

# Investigating Bat Viromes Along a Human Interaction Gradient

## Request for Laboratory/Diagnostic Services

### **Summary**

The Wildlife Health Program (WHP) within Indiana Department of Natural Resources Division of Fish & Wildlife would like to share a funding opportunity for qualified laboratory partners. The WHP received funding to investigate bat viromes across Indiana along a human interaction gradient. We know that bats are hosts for a variety of potentially emerging zoonotic pathogens and that human interactions with bats increase the likelihood of spillover event. Currently, we are uncertain how viral communities are dispersed among our bat populations due to limited bat health surveillance. Understanding these epidemiological patterns will help us address both human and bat health concerns. The selected investigator will conduct high throughput sequencing of samples collected from bats and perform initial bioinformatic analyses of no more than 650 samples. The maximum project budget is \$65,000. Proposals should be drafted based on the information provided below and will be evaluated according to the provided criteria and timelines. It is anticipated that sample collection for this research will begin in the late winter/early spring of 2024; however, with proper storage of the samples, laboratory work can begin in late spring/early summer.

### **Need**

The ability of pathogens to infect multiple hosts increases the threat to humans and domestic animals. Bats are known to be hosts for a variety of potentially emerging zoonotic pathogens, and human interactions increase the likelihood of spillover events. This study seeks to establish a framework for evaluating the potential threat of multi-host zoonotic viral pathogens, like rabies, in native bat species. By investigating the association between viral assemblages and human interactions, it aims to address the uncertainty surrounding the dispersion of viral communities among bat populations. Currently the health or physiology surveillance the State conducts on bats is limited to rabies and White-Nose Syndrome; therefore, understanding these epidemiological patterns will help us address both human and bat health concerns.

### **Objective**

We propose to measure viral diversity in bats that have contrasting health statuses and degree of human interactions (Table 1).

Table 1: Breakdown of health status and human interaction variation for bats screened for zoonotic viral pathogens.

	<i>Sick or Injured Status</i>	<i>Human Interaction Level</i>
<i>Wind farm mortalities</i>	Died without intervention	None
<i>Wildlife Rehabilitation Center*</i>	Likely injured, possibly sick	High, direct handling over time
<i>Department of Health</i>	Likely sick and euthanized	Medium, interaction on one occasion
<i>Hibernacula Surveys</i>	Not sick or dead	Low, biologist collecting samples

\*Samples from wildlife rehabilitators will be collected either at death and/or directly prior to release.

**Approach**

The DNR will be responsible for oral swab sample collection in bats across the gradient in Indiana. Upon sample collection, DNR will properly preserve the samples until a contract with a laboratory has been finalized. We will then provide the laboratory with the samples to conduct the high throughput sequencing and to perform initial bioinformatic analyses. We do not anticipate collecting more than 650 samples to process. We will use the results from the laboratory to determine whether measures of alpha and beta diversity, richness, and abundance of viral communities among bats are explained by the setting from which bats were collected. We expect to find that bats with a higher association with humans will have a greater proportion of potential zoonotic pathogens. Additionally, we would like to screen these samples for rabies virus, if possible.

The Indiana Department of Natural Resources will contractually retain ownership of all data collected, analyses conducted, and results generated by this project. The laboratory research team is expected to work closely and collaboratively with the Department throughout the project. Any publications associated with this research will require the concurrence and collaboration of the Department.

**Timeline**

Contracts may begin by October 1, 2024, and the final report is due by December 2025. Desired start and end dates must be specified in the proposal.

**Funding**

The maximum funding available for this project is \$65,000. This contract may also include a cost for work performed by a university student.

This project will be administered through a contractual agreement in compliance with State law. Payments will be made up to 35 days in arrears as work is completed and upon receipt of dated invoices that list expenses incurred as specified in the proposal budget. Payments will be disbursed through direct deposit into a banking account specified and authorized by the contractor.

The selected applicant may be determined to be a subrecipient of federal funds and be required to comply with federal stipulations and requirements for pass-through grants as detailed in 2 CFR 200. This includes, but is not limited to, complying with federal audit requirements and completing an SF-424B Assurances for Non-Construction Programs.

### **Proposal Instructions**

Proposals should be in PDF format, not exceed 12 pages in length, and must include the following seven elements:

*a. Cover Page* – provide a cover page that includes title; project summary that briefly states specific objectives; name, affiliation, and contact information for the project leader and, if appropriate, any project partners; and project budget.

*b. Need* – explain the value of the project as you understand it and priorities it will address. The need statement should detail how the project identifies the problem.

*c. Objectives* – state the specific objectives of the project.

*d. Approach* – describe the methods that will be used to meet the stated objective. This section should clearly identify the level of effort and analyses that will be used to meet the project objective.

*e. Timeline* – provide a proposed schedule for laboratory work and initial analysis.

*f. Budget* – provide an itemized budget by major expense types (e.g., salary and wage, supplies, etc.).

*g. Supporting Material* – a brief Curriculum Vitae demonstrating the capability and relevant experience of the principal investigator must be included. Support materials that aid in evaluating the proposal are encouraged.

### **Proposal Evaluation**

Comments on project proposals will be solicited from wildlife health program staff and other relevant DNR staff. Proposals will be judged based on feasibility, efficiency, quality and quantity of work that will be accomplished within the fixed budget, and the qualifications of the principal investigator(s).

The successful applicant must be able to enter into a contractual agreement with the State and be a registered vendor with the State or become registered prior to awarding the contract. Work may not commence until the contract is fully executed, which may be up to eight weeks from initiation. The contractor will be notified when work may begin.

### **Proposal Deadline**

Project proposals are due by COB on **June 1, 2024**.

### **Proposal Submissions**

Project proposals should be submitted via email to:

Janetta Kelly  
Division of Fish & Wildlife  
Indiana Department of Natural Resources  
jkelly1@dnr.IN.gov  
Cell: 317-473-6693