

2010 Project Abstract

For the Period Ending June 30, 2012

PROJECT TITLE: Minnesota Breeding Bird Atlas – NRRI/U of MN
PROJECT MANAGER: Gerald J Niemi
AFFILIATION: Natural Resources Research Institute, University of Minnesota
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WEBSITE: [If applicable] www.nrri.umn.edu
FUNDING SOURCE: Environment and Natural Resources Trust Fund
LEGAL CITATION: M.L. 2010, Chap. 362, Sec. 2, Subd. 3(c)

APPROPRIATION AMOUNT: \$161,000

Overall Project Outcome and Results

This project is the third and fourth years of a four-year effort in the development of the Minnesota Breeding Bird Atlas – the first comprehensive assessment of Minnesota's breeding birds. The overall project is divided into two parts: 1) volunteer observations organized by Audubon Minnesota and 2) systematic surveys of Minnesota's breeding birds organized by the University of Minnesota (summarized here). Objectives were to gain uniform statewide coverage for all Minnesota's birds, estimate breeding bird populations by habitat type, and contribute to a nationwide network of bird atlases. Data gathering was primarily completed by graduate and undergraduate students at the University of Minnesota. All passed an aural bird identification test, verified their hearing ability, and participated in field standardization exercises.

Over the two breeding seasons (2011 and 2012) of this project, the target of 40% of Minnesota townships (>920) was successfully completed. Currently, over 80% (>1,800) of the townships have been sampled, with over 230 species observed and over 160,000 individuals counted in over 2,800 individual point counts. Thousands of additional breeding observations were submitted by surveyors from this project to the volunteer database in the complementary study organized by Audubon Minnesota, including over 4,000 probable or confirmed breeding records for Minnesota birds. Over 70% of the data gathered during 2009-2012 have been entered, checked for errors, and briefly summarized.

Project Results Use and Dissemination

The data gathered through 2010 have been downloaded to the Minnesota breeding bird atlas database and during the fall of 2011 through the Cornell University interface. All of these data will be incorporated into a comprehensive atlas of Minnesota's breeding birds that will be used as 1) a first-ever baseline on the current population status of this important Minnesota resource, 2) critical information for future conservation planning, and 3) as a guide for such activities as identifying important bird areas or for nature-based tourism activities. The ultimate dissemination of these data will be through an interactive data system and we anticipate the publication of a hard copy book assuming suitable funding can be obtained.

Submitted date: July,

Environment and Natural Resources Trust Fund (ENRTF) 2010 Work Program

Date of Report: January 31, 2012
Date of Next Status Report: July 31, 2012
Date of Work program Approval: June 9, 2010
Project Completion Date: June 30, 2012

I. PROJECT TITLE: Minnesota Breeding Bird Atlas – NRRRI/U of MN

Project Manager: Gerald J Niemi
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Location: Statewide

Total Trust Fund Project Budget: \$372,000

The total appropriation for this project will be split between Audubon Minnesota and the Natural Resources Research Institute at the University of Minnesota Duluth as outlined below. Audubon Minnesota will submit a separate workplan for their part of the project.

NRRI, University of Minnesota Duluth	Trust Fund Appropriation:	\$ 161,000
	Minus Amount Spent:	\$ <u>160,249</u>
	Equal Balance:	\$ 751
 Audubon Minnesota	 Trust Fund Appropriation:	 \$ 211,000
	Minus Amount Spent:	\$ <u>120,931</u>
	Equal Balance:	\$ 90,069

Legal Citation: M.L. 2010, Chap. 362, Sec. 2, Subd. 3(c)

Appropriation Language:

\$372,000 is from the trust fund to continue development of a statewide survey of Minnesota breeding bird distribution and create related publications, including a book and online atlas with distribution maps and breeding status. Of this appropriation, \$211,000 is to the commissioner of natural resources for an agreement with Audubon Minnesota and \$161,000 is to the Board of Regents of the University of Minnesota for the Natural Resources Research Institute. The atlas must be available for downloading on the Internet free of charge.

