



# NORTHEAST

## MOTUS COLLABORATION

Thinking about hosting a Motus receiving station?

Things you need to know!

### **What is the Motus Wildlife Tracking System?**

The Motus Wildlife Tracking System is a global network of automated telemetry receiving stations coordinated by Birds Canada. Stations detect unique VHF radio signals from tiny tags that all transmit on the same frequency and can be deployed on small birds, bats, and even large insects. This new technology makes it possible to identify migration routes, stopover areas, and wintering locations for small animals whose travels have been impossible to study at a landscape scale.

### **Why is Motus important?**

Wildlife is in serious decline. By one estimate, 1 million species of plants and animals globally are threatened with extinction, and since 1970, a third of North America's birds -- roughly 1 billion individuals -- have disappeared. Effective conservation strategies depend on understanding a species' ecology throughout its life cycle. Motus technology finally makes it possible to link geographic areas that a migratory population uses throughout the year, identify threats at different seasons, and protect key habitats at each stage of its annual cycle.

### **What is the Northeast Motus Collaboration?**

The Northeast Motus Collaboration was formed in 2017 in Pennsylvania to create a telemetry network throughout the northeastern United States for tracking migratory animals and taking a landscape-scale approach to conservation. The original partners included the Ned Smith Center for Nature and Art, the Carnegie Museum of Natural History's Powdermill Nature Reserve, Project OwlNet, and

Willistown Conservation Trust. This team secured a Competitive State Wildlife Grant (C-SWG) from the U.S. Fish and Wildlife to the Pennsylvania Game Commission in 2018 to install 45 Motus receiving stations throughout the Mid-Atlantic states (Delaware, Maryland, New Jersey, Pennsylvania, New York).

### **What is the New England C-SWG Motus Project?**

Following the successful Mid-Atlantic C-SWG proposal, collaborators in New England submitted a partner application in 2019 for funding to support installation of 50 Motus receiving stations throughout the New England states. The NH Fish and Game Department is the lead agency for this project, which officially began on July 1, 2020. Partner agencies include Maine Department of Inland Fisheries and Wildlife, Massachusetts Fish and Game Department, and Pennsylvania Game Commission. Collaborating organizations include Carnegie Museum of Natural History, Maine Audubon, Massachusetts Audubon, New Hampshire Audubon, and Willistown Conservation Trust.

### **What are the characteristics of a good receiving station site?**

- Open area, higher than surrounding landscape, with clear line-of-sight for 15 km in multiple directions.
- Minimum interference on target frequencies (166.380 and 434.00 MHz).
- Easy access for installation and maintenance.
- Access to AC power source or southern exposure for solar panels.
- Low potential for vandalism.

### **What constitutes a receiving station?**

A Motus receiving station includes three basic elements: a set of antennas attached to a support structure, a power source, and a receiving device. Most Motus stations resemble an old-fashioned TV antenna. New England installations will include up to 8 antennas, in some combination of

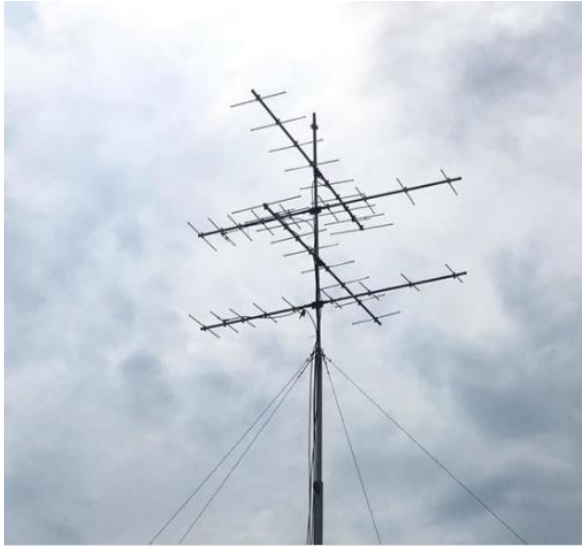
9-element yagi @ 166.380 mHz – 15 km range

5-element yagi @ 166.380 mHz - 8 km range

6-element yagi @ 434.00 mHz - 10 km range

Support structures can take many forms, from free-standing masts supported by guy wires to existing structures such as buildings, utility poles, communications towers, and fire towers. Where possible, receiving stations connect to a standard 120/240V electric supply, but many stand-alone stations are in remote areas

where solar panels and batteries are necessary. The receiver at a site will be either a SensorGnome ([www.SensorGnome.org](http://www.SensorGnome.org)) or a SensorStation (<https://store.celltracktech.com/products/sensorstation>).



