State Agency: Louisiana Department of Wildlife and Fisheries

Grant Title: Assessing Seaside Sparrow (*Ammodramus maritimus*) Abundance, Distribution, Annual Survivorship, and Nesting Productivity in Southwest Louisiana

Grant Number: TBD

Grant Period: August 1, 2018–June 30, 2021

Grant Costs: Federal Share: $103,695
State Share: $55,837
Total Cost: $159,532

Grant Funding: State Wildlife Grants

Grant Coordinator:
Sam Holcomb
2000 Quail Drive, Baton Rouge, LA 70898
sholcomb@wlf.la.gov
225-765-0239

Grant Description: The Seaside Sparrow is a permanent resident in Louisiana and is identified as a Species of Greatest Conservation Need (SGCN) in the Louisiana Wildlife Action Plan (WAP; Holcomb et al. 2015) with a state ranking of S4. It is also considered a priority species by the Gulf Coast Joint Venture and Partners in Flight Landbird Conservation Plan for the Gulf Coastal Prairie region (Vermillion et al. 2008). The population in Louisiana has been estimated at 20,000 individuals (Partners in Flight Science Committee 2013) and is potentially threatened due to loss of marsh habitat. Seasonal survivorship rates will be estimated and assessments will be made to determine the current abundance and distribution in relation to habitat changes. This information may be used to guide management decisions for the northern Gulf of Mexico population.

Need: The Seaside Sparrow, which Lowery (1960) referred to as the most appropriately named species of bird, is one of only five species of terrestrial vertebrates in the world that is restricted to coastal marsh (Greenberg et al. 2006), and is therefore an ideal candidate to serve as an indicator species of coastal ecosystem health. Loss of coastal marsh habitat is likely the greatest limiting factor for the species (Vermillion et al. 2008). As outlined in the Louisiana WAP, the main threats to brackish and salt marshes are anthropogenic effects, subsidence, and increased frequency and intensity of tropical storms associated with climate change.

Because the Seaside Sparrow spends its entire life cycle in coastal marshes, it is critical to evaluate rates of survivorship during the breeding and non-breeding seasons to determine accurate population estimates which may be used to model responses to predicted habitat changes. Traditional means used to estimate seasonal abundance such as Breeding Bird Surveys and Christmas Bird Counts prove to be difficult for some bird species inhabiting coastal environments, particularly for one that is restricted to coastal marsh where roadways are sparse and surveys by boat are infrequent and limited in scope. In addition, juvenile survival data are lacking and there are no data on winter survival. Furthermore, insights into Seaside Sparrow movements during major storm events can increase our knowledge of available suitable habitat required for displaced individuals (Stouffer et al. 2013).

Recent studies of Seaside Sparrows in Louisiana have occurred primarily in the southeastern portion of the state in response to the Deepwater Horizon Oil Spill (see Stouffer et al. 2013, Olin et al. 2017). Gabrey and Afton (2000, 2004) studied the abundance of male Seaside Sparrows in burned and unburned plots at Rockefeller Wildlife Refuge in the 1990s but little research has been conducted in the subsequent 20 years in the southwestern part of the state. Furthermore, there is much discrepancy in recent estimates of population size in Louisiana. Stouffer et al. (2013) collected point count data at study sites in the Lower Barataria region and estimated, on the upper bounds, more than 700,000 individuals at the end of the breeding season. In contrast, Partners in Flight estimated a population of 20,000 individuals for the entire state of Louisiana (Partners in Flight Science Committee 2013). Additional research is needed to determine more accurate estimates of Seaside Sparrow populations.

Objectives:

1) To estimate seasonal survivorship rates for adults and juveniles, especially during the non-breeding season.
2) To determine the current abundance and distribution of Seaside Sparrows and other priority marsh bird species at study sites in southwest Louisiana in order to assess the accuracy of recent population estimates.
3) To assess breeding productivity through nest searching and monitoring, and examine the habitat characteristics that most influence nest success.
4) To use radio telemetry devices (e.g., NanoTags) to track the distribution of marked individuals providing additional insight into seasonal movements and potential displacement from major storm events.
5) To further examine those fire management practices that provide the most benefits to Seaside Sparrows and other high-priority marsh species.

