BIOLOGGING SOLUTIONS INC.

Product Catalog · 2026

ANIMAL-BORNE LOGGERS & UNDERWATER ACOUSTICS

# LoggLaw Product Catalog

## Data loggers for marine animals, and underwater acoustic recorders



A humpback whale surfacing with a LoggLaw C7XIR on its back. Photo © Takashi Iwata, cropped from the original frame.


**LoggLaw C Series**
Ultra-compact archival tags. From 2.9 g, nine models
p.4

**LoggLaw CAM**
Animal-borne video logger. Video, sound and sensor data
p.6

**LoggLaw DiveSat**
Satellite-linked logger. Sends to Argos at every surfacing
p.8

**LoggLaw NAD-W**
Moored acoustic recorder. AI detects what it hears
p.10



**Biologging Solutions Inc.**
Kyoto / Fukuoka, Japan

www.biologging-solutions.com

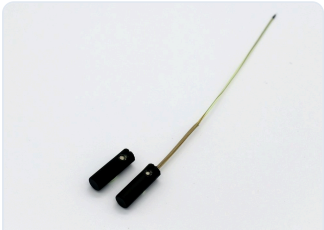
# Product Family

Four product lines

Biologging Solutions Inc., a Kyoto University spin-off founded in 2014, builds LoggLaw data loggers for seabirds, marine mammals, fish and sea turtles, and underwater acoustic recorders. The four products here fall into three groups by how the data reaches you.

## Recover the animal, read out the data

Everything stays on board until you recapture the animal.



### C Series

**Ultra-compact archival tags**

**Records**
Depth, temperature, light, salinity, acceleration, geomagnetism

**Size**
2.9 to 13.0 g, nine models

p.4 →



### CAM

**Animal-borne video logger**

**Records**
Video up to Full HD. Sound and sensors are options

**Size**
98 g (mini), 129 g (basic)

p.6 →

## Receive by satellite

Sends to Argos at every surfacing.



### DiveSat

**Satellite-linked logger**

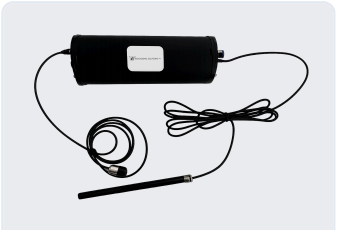
**Sends**
Dive profiles, dive summaries and positions (GPS on DiveSat-GPS)

**Size**
315 g, 320 g with GPS

p.8 →

## Moor at one site

Retrieve the card, or get detections over LTE.



### NAD-W

**Moored acoustic recorder**

**Records**
Underwater sound, sampled at 192 kHz

**Size**
Approx. 3 kg, ø11 × 40 cm

p.10 →

## Contents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GPS collars for land animals (**LoggLaw G Series**) and our cloud service for wildlife tracking and damage management (**Animal Portal**) are covered in separate catalogs.

# How to Choose

What to record, and how the data comes back

Find what you want to record, then compare weight, depth rating and data delivery below. Whether you can recover the animal decides most of the choice.

| What you want to record | C Series p.4 | CAM p.6 | DiveSat p.8 | NAD-W p.10 |
|---|---|---|---|---|
| Dive depth and water temperature over time | ● | ○ Sensor option | ● | — |
| Daily position from light levels (geolocation) | ● | — | — | — |
| Behaviour from acceleration and geomagnetism | ● C7XI / C7XIR | ○ Sensor option | — | — |
| Video of feeding and behaviour | — | ● | — | — |
| Underwater sound around the tagged animal | — | ○ Hydrophone option | — | — |
| Data from animals you may never recover | — | — | ● | — |
| Whereabouts after release | — | — | ● Argos locations GPS on DiveSat-GPS | — |
| Long-term sound at one site (passive acoustic monitoring) | — | — | — | ● |
| Automated detection of calls and vessel noise | — | — | — | ● Cloud AI |
| Detections while the unit is deployed | — | — | — | ○ LTE module (every 15 min) |
| Weight in air | 2.9 to 13.0 g | 98 g, 129 g | 315 g, 320 g | Approx. 3 kg |
| Depth rating | 1,000 m, 2,000 m | 500 m | 1,000 m | 600 m |
| How data comes back | Recover and read out | Recover and read out | By satellite at each surfacing | Card, or detections over LTE |
| Unit of record | One animal | One animal | One animal | One site |

● Recorded by the base unit ○ Recorded with an added option

## Size comparison

Scale 1 : 5 (one fifth of actual size)



**C7-100** 2.9 g
**C8X-500** 13.0 g
**CAM basic** 129 g, 71 mm with cap
**DiveSat** 315 g, upper face
**NAD-W** Approx. 3 kg, ø11 × 40 cm

Outlines drawn from each product's dimensions (C Series: diameter and length; CAM: side; DiveSat: upper face; NAD-W: side). The DiveSat antenna (165 mm above the housing) and the NAD-W hydrophone are not drawn.

