LifeWatch.be Users & Stakeholders Meeting

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Royal Belgian Institute of Natural Sciences (RBINS), Vautierstraat 29, 1000 Brussels

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Abstract booklet

General presentations

Research Infrastructures: at the service of science

Philip Van Avermaet – Head of the Science Division of the Flanders Department of Economy, Science and Innovation (EWI)

Today, it is a pleasure to say a few words of introduction to this gathering of the LifeWatch Belgium user and stakeholder community from the overall perspective of Research Infrastructure funding.

It is clear that the development of Research Infrastructures should be at the service of science. Not just the science of those who run the infrastructure, but for all those who might benefit from it. Therefore, a meeting such as the LifeWatch.be Users and Stakeholders Meeting, where the people involved in the set-up of the infrastructure meet a wider audience, is very important.

In 2016, LifeWatch became an ESFRI Landmark. This signal encapsulates the large expectations of the European research community to be able to move the goalposts of ecosystems and biodiversity research through its infrastructure and services. There are however other ESFRIs dealing with biodiversity, and there should be a clear interlinkage between them, avoiding any duplication of effort and funding.

All Research Infrastructures have strong common challenges in the area of IT developments. LifeWatch, as well as many other ESFRIs, needs to work on its interconnectivity. It needs to interact with many other services (e.g. for data, etc.) and stakeholder organizations to make sure that its services are attractive to its users. This means being continually involved in the developments of IT systems and platforms, such as the European Open Science Cloud (EOSC).

LifeWatch Belgium maintains a website that gives a good overview of what it does. The numbers on the homepage focus on the services and their output. Some of those numbers are quite high, and are certainly indicative of a high “LifeWatch Belgium ecosystem” “productivity”. For EWI it is vitally important that LifeWatch Belgium continues its strong user and stakeholder engagement. Furthermore, the knowledge about user needs that can be gained at the national level, can also be very informative of the type of services that are in demand at a broader scale. Therefore, this

information is important to feed towards the choice of services that are valuable to incorporate in the common services of the ERIC.

From their overall perspective, EWI sees these challenges ahead:

- The need to proceed swiftly with the operationalization of the infrastructure in accordance with the agreed plan. This means a good service delivery across the different Common Facilities and beyond, and some concrete outputs such as from the Internal Joint Initiative on Invasive species.
- To generate further momentum between the LifeWatch partner countries and their institutes, giving us the full confidence that it deserves the “Landmark status” that was attributed in 2016. This includes:
- Keeping a good interplay between the development of the overall European infrastructure and the involvement of users in national research communities.

LifeWatch has now entered its implementation phase and should become operational. The clock is ticking fast, after a relatively long delay a few years ago. EWI is certainly not contemplating the termination of LifeWatch yet. They wish LifeWatch a long and happy life!

LifeWatch ERIC: mission and recent developments

Christos Arvanitidis – CEO LifeWatch ERIC, on behalf of LW-ERIC Executive Board

The presentation aimed at updating the participants on the overall status of the LifeWatch ERIC (LW ERIC) Research Infrastructure (RI). It started with the fundamental concepts of LifeWatch ERIC and its governance scheme and resources. Then, the concept of the Virtual Laboratories (vLabs) and their integration towards the Virtual Research Environments (VREs) was presented and analyzed. The scientific, technological and cultural challenges of the RI are stressed, as well as their impacts on the development of the RI. Finally, the recent developments, including the implementation of the block chain technology in the platform of LifeWatch ERIC and the Internal Joint Initiative (IJI) were presented and discussed.

LifeWatch Belgium – A biodiversity infrastructure supporting science, industry, policy and civil society

Klaas Deneudt – Flanders Marine Institute (VLIZ)

The Belgian LifeWatch project is part of the European LifeWatch infrastructure. LifeWatch is an established landmark on the roadmap of the European Strategy Forum on Research Infrastructure (ESFRI) and can be seen as a virtual laboratory for biodiversity research. Belgium contributes to LifeWatch with varied and complementary "in-kind" contributions. These are implemented under the form of long lasting projects by different research centers and universities spread over the country and supported by each respective political authority. Each of the projects has a diverse spectrum of users and stakeholders, including scientist, policy makers, users from industry and civil society.

Moderated user consultation

The results of the moderated user consultation can be consulted upon request.

