TIME-CRITICAL NATURAL RESOURCE DAMAGE ASSESSMENT FEASIBILITY STUDY:

ESTIMATING CARCASS DETECTION IN PRIORITY WATERFOWL HABITATS IMPACTED BY THE DEEPWATER HORIZON (MISSISSIPPI CANYON 252) OIL SPILL

August 21, 2010

(Bird Study #11)

Prepared by:
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The primary objective of this proposal is to determine the feasibility of a modified beached bird survey method along representative marsh edge habitats where wintering waterfowl use is anticipated. This pilot project will test the efficacy of a modified (boat-based) beached bird survey along the marsh edge as a mechanism to measure oil-related mortality in waterfowl. There are few places in deltaic Louisiana where the transition from open water to walkable shoreline is not separated by expansive stands of emergent plants, leaving the vast majority of habitats inaccessible to anything but airboats or aircraft. Even if the traditional walking beached bird survey is modified to what we term a "marsh edge survey," data regarding the detectability of carcasses in these unique habitats are lacking. This pilot project would attempt to fill that data gap by conducting searches of marsh edge habitats with airboats or other appropriate observation methods or "platforms" (e.g., airboats, other watercraft). Experimental tests of survey accuracy would involve seeding areas with a known number of carcasses and then conducting counts following the beached bird survey approach. There is considerable need for timely information on how to assess oil impacts on the massive numbers of migratory waterfowl that will soon begin arriving in the Gulf of Mexico. Accurate assessments of mortality are imperative, and the data provided by this time-critical feasibility study will inform the study design for the wintering waterfowl injury assessment (Bird Study #10, in preparation).

Objectives

Estimate search team carcass detection rates along marsh edge habitats that are likely to support substantial numbers of wintering waterfowl (based on distribution data) within the oil impact zone by:

1. Experimentally placing marked carcasses (i.e., carcass seeding) on marsh edge transects to be searched using standard methods;
2. Conducting carcass searches in varied habitat types within the oil impact zone; and
3. Testing each relevant observation method or platform

Project Location

The pilot project will occur at selected representative habitat types in the Louisiana deltaic plain.

Project Timeline

To guide injury assessment method selection, data regarding carcass detectability are needed; consequently, this time-critical feasibility project would begin in late August and data collection would be complete by the end of September 2010.

Project Summary and Background

The Deepwater Horizon (MC252) oil spill began April 20, 2010. The Natural Resource Trustees with particular interest in birds consist of the Department of the Interior (U.S. Fish and Wildlife Service and National Park Service), the National Oceanic and Atmospheric Administration, and the natural resource agencies of the States of Texas, Louisiana, Mississippi, Alabama, and Florida. The Trustees are authorized under the Oil Pollution Act (33 U.S.C. 2701 *et seq.*) and the Comprehensive Environmental Response, and Liability Act (42 U.S.C. 9601 *et seq.*) to assess natural resource damages associated with the harm caused to natural resources by the discharges of oil and releases of hazardous substances respectively. The Preassessment activities proposed in this study plan are part of the natural resource damage assessment being conducted by the Trustees.

Every year, millions of waterfowl travel from breeding grounds in Canada and the northern United States to the marshes, bays, and estuaries of the Gulf coastal states through the North American migration flyways, where they stop over before continuing their southward migration, reside temporarily before redistributing to more northward southern U.S. habitats, or spend the winter. For example, Louisiana's coastal wetlands support vast numbers of migrating and wintering waterbirds, especially waterfowl, during fall and winter months (Bellrose 1980). Millions of waterfowl use coastal wetlands as migratory and wintering habitat, and they have considerable cultural and recreational value to Gulf Coast residents and other wildlife enthusiasts throughout North America (Enck et al. 2006, USFWS 2006). Fall migrants have already begun to arrive in the northern Gulf of Mexico; accordingly, there is an immediate need for a feasibility study to validate the preferred methodological approach to quantify oil-related mortality in waterfowl.

