BEeS

The LifeWatch ERIC Biodiversity & Ecosystem eScience Conference

Seville
22-24/05/23

Threats and challenges to biodiversity and ecosystem conservation from an eScience perspective

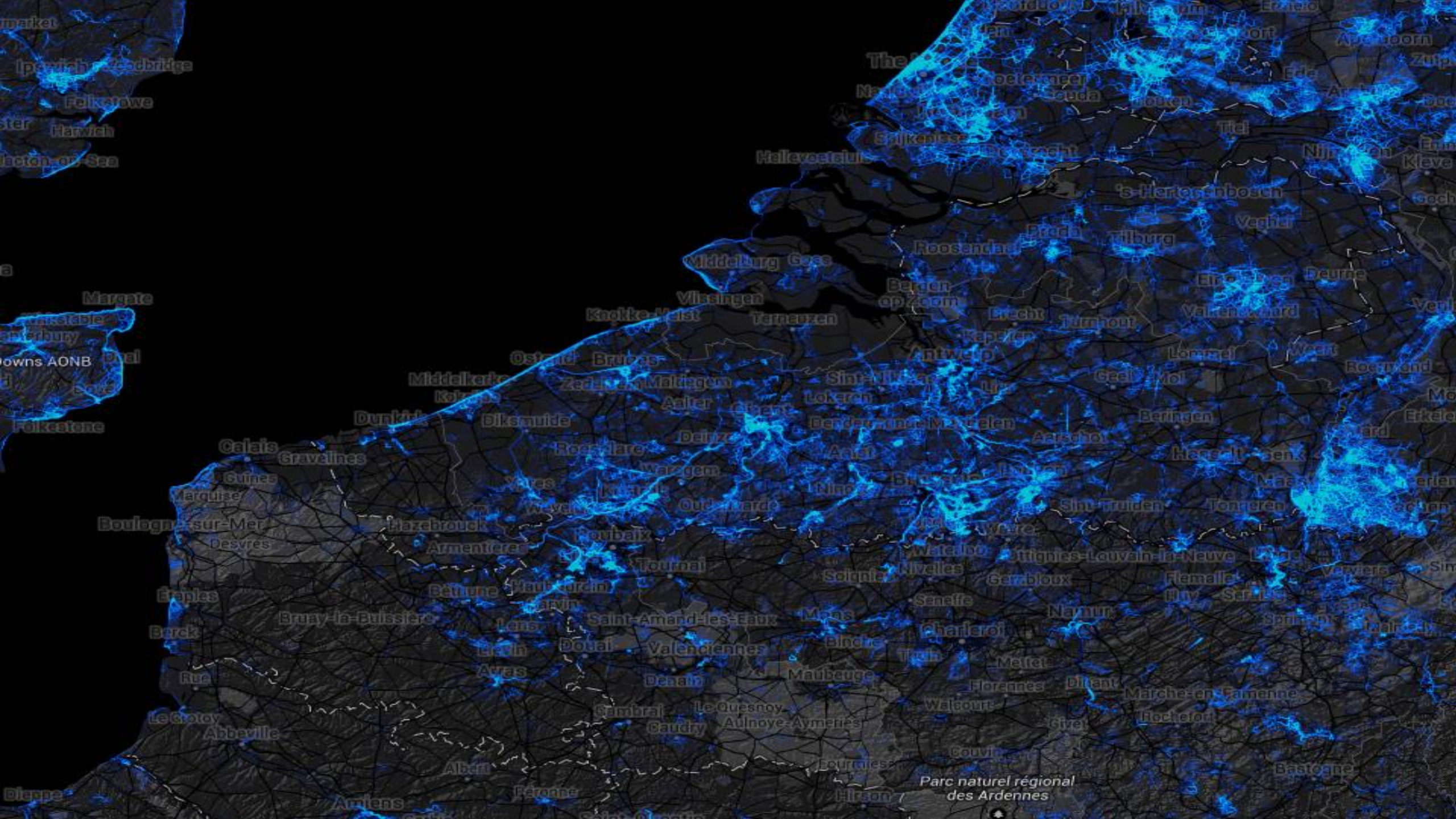
LifeWatch ERIC

GOBIERNO DE ESPAÑA MINISTERIO DE CIENCIA E INNOVACIÓN

UNIÓN EUROPEA
Fondo Europeo de Desarrollo Regional
Una manera de hacer Europa

How Belgian fish tracking research benefits from the LifeWatch ERIC VRE of the European Tracking Network

