

2011-2012 MAIN PROPOSAL

PROJECT TITLE: Gulf Oil Spill Impacts on Minnesota's Migratory Bird Species

I. PROJECT STATEMENT

Since April 2010, the Gulf oil spill has taken on significant dimensions and consequences as the American public first learned of the loss of life at the BP oil rig and then the damage to the offshore fishing, shrimp, and oyster industries; declines in tourism; and the tragic loss of resident wildlife along the coast.

Another consequence of the oil spill has become the potential loss or long term impact on migratory birds from central and eastern North America. For some birds, it could be a one-way trip if impacts are severe or if there is significant contamination of the food chain from petroleum chemicals or derivatives of the poorly-understood dispersants that were used on the oil. Migratory birds that could potentially be affected to some extent include the American bittern, spotted sandpiper, osprey, Franklin's gull, marbled godwit, yellow rail, lesser scaup, and redhead duck. However, consultation with wildlife biologists and conservationists have led to the conclusion that the two most potentially vulnerable Minnesota species are the common loon and American white pelican. The oil spill could affect the wintering survival and long term reproductive success of common loons and American white pelicans. The oil spill could have already taken a toll on these species because young loons hatched in Minnesota in the summers of 2008 and 2009 would have been in the Gulf when the oil spill occurred, and young pelicans hatched in 2009 would have also been present in the Gulf when the oil spill occurred. Subadult loons do not return to Minnesota until the beginning of their third year, and they typically do not begin breeding until their fifth year. Young American white pelicans do not return to Minnesota until spring of their second year.

Past banding studies of loons from Minnesota have demonstrated that some winter off the Atlantic coast from North Carolina southward to Florida, but most winter along the Gulf coast from Alabama and the Florida panhandle southward along the western coast of Florida to the Florida Keys. They use near-shore areas that are generally less than 150 feet deep, but they can dive as deeply as 220 feet in search of fish. Areas from Orange Beach, Alabama, through the Pensacola, Florida area had severe problems with oil washing ashore. Those are areas where loons begin arriving in October and November. To date, it is known that 82 dead loons were found dead as a result of the oil spill, but this may be only a fraction of the loons killed, since loons have a "dense" body structure and will typically sink when mired in oil and never be observed or tallied by observers.

The Minnesota Department of Natural Resources Nongame Wildlife Program in the Division of Ecological and Water Resources has been involved with closely monitoring the statewide population status of common loons since 1994 and American white pelicans since 2004. This data provides an important opportunity to determine if there are detrimental consequences resulting from the oil spill that could cause population declines or threats to the health of those species.

A package of six activities are proposed over the next three years to assess the impact of the Gulf oil spill on common loons and American white pelicans to deal with the questions raised above and to share that information with concerned citizens who wish to know how or if the oil spill has affected Minnesota's wildlife. The activities proposed will provide scientifically valid data documenting any effects – this data will be critical to any related efforts in the Natural Resource Damage Assessment (NRDA) process.

The goals of the activities in this proposal will be 1) to determine if population levels of loons and pelicans experience statistically significant declines in 2011 and 2012 that could be attributable to the oil spill and 2) if other impacts like chemical contamination of tissues, eggs, or blood of those species has occurred due to petroleum or oil dispersants. These pollutants could potentially affect the behavior, migratory abilities, reproductive success, or longevity of the affected birds.

II. DESCRIPTION OF PROJECT ACTIVITIES

Activity 1: Minnesota Loon Monitoring Program (MLMP) and Statistical Analysis of Minnesota Loon Monitoring Program Data from 1994 through 2013. Budget: \$ 20,000

The DNR Nongame Wildlife Program has monitored loons on 600 lakes since 1994. As in the past, the DNR will carry out the MLMP with over 600 volunteers in 2011, 2012, and 2013 and will collaborate with the USGS to conduct an intensive statistical study of the loon monitoring data over the next three years to detect any effect of the Gulf oil spill on Minnesota's loon population size and/or reproductive success.