C

# 01 LoggLaw C Series Ultra-compact archival tags

Ultra-compact data loggers (geolocators) recording any combination of depth, temperature, light, salinity, acceleration and geomagnetism. Nine models, from the C7 resolving shallow dives to 1 cm and the C8 measuring to 1,400 m, to the C7XI / C7XIR for behavioural analysis.

## Lineup (actual size)

Printed on A4 at 100%, true to life




Model numbers sharing a housing are shown once. Stalk not included.

## Three questions that settle the model

### 01 How deep?

**~600 m**
**C7 family / C7XI family**
Depth resolution ≤1 cm. Housing rated 1,000 m.

**~1,400 m**
**C8 family**
Housing rated 2,000 m. Resolution 0.05% FS (≈70 cm at 1,400 m).

### 02 How long?

**8 MB**
**C7-100 / C7-250 / C8-100 / C8-150**
C7-100, C8-100: 12 months; C7-250, C8-150: 24 months (60 s interval).

**128 MB**
**C8X-250 / C8X-500**
C8X-250: 12 months; C8X-500: 24 months (5 s interval).

**512 MB**
**C7XI-9D38 / C7XI-9D44 / C7XIR-9D44**
4.5 to 18 months in Long-term mode.

### 03 Behavioural analysis?

**Depth, temperature, light only**
**C7 family / C8 family**
Salinity optional on C8 and C7XI.

**Acceleration and geomagnetism too**
**C7XI (primary cell) / C7XIR (rechargeable)**
Activity, tail beats, feeding, spawning.



**Skipjack tuna**
With a stalk carrying the external temperature and light sensors.



**Next to a 10-yen coin**
Coin ø23.5 mm;
C7-100 ø8 × 26 mm

# C7, C8 and C7XI / C7XIR Compared



## Series comparison

| | C7 | C8 | C7XI / C7XIR |
|---|---|---|---|
| Role | High resolution, shallow water | High pressure, deep water | C7 base + behavioural analysis |
| Target animals | Seabirds, sea turtles, small-to-medium fish | Tuna, large odontocetes | Seabirds, pinnipeds |
| Depth rating | 1,000 m | **2,000 m** | 1,000 m |
| Depth sensor range | ~600 m | **~1,400 m** | ~600 m |
| Depth resolution | **≤ 1 cm** | 0.05% FS (≈70 cm at 1,400 m) | **≤ 1 cm** |
| Onboard sensors | Depth, int./ext. temp, light | C7 set + salinity | **C8 set + accel, geomag** |
| Memory | 8 MB | 8 to 128 MB | **512 MB** |
| Rechargeable model | — | — | **C7XIR** |

## The nine models

Battery life depends on the measurement settings (see notes)

| Model | Weight in air | Dimensions | Memory | Depth rating | Battery life |
|---|---|---|---|---|---|
| **C7-100** | 2.9 g | ϕ8 × 26 mm | 8 MB | 1,000 m | 12 months *1 |
| **C7-250** | 4.8 g | ϕ9 × 32 mm | 8 MB | 1,000 m | 24 months *1 |
| **C8-100** | 3.5 g | ϕ8.5 × 26 mm | 8 MB | 2,000 m | 12 months *1 |
| **C8-150** | 4.8 g | ϕ9 × 32 mm | 8 MB | 2,000 m | 24 months *1 |
| **C8X-250** | 6.0 g | ϕ11 × 33 mm | 128 MB | 2,000 m | 12 months *2 |
| **C8X-500** | 13.0 g | ϕ13 × 44 mm | 128 MB | 2,000 m | 24 months *2 / 36 months *3 |
| **C7XI-9D38** | 6.0 g (with stalk) | ϕ9 × 38 mm | 512 MB | 1,000 m | 12 months *4 |
| **C7XI-9D44** | 7.0 g (with stalk) | ϕ9 × 44 mm | 512 MB | 1,000 m | 18 months *4 |
| **C7XIR-9D44** | 4.4 g (without stalk) | ϕ9 × 44 mm | 512 MB | 1,000 m | 4.5 months *4 (rechargeable) |