Jan Reubens
Elisabeth Debusschere
Tjess Hernandez
Klaas Deneudt


Margate
Folkestone
Calais
Gravelines
Boulogne-sur-Mer
Hazebrouck
Armentieres
Roubaix
Tournai
Bethune
Lens
Douai
Valenciennes
Arras
Maubeuge
Saint-Amand-les-Eaux
Mons
Charleroi
Namur
Nivelles
Ottignies-Louvain-la-Neuve
Waterloo
Dunkirk
Ostend
Bruges
Middelkerke
Diksmuide
Roeselare
Ypres
Middelburg
Vlissingen
Terneuzen
Knokke-Heist
Antwerp
Turnhout
Tilburg
Breda
Roosendaal
Eindhoven
Deurne
Geel
Mol
Beringen
Hasselt
Sint-Truiden
Tongeren
Genk
Maastricht
Liege
Verviers
Spa
Malmedy
Stavelot
Bastogne
Marche-en-Famenne
Rochefort
Dinant
Florennes
Givet
Couvin
Philippeville
Walcourt
Chimay
Binche
Soignies
Seneffe
Genappe
Wavre
Aarschot
Diest
Leuven
Tienen
Zaventem
Brussels
Ninove
Aalst
Lokeren
Sint-Niklaas
Beveren
Zeebrugge
Knokke
Maldegem
Eeklo
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Lelystad
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Deventer
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Hengelo
Almelo
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Borne
Oldenzaal
Bad Bentheim
Nordhorn
Lingen
Meppel
Steenwijk
Heerenveen
Sneek
Leeuwarden
Drachten
Harlingen
Terschelling
Vlieland
Texel
Den Helder
Hoorn
Medemblik
Enkhuizen
Lelystad
Emmeloord
Urk
Kampen
Zwolle
Raalte
Nunspeet
Harderwijk
Ermelo
Putten
Barneveld
Scherpenzeel
Veenendaal
Rhenen
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Arnhem
Nijmegen
Cuijk
Boxmeer
Venray
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Maasmechelen
Hasselt
Genk
Tongeren
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Liège
Verviers
Spa
Malmedy
Stavelot
Vielsalm
Bastogne
Libramont
Neufchâteau
Arlon
Virton
Florenville
Bouillon
Sedan
Charleville-Mézières
Rethel
Vouziers
Attigny
Buzancy
Stenay
Montmédy
Carignan
Longwy
Thionville
Metz
Pont-à-Mousson
Nancy
Toul
Commercy
Bar-le-Duc
Verdun
Étain
Conflans-en-Jarnisy
Briey
Longuyon
Parc naturel régional des Ardennes
Hirson
Vervins
Guise
La Capelle
Le Nouvion-en-Thiérache
Wassigny
Le Cateau-Cambrésis
Caudry
Le Quesnoy
Aulnoye-Aymeries
Maubeuge
Avesnes-sur-Helpe
Fourmies
Cambrai
Bapaume
Albert
Péronne
Amiens
Abbeville
Le Crotoy
Rue
Berck
Montreuil
Étaples
Boulogne-sur-Mer
Desvres
Marquise
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Dunkirk
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Desvres
Marquise
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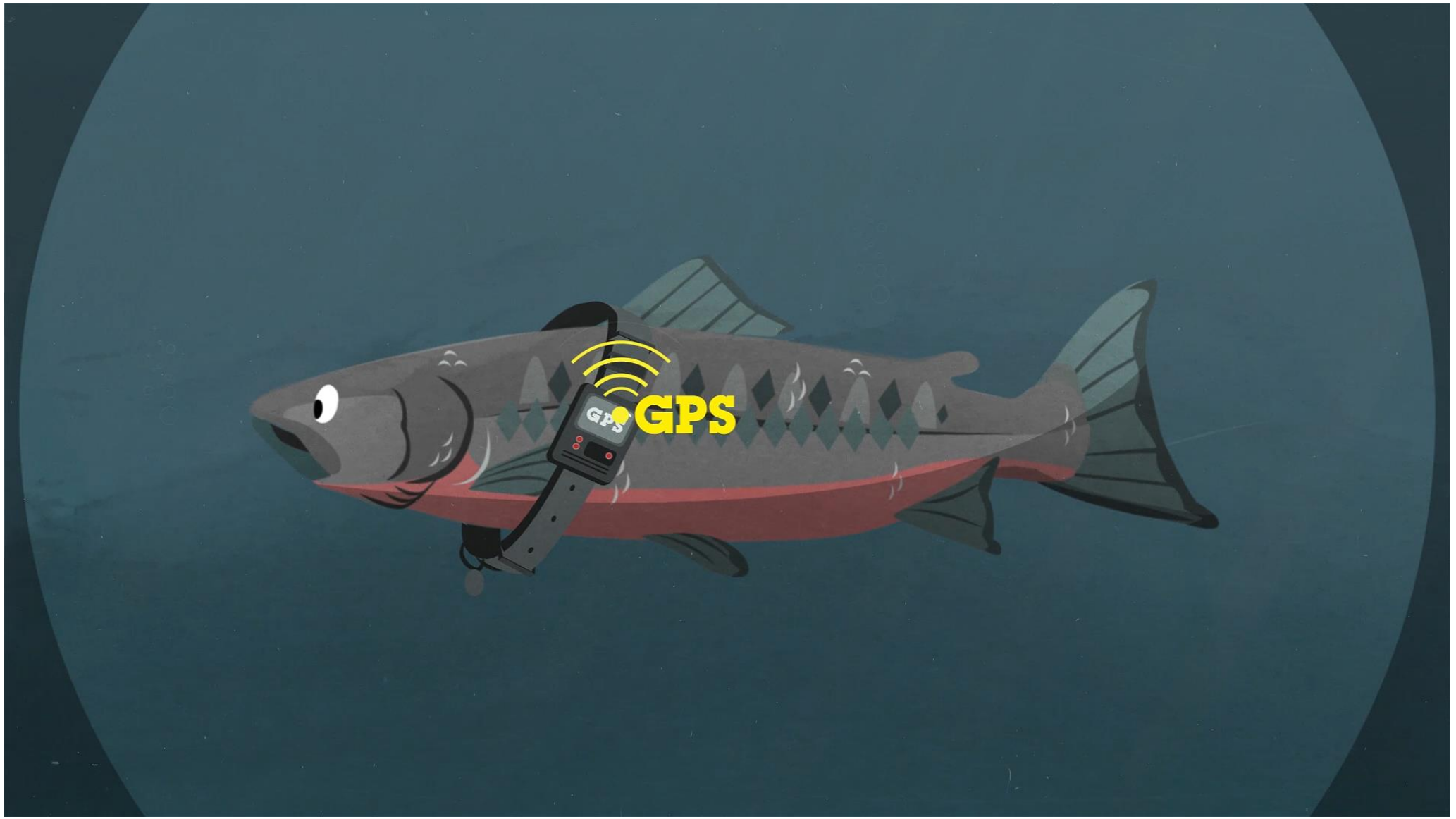
Calais
Gravelines
Dunkirk
Bray-Dunes

Evergem
Schoonstraat
Elslo
Westbekesluis
Botestraat
Voorhaven
Houtdok
Ketelvest
Ringvaart
Universitair Ziekenhuis Gent
Sint-Martens-Latem
Lochristi
Oude Veldstraat
Veldstraat
Hijftestraat
Hoekskensstraat
Haenhoutstraat
Bastelare
Gavergrachtstraat
Bosstraat
Beekstraat
Eeklostraat
Klossestraat
Keistraat
N9
N70
R4
R40
N424
E17
A14
A10
B402
N60
E40
B403

Image: Southwest Fisheries Science Center

Whereabouts of fish…



A GUIDE TO ELECTRONIC TAGGING

An introduction to telemetry and tagging equipment.

1. RADIO TAG

2. POP - UP SATELITE TAG

3. ACOUSTIC TAG

4. ARCHIVAL TAG

5. PIT TAG

PIT stands for:

- Passive
- Integrated
- Transponder

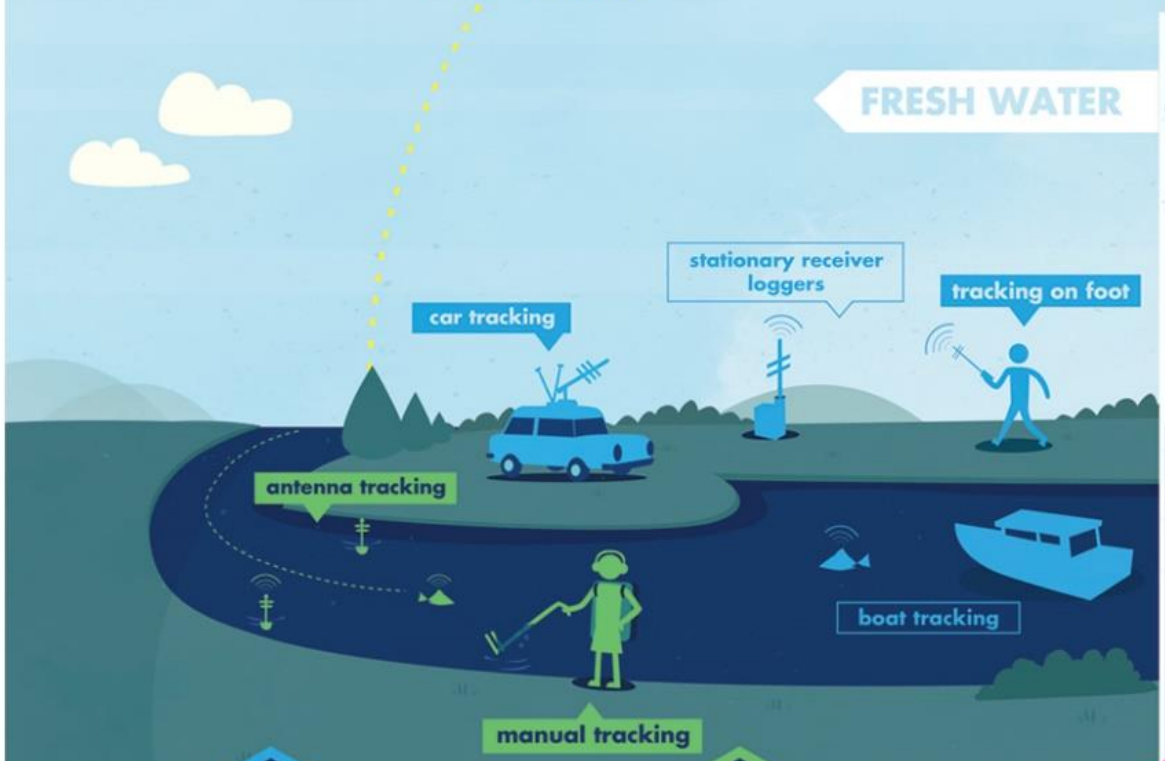
COMBINATION TAGS EXIST AND ARE EXPECTED TO BECOME MORE COMMON IN THE NEAR FUTURE

