(Projects funded under the Call 2014 onwards must use this format)

LIFE Project Number

LIFE17 NAT/HR/000594

Final Report

Covering the project activities from 01/09/2018 to 31/12/2023

Reporting Date[1]

31/03/2024

LIFE PROJECT NAME or Acronym

LIFE Artina

Data Project

Project location:	Croatia & Malta
Project start date:	01/09/2018
Project end date:	31/08/2023 **Extension date:** 31/12/2023
Total budget:	€ 1,921,387
EU contribution:	€ 1,152,832
(%) of eligible costs:	60%

Data Beneficiary

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[1] Include the reporting date as foreseen in part C2 of Annex II of the Grant Agreement

This table comprises an essential part of the report and should be filled in before submission

Please note that the evaluation of your report may only commence if the package complies with all the elements in this receivability check. The evaluation will be stopped if any obligatory elements are missing.

Package completeness and correctness check	
Obligatory elements	**✓ or N/A**
Technical report	
The correct latest template for the type of project (e.g. traditional) has been followed and all sections have been filled in, in English *In electronic version only*	✓
Index of deliverables with short description annexed, in English *In electronic version only*	✓
Mid-term report: Deliverables due in the reporting period (from project start) annexed Final report: Deliverables not already submitted with the MTR annexed including the Layman's report and after-LIFE plan Deliverables in language(s) other than English include a summary in English *In electronic version only*	✓
Financial report	
The reporting period in the financial report (consolidated financial statement **and** financial statement of each Individual Beneficiary) is the same as in the technical report with the exception of any terminated beneficiary for which the end period should be the date of the termination.	✓
Consolidated Financial Statement with all 5 forms duly filled in and signed and dated *Electronically Q-signed or if paper submission signed and dated originals* and in electronic version (pdfs of signed sheets + full Excel file)*	✓
Financial Statement(s) of the Coordinating Beneficiary, with all forms duly filled by each Associated Beneficiary and of each affiliate (if involved), ed in (signed and dated). The Financial Statement(s) of Beneficiaries with affiliate(s) include the total cost of each affiliate in 1 line per cost category. *In electronic version (pdfs of signed sheets + full Excel files) + in the case of the Final report the overall summary forms of each beneficiary electronically Q-signed or if paper submission, signed and dated originals**	✓
Amounts, names and other data (e.g. bank account) are correct and consistent with the Grant Agreement / across the different forms (e.g. figures from the individual statements are the same as those reported in the consolidated statement)	✓
Mid-term report (for all projects except IPs): the threshold for the second pre-financing payment has been reached	N/A
Beneficiary's certificate for Durable Goods included (if required, i.e. beneficiaries claiming 100% cost for durable goods) *Electronically Q-signed or if paper submission signed and dated originals* and in electronic version (pdfs of signed sheets)*	✓
Certificate on financial statements (if required, i.e. for beneficiaries with EU contribution ≥750,000 € in the budget) *Electronically Q-signed or if paper submission signed original and in electronic version (pdf)*	✓
Other checks	
Additional information / clarifications and supporting documents requested in previous letters from the Agency (unless already submitted or not yet due) *In electronic version only*	N/A
This table, page 2 of the Mid-term / Final report, is completed - each tick box is filled in *In electronic version only*	✓

**signature by a legal or statutory representative of the beneficiary / affiliate concerned*

1. Table of contents

2. List of key-words and abbreviations

- AG – Audouin's gull
- AIS – Automatic Identification System
- BIOM – Association BIOM
- BL – BirdLife
- BLECA – BirdLife Europe and Central Asia
- BLM – BirdLife Malta (BirdLife Partner Malta)
- CINEA – European Climate, Infrastructure and Environment Executive Agency
- DoF – Directorate of Fisheries at the Ministry of Agriculture
- EC – European Commission
- EMFAF – European Maritime Fisheries and Aquaculture Fund
- GPS – Global Positioning System
- GSM – Global System for Mobile Communications
- GFCM - General Fishing Commission for the Mediterranean
- HAZU – Institute of Ornithology (Croatian Academy of Sciences and Arts)
- IAS – Invasive Alien Species
- IUCN - International Union for the Conservation of Nature
- IBA – Important Bird and Biodiversity Area
- IOF – Institute of Oceanography and Fisheries
- Lastovo NP – Public Institution Nature Park Lastovo Islands
- KPI – Key Performance Indicator
- LIPU – Lega Italiana Protezione Uccelli (BirdLife Partner Italy)
- MoA – Ministry of Agriculture
- MoESD - Ministry of Economy and Sustainable Development
- MTF – Marine Task Force
- PMB – Project Management Board
- PSB – Project Scientific Board
- PSC – Project Steering Committee
- RSPB – Royal Society for the Protection of Birds (BirdLife Partner UK)
- SPA – Special Protection Area
- SS – Scopoli's shearwater
- Sunce – Association Sunce
- UHF – Ultra high frequency
- VMS – Vessel Monitoring System
- YLG – Yellow-legged gull
- YS – Yelkouan shearwater