## Series-wide specifications

| | |
|---|---|
| Time accuracy | ±95 s/yr (automatic temperature compensation) |
| Temperature sensor | Range -5 to 35 °C / Accuracy ±0.2 °C / Resolution ≤0.05 °C |
| Stalk (ext. temp / light sensors) | Optional; length to order (not available on C7XIR) |
| C7XI / C7XIR modes | Long-term mode (5 s every 60 s), Continuous, or Ten minutes a day; settings from 18 preset combinations |
| Setup and data retrieval | LoggLawSurfC application (Windows) + communication adapter |

*1 to *3: depth, internal and external temperature, and light measured at *1: 60 s / *2: 5 s / *3: 10 s intervals.
*4: Long-term mode, with acceleration (16 Hz), depth and geomagnetism (1 Hz) for 5 s every 60 s, plus internal and external temperature and light every 60 s. In continuous logging: 3 weeks (C7XI-9D38), 2 months (C7XI-9D44), 2 weeks (C7XIR-9D44).

### C Series full catalog

Per-model specifications, C7XI measurement modes and their combinations, the sampling pattern, deployment examples and options, in the full catalog (PDF) on the product page.

www.biologging-solutions.com/en/products/logglaw-c

# 02 LoggLaw CAM Animal-borne video logger



Records underwater behaviour in video and sound from the animal's point of view, with depth, temperature, acceleration and geomagnetism on the same time base. Two bodies, plus hydrophone, sensor and battery-extension options as the study requires. Nothing is transmitted by radio, so data comes only from animals you recover.

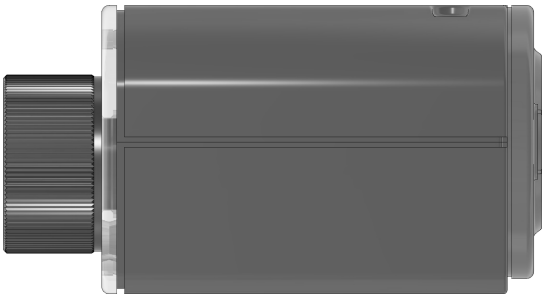
## Outline dimensions (actual size)

Printed on A4 at 100%, true to life

Side (waterproof cap fitted)



**CAM mini**
30 × 32 × 71 mm (body 58 mm + cap 13 mm)

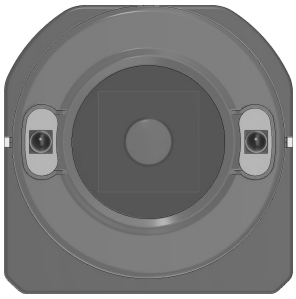


**CAM basic**
38 × 38 × 71 mm (body 58 mm + cap 13 mm)

Front (lens side)



**CAM mini**
30 × 32 mm / 98 g



**CAM basic**
38 × 38 mm / 129 g

### Decisions in the attachment design

- Whether a **mount** can be built for the attachment surface
- Whether **flotation** is needed; its amount and position change the attitude in water
- **Recovery method**, built around recapture of the animal
- **Total weight** once options are added, and the room left on the attachment surface

Each outline is the maximum envelope with the waterproof cap fitted, and excludes mounts, hydrophones and other options. The cap (ø23.6 mm, 13 mm long) is narrower than either body, so it adds length only.