II. PROJECT SUMMARY AND RESULTS:

The Minnesota Breeding Bird Atlas is a comprehensive, statewide survey of the breeding distribution of Minnesota's birds. Breeding Bird Atlases are used throughout the world to document and map the distribution of breeding birds. Atlas information is vital to scientists

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and conservationists, allowing them to focus conservation investments in the most strategic and effective manner. Minnesota is one of only six states that do not have an atlas, impeding state, regional, and national conservation efforts. Moreover, this atlas project combines a unique effort by over 600 volunteers coordinated by Audubon Minnesota to obtain detailed information on breeding status of Minnesota's breeding birds, while this project coordinated by the Natural Resources Research Institute is gathering systematic and consistent data from every township in the state of Minnesota. The combination of these two efforts represents a powerful addition to understanding the distribution, relative abundance, and habitat use by Minnesota's breeding birds.

Birds are important indicators of the quality of our environment and they are greatly appreciated by the public. According to the MN DNR, more than 1.8 million Minnesota citizens have been identified as having a defined interest in birds. In addition to our data gathering, many of the contemporary databases gathered by agencies, universities, and other organizations will be incorporated into the atlas. Final products will include a book 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 data will be useful to a wide variety of organizations including federal agencies, many state agencies such as the MN DNR and MPCA, county land management agencies, and both regional and local organizations to highlight tourism opportunities.

As a major participant in the LCCMR funded, Statewide Conservation and Preservation Plan, project manager Niemi needed to rely on crude information on the identification of important areas of biological diversity in the state. The information gathered during this project is at the sub-township level and will provide much greater spatial detail; one more compatible with contemporary remote sensing imagery available for vegetation, water, and development. These data will also be of great utility for use in agency decision-making regarding the dedicated funding legislation associated with land acquisition and water quality protection. These types of spatially-intensive data sets are essential to make wiser decisions about land use allocations for energy development, transportation networks, and other residential or industrial development.

Years 3 and 4 of this six-year project will focus on data collection, review, and organization. Data will be collected at the ownership level by volunteers recruited and trained by project staff and by paid, specially trained observers conducting limited, standardized point counts. 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 we anticipate having some information from all townships in the state including "hard-to-access" townships in the BWCA and the northern peatlands, and should have completed sampling in 80% of the townships.

Data entry and access along with project updates and information will be handled through our website and the data management system we maintain with Cornell University. The appropriation will be split with \$211,000 going to Audubon Minnesota to oversee project results 1 – 3 and \$161,000 going to the Natural Resources Research Institute, University of Minnesota.

III. PROGRESS SUMMARY AS OF JANUARY 31, 2011

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At the start of this portion of the project on July 1, 2010 we were in the process of completing the 2010 breeding bird samples. Overall we have completed sampling in 920 townships in Minnesota. This represents over 40% of the townships in Minnesota and indicates that we are on-target to complete sampling of the remaining 60% of townships over the coming three years. All of the data gathered during the 2009 and 2010 field seasons have been double-entered and all of the data have been error checked and corrected against the original field sheets. These data represent over 78,000 observations of individual birds for over 200 species. We are currently in the process of downloading these data to the Cornell University master data bank. These data will greatly increase the number of observations and reports for townships across the state of MN that will be observable on the website.

We have also been working closely with Audubon Minnesota on a strategy to increase the breeding confirmation for many species in the townships we intend to sample in 2011. This strategy will include having volunteers and potentially paid staff from Audubon Minnesota returning to the point counts and places within townships we have sampled. These data will allow a better determination on whether species are probable or confirmed breeding species within these townships. In general, the activity on this project is relatively minor during the period from September to April because project activity is primarily during the summer field season.

IV. OUTLINE OF PROJECT RESULTS:

Result 1: Volunteer and Staff Training and Management

Audubon Minnesota will oversee this Result using their portion of the appropriation. A separate workplan submitted by Audubon details this part of the effort.

Result 2: Data Collection

Audubon Minnesota will oversee this Result using their portion of the appropriation. A separate workplan submitted by Audubon details this part of the effort. NRRRI personnel with expertise in geographic information systems will participate in many aspects of this portion of the project, including interaction with the Cornell Laboratory of Ornithology on the data management system.

Result 3: Data Management and Analysis

Audubon Minnesota will oversee this Result using their portion of the appropriation. A separate work plan submitted by Audubon details this part of the effort. NRRRI personnel will continue to collaborate with Audubon and participate in coordination of this effort.