3. Executive Summary (maximum 2 pages)

The LIFE Artina project was a nature and biodiversity conservation initiative (2018 – 2023), with the aim to improve the conservation status of three seabird species in Croatia: Audouin's Gull *Larus audouinii* (AG), Yelkouan Shearwater *Puffinus yelkouan* (YS) and Scopoli's Shearwater *Calonectris diomedea* (SS). The project was designed to tackle major conservation issues regarding these three pelagic seabird species, preparing the ground for their recovery in two neighbouring marine Special Protection Areas (SPAs) in the south of Croatia, namely the SPA Lastovsko otočje and the SPA Pučinski otoci.

To achieve this the project set out three key objectives, namely:

1. Identify marine SPAs at sea in (southern) Croatia for AG, YS and SS.
2. Understand and assess the main threats affecting seabird populations on land and at sea in the project area and define actions to mitigate them.
3. Eradicate terrestrial invasive species (ship rats *Rattus rattus*) on shearwater breeding colonies and control of Yellow-legged Gulls *Larus michahellis* (YLG) at breeding colonies of AG.

Threats to these three seabirds on their colonies and at-sea, as identified prior to and during the project, were predation by invasive mammalian species, negative interactions with YLG, light pollution, accidental bycatch in fishing gear, marine litter and impact from tourists and visitors.

Over the course of the project rats were permanently eradicated from six islands, and their populations were annually controlled on another five islands. The main methodology for rat removal was through rodenticide baiting (in order to target a larger number of islands in parallel), but other techniques such as cage trapping followed by cervical dislocation and the use of self-resetting A24 GoodNature traps were carried out in parallel to obtain the best results. A feasibility study carried out on the island of Sušac also showed that a future project could consider upscaling these efforts and permanently remove rats from this large, remote island.

The eradication and control of rats had immediate positive effects on YS and SS breeding activity and reproductive success. The breeding success of YS went up from 35% to 76%, while that of SS went up from 45% to 63%. The number of pairs attempting to breed on each of the islands also increased after rat removal with 569 YS found during the last full census in 2022 (compared to 91 in 2019) and 369 SS (compared to 96). The increase in breeding pairs was also the result of improved nest monitoring efforts, which led to the detection of six previously unknown shearwater colonies as well. The project also developed a shearwater call recognition software which allows for population monitoring of inaccessible locations by means of sound recorders. This new application could be useful across their Mediterranean breeding range.

On the other hand, the breeding population and reproductive success of AG fluctuated strongly from year to year. While the removal of rats was successful and resulted in the majority of AG (historical) breeding islands now being rat-free – including the entire Vrhovnjaci archipelago between Lastovo and Mljet – their main threat of competition with and predation by YLG could not be mitigated during the project. While YLG egg piercing was trialled during two breeding seasons, the method was abandoned because AG changed breeding sites annually making it difficult to target the conservation efforts. The number of YLG can probably only really be decreased if improved waste management practises are carried out on a regional scale.

To improve the protection of seabirds at sea, the project carried out 192 boat-based transects around the SPA Lastovsko otočje, and deployed a total of 40 YS, 40 SS and 25 AG with GPS-tags in order to track their movements. The analyses of these data with the BirdLife Marine Toolkit identified 5 new marine Important Bird & Biodiversity Areas (IBAs) and proposed extending the borders of two existing IBAs to include key foraging and roosting sites. Two of these sites (Sjeverni Jadran & Lastovski Kanal) were eventually, in June 2025, designated as marine SPAs and included in the Natura 2000 network of Croatia.