Expected Benefits: The proposed research project will provide much needed insight into the current status of the population by providing estimates of abundance, distribution, survivorship, and productivity. Currently, there is a considerable discrepancy in population estimates for Louisiana (see Partners in Flight Science Committee 2013 and Stouffer et al. 2013). The proposed study would better assess the accuracy of those estimates and could be used to model the response of populations to predicted habitat changes. The Seaside Sparrow is an obligate coastal marsh species, and therefore, it is important to study its basic life history and breeding ecology to better inform habitat management decisions and help predict the effects of future threats to tidal marshes (Lehmicke 2014). This study would collect substantial amounts of data on the habitat requirements during the breeding and non-breeding seasons. Information related to nest-site selection and nest success will provide a better understanding of high quality nesting habitat. In addition, information on the frequency of burning and comparing seasonal fire management strategies can be incorporated into future marsh management planning that provides ideal habitat conditions for Seaside Sparrows and other high-priority marsh species (Vermillion et al. 2008).

Approach:

1) *Bird Callback Surveys* – Beginning in the spring of 2019, I will conduct secretive marsh bird callback surveys utilizing the standardized North American marsh bird monitoring protocols, otherwise referred to as the “Conway protocol” (Conway 2011), to determine the abundance and distribution of Seaside Sparrows and other marsh-dependent species in brackish and salt marshes at Rockefeller Wildlife Refuge. The Conway protocol incorporates a multi-species

survey design so that several focal species can be evaluated. I will focus on priority emergent marsh birds listed in the WAP including Black Rail, Clapper Rail, Least Bittern, King Rail, Common Gallinule, Purple Gallinule, American Coot, Pied-billed Grebe, and Marsh Wren. These surveys will be repeated each spring to estimate population trends at a local scale and evaluate effects of various management actions. Having a multi-species approach can better assess the degree of interaction between Seaside Sparrows and other marsh-inhabiting species of concern.

2) *Mist-netting and Banding* – Mist nets (3-7 nets measuring 12 m or 6 m x 2.6 m x 30 mm mesh) will be placed in a line on study plots and Seaside Sparrows will be flushed into the nets by people walking towards the nets. Each captured bird will be banded with a numbered aluminum USGS leg band and a unique combination of 1-3 colored plastic leg bands to facilitate individual recognition. Banded Seaside Sparrows will be aged as adult or juvenile using plumage characteristics (Pyle et al. 1991). Additional data such as subcutaneous fat, unflattened wing chord, mass, etc. will be recorded. The GPS location where each banded individual is captured will also be documented. Banding efforts will take place in the spring during the breeding season and in the fall during the post-breeding season. During the breeding season, captured adults will be banded and sexed based on the presence of a brood patch or cloacal protuberance (Pyle et al. 1991). A sample of nests will be selected in which nestlings of a certain age (~7-8 days old) will be banded with an aluminum leg band and 1 colored plastic leg band so that estimates on post-fledging survival can be attained based on resighted and/or recaptured individuals. This mark-recapture technique will be used to help estimate the number of Seaside Sparrows in the local population, site fidelity, and provide data on annual survivorship.
3) *Nest Searching and Monitoring* – Nest searching will take place from March – June throughout study plots in managed and unmanaged marshes at Rockefeller Wildlife Refuge. Nest searching will follow standardized protocols outlined in the Saltmarsh Habitat and Avian Research Program (SHARP) standard operating procedure (Ruskin et al. 2017). Nest searching will involve observing parental behavior indicative of active nesting such as adults carrying nest building material or food. Systematic searches throughout the study plots will also be used to flush incubating birds from nests. Each nest will be marked with flagging ~5 m away and a GPS location taken at the nest. A nest card will be used to record pertinent information and a small map of the immediate area will be drawn on the back of the card indicating the exact location of the nest so that it can be easily found on subsequent nest checks. Nests will be checked every 3-4 days and the contents monitored to determine success or failure. Additionally, camera traps will be deployed at a sample of active nests to determine causes of failure including disturbance, predation, flooding, etc. Nest searching and monitoring is labor intensive and a study of this scope will require multiple observers. There is also the potential for extremely high tides or major storm events during the breeding season to cause significant nest failure. However, nest success data are critical in determining accurate estimates of the productivity and sustainability of a population.
4) *Radio Telemetry Attachment and Spatial Distribution Monitoring* – A sample of Seaside Sparrows captured during banding efforts will be fitted with radio transmitters to track the movements of individuals. A combination of traditional VHF transmitters and NanoTags will be externally mounted to the backs of birds using a harness system. The entire weight of the transmitter and harness should not exceed 3-4% of the weight of the bird (Fair et al. 2010). Those individuals receiving conventional VHF transmitters will be manually tracked using radio telemetry equipment which consists of a hand-held antenna attached by a coaxial cable to a VHF receiver. This technique will allow ground-based tracking to accurately locate signals through triangulation which would be most beneficial during the breeding season to help determine territory size. Territory sizes across the species' range are highly variable (Post and Greenlaw