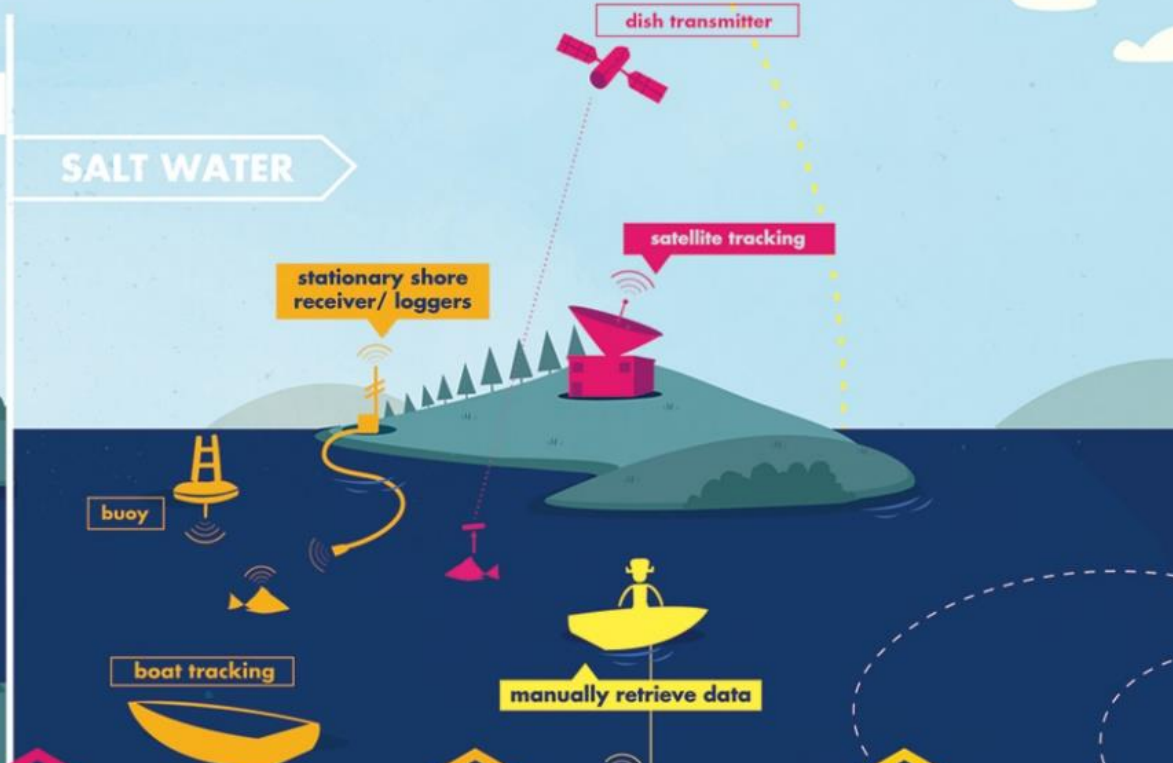
ETN is uniting the aquatic science community from all over Europe and neighboring countries.

TRACKING METHODS

HOW WE TRACK AQUATIC ANIMALS IN THE WILD.

RADIO TRANSMITTERS | PIT TAGS | 'POP-UP' SATELLITE | ACOUSTIC TRANSMITTERS | ARCHIVAL TAGS





Works in fresh water

Used in rivers, streams, shallow lakes

Transmitter with antenna

Individual coded tags without battery

Charged by electomagnetic field

Long Lasting
Low detection distance (cm - m)

Stores and transmits data

Location and data sent via satellite uplink

Signal propagates through water

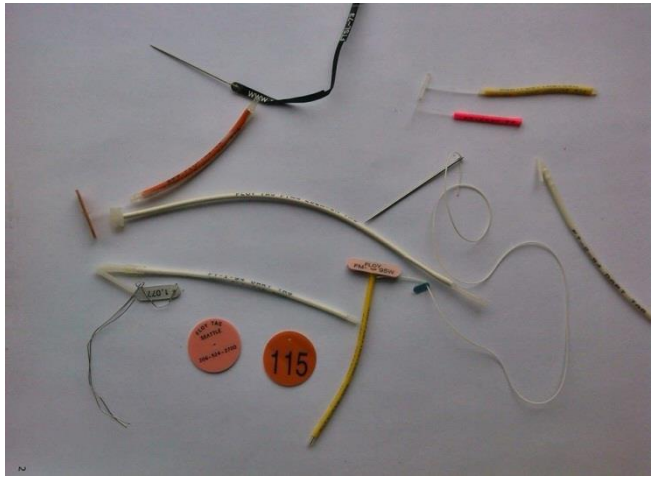
Used at sea, estuaries, lakes and rivers

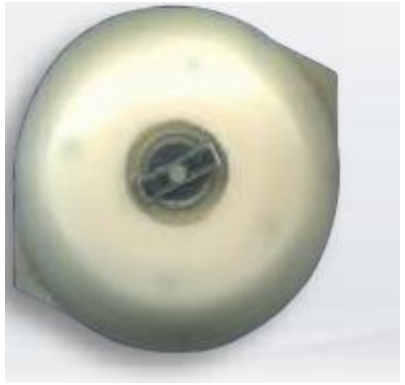
Transmitter without antenna

Relatively cheap

Need to recapture fish to retrieve data

Evolution in technology





1 –SPOT 363A

2 - VHF transmitter;

3 - SPLASH10

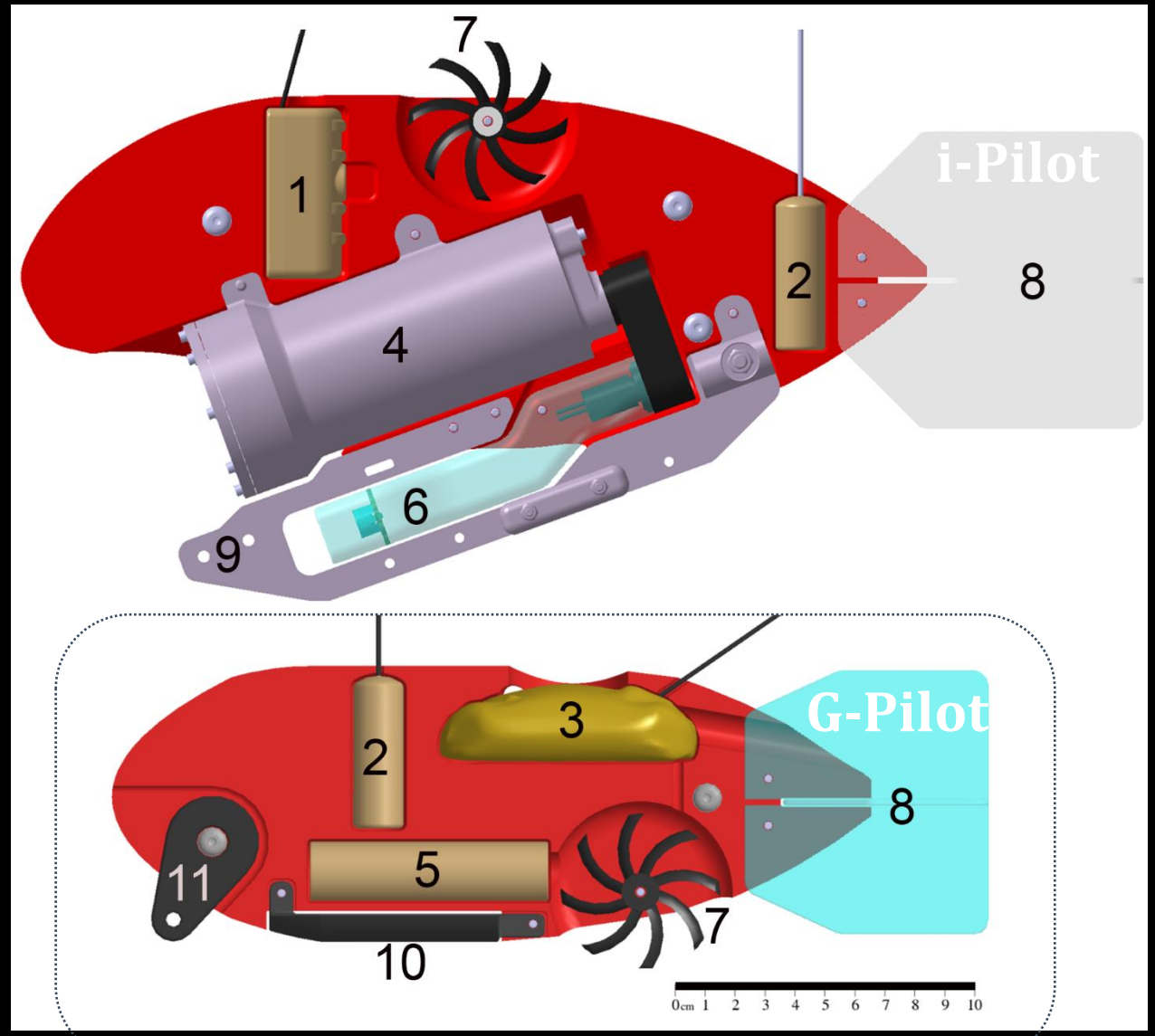
4 - Titanium housing with IMU & video, temperature, pressure sensors;

