



Julian Garcia Walther

Version 2



# Collaboration Policy



---

# Contents

## 1. Introduction 3

## 2. Collaborating Parties 4

## 3. Motus Registration 5

- 3.1 Motus Projects 5
- 3.2 Tag registration 5
- 3.3 Receiver registration 5
- 3.4 Collaborator Metadata Obligation 6
- 3.5 Motus Data Services Fees 6
- 3.6 Communications 7
- 3.7 Termination 7

## 4. Data Stewardship 8

- 4.1 Data Access Framework 9
- 4.2 Data Access 9
- 4.3 Tracking Data Access 9
- 4.4 Collective Initiatives, Augmented Data Products and Data Requests 10
- 4.5 Exceptions and Private Projects 10

## 5. Project Citation and Acknowledgment 11

- 5.1 Project Acknowledgement and Citation 11
- 5.2 Program Acknowledgment 11

## Appendix 1. Detailed descriptions of Motus data types 12

### Version History:

Version 1 – January 2016

Version 2 – October 2022

# 1. Introduction

The Motus Wildlife Tracking System (hereafter Motus) is a collaborative global research network that uses automated radio telemetry to track small flying organisms (birds, bats, and insects). Motus helps to answer fundamental research questions underpinning conservation, animal movement and behaviour, from local to global scales. Motus is a program of Birds Canada in close collaboration with a diverse network of organizations, businesses and individuals.

Three core principles underpin Motus:

1. collaboration harnesses the collective power of individuals to expand the scale and amplify the impact of our work
2. an open data framework is a powerful tool to minimize barriers to data access, maximize data value, and ensure appropriate data permissions and collaborator recognition
3. equity in research and development is promoted by lowering financial barriers to using technology, and encouraging companies and individuals to contribute to system improvements for all

Motus uses digitally-coded radio transmitters (tags) that emit signals on shared frequencies, detectable by an open-source network of receiving stations where all data is centrally processed and returned to the collaborating project. Collaborators in the network set up receivers and deploy registered tags for their own purposes, and in doing so leverage the time and effort of other collaborators, with mutually reciprocal benefits. The value of the Motus network grows as the spatial coverage of stations and number of partners and collaborators increases. With continued expansion and support, Motus provides a framework for coordinated global collaboration that works to solve some of the most complex problems in movement biology and ecology.

This document outlines the expectations and responsibilities of the collaborating individuals and organizations that comprise Motus.



Monarch Butterfly, Grace Pitman



Swainsons Thrush, Stu Mackenzie



Tiana Burke

## 2. Collaborating Parties



**Motus Central** is responsible for data management, system operation and development, and providing general coordination and support to the network.

Motus Central is composed of Birds Canada staff, specialist contractors, and leadership staff from close partners. Motus Central works closely with the groups below to ensure the interests and expectations of the Motus community as a whole are met.

**Technology Partners** are responsible for the research, development, production, sale and support of radio telemetry technologies upon which the system is based, as well as some data management and registration of tags and receivers where appropriate in coordination with Motus Central. By registering tags and/or receivers with the Motus network, these partners also agree to adhere to the policy.

**Motus collaborators** have many roles, but are generally responsible for the development and support of Motus projects, deployment of tags, and/or setup and maintenance of Motus stations within

the scope of their project(s), maintenance of their associated metadata, and analysis and publishing of their results. Groups of collaborators often come together to form Motus Working Groups.

**Motus Working Groups** are generally informal or formal collaborations of like-minded researchers and practitioners from academia, non-profit, government or private organizations focused on a specific region, species group, or project with their own funding, staff, and leadership hierarchies. Responsibilities of working groups are generally the same as collaborators, but often at a larger scale, working groups assume leadership in their region or project(s) of interest.



Bri Benvenuti



Julian Garcia Walther

**Data users and practitioners** generally include third parties (individuals and organizations) that make use of Motus data for research, education, conservation projects, or other land, water, resource, or wildlife management applications.

From this point forward all of these groups are collectively referred to as collaborators.