Waterfowl exposed to oil may die from ingestion or because oiled feathers decreases their ability to thermoregulate, ultimately leading to death from exposure (Fry and Lowenstine 1985, Piatt et al. 1990). Birds killed by oil or rendered flightless typically drift or eventually swim to a shoreline, but not always (Flint and Fowler 1998). Accumulation at the shoreline facilitates the task of counting birds that are impacted. The standard operating procedure for assessment of oil spill mortality involves "beached bird counts" (Rotello et al. 2003). Beached bird surveys were developed for offshore spills in regions with fairly firm sandy or rocky shorelines (Burger and Fry 1993, Rotello et al. 2003, Wiese and Ryan 2003). Unique site-specific conditions (e.g., un-walkable vast marsh shorelines) of coastal Louisiana will require habitat-specific evaluation of the feasibility of applying the beached bird survey approach.

The anticipated procedure for estimating the total number of spill-related bird mortalities in the Deepwater Horizon Natural Resource Damage Assessment is the beached bird survey (Bird Study #1), which entails teams of workers scanning shorelines typically by foot to collect beached carcasses. These data are used to determine a carcass deposition rate which is entered into a model that estimates the total number of birds that beached, and from that number, the number of carcasses whose demise were spill-related. The Trustees have already implemented these efforts focused primarily on collecting carcasses on and near coastal shorelines; ultimately, results of this effort are used in the Beached Bird Model. While the Beached Bird Model is effective on beaches on outer coasts and sandy or rocky beaches within bays, its performance in the context of marshes or bayous which do not have a distinct shoreline is not well understood. Rather than beaching in clearly defined areas which are relatively easy to search, dead birds may

be scattered across large areas of open water or along the edges of vegetated islands. Although there is the potential for significant numbers of birds to die in the marsh or to drift into the marsh, to date there are no standard protocols for determining the number of these birds.

It is anticipated that a modified beached bird survey (utilizing airboats and skiffs along the marsh edge) will be needed in waterfowl habitats. Carcass detection in marsh edge environments is likely to differ substantially from coastal beach habitats and carcasses or moribund birds may be difficult to detect in the concealing vegetation that characterizes most of the marsh shoreline. Consequently, a rapid research evaluation of the efficacy of the marsh edge beached bird method for surveying impacted birds in important waterfowl habitats is needed before vast numbers of migrant waterfowl reach the spill-impacted zone.

The proposed activities described in this time-critical feasibility study are not duplicative of any work described in Bird Study #1 (or its supplemental work plan focused on searcher efficiency in beach and barrier island habitats, in development). This pilot study is unique in that it will refine our understanding of waterfowl carcass detection in marsh edge habitats where the beached bird survey has been little used. Rapid evaluation of feasibility study results will allow the waterfowl Trustee Technical Work Group (TWG) preliminary habitat-specific carcass detectability information for marsh edges. Ultimately, if pilot study results suggest that marsh edge surveys are feasible, expanded site-specific and surveyor-specific searcher efficiency studies (evaluating specific search modes, search teams, depth of visibility into the marsh along transects identified for survey in the waterfowl injury assessment) may be implemented.

Methods

We propose to evaluate the accuracy of marsh edge surveys for detecting impacted waterfowl. One of the best ways to evaluate accuracy of counts is to compare estimates from a defined estimation method to a known population (Barnes and Belthoff 2008). In our experimental tests, the known population will be a set of un-oiled carcasses obtained from government agencies, research organizations, and/or other sources. Initial Trustee evaluations of carcass availability suggest that sufficient carcasses can be made available for this study or commercially obtained. Study protocols are discussed in greater detail in Appendix A; a synopsis follows.

Two-kilometer study transects will be randomly selected from a set of estuarine areas that (1) reflect representative habitat types, (2) are likely to support substantial numbers of wintering waterfowl (based on distribution data from decades of aerial waterfowl surveys), and (3) are likely to be impacted by oil (based on oil distribution histories and projections). Initially, the feasibility study pilot will focus on transects in Louisiana (e.g., outermost fringe of wetlands and the adjacent open water bays in the central and eastern coastal segments). These near-shore open water habitats are used extensively by diving ducks, including scaup, canvasback, and redheads, which have been reported to be susceptible to oiling (Holland-Bartels et al. 1998, Irons et al. 2000).