5 - IMU, temperature and pressure sensor;

6 – Red LED;

7 –magnetic paddle wheel

8 – Stabilizer fins



Effective management and conservation

"**where** is the animal going", "**how** is the animal moving", "**what** is the animal doing", and "**why** is the animal moving"

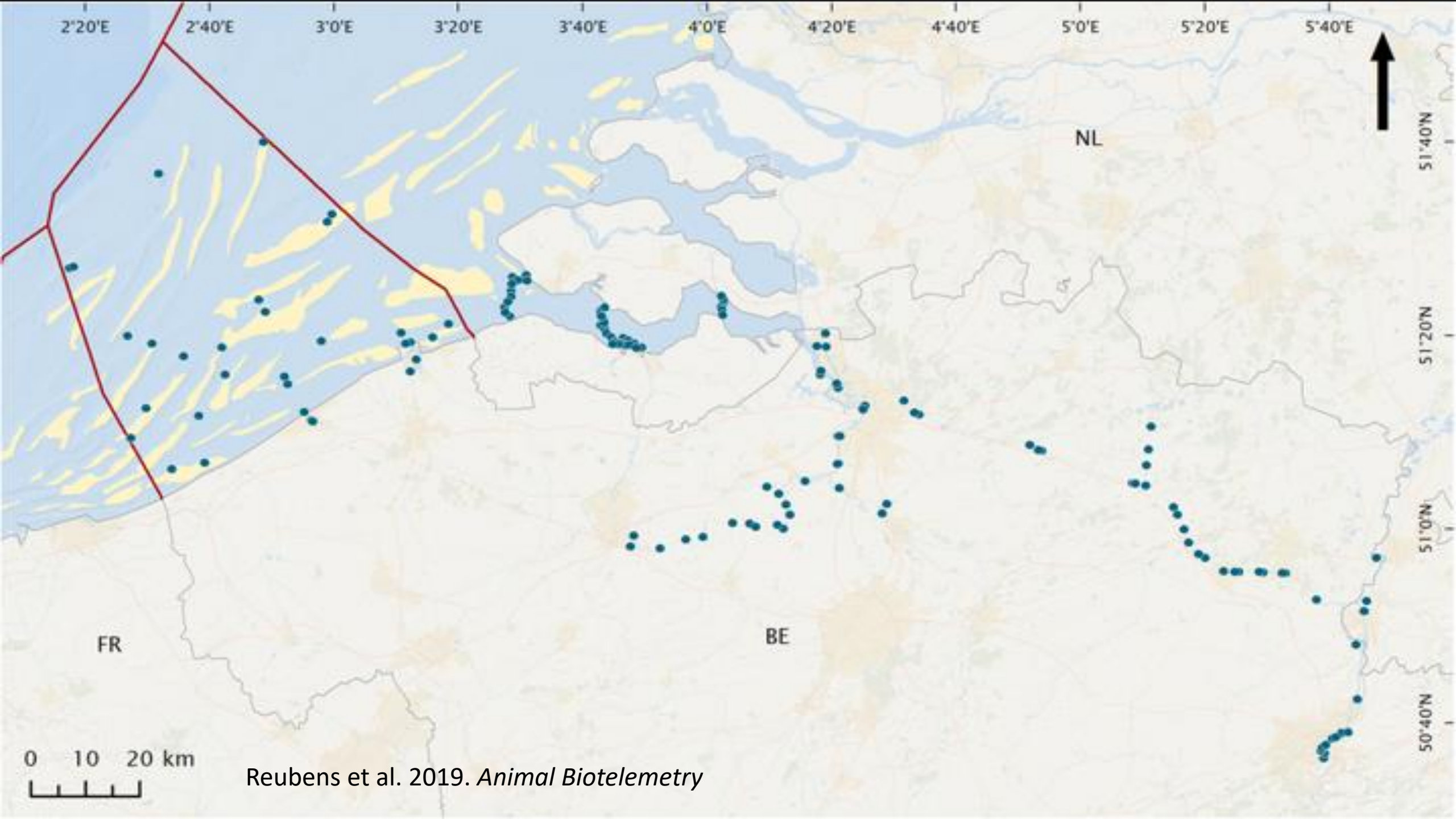
Nuno Sá ©

Aquatic animal tracking in Belgium

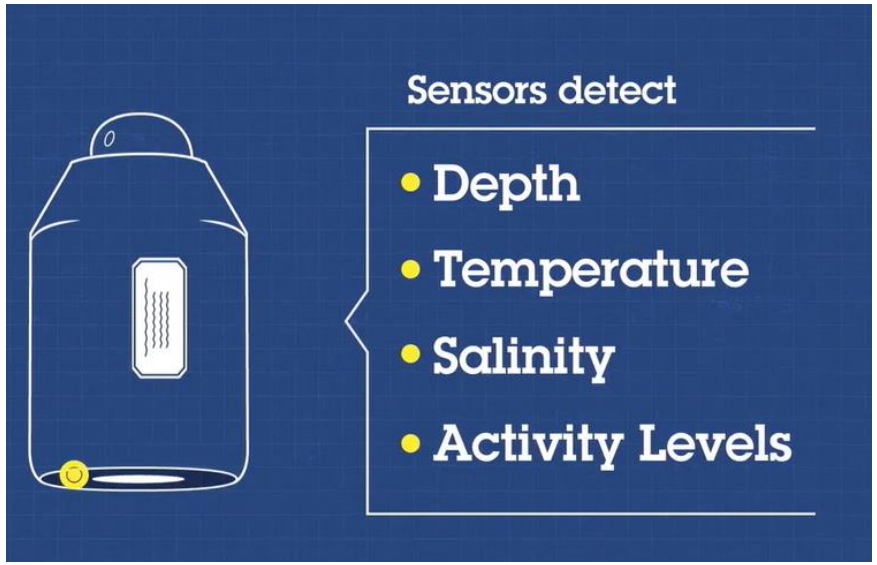
Acoustic Telemetry

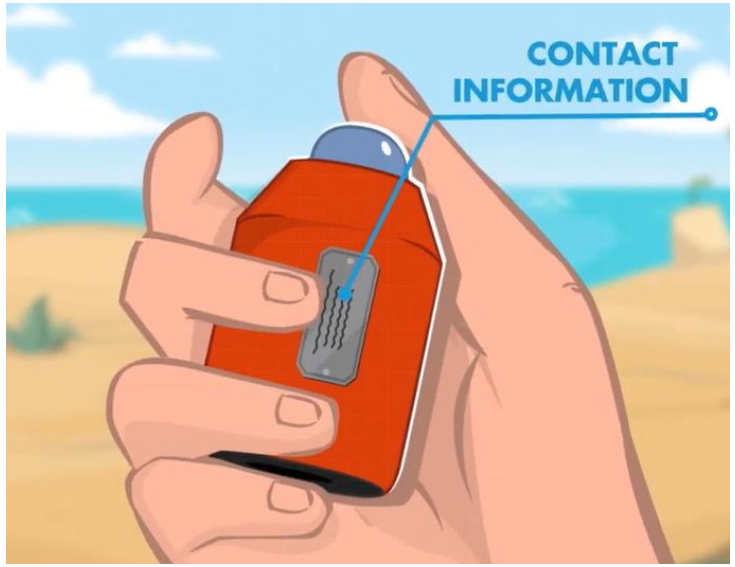
Data-storage Tags

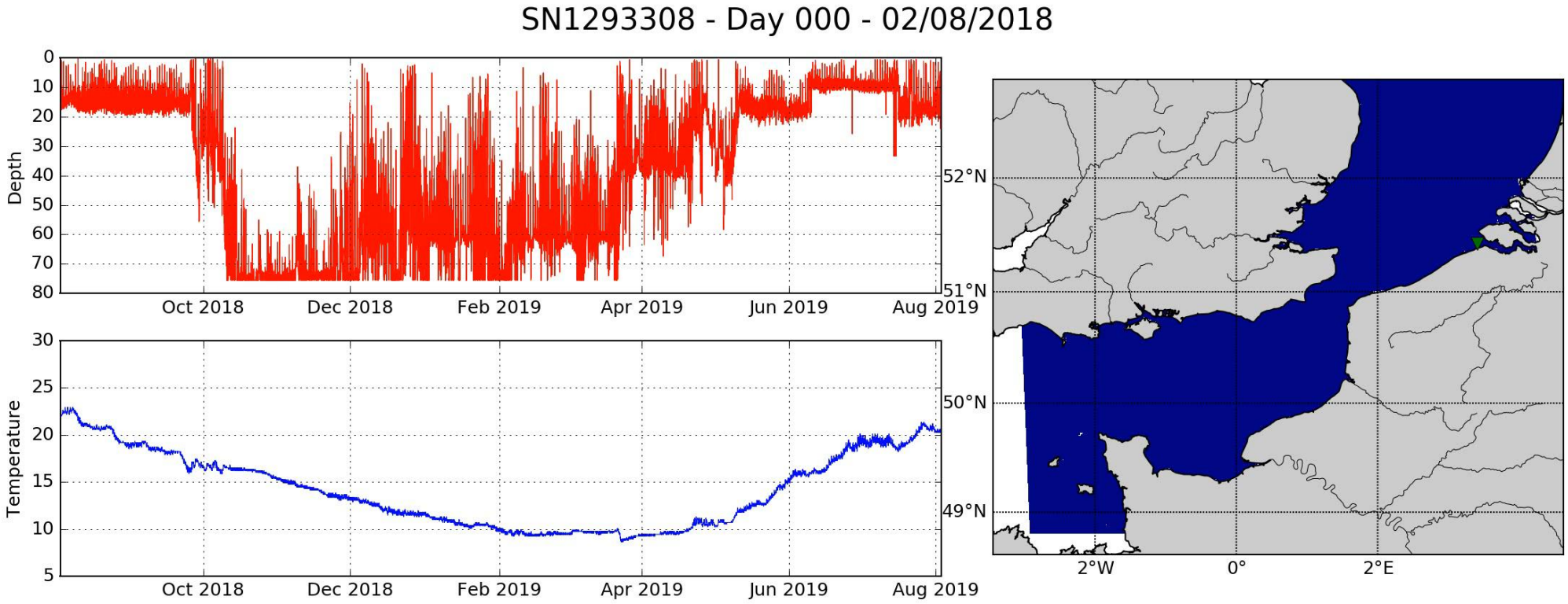
LifeWatch BELGIUM



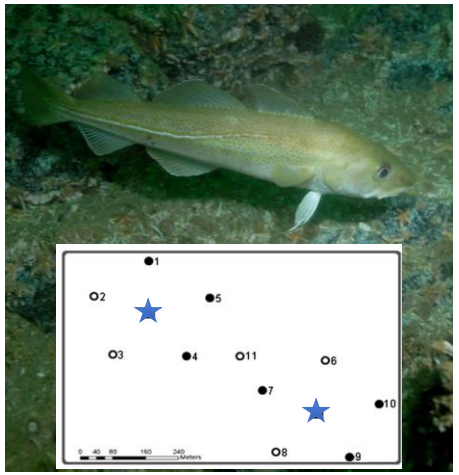
Reubens et al. 2019. *Animal Biotelemetry*

