Using Darwin Core to make tracking data discoverable via the Atlas of Living Australia

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Biodiversity e-Infrastructure

- Australian region (broad)
- Aggregator - not curator or collector
- Open data for re-use
- Australian node of GBIF
- observations & specimens

Contributors:

museums
herbaria
research institutions
government
citizen science

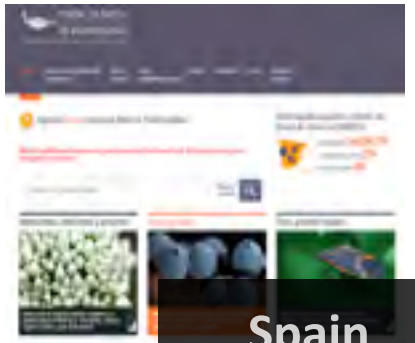
Users:

science research
ecology research
education
environmental assessment
conservation management/planning

Where does a species occur?
What species occur in an area?

Living Atlas e-Infrastructure

ALA and GBIF facilitate other countries to develop platforms using ALA e-infrastructure.

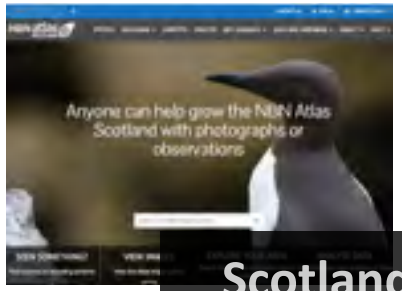

Spain


Costa Rica

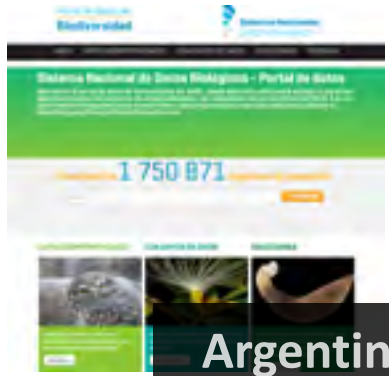

France

Australia


Brazil



Scotland



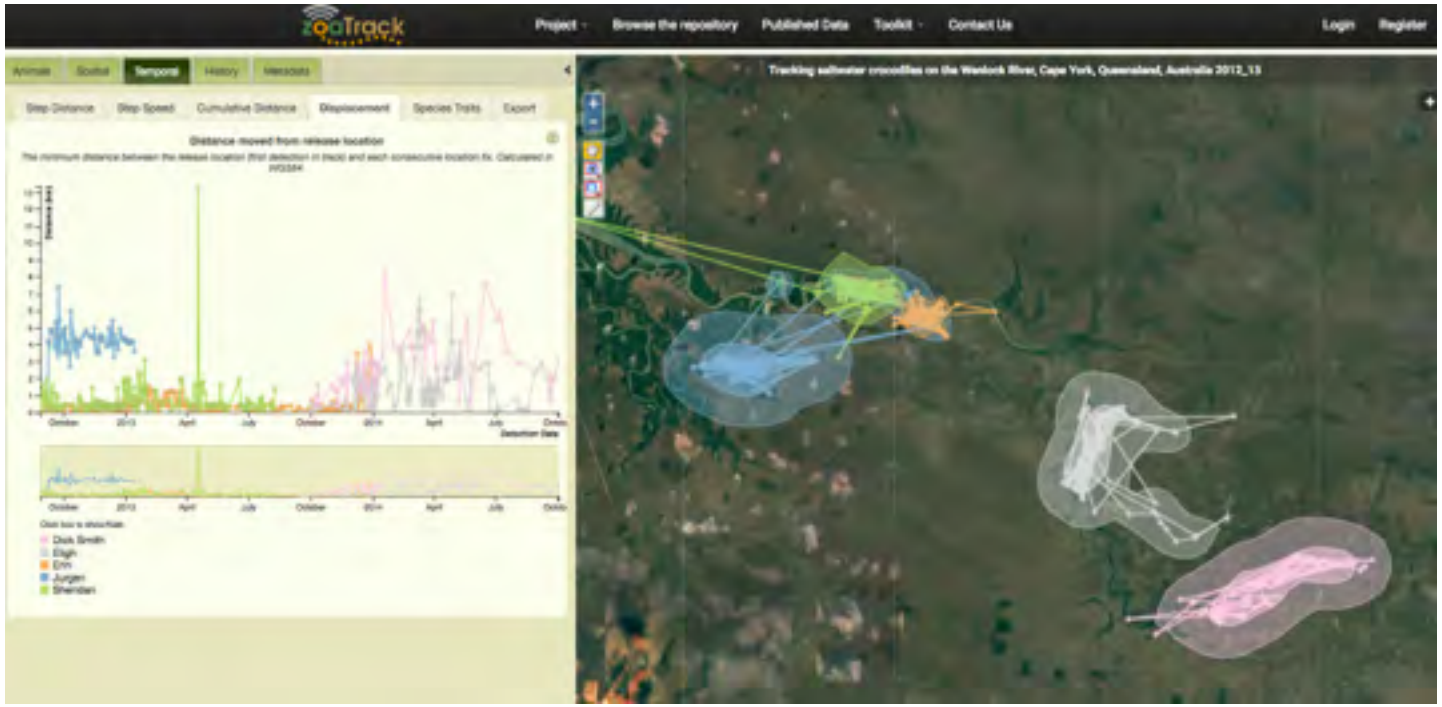
Argentina

More are being implemented or are under discussion.

ZoaTrack – Animal Movement

ZoaTrack: separate application supported by ALA **specifically** for animal movement data

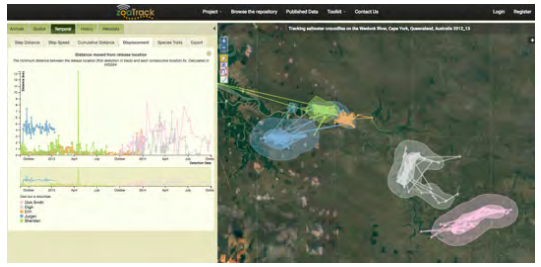
- analysis tools & visualisations (e.g., home range estimation)
- cleansing/filtering tools
- data embargoes to support a research data life cycle
- automated sensor feeds (e.g., Argos, Globestar)



Why share data between ZoaTrack and ALA?

- **Discoverability**
  - ALA is the go-to for Australia's biodiversity records
  - ALA is linked to GBIF and other Living Atlas platforms
- Tracking data is valuable, good quality, well described data that should be represented in the biodiversity record

