



Manual for the European Tracking Network data management platform

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1. Objectives

This document is a standardized protocol to upload fish tracking data and metadata to the European Tracking Network (ETN). Objectives of this protocol:

- 1) Have a standardized protocol available for FISH INTEL staff to follow,
- 2) Have a guide for future fisheries and/or statutory authorities to implement fish tracking studies for EBFM implementation.

VLIZ staff provided two technical workshops on 11-05-2021 and 30-03-2022 on appropriate data formatting and storage procedures on the ETN data platform, and on ensuring tracking data and the associated metadata meet global formatting standards which can be easily interpreted by all PP and wider audience post project. In particular, the following key aspects were discussed:

- FAIR data principles. Ensuring data is collated and stored in a Findable, Accessible, Interoperable, and Reusable (FAIR) format.
- Dataflow from project FISH INTEL to the European Tracking Network (ETN) and EMODNET data platforms: from survey to database to wider audience.

2. General introduction to the protocol

For FISH INTEL, the [ETN data management platform](#) will be used to store and maintain the tracking data generated in the project. The ETN data portal gives access to different types of aquatic animal tracking data. Currently acoustic telemetry, archival data, and acoustic-archival data are supported. In the future DST data will be extended to incorporate tags that send data to the ARGOS satellite (e.g. PSAT, SPOT, SPLASH). Also PIT (passive integrated transponder) data will be included. The portal provides an interface to manage, explore and download the metadata and data. Access is password protected and data moratorium rules are in place.

The ETN data portal has been developed by the Flanders Marine Institute (VLIZ) and is open to all European telemetry users. New developments and additional features are added on a continuous basis. The web application is built using PHP (using the Symfony framework) for the back-end side and Bootstrap/jQuery/Datatables/... (among others) to facilitate the development of the front-end side.

3. Dataflow

Tracking data generated in FISH INTEL is first uploaded from the receivers (for acoustic telemetry) or tags (DST) to the personal computer using the software provided by the manufacturer. In the next step, the raw data is uploaded to the ETN data portal and automatically stored in the [Marine Data Archive](#) (MDA). Project information is stored in the Integrated Marine Information System (IMIS). In ETN the metadata and data can be organised and downloaded. The [RShiny application](#) is available for data visualisation purposes and for the in-depth analyses the [ETN R-package](#) can be used. Data-exchange is possible between ETN and the data system of the Ocean Tracking Network (OTN).