**Mount and hydrophones**
Two hydrophones on a mount. Mounts are built for the attachment surface.



**Battery extension**
With a hydrophone. Size and weight increase.




**LoggLaw Float**
Next to a 10-yen coin (ø23.5 mm). Amount and position set the attitude in water.

# CAM Configuration and Recording Time

## Body

| Item | CAM mini | CAM basic |
|---|---|---|
| Size *1 | 30 × 32 × 58 mm | 38 × 38 × 58 mm |
| Weight in air | 98 g | 129 g |
| Depth rating | 500 m | 500 m |
| Operating temperature | -10 to 40 °C | -10 to 40 °C |
| Red LED | None | **Yes (660 nm)** |

## Video

| | |
|---|---|
| Resolution | VGA (640 × 480): 30 / 60 / 120 fps<br>HD (1280 × 720): 30 / 60 fps<br>Full HD (1920 × 1080): 30 fps |
| Field of view | 89° (in water) / 129° (in air) |
| Memory | SD card (up to 1 TB) |



## Options

| Option | What it records | What it changes |
|---|---|---|
| Sensors **-S** | Depth, temperature, 3-axis acceleration and geomagnetism, on the video clock. | Own battery; keeps recording after the video stops. |
| Hydrophone **-A** | Sound at 96 kHz, 100 Hz to 48 kHz, mono or stereo. | External; adds about 87 g each. Same clock as the video. |
| Battery extension **-EX** | Extends recording time. | External; size and weight increase. |

## Continuous recording time

Measured June 2023, units fitted with sensors

| Resolution | Frame rate | CAM mini | CAM basic |
|---|---|---|---|
| VGA 640 × 480 | 30 fps | **4.1 hours** | **6.7 hours** |
| VGA 640 × 480 | 60 fps | 2.8 hours | 4.3 hours |
| HD 1280 × 720 | 30 / 60 fps | Not yet measured. Please ask us | |
| Full HD 1920 × 1080 | 30 fps | 2.4 – 2.8 hours | 4.4 hours |

The battery, not memory, sets the recording time. One measurement per condition; figures vary with water temperature, settings and battery. Lighting the red LED shortens it.
*1: without the waterproof cap (13 mm long). Adding options changes dimensions and weight.



**Ambient light only**
Carried by a king penguin, early in the descent.



**Red LED lit (CAM basic)**
Deeper in the same dive. Prey stays visible without daylight.

### CAM full catalog

Coverage, the recording window, sensor specifications and data delivery, in the full catalog (PDF) on the product page.

**www.biologging-solutions.com/en/products/logglaw-cam**

# 03 LoggLaw DiveSat Satellite-linked logger

DiveSat detects each surfacing with a wet/dry sensor and sends the recorded dives to the Argos satellites, so data reaches you whether or not the tag is recovered. A recovered tag still holds the full-resolution record. DiveSat-GPS adds GPS.

DiveSat

## One deployment, step by step

**Attach and release**
Fix to the carapace, remove the wet/dry short cable

→

**Measure every 4 s**
Depth, temperature, wet/dry, voltage

→

**Summarise each dive**
Extract the break points of each dive

→

**Transmit at the surface**
To Argos about every 60 s in air

→

**Receive and decode**
Via Kinéis / CLS, decoded by us

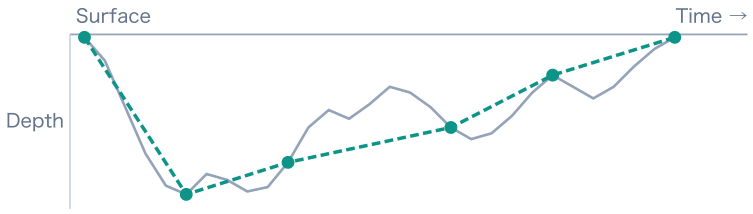
**If the tag is recovered**
Read out the full 4-second record over USB (most recent 8.3 days)

## Message types

One transmission = 20 bytes of user data, about every 60 s

| Type | Contents | Sent per |
|---|---|---|
| Dive Profile | Depth trace of one dive, as pairs of time (% of dive duration) and depth | dive |
| Summary | Dive count, max and mean depth and duration, time diving, water temperature, voltage | summary period |
| Hauled out | Record of time spent on land | haul-out |
| Temperature Cast | Vertical profile of water temperature | cast |
| Position | GPS fix (DiveSat-GPS only) | fix |
| Temporary | Status notification such as voltages | when nothing else is queued |

## From the 4-second record, the points that are sent (schematic)




Kept on board (every 4 s)
Break points transmitted

Break points are found with a Broken Stick Model and sent as time-and-depth pairs. Up to 6 points (default 4).