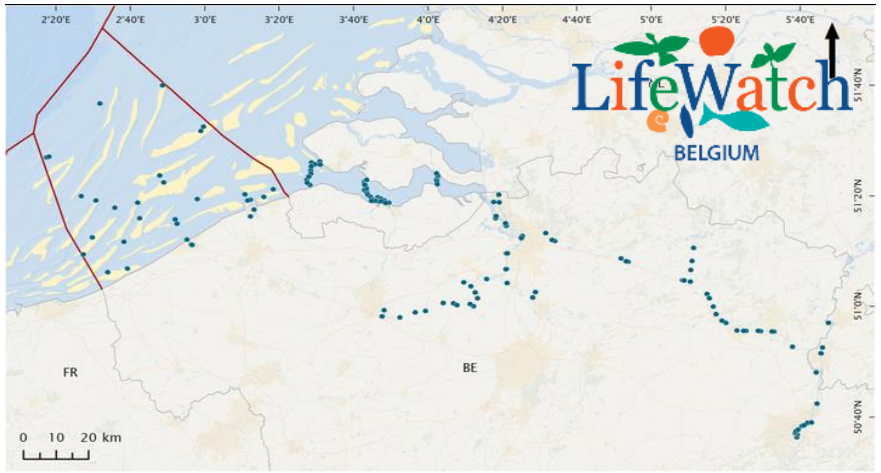

Sensors detect
• Depth
• Temperature
• Salinity
• Activity Levels

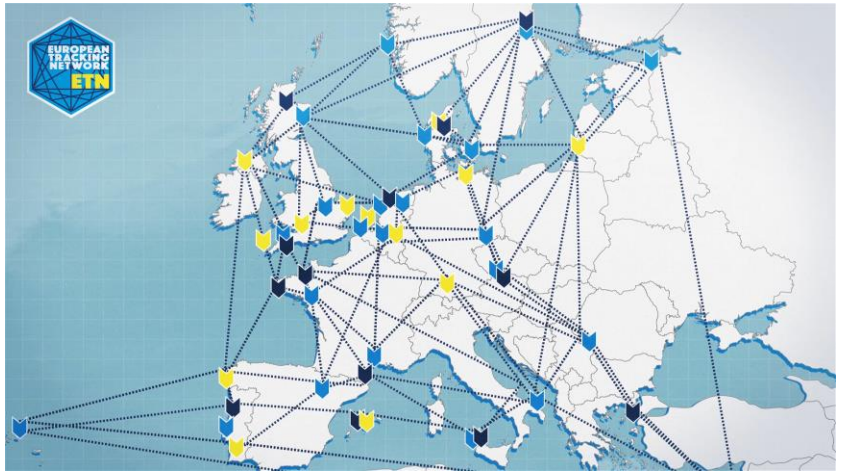

CONTACT
INFORMATION

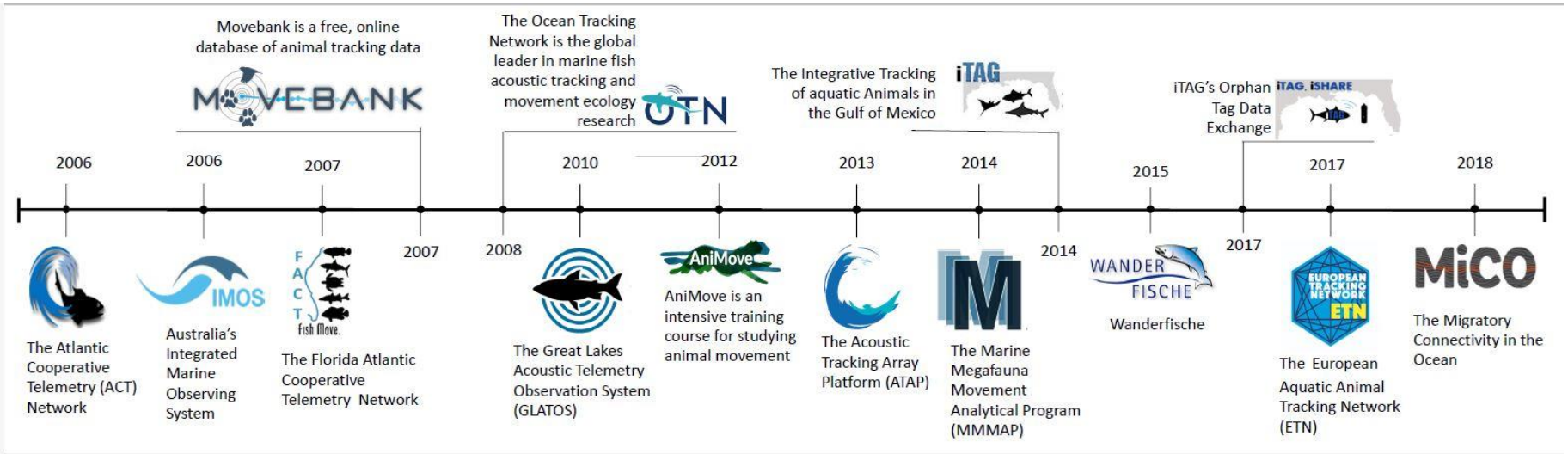

SN1293308 - Day 000 - 02/08/2018
Depth
0
10
20
30
40
50
60
70
80
Oct 2018
Dec 2018
Feb 2019
Apr 2019
Jun 2019
Aug 2019
Temperature
30
25
20
15
10
5
52°N
51°N
50°N
49°N
2°W
0°
2°E

Transition from a study to a network









Our mission is to track aquatic animals across Europe to better understand, protect and manage them

EUROPEAN TRACKING NETWORK ETN

Main aim:

"*Ensure a transition from a loosely-coordinated set of existing regional telemetry initiatives to a sustainable, efficient and integrated pan-European biotelemetry network embedded in the international context of already existing initiatives*"

- Implementation of centralised European database
- Interoperability of currently available technology
- Promoting the establishment of infrastructure and research on key species
- Provide continuous training & disseminate knowledge

ETN Virtual Research Environment

ETN Virtual Research Environment

Access to all data of the European Tracking Network. The VRE includes: a database for storage and integration of acoustic telemetry data and a number of analytical tools for analysing the data using R

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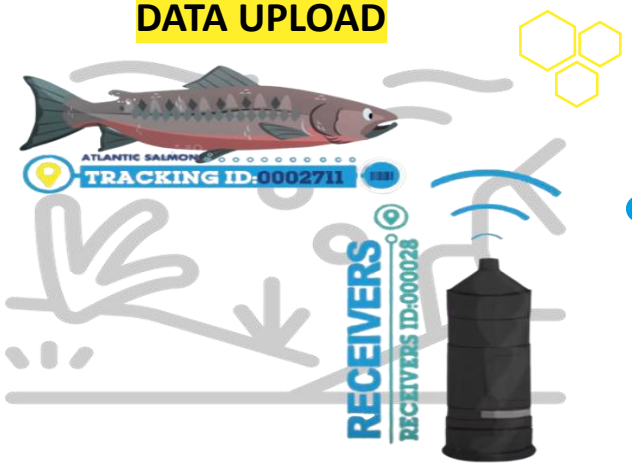
Una manera de hacer Europa