Result 4: Point Count Data Collection

Description: This work will be overseen by the Natural Resources Research Institute at the University of Minnesota Duluth. Up to ten paid, seasonal field surveyors, primarily graduate and undergraduate students will conduct counts in townships of Minnesota 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. By the end of year 4 approximately 80% of the point counts conducted by these specially trained seasonal staff will be completed for the entire state of Minnesota, including those in the BWCAW and other remote locations. A standard protocol 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. We anticipate that 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

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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 Result 4: **ENRTF Budget:** **\$ 161,000**
Amount Spent: **\$ 160,249**
Balance: **\$ 751**

Deliverable	Completion Date	Budget
1. Data gathered for an additional 40% of Minnesota townships or a total of 80% over four years.	June 30, 2012	\$141,000
2. Data entered and error-checked for 60% of Minnesota townships.	June 30, 2012	\$10,000
3. Preliminary tables and figures on the relative distribution and abundance of MN breeding birds.	June 30, 2012	\$10,000

Result Status as of January 31, 2011:

Field sampling for birds in over 400 Minnesota townships were completed during July 2010. These data have been double entered; once by the original counter and once by another counter. Any inconsistencies in the two entries are checked against the original field sheets or in some cases the original counter is contacted for clarification. In general, the number of inconsistencies is substantially less than 5% and most are easily reconciled with a simple check of the original field sheet. We are closely coordinating with efforts of Audubon Minnesota to increase coverage and determination of breeding by species in the various townships sampled.

The point count methodology has worked very effectively. We detect a mean between 17 and 38 species per township (priority block) and an average of 28 individual birds per point or 85 individual birds within a township. This results in a total for the two breeding seasons of sampling of over 78,000 individual birds and over 200 bird species. We have sampled a total of 2,850 individual points. We have also been responsible for sampling most of the inaccessible townships in the state. We have sampled over 20 inaccessible townships including six within the Boundary Waters Canoe Area Wilderness (BWCAW). In the BWCAW we identified between 40 and 51 species in one morning of sampling with approximately half identified as probable or confirmed breeding species. Our coverage of inaccessible blocks will be greatly expanded in summer 2011.

Most of the counts are being conducted by undergraduate and graduate students of the University of Minnesota Duluth and Twin Cities. These data will also be used as a basis for several future MS and PhD students at these universities.

Result Status as of July 31, 2011:

Breeding birds were sampled in over 700 townships with over 2,000 point counts from May 27 to July 15, 2011. This represents the completion of approximately 70% of the townships in the state of Minnesota and we are on track to complete sampling of all townships if funding is obtained for the next two years. Because these data collection efforts were recently completed, they have not yet been analyzed. These data are currently being double-entered and error-checked to insure accurate information. Species observations will also be scrutinized by several experts to insure that they are correct.

Preliminary Summary of 2009-2010 Data

A total of 899 townships and 2,849 points including 1,032 points (324 townships) in the southeast region, 906 points (288 townships) in the western region, and 911 points (287 townships) in the northeast region of Minnesota were surveyed by NRRI observers in the 2009 and 2010 field seasons (Table 1). In 2009 and 2010 66,730 individuals of 193 bird species were identified in Minnesota by NRRI observers. Note that that blocks represent the northeast quadrat (3 miles x 3 miles) of the township, so blocks are a subset sample of a township.

Table 1. Summary of points surveyed, blocks surveyed, clusters surveyed, number of individuals, and average number of individuals per block detected by region (2009-2010).									
Region	# Points	% Points	# Blocks	% Blocks	# Clusters	% Clusters	# Individuals	% Individuals	Average # individuals/ block
Southeast	1032	36.2	324	36.0	9	29.0	24740	37.1	76.3
West	906	31.8	288	32.0	8	25.8	24390	36.6	85.0
Northeast	911	32.0	287	31.9	14	45.2	17600	26.4	61.3
Total	2849	100.0	899	100.0	31	100.0	66730	100.0	74.2

Of the total 2,849 points surveyed in 2009-2010, cultivated crop habitat was sampled most often with a total of 844 points (29.6%), 733 points (25.7%) sampled were located in deciduous habitat, and 385 points (13.5%) were located in pasture habitats. Each of the remaining nine habitats covered 0.1-6.8% of the remaining points (Table 2). Without the inclusion of adjustments for distance of detection, cultivated crops, pasture, and deciduous forests were the habitats with largest number of observed individuals with 18,940, 14,885, and 10,066 detected in 2009 and 2010. The habitats with the greatest species abundance (of the 193 recorded species in Minnesota) were deciduous forests, emergent wetlands, and cultivated crops with 176, 156, and 154 species detected, respectively (Table 2). The habitats with lowest species abundance were habitats in developed and barren lands.