2009) and utilizing techniques such as the spot-mapping method (Ralph et al. 1993) to determine territory boundaries has proven difficult for Seaside Sparrows (Gabrey and Afton 2000). An accurate estimate of average territory size is an important parameter in habitat models. Avian NanoTags, produced by Lotek Wireless, Inc., utilize an automated radio-tracking system and unique coded transmitter technology to track hundreds of transmitters on a single frequency, while retaining the ability to identify individual birds. Receiver stations in the Motus-compatible SPDOR VHF network will record the identity of birds within the range of an antenna (~10-15 km away). There are currently two receiver stations located on Rockefeller Wildlife Refuge (Fig. 1). Deployment of NanoTag transmitters would be most beneficial on juveniles that may disperse from their natal grounds in the fall or on adults that may be displaced in the spring or summer ahead of a major storm event that is predicted to make landfall near the refuge with the assumption that there is enough time to safely and quickly deploy the transmitters.

5) *Vegetation Surveys* – Vegetation sampling will be conducted at all bird callback survey locations, all confirmed nest sites, and at random points within breeding territories. Vegetation surveys at bird callback locations will take place during the summer once all callback surveys have been completed. Following SHARP vegetation protocols, a 50-m radius circle centered on the survey point will be used to estimate cover classes of the plant community. Dominant species (>5% cover) will be recorded. Within each survey plot, a 100-m transect that bisects the plot center will be sampled every 10 m to document vegetation, standing water, bare ground, algae, wrack, etc. At nest sites, visual obstruction readings (Robel et al. 1970) will be recorded at the nest in each cardinal direction. Percent total vegetation cover and percent dead vegetation cover will also be estimated at the nest (Chabreck et al. 1985). Additional nesting data such as height above ground/water at high tide, distance to nearest creek/open body of water, etc. will be collected. For each nest site, a non-use point will be surveyed, following the same methods, that is located a random distance and compass bearing from the nest.
6) *Prescribed Fire* – Study plots will receive a prescribed fire treatment to determine Seaside Sparrow response to associated changes in habitat. Managed burns of variable timing and frequency will help our understanding of the role of fire in the conservation of coastal marsh birds in the Chenier Plain (Gabrey and Afton 2000). Traditionally, prescribed fire in coastal marshes have occurred in the fall/winter to promote conditions that are most beneficial for waterfowl (Nyman and Chabreck 1995). Little is known, however, of the impacts of experimental burns conducted in the summer growing season. Therefore, I propose a combination of prescribed fire in the growing (summer) and dormant (winter) seasons to determine the most desirable fire management practices that are ideal for Seaside Sparrows and other high-priority marsh bird species.

Literature Cited:

Chabreck, R. H., J. A. Vaughn, M. W. Olinde, and D. F. Carney. 1985. Vegetational characteristics and duck food availability and use in a Louisiana fresh marsh. Pp. 17–25 *in* Proceedings of the 4th coastal marsh and estuary management symposium (C. F. Bryan, P. J. Zwank, and R. H. Chabreck, eds.). Louisiana Cooperative Fish and Wildlife Research Unit, Baton Rouge.

Conway, C. J. 2011. Standardized North American marsh bird monitoring protocol. Waterbirds 34:319–346.

Fair, J., E. Paul, and J. Jones. 2010. Guidelines to the use of wild birds in research, Third edition. Ornithological Council, Washington, DC.

