Summaries of the transnational workshops available on project website

LIFE SeaBiL (Action B7)

Saving SeaBirds from marine Litter

LIFE20 GIE/FR/000114

Coordinator

Beneficiaries

Financial partners

TABLE OF CONTENTS

1. Summary

Three hybrid and transnational workshops (in english, spanish and french) were organised to share experience:

- Workshop 1 took place in Cabo de Gata, Spain, in 04/10/2023. It was shared 1) the importance of collecting data on seabirds during beach clean-ups, and 2) the importance of collecting data on impact of marine litter in breeding seabirds. Methodologies, protocols and metrics developed in B5 were shared. The target audience included organizers of beach clean ups, natural area managers, seabird researchers developing work at breeding colonies and government authorities. This workshop was held with the participation of 48 attendees from 12 organizations. Three presentations from outside the project partnership were shared.

- Workshop 2 took place in Peniche, Portugal, in 18/04/2024. It focused on the impact of marine litter on seabird colonies. Methodologies to use seabirds as indicators of marine litter impact on biota from the Bay of Biscay and the Iberian Coast sub-region were discussed. The target audience included natural area managers, seabird researchers developing work at breeding colonies and government authorities of Portugal, Spain, France and Italy. This workshop counted with the participation of 21 attendees in person plus 14 online, from 20 organizations. Six presentations from outside the project partnership were shared. It also included a field trip to Berlenga Island to see in place the monitorings trailing during the B5 and B6 actions.

- Workshop 3 took place in La Rochelle University, in 26/11/2024. It focused on the importance of necropsies providing information on marine litter impacts on seabirds. Protocols and difficulties with care centers were discussed in order to identify common solutions. This workshop was counted with the participation of 12 attendees in person plus 14 online, from 15 organizations. Five presentations from outside the project partnership were shared.

All reports summarizing the exchanges of these workshops are available on the project website here (Workshop 1, workshop 2 and workshop 3).

2. Summaries of the workshops- PDF version

https://lifeseabil.com/

LIFE SEABIL PROJECT
LIFE20GIE/FR/000114

OCTOBER 2023

LIFE SEABIL TECHNICAL WORKSHOP - SPAIN

TOOLS FOR STRANDED SEABIRDS MONITORING AND COLLECTING DATA

Organized By:

SEO/BirdLife and UCA

In the context of:

LIFE SeaBiL Project

INDEX

GENERAL INFO

TITLE OF THE WORKSHOP

Tools for stranded seabirds monitoring

DATE

October 4, 2023

LOCATION

Camping Los Escullos. Paraje Los Escullos s/n Parque Natural Cabo de Gata-Níjar

04118 Níjar. Almería. España

ORGANIZATION

The workshop was organized by the **Spanish Society of Ornitology** (SEO/BirdLife) and the **University of Cadiz** (UCA) in collaboration with all other partners of the LIFE SeaBiL project.

ATTENDEES

The event was attended by 48 participants (16 in person, 32 online via Zoom), including representatives from NGOs, universities, research centers, governmental authorities, and other stakeholders from Spain, France and Portugal.

ORGANIZATIONS

- Sociedad Española de Ornitología (SEO/Birdlife)
- University of Cadiz (UCA)
- Ligue pour la Protection des Oiseaux (LPO)
- Portuguese Society for the Study of Birds (SPEA)
- LIENSS Laboratory – La Rochelle University
- Agricultural Transformation, Technology and Services (TRAGSATEC) (Spain)
- Network of Andalusian Care Centers (Andalusia Government. Spain)
- Cantabrian Care Center (Cantabria Government. Spain)
- Bizkaian Care Center (Basque Country Government. Spain)
- Marine Environment and Sustainability Department (DGRM, Portuguese Government)
- "Mar a Deriva- Adrift sea" (Portugal)
- Centre for University Extension and Scientific Dissemination of Galicia (CEIDA) (Spain)

OBJECTIVES

OBJECTIVES OF THE WORKSHOP

The importance to collecting data about stranded seabirds during beach clean-ups

Demonstrate the importance of beach clean-up initiatives to provide information about stranded seabirds.

To know and standardize the existing protocols and network

Present the standardized protocols to be followed during the beach clean-ups in case stranded seabirds are found. What and how type of data should be collected.

Transmission of biological material to research laboratories. The importance of Care Centers.

To create a database and tissue bank, the collaboration between Wildlife Care Centers and researchers is a key point. It´s important knowing how Care Centers work in order to create a solid network.

AGENDA AND SESSIONS

OPENING AND WELCOME SESSION

- 10:00h – Guillaume Le Hétet (LPO)
  - LIFE SeaBiL Project

PRESENTATIONS AND DISCUSSIONS

- 10:20h – Marga L. Rivas (UCA)
  - Cabo de Gata-Níjar Natural Park as LIFE SeaBiL Project pilot site.

- 10:30h – Paulo Lago Barreiro (SEO/BirdLife)
  - Monitoring stranded seabirds through ICAO app

- 11:00h – Lidia Nascimento (Mar à Deriva)
  - Stranded seabirds found while collecting marine litter

- *11:15h – Coffee break*

- 11:45h – Alba García (Tragsatec)
  - Actions for the conservation, improvement of knowledge and protection of marine habitats and species.

- 12:15h – Isabel Molina (Andalusian Care Centers network)
  - Admissions and care of sea birds in the Andalusian Care Centers network

- 12:45 am - Discussions with the public

- *13:15h – End of the sessions*

DISCUSSIONS

This first workshop of the project (B7 action) was held in Cabo de Gata pilot site, Almería province (Andalusia region). It was the first time the project was presented in public. One of the main pillars of the project, the creation of a network around stranded seabirds, was addressed and synergies were created between all participants, especially with the CREAS (Care Center network) of Andalusia.

1- LIFE SeaBiL Project: overview and objectives - **Guillaume Le Hétet (LPO)**

After a quick reminder of the context about the problematic of marine litter, specially plastics, the four objectives of the project were shown.

Objective 1 – Develop citizen science collecting data and support eco-friendly beach clean-ups

- Adaptation of an application, accessible to all, for monitoring stranded seabirds: the existent ICAO app is being adapted to all partner countries, in conjunction with the MARNOBA app for monitoring marine litter.
- Creation of guidelines and risk maps in order to raise awareness and obtain better coordination amongst every stakeholder of the beaches monitoring (Guía y mapa - LIFE SeaBil).
- Trainings with stakeholders will be run for low foot-print beach clean-ups in order to keep safe some coastal species such as the endangered Kentish plovers (*Charadrius alexandrinus*).

Objective 2 – Stranded seabirds transnational network

- Identification of an indicator species for Good Ecological Status.
- Creation of a biological tissue bank
- Training and sharing experience (transnational sharing workshops).

Objective 3 – Identify marine litter sources and work on their reduction

- Implement a protocol for marine litter monitoring. Macro-waste monitoring in Spain and Portugal; Nano plastic analyses in France by CEDRE; Integrate stranded birds during waste monitoring.
- Carrying out a territorial diagnosi. Co-construction of an action plan to reduce marine litter in source. Implement tidal bins in Spain.