Policy supporting use cases

If life was simple …. GPS tracking data provides new insight in the use of offshore wind farms by Lesser Black-backed Gulls

Eric Stienen – Research Institute for Nature and Forest (INBO)

In an ideal world, all wind turbines would be located on land. In such a setting, e.g. in Zeebrugge, you can pick up and count the bird casualties, and maybe even correct for losses to predators. Nevertheless, in the end, you know exactly how many birds of each species are killed each year.

However, many wind turbines are located at sea. If a seabird collides with an offshore wind turbine, it falls into the water and sinks to the bottom of the sea. In this setting, it is next to impossible to find the victims and to calculate the number of victims.

Luckily, there is a solution to this problem and that is by modelling the number of victims, for example by using the Band Model/Band Collision Risk Model. You simply need specific information on the turbines (such as turbine height, blade size) and species-specific information (such as flight height and density of birds).

This presentation explains how the GPS tracking data generated by the LifeWatch Observatory can provide new insights into the use of offshore wind farms by Lesser Black-backed Gulls.

Transboundary Land Cover Dataset for Nature Protection

Corentin Rousseau – World Wide Fund (WWF)

The World Wide Fund (WWF) has launched new nature programs in Belgium focusing on ecological connectivity. We are working with two umbrella and iconic species: the otter (blue corridors) and the wildcat (green corridors). To be coherent, our ecological corridors should not stop at borders, so LifeWatch developed for us a transboundary land cover dataset to identify the best areas to work.

Surveillance of mosquitoes and other blood-sucking arthropods that can act as human disease vectors during foreign deployments of Belgian Defense

Veterinarian Major Leen Wilmaerts – Medical Component of the Belgian Armed Forces

Mosquitoes and other blood-sucking arthropods are widely distributed throughout the world. Some of these species are capable vectors of diseases that are of significant public health concern. Belgian military are deployed worldwide, and by the nature of their job, they are at a high risk of being bitten

by these vectors. In order to protect the fighting strength and the health of our troops, the Veterinary Service of Belgian Defense set up a surveillance project to gather a clear view on the species diversity and abundance in different operational theatres. The information collected serves as an input for the determination of preventive and reactive measures to, on one hand, keep the military free of vector borne diseases, and on the other hand prevent the unwanted introduction of exotic species in Belgium due to military transport means when returning from deployment. BopCo is a highly valued partner in the identification process of exotic species caught abroad.

How MarineRegions supports global fisheries policies and management

Lennert Schepers – Flanders Marine Institute (VLIZ)

The LifeWatch Species Information Backbone facilitates the standardization of biological observations.

Marine Regions is the geographical part of the Species Information Backbone and provides marine place names and areas such as the Exclusive Economic Zones, based on the United Nations Convention on the Law of the Sea (UNCLOS). This international convention defines a series of maritime zones and establishes the degree of rights and obligations of a coastal state in each of those zones.

Currently, the MarineRegions products are being used as essential datasets in global ocean conservation initiatives such as Sea Around Us (Zeller *et al.*, 2016), Global Fishing Watch (Kroodsma *et al.*, 2018) and the Ocean Health Index (Halpern *et al.*, 2012). As such, it supports fisheries and management of marine biodiversity on a global scale.

In this presentation, we introduce Global Fishing Watch, how they are tracking fishing ships and how they use MarineRegions' Maritime Boundaries to support fishery policies and management on a global scale.

References:

- Halpern, B.S., *et al.* (2012). An index to assess the health and benefits of the global ocean. Nature 488 (7413): 615. doi: 10.1038/nature11397
- Kroodsma, D.A., *et al.* (2018). Tracking the global footprint of fisheries. Science 359 (6378): 904-908. doi: 10.1126/science.aao5646
- Zeller, D., *et al.* (2016). Still catching attention: Sea Around Us reconstructed global catch data, their spatial expression and public accessibility. Marine Policy 70: 145-152. doi: 10.1016/j.marpol.2016.04.046

Industry supporting use cases

Using bird remains identification at the Belgian Air Force to improve flight safety

Commandant Serge Sorbi – Wildlife Hazard Management Office, Belgian Air Force – Aviation Safety Directorate (ASD)

The presentation briefly explained the birdstrike hazard and risk of the aircrafts of the Belgian Air Force. The main axes of the wildlife hazard management policy were presented. The need of identifying the species involved to adapt the wildlife hazard management and some figures about the top 10 bird species were explained.