One of the main threats at sea, in particular in the new marine SPAs, is accidental seabird bycatch in fishing gear. LIFE Artina influenced the fisheries policy in Croatia for it to recognize this threat and to start implementing real conservation measures. Together with six fishermen the project carried out the first testing of mitigation measures (weighted demersal longlines, hook-shielding devices in pelagic longlines (hookpods), and LED lights in gillnets) in Croatia. While the road for change is still long, the first official report of a bycaught seabird was actually registered during the project.

The systematic marine litter monitoring carried out in SPA Lastovsko otočje was the first of its kind in a marine protected area in Croatia, and the national monitoring protocol was updated based on the results. The issue of marine litter was also a great proxy for awareness of the general public by engaging them in a total of 31 beach and sea floor clean-up activities, removing 14 tons of litter.

Other awareness raising activities in the project area included amongst others an exhibition about seabirds, posters on the Split-Ubli ferry line, the opening of a seabird trail and an annual seabird event on Lastovo. The newly recognized threat of light pollution was addressed by talking to local restaurant owners, as well as by creating leaflets about the issue, and about what to do when finding stranded birds, which were distributed in the community. Furthermore, the project conducted a total of 71 workshops, 5 field visits and 5 boat trips for a total of 215 children from Lastovo, Vis and Korčula. While the COVID-19 pandemic hindered many of the in-person events at first, the team adapted its meetings according to what was allowed and postponed some other activities until after the pandemic.

Networking visits took place to LIFE Diomedee, LIFE PanPuffinus! and Biosecurity for LIFE, focusing on a variety of topics to gain expertise and exchange best-practises. At the same time, the acquired knowledge was shared nationally with other Public Institutions and protected area management bodies through a series of webinars, as well as through in-person visits showcasing methodologies and (monitoring) protocols. The inspiring networking and in-person replication visits eventually led to the successful application of the new LIFE TETIDE project focused on island biosecurity with new national and international project partners.

Towards the end of the project, a 3-day closing conference was organized which was attended by 45 participants. The conference book of abstracts can be downloaded from the project website, along with 30+ other technical reports regarding specific project activities, including also the results of the public attitudes surveys carried out among different stakeholder groups (fishermen, local community, school children and tourists) at the start and end of the project, a layman's report and the After-LIFE plan. Lastly, two videos were produced highlighting the project in general, and the work with fishermen on seabird bycatch mitigation, which can both be viewed on the project's website too.

www.lifeartina.eu

4. Introduction (maximum 2 pages)

The LIFE Artina project is a nature and biodiversity conservation initiative, aiming to improve the conservation status of three seabird species in Croatia: Audouin's Gull and two shearwater species, i.e. Yelkouan Shearwater and Scopoli's Shearwater. The project is designed to tackle major conservation issues regarding the three pelagic seabird species, preparing the ground for their recovery in two neighbouring marine SPAs in the south of Croatia, namely the SPAs Lastovsko otočje and Pučinski otoci.
SPA Lastovsko otočje encompasses the island of Lastovo with approximately 700 inhabitants. Most of them are economically dependent on tourism, whereas fishery makes only a minor part of the local economy. Since tourism is regarded as a minor threat to the three target species – they breed quite elusively on the surrounding islets of the Lastovo archipelago – it is not expected that the conservation actions will affect the local economy in a negative way. On the contrary, increased knowledge about the target species, which are attractive for birdwatching, may lead to new touristic offers and products in the future.
The Palagruža islands of the SPA Pučinski otoci are so remote that there is almost no tourism. On the island is a lighthouse whose operation does not interfere with conservation actions. Fishermen who fish with longlines in the marine area around Palagruža will not suffer any economic losses by using bird-friendly fishing gear.
Vision of LIFE Artina is that "Adriatic Sea in southern Croatia with its archipelagos will be effectively managed to favour the conservation of seabirds in the long-term". With that vision in mind, the following three main objectives were formed:

1. To identify marine SPAs at sea in southern Croatia for the Audouin's Gull, the Scopoli's Shearwater and Yelkouan Shearwater

This will be reached by comprehensive assessment of the target species at sea through individual tracking of "representatives" of the breeding population that will reveal movement patterns at sea and that will enable identification of significant foraging and roosting areas at sea. At least 40 SS, 40 YS and 20 AG will be individually tracked with remote sensing equipment by the end of the project. Moreover, tracking data will be complemented with extensive boat surveys covering 9 nautical miles of transects around SPA Lastovsko otočje following a standardised survey protocol. Tracking and transect data will be analysed in order to identify significant foraging and roosting areas at sea of the target species.
The number of newly found SPAs will vary since the collected data will be scientifically scrutinised. It is expected that at least 2 SPAs will be designated as a direct result of the project. A GIS-based database with all collected data will be established and shared with decision makers and relevant stakeholders.