Objective 4 – Education and sensibilisation

- In the field; On the beaches: stands; challenges; informative boards; involvement of schools (more than 1,000 children involved)
- Media; Through an online communication strategy and paper publications

In order to monitor the impact of the LIFE SeaBiL project, some guidelines have been described:

- Kentish plover monitoring during breeding season
- Seabirds going to Care Centers due to marine litter
- Data collected through ICAO app
- Data collected about marine litter through beach clean-ups and tidal bins (in Spain)
- Socioeconomic impact evaluation

2- The pilot site Cabo de Gata-Níjar N.P.- **Marga L. Rivas (UCA)**

Marga gave a presentation of the Natural Park, located in Almería,(Andalusia, Spain). The protected area, created in December 1987, stretches along 63km in the south east mediterranean coast and it´s a semi-desert area under a very peculiar climate conditions.

The tourist massification is one of the problems in the N. P. It generates a big amount of waste that in some specific beaches is very difficult to manage due to the complexity of the access both for people and vehicles.

As project partner, UCA is carrying out different actions in Cabo de Gata-Nijar and even in other places in Andalusia, such as ICAO surveys, beach clean ups, awareness-raising actions, and the implementation of tidal bins for instance.

They already have established the contact for a network in Andalusia with the different Care Center in order to gather as much information as possible about stranded seabirds and keep some carcasses for necropsies. In that point Marga emphasized the importance of standardizing protocols between different entities and partners in order to have similar and comparable data.

3- Stranded Seabirds Monitoring App (ICAO) – **Paulo Lago (SEO/BirdLife)**

Paulo Lago works in the marine team of SEO/BirdLife and he is in charge of the ICAO app. He started the talk explaining the importance of collecting data about stranded seabirds:

-To know how many birds are dying

-To know the reasons of the deaths

-To know the main threats for seabirds and oceans

In Europe, dead seabirds began to be recorded in the 1920s, and it was, mainly, because of oiled birds. SEO implemented the ICAO program in Spain in the 1980s and in recent years the App was developed.

Currently you can upload data through the app or through the website. Both show you two options: punctual observation or complete ICAO survey, and you choose depending on whether you are going to upload a single observation or you are going to walk along the beach in a regular ICAO monitoring.

In the app, for a complete ICAO monitoring you have to choose the beach in the map (thanks to your mobile phone location) and for that moment on, the track will be saved. Every time you find a stranded seabird you have to upload it, and only a little information is required. The species, the state of the bird and if there is some external evidence indicating the possible cause of death like oil or a fishing line or hook, etc would be enough. You can add much more info, but it is not necessary. And in case you do not know the species of bird, you can only upload some pictures and the managers of the app will check and complete the observation. Photos are always very important.

For a single observation, open the app, choose "Single observation" and follow the same steps for the location and the required bird information.

You can also upload data about stranded seabirds at home, through the ICAO website. The info required is the same as in the app. The main difference is that you have to introduce the distance covered manually.

WEB: https://icao.seo.org/

https://play.google.com/store/apps/details?id=com.rearmachine.icao

https://apps.apple.com/es/app/icao-seo-birdlife/id1558558890

4- Stranded seabirds found while collecting marine litter– **Lidia Nascimento (Màr a Deriva- Adrift sea)**

Màr a Deriva is not an Association, but a group of people with the same objective, to reduce marine litter and raise awareness about that problem. In 2022 for instance, they carried out around 150 beach clean ups and removed 15.500kg of rubbish.

When they started with this work, they realized they were finding not only waste, but also stranded seabirds. Màr a Deriva made contact with SPEA and some other official bodies in Portugal in order to standardize the collection of data and currently they are a very important part of the stranded seabirds network. If they find an alive bird they contact official entities to care for the birds. And if they find a dead bird they collect data following SPEA forms.

The role played becomes particularly important during the massive mortality events that occurred in winter 2022-2023 for instance. At that winter season hundreds of Atlantic puffins showed up stranded along the Atlantic coast in France, Spain and Portugal and Màr a Deriva (and other associations/organisations organizing beach clean-ups) collaborated in the detection and collection of data about the stranded seabirds. The only thing they need and they ask for is to know the protocols for both collecting data and bird procedures, to establish a useful stranded seabird network.

Lidia Nascimento´s talk

5- Actions for the conservation, improvement of knowledge and protection of marine habitats and species. – **Alba García (Tragsatec-MITECO)**

Alba García works in a project to protect the marine ecosystem in Red Natura2000 in Spain, depending on the Ministry for Ecological Transition and Demographic Challenge (Spanish government) under the European Directive 2008/56/CE.

What they do is basically:

- Obtain information about these marine protected areas regarding on conservation status of ecosystems and species, human activities/ interactions, main threats they face, etc
- Establish a contact network
- Communication
- Collaboration with existent projects as LIFE SeaBiL

At that point, the Tragsatec teams could collaborate with us in Andalusia, Cantabria and Ebro Delta supporting the ICAO monitoring, transferring birds to the Care Centers, carrying out necropsies, taking samples and also in the monitoring of threatened species as Kentish plovers.

Alba Garcia´s talk

6- Admissions and care of marine birds in the Andalusian Network of Wildlife Care Centers – **Isabel Molina (Coordination of Andalusian care centers CREAs, Andalusian Government)**

The Autonomous Community of Andalusia has 8 provinces. Every of them has a Wildlife Recovery Center and they started working together in 2002, in a coordinated way, under the same protocols, same logo, etc.

In addition to care for the animals, they also do:

- Education, sensibilization and training
- Different research projects
- Supporting existing projects, such as LIFE SeaBiL.
- Epidemiologic surveillance like avian flu in aquatic and marine birds, for instance.
- Training and simulation of different situations, such as an oil spill on the coast.

Regarding the seabirds they receive at the Care Centers, they represent only 5% of all birds they care for. The main reason is weakness. If birds do not eat, they get thinner, weaker and they show up stranded at the beaches. Sadly, the majority of them die despite the efforts to keep them alive. At the Care Centers, in general, the 50% of the animals are recovered, however, in the case of seabirds, the percentage drops to only 17%.

Isabel spoke about avian flu also. This group of birds are the main reservoir for this virus and in a natural way they have it with a low viral load and are often asymptomatic. It is very important to handle seabirds with gloves and other protection because many times you don´t know at the beach if the bird is infected. Avian flu in humans is rare, but it can happen.

Isabel Molina´s talk

7- Main point discussions with the public

After the talks, in this first SeaBiL Workshop some questions were raised from the audience in the room and online.

First, it was related to the ICAO survey and the different ways to register the stranded seabirds. Paulo said that the best option is to carry out an ICAO survey at the beach with the app, better than a single observation or the website. But it is true that some beaches have no internet signal and you can not use the mobile phone app. In that case it is necessary to use the website.

Paulo asked Isabel Molina about the possibility of using a unique ID number for each stranded seabird in order to know and gather information since the bird is found at the beach until it is analysed or necropsied at the Care Center.
She said it will be possible in order to create a strong network regarding stranded seabirds. But to implement it, it will require the implication of all actors involved. Volunteers, rangers, local and government authorities, organizations carrying out ICAO or beach clean-ups.

Alba García was questioned about the network between Tragsatec and the Government. She noticed the importance of networking not only with the Government, but also with different organisations, entities, NGO´s or anyone involved in the same matter, in that case the marine litter and the impact on seabirds.