Table 2. Summary of points surveyed and individuals detected by habitat (2009-2010).

Habitat	# Points Surveyed	% Points Surveyed	# Individuals	% Individuals	# Species	% Species
Barren Land	4	0.1	74	0.1	33	17.1
Cultivated Crops	844	29.6	18940	28.4	154	79.8
Pasture/Hay	385	13.5	10066	15.1	147	76.2
Developed-Low Intensity	75	2.6	1836	2.8	88	45.6
Developed-Medium Intensity	31	1.1	793	1.2	51	26.4
Developed-Open Space	22	0.8	486	0.7	74	38.3
Deciduous Forest	733	25.7	14885	22.3	176	91.2
Evergreen Forest	193	6.8	3684	5.5	119	61.7
Grassland/Herbaceous	171	6.0	4627	6.9	123	63.7
Emergent Herbaceous Wetlands	194	6.8	6565	9.8	156	80.8
Shrub/Scrub	71	2.5	1717	2.6	116	60.1
Woody Wetlands	124	4.4	3014	4.5	137	71
No Data	2	0.1	43	0.1	23	11.9
Total	2849	100.0	66730	100.0	193	--

The average number of individuals reported was 74.2 per township with an average of 26 species detected per township. The number of individuals found in a given township ranged from 16 with points in cultivated crops and deciduous forest habitat to a high of 430 individuals in a township with points in emergent herbaceous wetland, pasture, and cultivated crop habitat. The number of species identified in a given township ranged from a minimum of 8 different species to in a township with 48 identified species. The township with 8 species had two points in medium intensity developed land, and one point in low intensity developed land. The township with 48 species had points located in pasture, grassland, and deciduous forest habitats. The most common species detected in Minnesota include Red-winged Blackbird (6,107), American Robin (2,767), and Common Yellowthroat (2,720); however, species abundance varied by habitat.