## Suited to

- Getting data reliably from animals you may never recover
- Following dive depth and duration over long periods
- Following the animal after release (DiveSat-GPS: 25 m accuracy)

## Where another instrument fits better

- Sub-second behaviour → **C Series (recovery required)**
- Underwater video or sound → **CAM**
- Positions of terrestrial animals → **G Series (separate catalog)**

# DiveSat Field Trial and Specifications

| 17 days | 2,305 | 370 | 84.9 % |
|---|---|---|---|
| Continuous reception 2026-04-21 to 05-07 | Messages received 98.7 % with a Doppler location | Dive profiles received 04-27 to 05-05 | GPS fix rate 404 of 476 attempts |

Kumejima trial, April to May 2026 (one sea turtle, one DiveSat-GPS, 17 days). Measured values, not guaranteed performance.

## Argos Doppler — both models

| | |
|---|---|
| Source | Computed by Argos from each received transmission |
| Accuracy classes | Location Class 3 to B, each with an error radius |
| Field trial | 59.9 % in Class 3–1; mean error radius 937 m |

## GPS — DiveSat-GPS only

| | |
|---|---|
| Acquisition | A 30 ms capture at every surfacing (every 150 s on land) |
| Accuracy | 25 m (as transmitted, 5-satellite fix) |
| Field trial | 84.9 % of attempts fixed (404 / 476) |

## Housing and power

| | |
|---|---|
| Dimensions | 115 × 75 × 42 mm<br>Antenna 165 mm above the housing |
| Weight in air | DiveSat 315 ± 10 g<br>DiveSat-GPS 320 ± 10 g |
| Depth rating | 1,000 m |
| Operating temperature | -10 to 40 °C |
| Memory | 24 MiB; a ring buffer of about 8.3 days at 4 s |
| Battery | Lithium thionyl chloride, 19 Ah (non-rechargeable) |

## Sensors

| | |
|---|---|
| Channels | Depth, water temperature, wet/dry, battery voltage, every 4 s |
| Depth | Range 1,000 m, accuracy ±1 % FS<br>Resolution 5.5 cm or better on board; 0.01–10 m in the uplink |
| Temperature | -5 to 35 °C, accuracy ±0.2 °C |

## Satellite link and positioning

| | |
|---|---|
| System | Argos-2 (401 MHz, 500 mW output) |
| Transmission | About every 60 s while air is detected<br>20 bytes of user data per message |
| GPS | DiveSat-GPS only. 25 m accuracy |
| Arranged by the user | Argos PTT ID, radio licence, Argos system contract |



**Attachment face**
Curved to follow the carapace.



**Overall shape**
The antenna rises from the top of the housing. Dimensions are in the table above.

### DiveSat full catalog

Uplink, positioning, attachment and the field trial, in the full catalog (PDF).

www.biologging-solutions.com/en/products/logglaw-divesat

# 04 LoggLaw NAD-W Moored acoustic recorder

A moored broadband recorder for passive acoustic monitoring (PAM). It writes unfiltered audio to an SD card at 192 kHz, and AI decides what was in it. You choose where the AI runs: in the cloud after retrieval (Pathway A), or on the device with the LTE module (Pathway B).



**192 kHz**
Sampling rate. Records up to 96 kHz

**600 m**
Depth rating

**~2 weeks**
One deployment on the standard battery pack

**15 min**
Result transmission interval with the LTE module

Main unit and hydrophone. Cable length is specified per deployment.



| | Pathway A: Basic unit | Pathway B: With LTE module |
|---|---|---|
| Where the AI runs | LoggLaw Cloud, after upload | **On the device (Edge AI), then the cloud** |
| When results arrive | After the unit is serviced | **Every 15 minutes** |
| Site requirement | Boat access for retrieval | Cellular coverage at the float, and your SIM |
| Suited to | Seasonal surveys and soundscape ecology | Alerting, vessel traffic, fleets on one dashboard |

Both pathways keep the full raw audio on the card for re-analysis. Only the classification results travel over LTE.