How to share between such different databases?



- Multiple observations per individual
- Non standard data model

- Occurrence based datasets
- Simple Darwin Core

Solution – Simple Darwin Core

- ALA mainly uses Darwin Core - ingests flat files
- **Aggregate** each track into a single comprehensive record

Darwin Core Term	
basisOfRecord	MachineObservation
eventId	Identifier for the track (ie. sensor deployment on an animal). Foreign key to source system.
eventDate	**Date range** for first to last detection
eventRemarks	Sensor description
footprintWkt	**Polygon** representing track (home range, convex hull, alpha hull)
collectionId	URL link back to source system
decimalLatitude	Nominal occurrence (first detection)
decimalLongitude	Nominal occurrence (first detection)
measurement fields	Count of detections

Key Issues

- Discoverability – exposure - consistency
- General repository versus specialized
- Detailed Darwin Core record easily answers the two key questions
  - Where does this species/group occur?
  - What species occur in this area
- The difference between single occurrence records and tracks is made obvious to the users up front (no confounding)
- Ease of implementation

Next Steps

- TDWG involvement
- Upcoming Activities:
  - Darwin Core Hour discussion on Bio-logging and Camera Trap Data
  - TDWG 2018 Conference – workshop/symposium session on applying Darwin Core to Bio-logging data

WRAM & Swedish LifeWatch

Wireless Remote Animal Monitoring (WRAM)
The National Swedish Biotelemetry e-Infrastructure for sensor data from animals