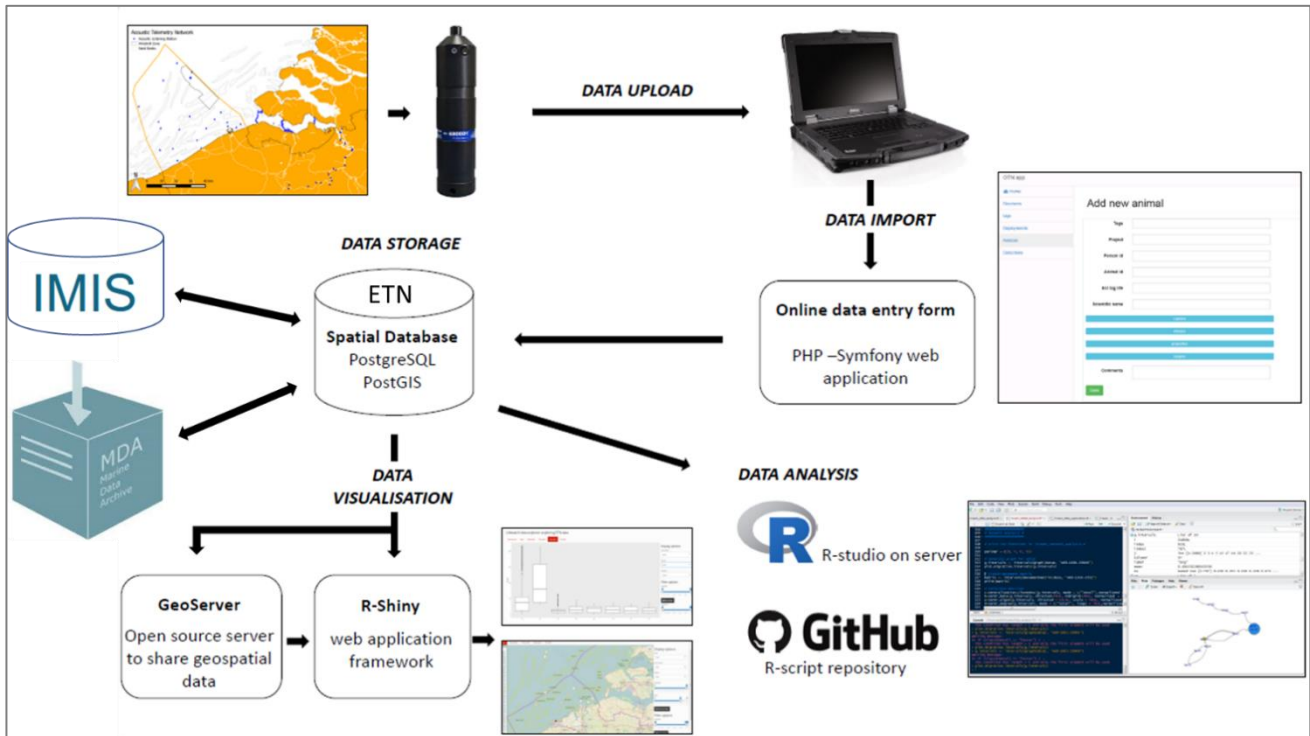


Figure 3.1: Data flow fish tracking data.

To enter (meta)data to ETN, several steps should be performed in the correct order (fig. 3.2). Access to the data portal is restricted to registered members only. You can register at <http://www.lifewatch.be/etn/login>. By registering, you automatically agree with the [data policy](#). Once your account has been created, you will be added to specific user groups by the administrators. A user group has restricted access to (meta)data of specific projects. The next step is the creation of a project. Data is linked to a project, and thus it needs to be created before (meta)data can be uploaded. The template to create a project is available at <https://www.lifewatch.be/etn/assets/docs/ETN-project-template.xlsx>. This template ensures that all necessary metadata to describe the project is available and understandable. Thereafter specific metadata and data, linked to the telemetry technology at stake, can be added.

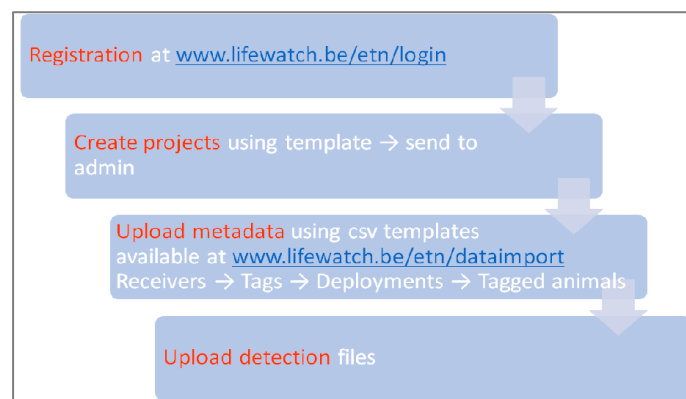


Figure 3.2: Steps to follow in (meta)data upload to ETN.

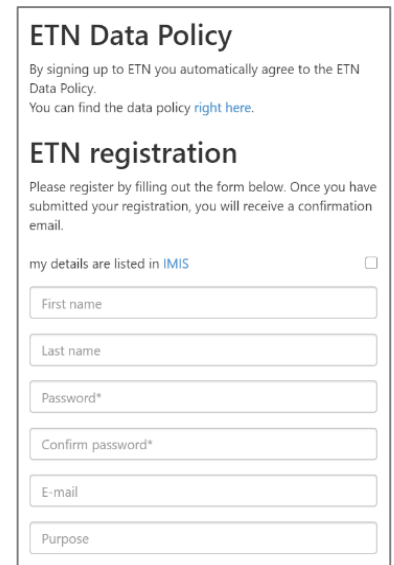
4. Create an account and a project

Create an account on ETN

- ETN access is restricted to registered users. Registration can be easily done at <http://lifewatch.be/etn/login>.
- By creating an account (fig. 4.1), you automatically accept the [data policy](#).
- Once an account has been created, ETN administrators will link each account to one or more user groups (requested by the user). A user group has restricted access to (meta)data of specific projects.

Create a project in ETN

- At the bottom of the landing page, a project template can be downloaded (fig. 4.2).
- The user must fill the sheet “**Tracking project info**” and send the file to an ETN administrator (etn@lifewatch.be) to include the project in the system. If the tracking project is part of a larger, overarching project the sheet “**Umbrella project info**” can be filled as well.
- The template contains an example to follow and guidelines for each field.
- The information provided should be as complete as possible. If incomplete, the ETN administrator will get back to the user to request input on specific information.
- The administrator will grant access to the project to every person mentioned in the project information only if they have an account in ETN.
- ETN makes a distinction between network and animal projects. A **network project** refers to a group of receiver deployments, linked to a project/study area. An **animal project** refers to a group of animals tagged in the framework of a project/study. When filling the template, the type of project (network/animal) is mandatory. In specific occasions it might be that a project has both a network and animal project. This can be specified.
- Rules (i.e. things to keep in mind):
 - The project code and title fields do not accept spaces between words.
 - The coordinates will be used to mark a point in the landing page’s map.



ETN Data Policy
By signing up to ETN you automatically agree to the ETN Data Policy.
You can find the data policy [right here](#).