## Recording chain

Runs for the whole deployment

**Underwater sound**
Clicks, whistles, vessel noise, ambient sound

→

**Hydrophone**
Broadband transducer, cable per site

→

**Amplifier, ADC**
Calibrated pre-amp 192 kHz, 16-bit

→

**MCU**
WAV encoding, timestamps

→

**SD card**
Raw WAV 256 or 512 GB

## Detection targets

| Target | What is detected, and what it needs | Status |
|---|---|---|
| Dolphin vocalisations | Clicks and whistles, present or absent per time segment. Model trained on Irrawaddy dolphin recordings | **Available** |
| Vessel noise and type | Passing vessels, separated by class. Trained on vessel recordings from your site | Available once site data is supplied |
| Other species | Dugongs, fish choruses, snapping shrimp. A custom model, scoped with you | Custom development |

# NAD-W Specifications and Deployment Length

| Main unit | Both pathways |
|---|---|
| Dimensions | Diameter 11 cm × length 40 cm |
| Weight in air | Approx. 3 kg, with the integrated battery |
| Depth rating | 600 m |
| Operating temperature | -10 to 50 °C |
| Battery | Approx. 2 weeks on the standard pack, carry-on compliant for air travel |
| Storage | Industrial high-endurance SD card. 256 GB standard, 512 GB optional |
| Deployment | Surface float, stake or bottom anchor |

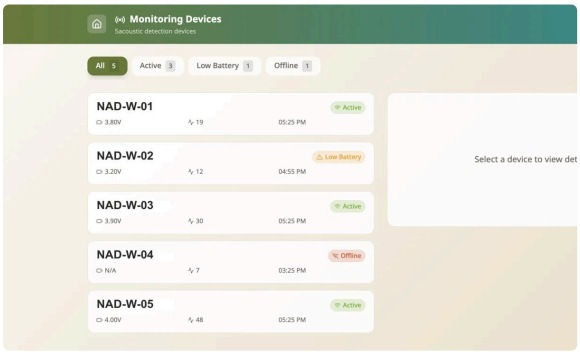
| Recording | |
|---|---|
| Sampling rate | 192 kHz (recorded band up to 96 kHz) |
| Resolution | 16-bit, mono |
| File format | WAV with embedded timestamps. No on-device filtering |
| Data rate | Approx. 1.38 GB per hour |
| Recording modes | Continuous, duty cycle, scheduled. With the LTE module, an alternating 30 s record / 30 s analyse cycle |

| LTE module | Optional, Pathway B |
|---|---|
| Edge AI | Acoustic classification on the device. Only the results are transmitted, never the audio |
| Communication | 3G / 4G LTE. Coverage at the surface float is required |
| Transmission | Every 15 minutes |
| Position | GPS fix once per day, shown on the dashboard map |
| Interrupted link | Results are cached and retransmitted once the connection returns |
| Customer provides | SIM card and cellular data plan |

**Deployment length** — At 1.38 GB per hour

| Configuration | Card fills in | Battery lasts |
|---|---|---|
| 256 GB, continuous | **7.7 days** | approx. 14 days |
| 256 GB, 50 % duty | 15.4 days | **approx. 14 days** |
| 512 GB, continuous | 15.4 days | **approx. 14 days** |
| 512 GB, 50 % duty | 30.8 days | **approx. 14 days** |

Bold green: the limit that arrives first. Past roughly two weeks, the battery, not the card, sets the length of a deployment.




**Device list on the dashboard (LoggLaw Cloud)**
Battery voltage, detection count and last contact for each deployed NAD-W. Example screen.

## What one deployment returns

- **Presence and absence**: detection per time segment, timestamped, with a confidence score
- **Raw audio**: the full WAV recordings on the card, for manual review and re-analysis
- **Device position**: GPS coordinates once per day (with the LTE module)
- **Export and alerts**: CSV export, and email or SMS on specified events

### NAD-W full catalog

Deployment planning, detection, the dashboard and the cloud AI service, in the full catalog (PDF) on the product page. Acoustic performance figures are available on request.

www.biologging-solutions.com/en/products/nad-w

# Contact Us

Tell us the species, the aim of the study, and the attachment surface or deployment site. We will propose the product, configuration, recording window, attachment and data delivery.

**www.biologging-solutions.com/en/contact**

Contact

## Full catalog for each product

Scan to open the product page and download the full catalog (PDF)

**C Series**
/en/products/logglaw-c

**CAM**
/en/products/logglaw-cam

**DiveSat**
/en/products/logglaw-divesat

**NAD-W**
/en/products/nad-w

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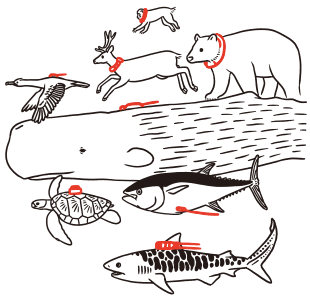

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