There was also a question about the massive mortality event in December 2022 in the mediterranean coast, affecting mainly to razorbills *Alca torda*. At that time, the only thing we know is that most of the razorbills were juveniles and they arrived in a very poor body condition. Necropsies looking for plastics or other kinds of human waste have not been carried out yet. It will be necessary to do specific analysis and use specific techniques in order to discover small pieces of plastic (micro plastic) of less than 1mm in size.

Mª Margarida Nunes, from the Portugal Government, pointed out that it should be interesting to disseminate into the general public some details about how to proceed when you find a stranded seabird at the beach. Things like do not touch it or do it with gloves, leaving the bird at the beach and calling 112 , which entity you have to call in case the bird was alive etc. One suggestion that we all thought was necesary.

CONCLUSION

Stranded Birds Survey. It is very important to have a tool, such as ICAO, in order to collect and gather as much info as possible about the stranded seabirds event. Seabirds are an indicator about the health of the oceans and the species that inhabit them.
Thanks to new technology we can have an ICAO app in our mobile phone and we can upload information by real time in a common database. And thanks to the application's reviewers all info will be verified and the doubts resolved.

It is necessary to **take into account all actors involved** that can help in the issue of marine litter and its impact on birds. And beach clean-up organizers are one of them. They spend a lot of time at the beach and they find stranded seabirds during waste collection.
Wildlife Care Centers are a key piece of that network. They receive most of the stranded seabirds and are able to carry out external examination and also necropsies in order to know the causes of death.

Once all parts of the network have been identified, the next step is to **standardize protocols**. In this way, each participant, volunteer, NGO, Care Center or any other kind of entity, will collect the information in the same way and it will be possible to use and compare all data. Currently we know we are losing a lot of data because different bodies with different collaborators are using different ways to register the stranded seabirds, for instance.

Working together is essential for the protection of nature.

ANNEX

LIST OF PEOPLE ATTENDING THE WORKSHOP:

Nombre	Apellido	Organization	Status	Regime
Mónica	Expósito Granados	UCA	Partner	Presencial
Marga	L. Rivas	UCA	Partner	Presencial
Felipe	Gónzalez	SEO/BirdLife	Partner	Presencial
Ludovico	de Vega	SEO/BirdLife	Partner	Presencial
Paulo	Lago	SEO/BirdLife	Partner	Presencial
Nuno	Oliveira	SPEA	Partner	Presencial
Guillaume	Le Hétet	LPO	Partner	Presencial
Jerome	Fort	La Rochelle University	Partner	On line
Pablo	Morón	Tragsatec	External	Presencial
Alba	García	Tragsatec	External	Presencial
Cristina	Bolumar	Tragsatec	External	Presencial
Juan M.	Gisbert	UAL	External	Presencial
Jose Miguel	García	General public	External	Presencial
Antonio	Fuentes	General public	External	Presencial
Isabel	Molina	Andalusian Government	External	Presencial
Manon	Linker	ELMEN	External	Presencial
Margarida	Nunes	Portuguese Government	External	Presencial
Lidia	Nascimento	Màr a Deriva	External	Presencial
Kiko	Alvarez	SEO/BirdLife	Partner	On line
Lucia	Soliño	SEO/BirdLife	Partner	On line
Gerardo	Carranza	Tragsatec - Cantabria	External	On line
Marinha			External	On line
LARA	ALVAREZ		External	On line
Óscar	Álvarez Losada		External	On line
Charo	Brinquis		External	On line
E.Macarena	Castro Casas	UCA	External	On line
Jose Miguel	Escribano	CRFS- Bizkaia	External	On line
Itziar	Galindez Centeno		External	On line
Bella	García Oliva		External	On line

Nombre	Apellido	Organization	Status	Regime
Eva	García Ortiz		External	On line
Anza	Ibone	CRFS Cantabria	External	On line
Inês	Lacerda	SPEA	Partner	On line
Guillermo	Lopez Torrents	Tragsatec - Cantabria	External	On line
Angela	Loring Salmerón		External	On line
Maria	Macias Gonzalez		External	On line
Ana	Maurer		External	On line
Carmen	Meléndez Díez		External	On line
Jaime	Moreno Aguilar		External	On line
Tânia	Nascimento	SPEA	External	On line
Sergio	París		External	On line
María	Parra Bermejo	Tragsatec - Fuerteventura	External	On line
Gaizka	Peñin	Tragsatec - Cantabria	External	On line
M. Simeón	Pérez Toledo		External	On line
Blanca	Pluja		External	On line
AMP_Canarias	TEC	Areas Marinas Protegidas	External	On line
Eva	-	Tragsatec	External	On line
-	-	Tragsatec- La Palma	External	On line
Yada	Trapletti Lanti	UCA	Partner	On line
Cesca	Viladecans		External	On line
Mireia	Villafafila	UCA	External	On line

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LIFE SEABIL PROJECT
LIFE20GIE/FR/000114

APRIL 2024

LIFE SEABIL TECHNICAL WORKSHOP PORTUGAL REPORT

MONITORING THE IMPACT OF MARINNE LITTER ON SEABIRD COLONIES

Organized By :
SPEA

In the context of:
LIFE SeaBiL Project

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GENERAL INFOS

TITLE OF THE WORKSHOP

Monitoring the impact of marine litter in seabird colonies

DATE

April 18-19, 2024

LOCATION

CETEMARES Building, Polytechnic University of Leiria, Peniche, Portugal

ORGANIZATION

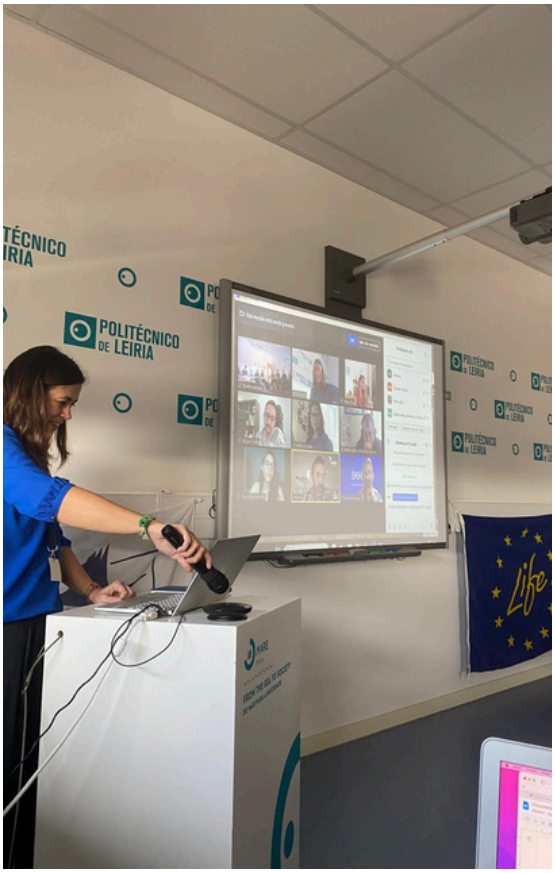
The workshop was organized by the Portuguese Society for the Study of Birds (SPEA) in collaboration with all other partners of the LIFE SeaBiL project.

ATTENDEES

The event was attended by 35 participants (21 in person, 14 online via Zoom), including representatives from NGOs, universities, research centers, governmental authorities, and other stakeholders from Portugal, Spain, and France.