Gabrey, S. W. and A. D. Afton. 2000. Effects of winter marsh burning on abundance and nesting activity of Louisiana Seaside Sparrows in the Gulf Coast Chenier Plain. Wilson Bulletin 112:365–372.

Gabrey, S. W. and A. D. Afton. 2004. Composition of breeding bird communities in the Gulf Coast Chenier Plain marshes: Effects of winter burning. Southeastern Naturalist 3:173–185.

Greenberg, R., J. Maldonado, S. Droege, and M. V. McDonald. 2006. Tidal marshes: A global perspective on the evolution and conservation of their terrestrial vertebrates. Bioscience 56:675–685.

Holcomb, S. R., A. A. Bass, C. S. Reid, M. A. Seymour, N. F. Lorenz. B. B. Gregory, S. M. Javed, and K. F. Balkum. 2015. Louisiana Wildlife Action Plan. Louisiana Department of Wildlife and Fisheries. Baton Rouge, Louisiana.

Lehmicke, A. J. J. 2014. Breeding ecology of the Seaside Sparrow (*Ammodramus maritimus*) in Northern Gulf of Mexico tidal salt marshes. Ph.D. dissertation, University of Georgia, Athens, Georgia.

Lowery, G. H., Jr. 1960. Louisiana birds. Louisiana State University Press, Baton Rouge, Louisiana. 567 p.

Nyman, J. A. and R. H. Chabreck. 1995. Fire in coastal marshes: history and recent concerns. Proceedings of the Tall Timbers Fire Ecology Conference 19:427–460.

Olin, J. A., C. M. Bergeon Burns, S. Woltmann, S. S. Taylor, P. C. Stouffer, W. Bam, L. Hooper-Bui, and R. E. Turner. 2017. Seaside Sparrows reveal contrasting food web responses to large-scale stressors in coastal Louisiana saltmarshes. Ecosphere 8:e01878.

Partners in Flight Science Committee. 2013. Population Estimates Database, version 2013. Available at http://pif.birdsconservancy.org/PopEstimates. Accessed on 27 February 2018.

Post, W. and J. S. Greenlaw. 2009. Seaside Sparrow (*Ammodramus maritimus*), version 2.0. *In* The Birds of North America (P. G. Rodewald, editor). Cornell Lab of Ornithology, Ithaca, New York.

Pyle, P. J., S. N. G. Howell, R. P. Yunick, and D. F. DeSante. 1991. Identification guide to North American passerines. Slate Creek Press, Bolinas, California.

Ralph, C. J., G. R. Geupel, P. Pyle, T. E. Martin, and D. F. DeSante. 1993. Handbook for field methods for monitoring landbirds. General Technical Report PSW-GTR-144, U.S. Forest Service, Albany, California.

Robel, R. J., J. N. Briggs, A. D. Dayton, and L. C. Hulbert. 1970. Relationships between visual obstruction measurements and weight of grassland vegetation. Journal of Range Management 23:295–297.

Ruskin, K. J., M. A. Etterson, T. P. Hodgman, A. C. Borowske, J. B. Cohen, C. S. Elphick, C. R. Field, R. A. Kern, E. King, A. R. Kocek, A. I. Kovach, K. M. O'Brien, N. Pau, W. G. Shriver, J. Walsh, and B. J. Olsen. 2017. Seasonal fecundity is not related to geographic position across a species' global range despite a central peak in abundance. Oecologia 183:291–301.

