

# Metadata for Open Access Data Sharing

## Dataset description

This dataset contains the core data tables used to analyse juvenile Baltic sturgeon movements in the HaffStor study. It includes fish biometrics, receiver deployments, station locations, study-site distances, raw acoustic telemetry detections, and a cleaned detection table matched to receiver arrays and depth information.

## General notes

- Files are provided as CSV tables.
- Most curated tables use semicolon separators (;). Some raw receiver detection files use comma separators (.). File-specific separators are listed below.
- Coordinates are in decimal degrees.
- Times labelled UTC are in Coordinated Universal Time.
- Tag IDs are study identifiers.
- Exact station coordinates and individual-level detection histories should be shared only if allowed by permits and conservation constraints.

## 1. Raw acoustic detection files

These files contain receiver-level acoustic detections exported from individual receivers or receiver groups. They are listed first because they are the primary detection records underlying the cleaned detection database.

File: final\_3811\_tag.csv

Rows: 8036

Delimiter: ,

Columns:

- Date and Time (UTC): UTC timestamp of the acoustic detection. Unit/format: ISO 8601 datetime, UTC.
- Unix Timestamp (UTC): Detection timestamp expressed as Unix time. Unit/format: seconds since 1970-01-01 UTC.
- ID: Detected acoustic tag or fish identifier. Unit/format: identifier.
- Data: Additional raw data field exported by the receiver, when present. Unit/format: text or numeric; may be blank.
- Protocol: Acoustic tag protocol or frequency code reported by the receiver. Unit/format: text, e.g. OPi-67kHz or R01M-69kHz.
- SNR: Signal-to-noise ratio reported by the receiver. Unit/format: numeric; receiver-reported SNR, commonly dB.
- Receiver: Receiver identifier that logged the detection. Unit/format: identifier.

File: final\_38114\_tag.csv

Rows: 13863

Delimiter: ,

Columns:

- Date and Time (UTC): UTC timestamp of the acoustic detection. Unit/format: ISO 8601 datetime, UTC.
- Unix Timestamp (UTC): Detection timestamp expressed as Unix time. Unit/format: seconds since 1970-01-01 UTC.
- ID: Detected acoustic tag or fish identifier. Unit/format: identifier.
- Data: Additional raw data field exported by the receiver, when present. Unit/format: text or numeric; may be blank.
- Protocol: Acoustic tag protocol or frequency code reported by the receiver. Unit/format: text, e.g. OPi-67kHz or R01M-69kHz.
- SNR: Signal-to-noise ratio reported by the receiver. Unit/format: numeric; receiver-reported SNR, commonly dB.
- Receiver: Receiver identifier that logged the detection. Unit/format: identifier.

File: final\_3812\_tag.csv

Rows: 9198

Delimiter: ,

Columns:

- Date and Time (UTC): UTC timestamp of the acoustic detection. Unit/format: ISO 8601 datetime, UTC.
- Unix Timestamp (UTC): Detection timestamp expressed as Unix time. Unit/format: seconds since 1970-01-01 UTC.
- ID: Detected acoustic tag or fish identifier. Unit/format: identifier.
- Data: Additional raw data field exported by the receiver, when present. Unit/format: text or numeric; may be blank.
- Protocol: Acoustic tag protocol or frequency code reported by the receiver. Unit/format: text, e.g. OPi-67kHz or R01M-69kHz.
- SNR: Signal-to-noise ratio reported by the receiver. Unit/format: numeric; receiver-reported SNR, commonly dB.
- Receiver: Receiver identifier that logged the detection. Unit/format: identifier.

File: final\_3813\_tag.csv

Rows: 11440

Delimiter: ,

Columns:

- Date and Time (UTC): UTC timestamp of the acoustic detection. Unit/format: ISO 8601 datetime, UTC.
- Unix Timestamp (UTC): Detection timestamp expressed as Unix time. Unit/format: seconds since 1970-01-01 UTC.
- ID: Detected acoustic tag or fish identifier. Unit/format: identifier.
- Data: Additional raw data field exported by the receiver, when present. Unit/format: text or numeric; may be blank.
- Protocol: Acoustic tag protocol or frequency code reported by the receiver. Unit/format: text, e.g. OPi-67kHz or R01M-69kHz.
- SNR: Signal-to-noise ratio reported by the receiver. Unit/format: numeric; receiver-reported SNR, commonly dB.
- Receiver: Receiver identifier that logged the detection. Unit/format: identifier.

