported recaptures for this fiscal year was the 2016 tournament in Grand Isle, with a recapture rate of over 26 percent.

TABLE 6.

LDWF VOLUNTEER INSTRUCTOR PROGRAM FY 2015-2016					
# of Workshops	# of Volunteers Trained	# of Active Volunteers	# of Single Day Events	# of Multi-Day Events	Total # of Hours Volunteered
7	52	24	14	4	250.75



Two volunteers reach over 900 students during the Iberville Ag Adventure Day.

CRAB TRAP REMOVAL

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 January 2016, the Louisiana Wildlife and Fisheries Commission ratified a final rule authorizing three temporary crab trap closures and two derelict crab trap cleanups.

The Lake Pontchartrain cleanup, headed by the Lake Pontchartrain Basin Foundation, was based out of Pelican Pointe Marina in Orleans Parish on Feb. 13, 2016. Volunteers from the Lake Pontchartrain Basin Foundation, USFWS and local chapters of CCA of Louisiana worked with LDWF personnel to collect 554 traps during the event, and LDWF and Lake Pontchartrain Basin Foundation staff continued to collect an additional 832 traps during the closure for a grand total of 1,386 traps removed.

The Barataria Basin cleanup, headed by the Barataria-Terrebonne National Estuary Program (BTNEP), was staged out of Jean Lafitte Harbor in Jefferson Parish on Feb. 20, 2016. Volunteers from BTNEP, local CCA chapters and commercial crabbers worked in coordination with LDWF to collect 874 traps. During the remaining closure period, an additional 320 traps were collected, for a total of 1,194 traps removed.

TABLE 8. 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	2	2,580	31+
Total	21	27,366	351+

TABLE 7. Redfish tagged and recaptured during FY 2015-2016 Louisiana Saltwater Series Tournaments.

DATE	LOCATION	TEAMS	REDFISH TAGGED	REDFISH RECAPTURED	RECAPTURE RATE
Aug. 22, 2015	Sweetwater Marina (Delacroix)	60	117	11	9.4%
Sept. 19, 2015	Quintana Landing (Cypremort Point)	18	33	5	15.2%
Oct. 9-10, 2015	Venice Marina (Venice)	25	139	5	3.6%
March 12, 2016	Delta Marina (Empire)	Cancelled due to severe weather			
April 9, 2016	Bridgeside Marina (Grand Isle)	34	75	20	26.7%
May 7, 2016	Campo's Marina (Shell Beach)	52	86	6	7.0%
June 11, 2016	Tradewinds Marina (Cocodrie)	38	73	9	12.3%



FIGURE 15. Map of derelict crab trap closures and cleanups since 2004.



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 manmade 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 Hospitals and the Louisiana Department of Agriculture and Forestry, has the ability to communicate to the consumers that the seafood they are consuming is caught by a licensed Louisiana fisherman, landed in Louisiana, and processed by a Louisiana processor through the entire supply chain. The ability to create a national brand that can be sought out by chefs, consumers, distributors and retail chains will increase the demand and thereby prices for the Louisiana seafood fishery.

Several changes and developments to the program were implemented during FY 2013-2014 including the transition to an online application process as well as supply chain verification through invoice validation. Also introduced was a product registration requirement - retail packages possessing the program's logo must register with LDWF. In FY 2014-2015, the online renewal process was simplified, allowing participants to easily renew their permit instead of reapplying. Before applying, applicants must also participate in a 45-minute training video available through the program's website. Once permitted, participants are given access to a participant portal where they may access program logo files and verify participation of their supply chain in the Louisiana Wild Seafood Certification Program. Additionally, program participants are eligible for grant funds through the Seafood Technology and Equipment Program to assist them in increasing product quality and complying with program regulations.

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 FY 2015-2016 the focus has been to build the interest of the program amongst the public to demand Louisiana seafood.

As of FY 2015-2016 there were a total of 128 permitted seafood businesses participating in the program. Restaurant participation was increased by 150 percent, and several "certified" labeled seafood retail packages are being sold in grocery markets across the state.