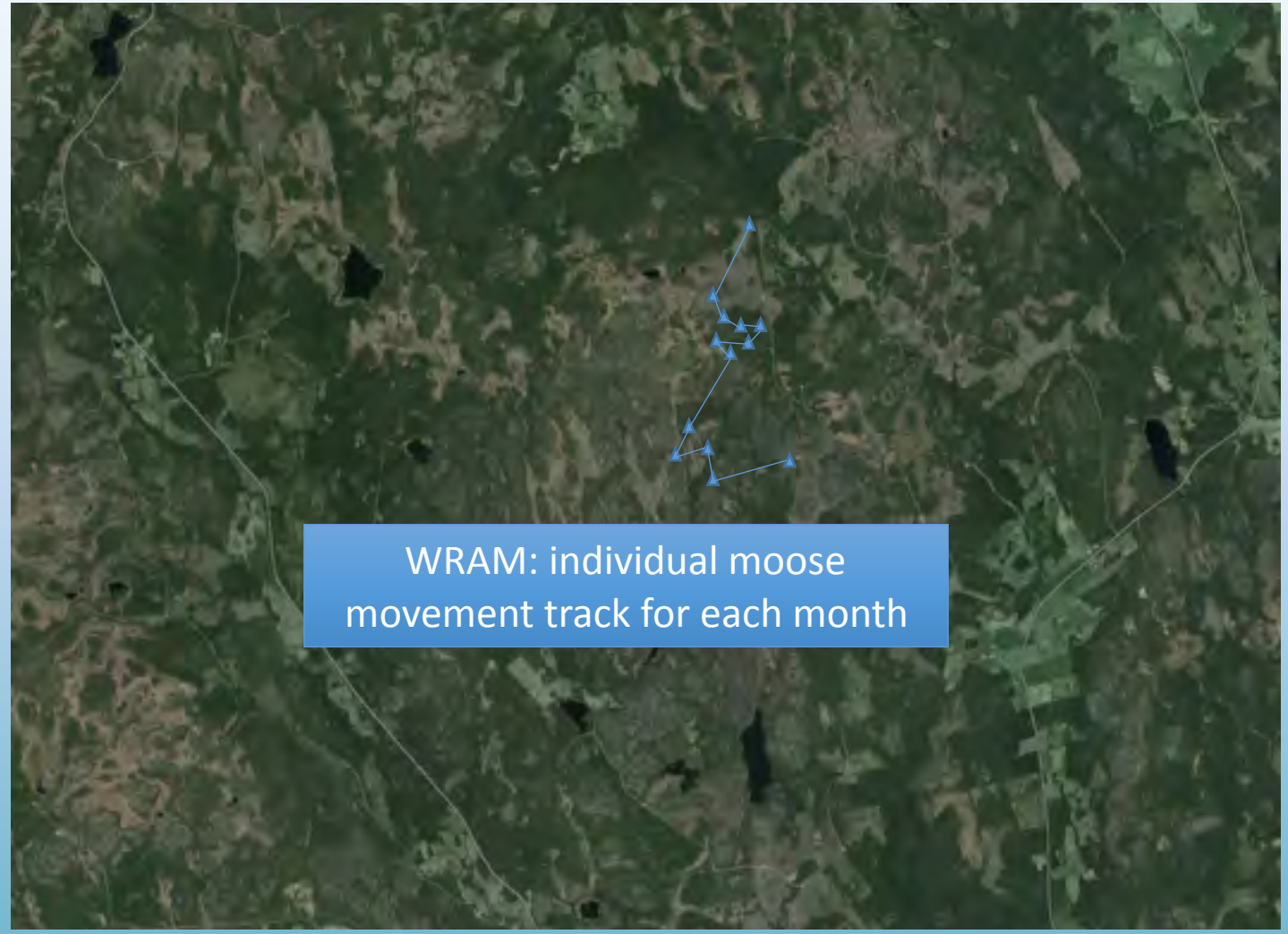
Swedish LifeWatch (SLW)
The Swedish e-Infrastructure for Biodiversity & Ecosystem Research