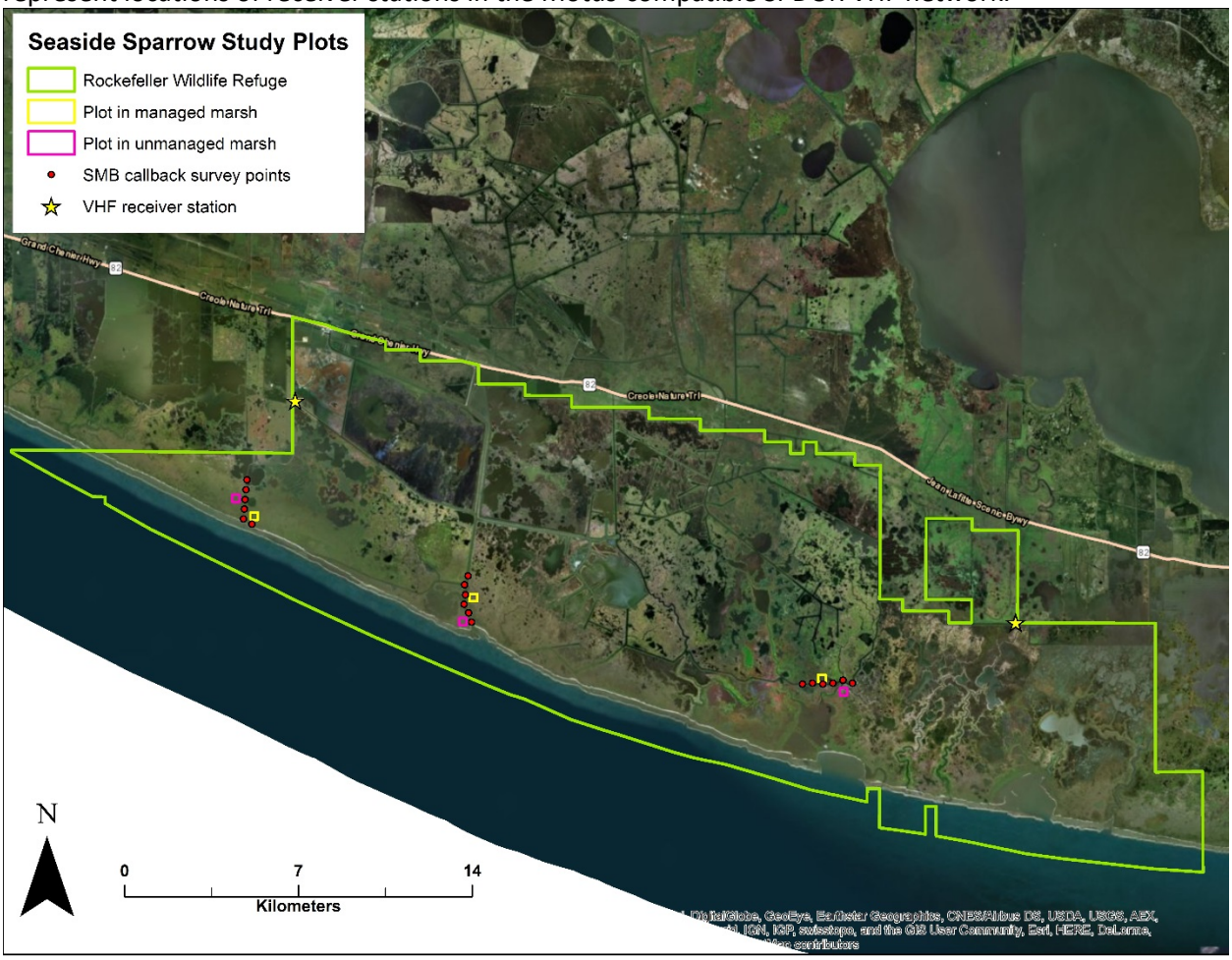
Stouffer, P. C., S. S. Taylor, S. Woltmann, C. M. Bergeon Burns, T. F. Shupe, and M. S. Bowen. 2013. Staying alive on the edge of the Earth: Response of Seaside Sparrows (*Ammodramus maritimus*) to salt marsh inundation, with implications for storms, spills, and climate change. Pp. 82–93 *in* Proceedings of the 4th Louisiana Natural Resources Symposium (T. F. Shupe and M. S. Bowen, eds.).

Vermillion, W., J. W. Eley, B. Wilson, S. Heath, and M. Parr. 2008. Partners in Flight Bird Conservation Plan Gulf Coast Prairie. Gulf Coast Joint Venture and Gulf Coast Bird Observatory. Lake Jackson, Texas.

Useful Life: N/A

Geographic Location: Rockefeller Wildlife Refuge. See map below.

Figure 1. Potential Seaside Sparrow study plots include managed and unmanaged coastal marsh. Stars represent locations of receiver stations in the Motus-compatible SPDOR VHF network.