## 3. Motus Registration

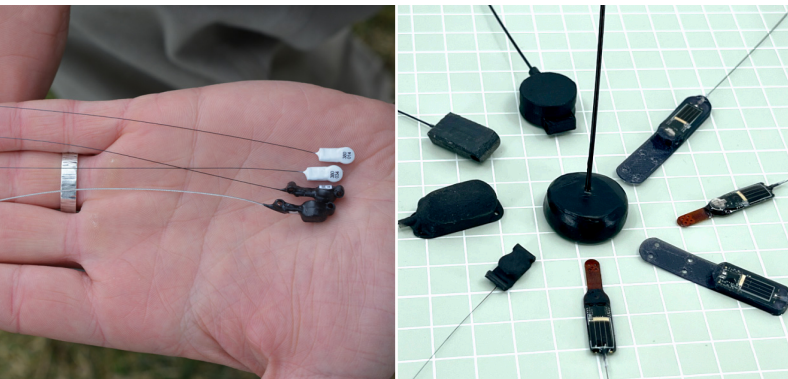
A Motus account is required to gain access to project management tools, and detailed Motus data. Opening a Motus account is free, simple and available to anyone.

By setting up an account, or registering a receiver or tag with Motus, collaborators agree to the terms and conditions of this policy, and must approve the most recent version of the policy in order to access, manage, or download data

### 3.1 Motus Projects

A Motus Project is an organization tool to manage tags and station metadata, upload and download data, view basic summary plots and visualizations, control open data outputs, and manage additional information (e.g., members, landowners).

Any collaborator with a Motus account can create a project, and assign other collaborators to that project. For existing projects, new collaborators need to be added by an existing collaborator with the authority to do so.



### 3.2 Tag registration

Motus currently supports two types of uniquely coded radio transmitters: NanoTags™ manufactured by [Lotek](#), operating on frequencies 166.380 MHz (Western Hemisphere), 150.100 MHz (Europe), and

151.500 MHz (Australia), and LifeTag™, HybridTag™ and PowerTags™ manufactured by [Cellular Tracking Technologies](#) (CTT) operating on 434 MHz globally.

Manufacturers will automatically register tags with a collaborator’s Motus project before they are shipped to the collaborator. Prior to ordering tags, collaborators are required to have registered with Motus and provide a Project ID to the manufacturer. Further instructions on selecting, purchasing and deployment of tags is available [here](#).



### 3.3 Receiver registration

Motus currently supports four receiver types: [Sensorgnomes](#), [Lotek](#) DL and SRX-series receivers, and [Cellular Tracking Technologies](#) SensorStations. SensorGnomes and CTT SensorStations can detect both CTT and Lotek tags. Receivers are registered by collaborators and assigned to a specific project within the Motus project management tools. Receiver serial numbers are required for registration. More information about Motus receivers is available [here](#).

### 3.4 Collaborator Metadata Obligation

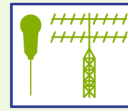
Tag and station metadata (particularly deployment information) are a critical component of Motus. Collaborators are required to maintain the minimum [accurate metadata](#) for their projects, tags, and receivers. Complete metadata ensures accurate detection data for all projects using the network, and an accurate archive for future use. Data will only be available to collaborators in summary or complete formats ([see Section 4.1](#)) from projects with all required metadata fields completed. In other words, access to project data will be restricted wherever the minimum required metadata is missing. Motus staff are happy to assist in the population of metadata as necessary. Any missing required metadata is highlighted in the Notification Centre found within project management tools.

### 3.5 Motus Data Services Fees

The one-time data service fee covers approximately half of the cost of data curation. The remainder is supported by Motus Central at Birds Canada through various grants, contributions, contracts, and unrestricted sources. The fee is an important investment by collaborators to help ensure the quality and security of their data, and the overall sustainability and productivity of the network.

The data service fee is \$25 CAD (\$20 USD, €18 EUR) per tag, charged by the tag manufacturer at time of purchase on behalf of Motus Central at Birds Canada. A Motus project must be created by the collaborator prior to ordering tags so they can be assigned to a project at the time of purchase. Please note that the purchasing and registration of Motus tags commits collaborators to this Motus Collaboration Policy. Applicable taxes may apply depending on origin and destination of purchase. There is no fee for registering as a collaborator, creating a project, registering a receiver, or any of the other services and resources provided. If fees pose a viability issue for a project, contact [Motus Central](#) to explore whether alternative options may be possible. The data services fee will be revisited annually.