File: final\_gate\_igb.csv

Rows: 120652

Delimiter: ;

Columns:

- Date and Time (UTC): UTC timestamp of the acoustic detection. Unit/format: ISO 8601 datetime, UTC.
- Unix Timestamp (UTC): Detection timestamp expressed as Unix time. Unit/format: seconds since 1970-01-01 UTC.
- ID: Detected acoustic tag or fish identifier. Unit/format: identifier.
- Data: Additional raw data field exported by the receiver, when present. Unit/format: text or numeric; may be blank.
- Protocol: Acoustic tag protocol or frequency code reported by the receiver. Unit/format: text, e.g. OPi-67kHz or R01M-69kHz.
- SNR: Signal-to-noise ratio reported by the receiver. Unit/format: numeric; receiver-reported SNR, commonly dB.
- Receiver: Receiver identifier that logged the detection. Unit/format: identifier.

File: final\_hydro\_tag.csv

Rows: 1854

Delimiter: ,

Columns:

- Date and Time (UTC): UTC timestamp of the acoustic detection. Unit/format: ISO 8601 datetime, UTC.

- Unix Timestamp (UTC): Detection timestamp expressed as Unix time. Unit/format: seconds since 1970-01-01 UTC.
- ID: Detected acoustic tag or fish identifier. Unit/format: identifier.
- Data: Additional raw data field exported by the receiver, when present. Unit/format: text or numeric; may be blank.
- Protocol: Acoustic tag protocol or frequency code reported by the receiver. Unit/format: text, e.g. OPi-67kHz or R01M-69kHz.
- SNR: Signal-to-noise ratio reported by the receiver. Unit/format: numeric; receiver-reported SNR, commonly dB.
- Receiver: Receiver identifier that logged the detection. Unit/format: identifier.

## 2. Cleaned detection table

File: database\_completed\_with\_depth\_clean.csv

Rows: 25994

Delimiter: ;

Description: Curated detection database used for analysis, with detections assigned to stations, arrays, sections, and depth/waypoint information where available.

Columns:

- Date.and.Time..UTC.: Detection timestamp from the curated detection database. Unit/format: ISO 8601 datetime, UTC.
- Unix.Timestamp..UTC.: Detection timestamp expressed as Unix time. Unit/format: seconds since 1970-01-01 UTC.
- ID: Detected acoustic tag or fish identifier. Unit/format: identifier.
- Data: Additional raw data field exported by the receiver, when present. Unit/format: text or numeric; may be blank.
- Protocol: Acoustic tag protocol or frequency code. Unit/format: text.
- SNR: Signal-to-noise ratio reported by the receiver. Unit/format: numeric; receiver-reported SNR, commonly dB.
- Receiver: Original receiver identifier from the detection record. Unit/format: identifier.
- method: Detection source or method category. Unit/format: text; e.g. static.
- location: Station or location assigned to the detection. Unit/format: text.
- distance\_to\_release: Distance from release site to assigned station/location. Unit/format: metres.
- array: Array assigned to the detection. Unit/format: text.
- closest\_array: Closest receiver array assigned to the detection. Unit/format: text.
- section: Study section assigned to the detection. Unit/format: text.
- receiver: Curated receiver/station assignment field. Unit/format: identifier.
- det\_time\_utc: Parsed detection timestamp used in analyses. Unit/format: ISO 8601 datetime, UTC.
- wp\_time\_utc: Matched waypoint timestamp, when depth/active tracking matching was available. Unit/format: ISO 8601 datetime, UTC; may be blank.
- depth: Matched water depth associated with the detection. Unit/format: metres; may be blank.
- depth\_RM: Depth variable from the Raymarine/depth-matching workflow. Unit/format: metres; may be blank.
- wp\_longitude: Longitude of the matched waypoint. Unit/format: decimal degrees; may be blank.
- wp\_latitude: Latitude of the matched waypoint. Unit/format: decimal degrees; may be blank.
- wp\_name: Matched waypoint name or identifier. Unit/format: text; may be blank.
- match\_time\_diff\_s: Absolute time difference between detection and matched waypoint. Unit/format: seconds; may be blank.