2. To understand and assess the main threats affecting seabird populations on land and at sea in the project area and define actions to mitigate them

Objective 2 will be reached by collecting extensive field data of SS, YS and AG at breeding colonies and at sea. The project area is being mapped for yet unknown breeding colonies of the target species whereas known colonies are intensively monitored in order to measure reproductive output and to identify and assess threats via direct observations, camera traps and video monitoring. Interactions with fisheries and possible bycatches will be assessed through direct observations and interviews with fishermen. Identified threats and mitigation measures will be addressed in stakeholder meetings; conservation measures and monitoring protocol for

target species and for threats will be elaborated. Main threats recognized so far and targeted by the project are:

- Predation by invasive mammals, namely black rats
- Interspecific competition between AG and YLG
- Bycatch in fishing gear
- Lack of data
- Impact of visitors and tourists
- Marine litter
- Lack of capacity of park authority managing the area

3. To eradicate terrestrial invasive species (black rats) on shearwater breeding colonies and control of Yellow-legged Gulls at breeding colonies of Audouin's Gulls

This objective will be reached by an assessment of black rat presence and YLG distribution and abundance at the breeding colonies of the target species. After initial assessment, a rat eradication/control program is initiated in order to completely eradicate rats from islets where it is feasible or to significantly reduce their abundance on breeding colonies of the shearwaters and AG. YLG are being prevented from breeding or their offspring numbers are being significantly reduced via egg piercing at AG breeding sites.
An expected result of this objective is the improved conservation status of the AG, the SS and YS, aiming for a 10% increase in the number of breeding pairs and a 25% increase in their reproductive success. Also, rat removal/reduction on at least 10 islands is expected to positively affect other non-target native species such as lizards.

The project further has a strong result-dissemination and awareness raising component, organising 7 workshops and conferences, 8 public events, producing and distributing more than 60.000 promotional materials and placing 3 educational boards in SPA Lastovsko otočje.
As for the replicability and transferability of solutions proposed within the project, we hope that another LIFE project will be implemented in a new geographic areas, namely Sušac island (for which the feasibility study is being conducted within the framework of LIFE Artina), and SPA Pučinski otoci (which is included in LIFE Artina only with regards to field surveys and potential bycatch mitigation measures, as there was not enough capacity to implement the project in all aspects in both SPAs). Additionally, we hope to transfer the know-how to other SPA management authorities, in the Southern Adriatic, where seabirds are present, in particular eradication measures relevant for black rats. These can also be transferred on small Indian mongoose, an IAS present at neighbouring SPA National Park Mljet for example.

5. Administrative part (maximum 1 page)

The partnership is well balanced with each beneficiary bringing its own expertise. BIOM has experience in seabird conservation, project management and working with national and international stakeholders. Sunce has expertise in cooperation with fishermen, awareness raising and education, and the issue of marine litter. Lastovo NP has experience with education and awareness raising activities and is key to cooperation with local stakeholders, as well as ensuring the project's sustainability. BLM mostly had a mentoring role because they have previous experience on implementing (seabird-related) LIFE projects.

The Project Management Board (PMB) was formed at the beginning of the project and initially had quarterly meetings, which later transitioned to bi-monthly online meetings. The PMB met once a year in person, back-to-back with the monitor visit, but during the COVID-19 pandemic, this was also moved to online. Project internal technical and financial reporting was regular – all partners reported quarterly to the coordinating beneficiary. In addition to the PMB, a Project Steering Committee (PSC) was formed, consisting of representatives of each of the Croatian project partners, as well as of the Ministry of Agriculture - Directorate of Fisheries (MoA-DoF) and the Ministry of Economy and Sustainable Development (MoESD). Most of its members also took part in the working group for designating marine SPAs.