ETN registration
Please register by filling out the form below. Once you have submitted your registration, you will receive a confirmation email.

my details are listed in [IMIS](#) ☐

First name

Last name

Password*

Confirm password*

E-mail

Purpose

Figure 4.1: ETN registration.

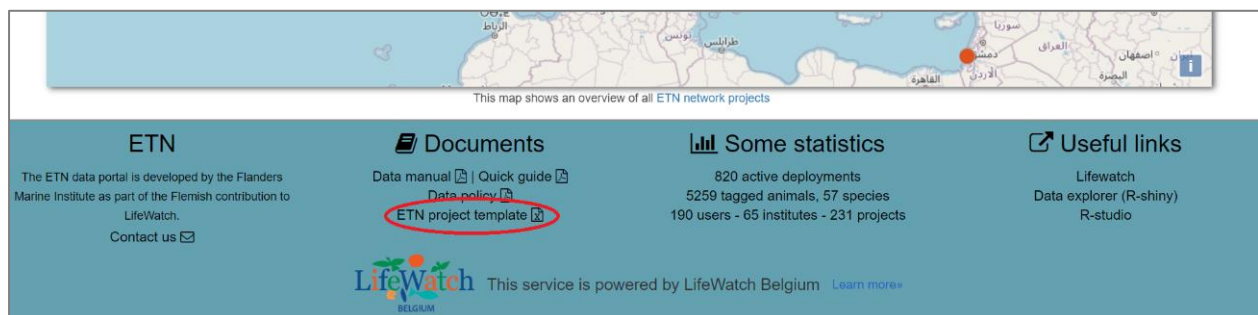


Figure 4.2: The project template can be downloaded from the landing page of ETN.

Keep in mind: link between User – Group – Project

- A user is always linked to a group.
- Users can have access to multiple groups.
- A group can contain several projects.
- A user has read-access to all the projects of the same group.
- Write-access can be specified per user linked to the project.
- A project can belong to more than one group.

How to get your dot(s) on the map:

Step-by-step guide

Step 1.

Download the
metadata excel file



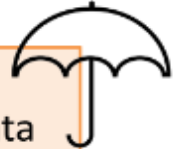
Step 2.

Complete the file

Tracking project
metadata
(mandatory)



Umbrella
project metadata
(desired)



Are you tracking animals or do
you have an array of receivers?

I am tracking
animals

I have an
array

Animal
project

Network
project

Who

Where

When

How

Note that data on
tagged animals,
receivers and/or
detection files will
be uploaded at a
later stage!

Is your project part of a larger set of
projects? (e.g., is your project part of a
larger project where one funding body
is funding 3 telemetry projects?)

Yes

No

Fill out
this file

Don't fill
out this file

Send your completed metadata
file to your *regional
representative*

Step 3.

Step 4.

Your project should appear on the ETN
database map within a few days!

Step 5.

What now?

You can upload data specific to your tagged
animals, receivers and/or detection files through
your ETN private data portal

Figure 4.3: Steps that are taken to create a project in ETN.

5. Context

ETN works with different contexts. Each context refers to a technology type. Currently there are four different contexts available (fig. 5.1): Acoustic Telemetry, Archival Data, Acoustic Archival, and Underwater acoustics.

By clicking the header, you can choose the technology type of your interest and switch between the different contexts.

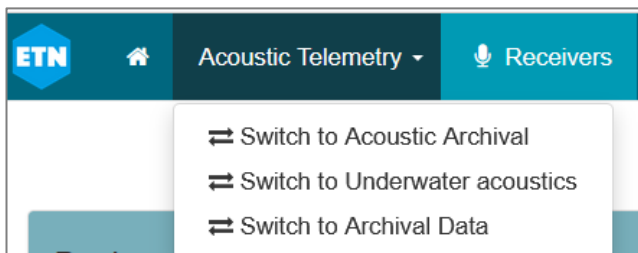


Figure 5.1: Available contexts in ETN.

6. Import, edit, and download metadata

6.1. Metadata upload

Click to watch the video tutorials to upload metadata of: [tags](#), [animals](#), [receivers](#), and [deployments](#).

- The steps to enter metadata are the same among different contexts. Depending on the context, different metadata types are required (fig. 6.1.). To upload any metadata, first select the appropriate context: 'Acoustic Telemetry', 'Acoustic Archival', 'Archival Data' or 'Underwater acoustics'.
- Click 'Data' → 'Import metadata' in the landing page and you will be redirected to the webpage to upload the metadata (fig. 6.2).
- To upload the metadata in the correct format, '.csv' file templates are available in 'Sample CSV file' (fig. 6.3). Using this template, you ensure that the file format will be accepted.