Task: WRAM delivers aggregated position data to SLW

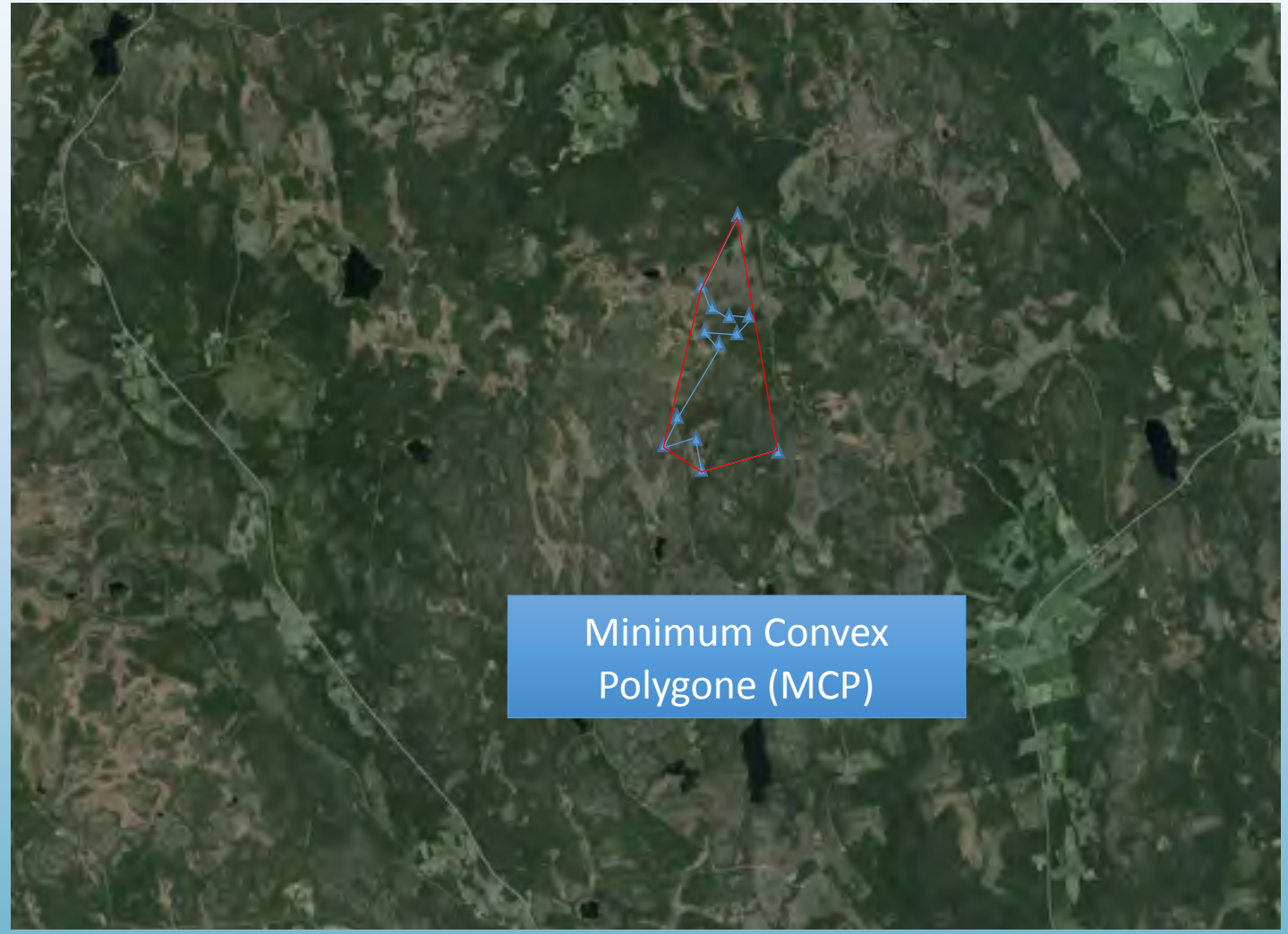
- WRAM currently contains e.g., 18.3M GPS records for 1,248 individual moose

- After aggregation 24,747 monthly ‘occurrence records’ with estimated position error can be delivered