## 3. Fish, receiver, spatial, and distance tables

File: biometrics\_all.csv

Rows: 25

Delimiter: ;

#### Columns:

- Release.date: Date and time when the fish was released. Unit/format: ISO 8601 datetime.
- Signal: Tag or fish study identifier. Unit/format: identifier.
- Sensor: Sensor or tag label. Unit/format: text.
- Length.mm: Fish total length. Unit/format: millimetres.
- Weight.g: Fish body mass. Unit/format: grams.
- Group: Tag/frequency or study group. Unit/format: text.
- Release.site: Release site label. Unit/format: text.
- Code.space: Tag code space or study code. Unit/format: identifier.

File: deployments\_all.csv

Rows: 17

Delimiter: ;

#### Columns:

- Receiver: Receiver identifier. Unit/format: identifier.
- Station.name: Receiver station name. Unit/format: text.
- Start: Receiver deployment start date and time. Unit/format: dd/mm/yyyy hh:mm; timezone as in study methods.
- Stop: Receiver deployment end date and time. Unit/format: dd/mm/yyyy hh:mm; timezone as in study methods.

File: spatial\_all.csv

Rows: 18

Delimiter: ;

#### Columns:

- Station.name: Station or site name. Unit/format: text.
- Latitude: Station latitude. Unit/format: decimal degrees.
- Longitude: Station longitude. Unit/format: decimal degrees.
- Section: Study section label. Unit/format: text.
- Array: Receiver array label. Unit/format: text.
- Type: Station type. Unit/format: text; e.g. Release or Hydrophone.

File: distance\_c1.csv

Rows: 18

Delimiter: ;

#### Columns:

- row\_name: Origin station or site. Unit/format: text.
- Site/station columns: Distance from the row station/site to each column station/site. Unit/format: metres.

#### 4. File inventory

- biometrics\_all.csv: 25 rows; delimiter ;; columns: Release.date, Signal, Sensor, Length.mm, Weight.g, Group, Release.site, Code.space
- database\_completed\_with\_depth\_clean.csv: 25994 rows; delimiter ;; columns: Date.and.Time..UTC., Unix.Timestamp..UTC., ID, Data, Protocol, SNR, Receiver, method, location, distance\_to\_release, array, closest\_array, section, receiver, det\_time\_utc, wp\_time\_utc, depth, depth\_RM, wp\_longitude, wp\_latitude, wp\_name, match\_time\_diff\_s
- deployments\_all.csv: 17 rows; delimiter ;; columns: Receiver, Station.name, Start, Stop
- distance\_c1.csv: 18 rows; delimiter ;; columns: row\_name, SiteA, Stuzkow, Up\_Widu, D\_Widu1, D\_Widu2, D\_Widu3, GryfinoIGB, GryfinoLFA, Mescherin, Lubnica, Dabie1, Dabie2, Gate1, Gate2, Gate3, Gate4, Gate5, Gate6
- final\_38114\_tag.csv: 13863 rows; delimiter ;; columns: Date and Time (UTC), Unix Timestamp (UTC), ID, Data, Protocol, SNR, Receiver
- final\_3811\_tag.csv: 8036 rows; delimiter ;; columns: Date and Time (UTC), Unix Timestamp (UTC), ID, Data, Protocol, SNR, Receiver
- final\_3812\_tag.csv: 9198 rows; delimiter ;; columns: Date and Time (UTC), Unix Timestamp (UTC), ID, Data, Protocol, SNR, Receiver

- final\_3813\_tag.csv: 11440 rows; delimiter ,; columns: Date and Time (UTC), Unix Timestamp (UTC), ID, Data, Protocol, SNR, Receiver
- final\_gate\_igb.csv: 120652 rows; delimiter ;; columns: Date and Time (UTC), Unix Timestamp (UTC), ID, Data, Protocol, SNR, Receiver
- final\_hydro\_tag.csv: 1854 rows; delimiter ,; columns: Date and Time (UTC), Unix Timestamp (UTC), ID, Data, Protocol, SNR, Receiver
- spatial\_all.csv: 18 rows; delimiter ;; columns: Station.name, Latitude, Longitude, Section, Array, Type