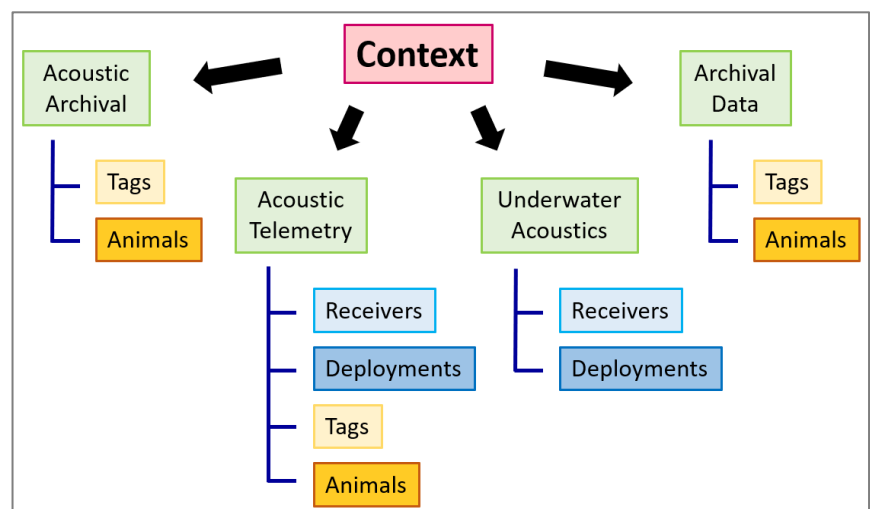


Figure 6.1: ETN contexts and metadata available on each context.

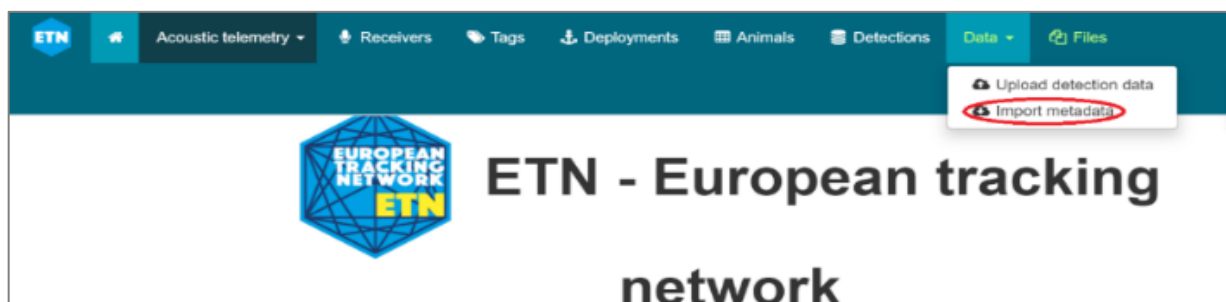


Figure 6.2: 'Import metadata' in the landing page.

- The file must be comma-separated. If it is not the case, this should be changed in the regional settings of the PC (*Control panel* → *Clock, language & region* → *Region and language* → *Additional Settings*).
- Some fields are mandatory and some are optional. You can check them in the 'file description' of each metadata type (fig. 6.3 and 6.4). The mandatory fields have a check mark next to them.
- Each file description contains the type of character expected for each field, and a description of the field with an example.
- Fill in as many fields as possible in the '.csv' template following the explanations in the file description (fig. 6.4).
- When the 'Sample CSV file' is completed, it can be uploaded by selecting the appropriate 'Import' box and uploading the file, 'Choose file' → 'Start import'.
- After importing the 'Sample CSV file', either a success or an error message appears.
- If the file cannot be uploaded:
 - Check the error returned by the system. It usually indicates what type of incompatibility is present. Update your file accordingly and re-upload it.
 - If the error persists, contact ETN via the link 'Contact us' at the bottom of the landing page or by sending an email to etn@lifewatch.be. When contacting ETN, provide sufficient information on the issue, send along the file you wanted to upload together with a print screen of the error message.

Choose which metadata you want to import

☐ Import tags

☐ Import receivers

☐ Import animals

☐ Import deployments

Figure 6.3: 'Sample CSV file' returns a template to fill in the metadata. Each 'file description' provides guidelines to fill the fields for the relevant metadata type.