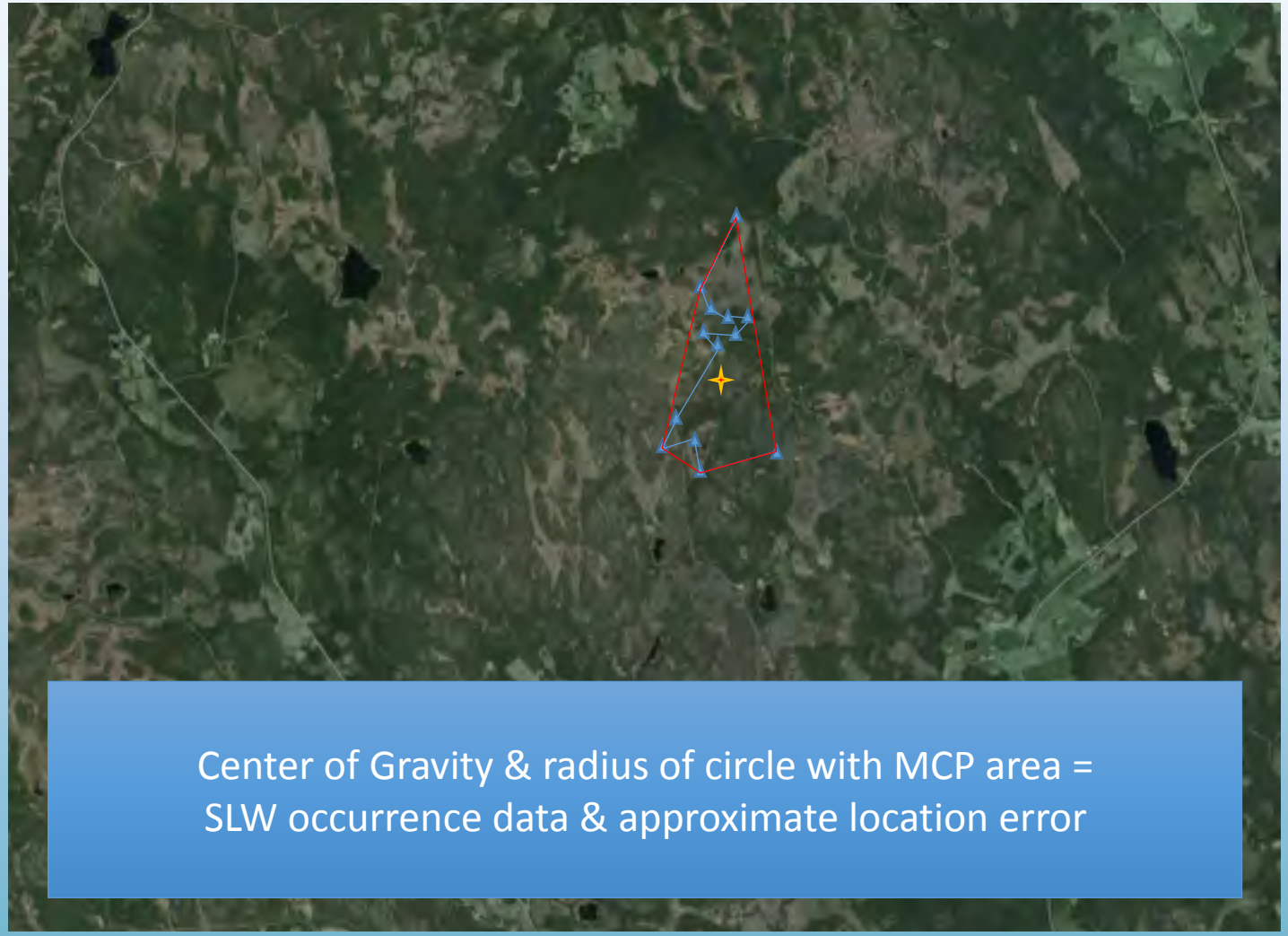
Aggregating data



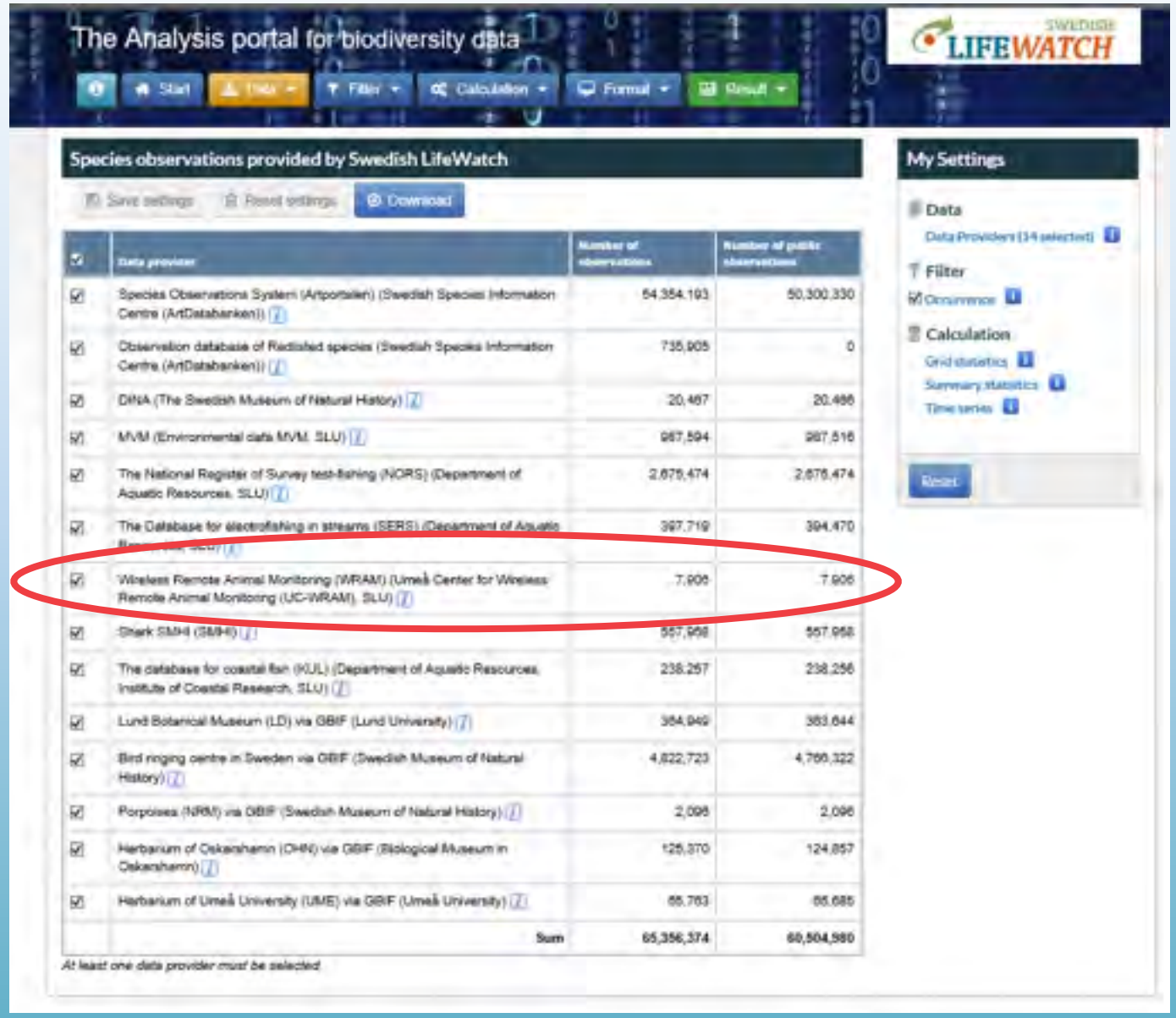
Aggregating data



Aggregating data



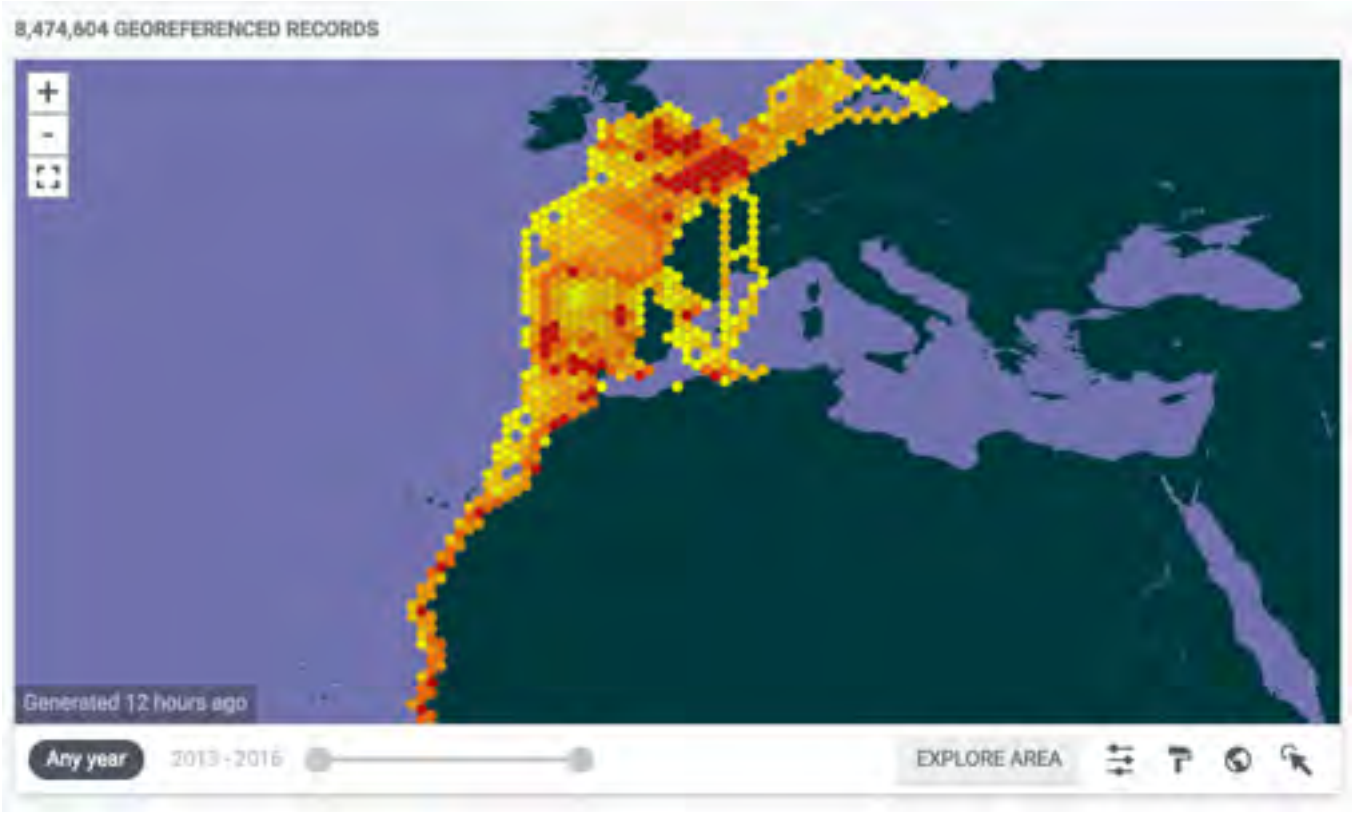
Swedish LifeWatch - WRAM



INBO / GBIF Example: Lossless Data

[Bird tracking - GPS tracking of Lesser Black-backed Gulls and Herring Gulls breeding at the southern North Sea coast]

- 150 animals, ~8.5M records
- Each position is a Simple Darwin Core Occurrence record
  - Machine Observations
  - published to GBIF using IPT
  - Repetition, but volumes are not considered a problem



INBO / GBIF Example: Lossless Data

Darwin Core Mappings
https://github.com/inbo/data-publication/blob/master/datasets/bird-tracking-gull-occurrences/mapping/dwc-occurrence.Rmd#transform-data

Sample 100 Records
https://github.com/inbo/data-publication/blob/master/datasets/bird-tracking-gull-occurrences/mapping/dwc-occurrence-100.csv