Investigators: MNDNR and USGS (Richard Baker and Dr. Douglas Johnson)

Outcome	Completion Date
1. Conduct an "incident analysis" of loon population data for 1994 – 2013, and carry out the Minnesota Loon Monitoring Program in 2011, 2012, and 2013 so data can be compared with data collected prior to the Gulf oil spill.	December 31, 2013
2. Develop statistical routines that can be used annually to evaluate changes in Minnesota's loon population	December 31, 2013
3. Produce a final report on whether or not a change associated with the oil spill can be detected in Minnesota's loon population.	December 31, 2013

Activity 2: Migration Patterns, Wintering Distribution, and Blood Chemistry of Common Loons that Breed in Minnesota. Budget: \$ 120,000

Impact assessment will require strong evidence that Minnesota's breeding loons use areas of the Gulf of Mexico that have been impacted by the oil spill. Sixty loons will be fitted with geolocator tags that will record their daily location for a year. The geolocators will require recapture of the loons in 2012 to download the data collected on those loons. Five of these loons will also be fitted with satellite transmitters to track detailed movement in real time for one year. Blood samples will be collected on all loons captured to assess presence of oil residues and dispersants related to the oil spill. The blood samples will be compared with loon blood collected in Minnesota prior to the oil spill.

Investigator: USGS (Kevin Kenow)

Outcome	Completion Date
1. Capture and outfitting of at least 60 Loons in 2011 with geolocator tags	October 1, 2011
2. Capture and outfitting of at least 5 loons with satellite transmitters	October 1, 2011
3. Monitor satellite data for loon movements and survival	June 30, 2013
4. Collect blood samples of captured loons and examine for isotope contaminants. Compare blood data with data from prior pre-spill years.	June 30, 2013
5. Recapture loons with geolocator tags in 2012 to download data	June 30, 2013
6. Produce final report of all studies	December 31, 2013.

Activity 3: Necropsy of Loons Found Dead in MN to Determine Cause of Death and Test for Presence of Oil-Related Contaminants or Oil Spill Dispersants. Budget: \$ 10,000

Approximately 25 loons are found dead each year and this will cover necropsy and analysis of 50 loons over a two year period.

Investigator: MNDNR (Pam Perry)

Outcome	Completion Date
1. Collection and analysis of 40+ loons for cause of death & presence of contaminants, including final report.	December 31, 2013

Activity 4: Statewide 2011/2012 American White Pelican Survey. Budget: \$ 60,000

Survey 16 known pelican nesting sites and check an additional 12 locations that have significant numbers of summering pelicans that could become nesting sites. Ensure that techniques are similar to those used in 2004 and 2010 so that results can be compared with survey results from those years.

Investigators: U of MN (Dr. Francesca Cuthbert & Linda Wires)

Outcome	Completion Date
1. Statewide aerial and ground surveys of American White Pelicans in 2011 and 2012 and preparation of final report comparing counts with those of 2004 and 2009.	December 31, 2013

Activity 5: American White Pelican Egg, Blood, and Tissue Collection and Analysis.

Budget: \$ 35,000

This survey will include collection of at least 60 eggs of American White Pelicans in 2011 at three different nesting colonies (20 per site) as well as tissue samples and blood samples of nestling pelicans to look for the presence of oil-related contaminants or dispersants. Blood plasma samples from pelicans that have been collected by Minnesota researchers Clark and DiMatteo over the past three years will be used to compare results with pre and post-oil spill data.

Investigators: NDSU (Dr. Mark Clark, Wendy Reed, and Jeff DiMatteo)

Outcome	Completion Date
1. Chemical analysis of 20 pelican eggs from each of 3 colonies,	June 30, 2013
2. Collection and analysis of blood and tissue samples from 30 pelicans at 3 colonies including comparison of blood samples with blood plasma collected in 2008, 2009, and 2010 to check for presence of oil and dispersant contaminants.	June 30, 2013
3. Prepare final report on results of egg, blood, and tissue analysis.	December 31, 2013

Activity 6: Education and Outreach of Project Results. Budget: \$ 5,000

News releases and feature stories will be produced by the Nongame Wildlife Program throughout the course of this project regarding the information gathered during this project, including credits to funding from the Environment and Natural Resources Trust Fund (ENRTF). Results will be shared with media for coverage in news stories and include educational products that can be used in classrooms to teach about wildlife conservation and environmental protection.