Fieldname	Required	Type	Description
OWNER_ORGANIZATION	<input checked="" type="checkbox"/>	String	Group owner of the tag. Use the exact group name to which the tag belongs. <i>as in: 'VLIZ'</i>
PI	<input type="checkbox"/>	string	First and last name of the Principal Investigator for the project. <i>as in: Jan Reubens</i>
TAG_TYPE	<input checked="" type="checkbox"/>	String	Type of tag attached to animal. Fixed option: sensor-tag, id-tag, combined-tag <i>as in: sensor-tag</i>
TAG_SUB_TYPE	<input checked="" type="checkbox"/>	String	Type of acoustic tag. Predefined options: "animal", "built-in tag", "sentinel tag" or "range tag". <i>as in: animal</i>
MANUFACTURER	<input checked="" type="checkbox"/>	String	Name of tag manufacturer. Predefined options are available. <i>as in: VENCO</i>
SERIAL_NUMBER	<input checked="" type="checkbox"/>	string	Serial number assigned by tag manufacturer to uniquely identify tag. <i>as in: 1036912</i>
MODEL	<input checked="" type="checkbox"/>	string	Tag model number as provided by the manufacturer. <i>as in: V9-6L</i>
TAG_ESTIMATED_LIFETIME	<input checked="" type="checkbox"/>	Integer	Estimated duration of time during which the tag will be transmitting. <i>units: days; as in: 80</i>
TAG_STATUS	<input checked="" type="checkbox"/>	String	Current status of the tag. Three options: "available", "active" or "ended". <i>as in: active</i>
TAG_ACTIVATION_DATE	<input type="checkbox"/>	datetime	Date and time the tag was activated, in UTC <i>format: yyyy-mm-ddThh:mm:ssZ; as in: 2020-01-01T12:30:00</i>
TAG_ESTIMATED_ENDDATE	<input type="checkbox"/>	datetime	Estimated date at which tag will stop transmitting. Date fields should follow the ISO-8601 format.

Figure 6.4: Example of description file. It contains the list of fields, the type of character required, a short description and an example.

General remarks:

- Do not use special characters or symbols.
- All date/times must follow ISO8601 format (yyyy-mm-ddThh:mm:ssZ)

For **tag/receiver** metadata:

- Once a tag or receiver is uploaded, the metadata stays in the database and it does not need to be uploaded again if it is used for another project.
- The tag or receiver **status** must be uploaded as 'available' before linking it to an animal or deployment, respectively. The status becomes automatically 'active' when an animal/deployment is linked to the tag/receiver, respectively.

For **animal** metadata:

- '**projectName**' must match exactly the name of the project in ETN.
- '**tag**' must match exactly the tag full ID of the tag used for this particular animal. Tag full ID includes 'tagSpaceCode', hyphen and 'idCode' (e.g. A69-1601-56789).

For **deployment** metadata:

- **Receiver** field must be: model + hyphen + serial number (e.g. VR2W-12345).
- The deployments are linked to a receiver. All the receivers must be in the database before uploading the deployments.
- Before uploading detection data, '**recoverDateTime**' must be empty. When a deployment contains a recovery date, the system does not allow to upload detections for this receiver.
- When the data for a deployment are successfully uploaded, the deployment is automatically closed (i.e. a **recoveryDate** is added) and a new deployment is created with the starting date matching the recovery date of the previous deployment.

6.2. Search in the database

- The successfully uploaded metadata can be checked in the relevant tab: tags, animals, receivers, or deployments.
- Filters can be applied to look for specific metadata entries (fig. 6.5). To be able to see the metadata, the user must have access to the relevant ETN group.

The screenshot shows the 'Tags overview' page in the ETN system. The page has a navigation bar with tabs for Acoustic Telemetry, Receivers, Tags (selected), Deployments, Animals, Detections, Data, Files, and Logs. Below the navigation bar, there are buttons for 'Add new', 'Edit', 'Duplicate', and 'Delete'. There are also links for 'Show/hide fields', 'Copy to clipboard', 'Refresh data', 'Download data', and 'Field definitions'. The table displays tag metadata with columns: SERIAL_NUMBER, TAG_FULL_ID, MANUFACTURER, MODEL, BATTERY_ESTIMATED_LIFE, and STATUS. A red box highlights the first row of the table, which is the header row. The data rows show tags with serial numbers A69-1303-4985 to A69-1303-4995, all manufactured by THELMA, with model ID-LP13, a battery life of 1400, and a status of 'available'.

SERIAL_NUMBER	TAG_FULL_ID	MANUFACTURER	MODEL	BATTERY_ESTIMATED_LIFE	STATUS
A69-1303-4985	A69-1303-4985	THELMA	ID-LP13	1400	available
A69-1303-4992	A69-1303-4992	THELMA	ID-LP13	1400	available
A69-1303-4993	A69-1303-4993	THELMA	ID-LP13	1400	available
A69-1303-4994	A69-1303-4994	THELMA	ID-LP13	1400	available
A69-1303-4995	A69-1303-4995	THELMA	ID-LP13	1400	available

Figure 6.5: Row filter example for the 'Tags' overview page. The filters can be applied to find the tags of interest

- In the case of the deployments, you can check all the deployments of a receiver in the 'Receivers' tab by filtering by the receiver serial number (fig. 6.6). In fig. 6.6, all deployments of a specific receiver are marked by a red square.
- Metadata columns not visible can be selected to be displayed under 'Show/hide fields'.

