2011 Project Abstract
For the Period Ending June 30, 2014
PROJECT TITLE: Species of Concern: Investigations
PROJECT MANAGER: Carrol L. Henderson
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WEBSITE: www.mndn.gov
FUNDING SOURCE: Environment and Natural Resources Trust Fund
LEGAL CITATION: M.L. 2011, 1st Special Session, Ch. 2, Art. 3, Sec. 2, Subd. 03p
APPROPRIATION AMOUNT: $ 500,000

PART A - Minnesota Common Loons and American White Pelicans

Overall Project Outcome and Results

Concerns about impacts of the 2010 Deepwater Horizon oil spill on Minnesota loons and white pelicans led to the need for an assessment of the extent to which pelicans and loons were exposed to impacts by PAH (polycyclic aromatic hydrocarbons) petroleum contaminants, which are carcinogenic, mutagenic, and teratogenic, and DOSS (dioctyl sodium sulfosuccinate) contaminants that cause respiratory, nervous system, liver, kidney, and blood disorders, cancer, and hormone disruption.

A statewide pelican count in 2012 showed an increase of 16-19% since 2010 to a level of 22,000 nesting pairs. Pelican egg and bill knob analysis revealed that 58 of 99 pelican eggs had PAH. For bill knobs, 29 of 37 had PAH. DOSS was found in 27 of 48 eggs in 2011 but no DOSS was found in 2012. Fourteen of 37 bill knobs had DOSS. In Phase 2 of this project, pelican eggs will continue to be tested, and a statewide pelican survey in 2015 will include population trend analysis and determination of the ratio of young birds to adults as an indicator of reproductive success.

Loon research included satellite telemetry on 13 loons and geolocator research on 42 loons. This work revealed migration phenology and routes, wintering sites, diving behavior, and on the extent to which PAH and DOSS have been accumulated by loons.

Loon eggs (6 of 27), fat (5 of 29), blood (20 of 52), and feathers (5 of 35) had PAH present. PAH and DOSS contaminants picked up in the Gulf of Mexico could cause

long-term sublethal effects. Phase 2 of this project will involve assessment of egg hatchability and chick survival. This information will be used to develop a federal NRDAR court case to recover damages to Minnesota loons from the Deepwater Horizon oil spill. LCCMR-funded research (phase 2 and 3) will continue through 2017.

Project Results Use and Dissemination

In summer of 2012 Ron Schara's photography team covered the capture and banding with geolocators the loons on Lake George in Anoka County. That story was featured on Minnesota Bound on September 1 and 7, 2013 on KARE-TV.

An article was published in the 2013 January-February issue of the Minnesota Conservation Volunteer magazine. Editor Kathleen Weflen devoted two pages of introduction to this study and reflecting concerns for protecting Minnesota's loons and water quality. The 12-page article "Flying with the Loons" by Adele Porter covered the work by Kevin Kenow and his staff from the US Geological Survey as they have studied Minnesota's loons over the past two years, and cited credits to the Environment and Natural Resources Trust Fund for financial support of this work.

Outdoor reporter Dennis Anderson accompanied the loon capture crew on July 16 and wrote an article in the Star Tribune on July 21, 2013, about this loon research project.

We have received recent requests from the media for updates on this study, but we have been deferring response until we have a more comprehensive analysis of the project results. We are also reluctant to release too much information at this point because BP has hired a person from Maine to find out what we are doing in regard to the loon study. Subsequently, their lawyers may try to use that information to minimize concerns or effects on Minnesota loons and pelicans related to the future NRDAR settlement from BP to the State of Minnesota for damages to the state's loon and pelican population due to the Deepwater Horizon oil spill.

PART B – Breeding Bird Atlas

Overall Project Outcome and Results

The Minnesota Breeding Bird Atlas project represents the most detailed, comprehensive assessment of the breeding distribution of Minnesota's birds ever undertaken. It is a multi-partner project which included: Audubon Minnesota, MN DNR, U.S. Fish and Wildlife Service, Minnesota Ornithologists' Union, individuals from the University of Minnesota, and many others. Representatives from these organizations made up a Steering Committee which helped oversee and advise the project. All field data collection was completed in August 2013 with incidental reports from volunteers coming into the database through September. The project recorded 372,172 bird sightings during the 5-years from 2009 - 2013 all of which are in our database. These sightings report 250 species, 232 of which we consider confirmed breeders. Data was collected from each of the 2,339 priority blocks which represent every Township in Minnesota. Additional point count data was collected from 99.5% of the Townships in Minnesota. Following the completion of our field data collection we reviewed, and reformatted 24 external datasets representing 20,000 records which were added to the database. An extensive quality control program was applied to the data involving species experts, regional reviewers from around the state and a verification committee. The number of registered volunteers in the project totaled 1,144 and they reported driving over 100,000 miles and spending 33,000 hours of contributed effort, which is an underestimate of their contribution since our data relies on self-reporting and we know many volunteers did not report this information. Our website, mnbba.org, which allowed volunteers to report their findings, provide county and species maps and a searchable database continues to provide information to the public. Data analysis and results dissemination will occur over the next 2 – 3 years.

Project Results Use and Dissemination

Preliminary data has been available on the mnbba.org website since the first year of the project. This website provides general information on the project, its methodology, and purpose. Through it data on specific species can be queried and mapped. We will continue to use this url as we migrate data analysis and information to a new format over the next 2 years. We are developing plans to store the data in the Avian Knowledge Network. Publications using BBA data have included the Minnesota Conservation Volunteer and presentations at the Midwest Bird Conservation and Monitoring Network meetings, the Minnesota Chapter of the Wildlife Society, and the Minnesota Ornithologists' Union meetings.

Environment and Natural Resources Trust Fund (ENRTF) M.L.2011
Work Plan Final Report

Date of Report: August 15, 2014
Final Report
Date of Work Program Approval: Part A-Minnesota Common Loons and American White Pelicans-August 11, 2011; Part B-Baseline Information on statewide Bird Distribution and reproductive status-December 7, 2011.
Project Completion Date: June 30, 2014

PROJECT TITLE: Species of Concern: Investigations

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Total ENRTF Project Budget:	**ENRTP Appropriation:**	**$ 500,000**
	Amount Spent:	**$ 493,561**
	Balance:	**$ 6,439**

Appropriation Language:

The LCCMR met on December 7, 2011, reviewed and approved the work program for the appropriation to the DNR in M.L. 2011, 1st Special Session, Ch. 2, Art. 3, Sec. 2 as required by M.S. 116P as signed into law on July 20, 2011.

Legal Citation:

M.L. 2011, 1st Special Session, Ch. 2, Art. 3, Sec. 2, Subd. 03p, "Species of Concern: Investigations." - Part A: Minnesota Common Loons and American White Pelicans for $250,000 was approved on August 11, 2011. Part B: Baseline Information on Statewide Bird Distribution and Reproductive Status for $250,000. At the LCCMR meeting on December 7, 2011, DNR assured members that Part B of this appropriation will continue under contract with the same research team of Audubon Minnesota in collaboration with the Natural Resources Research Institute (NRRI) and Cornell University.

A copy of M.L. 2011, 1st Special Session, Ch. 2, Art. 3, Sec. 2 language is provided with additional requirements specified for the expenditures of these dollars in Subdivisions 11 – 17, Subd. 19 and all provisions of M.S. 116P "Environment and Natural Resources Trust Fund".

PROJECT TITLE: "Species of Concern: Investigations.

This workplan consists of two parts. Part A includes investigations on Minnesota Common Loons and American White Pelicans and details follow here. Part B is for a contract to establish baseline information on statewide bird distribution and reproductive status relating to species of concern.

PART A: COMMON LOONS AND AMERICAN WHITE PELICANS

Summary of Budget Information:	**ENRTF Budget:**	**$ 250,000**
	Amount Spent:	**$ 250,000**
	Balance:	**$ 0**

II. PART A: FINAL PROJECT STATEMENT:

Satellite telemetry and geolocator research on loons resulted in greater understanding of the migration phenology, migration routes, and feeding behavior of wintering loons. Geolocators were placed on 42 loons and were recovered on 19 loons. A statewide population count of white pelicans showed an increase of 16-19% since 2010. Collection of white pelican eggs and bill knobs for contaminant analysis revealed that thirty-five of 66 pelican eggs had petroleum contaminants and 37 bill knobs revealed that 29 of 37 contained petroleum contaminants. Fourteen of the bill knobs had dispersant contamination. Analyses of pelican egg and bill knobs and loon egg, blood, tissues, and feathers for presence of PAH and DOSS contaminants showed that both pelicans and loons had picked up PAH and DOSS contaminants which could contribute to negative sublethal and long term effects on those birds.

The Minnesota Breeding Bird Atlas project represents the most detailed, comprehensive assessment of the breeding distribution of Minnesota's birds ever undertaken. All field data collection was completed in August 2013 with incidental reports coming into September. The project recorded 372,172 bird sightings during the 5-years from 2009 - 2013 which are in our database. These sightings report 250 species, 232 of which we consider confirmed breeders. Data was collected from each of the 2,339 priority blocks which represent every Township in Minnesota. The number of registered volunteers in the project totaled 1,144 and they reported driving over 100,000 miles and spending 33,000 hours of contributed effort, which is an underestimate of their contribution. Data analysis and results dissemination will occur over the next 2 – 3 years.

III. PROJECT STATUS UPDATES:

Project Status as of April 15, 2012:

In July and August of 2011, A total of 30 adult loons and 18 juvenile (young-of-the-year) loons were captured on lakes in Becker, Hubbard, St. Louis, Stearns, and Crow Wing Counties. Satellite transmitters were placed on 13 adult male loons and geolocator tags were placed on 28 adults. Blood samples were collected from all the adult loons and most of the juveniles except those that were too small to draw a sample from. Fat tissue samples were also collected from 11 of the adult male loons that had satellite transmitters implanted. All loons were released on the lakes where they were captured. Following are sites where loons were captured and marked:

Becker County
- Blackbird Lake-3 loons (ONE WITH TRANSMITTER)
- Loon Marsh-1 loon (ONE WITH TRANSMITTER)
- North Tamarac Lake-4 loons (ONE WITH TRANSMITTER)

Crow Wing County
East Fox Lake-2 loons
West Fox lake-2 loons

Hubbard County
Big Mantrap Lake-14 loons (FIVE WITH TRANSMITTERS)

St. Louis County
Burntside Lake-8 loons (TWO WITH TRANSMITTERS)
Rice Bay-4 loons
Vermilion Lake-5 loons (THREE WITH TRANSMITTERS)

Stearns County
Sagatagan Lake-2 loons (ONE WITH TRANSMITTER)

The satellite loons are online and the blood and tissue samples have been forwarded to the University of Connecticut for analysis.

Project Status as of September 15, 2012:

The loon and white pelican project has proceeded on course and on schedule through the summer field season of 2012. The USGS team from LaCrosse, Wisconsin was successful in capturing 9 loons that were banded in 2011 and removing and downloading the geolocator data as planned. Seven loons continue to transmit locations from their satellite transmitters, and an additional 42 loons were captured and outfitted with geolocators in the summer of 2012 and blood samples and feather samples were taken from those loons. At least 11 dead loons and 2 unhatched loon eggs were picked up for necropsy analysis. Additional white pelican eggs and bill knobs were collected at state pelican colonies, mainly at Marsh Lake, and are being held for future analysis pending assessment of the results obtained from analysis of eggs and bill knobs analyzed from 2011. The statewide white pelican count was completed on schedule, with a small decline seen in pelican numbers from 2011 to 2012, from 22,606 to 22,023.

The results of the contaminant testing continue to come in and reveal the levels of contamination by PAH and DOSS contained in the pelicans and loons.

Project Status as of April 15, 2013:

All phases of this project are on track to be completed this field season followed by write-ups and final reports by June 30, 2014. Additional results are still pending for analysis of loon and pelican samples by the University of Connecticut, and in May the US Geological Survey will begin its loon recapture attempts to catch the 42 loons on which they placed geolocators in 2012. Loons with satellite transmitters have begun returning north and can be followed by entering “USGS, loon tracking” in the Google search engine. A total of 38 loons found dead in Minnesota in 2011 and 2013 were necropsied by the Wisconsin DNR veterinary wildlife clinic in Madison, Wisconsin, during the week of March 25, as part of ongoing DNR Nongame Wildlife Program loon mortality studies. Tissue samples and blood samples from those loons are being forwarded to the University of Connecticut for PAH and DOSS analysis and the results should become available this summer.

Project Status as of September 15, 2013:

Recapture efforts for 42 loons that were outfitted with geolocators in 2012 were impeded by a poor hatch this year. Loons are very hard to capture if they are not accompanied by chicks. Only 14 loons were

recaptured. In addition, 8 additional adults and 8 chicks which were captured during the summer. Additional efforts to capture the remaining loons will be made in 2014. Data from the retrieved geolocators will be downloaded and analyzed in the coming months.

Two loons marked with satellite transmitters are still on the air, including one from Big Mantrap Lake near Park Rapids and one from Sagatagan Lake near Collegeville. Their movements can be followed via the USGS website by using Google and entering “USGS, loon tracking.”

A total of 20 pelican eggs collected in 2012 and 15 pelican eggs collected in 2013 will be analyzed by the University of Connecticut for PAH and DOSS contamination. All pelican counts required for this study were completed in 2011 and 2012.The analysis of pelican eggs, loon eggs, loon tissues, and loon blood is still underway and is scheduled for completion by next June 30, 2014.

Another 12 loons have been submitted to the Wisconsin DNR for necropsies. They will submit the tissues and blood to the University of Connecticut for PAH and DOSS analysis.

Project Status as of April 15, 2014:

Progress has continued in the past six months with planning for recapture of loons in the spring of 2014 to recover geolocator tags and continuing collection of blood and feather samples from the loons captured. Their PAH and DOSS levels will be compared with the blood and feather samples taken from the same loons in previous years to see if the levels have increased, decreased, or stayed the same. Volunteers are being recruited to observed geolocator-tagged loons in the spring and summer of 2014 to report on their reproductive success so the contaminant levels recorded in their blood and feather samples can be correlated with their success in laying eggs and raising chicks to fledging. Analysis of blood, egg, and feather samples collected in 2013 continues through the end of the fiscal year to detect presence of PAH and DOSS contamination. Overall, this project is on schedule to accomplish its Activity objectives on schedule. It is anticipated that this project will continue on into FY ’15 with approval of the current LCCMR proposal that is being considered in the Legislature.

Final Report Summary

All four phases of this project were completed as scheduled by June 30, 2014. The satellite telemetry phase resulted in dramatic new information on the phenology and spring and fall pathways of loon migration from Minnesota to the east coast and the Gulf of Mexico and on the location of wintering loons in the Gulf of Mexico. Geolocators were placed on 42 loons and were recovered on 19 loons. The data from the geolocators provided important information on the depths to which loons dive while foraging and suggests that much of their feeding in Lake Michigan in the fall migration and on the wintering grounds is actually on the bottom. This is problematic because in the Gulf of Mexico this is where petroleum contaminants and dispersants from the Deepwater Horizon oil spill would have settled. Blood and feather samples collected from all loons captured have been archived and forwarded to the University of Connecticut for analysis of PAH and DOSS contaminants, and the results have been returned. The results of Activity 1 are included in the final report at the end of the Activity 1 section.

The second phase of this study was to carry out a statewide population count of American white pelicans. The project was contracted to the University of Minnesota. The count was carried out in a manner that was comparable with previous counts done in 2004 and 2010. In 2011, 16 sites were used by 22,506 nesting pairs of pelicans, and in 2012, 15 sites were used by 22,023 nesting pairs of pelicans. These data suggest that the statewide population has increased by 16-19% since 2010. Population level impacts from the Deepwater Horizon oil spill have not yet been detected from these population counts, but longer term sublethal impacts could still occur because of the PAH and DOSS contamination that is

occurring in a high percentage of pelican eggs collected under Activity 3. At the conclusion of Activity 2 is the final report provided on the statewide pelican survey from the University of Minnesota.

The third phase of this project consisted of collecting American white pelican eggs and naturally shed bill knobs and analyzing them for petroleum and dispersant contaminants. A total of 66 pelican eggs and 37 pelican bill knobs were analyzed for petroleum contaminants (PAH) and DOSS by the University of Connecticut. Analysis of 37 bill knobs revealed that 14 had dispersant (DOSS) contamination, with levels ranging mainly from 41.3 to 79.5 parts per billion, with a mean of 115.5 parts per billion. Analysis of 37 bill knobs for PAH revealed that 29 of the 37 contained petroleum contaminants in a range from 1.1 to 73.7 parts per billion, with a mean of 11.2 parts per billion. We have not yet determined if these levels are having long term sublethal effects on the white pelicans that could affect their longevity or reproductive potential. At the conclusion of Activity 3 is the final report on this work.

The fourth phase of this project consisted of analyses of pelican egg and bill knobs and loon egg, blood, tissues, and feathers for presence of PAH and DOSS contaminants with the University of Connecticut.

IV. PROJECT ACTIVITIES AND OUTCOMES:

ACTIVITY 1: Migration Patterns, Wintering Distribution, and Blood and Tissue Analysis of Common Loons that Breed in Minnesota. Budget: $ 89,000. *note: an additional $47,000 of RIM Critical Habitat Matching funds will be provided for additional work on the satellite telemetry and geolocator work on loons in order to accomplish all of the deliverables that are proposed. Total budget for this activity is $136,000.