GENERAL INFOS

ORGANIZATIONS



- Institute for Nature Conservation and Forests (ICNF)
- Portuguese Institute for the Sea and Atmosphere (IPMA)
- Marine and Environmental Sciences Centre, University of Coimbra (MARE-UC)
- Centre for Ecology, Evolution, and Environmental Changes, University of Lisbon (CE3C-UL)
- Centre for Environmental and Marine Studies, University of Lisbon (CESAM-UL)
- Stranding Network of Lisbon and Tagus Valley, ISPA - University Institute (RALVT-ISPA)
- OKEANOS Research Centre, University of the Azores (OKEANOS-UAç)
- Regional Directorate for the Environment and Climate Change, Madeira (DRAAC Madeira)
- Regional Directorate of Maritime Policy (DRPM)
- Institute for Forests and Nature Conservation (IFCN)
- Regional Secretariat for the Environment - Madeira (Secretaria Regional do Ambiente - Madeira)
- University of Cadiz (UCA)
- Marine and Food Research Institute (AZTI)
- French Biodiversity Office (OFB)
- University of Siena (UNISI)

GENERAL INFOS

OBJECTIVES OF THE WORKSHOP

Dissemination and Discussion of Results

Share and discuss the findings and progress made regarding marine litter's impact on seabird colonies.

Establishing a Bioindicator

Establish standardized methods for monitoring the impact of marine litter on seabirds - specifically for criteria D10C3 (plastic ingestion) and D10C4 (entanglement) of Descriptor 10.

Collaboration and Networking

Strengthen transnational collaboration among researchers, conservation managers, and policymakers.

AGENDA & SESSIONS

DAY 1: APRIL 18, 2024

OPENING AND WELCOME SESSION

- **9:15 AM - Joana Andrade (SPEA)**
  - Opened the workshop by thanking CETEMARES and all participants. Joana discussed logistical details and facilitated a welcome round, emphasizing the importance of collaboration under the LIFE SeaBiL project.

PRESENTATIONS ON MONITORING THE IMPACT OF MARINE LITTER ON SEABIRD COLONIES

- **9:30 AM - Guillaume Le Hetet (LPO)**
  - Presentation of the LIFE SeaBiL Project.
  - Overview of the nature of plastic and its environmental impact.
  - Discussed how marine litter, especially plastic, affects seabirds, noting that seabirds often use plastic as nesting material, which poses significant health risks.

- **10:00 AM - Yasmina Rodríguez (OKEANOS)**
  - Presented two studies related to plastic ingestion and entanglement in seabirds, focusing on Cory's shearwater as a potential bioindicator for Southern Europe.
  - Highlighted the importance of standardized necropsy methods, citing data gaps and the need for reliable information.

AGENDA & SESSIONS

- **10:20 AM - Vitor Paiva (MARE-UC)**
  - Discussed the historic connection between seabirds and plastic contamination, with research from Berlenga and Porto highlighting the significant impact of plastic ingestion.
  - Mentioned ongoing studies tracking the effects of plastic on seabird tissues.

- **10:40 AM - Nuno Oliveira (SPEA)**
  - Presented findings on plastic debris in Cory's shearwater from Berlenga Island, noting that 24 out of 25 birds sampled had ingested plastic.

Coffee Break (11:00 - 11:30 AM)

- **11:30 AM - Javier Franco (AZTI)**
  - Presented a case study on the Assessment of the incidence of plastic ingestion by seabirds through analysis of bird pellets, specifically focusing on the European Shag (Gulosus aristotelis) along the Cantabrian coast in Northern Spain.

- **11:50 AM - Matteo Baini (UNISI)**
  - Discussed the impact of marine debris ingestion in Mediterranean seabirds, with a focus on exposure to plasticizers.

AGENDA & SESSIONS

- **12:10 AM - Nuno Oliveira (SPEA)**
  - Discussed the impact of marine debris ingestion in Mediterranean seabirds, with a focus on exposure to plasticizers.

- **12:20 PM - Clara Lopes (IPMA)**
  - Responsible for Descriptor 10 (criteria D10C3 and D10C4) in Portugal
  - Explored impact monitoring using fish as bioindicators for microplastic contamination, proposing horse mackerel as a valuable species for monitoring.

- Portuguese Marine Litter Action Plan presentation by **Margarida Nunes** from **DGRM** was scheduled, but unfortunately could not be delivered as Margarida was unwell

Lunch Break (1:00 - 2:00 PM)

AGENDA & SESSIONS

AFTERNOON SESSION: MARINE LITTER INDICATORS

- **2:20 PM – Nuno Oliveira (SPEA)**

Nuno Oliveira delivered a detailed presentation on the monitoring of marine litter's impact on seabird colonies. The presentation focused on the Marine Strategy Framework Directive (MSFD) and the use of seabirds to assess marine litter's impact through criteria D10C3 (plastic ingestion) and D10C4 (entanglement).

The Marine Strategy Framework Directive (MSFD) is a European Union directive aimed at protecting the marine environment across Europe. The MSFD is structured around 11 Descriptors that define what constitutes a good environmental status. Descriptor 10 focuses on marine litter.

Key points included:

- Importance of careful site selection for monitoring, based on potential marine litter accumulation areas and regions of environmental significance.
- Proposal of harmonized protocols for assessing plastic litter use as nesting material and associated mortality due to entanglement in bird breeding colonies.
- Suggested use of species such as Northern Fulmar, Cory's shearwaters, European Shag, Northern Gannet, and Kittiwake due to their behaviors that make them suitable bioindicators.

AGENDA & SESSIONS

- Emphasized the development of specific recommendations for using seabirds as indicators of marine litter impacts on the biota in regions like the Bay of Biscay and Iberian Coast, with potential for extension to broader MSFD regions.

ROUND TABLE DISCUSSION MODERATED BY SPEA

Following his presentation, Nuno Oliveira moderated the final round table discussion. The focus was on leveraging findings from seabird surveys to enhance monitoring of marine litter impacts.

Topics covered included:

- **Selection of common seabird species** that could serve as bioindicators across Portugal, Spain, and France.
- **Discussion on site selection** for effective monitoring and the relevance of different species and habitats.
- **Considerations for setting thresholds** for plastic ingestion and entanglement based on historical data, as well as addressing sub-lethal effects of contaminants associated with plastics.
- **Strategies to secure data quality and control contamination** during sample collection and analysis.
- **Long-term sustainability** of monitoring programs, including funding and collaboration opportunities.

- Participants explored the application of Nuno Oliveira's recommendations and the practicalities of integrating these methodologies into existing national and European marine litter action plans. The discussion emphasized collaboration across regions to standardize protocols and share data for more comprehensive monitoring and conservation efforts.

AGENDA & SESSIONS

DAY 2: APRIL 19, 2024

FIELD TRIP TO BERLENGA ISLAND

A field trip was organized around Berlenga Island, where participants observed the seabird colonies and marine litter-impacted sites.