Gathering ecological data on movement behavior of Atlantic cod in support of gas and oil industry

Jan Reubens – Flanders Marine Institute (VLIZ)

The increased levels of sound in our oceans due to anthropogenic activities, have led to large changes in the marine sound scape, to which fish are susceptible. One wide spread man-made sound source with a high potential to impact fish is seismic sound, and understanding what the effects of these changing sound levels are requires studies that incorporate the natural environment. A well-established technique to study the behavior of free-swimming animal is acoustic telemetry. This technique allows gathering information on movement, depth use and dynamic body acceleration at an individual level and can inform us on life history, biogeography and behavioral strategies. In this study, the effects of a seismic survey on the behavior of Atlantic cod, resident at an offshore Wind farm, were investigated. This work was performed under the auspices of the E&P Sound & Marine Life Joint Industry Programme.

Science supporting use cases

Tracking of marine predators in the Southern Ocean

Anton Van de Putte – Royal Belgian Institute of Natural Sciences (RBINS)

While often considered pristine, the Southern Ocean has known a strong fisheries interest from its discovery. Over the years, the scope of harvested species has changed, and the level of ecosystem-based management has increased. Nevertheless, Southern Ocean Ecosystems are under threat from the combined effects of fisheries and climate changes, requiring special consideration for its mitigation. For this purpose, the Retrospective Analysis Antarctic Tracking Data (RAATD) integrated >4000 tracks from 17 bird and mammal species, in order to determine Areas of Ecological Significance around sub-Antarctic islands in the Atlantic and Indian Oceans and over the Antarctic continental shelf.

CATREIN: CAmera Trap REsearch Infrastructure in support of a growing number of wildlife related research projects

Jim Casaer – Research Institute for Nature and Forest (INBO)

Camera trap surveys offer great potential for wildlife research, but come with important technical and software challenges. To address these challenges, a project called CATREIN was launched within LifeWatch Belgium in 2016. The goal of this project was to create a camera trap research infrastructure supplying both the hardware (camera traps) and the development of software solutions to organize, store, annotate and export the large amount of images collected by camera traps.

This research infrastructure was applied in 2017 through the PhD project of Jolien Wevers (UHasselt) on habitat use by wild boar in the National Park Hoge Kempen, during which 40 camera traps were deployed on random locations (Wevers *et al.*, 2018). In a second project, more than 30 camera traps were deployed to monitor the presence of wild boar in the forests and other protected areas south of the city of Leuven.

At present, we are jointly developing the platform Agouti (agouti.eu). Within the framework of CATREIN, 10 Belgian camera trap projects currently use Agouti as a platform to manage camera trap images and data, including the project that monitors the African swine fever infected area in Belgium. Recently several projects in Luxemburg, Italy and the Czech Republic also adopted Agouti as platform. Moreover, Agouti is one of the three tools used in the Mammalnet-initiative (Mammalnet.com), a partnership between different scientific and academic institutions in Europe, aiming to promote teamwork between researchers and citizens to collect more information about the presence of mammals in Europe.

The CARTREIN-related projects resulted in more than 55.000 newly annotated pictures in three years' time, but there remain a large amount of pictures for which the animals have to be identified. In total, all projects using Agouti jointly resulted up until now in more than half a million observations. Challenges for the next years will be to attract users that currently discard images and data, and to start setting up a real active user community. Moreover, we are working towards the automated identification of the species on the pictures taken (Hoebeke *et al.,* 2018) and towards an automated export of the project data towards GBIF and Zenodo.

References:

- Hoebeke, L.; Stock, M.; Van Hoey, S.; Casaer, J.; De Baets, B. (2018). Automated recognition of people and identification of animal species in camera trap images. 10th International Conference on Ecological Informatics, Jena, Germany.
- Wevers, J.; Casaer, J.; Beenaerts, N. (2018). Spatial use of wild boar in an urban protected area. 12th International Symposium on Wild Boar and Other Suids. Lázně Bělohrad, Czech Republic.

High resolution mapping of population dynamics in breeding birds in Wallonia

Antoine Derouaux – NATAGORA

Aves-Natagora is specialized in collecting bird data with the help of a great network of volunteer observers. For the Walloon breeding birds atlas, birdwatchers sampled more than 2.000 squares of 1km² and counted all birds during 2 hours in spring. This sampling was done twice (2001-2007 and 2015-2018), providing data that can be compared between the two periods. We used the ECOTOPE database of LifeWatch Wallonia-Brussels to create models of abundance and repartition of common breeding birds in Wallonia.