Description: Geolocators on leg bands of at least 24 common loons will record their daily locations and diving depths for a year. The geolocators will require recapture of the loons and followup field work in 2012 to download the data collected on those loons. At least 12 loons fitted with satellite transmitters will be tracked to detail movement in real time for at least one year including migratory pathways and wintering destinations. This study will provide support for summary and analysis of that work, include analysis of blood samples collected on loons captured to assess presence of petroleum and dispersant residues related to the oil spill, and cover follow-up field studies and loon captures in 2012. The blood samples will be compared with loon blood collected by the USGS in Minnesota prior to the oil spill. Tissue samples will also be collected from loons that are fitted with satellite transmitters to analyze tissues for petroleum and dispersant residues. Investigator: USGS (Kevin Kenow)

Summary Budget Information for Activity 1:	ENRTF Budget:	$ 89,000
	Amount Spent:	$ 89,000
	Balance:	$ 0

Activity Completion Date:

Outcome	*Completion Date*	*Budget*
1. *Monitor satellite and geolocator data on movements and survival of all loons marked with satellite transmitters and geolocators.*	*June 30, 2013*	*$ 15,000*
2. *Upload satellite data for web access of loon tracking and movements and satellite subscription service.*	*December 1, 2011*	*$ 20,000*

Outcome	*Completion Date*	*Budget*
3. *Provide blood and tissue samples from 20 loons captured so the samples can be analyzed for petroleum and dispersant contaminants. Compare blood data with data from collected from loons by the USGS in 2010.*	*Sept. 1, 2012*	*$ 10,000*
4. *Capture an additional 15 loons in 2012 to outfit them with geolocators and recapture loons fitted with geolocators in 2011 with geolocator tags in 2012 to download data.*	*June 30, 2013*	*$ 25,000*
5. *Recapture loons fitted with geolocators in 2012 in 2013 to download movement and diving depth data.*	*October 1, 2013*	*$ 12,000*
6. *Produce final report of all studies*	*December 31, 2013*	*$ 7,000*

Activity Status as of April 15, 2012:

During the summer of 2011, geolocators were placed on 28 adult loons in Becker, Hubband, St. Louis, and Crow Wing Counties, and satellite transmitters were placed on 13 adult male loons. Two adult loons in Stearns County were outfitted with satellite transmitters and geolocators in the summer of 2010. One of those loons died during the fall migration of 2010 in Lake Michigan, and the other loon is still "on the air" and has successfully completed two migrations and continues to nest at Lake Sagatagan at St. John's University.

Blood samples were collected from most adult and juvenile loons (26 adults and 18 juveniles) that were caught in 2011 except for juveniles that were too small). Fatty tissue samples were also collected from the loons receiving satellite transmitters. The blood and tissue samples were forwarded to the University of Connecticut for contaminant analysis. The total number of samples received by UConn was 23 red blood samples and 20 fatty tissue samples.

Of the 13 loons that were outfitted with satellite transmitters in 2011, two have successfully completed their migration and are back in Minnesota at their nesting lakes as of April 9. Four loons are currently en route to Minnesota from the Gulf of Mexico, and two loons are still in the Gulf of Mexico off shore from Florida. One loon died in Minnesota at Burntside Lake last summer, two loons died en route to their wintering grounds in December, and one loon has not been transmitting from the Gulf of Mexico since December 29 and this may reflect a transmitter failure. It will be looked for at its Vermilion Lake breeding territory this summer.

An additional 40 loons will be captured and outfitted with geolocators in the summer of 2012, and loons outfitted with geolocators in 2011 will also be recaptured to download their geolocator data. In late April of 2012, the eight loons that have returned to Minnesota with satellite transmitters will be recaptured and the data on their geolocators will be downloaded.

Activity Status as of September 15, 2012:

There are currently 7 loons with satellite transmitters on the air and they will begin migrating in the next month.

Banding efforts have gone well. So far a total of 30 adult loons have been banded with USFWS bands and 14 juvenile loons have been banded. Similarly, all of those loons have had blood samples taken at the time of capture and the samples are being provided to the University of Connecticut for analysis of PAH and DOSS contaminants. Feather samples have also been taken from all captured loons and are being prepared for submission to UConn for contaminant analysis.

Results of contaminant analysis for 11 fatty tissue samples of loons are still pending from UConn.

In 2011 28 loons were outfitted with geolocators and 9 of those loons were successfully recaptured in 2012 so their movement and diving data could be downloaded. An additional 42 loons were outfitted with geolocators in 2012 and they will be recaptured in 2013 to collect their data.

A total of 22 dead loons found in the summer of 2011 were submitted to the Wisconsin Department of Natural Resources for necropsies, and tissue samples are being forwarded to UConn for analysis. At least 11 loons have been collected in the summer of 2012 for similar analysis and submission to UConn.

Activity Status as of April 15, 2013:

We continued to monitor the movements of five common loons that had been radiomarked during July 2010 and July 2011, despite the fact the transmitters were well beyond their expected life. We continued to make loon movements available to the public through the USGS website at http://www.umesc.usgs.gov/terrestrial/migratory_birds/loons/migrations.html.

Loon blood samples were analyzed from 26 adult and 3 juvenile common loons for concentrations of selected polycyclic aromatic hydrocarbons and a tracer of Corexit oil dispersant (dioctyl sodium sulfosuccinate [DOSS]). While 42% of adult loon blood samples contained detectable levels of PAHs, PAHs were also present in all three of the juvenile loons suggesting a local (breeding ground) contamination source. DOSS was detected in 27% of adult loon blood samples. Both DOSS and PAHs are widely distributed in the environment and the source of these chemicals is yet to be determined. Archived feather samples are available for PAH and DOSS analysis to verify exposure to contaminants while on wintering grounds pending availability of additional funds.

Four marked loons are known to have died during the reporting period: a juvenile loon banded in Anoka County (July 2012) died in late September as the result of ingesting a fish hook in Lake Phalen, St. Paul, MN; an adult loon that was radiomarked in July 2011, died and was scavenged on Lake Vermillion on 25 November; an adult loon banded and fitted with a geolocator tag in Cass County (July 2012) was recovered near Clearwater Beach, Florida on 8 February; and a juvenile loon banded in Crow Wing County (July 2012) was recovered near Orange Beach, Alabama on 24 February. During summer 2013, we plan to focus our efforts on recovery of geolocator tags that were deployed during summers 2011 and 2012.

Activity Status as of September 15, 2013:

In the summer of 2013 a total of 34 loons were captured including 22 adults and 12 juveniles. Of this total, 14 were recaptures of birds with geolocators captured in previous years. Seven of those birds had intact geolocator tags from which migration and pressure data could be retrieved. In addition to those loons, three geolocator tags were recovered from loons in the Gulf of Mexico last winter, giving a total of ten loons from which geolocator data could be retrieved. A total of 16 loons were new captures including 8 adults and 8 juveniles.

Blood and feather samples were collected from 31 loons, including 22 adults and 9 juveniles. These will be forwarded to the University of Connecticut for analysis of PAH and DOSS contamination levels.

Activity Status as of April 15, 2014:

Satellite transmitters and geolocator tags were used to determine the migration patterns and wintering locations of common loons that nested in Minnesota. Satellite transmitters were implanted into 15 adult male loons and geolocator tags were placed on 71 loons, including the 15 with satellite transmitters. This work made it possible to identify the spring and fall migration routes used by the loons and the wintering areas used by them in the Gulf of Mexico. Telemetry data showed that the loons typically winter more than 20 miles offshore in water that is 50 to 100 feet deep. Geolocators revealed than most foraging is done on the bottom rather than near the surface of the Gulf.

Blood (29 samples) and fatty tissue (12 samples) samples were collected from loons and analyzed for petroleum contaminants (PAH) and dispersant contaminants (DOSS). A total of 42% of the blood samples contained PAH contaminants and 27% of those samples contained DOSS contaminants. A total of 17% of the fatty tissue samples contained detectable PAH levels and 17% of the fatty tissue samples contained DOSS contaminants. Three juvenile loons were found to have detectable PAH levels suggesting some petroleum contamination from Minnesota lakes, but the petroleum "footprint" of that PAH would be different from that released by the Deepwater Horizon oil spill.

This research will continue through 2014 and 2015 including implanting satellite transmitters into 15 juvenile loons to determine their patterns of activity in the Gulf of Mexico. They spend their first two years of life in the Gulf after migrating there in their first fall. Additional sampling of blood and feather samples will continue so that any long term trends in contamination and environmental impacts can be determined.

Activity 1: Final Report Summary

See the final report by Kevin Kenow of the USGS titled, "Migration Patterns, Wintering Distribution, and Blood and Tissue Analyses of Common Loons BreedING in Minnesota" on the activities carried out as part of Activity 1:

Final report_07apr14.doc

Activity 2: Statewide 2011/2012 American White Pelican Survey Analysis. Budget: $ 60,000

Description: Analysis of survey results for 16 known American white pelican nesting sites and data from an additional 12 locations that have significant numbers of summering pelicans that could become nesting sites in 2011. Ensure that survey protocol used is similar to that used in 2004 and 2010 so that results can be compared with survey results from those years. Follow up with additional field surveys in 2012 to validate trend information. Investigators: U of MN. Dr. Francesca Cuthbert & Linda Wires.

Summary Budget Information for Activity 2:			
	ENRTF Budget:	$	60,000
	Amount Spent:	$	60,000
	Balance:	$	0

Activity Completion Date: December 31, 2013

Outcome	*Completion Date*	*Budget*
Analysis of statewide aerial and ground surveys of American White Pelicans in 2011 and submission of final report comparing counts with those of 2004 and 2010.	*December 31, 2012*	*$ 30,000*
Follow-up white pelican surveys in 2012 to look for population trends, and preparation of final report.	*December 31, 2013*	*$ 30,000*

Activity Status as of April 15, 2012:

This component of the study on American white pelicans involved two consecutive statewide surveys of Minnesota's AWPE breeding population in 2011 and 2012. The goal of these surveys was to determine if Minnesota's pelican population experienced significant declines in these years that could be attributable to the oil spill. Because of the state's large breeding population and the species' conservation status, regular state-wide monitoring for pelicans had been initiated by the MN Department of Natural Resources in 2004. Since that time, two state-wide surveys have been completed to assess the distribution and abundance of AWPE in Minnesota, the first in 2004-05, and the second in 2010. Fortuitously, this monitoring effort compiled thorough baseline information on AWPEs in Minnesota pre-oil spill. The specific objectives of the 2011 and 2012 surveys are to 1) document distribution and abundance of breeding American White Pelican in each survey year using the same protocol as that used in the earlier surveys; and 2) compare results of the later surveys to the earlier ones to identify changes in abundance and distribution.

The 2011 survey was completed as planned. Table 1 shows results from this survey and compares data obtained with the data obtained in the two previous survey efforts. In the 2011 survey, a total of 22,506 pelican nests were estimated at a total of 16 discrete sites distributed on seven lakes. Marsh Lake and Lake of the Woods each had active colonies on five separate islands. The Marsh Lake complex of colonies continues to comprise most of the state's population (74%), as it did in the two earlier surveys.

Comparison of nest estimates in 2011 to those in 2010 suggests the state population of AWPE increased by 41%. Large increases (ranging from 28 to 134%) were documented at multiple locations, including Marsh Lake, Lake Johanna, Leech Lake, Lake of the Woods, Minnesota Lake and Pigeon Lake.

Table 1. Minnesota breeding site locations and number of nests of American white Pelican, 2004-2011.

Breeding colony locations	Number Nests		
Site	2004/05	2010	2011
Big Twin Lake	16	0	0
Hanska Lake	0	3	0
Lake Hassel	19	0	0
Lake Johanna	97	735	1203
Little Pelican Is, Leech Lake	11	174	239
Red Lake	340	0	0
Swartout Lake	49	913	11
Lake of the Woods - Crowduck	242	408	160
Lake of the Woods- Little Massacre	277	185	533
Lake of the Woods - O'Dell	25	0	450
Lake of the Woods - Red Lake Rk	0	292	43
Lake of the Woods - Techout	25	143	126
Lake of the Woods - Total	569	1028	1312
Marsh Lake - Banding Is	4160	684	1074
Marsh Lake - Big Is	5292	1082	279
Marsh Lake - Curry Is	0	4813	6245
Marsh Lake - Peninsula	2706	4650	8983
Marsh Lake - Small Is	1020	4	0
Marsh Lake - Total	13178	11233[1]	16581
Minnesota Lake - Island	974	622	429
Minnesota Lake - Mainland	0	748	1458
Minnesota Lake - Total	974	1370	1887
Pigeon Lake Bare	357	24	6
Pigeon Lake Veg	0	519	1267
Pigeon Lake-Total	357	543	1273
State Total	15610	15999	22506

[1] = More conservative of two estimates obtained for this location. Less conservative estimate was 14,155 nests.

Activity Status as of September 15, 2012:

A statewide white pelican survey was again carried out in 2012 and the total was very comparable to 2011, showing a slight decline from 7 colonies with 22,506 breeding pairs to 7 colonies with 22,023 pairs. A summary of the counts is shown in the following table.

Breeding colony locations	Number Nests				
Site	2004/05	2010	2011	2012	
Big Twin Lake	16	0	0	0	
Hanska Lake	0	3	0	0	
Lake Hassel	19	0	0	0	
Lake Johanna	97	735	1203	1904	
Little Pelican Is, Leech Lake	11	174	239	314	
Red Lake	340	0	0	0	
Swartout Lake	49	913	11	176	
Lake of the Woods - Crowduck	242	408	160	193	
Lake of the Woods- Little Massacre	277	185	533	248	
Lake of the Woods - O'Dell	25	0	450	442	
Lake of the Woods - Red Lake Rk	0	292	43	60	
Lake of the Woods - Techout	25	143	126	93	
Lake of the Woods - Total	569	1028	1312	1036	
Marsh Lake - Banding Is	4160	684	1074	3579	
Marsh Lake - Big Is	5292	1082	279	6465	
Marsh Lake - Curry Is	0	4813	6245	5163	
Marsh Lake - Peninsula	2706	4650	8983	0	
Marsh Lake - Small Is	1020	4	0	337	
Marsh Lake - Total	13178	11233	16581	15544	
Minnesota Lake - Island	974	622	429	1868	
Minnesota Lake - Mainland	0	748	1458	0	
Minnesota Lake - Total	974	1370	1887	1868	
Pigeon Lake Bare	357	24	6	115	
Pigeon Lake Veg	0	519	1267	1066	
Pigeon Lake-Total	357	543	1273	1181	
State Total	15610	15999	22506	22023	
	16	17	16	15	sites
	10	8	7	7	Lakes

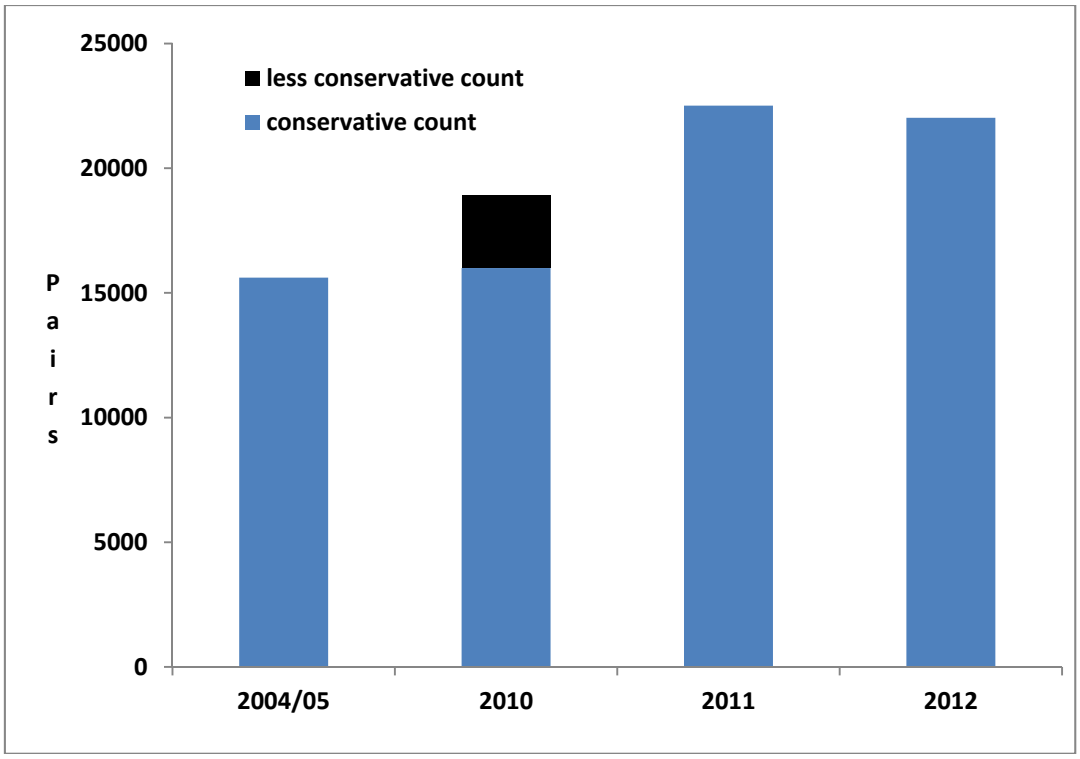


Figure 1. Numbers of American White Pelicans in Minnesota based on 4 statewide censuses, 2004-2012.

Activity Status as of April 15, 2013:

The field work for this project was completed in 2012 and most recent data were submitted to the MN DNR in August of 2012. There are no additional plans for monitoring in 2013.

Activity Status as of September 15, 2013:

Statewide surveys for this project were completed in 2011 and 2012 on schedule. Currently, preparation of a final report summarizing the project with methods, results and discussion is underway and will be submitted prior to December 31, 2013.