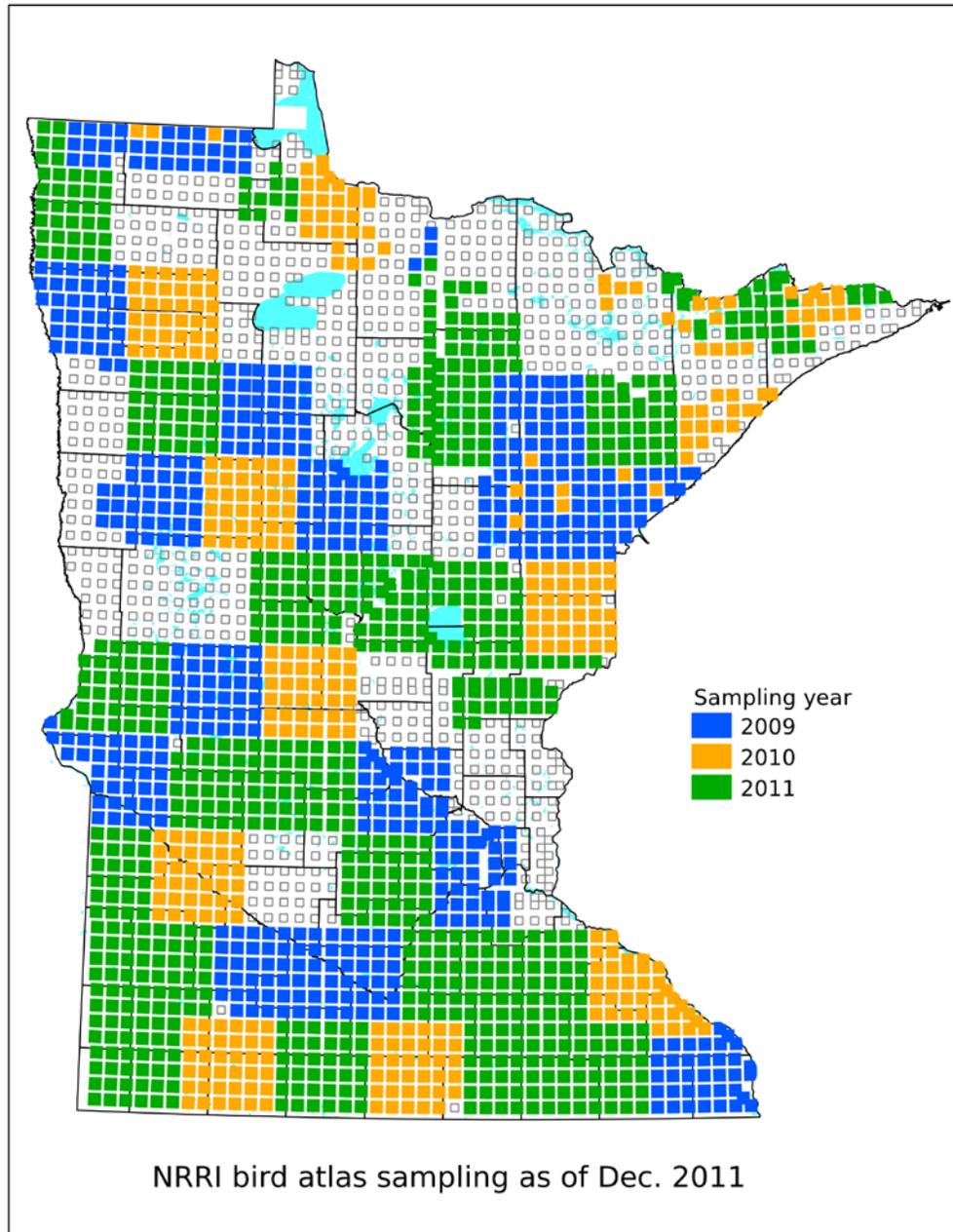
Result Status as of January 31, 2012: A total of 791 townships were sampled for breeding birds during the June-July 2011 period. This included a total of 2,375 point counts and 45,190 observations of 203 bird species. The total for the three years of sampling represents approximately 75% of the 2,300 townships in Minnesota. These totals also include 28 townships sampled in the BWCA and over 30 townships in the Red Lake Peatland. Up to this point we have not used any helicopter time to sample these difficult to reach places. The sampling within these areas has exclusively relied on the use of canoes and extensive hiking.

Summary of three years of sampling for Minnesota breeding bird species.

Year	Townships	Points	Observations	Species
2009	529	1,593	32,030	206
2010	414	1,245	25,921	193
2011	791	2,375	45,190	203
Total	1,734	5,213	103,141	602

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The distribution of townships sampled in 2009, 2010, and 2011 is shown in the map below. Those shown in gray are those that are still need to be sampled of which some will be sampled in 2012.



All data gathered through July 2011 have been error-checked for data entry and downloaded into the Minnesota Breeding Bird Atlas website via Cornell University which is the repository for this information. In addition, NRRI has worked cooperatively with Audubon Minnesota in the development of a sampling strategy for the volunteers in order to maximize coverage of the state and in conjunction with systematic sampling of the state by NRRI. We

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are also in the process of entering data from several other projects funded to NRRI that have been gathered in a similar fashion. The combination of these data will allow NRRI to reach its goal of sampling 80% of the townships in Minnesota by the end of this project in July 2012.