We will seed each study transect with a known number of subtly marked un-oiled carcasses. This method has the advantage of establishing a known number of carcasses to be found by survey teams. Given that detection rates are likely lower than actual carcass densities on the

beach, we will randomly assign a number of carcasses to each test transect (with an anticipated average seeding density of 10 carcasses per kilometer).

All carcasses will be recovered after search teams complete study transects. Missing carcasses, if any, will be noted by study participants. Standard protocols for conducting beached bird searches (Bird Study #1) will be used. Communication with response personnel will be important to ensure that carcasses placed for this study are not inadvertently logged as evidence and mistaken for "natually-occurring" carcasses; accordingly, study teams will affix to each carcass contact information and indication of the research purpose (to be positioned such that it is not visible to the search team). The exact GPS location of the carcass will be recorded as well as the vegetation obstruction class for that area (ultimately if a marsh edge beached bird survey is used in the waterfowl injury assessment, we anticipate a need for additional study of observable distance along the transect). Transects will be evaluated using each relevant observation method or platform expected to be used in the wintering waterfowl injury assessment. The count of observed carcasses from each survey will be compared with the known number of carcasses in the transect at the time of the survey to determine detection rates in the marsh edge zone.

Literature Cited

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Flint, P. L., and A. C. Fowler. 1998. A drift experiment to assess the influence of wind on recovery of oiled seabirds. Marine Pollution Bulletin 36:165-166.

Fry, D. M., and L. J. Lowenstine. 1985. Pathology of common murres and Cassin's auklets exposed to oil. Archives of Environmental Contaminants and Toxicology 14:725-737.

Holland-Bartels, L. B., B. E. Ballachey, M. A. Bishop, J. L. Bodkin, T. Bowter, T. A. Dean, L. Duffy, D. Eslers, S. C. Jewett, L. L. McDonald, D. McGuire, C. O. O'Clair, A. Rebar, P. W. Snyder, and G. R. VanBlaricom. 1998. Mechanisms of impact on potential recovery of nearshore vertebrate predators. Restoration Project No. 97025. Annu. Rep., U.S. Fish and Wildlife Service, Anchorage, AK, USA.

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Piatt, J. F., C. J. Jensink, W. Butler, M. Kendziorek, and D. R. Nysewander. 1990. Immediate impact of the Exxon Valdez oil spill on marine birds. The Auk 107:387-397.

Roletto, J., J. Mortensonm, I. Harrald, J. Hall, and L. Grella. 2003. Beached bird surveys and chronic oil pollution in Central California. Marine Ornithology 31:21-28.

USFWS. 2006. National survey of Fishing, Hunting, and Wildlife-Associated Recreation. Pages 157 *in* Fish and Wildlife Service, U.S. Department of the Interior and U.S. Department of Commerce, U.S. Census Bureau, editor. Washington, DC USA.

Wiese, F. K., and P. C. Ryan. 2003. The extent of chronic marine oil pollution in southeastern Newfoundland waters assessed through beached bird surveys 1984-1999. Marine Pollution Bulletin 46:1090-1101.

TIME-CRITICAL NATURAL RESOURCE DAMAGE ASSESSMENT FEASIBILITY STUDY: ESTIMATING CARCASS DETECTION IN PRIORITY WATERFOWL HABITATS IMPACTED BY THE DEEPWATER HORIZON (MISSISSIPPI CANYON 252) OIL SPILL

BIRD STUDY #11

Approval of this work plan is for the purpose of obtaining data for the Natural Resources Damage Assessment. Parties reserve their rights to produce their own independent interpretations and analyses of any data collected pursuant to this work plan

APPROVAL

8/23/10

Trustee NRDA Bird Group Lead Date

FOR ROLAND GUIDRY

8/27/10

State of Louisiana Trustee Representative Date

APPENDIX A. Protocol for Carcass Detection Pilot Work

The objective of the project is to determine detection rates for waterfowl and waterbird carcasses along vegetated shorelines using trained observers traversing edge habitats (*Spartina* and *Phragmites*) via flat bottom outboard skiffs and airboat observation. A modified beached bird survey technique will be needed in Gulf Coast wetlands because the edge habitat is not sandy or rocky shoreline, but is vegetated and often un-walkable because of the essential lack of a mineral substrate in much of the Deltaic Plane. Therefore, boats are required not just to gain access to potential transect sites but to also traverse the transect.