RECEIVER	DEPLOYMENTS	MANUFACTURER	RECEIVER_ID_MODEL	RECEIVER_ID_SERIAL_NUMBER	STATUS
123	DEPLOYMENTS	MANUFACTURER	RECEIVER_ID_MODEL	RECEIVER_ID_SERIAL_NUMBER	STATUS
VR2W-101230	23 (2007-08-20)	VEMCO	VR2W	101230	Available
VR2W-101235	100 (2007-06-24)	VEMCO	VR2W	101235	Active
VR2W-112123	50R (2011-11-23) C1 (2015-10-03)	VEMCO	VR2W	112123	Available
VR2W-112308	66 s mateus fora (2012-02-03) 110 COR PESQUEIRO (2018-08-13) 70 PAL fundo centro (2017-02-13) 66 s mateus fora (2014-05-24) 88 gettysburg (2015-08-23) 66 s mateus fora (2013-02-14)	VEMCO	VR2W	112308	Available
VR2W-112309	93 lucky strike (2019-06-24)	VEMCO	VR2W	112309	Active

Figure 6.6: One receiver can have been deployed multiple times.

6.3. Edit metadata

- The information entered for metadata entries can be individually edited.
- Select the appropriate tab (tags, animals, receivers, or deployments), a row of the list, and click on 'Edit' (fig. 6.7A). A list of metadata fields will appear (fig. 6.7B).
- When the fields have been modified, click the 'Edit' button at the bottom of the page.
- You can also delete or create new tags manually instead of using the CSV template file (see buttons 'Delete' and 'Add new').

A. Tags overview

[Add new](#)
[Edit](#)
[Duplicate](#)
[Delete](#)

[Show/hide fields](#)
[Copy to clipboard](#)
[Refresh data](#)
[Download data](#)
[Field definitions](#)

Show entries

SERIAL NUMBER	TAG_FULL_ID	MANUFACTURER	MODEL
SERIAL NUMBER	TAG_FULL_ID	thelma	MODEL
21010108	OPI-108	THELMA BIOTEL	ID-HP9
21010109	OPI-109	THELMA BIOTEL	ID-HP9
21010110	OPI-110	THELMA BIOTEL	ID-HP9
22020200	OPS-201	THELMA BIOTEL	DT-MP13
22020202	OPS-203	THELMA BIOTEL	DT-MP13

B. Edit window

OWNER_ORGANIZATION

PI

TAG_SUB_TYPE

TAG_TYPE

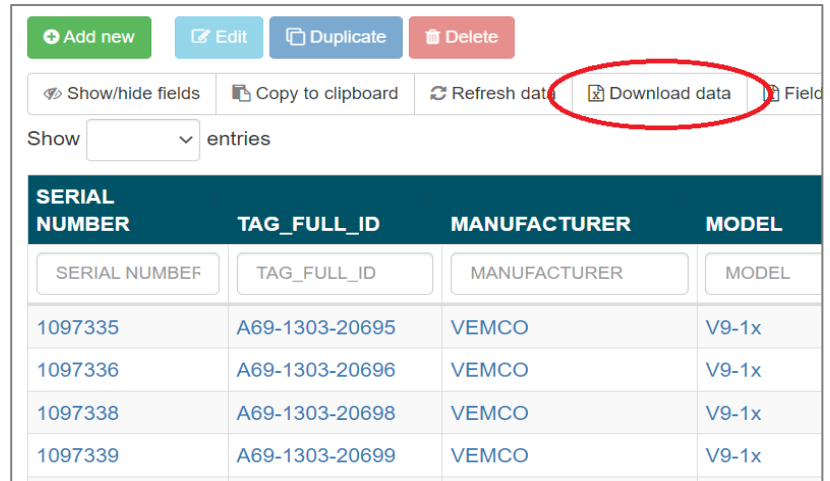
TAG_STATUS

MANUFACTURER

Figure 6.7: Editing of individual metadata entries (A), and edit window (B).

6.4. Download metadata

- By clicking on 'Download data' you will receive a CSV file containing all the metadata entries that comply with the filter characteristics (fig. 6.8).



The screenshot shows the ETN interface with a table of metadata. At the top, there are buttons for 'Add new', 'Edit', 'Duplicate', and 'Delete'. Below these are buttons for 'Show/hide fields', 'Copy to clipboard', 'Refresh data', 'Download data' (circled in red), and 'Field'. The table has columns for 'SERIAL NUMBER', 'TAG_FULL_ID', 'MANUFACTURER', and 'MODEL'. The data rows show four entries for 'V9-1x' models from 'VEMCO'.

SERIAL NUMBER	TAG_FULL_ID	MANUFACTURER	MODEL
1097335	A69-1303-20695	VEMCO	V9-1x
1097336	A69-1303-20696	VEMCO	V9-1x
1097338	A69-1303-20698	VEMCO	V9-1x
1097339	A69-1303-20699	VEMCO	V9-1x

Figure 6.8: 'Download data' returns a CSV file containing the metadata of the list.

7. Upload detection and sensor data

Click to watch the video tutorial on [detection data upload](#).