Transition towards the Swedish Biodiversity Data Infrastructure SBDI - The new National Swedish e-Infrastructure for Biodiversity and Ecosystem Research

Holger Dettki – Managing Director SLW, Swedish Species Information Centre (SSIC), Swedish University of Agricultural Sciences (SLU)

The Swedish Research Council has been funding Swedish LifeWatch (SLW) since 2010 to provide the national e-infrastructure for Biodiversity and Ecosystem Research. SLW will now merge with the Biodiversity Atlas Sweden (BAS) consortium into the new Swedish Biodiversity Data Infrastructure (SBDI). Funded by the Swedish Research Council between 2021 and 2024, the new consortium consisting of 11 Swedish universities and governmental agencies will provide services to the research community as e.g., harvest and federation, long-time storage, visualization and analysis tools for biodiversity data. Additionally, the different partners are responsible for a wide range of data types being ingested and disseminated in a standardized format as e.g., museum collection data, bird ringing data, systematic monitoring data, biotelemetry data, forest and landscape monitoring data, freshwater and marine data, marine trait data, microbiome sequencing data, metabarcoding, metagenomics, or palaeoecological data. The infrastructure will be based on the 'Atlas of Living Australia' code base combined with existing Swedish solutions, and will adhere to the FAIR principles, open source, open access, and open data policies. SBDI will function as the Swedish GBIF node and cooperate with the Living Atlas community to develop and operate the infrastructure. Further, through the ongoing Nordic cooperation within the project 'Deep Relations in Biodiversity e-Infrastructures (DeepDive), financed by the Nordic e-Infrastructure Collaboration (NeIC), SLW is working to establish a Nordic Observer Status within LifeWatch ERIC based on the Nordic DeepDive Network.

Panel discussion: "The use of LifeWatch for science, policy and industry"

Moderator: Dimitri Brosens – Research Institute for Nature and Forest (INBO) and Belgian Biodiversity Platform (BBPf)

Panel members: Christos Arvanitidis (CEO LifeWatch ERIC), Holger Dettki (Managing Director Swedish LifeWatch), Francisco (Tjess) Hernandez (VLIZ), Tanja Milotic (INBO) and Eric Stienen (INBO)

The panel members discussed general questions such as: "What does LifeWatch mean to you?" "How can we take LifeWatch and industry further?" "How can we take LifeWatch and policy further?" 'What are the strengths of LifeWatch (Belgium)?" "How did you perceive this LifeWatch.be Users & Stakeholders meeting, what message will you take home?" "LifeWatch data has produced some great output so far, but more or less from independent projects. How can we end with 1+1=3?"

Targeted questions included: "Would you support an Atlas of Living Europe in the framework of LifeWatch?" "What are the options for LifeWatch to connect to other networks?" "What are the obstacles/pitfalls for LifeWatch.be?" "What is the role of LifeWatch in the future?" "One big LifeWatch portal for data analysis: is that still a dream or is it reality? What should LifeWatch be capable of in 10 years' time?"

Some concluding remarks of the panel members:

"*LifeWatch Belgium already reached many good things and that 1 + 1 is already more than 2. I sincerely hope LifeWatch will not end in decline.*" (Eric Stienen)

"*There is a lot of potential for LifeWatch.be for collaborations with, linking data structures.*" (Tanja Milotic)

"*Linking data structures is what I expect the audience to do*." (Francisco (Tjess) Hernandez)

"*LifeWatch Belgium is the front-runner in the entire LifeWatch structure*." (Christos Arvanitidis)

"*This LifeWatch.be users and stakeholders meeting is a very valuable setting (something that is not yet there in Sweden), and a very good way to get good stories out and show them to others*." (Holger Dettki)

The full course of the panel discussion can be consulted upon request.

Poster session

The Belgian LifeWatch Infrastructure – A virtual laboratory for biodiversity research

The Belgian LifeWatch infrastructure is part of the European LifeWatch ERIC. LifeWatch was established as part of the European Strategy Forum on Research Infrastructure (ESFRI) and can be seen as a virtual laboratory for biodiversity research. Belgium contributes to LifeWatch with varied and complementary "in kind" contributions. These are implemented under the form of long lasting projects by different research centers and universities spread over the country and supported by each respective political authority.