Methodology: Before initiating surveys, survey teams will conduct reconnaissance of target habitats meeting the feasibility study objectives. Feasibility study areas will be chosen based on consultation with wetland and waterfowl scientists/managers from Louisiana State Univeristy (LSU) and Louisiana Department of Wildlife and Fisheries (LDWF) familiar with the potential areas. In addition, the transects will be placed as close as possible to feasible boat launch and lodging sites (Louisiana Universities Marine Consortium; Grand Isle; Leeville; Empire; Pointe A La Hache; Hopedale; Pas A Loutre/Venice; etc.). During reconnaissance, survey crews will identify at least double the number of potential transects that will actually be used; each will be marked with a start and a stop pole with length determined by the serpentine travel distance of a boat crew as determined by a GPS unit. Potential transects will be separated by at least 300 meters. After potential sites are identified, then actual transects will be randomly selected from the potential sites.

Preliminary work to determine appropriate marsh edge carcass placement will be conducted to appropriately simulate how birds settle in the vegetation. The project team will release three carcasses 20 meters upwind from some randomly selected edge sites on an incoming tide and observe them as they float and subsequently lodge in the edge vegetation (carcasses will remain in visible range during the float test). The project leader will use knowledge of the range of carcass lodge sites when he places the actual test carcasses at randomly selected sites on any given transect.

The project leader will seed a known, but variable number of carcasses (at an average seeding density of 10 carcasses per km) on each transect prior to actual survey work. Carcasses will be placed along the transect using an aluminum extension pole so that no walking trails will be made into the vegetation that might provide artificial cues for the survey teams looking for carcasses. During placement, GPS coordinates will be recorded for each seeded carcass. As soon as carcasses are placed in the first transect the project leader will call the survey teams (which will be blinded during carcass seeding and not have knowledge of seeding densities or protocols) and have them initiate surveys. Survey teams will consist of (1) an airboat crew, which will include a contracted airboat driver and one of the three technicians and (2) a skiff crew which will include the other two technicians. Tests of both observation methods (airboat and skiff) will evaluate transects as paired searches. In each case there is a primary observer, which will be one of the technicians, and the boat operator. The boat operator will primarily keep the boat in position as close to the vegetated edge as possible, but he/she may also spend time looking for carcasses and pointing out carcasses to the observer. The track line of the boat as well as the distance from the marsh edge will be recorded during the transect survey. When

carcasses are detected, the distance between the observer and the detected carcass will also be recorded. The airboat crew will precede the skiff crew. This will provide sufficient delay to ensure that the skiff search effort is not influenced by the airboat team detection rates. As the airboat crew runs the survey, they will simply record the GPS coordinates for the carcasses they locate. The skiff crew will record GPS coordinates for the carcasses they locate and place a PVC pole with flagging at the water's edge, perpendicular to the carcass to facilitate relocation of that carcass. There is potential that carcasses will move during the pilot study and not be retrievable. Ultimately, this loss will be reflected in reduced carcasses detection rates. Follow-up studies will be conducted to address carcass persistence. Note that all carcasses will be marked, noting their purpose for the study so as not to be mistaken for natural or spill related mortality.

Transects will be 2 km in length. We anticipate that on most survey days the project leader will seed a minimum of two transects and the skiff and airboat crews can traverse those transects. Dependent on time and feasibility, additional 2 km transects identified during prior reconnaissance will be added as time allows. When both the airboat and skiff tests are complete on a given transect, crews will retrieve the carcasses and place them in ice chests as soon as possible. Accordingly, the test duration will allow sufficient time for two passes of the transect (one pass for each observation platform), and is not anticipated to last more than a half day in total for carcass seeding, transect searcher observations, and carcass retrieval. Carcasses will be reused to the extent possible depending on condition upon retrieval.