DISCUSSIONS & CONCLUSIONS

The workshop yielded critical insights and conclusions that will shape future efforts in marine litter monitoring, seabird conservation, and transnational collaboration. Below is a detailed synthesis of the key points discussed during the sessions, organized by thematic areas and interventions:

1. MARINE LITTER AND ITS IMPACT ON SEABIRDS

Plastic Ingestion and Entanglement

Yasmina Rodríguez (OKEANOS): Presented two pivotal studies focusing on criteria D10C3 and D10C4 in seabirds. The studies revealed that Cory's shearwaters are particularly suitable as bioindicators for Southern Europe due to their wide distribution and frequent ingestion of plastic debris. Yasmina emphasized the need for standardized necropsy methods to ensure reliable data, noting significant information gaps due to inconsistent data collection over the years. The studies also highlighted that Cory's shearwaters in the Azores ingest more fishing tools compared to those in the Canary Islands, where the plastic ingestion is predominantly green and white, often linked to fishing activities in Northern waters.

Threshold for Plastic Contamination

Hany Alonso (SPEA, online): Questioned the threshold value of less than four pieces of plastic used to define contamination levels. Yasmina clarified that the threshold was based on existing datasets and not directly applicable to other species. The threshold was developed with input from OSPAR and reflects the current environmental values, although it remains challenging to apply uniformly across regions due to varying contamination levels.

DISCUSSIONS & CONCLUSIONS

Necropsy Methodology and Data Collection

Marga Rivas (UCA): Raised concerns about the selective necropsy approach, questioning whether different results might be obtained if the entire digestive tract were analyzed. Yasmina acknowledged that while more comprehensive necropsies could yield additional insights, practical challenges, such as difficulty in accessing the intestines, limit the feasibility of this approach. Marga also inquired about detecting microfibers, to which Yasmina responded that while they collected such data, they had not yet analyzed it but planned to do so in future studies.

2. BIOINDICATOR SPECIES FOR MONITORING MARINE LITTER

Identification and Suitability of Bioindicator Species

Nuno Oliveira (SPEA): Emphasized the importance of selecting appropriate bioindicator species. He proposed Cory's shearwater as a key species for monitoring plastic ingestion (D10C3) but noted its limitations for entanglement monitoring (D10C4). Nuno highlighted that, in Portugal, the Cory's shearwater and European shag are strong candidates due to their coastal habits and proximity to fishing areas, which expose them to higher levels of marine litter.

Expanding the Bioindicator Framework

Guillaume Le Hetet (LPO): Supported the inclusion of species like the Kittiwake, Northern Gannet, and Guillemot for France, although he acknowledged that Guillemots might be too small to serve as effective indicators. He suggested that Razorbills, common across all three countries involved in the project (Portugal, Spain, and France), could be another viable candidate. This suggestion was echoed by Jerome Fort

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(LRUniv), who noted that Fulmars are already used by the French government to monitor litter impacts on the Atlantic side, while the Loggerhead turtle is used in the Mediterranean.

Challenges in Applying Bioindicators

Pedro Sepulveda (DRAAC Madeira) and Yasmina Rodríguez discussed the challenges of applying bioindicator frameworks across different regions. Pedro pointed out that in Madeira, the authorities opted not to implement such frameworks, highlighting the difficulty in securing consistent financial support and the risks of data gaps once the initial funding ends. Yasmina added that while the Azores government has implemented the framework, sustaining it remains a challenge, particularly as long-term monitoring requires significant resources.

3. TECHNICAL AND METHODOLOGICAL CONSIDERATIONS

Standardization of Necropsy and Sampling Methods

Nuno Oliveira and Vitor Paiva (MARE-UC) discussed the necessity of standardized sampling and necropsy methods. Vitor mentioned ongoing research involving plastic ingestion by seabirds in Cape Verde, where results showed varying levels of anthropogenic particles in different seabird species, with coastal species exhibiting higher contamination. This highlighted the need for region-specific approaches in monitoring.

Analysis of Plastic Composition

During the discussion, Paulo Lago (SEO/Birdlife) questioned why the composition of ingested plastics was not analyzed. Nuno explained that it's challenging to distinguish between industrial and consumer plastics without advanced analytical methods. Vitor and Yasmina further

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elaborated that in the Canary Islands, more green plastics are ingested, whereas in the Azores, the plastics are mostly white, often linked to fishing activities. This variability underscores the importance of context-specific monitoring and analysis.

Invasive Sampling Techniques

The invasiveness of sampling techniques was questioned by **Paulo Lago**, particularly the use of tubes for diet sampling. Yasmina acknowledged that the sensitivity of the operator could impact the procedure's invasiveness and emphasized the need for careful timing and technique to minimize harm to the birds.

Use of Biomarkers and Contaminants Analysis

Clara Lopes (IPMA): Discussed using biomarkers and models to assess sub-lethal effects of contaminants on seabirds. This approach could help in understanding the broader impact of plastic ingestion beyond immediate mortality. **Marga** added that experimental studies using fluorescence markers in plastics have shown clear differences in health outcomes between exposed and non-exposed birds.

4. LONG-TERM MONITORING AND POLICY RECOMMENDATIONS

Data Quality and Contamination Control

Clara Lopes raised concerns about contamination at various stages of data collection, including before, during, and after sampling. **Javier Franco (AZTI)** pointed out that while contamination is less likely in bird pellets, it remains a significant issue in microplastics research. The discussion highlighted the importance of rigorous contamination control measures to ensure the reliability of collected data.

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Securing Long-Term Monitoring Efforts

Jerome and Guillaume emphasized the challenges of maintaining long-term monitoring programs, particularly in academic settings where funding and research priorities may shift. Guillaume discussed efforts to reduce costs and scale monitoring programs but acknowledged the difficulties involved, especially in expanding these programs to new regions.

National Marine Litter Action Plans

The workshop underscored the need for stronger integration of monitoring efforts within national marine litter action plans. In France, the MSFD indicators are referenced, while in Spain, comprehensive action plans are still lacking. Participants agreed on the importance of aligning scientific monitoring with national and European policy frameworks to ensure that research informs policy and vice versa.

5. THRESHOLDS AND IMPACT ASSESSMENT

Defining Harm and Establishing Thresholds

Yasmina and Nuno discussed the complexities of defining harm and establishing thresholds for plastic contamination. Yasmina mentioned that current thresholds, such as those for Fulmars, are based on pristine sites and might not reflect the realities of more polluted areas. Nuno noted that while setting thresholds near zero is desirable, particularly for bycatch, the lack of comprehensive data complicates such efforts.

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Javier expressed concerns about the limited data available, which constrains the ability to set scientifically robust thresholds.

Implications for Policy and Future Research

The workshop concluded that establishing scientifically sound, region-specific thresholds is essential for effective marine litter management. However, this requires a balance between scientific rigor and practical implementation, considering the variability in data availability and the different ecological contexts across regions.

6. COLLABORATIVE EFFORTS AND FUTURE DIRECTIONS

Enhanced Collaboration Across Regions

Paulo Lago: Inquired about extending indicators from the Azores to other regions like Cantabria.

Maria Dias (CE3C-UL): Emphasized including colonies like Selvagens in monitoring efforts.

Jerome: Suggested considering other species like Northern Gannet as bioindicators.

The workshop highlighted the need for continued collaboration across Portugal, Spain, and France. Participants agreed on the importance of sharing data, methodologies, and findings to build a more comprehensive understanding of marine litter's impact on seabirds.

Future Research Priorities

Diana Matos (MARE-UC) and Clara Lopes suggested expanding research to include sub-lethal effects of plastic ingestion, using biomarkers, and exploring the potential of non-commercial species as

DISCUSSIONS & CONCLUSIONS

bioindicators. They emphasized the importance of integrating these findings into policy and conservation strategies.