Artificial intelligence based approaches for plankton observation

The LifeWatch VLIZ team

As part of the Flemish contribution to the LifeWatch ESFRI infrastructure for biodiversity and ecosystem research, a number of AI pipelines are being developed and applied for processing of marine biodiversity observation data. The LifeWatch marine observatory operates several innovative imaging sensors in the Belgian part of the North Sea. Automated image processing holds great potential for faster and more efficient observation of the biodiversity in our coastal ecosystems. Imaged plankton particles are identified and quantified using neural networks that are incorporated in the big data processing workflows.

LifeWatch web services support operations at sea

The LifeWatch VLIZ team

Marine Regions provides open access to Maritime Boundaries products, based on the United Nations Convention on the Law of the Sea (UNCLOS). Initially developed as a georeferenced standard of marine place names and areas for marine biogeography, Marine Regions now serves more and more users from the private sector. Web services provide a free and operational 99 uptime) access to the data products, guaranteed the latest version.

European Tracking Network tracking aquatic animals at a pan-European scale

Jan Reubens* et al*. – Flanders Marine Institute (VLIZ)

Aquatic environments drive important global systems and their species play crucial roles in ecosystem functioning and dynamics. Many people depend on aquatic biodiversity for their livelihoods and aquatic species play an important role in tourism and recreation. Careful management of these resources is key for conservation and a sustainable future. Despite their importance, there is still little knowledge on habitat preferences, movements and migrations, and the resilience to changes in the environment. In recent years, electronic telemetry applications and technologies evolved quickly and revolutionized our ability to study free-ranging aquatic animals in the wild. These detailed and data

rich observations can be used to address crucial scientific, conservation and management questions on a global level. However, this requires expanded telemetry infrastructure and animal-tagging efforts over large scales and across national borders. Therefore, the European Tracking Network (ETN) was established to unite researchers working with biotelemetry on aquatic animals in Europe.

The overarching objective of ETN is to ensure the transition from a loosely coordinated set of existing regional telemetry initiatives scattered in Europe to a sustainable, efficient and integrated pan-European biotelemetry network embedded in the international context of already existing initiatives outside Europe. This will result in excellence in science across Europe and provide advice for EU policies.

More information on http://europeantrackingnetwork.org

Applied ecological models based on ecotope database

Axel Bourdouxhe* et al. – *University of Liège, Gembloux Agro-Bio Tech, Biodiversity and Landscape team

The Ecotopes Database of the LifeWatch-WB team has a wide range of possibilities, thanks to an important environmental dataset and a segmentation that allows the use of coherent and homogenous landscape units. This poster shows some examples of the applications allowed by the Ecotopes database, performed by the LifeWatch-WB team: bird dynamic models and species connectivity analysis.

Assessing Grassland Use Intensity using Sentinel Optical an SAR Data for Biodiversity Assessment

Mathilde De Vroey* et al. – *Université Catholique de Louvain, Earth and Life Institute

Over the last decade, many efforts have been focusing on providing land cover maps at various scales and with different levels of precision. In some cases, it is however more relevant to identify “land use” rather than “land cover” classes. Grasslands represent a vast and diverse land cover class. In the context of biodiversity assessment, all grasslands cannot be given the same biological value. A distinction should be made between natural grasslands and agricultural grasslands with different levels of intensity. With the increasing availability of satellite imagery with high spatial and temporal resolution, it should be possible to differentiate grasslands in terms of land use intensity and thereby provide valuable information for habitat monitoring and preservation.

This study focuses on Belgium, where 10 different types of grassland of high biological value have been recorded in the frame of the European network of natural and semi-natural sites (NATURA 2000) in addition to several other land use of grasslands associated with a high level of anthropic pressure: gardens, intensive pasture, hayfields and leisure (golf, soccer….). The aim of this study is to discriminate different land uses of grassland based on time series from Sentinel-1 and Sentinel-2 images for the year 2018. Some biotopes differ from floristic differences that are not observable by satellite remote sensing while other are accurately detected with optical images or SAR images based on specific spectral signature or water content. For the less obvious cases, we then focus on the land use intensity gradient based on the frequency and the intensity of mowing/grazing derived from the analysis of

Sentinel-1 time series. This objective will be achieved by combining the information from the backscattering coefficient of gamma0 GRD images with the 6-day coherence derived from successive overpass of the satellite. The impact of the speckle was reduced thanks to the use of parcel-based smoothing. Validation results are not yet available, but preliminary analyses are convincing.