Principal Investigator(s):
Phillip Vasseur
Biologist III, Rockefeller Wildlife Refuge
Grand Chenier, LA 70643
pvasseur@wlf.la.gov
O: (337) 491-2593
C: (337) 356-1653

Co-Principal Investigator
Joseph Marty
Biologist Supervisor, Rockefeller Wildlife Refuge
Grand Chenier, LA 70643
jmarty@wlf.la.gov
O: (337) 491-2593
C: (920) 973-3446

Program Income: N/A

Budget Narrative:

	FY18	FY19	FY20	TOTAL
Salary + Overhead	$25,914.78	$25,914.78	$7,890.38	$59,719.94
Field technicians (up to 4/yr.)	$27,922.50	$27,922.50		$55,845.00
VHF transmitters ($147/unit)	$3,675.00	$3,675.00		$7,350.00
NanoTags ($175/unit)	$4,375.00	$4,375.00		$8,750.00
NanoTag Activation Fees	$1,750.00	$1,750.00		$3,500.00
Field Supplies	$10,187.00			$10,187.00
Travel (conferences, meetings)			$3,000.00	$3,000.00
Publication Fees			$2,500.00	$2,500.00
In-kind Housing	$4,340.00	$4,340.00		$8,680.00
Federal Share (SWG funds)				$103,695.76
State Share (Matching funds)				$55,836.18
Total Cost of Proposed Project				$159,531.94

Relationship with other Grants: N/A

Timeline:

- Aug–Sep 2018: Burn selected study plots and conduct post-burn habitat assessments.
- Oct 2018–Feb 2019: Band Seaside Sparrows and attach NanoTags on a sample of captured birds. Burn selected study plots and conduct post-burn habitat assessments.
- Mar–Jun 2019: Perform nest searching and monitoring. Continue banding efforts and attach VHF radio transmitters to a sample of breeding males to delineate territory boundaries. Deploy cameras at a sample of nests. Conduct vegetation surveys in breeding territories.
- Oct 2019–Feb 2020: Band Seaside Sparrows and attach NanoTags on a sample of captured birds.
- Mar–Jun 2020: Perform nest searching and monitoring. Continue banding efforts and attach VHF radio transmitters to a sample of breeding males to delineate territory boundaries. Deploy cameras at a sample of nests. Conduct vegetation surveys in breeding territories.

- Jul 2020–Jun 2021: Perform data analysis and draft manuscripts

Key Personnel Qualifications and Experience:

Phillip Vasseur (PI)

Phillip will be responsible for conducting preliminary secretive marsh bird callback surveys, setting up study plots, overseeing banding and nest searching operations, and coordinating with Rockefeller staff on prescribed fire management objectives. He will also be responsible for data management, reviewing data for quality assurance/control, analyses, and drafting manuscripts. Phillip has conducted previous research studies with a focus on nest ecology and has extensive experience banding passerines for research projects located in Louisiana, California, and Tennessee. He is actively involved with the Louisiana Bird Observatory network which is a state-wide partnership of bird monitoring stations that collect avian demographic and community assemblage data through year-round censuses and bird banding to support conservation and management decisions.

Joseph Marty (Co-PI)

This work will be conducted in collaboration with and monitored by Joseph Marty, a biologist supervisor at Rockefeller Wildlife Refuge. Joseph will primarily assist with the logistical and financial aspects of the project, and will review results and any publications derived from this research. If needed, Joseph will assist Phillip and other LDWF staff with field work and data analysis.

Michael Seymour and Samuel Holcomb

This work will be conducted in collaboration with Michael Seymour and Samuel Holcomb with the Louisiana Natural Heritage Program (NHP). NHP partners will primarily assist with Motus receiving station settings, placement, and data acquisition from receiving stations. These staff members have been in charge of setting up receiving stations along coastal Louisiana, as well as involvement in projects using NanoTag technology through outside agencies (Audubon and BTNEP).

Field Technicians

TBD – will be responsible for conducting banding operations, nest searching and monitoring, tracking birds with transmitters, maintaining equipment, data entry, conducting sampling and survey efforts within study areas. Two technicians will be needed for winter operations involving NanoTag banding and resighting color-banded individuals to develop survivorship estimates. Additionally, two technicians will be needed for spring operations involving nest searching and monitoring, tracking transmittered males with telemetry equipment, and conducting vegetation surveys.