

Tanya Lama; Co-PIs: Drs. John Organ & Stephen DeStefano; Technical Direction: Dr. Warren Johnson

Small Cat Action Fund January 2018

University of Massachusetts Amherst

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LOI Form

Project Details

Abstract*

Provide a brief overview of the proposed project. Include information on the study site, the conservation issue the project will address, the project's goals and objectives, and the proposed methods. Maximum word limit: 500 words

The Canada lynx (*Lynx canadensis*) is a native North American felid that requires dense boreal forest capable of supporting high abundances of its primary prey, snowshoe hare. Despite being legally harvested in Alaska and Canada, lynx populations at the southern extent of the species distribution were listed as threatened under the US Endangered Species Act (ESA) in 2000. The US Fish & Wildlife Service recently published a scientific review recommending that the species be delisted, shifting management priorities from recovery to post-delisting monitoring. However, traditional genetic methods using coarse-resolution markers have not produced reliable measures of population size, structure, gene flow, and dispersal dynamics critical to effective monitoring of lynx at appropriate spatial and temporal scales. Therefore, we propose standardization of newly developed genotyping protocols and establishment of shared single nucleotide polymorphism panels for monitoring six Canada lynx populations in the contiguous US (Northern Maine, Northeastern Minnesota, Northwestern Montana/Northeastern Idaho, North Central Washington, Greater Yellowstone Area, Western Colorado). A harmonized monitoring scheme will enable trans-boundary research and management strategies critical to conservation of broadly-distributed, low-density, long-distance dispersing carnivores such as lynx.

The effective use of genomics in conservation requires a coordinated and multidisciplinary effort to streamline methods, facilitate rapid, wide-spread adoption of protocols, produce results at large spatial scales, and translate findings into recommendations for managers. Coordinating efforts among experts in field biology, conservation planning, genomics and bioinformatics, our team has produced an annotated reference genome assembly for Canada lynx. Our proposed monitoring scheme leverages the reference genome as a powerful tool for applied conservation science and incorporates genome-wide variation from each of the six populations to address practical conservation issues including quantifying migration rates, calculating effective population sizes, performing viability and vulnerability analyses and writing trans-boundary management plans.

Recovery efforts and protection offered by the ESA have allowed lynx populations to expand. However, many populations, especially at the southern edge of the species distribution, are relatively small and persist in highly fragmented landscapes with limited capacity to track environmental change. As cold-climate and snow adapted habitat and prey specialists, uncertainty remains about the long-term persistence of vulnerable lynx populations. A common and shared approach will provide the most cost-effective use of limited conservation resources, aid the implementation of science-based management actions, and provide a better understanding of the ecological requirements of lynx and the spatial and genetic variation therein. We believe that, if successfully applied, a common and shared approach to monitoring will provide the best possible foundation for continued recovery and management of this species at relevant spatial scales and will also serve as a proof of concept for applying genomics to conservation.

Expected or actual project start date*

Please use the following format: mm/dd/yyyy.

01/01/2019

Expected project end date*

Please use the following format: mm/dd/yyyy.

01/01/2020

Total program budget for grant period*

\$98,326.00

Other funding

Please list up to three other funders to whom you have applied, and indicate the status of the applications (pending or awarded).

Maine Inland Fisheries & Wildlife/US Fish & Wildlife Service (awarded \$270,556); University of Massachusetts National History Collection (pending \$4,000); University of Massachusetts Dissertation Fieldwork Grant (pending \$5,000)

Are you seeking support for genetic analysis through this grant?*

Yes

Current student status*

PhD

If you selected "Other" above, please describe your status**Institutional affiliation***

University of Massachusetts Amherst; US Geological Survey/Massachusetts Cooperative Fish and Wildlife Research Unit

Panthera Affiliation*

Do you have an affiliation with Panthera? If yes, please explain

No

Name of Applicant/Principal Investigator*

Tanya Lama; Co-PIs: Drs. John Organ & Stephen DeStefano; Technical Direction: Dr. Warren Johnson

Project Title*

Please enter the title of the project.

Standardized molecular markers and a cohesive monitoring scheme for Canada lynx conservation

Amount Requested*

Amount Requested

\$14,560.00

Grant Program*

Please indicate to which grant program you are applying. For information on eligibility requirements, please click [here](#).

Small Cat Action Fund

Region*

Please choose the region in which your project is located.

North America

Country*

Please choose the country in which your project is located.

UNITED STATES

Main Species 1*

Please choose the main species your project addresses.

Lynx canadensis - Canada lynx

Other Species 2

If applicable, choose an additional species that your project addresses.

Main Activity 1

Please choose the activity that best describes your project.

Genetics

Study Site*

Please enter the name of the project study site.

Northern Maine, Northeastern Minnesota, Northwestern Montana/Northeastern Idaho, North Central Washington, Greater Yellowstone Area, Western Colorado

Latitude/Longitude

Please provide the latitude and longitude of your study site in the coordinate system WGS 1984 in decimal degrees (ie 38.889722, -77.008889).

47.066011, -69.086614

Nationality

Please enter the nationality of the project's Principal Investigator.

United States

File Attachment Summary

Applicant File Uploads

No files were uploaded