Activity Status as of April 15, 2014:

The final report has been submitted for this activity entitled “The American White Pelican in Minnesota after the Deepwater Horizon Oil Spill: Assessing Distribution, Abundance, and Population change.” A total of 53 former or currently active pelican nesting sites were visited in 2011 and 2012 and a total of 17 active sites were encountered in one or both years. In 2011 a total of 16 sites were used by 22,506 nesting pairs of white pelicans, and in 2012, a total of 15 sites were used by a total of 22,023 nesting pairs of pelicans. This data suggests that the statewide population has increased by 16-19% since 2010. Population level impacts from the Deepwater Horizon oil spill have not yet been detected from the population counts done as part of this activity, but longer term sublethal impacts could still occur because of the PAH and DOSS contamination that is occurring in a high percentage of pelican eggs collected under Activity 3.

Activity 2 Final Status Report. August 15, 2014.

See the final report submitted by researchers Dr. Francesca Cuthbert and Linda Wires titled "The American White Pelican in Minnesota after the Deepwater Horizon Oil Spill: Assessing Distribution, Abundance and Population Change" for Activity 2 of this project:

MN Am White Pelican
2011 & 2012--Oil Spill

ACTIVITY 3 Description: American White Pelican Egg, Blood, and Bill Knob Collections.

This activity will include providing 60 eggs laid by American White Pelicans in 2011 at three different Minnesota nesting colonies (20 per site) for analysis of petroleum and dispersant residues by the University of Connecticut. Additional deliverables will include analysis of blood samples from pelican chicks at three colonies, analysis of shed bill knobs from pelicans to look for petroleum and dispersant residues, and preparation of a final report on the findings of the egg, blood, and bill knob analyses.

Summary Budget Information for Activity 3:		
	ENRTF Budget:	$ 35,000
	Amount Spent:	$ 35,000
	Balance:	$ 0

Activity Completion Date:

Outcome	*Completion Date*	*Budget*
***1.** Provide 60 pelican eggs (20 each from 3 colonies) so they can be analyzed by the U of Connecticut for petroleum and dispersant residues. (2011 and 2012)*	*June 30, 2012*	*$ 10,000*
***2.** Analysis by NDSU of blood 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, 2012*	*$ 10,000*
***3.** Providing shed bill knobs (rhynotheca)and collection data from 30 pelicans so the keratin in the knobs can be analyzed by the U of Connecticut for petroleum and dispersant residues.*	*Sept. 1, 2012*	*$ 10,000*
***4.** Prepare final report on results of egg, blood, and bill knob analysis.*	*June 30, 2013*	*$ 5,000*

Activity Status as of April 15, 2012:

In 2011 a total of 96 eggs and 27 rhynotheca (i.e., bill knobs) were collected from three colonies of American White Pelicans nesting in Minnesota. Researchers collected 70 eggs from the Marsh Lake colony, 14 eggs from the Swartout Lake colony and 12 eggs from the Pigeon Lake colony. Egg

collections from Marsh Lake were made over a five week period (with approximately equal numbers collected each week), but collections from Swartout and Pigeon Lake were from a single date. We collected 20 bill knobs shed in 2011 from the Marsh Lake colony, two bill knobs shed in 2011 from the Swartout Lake colony and five bill knobs shed in 2011 from the Pigeon Lake colony. Mixed yolk and albumen samples from 22 eggs from the Marsh Lake colony, samples from all 14 eggs from the Swartout Lake colony and samples from all 12 eggs from the Pigeon Lake colony were sent to the University of Connecticut for analysis of polycyclic aromatic hydrocarbons (PAH). All bill knobs collected in 2011 (i.e., 20 from Marsh Lake, 2 from Swartout Lake and 5 from Pigeon Lake) plus 10 knobs shed in years before 2011 (all from the Marsh Lake colony) were sent for PAH analysis at the University of Connecticut. We are currently awaiting results from the analysis for PAH content in eggs and bill knobs.

To date in 2012 researchers have collected 24 eggs from the Marsh Lake colony. They plan to continue collecting eggs at 5-10 day intervals until laying ceases in the colony, which will follow the collection protocol from 2011. They also plan to collect a single sample of 5-15 eggs from the Swartout Lake colony and from the Pigeon Lake colony in 2012 also. No eggs from 2012 have been sent for analysis.

Activity Status as of September 15, 2012:

Additional pelican eggs and bill knobs were collected in the summer of 2012 and are being held for subsequent analysis pending the return of results from 2012. Meanwhile, results from the first batch of pelican eggs have been significant. PAH contaminants were found in 20 of 22 eggs analyzed and DOSS (Corexit) dispersant contaminants were found in 14 of 18 eggs examined.

Analysis of the pelican bill knobs for PAH and DOSS is underway. Analysis of 37 bill knobs revealed that 14 had dispersant (DOSS) contamination, with levels ranging mainly from 41.3 to 79.5 ng/g, but several samples were exceptionally high, with readings of 129.0, 130.8, 262.5, and 516.7 parts per billion. Analysis of 20 bill knobs for PAH revealed that 15 of the 20 contained petroleum contaminants in a range from 1.2 to 12 parts per billion.

Activity Status as of April 15, 2013:

In 2012 we collected a total of 40 eggs and 15 rhynotheca (i.e., bill knobs) from the American White Pelican colony nesting at Lac Qui Parle Wildlife Management Area on Marsh Lake in Minnesota. Egg collections from Marsh Lake were made over a four week period (with approximately equal numbers collected each week). Mixed yolk and albumen samples from 25 eggs have been prepared and stored (at -80 F) according to protocol for analysis of polycyclic aromatic hydrocarbons (PAH) at the University of Connecticut.

Mixed yolk and albumen from eggs collected in 2011 and bill knobs collected in 2011 from three different American White Pelican colonies (Marsh Lake, Swartout Lake and Pigeon Lake) located in Minnesota were analyzed for PAH and an oil dispersant used in the Gulf of Mexico in 2010 by the University of Connecticut. Concentrations of PAH were detected in 31 of 48 egg samples analyzed, and concentrations of dispersant were detected in 27 of 46 egg samples analyzed. Moreover, concentrations of PAH and dispersant were detected in egg samples from each of the colonies. Concentrations of PAH were detected in 19 of 27 bill knob samples analyzed, and concentrations of dispersant were detected in 10 of 27 bill knob samples analyzed. Again, concentrations of PAH and dispersant were detected in bill knob samples from each of the colonies. All of the specific types of PAH detected in both egg and bill knob samples were short-chain, low molecular weight compounds that are considered molecules of petrogenic (i.e., derived from petroleum or petroleum distillates rather than from post-combustion sources) origin. We are currently conducting further analysis of the concentrations as we prepare a manuscript for submission to a peer-reviewed, scientific journal on our findings.

For 2013 we plan to collect another sample of eggs (40-50 total) from the Marsh Lake pelican colony to again analyze for PAH and dispersant. Protocol for sampling will follow the protocol for collecting eggs followed in 2011 and 2012 at Marsh Lake, so that we may compare concentrations of PAH and dispersant in subsequent breeding seasons to make inferences regarding the duration of PAH and dispersant contaminants as they appear in eggs. To our knowledge, this study represents the only multi-year investigation of petroleum contaminants in the eggs of colonial waterbirds.

Activity Status as of September 15, 2013:

In 2013 we collected a total of 15 eggs from the American White Pelican colony nesting at Lac Qui Parle Wildlife Management Area on Marsh Lake in Minnesota. Egg collections from Marsh Lake were made in the second week of May only because nesting was delayed more than three weeks from observations of previous years. Mixed yolk and albumen samples from 15 eggs have been prepared and stored (at -80 F) according to protocol for analysis of polycyclic aromatic hydrocarbons (PAH) at the University of Connecticut.

Rhynotheca (i.e., bill knobs) collected in 2011 from three different American White Pelican colonies (Marsh Lake, Swartout Lake and Pigeon Lake) located in Minnesota as well as knobs collected in previous years from the Marsh Lake colony were analyzed for PAH and an oil dispersant used in the Gulf of Mexico in 2010 by the University of Connecticut. Concentrations of PAH were detected in 19 of 27 bill knob samples analyzed, and concentrations of dispersant were detected in 10 of 27 bill knob samples analyzed. Concentrations of PAH and dispersant were detected in bill knob samples from each of the colonies, with all of the specific types of PAH detected in the bill knob samples being short-chain, low molecular weight compounds that are considered molecules of petrogenic (i.e., derived from petroleum or petroleum distillates rather than from post-combustion sources) origin. However, concentrations of PAH and dispersant did not differ among colonies, nor did concentrations in knobs collected in 2011 differ from concentrations from knobs collected in previous years. We are currently awaiting the results of analysis of egg samples collected in 2012. We expect to prepare a manuscript for submission to a peer-reviewed, scientific journal on our findings from this study.

For 2014 we plan to collect another sample of eggs (30-50 total) from the Marsh Lake pelican colony to again analyze for PAH and dispersant. Protocol for sampling will follow the protocol for collecting eggs followed in 2011 and 2012 at Marsh Lake, so that we may compare concentrations of PAH and dispersant in subsequent breeding seasons to make inferences regarding the duration of PAH and dispersant contaminants as they appear in eggs. To our knowledge, this study represents the only multi-year investigation of petroleum contaminants in the eggs of colonial waterbirds.

ACTIVITY 3 Final Status Report Status: April 15, 2014.

Dr. Mark Clark has submitted the final report on this phase of the project entitled “Report for Assessment of PAH Content in Eggs of American White Pelicans Nesting in Minnesota.” Findings show that both petroleum-based hydrocarbons (PAH) and dispersant (DOSS) occurred in the eggs of American white pelicans nesting in Minnesota. More than half of the pelican eggs (47 of 69 eggs) analyzed had detectable concentrations of both PAH and DOSS. Most of the eggs (51) were collected from the Marsh Lake pelican colony. Concentrations of PAH were higher in 2012 than in 2011 so the contaminants are still being picked up on the wintering grounds in the Gulf of Mexico and the increases suggest that the long term effects of the Deepwater Horizon oil spill are continuing. Another 50 eggs will be collected at Marsh Lake in 2014 to continue monitor the contamination levels. Shed pelican bill knobs were also collected for analysis, but problems with the ability to extract PAH from the keratin matrix of the bill knob

did not provide an adequate recovery rate for the contaminants. See Dr, Clark's final report titled "Report for Assessment of PAH Content in Eggs of American White Pelicans Nesting in Minnesota" as follows:

AWPE PAH Study Report 2014.docx

ACTIVITY 4: Analysis of loon and pelican blood, tissue, egg, and bill knobs to determine if petroleum (PAH) and dispersant (Corexit) contaminants are present in Minnesota loons and pelicans. This analysis will be carried out by the Center for Environmental Sciences and Engineering at the University of Connecticut.

Description: Samples of blood and tissues from dead loons found in Minnesota will be forwarded to UConn after necropsy by the Wisconsin DNR, and egg and bill knob samples collected by project contractors from NDSU will be forwarded to this laboratory for standardized analysis for petroleum (PAH) and dispersant (Corexit) contaminants in Minnesota loons and white pelicans. Investigator: Dr. Christopher Perkins.

Summary Budget Information for Activity 4:			
	ENRTF Budget:	$	66,000
	Amount Spent:	$	66,000
	Balance:	$	0

Activity Completion Date: June 30, 2014

Outcome	*Completion Date*	*Budget*
***1.** Analysis of up to 55 white pelican eggs for petroleum and dispersant contaminants. (60 samples with two analyses per sample=110 analyses @ $150 per analysis)*	*June 30, 2012*	*$ 16,500*
***2.** Analysis of up to 35 shed rhynotheca bill knobs from white pelicans for petroleum and dispersant residues. (Up to 30 samples with two analyses per sample@$150 per analysis)*	*October 1, 2012*	*$ 10,500*
***3.** Analysis of fatty tissue samples and blood samples from up to 65 dead loons for petroleum and dispersant contaminants. (Up to 130 samples with two analyses per sample=230 analyses @ $150 per analysis)*	*December 1, 2013*	*$ 39,000*
***4.** Submit final summaries on results of loon and pelican analyses.*	*June 30, 2014*	*$ 0*

Activity Status as of April 15, 2012:

For the summer of 2011, UConn received 23 red blood samples from live loons and 20 fat samples from live loons. Those samples were collected by Kevin Kenow of the US Geological Survey while capturing and outfitting loons with satellite transmitters and geolocators. UConn also received 59 American white pelican eggs and 37 pelican bill knobs from North Dakota State University researchers Mark Clark and

Jeff DiMatteo. Finally, dead loons that were found in Minnesota were shipped to the Wisconsin DNR for necropsy where 8 blood and 5 fat samples were salvaged from those dead loons and forwarded to UConn for testing of PAH and Corexit contaminants.This is a total of 152 samples for analysis from 2011.

Activity Status as of September 15, 2012:

Analysis of loon and pelican tissue, blood, eggs, and bill knobs has been underway throughout the summer of 2012 and results are still coming in. Reports have been received for 37 bill knobs and for tissues/blood from 8 dead loons picked up in Minnesota in the summer of 2011 (not exposed to the oil spill). Analysis has also been completed for the first batch of white pelican eggs. PAH was detected in 20 of 22 eggs sampled and DOSS was detected in 14 of 18 eggs sampled.

Activity Status as of April 15, 2013:

Analysis of loon tissues and blood samples continues, with another 12 samples of loon blood and 5 samples of loon fatty tissue to be received in the next week from the Wisconsin DNR. These Minnesota origin loons were necropsied in March by veterinary wildlife specialists from the Wisconsin DNR. They analyzed those loons for cause of death (eg. lead poisoning; trauma from being hit by a boat, etc.) and extracted blood and tissue samples for analysis by the University of Connecticut. On April 12 the University of Connecticut sent the MN DNR the results of analyses of five loon eggs that were retrieved in 2012 from their nests after they failed to hatch. Four of the eggs were suitable for analysis of PAH and DOSS. One of the four eggs, from a nest on Big Mantrap Lake, had exceptionally high PAH levels:

Total PAH:	4412.3 parts per billion
PAH components:	
Acenaphthene:	3093.0 parts per billion
Anthracene:	888.0 parts per billion
Flouranthene:	431.3 parts per billion
TOTAL PAH:	4412.3 PARTS PER BILLION

Another loon egg analyzed had a level of 8.70 parts per billion of DOSS contamination.

The University of Connecticut will soon be receiving samples of the crude oil that comprised the Deep Horizon oil spill and will be developing a footprint of the PAH composition from the 16 different types of PAH that comprise the PAH complex so that the specific footprint of the BP oil spill can be compared with the footprint of the PAH contamination detected in Minnesota loons and white pelicans.

Additional samples of loon blood, tissues and eggs, and pelican eggs and bill knobs will be collected again in the summer of 2013 to look for continuing presence of PAH and DOSS.

Activity Status as of September 15, 2013:

A total of twelve loons found dead in Minnesota in 2012 were given necropsies by the Wisconsin DNR and tissue samples were forwarded to the University of Connecticut for analysis of PAH. The PAH analysis was returned on September 3, 2013 and showed presence of PAH contaminants in 5 of the12 loons examined. The total PAH levels for the five loons were as follows (Numbers are shown in parts per billion):

	Total PAH	Fluoranthene	Benzo(a)anthracene	Benzo(b)fluoranthene
BRD 49*	24.7	ND	24.7	ND
BRD 47*	137.6	ND	43.0	94.6
BRD 46*	211.1	ND	63.1	148.0

124407*	21.3	21.3	ND	ND
124403*	30.7	ND	30.7	ND
Mean:	85.0			

Source of Loons with PAH:

BRD 49: Swan Lake in Ottertail County, 7/10/2012
BRD 47: Little Rabbit Lake in Crow Wing County, 6/18/2012
BRD 46: Two Inlets Lake In Becker County, 8/14/2012 (Bear Paw Resort)
124407: Deer Lake in Itasca County 8/13/2012
124403: Pokegama Lake in Itasca County (Wendigo Arm), 5/16/2012

(ND = not detected)

The number of samples awaiting analysis at UConn is:
- 5 loon fat samples received from the Wisconsin Pathology Lab
- A batch of 25 pelican egg samples received from Mark Clark
- A batch of 30 pelican egg samples received from Mark Clark

Activity Status as of April 15, 2014:

Results of loon tissue and fat analysis continue to come in from UConn. Three of 15 dead loons picked up in 2013 showed presence of PAH in their tissue samples. (Numbers are shown in parts per billion):

	Total PAH	Anthracene	Flouranthene	Dibenz(a.h)antracene
2013 MN07	1182.5	733.8	448.7	ND
2013 MN14	418.2	ND	ND	418.2
2013 MN15	127.6	ND	ND	127.6

A total of 23 loon eggs were shipped to UConn on February 3, 2014. They are currently being analyzed and the results of analysis for PAH and DOSS should be available by the end of April. It is anticipated that all of the funds for analysis of loon and pelican tissue, blood, and egg analysis will be utilized by the end of the fiscal year.

ACTIVITY 4. Final Status Report: August 15, 2014:

The LCCMR work plan called for PAH and DOSS analysis of 440 loon and pelican samples. A total of 451 samples of pelican and loon tissues were analyzed for PAH and DOSS contaminants. There were 198 pelican samples tested, including 124 egg samples and 74 bill knob samples. A total of 253 loon samples were analyzed, including 54 egg, 38 fat, 91 blood, and 70 feather samples.

White Pelicans

For the white pelican samples, 58 of the 99 eggs (58.6%) had PAH contamination. A total of 27 of 48 eggs had DOSS in 2011 but no DOSS was found in the 2012 egg samples. For bill knobs, 29 of the 37 bill knobs (78.4%) tested positive for PAH, and 14 of 37 bill knobs (37.8) tested positive for DOSS.