Final Report Summary: August 1, 2012:

V. TOTAL ENRTF PROJECT BUDGET: \$372,000

Personnel: \$ 222,700

Contracts: \$ 61,000

Equipment/Tools/Supplies: \$ 5,300

Travel: \$ 83,000

Explanation of Capital Expenditures Greater Than \$3,500: We have requested \$40,000 in the budget for helicopter services (competitively bid) and for BWCAW outfitter services. These two items may be absolutely necessary in order to successfully and safely sample the large number of townships in Minnesota that are inaccessible by vehicle, boat, bike, or on foot. The summer of 2010 will be our first year in attempting to sample the inaccessible townships of Minnesota both in the BWCAW and in the Red Lake Peatland region. In the summer of 2010, we will attempt to do this without helicopters or the use of outfitters in order to save money and invest in more individuals to do the sampling. Depending on these results, we may request a modification to the budget. A consideration is the efficiency with which we can sample these inaccessible areas. Even though one individual was able to sample three to four townships per morning in areas with good road access, in these inaccessible areas our goal is to sample one township per morning. Hence, we will need to evaluate our efficiencies in cost per township of effort using different modes of transportation.

VI. PROJECT STRATEGY:

A. Project Partners:

Audubon Minnesota – Mark Martell, Project Manager, \$211,000

Natural Resources Research Institute – University of Minnesota Duluth – Gerald J. Niemi, \$161,000

Other Partners – Not receiving Funds

Bell Museum of Natural History - Dr. Scott Lanyon

Minnesota DNR Division of Ecological Resources

U.S. Fish and Wildlife Service

Minnesota Ornithologists' Union

B. Project Impact and Long-term Strategy:

The Minnesota Breeding Bird Atlas will provide the first time-specific survey of all the breeding birds in the state. This information will be available to land and resource managers, the public, and policy makers providing an invaluable resource as future events such as global warming require a response. Information can continue to be collected by partners and others providing a unique and robust view of Minnesota's birds.

C. Other Funds Proposed to be Spent during the Project Period: \$80,000

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Audubon Minnesota - \$20,000
Minnesota Ornithologists' Union - \$20,000
U.S. Fish and Wildlife Service - \$20,000
Minnesota DNR - \$20,000

D. Spending History: LCCMR ML 2008 sub 5d - \$270,000, Audubon- \$30,000, USFWS- \$50,000, Minnesota Ornithologists' Union- \$20,000, Minnesota DNR - \$20,000

VII. DISSEMINATION: Information will be available at: www.mnbba.org, at the end of the anticipated 6-year project we will publish a hardcover atlas.

VIII. REPORTING REQUIREMENTS: Periodic work program progress reports will be submitted not later than: January 31, 2011, July 31, 2011, January 31, 2012. A final work program report and associated products will be submitted between June 30 and August 1, 2011 as requested by the LCCMR.

IX. RESEARCH PROJECTS:

Attachment A: Budget Detail for 2010 Projects - Summary and a Budget page for each partner (if applicable)

Project Title: <i>Minnesota Breeding Bird Atlas</i>						
Project Manager Name: Gerald Niemi						
Trust Fund Appropriation: \$ 372,000 (Audobon - \$211,000 / NRRRI \$161,000)						
1) See list of non-eligible expenses, do not include any of these items in your budget sheet						
2) Remove any budget item lines not applicable						
	Result 4 Budget:	CORRECTED Revised Budget (Sept. 26, 2011)	Amount Spent (thru 09/26/11)	Balance	Amount Spent (thru 01/31/12)	Balance
2010 Trust Fund Budget						
NRRI's Appropriation = \$161,000	<i>Data Collection, Management and Analysis</i>					
BUDGET ITEM						
PERSONNEL: wages and benefits						
Wages: Research Associate, Terry Brown, 6% effort; Graduate Student, 3 mos. summer effort; Field assistants- 7 seasonal staff (4-7 wks each summer), 1 work study \$625 award	64,656	93,756	94,450	-694	97,786	-4,030
Fringe: Research Associate, 33.3% fringe; Graduate Student, 24.2% fringe; Field assistants - 7 seasonal staff and 1 work study, 8.2% fringe	9,344	15,244	19,482	-4,238	20,505	-5,261
Contracts / Services						
Services for access to remote sites	40,000	0	0	0		
Other Services		5000	1,066	3,934	1,107	3,893
Supplies						
Field/lab supplies (camping supplies,maps,GPS,binoculars)	6,000	6,000	2,420	3,580	2,450	3,550
Travel expenses in Minnesota						
Field research travel	41,000	41,000	37,689	3,311	38,400	2,600
COLUMN TOTAL	\$161,000	\$161,000	\$155,108	\$5,893	\$160,248	\$752