Spatial region data model for biodiversity research

Julien Radoux* et al. – *Université Catholique de Louvain, Earth and Life Institute

The ecotope database is an object-based geodata that has been designed to make a consistent set of variables available for ecological models.

Natural infection of gastropods by feline cardio-pulmonary parasites in various areas of Greece: preliminary results

Anastasia Diakou* et al. – *School of Veterinary Medicine, Faculty of Health Sciences, Aristotle University of Thessaloniki, Greece

Cardiopulmonary parasitism in domestic cats (*Felis silvestris catus*) and wildcats (*Felis silvestris silvestris*) is mainly caused by metastrongyloid nematodes that use terrestrial gastropods as intermediate hosts. Currently, these parasites are emerging and spreading. Yet, little is known about which gastropods can act as intermediate hosts. Therefore, the present study aims to identify natural intermediate gastropod hosts of feline metastrongyloid nematodes in various regions of Greece. Terrestrial gastropods were collected from domestic and wildcat habitats. The gastropods and their metastrongyloid larvae were identified by respectively BopCo and the University of Thessaloniki, based on morphology, morphometry and DNA methods. The parasites found were *Angiostrongylus chabaudi* in *Eobania vermiculata*, *Helix lucorum* and *Limax* sp., *Troglostrongylus brevior* in *Cornu aspersum*, *Tandonia* cf. *sowerbyi*, *Limax* cf. *conemenosi*, *Limax* sp., and *Limacus flavus*, and *Aelurostrongylus abstrusus* in *Eobania vermiculata*, *Helix lucorum*, *Lehmannia valentiana* and *Limacus flavus*. Mixed infections by *T. brevior* and *A. abstrusus* were detected in five gastropods. This is the first record of *A. chabaudi* in naturally infected gastropods worldwide and the first time that *T. brevior* and *A. abstrusus* are reported in naturally infected intermediate hosts in Europe and Greece, respectively.

First record of the North African terrestrial snail *Otala xanthodon* (Anton, 1838) in Belgium

Brigitte Segers* et al. – *Royal Belgian Institute of Natural Sciences (RBINS), Barcoding of Organisms and Tissues of Policy Concern (BopCo)

In 2017, a living population of the North African terrestrial snail *Otala xanthodon* (Anton, 1838) was found at Heverlee, Belgium. BopCo identified the species using COI and 16S DNA barcodes, combined with shell morphology and genital anatomy. The species is indigenous in North Africa (Morocco and Algeria), but was successfully introduced in southern France. The record at Heverlee is about 1000 km further northwards. However, the Heverlee population did not manage to establish itself permanently.

Yet, considering climate change, it is not excluded that in the future the species might form stable populations in Belgium, like other Mediterranean species did (e.g. *Theba pisana*, *Cochlicella acuta*, etc.).

Identification of invasive *Physa* sp. from Inagro aquaculture facility

BopCo team

In 2018, BopCo was contacted by the Inagro aquaculture station at Rumbeke-Beitem, Belgium to identify an invasive freshwater snail that blocked their pipe system. Based on shell morphology, it was first thought to be *Physella acuta*, a species that was introduced into Belgium in the 19th century. Yet, surprisingly, DNA sequence analysis of COI and 16S showed convincingly that a different species must be involved. The COI sequences matched sequences available in GenBank from specimens from the aquarium trade and garden centers in Singapore, New Zealand and Germany. Yet, which species is involved is still unclear because of the poor Physidae species representation in the available DNA sequence databases.

Identifying invasive alien species by DNA barcoding using currently available sequence data

BopCo team

In order to implement EU Regulation (2016/1141) with respect to the monitoring of a number of Invasive Alien Species (IAS), BopCo evaluated the usefulness the DNA sequence data in GenBank to identify these IAS. The results of these evaluations are presented as species-specific factsheets, each of which consists of: 1) a short introduction about the specific IAS, and 2) an analysis of the available DNA sequences to identify this IAS. As such, the BopCo factsheets aim to inform policy makers so that they can provide relevant authorities with an identification and detection to verify suspected IAS samples.

This poster introduces the IAS factsheets compiled by BopCo, the criteria used for the evaluation of the usefulness of available DNA sequence data for accurate species identification, as well as the knowledge gaps in the DNA reference databases and other issues encountered."