The goal of a seafood 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 retailers worldwide have been under increasing pressure to "prove" the seafood they are sourcing is from sustainable fisheries. Similar requirements are now being made by many United States buyers and retailers. 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. In June 2016, the Louisiana blue crab fishery successfully completed its fourth and final Marine Stewardship Council audit. All pre-existing conditions were closed out, although one new condition was added. This certification ends March 2017, and the Louisiana Blue Crab Task Force has decided to forego re-certification. LDWF will therefore no longer administer the certification. However, an industry member has volunteered to renew the certification and allow it to continue to be applied to the entire Louisiana blue crab fishery.

In addition to Marine Stewardship Council certification, the Office of Fisheries has been developing a Gulf-centric sustainability certification system in partnership with the Audubon Nature Institute. The Audubon Gulf United for Lasting Fisheries program is leading the development of this Responsible Fisheries Management certification system based on the United Nations Food and Agriculture Organization and International Standards Organizations protocols. LDWF participates on the Audubon Gulf United for Lasting Fisheries Technical Advisory Committee, which met in September 2014, April 2015, July 2015, December 2015, March 2016 and July 2016. Other discussions were held via conference call and internet-based technologies. Pre-assessments for Louisiana blue crab and oyster certification were conducted in February 2015 against the Audubon standard; full assessments began in 2016.

We are continually vetting our program with seafood buyers to ensure Louisiana seafood and the Audubon Gulf United for Lasting Fisheries 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 United for Lasting Fisheries - Responsible Fisheries Man-

agement and the Marine Stewardship Council programs. Based on these pre-assessments, the Audubon Nature Institute will lead a joint fishery improvement project encompassing issues identified in both pre-assessments. Preliminary meetings among Audubon, LDWF, and potential industry participants were held in the summer and will be held into the fall of 2016, with expectations of a full project in place by early 2017.

FINFO

Developed in cooperation with GSMFC and the other Gulf states, FINFO is a web-based portal that provides seafood buyers with easy to understand, science-based information about the responsible management of Gulf fisheries and the sustainability of Gulf seafood.

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 their industry.

Louisiana Fisheries Forward, Advancing Our Seafood Industry, is an LDWF Office of Fisheries, collaborative effort with Louisiana SeaGrant 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 2015 to June 2016, LDWF and Louisiana SeaGrant continued to execute Phase II of Louisiana Fisheries Forward; mainly, the production and post production of the training videos. Additionally, work continued on the production of educational materials (referred to as fact sheets), the offering of in-person training sessions (referred to as dock days), a refrigeration demonstration project, the Louisiana Fisheries Forward website

(<http://lafisheriesforward.org>) and an annual fisheries summit. Within the time frame as noted previously, aside from the voluntary component of Louisiana Fisheries Forward, the Commercial Crab Trap Gear Requirement was suspended, and then resumed, the Oyster Harvester Training Requirement was established and being developed (<http://www.wlf.louisiana.gov/mandatory-oyster-harvester-training>) as well as the exploration and communication of Phase III for Louisiana Fisheries Forward. As a sidebar initiative, Proposed Nearshore Artificial Reef Planning Areas was established, developed and executed as an information/communications plan (<http://www.lafisheriesforward.org/artificialreef/>).

Phase II training videos

(available on <http://lafisheriesforward.org>):

- Best Practices for Oyster Harvesters
- Best Practices for Commercial Shrimpers
- Best Business Practices for Commercial Fin Fishermen
- Fisheries Management and the Regulatory Process

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). By June 2016, there were approximately 88 active participants and approximately 205 participants who completed the requirement. Commercial Crab Gear Requirement details are available at www.wlf.la.gov/crabtraining.

By June 2016, Phase II of Louisiana Fisheries Forward was nearing completion. Within Phase II, as noted previously, four videos were being produced with corresponding fact sheets, several hands-on workshops were be-

ing offered to include new and trending topics, and the Louisiana Fisheries Forward Refrigeration Demo Unit was being utilized on a regular basis (a 6,500 lb. unit that consists of a brine freezer, plate freezer and chilled water system).

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, and 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 three active task forces: Shrimp, Oyster and Crab. 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 2015-2016, the Shrimp Task Force met on Sept. 14, 2015, Dec. 9, 2015, Feb.

3, 2016, Feb. 17, 2016, and April 20, 2016.