Collaborators: DNR Nongame Wildlife Program (Lori Naumann and Jan Welsh)

Outcome	Completion Date
1. Produce six news releases and media interviews in FY '12	June 30, 2012
2. Produce six news releases and media interviews in FY '13	June 30, 2013

3. Produce a teacher's lesson plan for use in Project WILD consisting of a case study of how wildlife biologists have studied loons and pelicans to determine if they were affected by the Gulf oil spill.	April 30, 2014
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III. PROJECT STRATEGY

A. Project Team/Partners

This will be a collaborative effort involving the DNR Nongame Wildlife Program (Division of Ecological and Water Resources), University of Minnesota Department of Ecology and Behavioral Biology, US Geological Survey, and North Dakota State University Department of Biology. This unique team brings together Minnesota's best experts on common loons and American white pelicans to evaluate the possible impact of the Gulf oil spill on Minnesota's loons and pelicans.

Dr. Doug Johnson, a wildlife biologist from the US Geological Survey, will collaborate with of the DNR Nongame Research Program to analyze the long term data that has been collected as part of the Minnesota Loon Monitoring Program since 1994 to determine the sensitivity of this data to population changes that could be caused by the Gulf oil spill. Dr. Johnson is widely recognized for his expertise in applying statistical analysis to wildlife data and will carry out the analysis of the Minnesota Loon Monitoring Program data. This component of the project will receive \$20,000 of ENRTF dollars.

Richard Baker is in charge of DNR Nongame Research and has administered the Minnesota Loon Monitoring Program (MLMP) since its inception in 1994. He collaborated in developing the original randomly-based statistical design of the loon survey for 100 lakes in six survey regions. Baker will continue to carry out the collection of data for the Minnesota Loon Monitoring Program in 2011, 2012, and 2013. He will collaborate with Dr. Johnson on the statistical analysis of the Minnesota Loon Monitoring Program data so that data can be compared with data collected prior to the Gulf oil spill. Baker's salary coded this project will serve as in-kind match.

Kevin Kenow is a wildlife researcher in the US Geological Survey researcher who is currently carrying out a botulism study of common loons using geolocators and internal satellite transmitters to monitor migratory movements, survival, and wintering locales for Midwestern loons. He has been involved with loon research for over ten years. This study will enable Kenow to apply the knowledge and experience he has gathered in the USGS botulism study to the proposed loon study in Minnesota. Kenow will carry out all capture of loons, equip them with geolocators and satellite transmitters, monitor subsequent movements of loons equipped with satellite transmitters, and recapture loons in 2012 to download geocator data. This component of the project will receive \$120,000 of ENRTF dollars.

Pam Perry is a DNR Nongame Wildlife Program biologist who has been involved with loon conservation in Minnesota since 1982. She has coordinated past efforts to gather loon carcasses that are encountered by the public and arrange for necropsies to determine the cause of death. Perry will coordinate collection and analysis of loon carcasses to determine presence and concentrations of any petroleum or dispersant residues as well as cause of death. This component of the project will receive \$10,000 of ENRTF dollars. Her salary coded to this project will serve as in-kind match.

Dr. Francesca Cuthbert and Linda Wires from the University of Minnesota Department of Fisheries, Wildlife and Conservation Biology have extensive experience with research on colonial waterbirds have planned and carried out statewide American white pelican surveys in Minnesota in

2004 and 2009. They will be carrying out the statewide pelican surveys in 2011 and 2012. This component of the project will receive \$60,000 of ENRTF dollars. **Katie Haws**, non game wildlife biologist with the DNR Nongame Wildlife Program, has assisted Dr. Cuthbert and Ms. Wires with the previous statewide pelican surveys in both 2004 and 2009. She will assist with this survey as needed and her salary coded to this project will serve as in-kind match.

Dr. Mark Clark, Wendy Reed, and Jeff DiMatteo are from Dept. of Biological Sciences at North Dakota State University. DiMatteo is a doctoral candidate who is currently studying pelican ecology in Minnesota. He has banded over 19,000 pelicans in Minnesota during the past ten years and is familiar with all of the state's pelican colonies. DiMatteo will be collect pelican eggs, blood, and tissue samples for analysis. This component of the project will receive \$35,000 of ENRTF dollars.