ETN Dataflow

DATA UPLOAD



PROJECT METADATA

DATA IMPORT

EUROPEAN TRACKING NETWORK ETN

Into ETN
portal
CSV
Templates

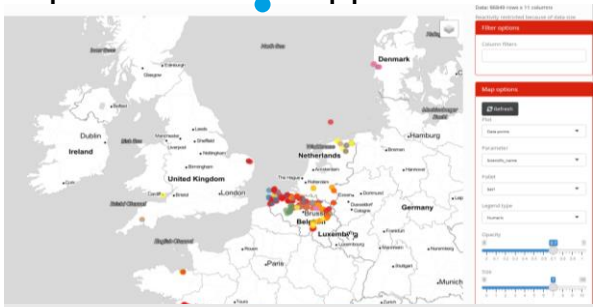
DATA STORAGE

PostgreSQL
PostGIS
Spatial
Database

DATA VISUALIZATION

GeoServer

Shiny web application



LifeWatch data explorer

DATA ANALYSIS

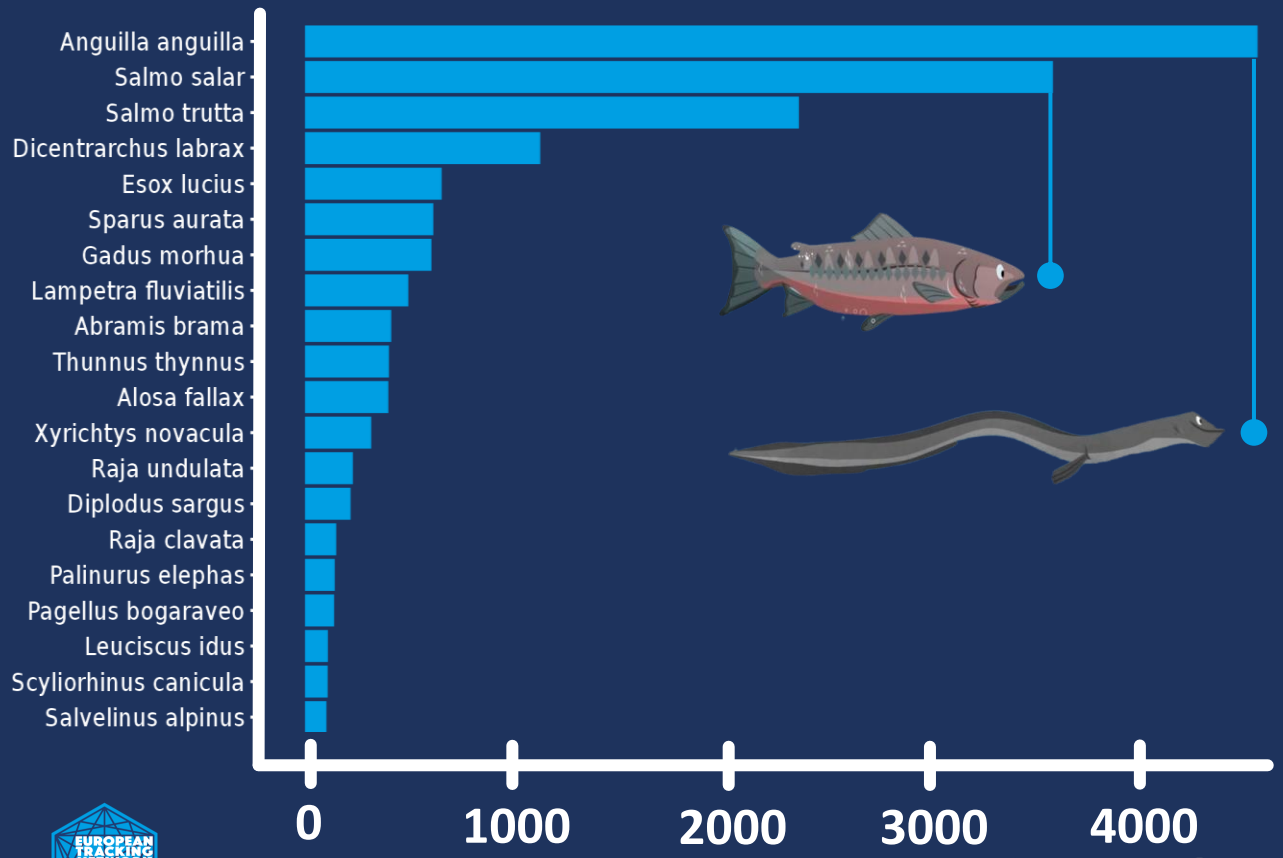
R-script repository

Rstudio server

ETN package

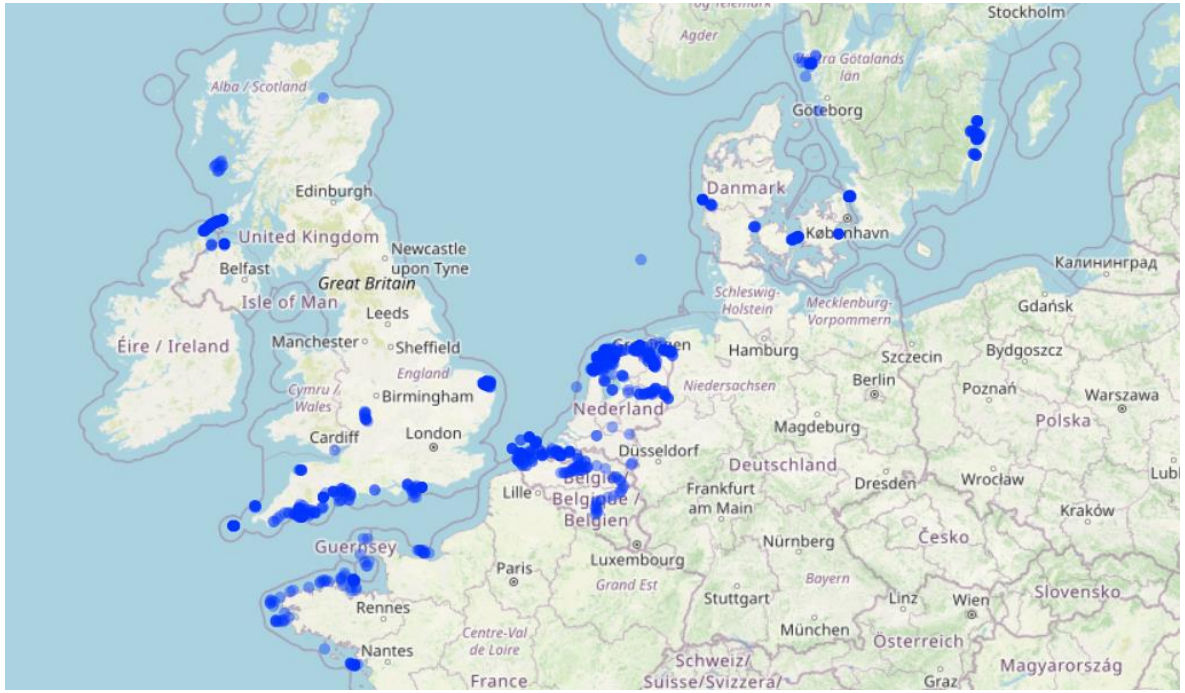
European Tracking Network

Some statistics



- 4000 active deployments
- +718 million detections
- 20000 tagged animals
- 126 species
- 450projects
- 420 users
- 123 institutes