Common Loons

For all loon tissues analyzed, PAH was present in 36 of the 142 samples (25.4%). DOSS was present in 12 of 99 samples (12%). Six of 27 loon eggs (22.2%) had PAH contamination. The composite

percentage for PAH in all 56 loon blood samples was 37.5% Five of 21 loon blood samples from 2011 had DOSS present, but it was not found in 21 blood samples from 2012 or 2013. Analysis of 19 loon fat tissues showed PAH in 5 of 19 samples (26.3%) and DOSS in two of 19 fat samples. Out of 35 loon feather samples, 5 had PAH contaminants (14.3%) and three had DOSS contaminants (8.6%). One of those feather samples had both PAH and DOSS present.

Following are summaries of analyses completed through the entire project for PAH and DOSS concentrations in American white pelican eggs and bill knobs and for loon blood, tissues, eggs, and feathers. These results will be supplemented by continuing analyses of loon and pelican tissues already collected and additional samples to be collected in 2014 and 2015. This will include 50 more pelican eggs, 26 loon feathers, 45 live loon blood samples, and 34 additional loon blood, fat, and egg samples within the new LCCMR work plan for continuing project activities in FY 15 and 16. Additional PAH and DOSS analysis for 222 more samples of loon tissues is included in the new LCCMR third phase of this project projected to start on July 1, 2015. At the conclusion of the three phases of this work, an assessment of the impact of the Deepwater Horizon oil spill on Minnesota's loons and pelicans will be prepared.

AMERICAN WHITE PELICAN

EGG ANALYSES

Marsh Lake Pelican egg analysis: Forty-eight white pelican eggs were collected in 2011 and 51 white pelican eggs were collected at Marsh Lake in the summer of 2012. Thirty-one of the 48 eggs (64.6%) had detectable levels of the PAH in 2011 (mean 167.3 ppb) and 27 of the 48 eggs (56.3%) had detectable levels of DOSS (mean 296.8 ppb). In 2012, 26 of the 51 eggs (50.9%) had detectable levels of PAH but no DOSS was detected. The range of the PAH levels was 32.5 to 1390.5, with a mean of 584.1 parts per billion. Eggs collected in the summer of 2013 and 2014 will be tested in the next phase of this project.

ID Number	Total PAH	Acenapthene	Flourene	Anthracene	Phenanthrene	Benzo(a)	DOSS
Eggs collected summer of 2011							
120013-001	**189.6**	**189.6**	ND	ND	ND	ND	**7.8**
120013-002	**37.0**	**37.0**	ND	ND	ND	ND	ND
120013-003	**32.5**	**32.5**	ND	ND	ND	ND	**613.7**
120013-004	**240.0**	**240.4**	ND	ND	ND	ND	**75.9**
120013-005	ND	ND	ND	ND	ND	ND	**0.6**
120013-006	**287.7**	ND	ND	ND	**287.7**	ND	**216.9**
120013-007	**143.6**	**143.6**	ND	ND	ND	ND	**458.0**
120013-008	**412.3**	ND	**148.8**	ND	**263.5**	ND	ND
120013-009	**82.3**	ND	ND	ND	**82.3**	ND	ND
120013-010	**221.4**	ND	**107.9**	ND	**113.6**	ND	**140.1**
120013-011	**325.7**	**325.7**	ND	ND	ND	ND	**5.5**
120013-012	**49.8**	ND	ND	ND	**49.8**	ND	**287.6**
120013-013	**269.6**	**269.6**	ND	ND	ND	ND	**52.0**
120013-014	**166.3**	**166.3**	ND	ND	ND	ND	**105.6**
120013-015	**202.5**	**28.6**	**125.4**	ND	**48.5**	ND	ND
120013-016	**203.3**	**203.3**	ND	ND	ND	ND	0.6

120013-017	**48.3**	ND	ND	ND	**48.3**	ND	**219.2**
120013-018	**311.6**	**311.6**	ND	ND	ND	ND	**91.6**
120013-019	**235.6**	**235.6**	ND	ND	ND	ND	**96.9**
ID Number	TotPah	Acenapthene	Flourene	Anthracene	Phenanthrene	Benzo(a)	DOSS
120013-020	**302.7**	**302.7**	ND	ND	ND	ND	**0.9**
120013-021	ND	ND	ND	ND	ND	ND	ND
120013-022	**190.7**	**190.7**	ND	ND	ND	ND	ND
120013-023	ND	ND	ND	ND	ND	ND	**1349.2**
120013-024	ND	ND	ND	ND	ND	ND	**0.8**
120013-025	**204.5**	**128.2**	**76.3**	ND	ND	ND	ND
120013-026	ND	ND	ND	ND	ND	ND	ND
120013-027	**43.9**	**43.9**	ND	ND	ND	ND	**0.5**
120013-028	ND	ND	ND	ND	ND	ND	**2.0**
120013-029	**84.3**	ND	84.3	ND	ND	ND	ND
120013-030	ND	ND	ND	ND	ND	ND	ND
120013-031	ND	ND	ND	ND	ND	ND	**1.0**
120013-032	**136.9**	ND	**136.9**	ND	ND	ND	ND
120013-033	**51.7**	ND	**51.7**	ND	ND	ND	**755.4**
120013-034	**114.9**	**76.5**	ND	**38.4**	ND	ND	**1613.1**
120013-035	**173.8**	**173.8**	ND	ND	ND	ND	ND
120013-036	ND	ND	ND	ND	ND	ND	ND
120013-037	ND	ND	ND	ND	ND	ND	ND
120013-038	ND	ND	ND	ND	ND	ND	**0.8**
120013-039	ND	ND	ND	ND	ND	ND	ND
120013-040	**101.8**	**101.8**	ND	ND	ND	ND	ND
120013-041	ND	ND	ND	ND	ND	ND	**221.9**
120013-042	**72.1**	**72.1**	ND	ND	ND	ND	ND
120013-043	**167.3**	**66.2**	**101.1**	ND	ND	ND	**1013.4**
120013-044	**82.6**	ND	ND	**82.6**	ND	ND	**682.1**
120013-045	ND	ND	ND	ND	ND	ND	**1.1**
120013-046	ND	ND	ND	ND	ND	ND	ND
120013-047	ND	ND	ND	ND	ND	ND	ND
120013-048	ND	ND	ND	ND	ND	ND	ND

ID Number	Total PAH	Acenapthene	Flourene	Anthracene	Phenanthrene	Benzo(a)	DOSS
Eggs collected summer of 2012							
130153-015	**1390.5**	**1390.5**	ND	ND	ND	ND	-
130153-016	**517.4**	**517.4**	ND	ND	ND	ND	-
130153-017	ND	ND	ND	ND	ND	ND	-
130153-018	ND	ND	ND	ND	ND	ND	-
130153-019	ND	ND	ND	ND	ND	ND	-
130142-001	ND	ND	ND	ND	ND	ND	ND
130142-002	**300.7**	**300.7**	ND	ND	ND	ND	ND
130142-003	ND	ND	ND	ND	ND	ND	ND
130142-004	ND	ND	ND	ND	ND	ND	ND
130142-005	**591.1**	**591.1**	ND	ND	ND	ND	ND
130142-006	**187.6**	ND	ND	ND	ND	**187.6**	ND
130142-007	**332.6**	ND	ND	ND	ND	**332.6**	ND

130142-008	ND	ND	ND	ND	ND	ND	ND
130142-009	ND	ND	ND	ND	ND	ND	ND
130142-010	**500.8**	**500.8**	ND	ND	ND	ND	ND

ID Number	Total PAH	Acenapthene	Flourene	Anthracene	Phenanthrene	Benzo(a)	DOSS
130142-011	ND	ND	ND	ND	ND	ND	ND
130142-012	ND	ND	ND	ND	ND	ND	ND
130142-013	**244.3**	ND	**244.3**	ND	ND	ND	ND
130142-014	ND	ND	ND	ND	ND	ND	ND
130142-015	ND	ND	ND	ND	ND	ND	ND
130142-016	ND	ND	ND	ND	ND	ND	ND
130142-017	ND	ND	ND	ND	ND	ND	ND
130142-018	ND	ND	ND	ND	ND	ND	ND
130142-019	ND	ND	ND	ND	ND	ND	ND
130142-020	**494.0**	ND	ND	**494.0**	ND	ND	ND
130142-021	ND	ND	ND	ND	ND	ND	ND
130142-022	ND	ND	ND	ND	ND	ND	ND
130142-023	**422.7**	**422.7**	ND	ND	ND	ND	ND
130142-024	ND	ND	ND	ND	ND	ND	ND
130142-025	ND	ND	ND	ND	ND	ND	ND
130142-026	ND	ND	ND	ND	ND	ND	ND
130142-027	ND	ND	ND	ND	ND	ND	ND
130142-028	**386.1**	**386.1**	ND	ND	ND	ND	ND
130142-029	**268.3**	ND	**268.3**	ND	ND	ND	ND
130142-030	ND	ND	ND	ND	ND	ND	ND
130153-001	**241.3**	**241.3**	ND	ND	ND	ND	ND
130153-002	**269.3**	**269.3**	ND	ND	ND	ND	ND
130153-003	**475.7**	**475.7**	ND	ND	ND	ND	ND
130153-004	**484.8**	**484.8**	ND	ND	ND	ND	ND
130153-005	**350.6**	**350.6**	ND	ND	ND	ND	ND
130153-006	**916.9**	**916.9**	ND	ND	ND	ND	ND
130153-007	**800.6**	**800.6**	ND	ND	ND	ND	ND
130153-008	**378.0**	**378.0**	ND	ND	ND	ND	ND
130153-009	**695.3**	**695.3**	ND	ND	ND	ND	ND
130153-010	**383.1**	**383.1**	ND	ND	ND	ND	ND
130153-011	**750.0**	**750.0**	ND	ND	ND	ND	ND
130153-012	**514.5**	**514.5**	ND	ND	ND	ND	ND
130153-013	**435.4**	**435.4**	ND	ND	ND	ND	ND
130153-014	ND	ND	ND	ND	ND	ND	ND
130153-020	ND	ND	ND	ND	ND	ND	ND
130153-025	**742.4**	**742.4**	ND	ND	ND	ND	ND

BILL KNOB ANALYSES

American White Pelican Bill Knob Analysis (All results shown in parts per billion)

We have records of 37 white pelican bill knobs being analyzed at the University of Connecticut for both PAH and DOSS. PAH: A total of 29 of 37 bill knobs contained PAH contaminants: These contaminants consisted of nine compounds: Naphthalene, Acenaphthylene, Flourene, Anthracene, Phenanthrene, Fluoranthene, Pyrene, Crysene, and Benzo(a)anthracene

PAH: A total of 29 of 37 bill knobs, with a range of 1.1 to 73.7 parts per billion, with a mean concentration 11.3 parts per billion.

DOSS: A total of 14 out of 37 bill knobs contained DOSS contaminants, with a range of 41.3 to 516.7 parts per billion, with a mean concentration of 115.5 parts per billion.

ID Number	Total PAH	Napth-thalene	Acenaph-Thylene	Fluor-Ene	Anthra-Cene	Phenan-Threne	Py-Rene	Cyr-Sene	Benzo(a) Anthra-cene	DOSS
(All results shown in parts per billion)										
120023-001	**12.0**	ND	ND	ND	ND	ND	ND	**6.0**	**6.0**	ND
120023-002	**6.7**	ND	ND	**1.0**	ND	ND	ND	ND	**5.7**	**129.0**
120023-003	**8.0**	**2.4**	ND	ND	ND	ND	ND	ND	**5.6**	**262.5**
120023-004	**1.1**	**1.1**	ND	ND	ND	ND	ND	ND	ND	ND
120023-005	**5.5**	ND	ND	ND	ND	ND	ND	ND	**5.5**	ND
120023-006	**6.3**	**0.6**	ND	ND	ND	ND	ND	ND	**5.7**	ND
120023-007	**8.4**	ND	ND	**0.9**	ND	ND	ND	ND	**5.6**	ND
120023-008	**2.5**	**1.4**	ND	**0.4**	ND	**0.8**	ND	ND	ND	ND
120023-009	ND	ND	ND	ND	ND	ND	ND	ND	ND	**66.6**
120023-010	**6.7**	ND	ND	ND	ND	**1.1**	ND	ND	**5.6**	ND
120023-011	**2.9**	**1.9**	ND	**0.3**	ND	**0.7**	ND	ND	ND	ND
120023-012	**4.9**	**0.8**	ND	**0.5**	ND	**0.8**	ND	ND	**2.8**	**47.0**
120023-013	**7.0**	ND	ND	ND	ND	**1.4**	ND	ND	**5.6**	ND
120023-014	**73.7**	**1.2**	ND	ND	ND	**0.7**	ND	**3.0**	**2.8**	ND
120023-016	ND	ND	ND	ND	ND	ND	ND	ND	ND	**41.3**
120023-017	**4.2**	**1.1**	ND	**0.3**	ND	ND	ND	ND	**2.8**	**130.8**
120023-018	ND	ND	ND	ND	ND	ND	ND	ND	ND	**516.7**
120023-019	**2.9**	ND	ND	ND	ND	ND	ND	**2.9**	ND	ND
120023-020	**6.2**	ND	ND	**0.5**	ND	ND	ND	ND	**5.7**	**51.1**
120023-021	**161.1**	ND	ND	**0.9**	ND	**4.3**	**2.9**	ND	**6.0**	ND
120023-022	**15.9**	**7.0**	ND	**0.6**	ND	**3.4**	**2.8**	ND	ND	ND
120023-023	**6.9**	**1.6**	**2.3**	**0.7**	**2.3**	ND	ND	ND	ND	**77.4**
120023-025	**10.0**	ND	ND	ND	ND	**4.8**	**5.2**	ND	ND	**65.9**
120023-026	**8.3**	ND	**1.2**	ND	ND	**3.9**	**3.2**	ND	ND	ND
120023.027	**7.7**	**0.3**	ND	**0.5**	ND	**2.6**	**2.5**	ND	ND	ND
120023-028	**7.5**	ND	ND	**0.5**	ND	**2.5**	**2.5**	ND	ND	ND
120023-029	**21.1**	ND	ND	**1.0**	**1.9**	**10.1**	**3.9**	ND	ND	**49.1**
120023-030	**14.3**	ND	ND	ND	ND	**7.8**	**3.3**	ND	ND	ND
120023-031	**21.3**	ND	ND	**0.5**	ND	ND	ND	ND	ND	ND
120023-033	ND	ND	ND	ND	ND	ND	ND	ND	ND	**45.4**
120023-034	**11.2**	ND	ND	ND	ND	ND	ND	ND	**11.2**	ND
122023-036	**4.1**	**4.1**	ND	ND	ND	ND	ND	ND	ND	**79.5**
120023-037	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

COMMON LOON

LOON EGG ANALYSIS:

All results are shown in parts per billion

Four unhatched loon eggs were retrieved by the public in 2012 and analyzed for contaminants. One egg had petroleum contamination. Twenty-three unhatched loon eggs were reported by the public and retrieved for contaminant analysis in the summer of 2013. Four of those eggs had partially developed embryos of loon chicks that had died during development. No DOSS contamination was detected in those eggs. However, five of the 23 eggs had PAH petroleum contaminants which included three PAH compounds. The results are summarized in the following table:

ID Number	Total PAH	Acenapthene	Anthracene	Flouranthene	Chrysene
Results from 4 eggs collected in 2012					
	4412.3	**3093.0**	**888.0**	**431.3**	ND
Results from 23 eggs collected in 2013					
140027-012 (MN12)	**517.0**	**517.0**	ND	ND	ND
140027-014 (MN14)	**1782.5**	**364.3**	ND	ND	**1418.2**
140027-019 (MN19)	**743.7**	ND	**742.7**	ND	ND
140027-020 (MN20)	**332.5**	**332.5**	ND	ND	ND
140027-022 (MN22)	**874.7**	**874.7**	ND	ND	ND

The range of PAH contaminant levels was 332.5 to 1782.5, with a mean of 850.1 parts per billion.

LOON FAT TISSUE ANALYSIS

Loon fat tissue analysis: Loon fat tissues were obtained from 12 loons during operations to insert satellite transmitters in them in the summer of 2011. In addition, five samples of loon fat tissue were recovered from dead loons in 2012 and two samples of loon fat tissue were recovered from dead loons in 2013. Among these 19 loon fat tissue samples, PAH was found in five samples and DOSS was found in two samples.