Generally, there were no significant deviations from the work plan, but the COVID-19 pandemic delayed the implementation of some of the foreseen activities. Furthermore, in August 2021, BIOM made changes to its policy on the implementation of the procurement procedure and public procurement thresholds in accordance with Croatian national legislation. Since then, all public procurements were conducted according to the new policy. Over the course of the project, there have been several staff changes, but these did not affect the implementation of the work. In BIOM, personnel for the roles of project administrator, conservation manager and GIS expert all changed during 2019. In the beginning of 2022, the project administrator changed once more, and in June 2023 the project manager changed as well. While the project had budgeted two project officers, the work for these positions was carried out by a variety of staff during the implementation of the project. For the role of skipper an employment contract was arranged for the first 3 years of the project (as project officer), but during 2022 and 2023, when gaps between periods of fieldwork became bigger and no long-term presence on Lastovo was required, skippers were contracted as external assistance through service contracts. In Sunce, the project fishery and marine litter officer position was shared by several persons, one person needed to work more on specific expertise related to fishery and another on marine litter. Also there was a lot of workload at the same time that needed to be spread to several persons. This was also the main reason for several persons working on the position of the project education and awareness rising officer, especially during COVID. In addition, there were few changes of staff due to maternity leave and replacements with newly hired persons. In BLM two finance and administration officers were sharing a position until December 2019. Afterwards all the work was done by one person, who left BLM at the end of 2022, and was replaced with a newly hired person.

Communication with our monitor from NEEMO (later ELMEN-EEIG), Nikica Skroza, worked very well. During the course of the project twenty notifications were sent to and approved by the monitor. For substantial changes the communication also included the project advisor, Manuela Osmi. Furthermore, two amendments to the Grant Agreement were submitted, both of which were approved. The first one was to inform the change of the legal address of the coordinating beneficiary (submitted together with the midterm report). The second one, submitted in June 2023, asked for a 4-month extension of the project, some final budget reallocations and the extension of the due dates of some project deliverables.

6. Technical part (maximum 25 pages)

6.1. Technical progress, per Action

A.1 Field surveys for gathering baseline information on seabird colonies, assessing their size and measuring reproductive outputs in the project area

Foreseen start date: 01/09/2018 Actual start date: 01/09/2018
Foreseen end date: 31/12/2020 Actual end date: 31/12/2020

The project team was assembled, a project vehicle and boat purchased, as well as other field equipment (e.g. binoculars, camera traps, SLR camera, GPS devices and sound recorders). Prior to starting the fieldwork in Croatia, 24-28 February 2019, one staff member from BIOM and one from Lastovo NP visited BLM to learn more about shearwater censuses, tagging, rat detection and eradication techniques.

A 1.1 Systematic mapping of colonies by both boat and land based surveys

Nocturnal and diurnal boat-based field surveys were carried out to map all the colonies of shearwaters and AG in the SPA Lastovsko otočje. For AG this survey was carried out each year because the species changes its breeding locations annually. Inaccessible places with suspected breeding of shearwaters, as well as remote islands (e.g. Palagruža), were monitored by sound recorders. During the first two years of the project one small, new YS colony was found on the island of Vlašnik, and two new SS colonies were found on the islets of Pod Kopište and Gornji Lukovac. Sound recorders also confirmed breeding of YS on Palagruža.

A 1.2 Systematic assessment of colony sizes

Shearwater colony sizes were assessed during daytime when nesting cavities were surveyed thoroughly using headlights and a GPS. In 2019, 91 breeding pairs of YS were found on 5 islands and 96 breeding pairs of SS on 13 islands. The year after we found 312 nests of YS on 6 islands, and 254 SS on 13 islands. The increase in breeding pairs was due to improved nest searches, as well as due to the start of the rat eradication work in 2020 (as part of Action C.2). The number of AG breeding pairs was 29 on 2 islands in 2019, and 35 on 6 islands in 2020.

A 1.3 Assessment of reproductive output on major seabird colonies

Shearwater nests were visited three times per season (late March, early May, and mid-June for YS; mid-June, mid-July and late Sept. for SS) coinciding with their incubation, hatching and fledging. Some nests were monitored with the help of camera traps. Breeding success was based on the percentage of nests containing a near-fledged chick during the third visit. All accessible chicks were ringed. AG pairs were counted in early May, and colonies were visited again in mid-June to count and ring the chicks. Breeding success of YS across all colonies was assessed to be 35% in 2019 and 76% in 2020; for SS it was 46% in 2019 and 51% in 2020; and for AG it was 2% in 2019 and 20% in 2020. The number of ringed chicks in 2019 and 2020 was 39 and 100 respectively for YS, 15 and 13 for SS and 0 and 17 for AG.