The project leader and the survey crew will take Robel pole readings, which will index the vegetation density, both at the time of carcass placement and again upon return to the GPS coordinates (or flag pole) marking each carcass found by search teams. They also will pick five random sites on the transect and record Robel readings to gauge vegetation height and cover density. In addition to Robel readings when the carcasses are deployed, readings will be conducted at the location of any carcass that is located distant from the original seeded location.

Replication: A total of 10 to 20 transects will be included in the pilot effort (representing a minimum of 2 individual transects traversed per day for 5 days). Approximately 75% of transects will be located in *Spartina* dominated habitats and 25% of transects will be located in *Phragmites* dominated habitats. We will run as many transect replicates as possible during the five-day contract period for the airboat and driver, and may ultimately exceed the targeted 10 to 20 transects depending on conditions, but we will remain within the study budget presented. Skiff transect surveys will also be conducted during the five-day period.

Carcasses: Unoiled carcasses will be obtained from government agencies, research organizations, and other commercial sources. Birds used for the carcass seeding will include female mallards (66%) and gull species (33%).

Carcasses per transect: We will randomly assign a number of carcasses to each test transect (with an anticipated average seeding density of 10 carcasses per kilometer). Absent site- and habitat-specific data regarding habitat rates, the average seeding density was determined based on consensus-based input of waterfowl technical experts participating on the technical team.

Timeline: We anticipate that the project would begin in late August and data collection would be complete by September 30, 2010.

Secure commitment for funding by August 31.

August 31 + 0 to 7 days
Get project leader and 3 technicians on site
Service LSU airboat and skiff
Select representative launch sites
Secure carcasses
Take safety training

August 31 + 1 to 2 weeks
Run initial transects using LSU airboat as non-recorded training sessions.
Interview potential airboat contractors and find suitable boat and driver
Run any suggested protocol changes by NRDA working group

August 31 + 2 to 3 weeks
Run transects for 5 days using contracted airboat and driver

August 31 + 3 to 6 weeks
Analysis of data and delivery of preliminary report

August 31 + 4 to 7 weeks
Final report

APPENDIX B. Budget

Personnel	
Dr. Rohwer ( )	$4,500
Dr. Pieron ( )	6,000
Technicians ( )	6,000
Fringe Benefits	
Pieron ( )	2,160
Technician ( )	459
Travel	
Mileage ( )	1,008
Housing at coastal sites	1,200
Supplies	
Fuel, repairs, rental, and maintenance for LSU boats	1,500
Airboat contracting ( )	5,500
Mallards	1,200
Miscellaneous supplies	1,000
	$30,527
Indirect Costs ( )	$12,821
Total	**$43,348**

Biosketch: Dr. Frank C. Rohwer

George Barineau Jr. Professor of Wildlife Ecology
Louisiana State University
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Baton Rouge, LA 70803

Education

B.S. 1976, Wildlife Biology, Kansas State University, Manhattan, KS
M.S. 1980, Wildlife Ecology, Washington State University, Pullman, WA
Ph.D. 1986, Ecology, University of Pennsylvania, Philadelphia, PA

Professional Experience

NSF-NATO Postdoc with Dr. Fred Cooke, Queen's Univ., Kingston, Ontario (1986–1987)
Assistant Professor, U. of Maryland, Center for Environ. and Estuarine Studies (1987–1990)
Assistant Professor, Louisiana State U. and LSU Ag. Center, Baton Rouge, LA (1991–1997)
Associate Professor, Louisiana State U. and LSU Ag. Center, Baton Rouge, LA (1997–2010)

Awards, Professional Honors, and Service

Associate Editor, Journal of Wildlife Management
Scientific Director, Delta Waterfowl Foundation; direct student grants program of about $500,000/year (1991–1997; 2000–2001; 2003–present)
Louisiana Conservation Educator of the Year 2010, Louisiana Wildlife Federation
Selected (2004) as George Barineau Distinguished Professor of Wildlife Ecology, School of Renewable Natural Resources
Member of Executive Board of the Louisiana Association of Professional Biologists and Editor of *The Wildlife News* (1996–2006)
Chair of Student Travel and Presentation Awards Committee for the North American Ornithological Conference in New Orleans (awarded over $42,000 in travel grants to over 100 students)