Agenda items discussed include:

- Gulf-wide seafood certification and the Louisiana Wild Seafood Certification
- Recommendations for fall 2015/2016 shrimp season
- TEDs testing in skimmer nets
- Amending the shrimp 'Inside/Outside Line'
- Refrigeration Grant Program
- Shrimp enforcement and penalties
- Funding of Louisiana Seafood Board salaries through Task Force funds
- Audubon Gulf United for Lasting Fisheries/ Marine Stewardship Council Certifications
- Federal shrimp permits and Amendment 17 A,B
- Draft resolution to reduce Gulf hypoxic zone

TABLE 9. Louisiana Fisheries Forward Commercial Crab Gear Requirement.

PROGRAM STATUS	APPRENTICESHIP	SPONSORSHIP	GRAND TOTAL
Applicant Ineligible	19	59	78
Approved	11	64	75
Conditionally Approved	7	6	13
M S Ineligible	15	32	47
In Review	0	1	1
Opt Out	2	5	7
Program Completed	43	162	205
Grand Total	97	329	426

CRAB TASK FORCE

The Crab Task Force continued to work with the Office of Fisheries in FY 2015-2016 toward improving the Louisiana crab fishery. The task force met on July 21, 2015, Sept. 22, 2015, Oct. 8, 2015, Nov. 17, 2015, Jan. 12, 2016, April 5, 2016, June 8, 2016. Agenda items discussed include:

- Louisiana Fisheries Forward Program and crab gear license requirements
- Sustainability Certification and industry options (Marine Stewardship Council/ Audubon Gulf United for Lasting Fisheries Certifications)
- 2015 legislative session report
- 2015/2016 Derelict Crab Trap Clean-up
- Crab possession limits and new regulations
- Actions for restricted crabbing areas
- Recreational crabbing management options
- Blue Crab Mark-Recapture Study
- Crab Stock Assessment results
- Blue Crab Management Plan
- Penalties for undersized crabs
- Results from the LDWF Cooperative Research Survey

Permits

- Changing the term 'dredges' to 'scrapers'
- Resolving Dual-Claim Issues
- Additional enforcement needs
- Coastal Restoration and Master Plan Impacts to the Industry
- Washington D.C. Mardi Gras events
- Oyster Hatchery operation and construction schedule
- Sustainability Certification
- ISSC regulatory changes
- Supplemental oyster monitoring for opening of Bonnet-Carre Spillway

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.

OYSTER TASK FORCE

In FY 2015-2016, the Oyster Task Force met on Aug. 26 2015, Sept. 23, 2015, Nov. 10, 2015, Dec. 15, 2015, Feb. 2, 2016, Mar. 2, 2016, Mar. 29, 2016, May 17, 2016. Agenda items discussed include:

- 2015 Louisiana Oyster Stock Assessment
- 2015-2016 Oyster Season
- 2015-2016 Oyster Harvest Summary
- Reporting of Harvest (trip tickets/mini-sack issue)
- Modifying the Severance Tax
- Dealer/Harvester Education Requirements/Louisiana Fisheries Forward Content
- Lifting the Oyster Lease Moratorium
- Gear Regulations and Permit Fees for Public Oyster Seed Ground Vessel

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 2015-2016, 17 Fiscal and Economic Impact Statements were developed and published along with the Notices of Intent in the Louisiana Register.

The following programs, projects and surveys were conducted in FY 2015-2016.

SURVEYS

SURVEY OF NATIONAL HUNTING AND FISHING DAY PARTICIPANTS

On Sept. 26, 2015, 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 sur-

veys of 379 participants in this event. Results of this survey were completed and sent to the LDWF Public Information Section in October 2015.

SURVEY OF LOUISIANA RECREATIONAL OFFSHORE LANDINGS PERMIT HOLDERS

In September and October 2015, the Socioeconomic Research and Development staff conducted an online survey of 19,036 individuals who held a Recreational Offshore Landings Permit (ROLP) and provided a verified e-mail address on the topic of regional management of the red snapper fishery in the Gulf of Mexico. The survey registered 5,938 responses for a response rate of 32.1 percent.

PUBLICATIONS, REPORTS AND PRESENTATIONS

Isaacs, Jack C. "Results of an Online Survey of Louisiana Recreational Offshore Landings Permit Holders," October, 2015.

Isaacs, Jack C. "Summary of a Survey of Participants in the 2015 Louisiana Department of Wildlife and Fisheries National Hunting and Fishing Day Event." October, 2015.

Isaacs, Jack C. "Entry, Exit, and Continuous Participation in Louisiana's Fisheries among Licensed Commercial Fishermen." Presentation at the meeting of the Center for Natural Resource Economics and Policy, New Orleans, Louisiana, March 21, 2016.

