1. Station: Tetlin National Wildlife Refuge	2. Org Code (FBMS): FF07RTET00/FXRS12610700000/178	3. Amount Requested: $20,000
4. Project Title:Analysis and Data Management for Canada Lynx Dispersal, Space and Habitat Use Patterns During a Snowshoe Hare Population Cycle		
5a. Project Officer: Nate Berg, Lead Wildlife Biologist, Tetlin NWR	5b. Phone: 907-883-9406	5c. email: nathan_Berg@fws.gov
6. I&M Staff Name: Anna-Marie Benson, McCrea Cobb	7. PRIMR Survey ID: FF07R07RTET00-064	8. Station Project Ranking: #1

PROPOSAL BODY:

9. Problem Statement and Objectives

Since 2015, a variety of data types have been collected that address the survival, movement, and fecundity of Canada lynx in Interior Alaska. This dataset is part of a long-term project investigating the movements of lynx in response to cyclic fluctuations in snowshoe hare populations. The data now span four refuges in Alaska, as well as Gates of the Arctic NPP and Bonanza Creek LTER, and we anticipate further collaboration with the Department of Defense in Alaska.

The primary data that have been collected are locations of lynx derived from satellite GPS collars. There is a constant inflow of these data as the collars obtain location data on a 4-hour fix schedule and transmit this information on a weekly basis to a secure server. As such, there is need for a strong data management strategy that efficiently processes and archives the incoming data from all of the participating research sites. Ancillary data, such as information on the live-capture of collared lynx and the den sites of females, should also be stored alongside the location data in a relational database. Currently, this is accomplished at Tetlin Refuge station by a locally stored database that houses the data for lynx captured by that refuge. We propose using funds to further develop this database in a manner that incorporates and makes available the data from all collaborating sites.

The lynx project requires financial support if it is to continue to fruition in the next five years. Delivering this preliminary product would help secure additional funding by showing the progress and utility of the project to management applications on refuges and other federal lands. In addition to authoring a summary report for the project that will be stored in SERVCAT, we propose using funds to analyze the existing dataset and publish at least one article in a peer-

reviewed journal.

10. Methods/Scope of Work

Data related to the live-capture of lynx at Tetlin Refuge and collaborating sites during the past year will be evaluated and compiled in a summary report for the project. Upon completion, this report will be made available on SERVCAT.

The existing database at Tetlin Refuge will be modified to include more derived data fields, a data entry form, queries for updating master data tables and data export, and established relationships between tables. Data from collaborating sites will then be incorporated into the database. We will work with refuge staff at the Regional Office and relevant stations to establish this database on a FWS server that is accessible to participating refuge stations. Project leads at each of the stations will be instructed on the use of the database.

Data analysis will focus on habitat use and movement rates of lynx on Tetlin Refuge. We will use a vegetation classification map generated for the refuge to categorize habitat used by lynx. Data will be manipulated in ArcGIS, R, and associated software.

Authorship of a peer-reviewed publication will be coordinated among participating researchers with the bulk of the writing being done by a contract biologist involved with the project.

Also please see attached study plan/protocol.

11. Partnerships and Roles

The proposed work will reinforce and better organize the existing project collaboration between Tetlin, Yukon Flats, Kanuti, and Koyukuk-Nowitna Refuges, as well as Gates of the Arctic NPP and the University of Alaska Fairbanks.

A contract biologist involved with the project will be responsible for the proposed work by coordinating with project leads at each of the participating stations (Nate Berg, Tetlin; Mark Bertram, Yukon Flats; Roy Churchwell, Kanuti; Brad Scotton, Koyukuk-Nowitna; Donna DiFolco, Gates of the Arctic NPP; Knut Kielland, University of Alaska Fairbanks).

We will consult with FWS database managers McCrea Cobb and Hilmar Maier on the storage of the database on FWS servers.

Any computers, external drives, and software needed will be supplied by Tetlin Refuge, the RO, or University of Alaska Fairbanks.

12. Products and Schedule

A summary report for the project will be completed and stored on SERVCAT within one month of receiving funds.

The existing database for storing location data and ancillary data will be refined and developed

to incorporate data from all collaborating sites. This database will be housed on a FWS server that is accessible to collaborating refuges, and a data-sharing agreement will be reached that enables collaborators outside of the refuge system to access the database as needed. Protocol will be written to instruct the use and future management of this database. These tasks will be completed within 6 months of receiving funds.

The process of data analysis leading to the authorship of a peer-reviewed publication will begin immediately upon receiving funds with the goal of submitting the manuscript for review within 12 months.

13. Literature Cited (Not included in page limit)

See attached study plan/protocol

Feierabend DS and Berg ND. 2016. Northwest Boreal Lynx Project: 2016 Summary Report for Tetlin National Wildlife Refuge. Tetlin National Wildlife Refuge. Tok, Alaska

14. Budget

Requested funds will be used to contract the services of a biologist who will serve as data analyst, database manager, and author of a summary report and peer-reviewed publication. We anticipate paying a contract rate of $30 per hour for a total duration of approximately 4 months of full-time work.

15. Station Project Leader Approval (Required)

Project proposal approved