Funding and Resource Allocation

Securing long-term funding was identified as a critical challenge. Pedro Sepulveda stressed that without sustained financial support, monitoring efforts risk becoming fragmented, leading to data gaps that could undermine conservation efforts.

CORE GUIDELINES

Implement and Standardize Monitoring

Adopt Cory's shearwater and European shag as a primary bioindicator for Southern Europe, with standardized necropsy and sampling methods to ensure data consistency.

Strengthen Contamination Control

Implement rigorous protocols to minimize contamination during data collection and analysis, particularly in microplastics research.

Advocate for Policy Integration

Align marine litter monitoring efforts with national and European policy frameworks to ensure that research informs policy decisions.

Secure Long-Term Funding

Advocate for sustained funding to support ongoing monitoring and research programs, ensuring that data collection remains comprehensive and consistent.

Expand Research on Sub-Lethal Effects

Prioritize research on the sub-lethal effects of plastic ingestion, using biomarkers and models to assess the broader impact on seabird health and reproduction.

Promote Transnational Collaboration

Continue fostering collaboration among Portugal, Spain, and France to share data, methodologies, and best practices in marine litter monitoring and seabird conservation.

ANNEX

LIST OF ATENDEES

Name	Organization	Status	Regime
Christopher Pham	UA	external	online
Clara Lopes	IPMA	external	presencial
Diana Matos	MARE-UC	external	presencial
Dília Menezes	IFCN	external	online
Edna Correia	CESAM-UL	external	online
Gonzalo Munoz	UCA	external	online
Guillaume Le Hetet	LPO	partner	presencial
Hany Alonso	SPEA	staff	online
Inês Lacerda	SPEA	organization	presencial
Javier Franco	AZTI	external	presencial
Jerome Fort	LRUniv	partner	presencial
Joana Andrade	SPEA	organization	presencial
Karen Bourgeois	OFB	external	presencial
Louis Doremus	LPO	partner	presencial
Ludovico de Veja	SEO/Birdlife	partner	presencial

ANNEX

LIST OF ATENDEES

Name	Organization	Status	Regime
Lurdes Morais	ICNF	external	presentail
Marga Rivas	UCA	partner	presencial
Maria Dias	CE3C-UL	external	online
Maria Laranjeiro	MARE-UC	external	presencial
Maria Magalhães	DRPM	external	online
Matteo Baini	UNISI	external	online
Miguel Grilo	RALVT-ISPA	external	online
Mónica Costa	SPEA	organization	online
Monica Exposito	UCA	partner	presencial
Monica Silva	CE3C-UL	external	online
Nicola Pestana	SRAM	external	online
Nuno Oliveira	SPEA	organization	presencial
Paulo Lago	SEO/Birdlife	partner	presencial
Pedro Sepulveda	DRAAC Madeira	external	online
Sara Veríssimo	MARE-UC	external	presencial

ANNEX

LIST OF ATENDEES

Name	Organization	Status	Regime
Tânia Nascimento	SPEA	staff	online
Thomas Jonca	LRUniv	external	presencial
Vitor Paiva	MARE-UC	external	presential
YADA Trapletti	UCA	external	presential
Yasmina Rodriguez	OKEANOS-UC	external	presential

https://lifeseabil.fr/

LIFE SEABIL PROJECT
LIFE20GIE/FR/000114

NOVEMBER 2024

LIFE SEABIL TECHNICAL WORKSHOP - FRANCE

SEABIRD'S NECROPSIES: HOW TO USE SEABIRD AS BIOINDICATORS IN THE MARINE ENVIRONMENT

Organized By:
LPO FRANCE

In the context of:
LIFE SeaBiL Project

Associated beneficiaries

Fundings

INDEX

GENERAL INFOS

TITLE OF THE WORKSHOP

Seabird's necropsies: How to use seabirds as bioindicators in the marine environment

DATE

November 26, 2024

LOCATION

LIENSS Laboratory – La Rochelle University – 2 rue Olympe de Gouges, 17000 La Rochelle, France

ORGANIZATION

The workshop was organized by the **Ligue pour la Protection des Oiseaux** (LPO) in collaboration with all other partners of the LIFE SeaBiL project.

ATTENDEES

The event was attended by 26 participants (12 in person, 14 online via Zoom), including representatives from NGOs, universities, research centers, governmental authorities, and other stakeholders from France, Portugal, and Spain

ATTENDEES

ORGANIZATIONS

- Ligue pour la Protection des Oiseaux (LPO France)
- Sociedad Española de Ornitología (SEO Birdlife)
- Portuguese Society for the Study of Birds (SPEA BirdLife)
- LIENSS Laboratory – La Rochelle University
- University of Cadiz (UCA)
- Environment and Climate Change Canada (ECCC)
- National Institute for Scientific Research (INRS)
- Wildlife Rehabilitation and Research Center (RIAS)
- Marine and Food Research Institute (AZTI)
- French Biodiversity Office (OFB)
- National Center for Scientific Research (CNRS)
- Ecole Normale Supérieure de Rennes (ENS Rennes)
- Ornithological Groupe of Normandy (GONm)
- Manche-Mer du Nord network (MMN)
- National Museum of Natural History (MNHN)

LIST OF ATTENDEES

Name	Organization	Regime
Karen Bourgeois	OFB	Presential
Antoine Chabrolle	MNHN	Online
Christophe Aulert	OFB	Online
Diana Matos	NA	Online
Fabrice Gallien	GONm	Online
Florence Nono Almeida	CNRS	Online
Françoise Amelineau	ENS Rennes	Online
Guillaume Le Hetet	LPO	Presential
Ilhas Barreira	SPEA	Online
Inês Lacerda	SPEA	Presential
Javier Franco	AZTI	Presential
Jérôme Fort	LIENSS	Presential
Joao Franco	SPEA	Presential
Karen McCoy	CNRS	Online
Ludovico De Vega	SEO	Presential
Marga L. Rivas	UCA	Online
Maria Victoria Mena Casero	SPEA	Presential
Monica Costa	SPEA	Online
Monica Exposito Granados	UCA	Online
Nuno Oliveira	SPEA	Presential
Paulo Lago Barreiras	SEO	Presential
Philippe Giraud	MMN	Online
Raphaël Lavoie	INRS	Presential
Rute Costa	SPEA	Presential
Victor H. Paiva	Univ. Coimbra	Online
Yada Trapletti	SPEA	Online

OBJECTIVES

OBJECTIVES OF THE WORKSHOP

Role of Necropsies in Seabird Research

Demonstrate the importance of necropsies to provide information on marine litter impacts on seabirds

Harmonized Protocols

Present the standardized protocols to be followed throughout the Bay of Biscay sub-region and the advantages of these protocols

Unified Solution for Wildlife Research

Discuss the main difficulties encountered by wildlife care centres and researchers, with a view to identifying common solutions. And official presentation of the central tissue bank

AGENDA & SESSIONS

OPENING AND WELCOME SESSION

- 9:30 am – Guillaume Le Hétet (LPO)
  - LIFE SeaBil: Project overview and Key results

PRESENTATIONS AND DISCUSSIONS

- 9:50 am – Raphaël Lavoie (INRS)
  - Ecotoxicology and other environmental stressors impact seabirds