Tabarestani, Maryam, Jack C. Isaacs, and Alex Miller. "Gulf of Mexico Inshore Recreational Shrimping Survey, 2014." Presentation at the meeting of the Center for Natural Resource Economics and Policy, New Orleans, Louisiana, March 22, 2016.

Tabarestani, Maryam, Walter Keithly and Wes Harrison. "An Analysis of the Influence of U.S. Imports by Products on the Gulf of Mexico Dockside Price." Presentation at the meeting of the Center for Natural Resource Economics and Policy, New Orleans, Louisiana, March 22, 2016.

Tabarestani, Maryam, Walter Keithly and Wes Harrison. "A Dynamic Demand System for U.S.

Oysters by Source and the Influence of Exogenous Shocks, 1984-2014." Presentation at the meeting of the Center for Natural Resource Economics and Policy, New Orleans, Louisiana, March 22, 2016.

REPRESENTATION ON TASK FORCES, STUDY GROUPS AND COMMITTEES

During FY 2014-2015, Socioeconomic Research and Development staff members represented LDWF on the following task forces, study groups and committees:

- GSMFC FIN Social/Economic Work Group
- Louisiana Blue Crab Task Force
- Louisiana Shrimp Task Force
- Socioeconomic Scientific and Statistical Committee (Socioeconomic SSC) of the Gulf of Mexico Fishery Management Council
- Technical Advisory Committee for the USFWS's National Survey of Fishing, Hunting and Wildlife-Associated Recreation.

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 Myron Fischer, 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.

Further information can be located at gulfcouncil.org.

GULF STATES MARINE FISHERIES COMMISSION

The Gulf States Marine Fisheries Commission (GSMFC), 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 GSMFC 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. Additionally, Fisheries biologists serve on a number of GSMFC 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.

REPORT ACRONYMS

ALAS - Archery in Louisiana Schools
BTNEP - Barataria-Terrebonne National Estuary Program
CCA - Coastal Conservation Association
CNCP - Coastal Nutria Control Program
CPRA - Coastal Protection and Restoration Authority
CWPPRA - Coastal Wetlands Planning, Protection and Restoration Act
DMAP - Deer Management Assistance Program
EGCP - East Gulf Coastal Plain WMAs
EOR - Element Occurrence Records
FP&C - Facility Planning and Control
FY - Fiscal Year
GOHSEP - Governor's Office of Homeland Security and Emergency Preparedness
GSMFC - Gulf States Marine Fisheries Commission
LAA - Limited Access Area
LCC - Landscape Conservation Cooperative
LDEQ - Louisiana Department of Environmental Quality
LDNR - Louisiana Department of Natural Resources
LDWF - Louisiana Department of Wildlife and Fisheries
LDWF-LED - Louisiana Department of Wildlife and Fisheries Law Enforcement Division
LEEC - Louisiana Environmental Education Commission
LNHP - Louisiana Natural Heritage Program
LSU - Louisiana State University
LSUSVM - LSU School of Veterinary Medicine
MAVN - Mississippi Alluvial Valley - North WMAs
MAVS - Mississippi Alluvial Valley - South WMAs
MSRT - Maritime Special Response Team
NASBLA - National Association of State Boating Law Administrators
NAWCA - North American Wetland Conservation Act
NAWMP - North American Waterfowl Management
NOAA - National Oceanic and Atmospheric Administration
NMFS - National Marine Fisheries Service
NRCS - USDA Natural Resources Conservation Service
NRDA - Natural Resource Damage Assessment
NWR - National Wildlife Refuge
NWTF - National Wild Turkey Federation
RWR - Rockefeller Wildlife Refuge
SEAFWA - Southeastern Association of Fish and Wildlife Agencies
SEAMAP - Southeast Area Monitoring and Assessment Program
SGCN - Species of Greatest Conservation Need
SWG - State Wildlife Grant
USACE - U.S. Army Corps of Engineers
USDA - U.S. Department of Agriculture
USFWS - U.S. Fish and Wildlife Service
USGS - U.S. Geological Service
WAP - Wildlife Action Plan
WET - Watershed Experience Tracker
WGCP - West Gulf Coastal Plain WMAs
WLWCA - White Lake Wetlands Conservation Area
WMA - Wildlife Management Area