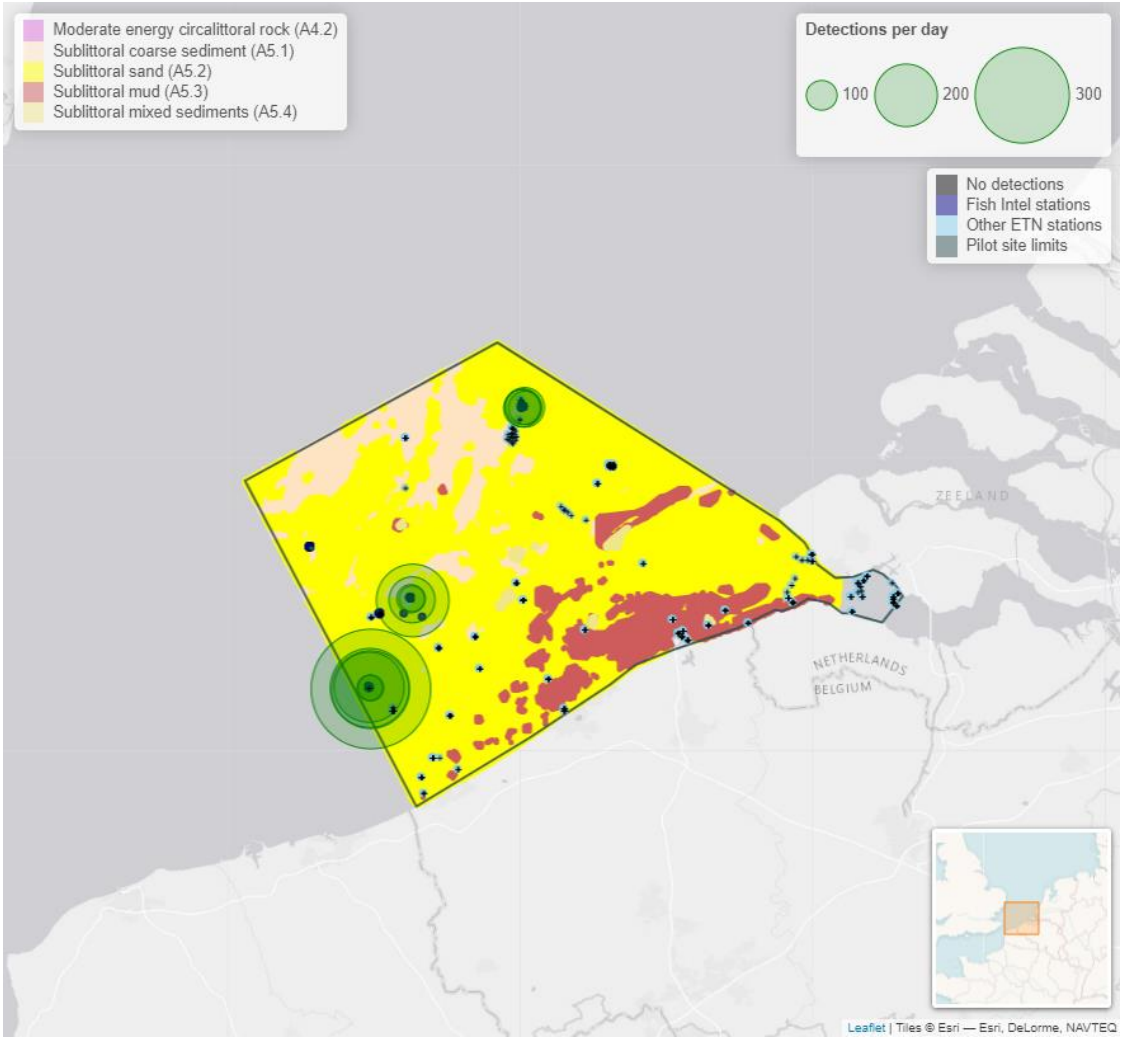
Active Networks

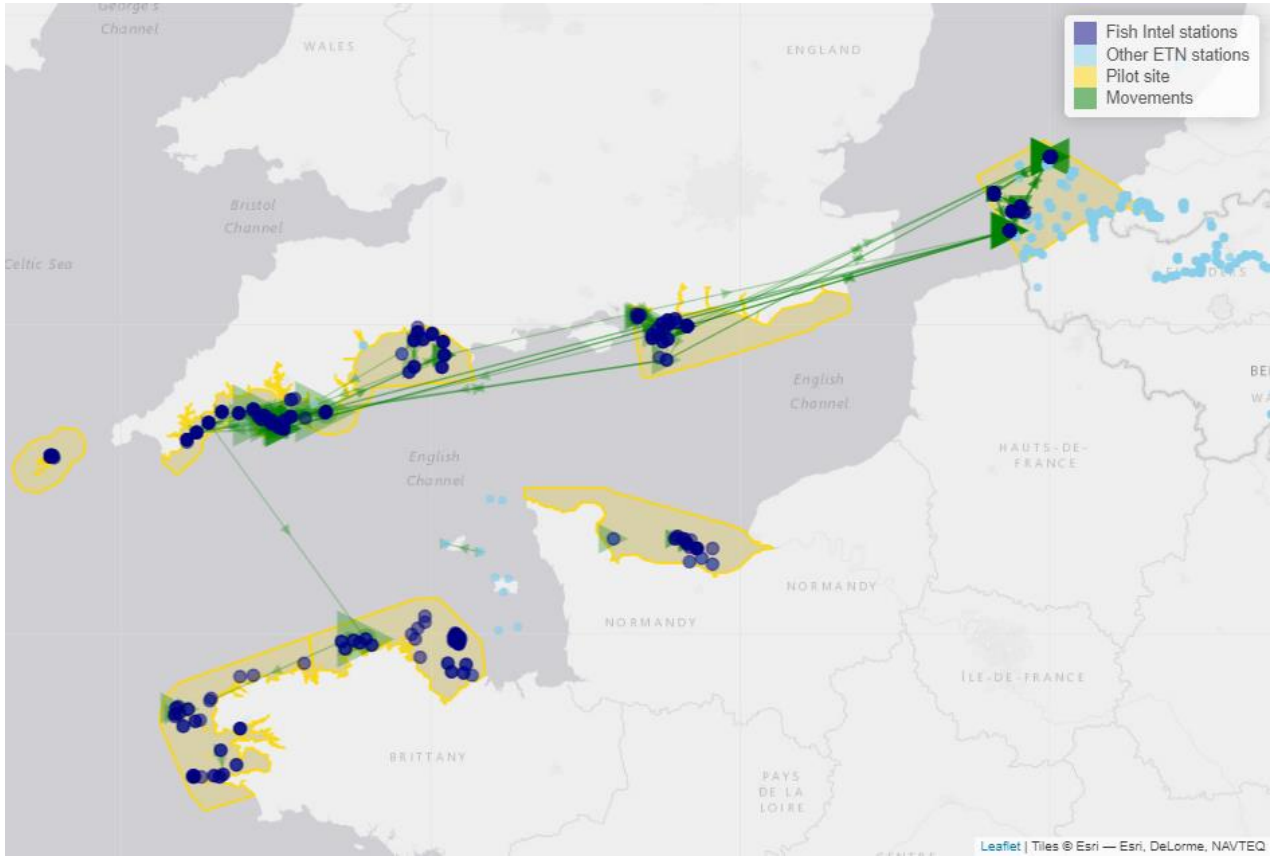


Active Networks

STRAITS

Rshiny/Rstudio application





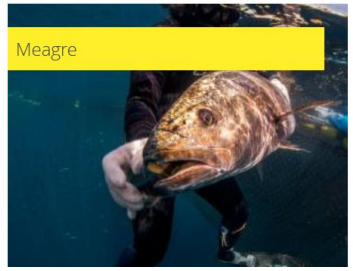
Interactions and Collaborations

OSPAR

MISSION OCÉAN

Mission Océan Soutient les Objectifs de Développement Durable

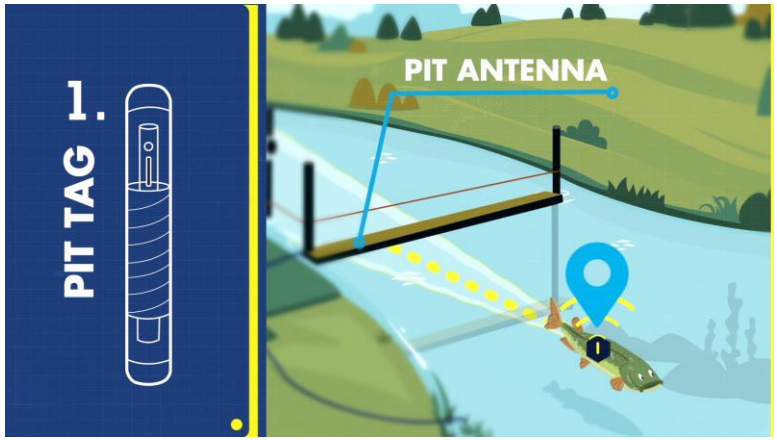
OCEAN TRACKING NETWORK



2021 2030 United Nations Decade of Ocean Science for Sustainable Development

https://europeantrackingnetwork.org/en/species-interest

Growing community ... Growing needs