Now that all metadata is uploaded to the system, it is time to upload detections data (acoustic telemetry) and sensor data (acoustic-archival and archival data).

For acoustic telemetry ETN allows the upload of detection data files from four different brands (being Lotek, Sonotronics, Thelma-Biotel, and Innovasea). The detections are stored in ETN and can be visualized.

For acoustic-archival and archival data the sensor data files can be uploaded. For these two contexts, data are stored in the Marine Data Archive (MDA). A link to the data file is stored in ETN, but the data cannot be visualized.

7.1. Detection data upload (acoustic telemetry context)

- Select the context 'Acoustic Telemetry' on the top-left corner.
- On the landing page, click on 'Data' and 'Upload detection data' (fig. 7.1) which redirects you to the space to upload detection data for each of the brands.
- Select the brand for which you would like to upload detection data (fig. 7.2).
- Click 'Browse for files' and select the file you would like to upload.
- A new deployment can be automatically created after uploading your detection file. Untick the box 'Automatically create a new deployment?' if you do not want to create a new deployment.

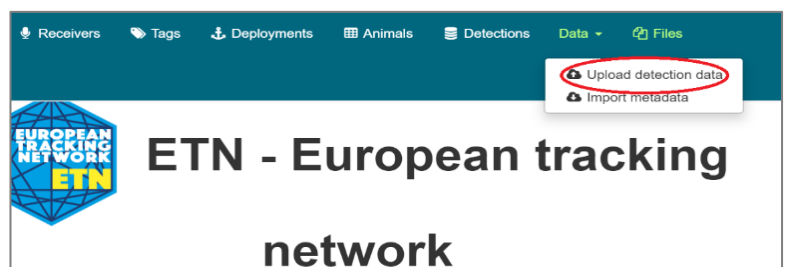


Figure 7.1: Upload detection data to ETN

- Each brand has specific file formats that can be uploaded:
 - Lotek: .TXT files (converted for the .JST files) can be uploaded.
 - Sonotronics: .CSV files can be uploaded.
 - Thelma-Biotel: .TBRARW files are accepted.
 - Innovasea/Vemco: .VRL files are accepted.

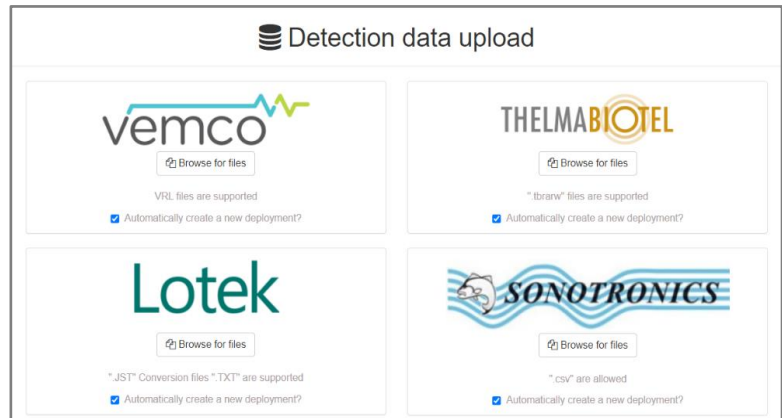


Figure 7.2: The different brands for which detection data can be uploaded.

It is important to keep in mind that all the deployments for which data will be uploaded need to be open (without recovery date, see fig. 7.3). If the deployment is not open, the system will not be able to link the data and no detections will be added to the system. An error message will appear that upload failed.

Add new	Edit	Duplicate	Delete	
Only show deployments of my projects <input checked="" type="checkbox"/> (Unchecked will also list deployments not under moratorium)				
Show/hide fields	Copy to clipboard	Refresh data	Download data	Field definitions
Show <input type="text" value="5"/> entries	Previous			
RECEIVER_ID ⓘ	DEPLOY_DATE_TIME ⓘ	RECOVER_DATE_TIME ⓘ	DEPLOY_LATITUDE ⓘ	DEPLOY_LONGITUDE ⓘ
RECEIVER_ID	DEPLOY_DATE_TIME	RECOVER_DATE_TIME	DEPLOY_LATITUDE	DEPLOY_LONGITUDE
VR2-1681	2004-10-20 00:00	2004-10-27 00:00	38.041	12.926417
VR2-1681	2004-10-27 00:00	2004-11-25 00:00	38.041	12.926417
VR2-1681	2011-02-10 00:00		40.717342	17.79775
Deployments				

Figure 7.3: The first two deployments are closed because they have a recovery date. The third deployment is open and can store new data.

- The process of uploading a file can take several minutes. As long as the status indicates 'processing' or 'running', the upload is still in process.
- If the file cannot be uploaded:
 - Check the error returned by the system. It usually indicates what type of incompatibility is present.
 - If the error persists, contact ETN via the link 'Contact us' at the bottom of the landing page or by sending an email to etn@lifewatch.be. When contacting ETN, provide sufficient information on the issue, send along the file you wanted to upload together with a print screen of the error message.
- Once a file is uploaded, the deployment for that file will close. A new deployment can be automatically created by ticking the box 'Automatically create a new deployment?'.