#### The one-time tag fee pays for:



Data management and processing for project, station, tag detection and metadata, for the duration of tag life



Quality Control: error identification, corrections, bug-fixes and notifications



Server, web platform, data storage, security and maintenance



Technical Support for all tag, station and data-related questions

#### Additional Motus benefits include:



Data Exploration – organization, summary and visualization of species, project and station information



Data Analysis Tools – access to Motus database, R package and tutorials, all updates and related resources



Collaborator networking – web platform for enhanced collaboration and sharing



Full access to hemispheric receiver network [map of hemisphere icon]

## 3.6 Communications

Primary correspondence from Motus Central to collaborators about system developments, maintenance, or other updates will occur through the [Motus google group](#). New registrants will automatically be invited to join this group, but assume responsibility for joining, or regularly checking in. Collaborators are strongly encouraged to join upon registration and to post to this group with any updates or questions.

To contact Motus Central, email [motus@birdscanada.org](mailto:motus@birdscanada.org), or phone 519-586-3531 | 888-448-BIRD X 117.

## 3.7 Termination

Birds Canada reserves the right to terminate access to collaborators who do not abide by the terms of the policy, or for any other reasonable reason. Collaborators wishing to voluntarily terminate their registration can also contact [Motus Central](#). In case of termination, Birds Canada will anonymize the collaborator profile, including their name and contact information, and other data and metadata will be treated in accordance with the data policy ([see Section 4](#), Data Stewardship).

## 4. Data Stewardship



The Motus database (via <https://motus.org>) is the central repository for all Motus data. The primary goal of Motus is to maximize the efficacy of everyone's data for use in

science, conservation and wildlife management through scientific publications, interpretation, visualization and increased public engagement. Critical to this goal is a [FAIR \(Findable, Accessible, Interoperable, and Reusable\) open data framework](#) that facilitates data sharing and collaboration among researchers while ensuring appropriate permissions and acknowledgement to project collaborators and participants. The model framework is largely analogous to eBird, or bird banding/ringing programs, where all data are submitted to and coordinated by a central repository that is open and freely available to all.



Green Darner, Grace Pitman

The policy ensures that Motus collaborators who deploy tags receive all detection data from their tags from across the network, regardless of the station where tags are detected. Likewise, Motus collaborators that manage stations can get all data collected from their station, regardless of where the tag was deployed, or who deployed it.

The policy also recognizes the existence of certain

constraints or sensitivities that may limit the desired availability of data such as the priority of researchers to publish their work, protection of sensitive species or places. Requests for hiding, delaying release, or blurring sensitive data can be made to [Motus Central](#).

Within the spirit of this policy, the proper operation of Motus requires Birds Canada to have the autonomy and flexibility to freely manage the Motus database and content. Motus content includes, but is not limited to the Motus database in its entirety, any other data received from any means such as tag or receiver registrations and data streams from receivers and manufacturers, data entered or files transferred or uploaded through the research platform. Collaborators grant Birds Canada a royalty-free, perpetual, irrevocable, non-exclusive, transferable license to use, reproduce, modify, adapt, publish, translate, create derivative works from, distribute, perform, and display content (in whole or part) worldwide and/or to incorporate it in other works in any form, media, software or technology now known or later developed, all subject to the terms of any applicable license.

### Limitation of liability

Birds Canada endeavours to make data available to collaborators in a reasonable time-frame, and to preserve data for a reasonable period of time, but collaborators accept that, for reasons beyond Birds Canada's control or otherwise, data may be lost, or their access may be delayed. Collaborators also recognize that technology may be subject to certain inaccuracies that can create errors such as false positive or missing detections. It is the collaborators' responsibility to conduct their own research about the system, technologies, and to apply the appropriate processes and methods to ensure the success of their projects. For more details see [Motus Guides](#). Collaborators will not hold Birds Canada responsible for any data loss or inaccuracies, bodily injuries, financial loss or other harms related to their projects.



## 4.1 Data Access Framework

Motus detection data fit into two categories: Summary and Complete ([see Appendix 1](#) for more details).

**Summary Data** consists of basic information about a project, limited deployment metadata for tags and stations, as well as daily summaries of tag detections and track maps. Summary Data for all projects can be viewed by anyone visiting Motus.org and can be downloaded in csv format by anyone with a Motus account. Summary data may also be presented on other collaborating platforms and products ([see 4.4](#)). Summary Data provides a sufficient overview for many purposes but lacks the detail needed to properly identify false positives and perform many analyses.