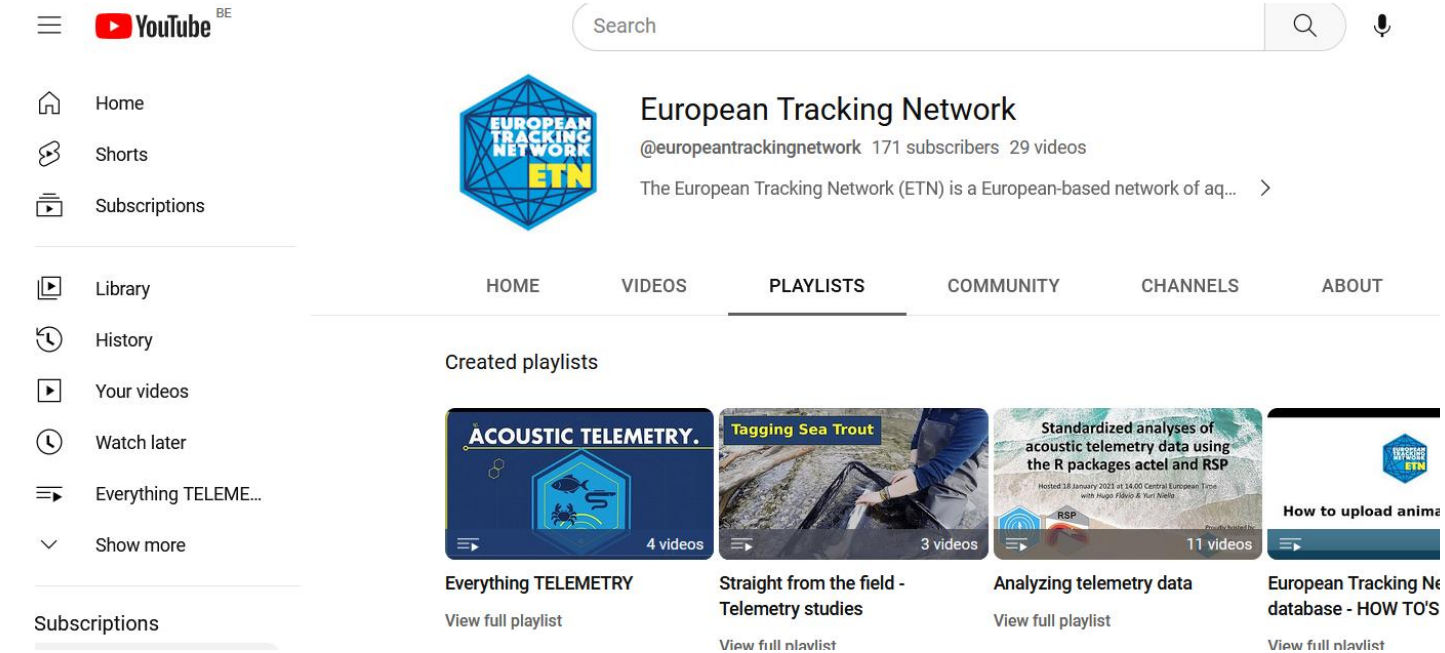


GLATOS
Great Lakes Acoustic Telemetry Observation System

EUROPEAN TRACKING NETWORK ETN

actel

Want to know more?



https://www.lifewatch.eu/cm/a-window-on-science-s3-podcast/

Thank you!

Jan.reubens@vliz.be

https://lifewatch.be/en/fish-acoustic-receiver-network
https://europeantrackingnetwork.org/en

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@AquaticTracking

VLIZ

EUROPEAN TRACKING NETWORK ETN

cost EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

LifeWatch BELGIUM