ID Number	Total PAH	Acenaph-thylene	Phenan-Thene	Flouran-Thene	Anthra-Cene	Benzo(a) anth-Rathracene	Benzo(a)-Pyrene	DOSS
Live loon fat tissue analysis from 12 satellite-equipped loons - summer 2011								
1038-94222	ND	ND	ND	ND	ND	ND	ND	ND
1038-94223	**33.1**	ND	**33.1**	ND	ND	ND	ND	ND
1038-94226	ND	ND	ND	ND	ND	ND	ND	ND

918-30974	ND	ND	ND	ND	ND	ND	ND	ND
918-30975	ND	ND	ND	ND	ND	ND	ND	ND
918-30976	ND	ND	ND	ND	ND	ND	ND	ND
918-30977	ND	ND	ND	ND	ND	ND	ND	**219.2**
918-30978	ND	ND	ND	ND	ND	ND	ND	ND
918-30982	ND	ND	ND	ND	ND	ND	ND	**276.2**
918-30986	ND	ND	ND	ND	ND	ND	ND	ND
918-30992	ND	ND	ND	ND	ND	ND	ND	ND
918-30993	**15.7**	**15.7**	ND	ND	ND	ND	ND	ND

Dead loon fat tissue results from 12 dead loons, summer 2012
(contaminants shown in parts per billion)

130122-001	ND	ND	ND	ND	ND	ND	ND	ND
130122-002	**1779.5**	**432.0**	**224.2**	ND	ND	**1123.3**	ND	ND
130122-007	**413.6**	ND	ND	**413.6**	ND	ND	ND	ND
130122-008	ND	ND	ND	ND	ND	ND	ND	ND
130122-012	ND	ND	ND	ND	ND	ND	ND	ND

ID Number	Total PAH	Acenaph-thylene	Phenan-threne	Flouran-thene	Anthra-cene	Benzo(a) anth-rathracene	Benzo(a)-pyrene	DOSS

Dead loon fat tissue samples from 2 dead loons, summar 2013

140040-002	**1182.5**	ND	ND	**448.7**	**733.8**	ND	ND	ND
140040-014	ND	ND	ND	ND	ND	ND	ND	ND

LOON BLOOD ANALYSIS

Seven of the 13 dead loon blood samples had the PAH contaminant, Dibenz(a,h)anthracene, at levels ranging from 21.3 to 418.2 ppb, for a mean level of 138.7 ppb. A total of 13 of 42 samples of blood taken from live loons had PAH present. PAH levels ranged from 1.6 to 26.9, with a mean of 8.0 parts per billion. The cumulative occurrence rate for PAH in all loon blood samples was 36.3%. It is interesting that the level of PAH contamination in dead loons was 138.7 ppb and in live loons it was 8 ppb.

ID Number	Total PAH	Acenaph-thylene	Phenan-threne	Flouran-thene	Benzo(a)-anthracene	Dibenz(a,h)-anthracene	Benzo(b) flouranthene	DOSS

Dead loon blood analysis results, summer 2012

130122-001	ND	ND	ND	ND	ND	ND	ND	N/A
130122-002	**24.7**	ND	ND	ND	**24.7**	ND	ND	N/A
130122-003	**137.6**	ND	ND	ND	**43.0**	ND	**94.6**	N/A
130122-004	**211.1**	ND	ND	ND	**63.1**	ND	**148.0**	N/A
130122-005	ND	ND	ND	ND	ND	ND	ND	N/A
130122-006	ND	ND	ND	ND	ND	ND	ND	N/A
130122-007	ND	ND	ND	ND	ND	ND	ND	N/A

130122-008	ND	ND	ND	ND	ND	ND	ND	N/A
130122-009	ND	ND	ND	ND	ND	ND	ND	N/A
130122-010	ND	ND	ND	ND	ND	ND	ND	N/A
130122-011	ND	ND	ND	ND	ND	ND	ND	N/A

Dead loon -- blood samples results, summer 2013
(All results shown in parts per billion)

140040-007	**418.2**	ND	ND	ND	ND	**418.2**	ND	N/A
140040-008	**127.6**	ND	ND	ND	ND	**127.6**	ND	N/A

Live loon blood analyses

A total of 39 loons that were captured for placement of geolocators and bands had a blood sample taken to check for contaminant accumulation. There were 13 of the 39 blood samples with detectable levels of PAH and 6 loons had detectable levels of DOSS. The PAH levels ranged from 1.6 to 26.9, with a mean of 8.0 parts per billion. DOSS levels ranged from 3.0 to 65.4, with a mean of 25.4 parts per billion. Ten loons were captured on subsequent years so it was possible to determine any changes in their contaminant levels. They are identified by underlines for their band numbers. (PAH and DOSS shown in parts per billion).

The incidence of occurrence of DOSS (23.8%) was higher in 2011, the year after the Deepwater Horizon oil spill, than in 2012 and 2013 when only one loon in 18 (5.6%) registered DOSS contamination. A mean level of PAH contamination (8.3 ppb) found in 2011 decreased only slightly in 2012/2013 to 6.7 ppb, suggesting that the PAH was more persistent in the ecosystem than the DOSS dispersant.

Live loon blood samples from 2011

Loon ID Band	Total PAH	Anthracene	Flouranthene	Pyrene	Benzo(a)pyrene	DOSS
1038-94222	**4.0**	**1.7**	**2.3**	ND	ND	ND
1038-94221	**13.5**	ND	ND	ND	**13.5**	**7.2**
1038-94223	**1.6**	**1.6**	ND	ND	ND	**60.3**
1038-94226	**1.6**	**1.6**	ND	ND	ND	ND
918-30974	**2.4**	**2.4**	ND	ND	ND	**3.0**
918-30975	ND	ND	ND	ND	ND	ND
1038-94228	ND	ND	ND	ND	ND	ND
918-30976	ND	ND	ND	ND	ND	ND
918-30977	ND	ND	ND	ND	ND	ND
918-30978	ND	ND	ND	ND	ND	ND
918-30982	ND	ND	ND	ND	ND	**10.3**
918-30981	ND	ND	ND	ND	ND	ND
918-30986	**7.9**	**2.6**	**5.3**	ND	ND	ND
918-30987	ND	ND	ND	ND	ND	**26.8**
918-30983	**26.9**	**8.2**	**9.2**	**9.5**	ND	ND
918-30984	ND	ND	ND	ND	ND	ND
918-30992	ND	ND	ND	ND	ND	ND

918-30993	ND	ND	ND	ND	ND	**65.4**
918-30989	ND	ND	ND	ND	ND	ND
1038-94195	ND	ND	ND	ND	ND	ND

Live loon blood samples from 2012

918-30978	ND	ND	ND	ND	ND	ND
1038-94312	ND	ND	ND	ND	ND	ND
1038-94322	**5.2-JUV**	ND	ND	ND	**5.2**	ND
1038-94335	**3.1**	ND	ND	ND	**3.1**	ND
1038-94336	**6.4-JUV**	**6.4**	ND	ND	ND	ND
1038-94228	ND	ND	ND	ND	ND	ND
1038-94195	ND	ND	ND	ND	ND	ND
1038-94362	ND	ND	ND	ND	ND	ND
1038-94370	ND	ND	ND	ND	ND	ND
1038-94371	**15.8-JU**	**7.8**	ND	**3.3**	**4.7**	ND
1038-94222	**6.1**	ND	ND	ND	**6.1**	**5.1**
918-30977	ND	ND	ND	ND	ND	ND

Live loon blood samples from 2013

918-30986	ND	ND	ND	ND	ND	ND
918-30983	ND	ND	ND	ND	ND	ND
918-30984	ND	ND	ND	ND	ND	ND
1038-94312	ND	ND	ND	ND	ND	ND
1038-94370	ND	ND	ND	ND	ND	ND

Blood sample results from loons captured twice, on subsequent years, 2011 and 2012

Loon ID Band	Total PAH	Anthracene	Flouranthene	Pyrene	Benzo(a)pyrene	DOSS
1038-94222	**4.0**	**1.7**	**2.3**	ND	ND	ND
1038-94222	**6.1**	ND	ND	ND	**6.1**	**5.1**
918-30977	ND	ND	ND	ND	ND	ND
918-30977	ND	ND	ND	ND	ND	ND
918-30978	ND	ND	ND	ND	ND	ND
918-30978	ND	ND	ND	ND	ND	ND
918-30986	**7.9**	**2.6**	**5.3**	ND	ND	ND
918.30986	ND	ND	ND	ND	ND	ND
1038-94228	ND	ND	ND	ND	ND	ND
1038-94228	ND	ND	ND	ND	ND	ND
918-30983	**26.9**	**8.2**	**9.2**	**9.5**	ND	ND
918-30983	ND	ND	ND	ND	ND	ND
918-30984	ND	ND	ND	ND	ND	ND
918-30984	ND	ND	ND	ND	ND	ND
1038-94370	ND	ND	ND	ND	ND	ND
1038-94370	ND	ND	ND	ND	ND	ND
1038-94195	ND	ND	ND	ND	ND	ND
1038-94195	ND	ND	ND	ND	ND	ND
1038-94312	ND	ND	ND	ND	ND	ND
1038-94312	ND	ND	ND	ND	ND	ND

LOON FEATHER ANALYSIS

Out of 35 loon feather samples, 5 had PAH contaminants, one had PAH and DOSS contaminants, and two others had DOSS contaminants but no PAH present. (Numbers shown are in parts per billion.)

ID Number	Total PAH	Acenaph-thalene	Anthra-cene	Phenan-threne	Benzo(b) fluoranthene	Benzo(a)-Pyrene	DOSS
Feather samples from 3 out of 22 loons, 2011							
140029-021	**501.8**	ND	ND	ND	ND	**501.8**	ND
140029-032	**84.7**	ND	ND	**84.7**	ND	ND	**6.9**
140029-038	ND	ND	ND	ND	ND	ND	**14.8**
Feather samples from 3 out of 13 loons, 2012							
140029-011	ND	ND	ND	ND	ND	ND	**44.4**
140029-020	**126.6**	ND	ND	ND	**126.6**	ND	ND
140029-042	**228.6**	**228.6**	ND	ND	ND	ND	ND
Feather samples from 1 out of 10 loons, 2013							
140029-031	**273.5**	**273.5**	ND	ND	ND	ND	ND

All of this data will be reviewed and analyzed in terms of how the contaminants revealed in these analyses relates to the footprint of the petroleum contaminants released during the Deepwater Horizon oil spill and to the presence of DOSS in the samples which would be directly related to the oil spill.

V. DISSEMINATION:

Description: Results of this project will be disseminated through the DNR web site and through news releases, interviews with local media, and in stories in the Minnesota Volunteer**.**

Status as of April 15, 2012: We are still in the early phases of this study and much of the data that has been collected has not been analyzed or is still being analyzed. However, all survey work and collection of egg, blood, and tissue samples that were targeted for the summer of 2011 were carried out on schedule. The satellite transmitter and geolocator work on common loons is already a great success as it has provided a much better insight to the migratory traditions of loons and their mortality issues. We should have much more information available by September when the chemical analysis of eggs, blood, and tissues from the 2011 season will be available. As results become available, the information will be shared with the public through news releases and the DNR website.

Status as of September 15, 2012: There has been an impressive amount of local and even national interest in this project because no other northern state or Canadian province is looking at the impacts of the Deepwater Horizon oil spill on either migratory loons or pelicans. We have had to emphasize to members of the media that the results are coming in over an extended period of time through 2013 and that conclusions on the immediate and long term impacts of the oil spill will not be available on a short term basis. This summer Ron Schara's photography team covered the capture and banding with geolocators the loons on Lake George in Anoka County. This story will be run sometime this fall on his Minnesota Bound TV series on KARE-TV.

Status as of April 15, 2013: The most recent news coverage of this project is an article in the January-February issue of the Minnesota Conservation Volunteer magazine. Editor Kathleen Weflen devoted two pages of introduction to this study and reflecting concerns for protecting Minnesota's loons and water quality. The 12-page article "Flying with the Loons" by Adele Porter covered the work by Kevin Kenow and his staff from the US Geological Survey as they have studied Minnesota's loons over the past two years, and cited credits to the Environment and Natural Resources Trust Fund for financial support of this work. Ron Schara's staff filmed the loon research being done to capture loons and place geolocators in July of 2012 on Lake George in Anoka County.

Status as of September 15, 2013: Outdoor reporter Dennis Anderson accompanied the loon capture crew on July 16 and wrote an article in the Star Tribune on July 21 about this loon research project. Ron Schara's photographers covered the capture of loons and banding them with geolocators at Lake George in Anoka County in the summer of 2012. That story was featured on Minnesota Bound on September 1 and 7, 2013.

Status as of April 15, 2014: We have received occasional requests from the media for updates on this study but we have been deferring response to a future date when we have had more opportunity for a more comprehensive analysis of the project results. We are also reluctant to release too much information at this point because apparently BP has hired a person from Maine to find out what we are doing in regard to the loon study. Subsequently, their lawyers may try to use that information in a manner critical to the settlement of a future NRDAR settlement from BP to the State of Minnesota for damages to the state's loon and pelican population due to the Deepwater Horizon oil spill.

Status Final Report Summary as of August 15, 2014: As mentioned in the previous status report, we have deferred media inquiries about results of this study for the immediate future because BP has hired a person to try to find out our results and provide them to BP probably as they prepare a defense for legal action regarding claims of damages to Minnesota's loon and pelican populations. Collection of data

and sharing of that information will occur as additional information is collected in FY 15-17 and made available for legal processes associated with the NRDAR process.

VI. Project Budget SUMMARY:

A. ENRTF Budget:

Budget Category-PT contracts	$ Amount	Explanation
US Geological Survey. Loon telemetry, geolocators, and tissue analysis	$ 89,000 (ENRTF) + $47,000 DNR	Satellite telemetry, geolocator telemetry, and blood and tissue analysis of Minnesota Common Loons to investigate migration patterns and contamination levels of petroleum and dispersant levels in loons.
Univ. of Minnesota Dept. of Fisheries, Wildlife and Conservation Biology	$60,000	Statewide surveys and population trend analysis of American White Pelicans including 28 sites.
North Dakota State Univ. Dept of Biological Sciences.	$35,000	Collection and analysis of contamination levels in blood and tissues of American White Pelicans from three major colonies in Minnesota. Also provide samples for analysis at UConn.
Univ. of Connecticut, Center for Environmental Sciences and Engineering	$66,000	Analysis of loon blood and tissues from loons found dead in Minnesota and analysis of white pelican eggs and bill knobs for presence of petroleum and dispersant contaminants.
TOTAL ENRTF BUDGET:	**$ 250,000 + $47,000 DNR funds**	

Explanation of Use of Classified Staff: No DNR staff will be paid from this appropriation. Project management will be carried out by Carrol Henderson and Richard Baker in the Department of Natural Resources with funding from the DNR provided as match ENRTF dollars.

Explanation of Capital Expenditures Greater Than $3,500: N/A

Number of Full-time Equivalent (FTE) funded with this ENRTF appropriation: None.

Number of Full-time Equivalent (FTE) estimated to be funded through contracts with this ENRTF appropriation: 3.0 (NDSU, Univ. of MN, and USGS combined)

B. Other Funds:

Source of Funds	$ Amount Proposed	$ Amount Spent	Use of Other Funds
Non-state			
State			
RIM Matching funds (521)	$ 47,000	$47,000	Loon geolocator/satellilte work
Nongame match for project management-staff time	$ 20,000	$24,000	Project management
Analysis of MN dead loons	$ 3,000	$2,800	Necropsy studies of dead loons
TOTAL OTHER FUNDS:	$ 70,000	$ 73,800	

VII. PROJECT STRATEGY:

Project 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, North Dakota State University Department of Biology and the Center for Environmental Sciences and Engineering at the University of Connecticut. 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.

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 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 his 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 geolocator data.

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.

Dr. Mark Clark, Wendy Reed, and Jeff DiMatteo are from Department 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 submit pelican eggs, blood, and bill knob samples for analysis. These samples will be collected from three colonies in Minnesota.

Dr. Christopher R. Perkins is the Project Director and Co-laboratory Director of the Center for Environmental Sciences and Engineering at the University of Connecticut. The state-of-the-art equipment and technology utilized by this research center has allowed this facility to be at the forefront of assessment of biological impacts of the Gulf oil spill related to contamination by both petroleum and dispersant residues in wildlife. This lab has the capability for assessment of PAH levels reflecting petroleum contamination and Corexit levels reflecting presence of oil dispersants that were used in the Gulf of Mexico.

Carrol L. Henderson has been the DNR Nongame Wildlife Program supervisor since it was founded in 1977. He has coordinated statewide efforts for nongame 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.

A. **Project Impact and Long-term Strategy:**

The 2011 field season provided 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. All of this preliminary work has made possible the variety of analyses and assessments that will be accomplished with the ENRTF appropriatrions provided for this study. The 2012 field season will provide the opportunity for capture of an additional 15 loons to outfit them with geolocators and recapture of loons to download geolocator data and taking of additional blood samples and any necessary follow-up surveys in 2012.Loons outfitted with geolocators in 2012 will be recaptured in the summer of 2013 to download their migratory movements and diving data. Another statewide pelican survey will be accomplished in 2012 to supplement the survey in 2011.

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 as an ongoing project of the DNR Nongame Wildlife Program. That work will complement the work that is to be carried out with the ENRTF activities.

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 and 2012 field seasons.

An additional proposal has been approved for use of $260,000 of Environment and Natural Resources Trust Fund allocations beginning on July 1, 2014, for continuing research and survey work on common loons and white pelicans. This will include continuing collection of loon blood, feathers, and eggs to monitor for contaminants, satellite telemetry on juvenile loons to determine their usage areas in the Gulf of Mexico in the first two years of their lives, continuing monitoring of white pelican populations, and

contaminant monitoring of contaminants in pelican eggs. That proposal will be followed up by survey and research on the loons with a subsequent LCCMR proposal for FY '16 for $140,000.

The data gathered by this project is being provided to the US Fish and Wildlife Service Deepwater Horizon Field Office for Natural Resource Damage and Assessment and Restoration related to the Deepwater Horizon oil spill. That office is preparing a legal case against BP for damages to Minnesota's migratory loon and pelican populations. The USFWS has affirmed that there will be a financial settlement to the State of Minnesota to be paid out over a 15 year period to restore the numbers of loons that have been lost because of this pollution event.

C. Spending History:

Funding Source	M.L. FY 2011
ENRTF	$ 250,000
RIM-CH Matching Fund	$ 47,000

VIII. ACQUISITION/RESTORATION LIST: N/A

IX. MAP(S): Maps of sites with marked loons and sampling sites for white pelicans will be incorporated as part of regular project updates.