**Complete Data** consists of detailed tag detection data including properties such as signal strength, direction from the station, precise date and time stamps, and expanded tag metadata fields. Complete Data is only available through the Motus R Package, but by default is open to all registered Motus collaborators. Access can be restricted at any time to only members of said project, which will remain in effect for 5 years after tag deployment, after which time Complete Data will become open to all Motus collaborators (unless otherwise exempt; [see 4.5](#)). The level of detail included in Complete Data is necessary to fully vet detection validity and for many analyses investigating questions such as stopover duration and arrival and departure time.

Through participation in Motus, collaborators agree to having Summary Data open for viewing by the general public and Summary and Complete Data open for download by all Motus collaborators, with the option of modifying some settings for Complete Data in the project management tools. Some metadata, such as personal contact information of landowners, are always restricted to members of a particular project.

## 4.2 Data Access

Motus data are available in four ways:

1. Public data visualizations, plots, summaries, maps and animations through motus.org, or collaborating platforms and products. Summary Data only; available to anyone.
2. Downloads of data summaries from project, station, or species-specific queries from Motus.org Summary Data only; available to anyone with a Motus account.
3. Downloads from specific stations, tags or projects via the Motus R Package. Complete Data; available to anyone with a Motus account, or members of the relevant project(s).
4. If your needs are not met by 1-3, a custom request for data to Motus Central can be made through [Motus Central](#).

## 4.3 Tracking Data Access

Motus Central maintains a record of all Complete Data accessed through the Motus R Package which can be viewed for each project through the Motus project management tools. It is the responsibility of all collaborators accessing open data—whether Summary or Complete—to correspond and collaborate with project PI's including co-authorship *where appropriate*, and to ensure that each project and collaborator is properly acknowledged and cited. PI's are responsible for monitoring access to their data and responding to requests for collaboration as they wish to do so. [See Section 5.1, Project Acknowledgment and Citation.](#)

## 4.4 Collective Initiatives, Augmented Data Products and Data Requests

Collaborative research or conservation initiatives often require data spanning multiple projects, regions, or species. Motus provides a unique opportunity for collaboration by facilitating access to data for these types of meta-analyses. By enabling access to Motus data we are increasing every collaborator's return on investment, and our collective impact for conservation science. Examples of collective initiatives partnering with Birds Canada include [Movebank](#), [Bird Migration Explorer](#), [Atlas of Migratory Connectivity](#), [Shorebird Science and Conservation Collective](#), [Atlantic Offshore Wind Collaborative](#).

Currently, requests to access data across multiple projects, custom summaries, or augmented data products (e.g. filtered or otherwise cleaned or analyzed data), can be made to [Motus Central](#). Motus Central will review requests for data, help to coordinate communication with collaborators involved, and organize the data required on a case by case basis. When appropriate, data sharing agreements, or memoranda of understanding with lead organizations may be established on behalf of all projects involved. Agreements will outline the nature of the data use and ensure proper acknowledgement of Motus projects, collaborators, and publications. In the event that data requested is not yet open, requests will be directed to the PI(s) for the project(s) in question. All individuals and organizations requesting or using Motus data must be registered Motus collaborators and abide by this policy.

Motus collaborators authorize Motus Central to act on behalf of the network, projects and collaborators to manage, organize, and disseminate Motus data that has been specified as open (Summary data or Open Complete data) to facilitate the use of data for collective initiatives, or other uses in science, conservation, wildlife management, scientific publications, interpretation, visualization and public engagement. This process may change as new data access and communication tools are developed.

## 4.5 Exceptions and Private Projects

In certain circumstances, such as the protection of sensitive species or places, strict publication timelines, guidelines or embargos, or matters regarding Indigenous data sovereignty, restrictions can be implemented on aspects of the visibility and availability of data.

Requests for hiding, delaying release, or blurring sensitive location data can be made to [Motus Central](#) for consideration prior to deploying the relevant stations or tags. Each request should provide a rationale for the restriction and whether it should be permanent or for a fixed duration only (e.g. data release is delayed 3 months, or station location hidden or blurred to 0.5 km). Data from species at risk alone is not justification for exemption unless a case can be made for its sensitivity.

Collaborators should keep in mind that in most cases, the temporal and spatial resolution of publicly available data will usually not be detailed enough to represent a conservation concern, or be useful to compete with any research or publications interests of the investigators.