Carrol L. Henderson has been the DNR Nongame Wildlife Program supervisor since he founded the program in 1977. He has coordinated statewide efforts for non game wildlife program administration, trumpeter swan restoration, river otter restoration, lakescaping demonstration site projects, Project WILD, and the Digital Photography Bridge to Nature teacher workshops. He has partnered with the Raptor Center, the University of Minnesota, and The Nature Conservancy on peregrine falcon restoration. He has experience as project manager in administering over \$1,250,000 in Environment and Natural Resources Trust Fund projects over the past 12 years. Henderson will serve as the project manager for this project. His salary coded to administer this project will serve as in-kind match.

Lori Naumann and Jan Welsh have more than 15 years of experience in the DNR Nongame Wildlife Program in publicity, outreach, and environmental education. Their salaries coded to this project will serve as in-kind match. Expenditures proposed from the ENRTF will be for development and production of educational teacher materials resulting from this project.

B. Timeline Requirements

The 2011 field season will provide the opportunity for collection of pelican eggs, blood, and tissue samples as well as the capture and outfitting of loons with geolocator tags, satellite transmitters, collection of loon blood, and a statewide survey of white pelicans. The 2012 field season will provide the opportunity for recapture of loons to download geolocator data and take additional blood samples. Another statewide pelican survey will be accomplished in 2012.

Collection and analysis of loon carcasses will be carried out throughout 2011 and 2012, and the MLMP data statistical analysis will be completed after the 2013 field season. Media and publicity efforts for this project will be carried out throughout the biennium, and the educational materials will be developed and produced using the final reports and materials received from the project partners. Those materials should be completed by April 30, 2014.

C. Long-Term Strategy and Future Funding Needs

The need for long term investment in monitoring of common loon and American white pelican populations will depend on the outcome of the studies described above. We should have some indication of how the study is going after the 2011 field season, but those results would be tentative. No additional commitment is sought at this time.

2011-2012 Detailed Project Budget

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IV. TOTAL TRUST FUND REQUEST BUDGET 3 years

<u>BUDGET ITEM</u>	<u>AMOUNT</u>
Personnel: None.	\$ -
Contracts: Contract 1. USGS. Part 1. Statistical "incident analysis" of loon monitoring data.Collaborator, Doug Johnson. Part 2. Capture and outfitting of loons with geolocators and satellite transmitters and taking of blood samples. Followup recapture of loons and monitoring of movements. Analysis of blood samples. Collaborator, Kevin Kenow.	\$140,000
Contract 2. Contractor to be determined. Necropsy and analysis of dead loons for cause of death and presence of petroleum and dispersant residues. Preparation of final report of results.	\$10,000
Contract 3. U of MN, Dept. of Fisheries, Wildlife, and Conservation Biology. Carry out statewide white pelican surveys in 2011 and 2012. Prepare final reports. Collaborators, Dr. Francesca Cuthbert and Linda Wires.	\$60,000
Contract 4. North Dakota State University, Department of Biological Sciences. Collection of white pelican eggs, blood, and tissue samples at pelican colonies and analysis of samples for petroleum and dispersant residues. Preparation of final report. Collaborators, Dr. Mark Clark, Wendy Reed, and Jeff DiMatteo	\$35,000
Contract 5. Contractor to be determined. (annual plan). Development of Classroom Teacher materials relating the ecological lessons and case study of how the Gulf oil spill affected or potentially affected Minnesota's migratory birds like the loon and white pelican.	\$5,000
Equipment/Tools/Supplies: N/A	\$ -
Acquisition (Fee Title or Permanent Easements): N/A	\$ -
Travel: N/A	\$ -
Additional Budget Items:	\$ -
TOTAL ENVIRONMENT & NATURAL RESOURCES TRUST FUND \$ REQUEST	\$ 250,000

V. OTHER FUNDS

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
Other Non-State \$ Being Applied to Project During Project Period: N/A	\$ -	
Other State \$ Being Applied to Project During Project Period: N/A	\$ -	
In-kind Services During Project Period: DNR staff time for project support, coordination, and project management, travel to project sites, LCCMR reporting, photo documentation, and collaboration with researchers.	\$ 18,000	
Remaining \$ from Current ENRTF Appropriation (if applicable): N/A	NA	
Funding History: N/A	NA	