X. RESEARCH ADDENDUM: The egg, blood, and tissue samples involved in this study will be tested for presence of two primary contaminants associated with the Gulf oil spill:

***PAH:** Polycyclic aromatic hydrocarbons (PAHs), also known as poly-aromatic hydrocarbons or polynuclear aromatic hydrocarbons, are potent pollutants from petroleum that consist of fused aromatic rings and do not contain heteroatoms or carry substituents. As a pollutant, they are of concern because some compounds have been identified as carcinogenic, mutagenic, and teratogenic. Natural crude oil contains significant amounts of PAHs, arising from chemical conversion of natural product molecules to aromatic hydrocarbons.

COREXIT: Corexit is a product line of solvents primarily used as a dispersant for breaking up oil slicks. Corexit was the most-used dispersant in the Deepwater Horizon oil spill in the Gulf of Mexico, with COREXIT 9527 having been replaced by COREXIT 9500 after the former was deemed too toxic. Oil that would normally rise to the surface of the water is broken up by the dispersant into small globules that can then remain suspended in the water.

XI. **REPORTING REQUIREMENTS:**
This final report and associated products are being submitted on August 15, 2014 as requested by the LCCMR.

PART B. Species of Concern: Investigations.
MINNESOTA BREEDING BIRD ATLAS, YEARS 4 AND 5

Contract with the MN DNR to establish baseline information on statewide bird distribution and reproductive status relating to species of concern. $250,000.

ENRTF Appropropriation:	**$ 250,000**
Amount Spent:	**$ 243,561**
Balance:	**$ 6,439**

II. PROJECT SUMMARY:

This is the completion of a comprehensive, statewide survey, begun in 2008, documenting the breeding distribution of Minnesota's birds which will result in a breeding bird atlas. Atlases are used throughout the world to document and map the distribution of breeding birds. This information is vital to scientists and conservationists, allowing focus of conservation investments in the most strategic and effective manner. To date, over 800 volunteers coordinated by Minnesota Audubon, have been deployed to obtain detailed information on the breeding status of Minnesota's birds. Concurrently, surveyors coordinated by the Natural Resources Research Institute at the University of Minnesota – Duluth have been gathering systematic data from every township in the state. In combination, these two efforts will result in a powerful addition to understanding the distribution, relative abundance, and habitat use by Minnesota's breeding birds. In addition to our data gathering, many of the contemporary data bases gathered by agencies, universities, and NGOs will be incorporated into the atlas. Final products will include a publication and on-line atlas, containing detailed distribution maps, data on species breeding status, and a summary of historical species information. Access to the information will be provided to the public as well as conservation agencies and organizations.

These funds will be used for the final 2-years of data collection, review, and organization, followed by a year of analysis and product preparation. ENRTF funds will be supplemented with an estimated $222,570 provided by the U.S. Fish and Wildlife Service, Audubon Minnesota, and the Minnesota Ornithologists' Union. Data will be collected at the Township level by volunteers recruited and trained by project staff and by paid, specially trained observers conducting limited, standardized point counts and surveying underserved parts of the state. Combined, these methods will provide the most complete picture to date on the overall distribution of all bird species as well as relative abundance estimates and detailed breeding habitat analysis for a majority of the breeding bird species of Minnesota. By the end of this work period approximately 2,250 townships in the state (with the possible exception of a few hard-to-accesses Townships in the northern peatlands) will have been surveyed.

Data entry and access along with project updates and information will be handled through a website (mnbba.org) and a data management system contracted through Audubon Minnesota.

III. PROJECT STATUS UPDATES:

Project Status as of April 15, 2012: After approval of Part B: Species of Concern, Investigations on December 12, 2011 by the Legislative-Citizens' Commission on Minnesota Resouces,the Minnesota Department of Natural Resources determined that it is necessary to manage this project through a Professional-Technical Contract with Audubon. Carrol Henderson of the Division of Ecological and Water Resources was designated as the project manager. He has prepared a PT contract in collaboration with Audubon Minnesota which will provide for accomplishment of the deliverables identified by Audubon

Minnesota in the work plan. The contract has been signed by the appropriate authorities of Audubon and in the Minnesota Department of Natural Resources. On April 10, the contract was forwarded to Admin Minnesota for the final signature. At that point the contract is effective and Audubon Minnesota will proceed to implement the activities necessary for the final two seasons of the Breeding Bird Atlas project.

Status as of October 15, 2012: The project contract between Audubon and MN DNR was finalized and signed in April 2012. A sub-contract was written and signed between Audubon and NRRI in May 2012. The BBA Steering Committee continues to meet and advise the project. During the 2012 field season we employed over 200 volunteers and seven paid staff who reported 66,033 observations in 2012. We now have data from 2,308 townships (98% of the total) across Minnesota. MNBBA.org continues to provide up to date information on the status of the BBA including maps of species distribution by county and block. This website connects directly with the Cornell database allowing for easy data entry and results recovery. Breeding activity by habitat at 3 data points per block was completed in nearly 700 blocks in 2012 bringing the total number of Townships sampled to 99%. The remaining 22 Townships will be sampled during the 2012 field season.

Project Status as of April 15, 2013

A statewide volunteer coordinator meeting was held in Sandstone on October 15, 2012. In preparation for the fifth and final field season in 2013 we determined the most under-surveyed parts of the state and developed strategies to ensure coverage of those areas. Five surveyors have been hired for the 2013 field season and they will begin working in mid-May. We are working on upgrades and design changes that will allow MNBBA.org to provide relevant information in the years after the surveys have been completed. The Natural Resources Research Institute has completed sampling of approximately 98 % of the 2,250 townships in the state In some townships it was not possible to complete three point counts due to logistical or weather issues.

Project Status as of September 15, 2013

Project field work was completed in August 2013, within our predicted schedule of 5 years. By mid-September, 2013, there have been a total of 289,448 individual observations reported to the MNBBA project by more than 850 volunteers and partners and 7,000 point counts completed. During the spring and summer of 2013, the Natural Resources Research Institute completed point-count sampling of most of the remaining 23 townships in Minnesota. In total, >99.8% of townships were visited, and >99.5% had complete point-count coverage in the five year sampling period, 2009-2013. Additional data from external sources (academic research, agency projects, and other non-profit organizations) are being reviewed and reformatted to comply with Atlas criteria. Data has already been reported in 2,328 priority blocks providing us with information from the entire state, and 249 breeding species have been reported, 232 with confirmed evidence. Over 100,000 volunteer miles and 30,000 hours of effort have been contributed. Plans are in development to recognize the efforts of the Atlas volunteers in the next few months and beyond. The project website: MNBBA.org, continues to provide information on the project to volunteers and the public. Data collection methodology and data entry portals are available through MNBBA.org. Atlas results are updated daily and available in the form of: a) county maps, b) species maps, c) county checklists, d) searchable database, e) species reported by observer, f) species by block.

Amendment Request, September 15, 2013: Budget allocations to be shifted from Personnel and service contract to travel for surveys. This is to be done to accommodate the timing and restrictions of other funding sources with no effect on the final product or bottom line of the budget.

Project Status as of April 15, 2014

Active data collection by volunteers and for point counts has been completed. We communicated final project messages to all volunteer participants and conducted a volunteer thank you "celebration" in December. Data from 24 external data sets was collected, reviewed, and reformatted. Quality control review processes have been initiated which include reviews by: species experts, a verification committee, and regional reviewers. Species data review for the 2012 -13 seasons was initiated on 270,000 records along with regional and expert reviews of all 375,000 records.

Our webste: mnbba.org remains available and provides information on the project and its results. We are developing appropriate methods for production of graphics to summarize the atlas data. Four different maps may be used for species distribution including: a summary of breeding evidence gathered by the project, a summary of observations by ecological subsections, a preliminary probability distribution map using land cover and climate and a second probability distribution map with greater resolution.

Amendment Request May 1, 2014

Requesting budget allocations to be shifted from salaries, meeting rooms, and postage, which will not be needed at the originally projected levels, in Activity 1 to; an increase in travel in Activity 1, the Cornell contract in Activity 2 (from $2,500 to $3,000), and NRRI in Activity 3. The travel increase is slight and reflects final billing by season field staff, the Cornell contract increased by $500, and NRRI will be taking on additional quality control and data analysis. This amendment does not change any of the outcomes.

Final Report as of August 15, 2014:

The Minnesota Breeding Bird Atlas project represents the most detailed, comprehensive assessment of the breeding distribution of Minnesota's birds that have ever undertaken. All field data collection was completed in August 2013 although incidental reporting occurred into September of that year. We set a deadline for data entry from volunteers of September 30^{th,} 2013 although the online database accepted entries until the end of that year. The point count portion of this project was successfully completed in 2013 when > 99.5 % of the townships in Minnesota had been sampled. Following the completion of our field data collection we reviewed, and reformatted 24 external datasets (20,000 records). This required developing data use agreement and metadata requirements for each dataset.

An additional effort in 2014 was completed to assess the annual variability within a subsample of MN townships. Approximately 200 point counts within 60 randomly selected townships were re-sampled in 2014 and these townships were stratified within 20 equal-sized areas across the entire state of MN. Within each stratified area the center township was sampled and then the remaining surrounding townships were randomly selected. As many townships as possible within the stratified area were sampled in one morning.

We recorded 372,172 bird sightings during the 5-years of data collection from 2009 - 2013 which are now stored in our online database. These sightings comprise 250 species, 232 of which we consider confirmed breeders. Data was collected from each of the 2,339 priority blocks which represent every Township in Minnesota. The number of registered volunteers in the project totaled 1,144 and they reported driving over 100,000 miles and spending 33,000 hours of contributed effort However, we know that many people did not bother reporting either their miles or hours so these totals understate what was donated to the project by volunteers.

The BBA Steering Committee continued to meet and advise the project on strategies and methodologies. We held a regional coordinators meeting on October 13, 2012. Changes to survey strategies and

volunteer recruitment and training were discussed. We conducted analysis to determine the most under-surveyed parts of the state and developed strategies to ensure coverage of those areas during the 2013 field season. In 2012 we hired 7 temporary bird surveyors and 5 in 2013 to work in under-reported areas of the state. In June 2013, we conducted a 'Birdmobile' program of ten 1-day Atlas survey events to complete 10 critical subsection blocks.

Monthly alerts were distributed to all registered volunteers to highlight species to watch for, review project protocols, and to notify them of project deadlines. In December of 2013 we communicated final project messages to all volunteer participants and conducted a volunteer thank you "celebration" at the annual meeting of the Minnesota Ornithologists' Union.

Our website: MNBBA.org, was set up to 1) provide our volunteers with information and materials on how to conduct surveys and most importantly a place to report their findings, and 2) provide up to date information on the status of the BBA including a) county maps, b) species maps, c) county checklists, d) searchable database, e) species reported by observer, f) species by block. This provides up to the minute results for anyone interested in the results of the MN BBA. This website connects directly with the Cornell database allowing for easy data entry and results recovery**.**

The final phase of the data collection was doing and extensive data quality control. To that end we first resolved unusual record issues identified during an initial review. We then designed and documented MNBBA data quality control process, which included reviews by: species experts, a verification committee, and regional reviewers. To facilitate this we prepared and distributed data and instructions for reviews. All data for point counts sampled from 2009 to 2013 have been entered and error checked

We began to plan for data analysis and results dissemination which will occur over the next 2 – 3 years.

IV. PROJECT ACTIVITIES AND OUTCOMES:

ACTIVITY 1: Township data collection by volunteers and paid staff - training and support.

Description: Project strategies and advice will be overseen by a multi-partner steering committee which will include the MN DNR, U. S. Fish and Wildlife Service, Audubon Minnesota, Minnesota Ornithologists' Union and other members. A full-time project coordinator and additional part-time staff as needed will provide day-to-day oversight of the project. Volunteers and paid surveyors will be recruited and deployed statewide and provided with ongoing training and support. Data will be collected from late winter through mid-summer in 2012 and 2013 and entered into the online database. The northeast 3 X 3 mile quadrant of each township in the state are our target or "priority" blocks. While these 2,250 (approximately) blocks will be the focus of our efforts, data from any other location in the state will be accepted.

Summary Budget Information for Activity 1:	ENRTF Budget:	$ 112,799
	Amount Spent:	$ 101,360
	Balance:	$ 11,439

Activity Completion Date:

Outcome	*Completion Date*	*Budget*
1. Conduct Breeding Bird Block Surveys in 2013	*August 30, 2013*	*$ 73,166*
2. Train and support bird surveyors	*August 30, 2013*	*$ 39,633*

Activity Status as of April 15, 2012: Activities will commence after the PT contract with the Minnesota DNR is signed by all necessary parties. That should occur by April 20, 2012.

Activity Status as of October 15, 2012:

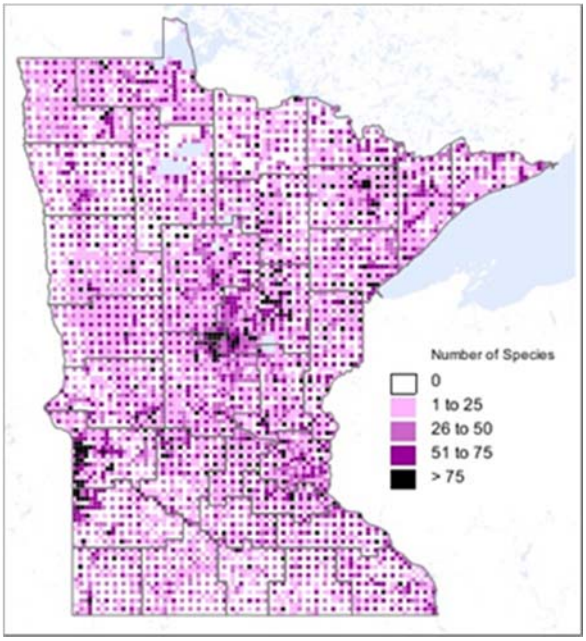
The BBA Steering Committee continues to meet and advise the project. The most recent meeting was held on September 21 where review of the past field season was discussed and strategies for the next (final) field season were outlined. Staff is planning for the regional coordinators meeting which will be held on October 13, 2012. During the 2012 field season we employed over 200 volunteers (over 800 people have participated since 2009) and seven paid staff to do surveys in Minnesota. They made and recorded 66,033 observations in 2012 bringing the total number of observations collected to 222,344 since the start of the project. We collected data in 973 new blocks brining our total to 5,804 since the beginning of the project. We now have data from 2,308 townships (98% of the total) across Minnesota, having added 274 new Townships this past field season.

Activity Status as of April 15, 2013:

A statewide volunteer coordinator meeting was held in Sandstone on October 15, 2012. Changes to survey strategies and volunteer recruitment and training were discussed. We conducted analysis to determine the most under-surveyed parts of the state and developed strategies to ensure coverage of those areas during the 2013 field season. Five surveyors have been hired for the 2013 field season and they will begin working in mid-May. Expert review of all data submitted through the 2011 season is complete.

Activity Status as of September 15, 2013:

Project field work was completed in August 2013, with incidental reporting occurring into September due to an unusual weather season. The deadline for data entry from volunteers was extended to September 30th to accommodate the late season. Seven skilled birders (two part-time) were hired to survey Atlas blocks in remote areas of the state, beginning May 15. In June 2013, we conducted a 'Birdmobile' program of ten 1-day Atlas survey events to complete 10 critical subsection blocks. Monthly alerts were distributed to all registered volunteers to highlight species to watch for, review project protocols, and to notify them of project deadlines. By mid-September, there have been a total of 289,448 observations reported to the MNBBA project by more than 850 volunteers and partners, and we expect more to be submitted before the September 30, 2013 deadline. Additional data from external sources (academic research, agency projects, and other non-profit organizations) are being reviewed and reformatted to comply with Atlas criteria. Data has already been reported in 2, 328 priority blocks providing us with information from the entire state, and 249 breeding species have been reported, 232 with confirmed evidence. Over 100,000 volunteer miles and 30,000 hours of effort have been contributed. Plans are in development to recognize the efforts of the Atlas volunteers in the next few months and beyond.



Activity Status as of April 15, 2014

Active data collection in the field has been completed. We communicated final project messages to all volunteer participants and conducted a volunteer thank you "celebration" in December. We monitored data entry during final post-season months and collected, reviewed, and reformatted 24 external datasets (20,000 records). This required developing data use agreement and metadata requirements.

The project is being transitioned from data collection to data use and review, to that end we first resolved unusual record issues identified during and initial quality control process. We then designed and documented MNBBA data quality control process, which will include reviews by: species experts, a verification committee, and regional reviewers. To facilitate this we prepared and distributed data and instructions for reviews. Species data review for the 2012 -13 seasons was initiated on 270,000 records along with regional and expert reviews of all 375,000 records.

Final Report Summary as of August 15, 2014:

All project field work was completed in August 2013. Incidental reporting occurred into September of that year and we set a deadline for data entry from volunteers of September 30th, 2013 although the online database accepted entries until the end of the year. We have recorded 372,172 bird sightings which are now in our database. These sightings report 250 species, 232 of which we consider confirmed breeders. Data was from each of the 2,339 priority blocks which represent every Township in Minnesota. The number of registered volunteers in the project totaled 1,144 and they reported driving over 100,000 miles and spending 33,000 hours of effort have been contributed. However, we know that many people did not bother reporting either their miles or hours so these totals understate what was donated to the project by volunteers.

The BBA Steering Committee continued to meet and advise the project on strategies and methodologies. We held a regional coordinators meeting on October 13, 2012. Changes to survey strategies and volunteer recruitment and training were discussed. We conducted analysis to determine the most under-surveyed parts of the state and developed strategies to ensure coverage of those areas during the 2013

field season. In 2012 we hired 7 temporary bird surveyors and 5 in 2013 to work in under-reported areas of the state. In June 2013, we conducted a 'Birdmobile' program of ten 1-day Atlas survey events to complete 10 critical subsection blocks.