Typical antenna array



Box containing receiver and batteries

### **How is site suitability determined?**

Once a potential site is identified, project staff do a GIS analysis to determine the expected reception area from that site. If this analysis indicates it's a good location, staff will then make a site visit to check for interference, identify a specific location for the station, determine what supplies will be needed, and evaluate logistical needs for the installation.

### **What else needs to happen before a station can be installed?**

In order to comply with the provisions of the federal grant, project staff will need to ensure that the installation will not have adverse effects on historical or cultural resources or federally listed threatened or endangered species before a receiving station is installed at the proposed site. We accomplish this by requesting a compliance review by the pertinent state agencies where the installation will take place. Landowners may need to assist us by providing information about the property (e.g., map and lot number, acreage, land use history) as required on compliance review request forms, and by affirming that they are willing to have the agencies release any information they have about important resources on the subject property. Landowners will also need to sign

an agreement with New Hampshire Audubon and Willistown Conservation Trust. A template for this agreement is provided at the end of this document. The agreement may take different forms (e.g., license agreement, special use permit, memorandum of understanding) depending on the needs of the landowner.

### **How long does installation take?**

Most installations can be completed in a single day. Occasionally a second day may be required.

### **How is data downloaded?**

Stations with internet access can upload data automatically to the Motus website and transmit basic information about station function as well. At remote stations that have cell service, these data can be transmitted cellularly. Sites with neither internet nor cell service will require periodic visits by project personnel or collaborating volunteers to manually upload data and address any maintenance needs.

### **What maintenance do receiving stations require?**

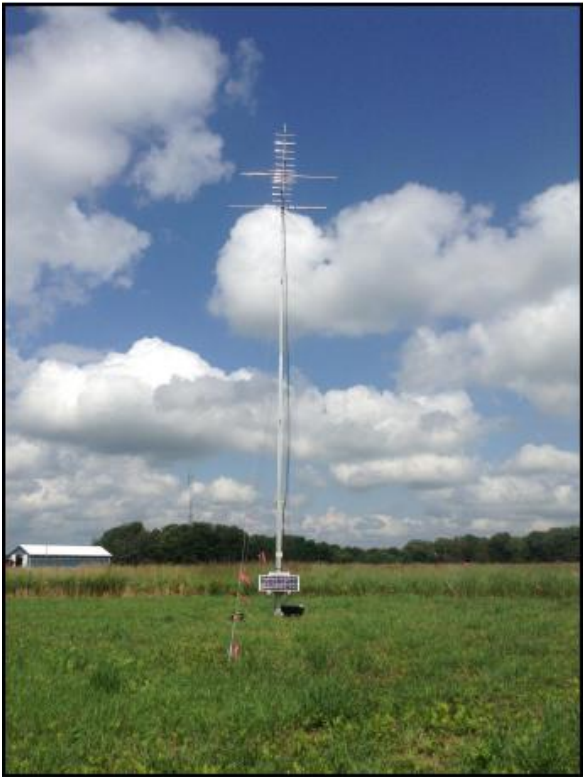
Receiving stations are designed and constructed to withstand typical weather events. In northern New England with severe winters, it may be appropriate to deactivate some stations for several months to avoid damage to solar panels and batteries. High winds may loosen guy wires and antenna connections, and porcupines have been known to chew turnbuckles. Project personnel will be alerted to maintenance needs by checking data from automatically uploading receivers, and will field check remote stations before and after major migration periods to ensure that all systems are working properly.

### **Who do I contact with questions?**

For questions about the overall New England Motus Project, compliance reviews, or other administrative topics, contact Carol Foss: [cfoss@nhaudubon.org](mailto:cfoss@nhaudubon.org).

For technical questions about receiving station components or scheduling site visits and installations, contact Todd Alleger: [tsalleger@gmail.com](mailto:tsalleger@gmail.com).

Free-standing installations





## Fire tower installations



Building co-locations