7.2. Upload of sensor readings (acoustic archival and archival data contexts)

- Sensor readings need to be downloaded from the tag using the appropriate software and hardware.
- The steps to upload sensor readings are the same for the 'Acoustic Archival', and 'Archival Data' contexts.
- To upload sensor readings, first select the appropriate context: 'Acoustic Archival', or 'Archival Data'.
- Click 'Data' → 'Upload sensor readings' (fig. 7.4). You will be redirected to the Marine Data Archive file uploader (fig. 7.5).
- Search for the serial number of the tag whose readings will be uploaded. The result will show 'Serial Number - Animal release datetime'. Select the correct record belonging to your tag and click on it. The window will automatically update and show the button 'Browse for files'.
- Click on 'Browse for files' and upload the file as downloaded from the tag.

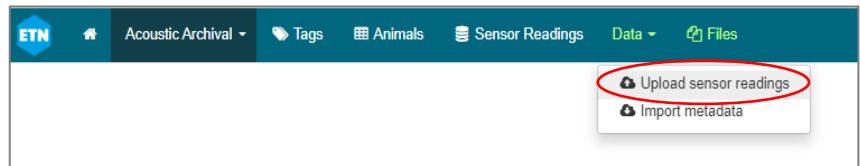


Figure 7.4: Example to upload sensor readings in the ETN under Acoustic Archival context.

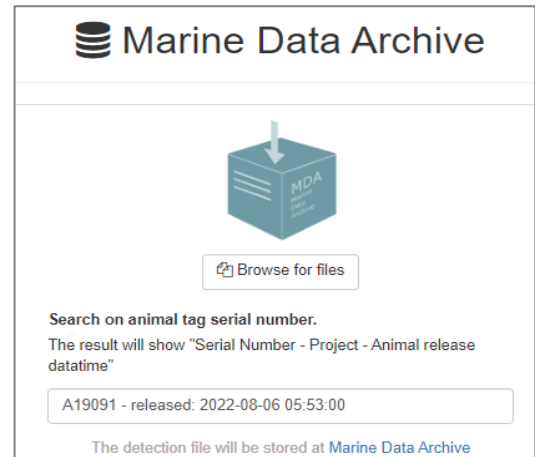


Figure 7.5: Marine Data Archive file uploader.

- After upload you will get a message informing whether the upload was successful. (fig. 7.6).
- Once uploaded the file will be stored in the [Marine Data Archive](#) and can be accessed directly at MDA or through ETN at 'Sensor Readings' (fig. 7.7), where data can be filtered by upload date, project, or tag ID (fig. 7.7).



Figure 7.6: Status update after uploading sensor readings.

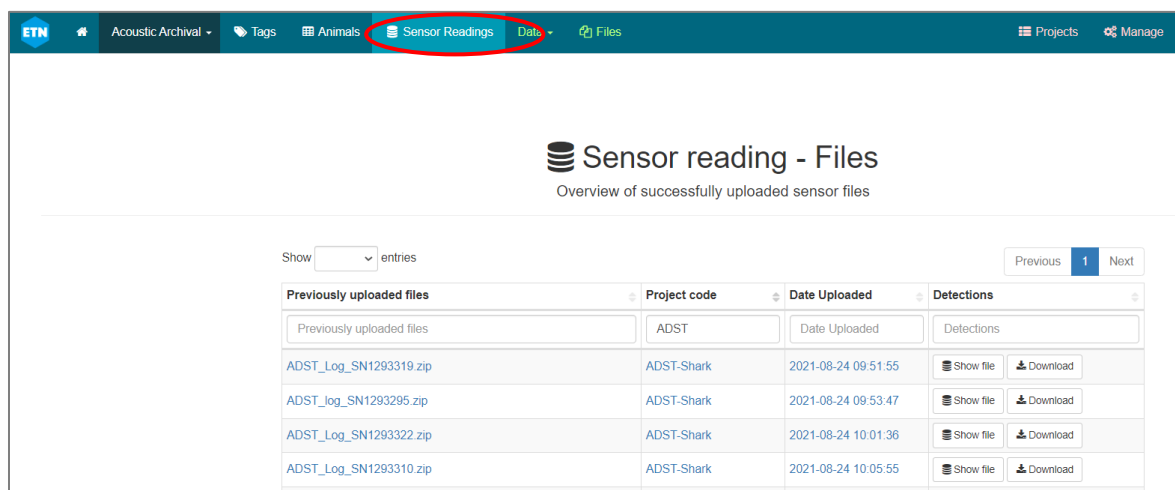


Figure 7.7: Check or download sensor readings.