NORTH ATLANTIC LANDSCAPE CONSERVATION COOPERATIVE GRANT 2012 PROGRESS REPORT

Quarter: (circle one) (2014 1st) 2014 2nd 2014 3rd 2014 4th

Grant Number and Title: NALCC 2011 (11) Mapping Marine Birds NW Atlantic: Phase 1

Grant Receipt/Organization: NCSU

Grant Project Leader: Gardner

Were planned goals/objectives achieved last quarter? Yes

NALCC Conservation Need Addressed:

Progress Achieved: (For each Goal/Objective, list Planned and Actual Accomplishments)

1. Develop models for estimation of sea bird distributions, particularly in regards to potential areas of aggregation
   - Planned Goal – Determine when is the best usage of our double hurdle model over other single hurdle and non-hurdle models.
   - Accomplished – We looked into the relationship between the skewness of the data and the best model chosen for each species. We were able to show that skewness plays a role in determining whether a double-hurdle model gives a better fit than a single-hurdle model, i.e., whether an extreme distribution component provides a better fit to the data than negative binomial.

2. Determine statistically appropriate models for assessing risk
   - Planned Goal – Create risk maps that combine information from several species, possibly looking into vulnerability indices, and to include species that are less abundant in the overall determination of risk.
   - Accomplished – We decided that a good way to show areas of high risk and aggregation was to create maps of extreme count probabilities as well as maps of the expected median count for each species. Different kinds of maps are still being developed, including an overall one-year risk assessment, which could be used to inform the locations of overall risk throughout the year. We conclude that incorporating a vulnerability index, as a way to create a risk map, is not a feasible solution at the moment. There are too many questions surrounding the accuracy and variability of such an index. About half of how these indices are calculated comes from "expert" opinion, which is difficult to quantify. Additionally, the vulnerability index we considered was based at least partially on abundance and we think it inappropriate to then use this as a weighting mechanism for the abundance models we developed (basically double using abundance).

Summary of Progress: (Provide a paragraph describing progress, work to come, and timelines)

We have run models and created predictive maps for each of 22 individual species that have at least 100 non-zero counts in the data. For each species, we ran eight models: One for each combination of threshold level (1, 97.5th %-tile, 99th %-tile, infinity) and inclusion or exclusion of a conditional auto-regressive (CAR) process (spatial, non-spatial). The best model for each species was chosen by log-pseudo marginal likelihood (LPML),

and the results from this model were analyzed using parameter estimates, convergence plots, and risk maps.

For the less-abundant species, the 97th and 99th percentiles of the count distribution may be too low. For example, because there are only 196 non-zero counts of Roseate Tern, the 99th percentile is one. Thus, if either of these percentile values were below five, we set the threshold to five and use these results for comparison. Some species such as Bonaparte's Gull will thus be run at three threshold levels: 1, 5, and infinity, because both the 97th and 99th percentiles are less than 5. Some other species such as Common Loon will be run at four threshold levels with the second threshold equal to 5, since the 97th percentile of their count distribution is less than 5 (for the Common Loon, the 97th percentile is 4 and the 99th percentile is 7).

For most of the species, the best model was a double-hurdle model with the CAR model for spatial effects and the 97th percentile as the extremes threshold value. In general, with all else being equal, including the CAR model provided a better fit than not including it. The Roseate Tern is an example where the best model chosen was the model with the threshold value was 1. Furthermore, our results show that the GPD single hurdle model performed better than the negative binomial hurdle model for most species. More details about the comparison of these models, and general insight as to which model provides the better fit to which type of data will be included in the final report.

Project updates were presented at the Atlantic Marine Bird Cooperative Meeting in Hershey, PA on February 26-28.

Difficulties Encountered:
- For the Common Eider, the negative-binomial (single) hurdle model is unable to run with 50 eigenvectors, but was able to run with 5 eigenvectors.
- As mentioned before, our models are not properly achieving convergence for sea duck species, such as Common Eider, Long-tailed Duck, and Surf Scoter, if spatial effects were included in the model.

Activities Anticipated Next Quarter:
- Decide which risk map gives the best information and include in reports.
- Create a final technical report of current project results.
- Write and submit a manuscript for publishing.

Expected End Date: 12/31/2013

Costs:

Funds Expended to Previous to this Report: $106,399.29

Amount of NALCC Funds Requested within this Report: $850.45
Total Approved Budgeted NALCC Funds: 115,000.00

Are you within the approved budget plan? yes

Are you within approved budget categories? yes

Signature: Beth Gardner

Date: 5/10/2014

NORTH ATLANTIC LANDSCAPE CONSERVATION COOPERATIVE GRANT 2014 PROGRESS REPORT

Quarter: (circle one) (2014 1st) 2014 2nd 2014 3rd 2014 4th

Grant Program, Number and Title: 2011-14 Best Darn Bird Map

Organization: Biodiversity Research Institute

Project Leader: Andrew Gilbert

Abstract: Please provide a short (1-2 paragraphs) abstract that addresses EACH of the following: the objectives of your project, accomplishments to date, future plans and timelines with an estimate for when the project will be completed.

The Best Darn Bird Map project will pull together existing information on marine bird distribution and abundance, including modeled distributions, vessel and aerial survey information, and data from individually marked birds, and create mapping products useful for planning uses of the marine environment, including sighting alternative energy projects.

The objectives of our contribution to the BDBM are to 1) produce model data appropriate for BDBM and 2) deliver seabird model input for BDBM.

We have completed processing the latest seabird data and have worked with USGS to transfer this to the Atlantic Seabird Compendium for model development. This completes the work under this project.

Were planned goals/objectives achieved last quarter? Yes.

Progress Achieved: (For each Goal/Objective, list Planned and Actual Accomplishments)

1. Consult with project PI and USGS to produce model data appropriate for BDBM.

   Work completed 4th quarter 2013.

2. Deliver seabird model input for BDBM
   Work completed 4th quarter 2013.

Difficulties Encountered:
None.

Activities Anticipated Next Quarter:
Project complete.

Expected End Date: December 2014

Costs:

Total life to date expenses (include this quarter): $9,925.24

Total Approved Budgeted Funds: $9967

Are you within the approved budget plan and categories?YES

Signature: 

Andrew T. Gilbert

Date: 4/15/2014