Monthly alerts were distributed to all registered volunteers to highlight species to watch for, review project protocols, and to notify them of project deadlines. In December of 2013 we communicated final project messages to all volunteer participants and conducted a volunteer thank you "celebration" at the annual meeting of the Minnesota Ornithologists' Union.

Following the completion of our field data collection we reviewed, and reformatted 24 external datasets (20,000 records). This required developing data use agreement and metadata requirements. The final phase of the data collection was doing and extensive data quality control. To that end we first resolved unusual record issues identified during an initial review. We then designed and documented MNBBA data quality control process, which included reviews by: species experts, a verification committee, and regional reviewers. To facilitate this we prepared and distributed data and instructions for reviews.

ACTIVITY 2: Data Management and Analysis

Description: Audubon Minnesota will (with ENTRF support) maintain and update the breeding bird website (mnbba.org) which will be the central source of information about the atlas for volunteers, partners, and the general public. The site will also provide volunteers with survey protocols, identification aids, and other information. Updated results and maps will be maintained and improved as necessary.

MNBBA.org will connect directly with a breeding bird database which is used for management and storage of data. This database provides on-line data entry capabilities, quality control, and editing functions and will house the data during the course of the project. Google maps provide views of survey sites and results can be reviewed by species or geographic region.

Summary Budget Information for Activity 2:	ENRTF Budget:	$	4,600
	Amount Spent:	$	4,600
	Balance:	$	0

Activity Completion Date:

Outcome	*Completion Date*	*Budget*
***1.** Support and maintain mnbba.org website*		*$ 1,600*
***2.** Provide database through contract*		*$ 3,000*

Activity Status as of April 15, 2012: Activities will commence after the PT contract with the Minnesota DNR is signed by all necessary parties. That should occur by April 20, 2012.

Activity Status as of October 15, 2012:

MNBBA.org continues to provide up to date information on the status of the BBA including maps of species distribution by county and block. MNBBA also provide volunteers and others with information and materials on how to conduct surveys and report their findings. This website connects directly with the Cornell database allowing for easy data entry and results recovery**.**

Activity Status as of April 15, 2013:

MNBBA.org is providing up to date information on current news and survey results by species, or block. Search functions allow for detailed information gathering. We are working on upgrades and design changes that will allow MNBBA.org to provide relevant information in the years after the surveys have been completed.

Activity Status as of September 15, 2013:

The project website: MNBBA.org, continued to provide information on the project to volunteers and the public. Data collection methodology and data entry portals were available through MNBBA.org. Atlas results are updated daily and available in the form of: a) county maps, b) species maps, c) county checklists, d) searchable database, e) species reported by observer, f) species by block. This provides up to the minute results for anyone interested in the results of the MN BBA. We are also exploring ways to provide information in the most useful way upon completion of the BBA analysis. Data review continues and is intensifying, both at the region and state levels, with the conclusion of data entry. Procedures and processes are in development as the Atlas transitions to the analysis phase.

Activity Status as of April 15, 2014:

The project website: MNBBA.org was updated to reflect the end of active data collection. It continues to provide information on the project and preliminary results.

Final Report Summary as of August 1, 2014:

Our website: MNBBA.org, was set up to 1) provide our volunteers with information and materials on how to conduct surveys and most importantly a place to report their findings, and 2) provide up to date information on the status of the BBA including a) county maps, b) species maps, c) county checklists, d) searchable database, e) species reported by observer, f) species by block. This provides up to the minute results for anyone interested in the results of the MN BBA. This website connects directly with the Cornell database allowing for easy data entry and results recovery**.**

ACTIVITY 3: Point Count Data Collection

Description: Up to ten paid, seasonal field surveyors, primarily graduate and undergraduate students, will finish point counts in townships and the remote and hard-to-access areas of the state, including the BWCAW and the remote peatlands of Koochiching, Beltrami, and St. Louis Counties. This work will be done using a standard protocol which has been developed and tested for the gathering of these data. These systematic counts will provide uniform and standardized distribution and abundance data on bird species across the entire state. Some of these remote locations will require specialized travel such as the use of helicopters, boats, canoe, and extensive hiking in remote areas. These individuals will also gather data in the same fashion as the volunteers to supplement the data in all the townships, but especially in most of the remote, inaccessible townships where volunteers are unlikely to cover.

Summary Budget Information for Activity 3:	ENRTF Budget:	$	132,601
	Amount Spent:	$	137,601
	Balance:	$	(5,000)

Activity Completion Date:

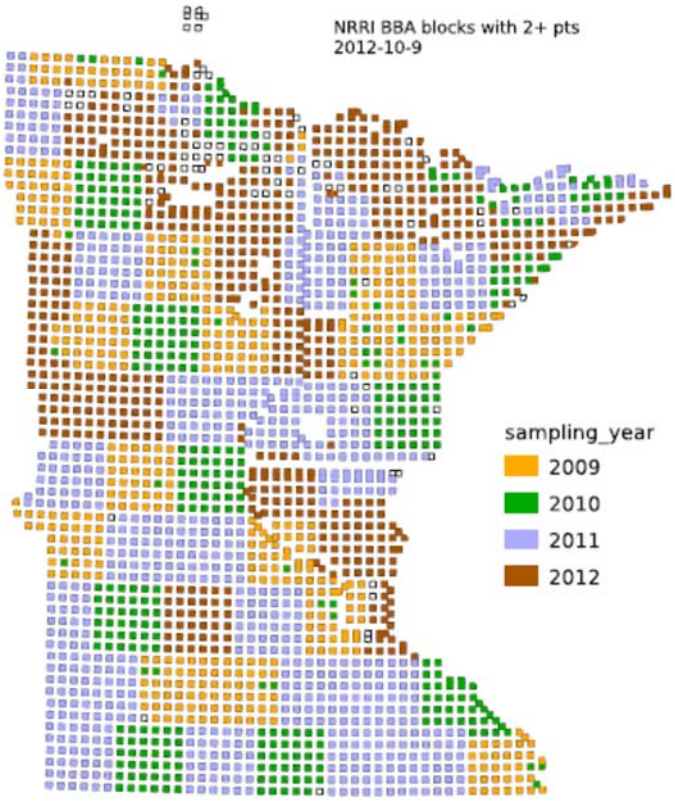
Outcome	*Completion Date*	*Budget*
***1.** Complete Point Count Surveys for 2,250 blocks*	*July 30, 2012*	*$ 117,601*

Activity Status as of April 15, 2012: Activities will commence after the PT contract with the Minnesota DNR is signed by all necessary parties. That should occur by April 20, 2012.

Activity Status as of October 15, 2012: Sampling of 3 data points was completed in nearly 700 blocks in 2012 bringing the total number of Townships sampled to 99%. The remaining 22 Townships will be sampled during the 2012 field season.

Activity Status as of April 15, 2013: The Natural Resources Research Institute has completed sampling of approximately 98 % of the 2,250 townships in the state of Minnesota as specified in its agreement with MN Audubon/National Audubon Society (Figure 1). These consisted of three 10-minute point counts that have been completed for approximately 97 % of the 2,250 townships in the state, plus approximately 1 % that had only 2 point counts completed. In some townships it was not possible to complete three point for the following reasons: 1) it was impossible to find an accessible secondary habitat type for the third point within a township, 2) accessibility limited the access to all three point counts within the township, or 3) weather conditions prohibited sampling all three points and it was difficult to re-sample them later because of scheduling or logistic issues. It is our intent in 2013 to finish a minimum of 23 more townships to achieve the goal of completing 99 % of the townships in the state. All of the data gathered through 2012 have been entered, error checked, and downloaded into the Cornell data base. Thus, these data are all available to MN Audubon for the MN Breeding Bird Atlas project.

Figure 1. Summary of townships sampled with three, 10 minute point counts by the Natural Resources Research Institute, University of Minnesota, Duluth by year for the Minnesota Breeding Bird Atlas project. The non-colored blocks (white) represent those blocks not yet sampled or sampled with 2 or more point counts.



Activity Status as of September 15, 2013:

During the spring and summer of 2013, the Natural Resources Research Institute completed point-count sampling of most of the remaining 23 townships in Minnesota. Several townships where 1 or 2 point counts remained to be completed were not visited due to logistical issues. In addition, three townships were not sampled due to poor access. In the latter case, surrogate point counts were completed by NRRI personnel in the nearest accessible location, usually within 1 mile of the township edge.

In total, >99.8% of townships were visited, and >99.5% had complete point-count coverage in the five year sampling period, 2009-2013. With over 7,000 point counts and nearly 200,000 individual birds detected of 241 species, these counts contribute a wealth of information to the knowledge of breeding birds in Minnesota. All of these data have been error checked and are in the process of being uploaded to the Cornell database, along with a variety of data from separate point-count projects conducted by NRRI.

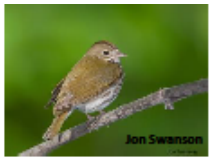
In addition to point counts, NRRI personnel also conducted extensive surveys for breeding evidence in June and July of 2013. Over 100 townships were visited, usually twice, during the breeding season. All of these townships were in northern Minnesota, and often in remote, poorly accessible areas such as the

Boundary Waters Canoe Area Wilderness, the Agassiz Lowlands, and the Northwest Angle. These efforts contribute to a vast amount of data collected by Minnesota Audubon that, to date, shows nearly 240 probable or confirmed breeding species of birds across Minnesota.

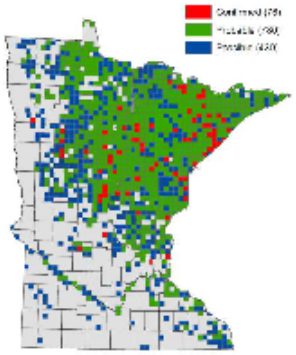
Activity Status as of April 15, 2014

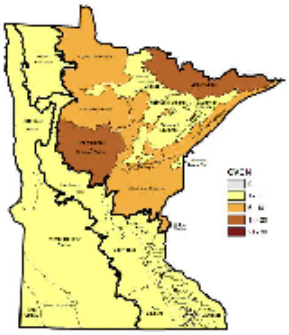
The point count data gathering phase is now complete, so activity has focused on data review process and preliminary analyses of the atlas data for selected species. Our primary focus thus far has been on the development of appropriate methods and production of potential graphics to summarize the atlas data. One example of graphics for the MN Breeding Bird Atlas is for the Ovenbird below, one of the most common species in Minnesota. It includes four different maps we have produced on Ovenbird distribution: 1) a summary of confirmed, probable, and possible breeding evidence of data gathered on the project in MN, 2) a summary of observations for the Ovenbird but divided into ecological subsections, 3) a preliminary probability distribution map for the Ovenbird using land cover and climate as input variables, and 4) a second probability distribution map with greater resolution and shown for Bird Conservation Region 12 including MN, WI, and the upper peninsula of MI. Also shown are a picture of the Ovenbird, a summary of the breeding evidence codes by priority blocks in MN, a summary of habitat relationships where Ovenbirds were observed, and trend information for the Ovenbird in MN and for all of North America based on the USGS Breeding Bird Survey from 1966 to 2011. These data were presented as possible ways to summarize information for each species, but do not necessarily represent a final product.

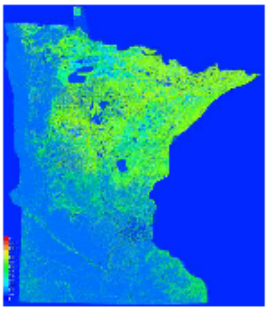
Ovenbird (*Seiurus aurocapilla*)

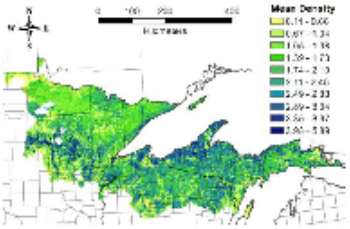


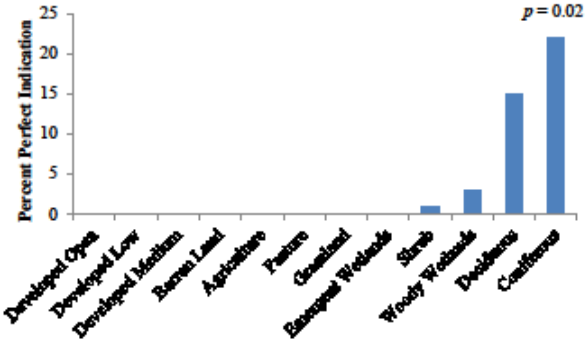
Evidence	Number	% of all blocks
Observed	4	0.0%
Possible	751	7.7%
Probable	1008	10.3%
Confirmed	80	0.8%
Total	**1843**	**18.9%**

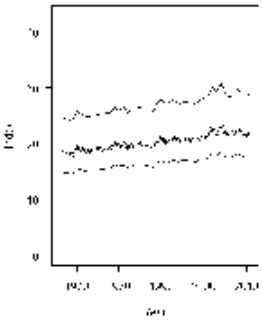




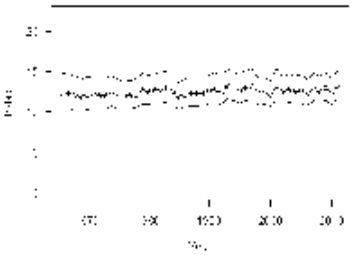








Annual trend MN = 0.4%;
95% CI (0.0, 0.7); n = 61

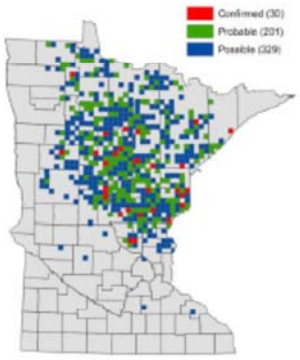


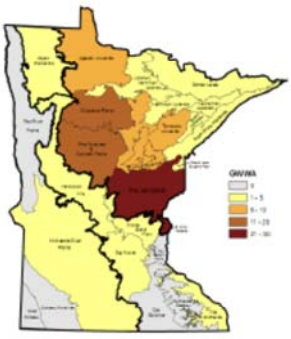
Annual trend NA = 0.1%;
95% CI (-0.2, 0.5); n = 1956

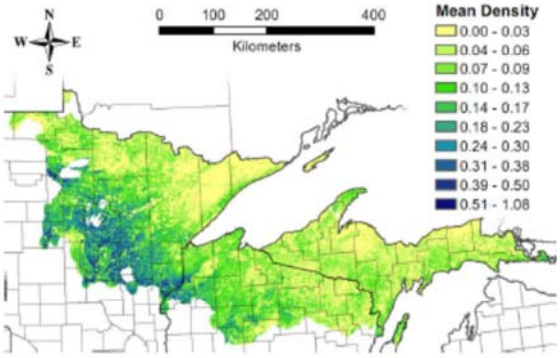
Final Report Summary as of August 1, 2014:

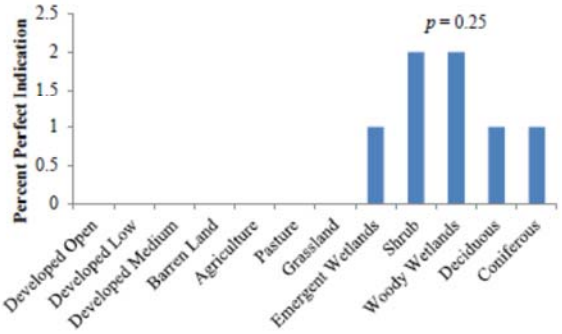
Golden-winged Warbler
Vermivora chrysoptera

Evidence	Number	% of all blocks
Observed	2	0.0%
Possible	431	4.4%
Probable	224	2.3%
Confirmed	33	0.3%
Total	**690**	**7.1%**

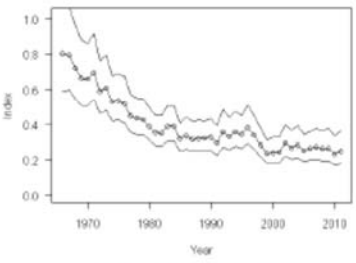








Annual trend MN = 0.5%;
95% CI (-1.1, 2.0); n = 36



Annual trend NA = -2.6%;
95% CI (-3.5, -1.6); n = 437

V. DISSEMINATION:

Description: Survey results will be updated daily on mnbba.org. This includes distribution maps by species and block level lists of birds seen. Program updates through newsletters and general media will be produced. Final results will be compiled, analyzed and available through a website and printed publication.

Activity Status as of April 15, 2012: Activities will commence after the PT contract with the Minnesota DNR is signed by all necessary parties. That should occur by April 20, 2012.

Activity Status as of October 15, 2012: Results from the MN BBA are available on MNBBA where results are updated daily. Data can be viewed by county or species (statewide) and summary tables and graphics of results are available.

Activity Status as of April 15, 2013: MN BBA results are available on MNBBA where results are updated daily. Data can be viewed by county or species and summary tables and graphics of results are available. With the final season of data collection underway, planning is now being done to for development of final products for the BBA project.

Activity Status as of September 15, 2013:

Up to date raw data is available on mnbb.org. We are planning analysis, publication, and electronic dissemination to accommodate the wide audience that is interested in the results of the MNBBA.

Activity Status as of April 15, 2014

Information is available on our website: mnbba.org. We are doing quality control on data and preparing for analysis and dissemination.

Final Report Summary as of August 1, 2014

WEBSITE: Preliminary data has been available on our website: mnbba.org since the beginning of data collection. We will continue to use that url as we migrate our data, analysis, and other online products to the web. In the course of the next 2 years we will do major upgrades to the design and functionality of the website.

