Postdoctoral researcher position:
Improving management and surveillance decisions related to white nose syndrome by accounting for imperfect detection and misclassification error
Massachusetts Cooperative Fish and Wildlife Research Unit (MA Coop Unit)
University of Massachusetts, Department of Environmental Conservation, Amherst, MA

Review of applications will begin 23 June 2021
Position start date Fall 2021

Position description Management decisions for emerging infectious diseases, endangered species, and invasive species depend on the true state of the system and must be made quickly to maximize opportunities for control. However, molecular detection methods, like any diagnostic test used in the detection of pathogens, may occasionally yield false negatives (i.e., when a sample appears negative but is truly positive) as well as ‘ambiguous,’ ‘uncertain,’ or ‘equivocal’ results (i.e., an inability to confidently classify a sample as negative or positive). Therefore, we are seeking to recruit a postdoctoral researcher that will develop quantitative tools to improve pathogen surveillance in the white nose syndrome (WNS) system. Specifically, we are looking for a postdoc to extend a novel statistical model that accounts for both imperfect and ambiguous pathogen detections and to apply this model to already collected WNS field data for parameter estimation. This is a one-year postdoctoral position with the possible extension to a second-year dependent on performance and funding.

This work is a collaboration among the USGS Amphibian Research Monitoring Initiative, USGS National Wildlife Health Center, the University of Vermont, and the Massachusetts Cooperative Research Unit. The postdoctoral researcher will explore optimal sampling designs for determining pathogen absence or eradication and will use simulations to explore the model’s accuracy, precision, bias, and coverage. This model will use both negative and uncertain detections to make inference about a site’s disease state, and the postdoc will extend this model to include temporally and spatially varying covariates that can improve estimation of model parameters. The model will be incorporated into a surveillance model to improve inference on the distribution of WNS and its causative agent, *Pseudogymnoascus destructans* (Pd). PIs on this project work in several other disease systems, and while this project is focused on the WNS system, we will help to ensure that this model can be used to improve the detection and management of emerging pathogens and invasive species more broadly.

We highly encourage people from historically underrepresented groups to apply. The postdoc will work closely with collaborators from the USGS and Refuge managers. Please note that the successful candidate will likely work remotely until covid occupancy limits are lifted.

The University of Massachusetts, Amherst (which ranks among the top public universities nationally) and the USGS Eastern Ecological Science Center at the SO Conte Anadromous Fish Research Lab are located in Western Massachusetts. The area offers a rich cultural environment in a rural setting close to major urban centers, with many great outdoor recreational opportunities.

Salary/Benefits The postdoctoral researcher will be provided:
1. Annual salary of $55,000 plus benefits
2. Travel funds to attend a national conference
3. A supportive network of professionals that encourage work-life balance, promote mental health well-being, and focus on helping you achieve your career goals
4. Professional development relevant to a career with the USGS but transferable to other agencies
5. Mentoring, encouragement, and autonomy to ensure that they see and understand how their perspectives are vital to achieving the mission of the USGS
**Duties** The postdoctoral researcher will be expected to:

1. Develop a statistical model that accounts for imperfect detection and misclassification error, while including biological realism (e.g., detection probability as a function of pathogen load)
2. Explore the properties of the statistical model using simulations and Bayes Theorem (i.e., explore model accuracy, precision, bias, and coverage with variable sampling designs and parameter values)
3. Apply the statistical model to available surveillance data of WNS across the US, which will provide an estimate of the probability of pathogen occupancy given the number of negative and uncertain samples at each location (i.e., risk assessment)
4. Provide decision support for sites at risk of WNS, where the true state of the system determines the optimal decision

**Eligibility**
- PhD in ecology, epidemiology, biology, math, statistics, wildlife, or other related field

**Application** To apply, please submit your application as a single PDF with the document name “YOUR LAST NAME-WNS postdoc app-2021.pdf” in an email with the subject “WNS postdoc application” to Drs. Graziella DiRenzo at gdirenzo@umass.edu and Evan Grant at ehgrant@usgs.gov. Please include in your application the following materials:

1. a 300–600 word cover letter describing:
   - your research interests and background
   - why you are interested in this position
   - your experience in disease ecology, Bayesian methods, statistical modeling, and simulations
   - your career goals;

2. a curriculum vitae or resume;

3. the contact information (name, position, relationship to applicant, email, and phone number) for three references;

Please send questions to any of the project investigators listed below.

**Project investigators**
- Dr. Graziella DiRenzo (gdirenzo@umass.edu), U.S. Geological Survey, MA Coop Unit
- Dr. Evan H. C. Grant (ehgrant@usgs.gov), U.S. Geological Survey, Eastern Ecological Science Center
- Dr. Brittany A. Mosher, University of Vermont, Burlington
- Dr. Dan Walsh, U.S. Geological Survey, National Wildlife Health Center

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