- 10:10 am – María Victoria Mena Casero (RIAS)
  - Birds as sentinels of environmental health: exploring pollution through necropsies

- 10:30 am - Discussions with the public

- *11:00 am – Coffee break*

- 11:20 am – Florence Nono Almeida & Karen Mc Coy (CNRS)
  - EcoDIS project: impact of environmental stress on seabird movements and infectious transmission in the Mediterranean Sea

- 11:40 am – Javier Franco (AZTI)
  - Assessment of the incidence of plastic ingestion by seabirds from the Bay of Biscay by bird necropsies and bird pellets

- 12:00 am - Discussions with the public

- *12:30 am – Lunch break*

- 2:20 pm – Françoise Amelineau (ENS Rennes)
    - Northern fulmar and plastic distribution at sea in North Atlantic

- 2:40 pm - Discussions with the public

- *3:00 pm – Coffee break*

- 3:20 pm – Jérôme Fort (LIENSS) & Monica Exposito Granados (UCA)
    - LIFE SeaBiL Necropsies methodologies and results

- 3:45 pm - Discussions with the public

END OF THE DAY

DISCUSSIONS

This workshop was the moment for every partner to discuss the results of the LIFE SeaBiL project and to talk about necropsies as a tool for seabird research and about how to harmonize existing protocols for that. Below is a summary of the key points discussed during the various presentations:

1- LIFE SeaBil: Project overview and Key results - Guillaume Le Hétet (LPO)

After a quick reminder of the context of the LIFE SeaBiL project, its four objectives and the main results were shown. Here is the list with the achievement for every objective.

Objective 1 – Improve the coordination of beach cleaning actions and the monitoring of stranded birds

- Adaptation of an application, accessible to all, for monitoring stranded seabirds: the adaptation of the ICAO application in conjunction with the MARNOBA application for monitoring marine litter (https://lifeseabil.fr/ressources/application-suivi/).
- Creation of guidelines and risk maps in order to raise awareness and obtain better coordination amongst every stakeholder of the beaches monitoring (https://lifeseabil.fr/ressources/guide-carte/). In addition, training sessions and waste collections were carried out in the partner towns to demonstrate the right actions to take to protect biodiversity during this type of event. The project will have carried out 56 waste collections on the beaches, with 1,250 volunteers. For a total of 1.5 tons of waste collected.

Objective 2 – Consolidate the acquisition of knowledge on the impact of plastic waste on seabirds and define an indicator species for Good Environmental Status

- Replication of the work carried out by the northern sea fulmar network and then the LPO Poitou-Charentes

- Identification & monitoring of an indicator species for Good Ecological Status; Transfer of biological material & analyses to the University of La Rochelle
- Creation of a biological tissue bank
- Training & experience sharing (transnational); On tools for monitoring strandings/on the monitoring of marine waste in colonies/on necropsies

Objective 3 – Improve the identification of marine litter sources to optimize the management and prevention of waste

- Implementation of protocol-based monitoring of marine litter; for macro-waste monitoring in Spain (training operators in protocol monitoring); Nano plastic analyses in France by CEDRE; Integrating stranded birds
- Carrying out a territorial diagnosis (FR); Co-construction of an action plan (https://lifeseabil.fr/wp-content/uploads/2024/11/V4-SeaBiL-Plan-daction_compressed.pdf) (28 objective sheets) to reduce waste at source (test areas La Tremblade, CARA[1], St Georges de Didonne, St Palais sur Mer / Collaborators PNMEGMP[2], CDC[3] Oléron, TEO[4], Agglomeration La Rochelle and many others). And sharing expertise on tidal bins with Spain (6 tidal tanks installed in Spain)

Objective 4 – Raise awareness amongst the general public on the issue of marine litter and seabirds in the N2000 areas

- In the field; On the beaches (stands, challenges, panels); Involvement of schools (more than 1,000 pupils involved)
- Media; Through an online communication strategy; Paper publications (Oiseaux mag junior - LPO)

[1] Royan Atlantique Agglomeration Community
[2] Gironde Estuary Marine Nature Park
[3] Community of municipalities
[4] Territories environment Ocean

2- Ecotoxicology and other environmental stressors impact seabirds - Raphaël Lavoie (INRS)

To look abroad and not just at Europe, this Environment Climate Change Canada (ECCC) presentation shows how plastic pollution is dealt with in Canada.

For the context, there is some politics about plastic pollution in the country;

- Zero plastic waste program by 2030
- Regulation banning single-use plastics by 2025
- Promoting science (Canadian Plastics Science Program (CPSP))

This program is designed to study plastics in the environment in a very broad way: from their design, through their use, waste recovery, etc., to their impact on flora and fauna and human health. All this is within the Ecotoxicology and Wildlife Health department at the ECCC.

They use waterbirds to study contaminants in general, as birds are sensitive to any change in their habitat, and they are under the responsibility of the ECCC via the Migratory Birds Convention Act.

One main result shown during the presentation is about a 20-years study on seabirds in the Saint-Laurent, Canada. They showed a decrease in 30% of birds' colony. To find that, they have been monitoring birds' eggs since 1969 and analyzing contaminant concentration. To determine the plastic contamination, they used Herring gull as a bio-indicator, because of its generalist characteristics. The study is still in progress for spatial monitoring to follow contamination through Canada. There are also other studies about plastic in Herring gull colony occurring.

3- Birds as sentinels of environmental health: exploring pollution through necropsies - María Victoria Mena Casero (RIAS)

In Portugal, « *Recuperação e Investigação de Animais Selvagens* » is a rescue centre for biodiversity and mostly seabirds. In addition to caring for and rehabilitating the animals, the hospital raises awareness and educates the public about the environment, as well as carrying out research and scientific monitoring.

One of their main types of research is about necropsies. They use it to monitor ecosystem health, understand mortality causes, detection of threats and crimes and to supply a tissue bank, which can be widely used by everyone.

Necropsies is a tool for now and the future. RIAS does it to train and educate student and volunteers, as well as contribute to conservation beyond borders.

RIAS has also an experience in pollution research. 4,4% of their admissions are about pollution impact. Between 2010 and 2019, they recorded 14 species affected mainly from fishing gears. If sometime, the dead cause is not obvious, they carry out necropsies to find it.

In two of their study about plastic ingestion by aquatic birds, they found more than 22% of the stomachs had anthropogenic litter and predominantly plastics debris, clear of white in colour. They also studied the plastic contaminant' assimilation in gulls and found that the effects are not only physical but also neurofunctional.

4- EcoDIS project: impact of environmental stress on seabird movements and infectious transmission in the Mediterranean Sea - Florence Nono Almeida & Karen Mc Coy (CNRS)

In the context of the very high impact of plastic pollution on biodiversity, this thesis focuses on micro-plastic in the Mediterranean Sea, a hotspot of plastic pollution in the world.

The Yellow-legged Gull is used as a bio-indicator to determine the quantity and type of plastic ingested by seabirds. Necropsies are used to analyze the plastic inside the digestive system, and then to analyze the potential presence of microplastics. Research on plastics has been done everywhere in the bird's body. The results are clear with 96,67% of Gulls with plastic inside, mostly found in ventricle and then digest system and intestine. Moreover, 15% of pellets contain plastic, and the most common type of plastic is micro-plastic (97%)

5- Assessment of the incidence of plastic ingestion by seabirds from the Bay of Biscay by bird necropsies and bird pellets - Javier Franco (AZTI)

In the context of the OSPAR Commission, Northern fulmar (*Fulmarus glacialis*) is used as a sentinel species to evaluate the 'Ecological Quality Objective with' (EcoQO). But the Bay of Biscay is a big area for wintering and migratory seabirds, in addition to resident species for breeding season.

