

Biologging: Bringing the Lab into the Field

Jared Shaftoe

University of Guelph

ABSTRACT

Comparative physiology as a field investigates how animals function within their environments at different levels of biological organization. Central to this goal is understanding how internal systems relate to the external context animals inhabit. An important tool for characterizing the function of physiological systems in environmental context is biologging. Biologging is a technique that uses either transmitted or stored radio signals to record physiological measurements, such as heart rate, activity, or oxygen concentration, and environmental characteristics, such as geographical location, depth/altitude, and temperature. In this infographic, the uses and considerations for using biologgers in the field are presented in a concise way to introduce high school or undergraduate students to this field of research and application.

KEYWORDS: Biology, Conservation, Technology, Biologging

For correspondence:
jshaftoe@uoguelph.ca

Accepted: Sept 5, 2025

Published: Dec 2025

Edition: Volume 1, Issue 1

DOI: [10.15173/cjsc.v1i1.3935](https://doi.org/10.15173/cjsc.v1i1.3935)

© The author. This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (CC BY-NC-ND 4.0), which provides unrestricted use and redistribution, provided that the original author and source are credited, and the material is not used for commercial purposes nor modified.

ISSN 2819-800X

Biologging: Bringing the Lab into the Field

“Biologging tags” allow researchers to take sophisticated lab equipment into the field, using an array of sensors to better understand how animals survive in their environment. Whether, mapping the course of a diving turtle, tracking the energy for a salmon swimming upriver, biologging can bring science to new frontiers.

What is biologging?

Placement



External or Internal

Measurement



Physiology or Environmental Conditions

Retrieval



Onboard Storage or Radio Transmission

Variables biologging can measure:



Location



Depth



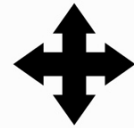
Temperature



Oxygen



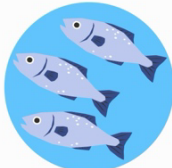
Heart Rate



Activity

Many types of sensors can be installed. Some record where the animal has gone, others measure aspects of the environment, like temperature or depth, more recently, tags measure physiological parameters like blood oxygen or heart rate, as well as behaviour such as activity, which shows researchers how hard an animal works.

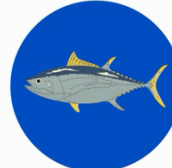
Applications for biologging:



Animal Welfare



Migrations



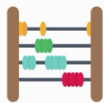
Hunting Behaviour



Cryptic Species

There are a wide variety of fields where biologging is useful. For example, biologging tags can be used by researchers to track the health of fish in aquaculture pens, to investigate the energetic consequences of upriver migrations, to characterize hunting patterns in diving animals, or to study the behaviour of animals that cannot be held in a lab.

Some considerations before using biologging:



Onboard Memory



Tag vs. Animal Size



Length of Study



Environmental Exposure

Biologging devices are tiny computers with sensors that take measurements of the things around them. They have limited memory so scientists have to decide how frequently they record information. The size of the tag must also be matched to the animal so they are not over-encumbered. Battery life must be rationed for the duration of the study.

The tag must be able to withstand the environmental conditions where the animal lives.

Biologging gives researchers a window into the hidden lives of animals—without removing them from their habitat!

For more information, visit: <https://www.star-oddi.com/news/case-studies>

Created in Canva.com