Recent Teaching

Renewable Natural Resources Policy; Principles of Wildlife Management; Ecology and Management of Waterfowl (graduate); Wildlife Management Techniques; and, Seminars in Avian Life Histories and Human Dimensions of Wildlife Management (graduate)

Relevant Publications

Pieron, M. R., and F. C. Rohwer. 2010. Effects of large-scale predator reduction on nest success of upland nesting ducks. Journal of Wildlife Management 74:124–132.
Baldwin, M. J., Barrow, W. C, Jr., Jeske, C., and Rohwer F. C. 2008. Metabolizable energy in Chinese Tallow fruit for Yellow-rumped Warblers, Northern Cardinals, and American Robins. Wilson Journal of Ornithology 120:525–530.
Baldwin, H.Q., Grace, J. B., Barrow, W. C, Jr., and Rohwer, F. C. 2007. Habitat relationships of birds overwintering in a managed coastal prairie. Wilson Journal of Ornithology 119:189–197.
Johnson, W. P. and F. C. Rohwer. 2007. Early nesting by Blue-winged Teal in coastal Louisiana. Journal of Louisiana Ornithology: In press.

Richkus, K. D., F. C. Rohwer, and M. J. Chamberlain. 2005. Survival and cause-specific mortality of female northern pintails in southern Saskatchewan. Journal of Wildlife Management 69:674–581.

Rohwer, F. C., J. S. Scarth, and R. Olson. 2004. Seasonal reduction of medium-sized mammalian predator populations to enhance waterfowl production – an evaluation of biological factors and barriers to adoption. Transactions North American Wildlife and Natural Resources Conference 67:129–149.

Loos, E. R., and F. C. Rohwer. 2003. Efficiency of nest traps and long-handled nets for capturing upland nesting ducks. Wildlife Society Bulletin 31:1202–1207.

Rohwer, F. C., K. D. Richkus, and D. B. Smith. 2003. Effects of backpack radio packages on mass of captive-reared mallards released in Maryland. Proceedings of the Southeastern Association of Fish and Wildlife Agencies 56:365–373.

Johnson, W. P., R. S. Holbrook, and F. C. Rohwer. 2002. Nesting chronology, clutch size, and egg size in the mottled duck. Wildfowl 53:155–166.

Walters, N. F., F. C. Rohwer, and J. O. Harris. 2002. Nest success and nesting habitats of Mottled Ducks on the Mississippi River Delta in Louisiana. Proceedings of Southeastern Association of Fish and Wildlife Agencies 55:In press.

Garrettson, P. R., and F. C. Rohwer. 2001. Effects of mammalian predator removal on production of upland-nesting ducks in North Dakota. Journal of Wildlife Management 65:398–405.

Holbrook, R. S., F. C. Rohwer, and W. P. Johnson. 2000. Habitat use and productivity of Mottled Ducks on the Atchafalaya River Delta, Louisiana. Proceedings of Southeastern Association of Fish and Wildlife Agencies 54:292–303.

Johnson, W. P., and F. C. Rohwer. 2000. Foraging behavior of green-winged teal and mallards on tidal mudflats in Louisiana. Wetlands 20:184–188.

Recent Grants

Testing Louisiana waterfowl hunter preferences and activities during 2009–2010 hunting season.
2010–2011. Louisiana Department of Wildlife and Fisheries and Delta Waterfowl Foundation $50,000.

Understanding the use of barrier islands as nesting habitat for Louisiana birds of concern 2008–2010. Louisiana Department of Wildlife and Fisheries $133,500.

Seasonal Survival, Movements, and Habitat Use of Mottled Ducks in Texas and Louisiana 2007–2011 LDWF, TPWD, GCJV, Ducks Unlimited and Delta Waterfowl; total project $900,000 in direct funding. Project 50% LSU Ag Center and 50% Texas AM University.