So, in order to assess plastic ingestion by different species in the area and to assess various methodological approaches considering seabirds

community, the AZTI group have been studying two main target groups (wintering and migratory species, and resident species). They used necropsies of carcasses and pellet analysis from 359 birds of 18 species over 10 years. They characterised plastic by colour, type and size before analysed the Frequency of Occurrence, factors influence, etc.

Considering bird pellet analysis, although the number of samples from each colony was low, the Frequency of Occurrence was 10%, like other study from 2010 and 2019. The two main type of plastic found were fragment (50%) and thread (40%), mostly white-clear of black colours. IN pellet, microplastic were the most abundant by size (70%).

The results of the necropsies shown that 14% of the individuals of 13 species have plastics inside their bodies, and that for some of the species 100% of the birds had. The incidence of plastic ingestion by seabirds in the Bay of Biscay has been shown to be like the level found in other marine regions for the same species. Same as in the pellet, fragment (70%) and thread (20%) were the most type of plastic, and the colours was black and white-clear.

The results of this assessment in the Bay of Biscay are relevant about the good option to assess the spatial and temporal variation of marine plastic pollution via pellets analysis, although in some areas sampling is not easy. It concludes that more studies are needed to evaluate the presence of plastic in stomachs. The combined analysis of seabird pellets and stomach contents with necropsies seem to provide a more comprehensive record of marine plastic pollution than a single approach alone.

6- Northern fulmar and plastic distribution at sea in North Atlantic - **Françoise Amelineau (ENS Rennes)**

Northern fulmar are indicator species of plastic pollution in the North Atlantic Ocean (OSPAR Convention). The aim of this OSPAR work is to have less than 10% plastics in stomach birds, a rate which is currently around 50%.

In this context, SEATRACK project wants to calculate the risk of plastic ingestion depending on the location of the birds and plastic pollution. Their hypotheses are (1) there are differences between colonies depending on exposure during non-breeding season and (2) there is a correlation with corresponding EcoQO values for those regions.

By recording models mounted on coded leg rings of 382 individuals from 11

colonies (between 2006 and 2021), *...to be completed by the presentation (on request).*

7- LIFE SeaBiL Necropsies methodologies and results – **Jérôme Fort (LIENSS) & Monica Exposito Granados (UCA)**

For the LIFE SeaBiL, necropsies have been carried out to evaluate the plastic contamination in seabirds wintering along the coast of France, Spain and Portugal and to run preliminary analyses to propose one or several bioindicator species for the area.

The methodology was to use bird carcasses from French, Spanish and Portuguese wildlife rescue centres. The bird must have been dead within 24h and not been fed. They also used stranded birds found on beaches. At the end, 273 carcasses were necropsies and analyzed for plastic content. In addition to this analysis, all the tissues were collected to supply the tissues bank.

In French, 82 seabirds were analyzed, from 6 different species. All birds necropsied were dead of starvation. In Spain, 195 birds, from 15 species, were collected between 2022 and 2024.

The necropsies have been carried out through two phases, following the standard protocol, e.g. OSPAR ecoQO:

1) Extraction of all plastic particles from digestive track using a binocular loupe, plus infrared spectroscopy to validate these particles were plastics and if so, characterize them (number, type, size, colour, etc.)
2) Digestion of the entire digestive tract using 30% hydrogen peroxide for 48-72 hours, followed by filtration and analysis using a Spotlight Fourier-transform infrared spectroscopy (FTIR)

The results in France were quite small and unexpected. Only one of the 82 analyzed birds had confirmed plastic particles in its digestive track (with phase 1). For phase 2, over the 5 individuals tested, 4 of them contain plastics particles.

In Spain, the results were only relevant for three of the 15 species collected, because their sample of individuals tested was larger, the other species having only 1 or 3 individuals collected. The frequency of plastic occurrence for these three species was between 30 and 65%. Microplastics (1mm - 5mm) were the size of plastic most present, at 66%, followed by meso-plastics (5mm - 25mm) at 20%. The most common type of plastic was

fiber (80%), followed by plastic film (15%) and fragments (2%). Finally, the most dominant colors found in plastics were transparent (49%), blue (21%) and black (18%).

8- Main point discussions with the public

During the workshop, several key points were raised concerning details of research methods and the future of the LIFE SeaBiL project.

First, the origin of plastic is often poorly identified, or impossible to determine, which makes the fight against this pollution complex.

The analysis of regurgitation of pellets seems to be a promising method, but it still presents technical challenges (such as access to the pellets, the species, etc.).

As with all scientific research, the financial costs associated with the work are always an issue, so if we are to continue this work, particularly research into microplastics, greater technical and financial resources will be needed in the future.

Secondly, access to tissue banks was identified as a key issue for researchers. They all see it as an effective way of sharing data and information. Everyone would like to establish a simple protocol allowing anyone to access the tissue bank on request. A map of all the samples has been proposed, to show where samples have been sent in Europe, and to create links between the partners. What's more, once the samples have been shared, everyone would like to share the knowledge acquired and the data obtained. A common database, accessible to all, was proposed to facilitate the exchange of information and encourage collaborative work.

Indeed, as in all LIFE projects, the importance of continuing to work together in a coordinated fashion was emphasized, in order to strengthen the impact of research and find sustainable solutions, particularly for the AFTER-LIFE period.

Finally, the question of adapting the work carried out in the Atlantic to the Mediterranean was also discussed. The environmental conditions and species present differ between these two areas, requiring specific adaptation to ensure the relevance of the research, particularly in the choice of indicator species. Similarly, major differences between France and Spain were highlighted in the results, both in terms of conditions and the species studied. It is therefore necessary to adapt the work to the local conditions of the sites/species studied, and therefore to continue

discussions on the harmonization of research protocols on plastic pollution and the impact on seabirds.

CONCLUSION

Studies on the impact of plastic on seabirds are numerous and varied. There are many different techniques, depending on the research objectives.

Necropsy is one method that appears to be effective in determining plastic contamination in seabirds. It appears to be useful for following the causes of death of birds, and the spatial and temporal evolution of plastic pollution in the marine environment. However, **combining necropsies with other analysis methods**, such as the analysis of pellets, would probably be even more effective.

The results of the various necropsies presented by the partners at this workshop seem to be similar; **plastic is very present in the bodies of the seabirds studied**, whether they are migratory or resident. Microplastics (1mm to 5mm) are generally the most present. They are most often in the form of plastic fragments or fibers, and are white, clear or even transparent, or black or grey in color.

This highlights the **need to work together** on these issues, to minimize financial costs on the one hand, but above all **to propose harmonized and effective research methods and protocols** on the other.

To continue to develop research methods and increase our knowledge of the impact of plastics on biodiversity, the project partners emphasized at the workshop the **need to work together and to share and exchange their data (via databases and tissue banks in particular)**. Especially as there is still a lack of knowledge about the precise origin of plastics. With the aim of reducing plastic waste at source, it is therefore important to continue research and development in this area.

APPENDICES

Presentation available on request