Cerulean Warbler, Jose Pablo Castillo

---

# 5. Project Citation and Acknowledgment

## 5.1 Project Acknowledgement and Citation

All Motus collaborators are expected to exhibit professional courtesy and the highest scientific integrity. Whenever Motus data is used for purposes outside of the Motus platform, projects, collaborators and organizations must be properly acknowledged. Individuals accessing open data are expected to correspond and collaborate with the project PI's and other collaborators where appropriate, and to ensure at a minimum that projects and contributing collaborators are properly acknowledged and cited.

To facilitate acknowledgments, each Motus project is given a citation based on the project information available on Motus project exploration and management pages. Collaborators can customize project citations to acknowledge partner institutions or individuals, and set the order in which they appear. Project citations should be used anytime Motus data is used or displayed outside of the Motus platform. Collaborators are identified through project profiles on the Motus website, and their contact information may be shared between collaborators requesting or providing data, but only to other registered Motus collaborators and will not be made publicly available.

### Project citation format:

[Institution | Collaborators]. [Project Name and Number]. [Years of project activity]. Data accessed from Motus Wildlife Tracking System, Birds Canada. Available: <https://motus.org/>. Accessed: [Date].

## 5.2 Program Acknowledgment

Motus is a collaborative enterprise that is made stronger by the individual and collective success of all its collaborators and projects. To this end, collaborators are encouraged to acknowledge Motus in any written work, popular or peer-reviewed publications, oral presentations, social media, or websites. Collaborators are also encouraged to acknowledge Motus as a program of Birds Canada in close collaboration with a diverse network of organizations, businesses and individuals. Official Motus and Birds Canada logos and guidelines for their use are available in [Motus Resources](#).

**If Motus tools (e.g. Motus website, RBook, visualizations, output tables) are used in your analysis or communications, the citation should be as follows:**

Motus Wildlife Tracking System. 2023. Birds Canada, Port Rowan, Ontario. Available: <https://motus.org>. Accessed: [Date].

### Motus RBook citation

Birds Canada (2023). motus: Fetch and use data from the Motus Wildlife Tracking System. <https://motusWTS.github.io/motus>.

# Appendix 1. Detailed descriptions of Motus data types

† denotes required metadata. ‡ denotes restricted data.

SUMMARY DATA	
<p><i>Station metadata:</i> information about station location, receiver and antenna configuration, deployment dates, station performance metrics, etc.</p> <p><i>Tag metadata:</i> information about the animal to which the tag was attached (e.g. species, age, and measurements), release location, time, date, type/model/size of tag, etc.</p> <p><i>Summary of tag detection data:</i> summarized runs of detections daily.</p>	
Project Metadata*	
Description	
General project information: Long and short project descriptions, institution/organization name, project citation, and project ID.†	
Principal Investigator and Collaborator names and contact information. Provided and defined by collaborators. †‡	
Station metadata	
Description	
Unique identifier assigned and basic deployments information: Unique receiver ID (serial number), station name, and deployment identifiers.†	
Location and operational dates of each receiver deployment.†	
Detailed information about station configuration: Antenna type/size/frequency, port numbers, direction/bearings, height, and other equipment details.	
Station land owner and contact information. ‡	
Deployment name and comments.	
Station performance metrics: Antenna noise and activity plots, GPS fixes, battery voltage, up-time vs. down-time, etc.	
Tag Metadata	
Description	
Tag properties: Manufacturer, program, size, identifier, frequency and burst rate. Some properties may be private to protect proprietary information. Automatically provided by the manufacturer.†	

Exact location and release date/time of the tag deployment.†
Required tag deployment properties: Species identity, and Band or Ring Number.† †
<b>Summarized Tag Detection Data</b>
<b>Description</b>
Daily summaries of detection data from each station. This is generally the information available for public data exploration, coarse mapping, project and station reports, and for download.
<b>COMPLETE DATA</b>
<b>Complete Detection Data</b>
<b>Description</b>
Includes all Summary data as well as Detailed detection data: Individual tag detections, including signal properties (e.g. signal strength), precise time stamps of each detection, as well as tag, receiver and antenna identifiers.
<b>Complete Tag Metadata</b>
Custom tag deployment properties: Age, sex, measurements, condition, other auxilliary markers or information about the tagged animal.



Red Knot, Julian Garcia Walther

### **Motus Wildlife Tracking System**

Birds Canada | PO Box 160, 115 Front Rd. Port Rowan, Ontario, Canada. N0E 1M0  
519-586-3531 x 117 | [motus@birdscanada.org](mailto:motus@birdscanada.org) | <https://motus.org>