BOOK: We will be seeking funding for the publication of the Minnesota Breeding Bird Atlas in book form.

DATA STORAGE: We plan to make all our data available through the Avian Knowledge Network's Midwest Data Node. This online database will allow maximum access to the data for researchers and others we want to explore the data that was collected by the BBA. It will also allow BBA data to combined with other data sources for research and conservation uses.

MISC. PUBLICATIONS AND PRESENTATIONS: Already data from the MN BBA is being used in publications and other resources. A list of those we know of are below.

"Golden Birds, Golden Opportunity" – Gerald Niemi. A Summary report on the Golden-winged Warbler in the Minnesota Volunteer Magazine.
http://www.dnr.state.mn.us/mcvmagazine/issues/2014/may-jun/golden-birds.html

Zlonis, E., G. Niemi, A. Grinde, R. Howe, N. Walton, E. Giese, L. Parker, N. Danz. Long-term monitoring of forest breeding birds of the Western Great Lakes Region. 2014 Midwest Bird Conservation and Monitoring Network, Port Washington, WI, August 4-5, 2014 (Invited plenary talk – includes info on MN Breeding Bird Atlas)

Niemi, G.J. THE STATE OF FOREST BREEDING BIRDS IN MINNESOTA – THE RESULTS FROM MINNESOTA'S FIRST BREEDING BIRD ATLAS. Minnesota Forest Habitats: Managing across the forest continuum. MN Chapter of the Wildlife Society, Palisade, MN. August 18, 2014. (Invited)

Niemi, G.J., A. Peterson, J. Bednar, T. Brown, and E. Zlonis. An ALTERNATIVE DESIGN TO SAMPLE BREEDING BIRDS FOR A STATE ATLAS. American Ornithologists' Union and Cooper Ornithological Society Annual Meeting, Estes Park, CO. Sept 24 - 27, 2014.

North, M. R., and W. E. Faber. IMPACTS OF TWIN CITIES METROPOLITAN AREA DEVELOPMENT ON REGIONAL BREEDING BIRD DISTRIBUTIONS. Midwest Bird Conservation and Monitoring Network, Port Washington, WI, August 4-5, 2014, and the Minnesota Chapter of the Wildlife Society Annual meeting, February 2014

(Funding for this allocation is available for expenditure through June 30, 2014):

VI. Project Budget SUMMARY:

A. ENRTF Budget:

Budget Category	Amount	Explanation
Personnel:	$ 144,990	Audubon MN & subcontractors, supervisor, support, surveyors
Professional/Technical Contracts:	$ 4,500	Contracts for maintenance of mnbba.org
Service Contracts	$ 5,500	Helicopter services, meeting and workshop expenses
Equipment/Tools/Supplies:	$ 250	Misc. Data recording supplies
Postage and Mailing:	$ 100	Information and forms for volunteers
Travel Expenses in MN:	$ 94,660	See Attachment A for details
TOTAL ENRTF BUDGET:	$ 250.000	

Explanation of Use of Classified Staff: No DNR staff will be paid from this appropriation.

Explanation of Capital Expenditures Greater Than $3,500: N/A

Number of Full-time Equivalent (FTE) funded with this ENRTF appropriation: 0

Number of Full-time Equivalent (FTE) estimated to be funded at Audubon MN and through contracts with this ENRTF appropriation: 4.5

B. Other Funds:

Source of Funds	$ Amount Proposed	$ Amount Spent	Use of Other Funds
Non-state			
U.S. Fish and Wildlife	$ 133,331	$ 88,454	Salaries, travel, supplies
Audubon Minnesota	$ 69,239	$ 46,253	Program support, office
MN Ornithologists' Union	$ 20,000	$ 10,000	Program support
TOTAL OTHER FUNDS:	$ 222,570	$ 144,707	

VII. PROJECT STRATEGY:

A. Project Partners: Audubon Minnesota, Minnesota Ornithologists' Union, U.S. Fish and Wildlife Service, Minnesota Department of Natural Resources

B. Project Impact and Long-term Strategy:

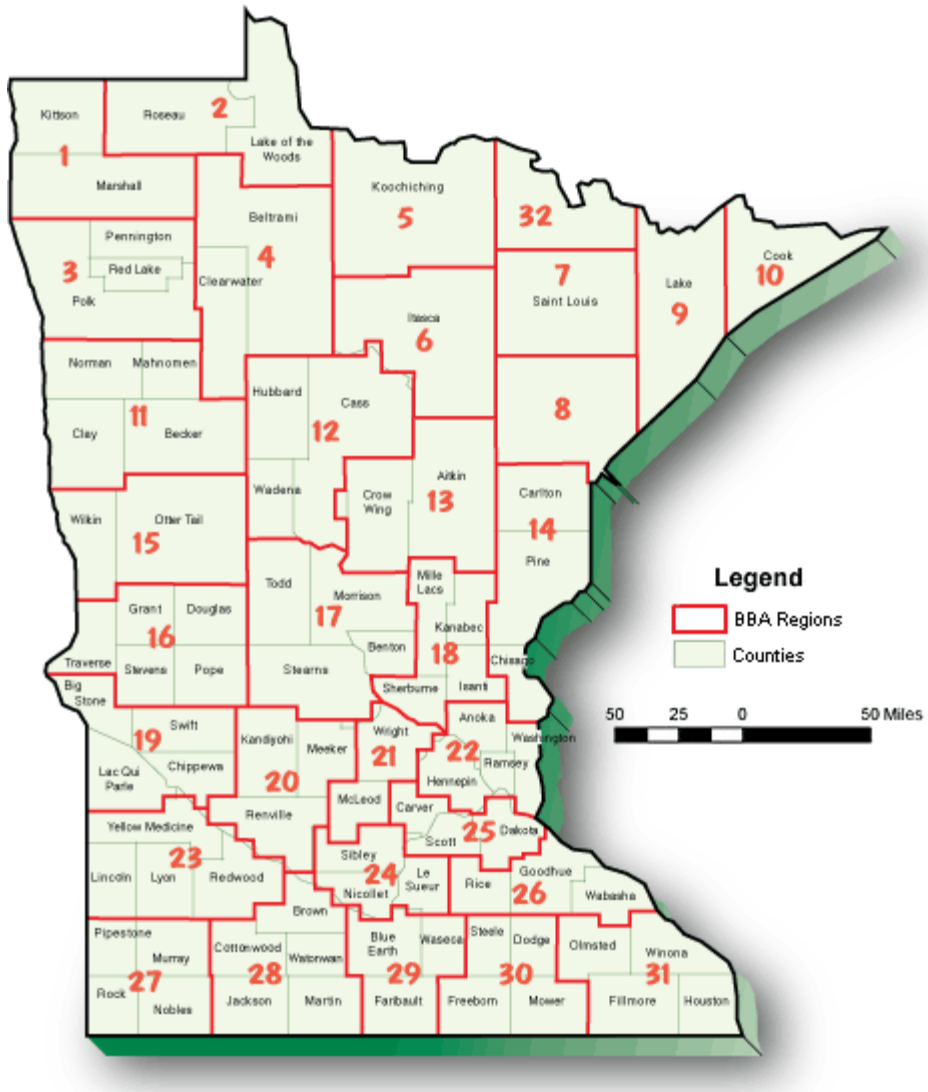
This five-year (2009-2013) pioneering effort will result in a comprehensive set of maps and data for the State of Minnesota that will provide a detailed picture of the distribution and breeding status of over 200 nesting bird species in the state. This information will be invaluable for wildlife biologists, conservationists, foresters, land use planners, private conservation organizations as they identify priority bird species and habitats that need to benefit from future conservation actions. This will help prevent bird species from becoming endangered and it will help direct future avian research to refine our expenditure of conservation funds to those species and habitats most in need of preservation and management.

C. Spending History:

Funding Source	M.L. 2005 or FY 2006-07	M.L. 2007 or FY 2008	M.L. 2008 or FY 2009	M.L. 2009 or FY 2010	M.L. 2010 or FY 2011
ENRTF			$ 270,000	$ 0	$ 372,000
MNDNR			$ 10,750	$ 9,250	$ 0
USFWS			$ 2,347	$ 3,007	$ 7,127
Audubon/NRRI/Others			$ 13,755	$ 30,296	$ 40,840

VIII. ACQUISITION/RESTORATION LIST: N/A

IX. MAP(S): See www.mnbba.com



Attachment A: Budget Detail for M.L. 2011 (FY 2012-13) Environment and Natural Resources Trust Fund Projects

Project Title: Species of Concern: Special investiations: Part A

Legal Citation: M.L. 2011, First Special Session, Chapter 2, Article 3, Section 2, Subd. 03p, "Species of Concern; Investigations

Project Manager: Carrol L. Henderson

M.L. 2011 (FY 2012-13) ENRTF Appropriation-Part A: $ *250,000*

Project Length and Completion Date: June 30, 2014

Date of Update: April 15, 2014

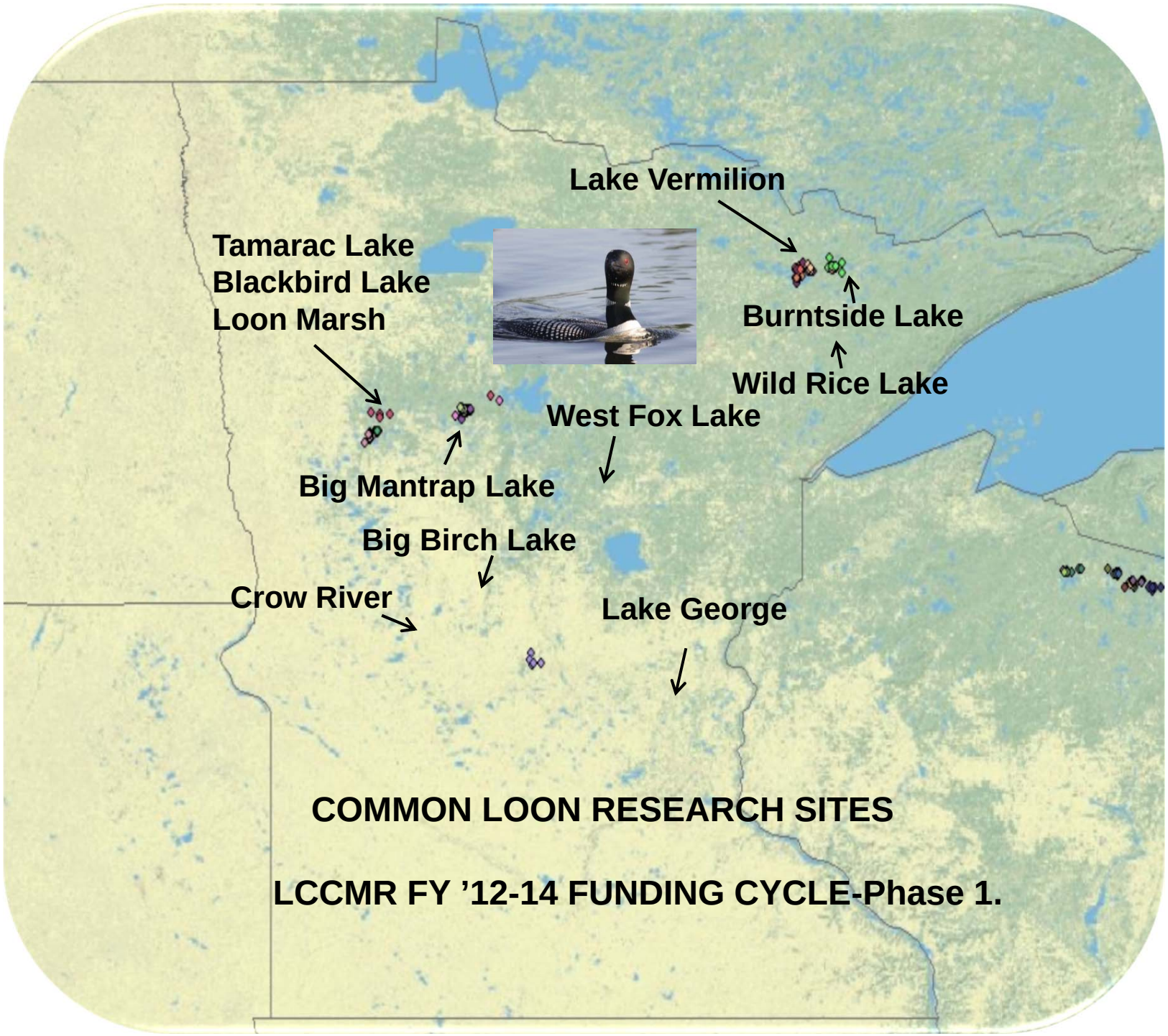
ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	**Activity 1 Budget**	**Amount Spent**	**Balance**	**Activity 2 Budget**	**Amount Spent**	**Balance**	**Activity 3 Budget**	**Amount Spent**	**Balance**	**Activity 4 Budget**	**Amount Spent**	**Balance**	**TOTAL BUDGET**	**TOTAL BALANCE**
BUDGET ITEM	***Loon telemetry & tissue analysis***			***Statewide pelican survey analysis***			***Pelican egg and tissue studies***			***Analysis samples***	***of loon & for PAH &***	***pelican Corexit***		
Professional/Technical Contracts														
US Geological Survey. Loon telemetry, geolocator studies, and blood and tissue analysis. Web info on loon tracking.	89,000	89,000	0										89,000	0
University of Minnesota. Department of Fisheries, Wildlife, and Conservation Biology. Analysis and summary of white pelican surveys and population trends from statewide surveys related to surveys in 2004 and 2011				60,000	60,000	0							60,000	0
North Dakota State University, Department of Biological Sciences. Analysis and evaluation of pelican eggs, blood, and tissue samples for petroleum and dispersant contamination from three different colonies.							35,000	35,000	0				35,000	0
University of Connecticut, Center for Environmental Sciences and Engineering. Chemical analysis for PAH and Corexit contamination in eggs, blood, and tissue samples of Minnesota loons and pelicans from project contractors										66,000	66,000	0	66,000	0
COLUMN TOTAL	**$89,000**	**$89,000**	**$0**	**$60,000**	**$60,000**	**$0**	**$35,000**	**$35,000**	**$0**	**$66,000**	**$66,000**	**$0**	**$250,000**	**$0**

Attachment A: Budget Detail for M.L. 2011 (FY 2012-13) Environment and Natural Resources Trust Fund Projects

Project Title: Species of Concern: Investigations Part B
Legal Citation: Laws of Minnesota 2011 1st Special Session Ch 2, Article 3, sec. 2, subd. 3 (p)

Project Manager: Carrol Henderson
M.L. 2011 (FY 2012-13) ENRTF Appropriation: $ 250,000
Project Length and Completion Date: June 30, 2014
Date of Update: June 30,2014

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Activity 1 Budget	Amount Spent	Balance	Activity 2 Budget	Amount Spent	Balance	Activity 3 Budget	Amount Spent	Balance	TOTAL BUDGET	TOTAL BALANCE
BUDGET ITEM	***Township data collection by volunteers and paid staff - training and support.***			***Data Management and Analysis***			***Point Count Data Collection***				
Professional/Technical Contracts											
Contracted Personnel- Audubon Minnesota (Wages and Benefits) or subcontractors (To be determined)	108,127	96,749	11,378							108,127	11,378
Project Coordinator (estimated $36,123), 45% of salary and fringe in yr2-FY-13 ($20,602 salary, $7,416 fringe), and 12.5% of salary and fringe in yr 3-FY 14 ($5,959 salary, $2,145 fringe) total estimated		51,202									
Project Support (estimate $4,481), partial salary and fringe in YR 2 - FY 13 ($3,296 salary, $1,185 fringe)		22,087									
Project Manager (estimate $15,180), 18% of time in YR 2 - FY 13 ($11,162 salary, $4,018 fringe)		23,460									
Field Technicians (estimated $32,928)- Block Survey, 7 temporary employees (8 weeks) in Yr 2, FY 13, $29,400 salary, $3,528 fringe											
Field Technicians - Point Count (estimated $49,478), 10 Temporary employees (6 - 10 wks) in Yr 1 FY 12, $44,177 salary, $5,301 fringe											
GIS Support (estimated $6,800) - partial support in Yr 1 - FY 12, $6,071 salary, $729 fringe											
Database and Web Entry Portal (Cornell University)				3,000	3,000	0				3,000	0
MNBBA.org - website maintenance and updating - contractor to be selected by Audubon				1,600	1,600	0				1,600	0
Service contracts (NRRI - Univ. of MN-Duluth)							132,601	137,601	(5,000)	132,601	(5,000)
Helicopter Services - provide transportation to and from remote blocks on northern peatlands											
Meeting room and workshop expenses	222	222	0							222	0
Equipment/Tools/Supplies Paper, misc data recording suuplies											
Travel expenses in Minnesota											
Travel - block counts, mileage, food, lodging in Yr 2, FY 13	4,450	4,389	61							4,450	61
Travel - point counts, mileage, food, lodging in Yr 1 - FY12											
Other - postage and mailing cost for volunteer recruitment and training in Yr 2 - FY13	0		0							0	0
COLUMN TOTAL	**112,799**	**101,360**	**11,439**	**$4,600**	**$4,600**	**0**	**$132,601**	**137,601**	**(5,000)**	**$250,000**	**$6,439**


Lake Vermilion
Tamarac Lake
Blackbird Lake
Loon Marsh
Burntside Lake
Wild Rice Lake
West Fox Lake
Big Mantrap Lake
Big Birch Lake
Crow River
Lake George
COMMON LOON RESEARCH SITES
LCCMR FY '12-14 FUNDING CYCLE-Phase 1.