Delta Waterfowl Foundation. Funding for graduate research projects:

Understanding waterfowl hunter preference in the Mississippi Flyway as a guide to maintaining hunter numbers and activity. 2009-2012. Ph.D research for Lucien Laborde, $104,000

Responses of upland nesting waterfowl to predator reduction: a local investigation of density dependence. 2006–2010. Ph.D. research for Matt Pieron. $327,700.

Nest site selection and nest success of upland nesting shorebirds on trapped and non-trapped block in the drift prairie of North Dakota. 2005–2008. M.S. research for Darren Wiens. $112,000.

Quantifying the edge effects associated with predator reduction blocks on the nesting success of upland-nesting ducks in North Dakota. 2005–2008. M.S. research for Margaret Kuhn. $83,000.

Biosketch: Dr. Matthew R. Pieron

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Education

B.S. 1999, Biology, Mount Union College, Alliance, OH
M.S. 2003, Biology, Eastern Kentucky University, Richmond, KY
Ph.D. 2010, Wildlife and Fisheries, Louisiana State University, Baton Rouge, LA

Professional Experience

NAWCA Biologist, USFWS and Ducks Unlimited, Woodworth, ND (2003–2005)
Ph.D. Assistant, Louisiana State U. and LSU Ag. Center, Baton Rouge, LA (2005–2010)
Postdoctoral Fellow, Louisiana State U. and LSU Ag. Center, Baton Rouge, LA (2010–2010)

Awards and Professional Honors

2009 Louisiana Association of Professional Biologists Symposium
-Best PhD Student Presentation
2009 North American Duck Symposium
-PhD Oral Presentation Student Award
-PhD Poster Presentation Student Award
-Robert Helm Student Travel Award
2008 Delta Waterfowl Research Symposium
-Best Ph.D. Student Presentation
-Edward L. Clarke Award
2007 Delta Waterfowl Research Symposium
-Edward L. Clarke Award

Relevant Presentations, Posters, and Publications

Pieron, M. R. 2010. Upland nesting waterfowl population responses to predator reduction in North Dakota. Ph.D. Dissertation, Louisiana State University, Baton Rouge, USA.

Pieron, M. R., and F. C. Rohwer. 2010. Effects of large-scale predator reduction on nest success of upland nesting ducks. Journal of Wildlife Management 74:124–132.

Leumas, C., F. Rohwer, M. Pieron, E. Raynor, and A. Pierce. 2010. The calm after the storm: Do hurricanes help least terns? Poster Presentation. Joint Proceedings of the Cooper Ornithological Society, American Ornithologist's Union, and Society of Canadian Ornithologists. San Diego, CA.

Pieron, M. R., and F. C. Rohwer. 2010. Adaptive management for duck production on the prairies: an overview of 16 years of work on predator management. Louisiana State University Museum of Natural Science Lecture Series.

Amundson, C. A., and M. R. Pieron. 2009. Quantifying the effects of predator management on mallard recruitment in North Dakota. Proceedings of the 5th North American Duck Symposium. Toronto, Canada.

Pagano, A. M., C. L. Amundson, T. W. Arnold, M. R. Pieron, and T. C. Kimmell. 2009. The uses of sightability-adjusted brood-pair ratios to estimate waterfowl productivity. Poster Presentation, Proceedings of the 5th North American Duck Symposium. Toronto, Canada.

Pieron, M. R., F. C. Rohwer, and E. Loos. 2006. Does increased production elevate subsequent local breeding populations? Poster Presentation, Proceedings of the 4th North American Duck Symposium. Bismarck, ND, USA.

Pieron, M. R. 2003. Winter distribution patterns of Ontario-breeding mallards and black ducks. M.S. Thesis, Eastern Kentucky University, Richmond, USA.

Recent Grants

2005 Delta Waterfowl Research Grant: $84,000
2006 Delta Waterfowl Research Grant: $78,200
2007 Delta Waterfowl Research Grant: $97,500
2008 Delta Waterfowl Research Grant: $68,000

Membership and Service

Louisiana Association of Professional Biologists; member and quarterly newsletter editor
The Wildlife Society
Delta Waterfowl Foundation
Ducks Unlimited