All data collected through activities A.1.1, A.1.2, A.1.3 are described in the overall site assessment report (Deliverable A.1, 12/2020), were entered into the database developed under A.4, and will be used as a baseline for monitoring the effect of the conservation work. All activities were implemented by BIOM, and training by BLM.

A.2 Surveys to assess and quantify relevant threats for seabirds on sea

Foreseen start date: 01/09/2018 Actual start date: 01/09/2018
Foreseen end date: 31/12/2020 Actual end date: 31/05/2022

A.2.1 Fisheries and seabirds interactions assessment

The extent of seabird bycatch in the Croatian part of the Adriatic was unknown at the beginning of the LIFE Artina project. In cooperation with the Institute of Oceanography and Fisheries (IOF), the fishing fleet and gear with potential impact on seabirds were analysed in SPAs Lastovsko otočje and Pučinski otoci, as well as surrounding fishing areas. Longlines and set nets were identified as gear with the highest potential for seabird bycatch. A questionnaire for fishermen about interactions with seabirds was designed together with the Institute of Social Sciences Ivo Pilar, after which the impact of fishing activities on seabirds was assessed through 29 interviews with fishermen in Komiža (Vis), Vela Luka (Korčula), and Lastovo in 2019 and 2020. While interviews with up to five additional fishermen from Split and Zadar were also planned, they were cancelled due to COVID-19 pandemic. One fisherman from Dugi Otok was interviewed instead. The results showed that seabird bycatch on fishing gear is not negligible, occurring most often after setting longlines in the sea, before the bait sinks, or when birds get entangled in nets or lines. The results and recommendations for improvement of collaboration with fishermen are summarised in the "Report on the extent of use of fishing gear with potential impact on seabirds and the extent of accidental seabird bycatch" (Institute of Social Sciences Ivo Pilar, 2020). During the meetings with fishermen and experts from IOF in 2021, it was established that floating longlines are also used in the project area, and an additional 3 questionnaires were conducted with fishermen using this gear. Working boots and raincoats with the project logo were provided as a gift to the fishermen that participated in the project. It was evident from the questionnaires and conversations with fishermen that seabird bycatch occurred. However, no such incidents were recorded in official fishing logbooks or during sea monitoring by scientific observers (despite the legal obligation to do so). Mitigation measures to reduce bycatch of seabirds were identified and international good practice examples were collected. These were presented and discussed with fishermen in Komiža (2020), Vela Luka (2021) and Lastovo (2021). As workshops were held during the COVID-19 pandemic, the response rate was fairly low with 7-8 participants each. Results and findings were summarised in Deliverable A.2 'Seabirds and fishing activities interactions assessment report' (03/2021). A meeting with MoA-DoF was held online in 2021, during which results and planned activities (to be carried out under Action C.1) were presented.

A.2.2 Marine litter threat assessment and potential mitigation measures identification

An expert from IOF, Pero Tutman, was contracted in July 2019 to support the development and implementation of the marine litter monitoring plan. The monitoring of marine litter was conducted on the sea surface and on three beaches located in the Lastovo Islands Nature Park. During the project four monitoring events were carried out (10/2019, 05/2020, 10/2020, 05/2021) with Lastovo NP participating in all of them. After each monitoring, the expert delivered a small report, and after the final one, a comprehensive technical report including mitigation measures (Deliverable A.2, 12/2021). The data revealed that plastic was the most common type of litter found on beaches (94.94 %) and on the sea surface (95.93%). In collaboration with Lastovo NP, a marine litter monitoring plan for SPA Lastovsko otočje was created (Deliverable A.2, 05/2022). The protocol was demonstrated during the clean-up action on Kremena beach in 2022. This activity was implemented by Sunce.

A.3 Field surveys to assess and quantify all relevant threats operating at seabird colonies

Foreseen start date: 15/03/2019 Actual start date: 13/03/2019
Foreseen end date: 31/12/2020 Actual end date: 31/12/2020

A 3.1 Assessment of mammal predation impact on colonies reproductive output

All islands with confirmed breeding of shearwaters and/ or AG (13 islands in total) were checked for rat presence through a variety of detection methods (e.g. searching for faeces, installing camera traps on bird nests, placing wax blocks to monitor for bite marks). Subsequent visits to islands also confirmed rat presence as especially shearwater nests were found with predated eggs and chicks inside. Dr Karen Varnham (biosecurity expert) and Martin Austad from BLM joined BIOM staff during field surveys on several islets around Lastovo between 29th April and 6th May 2019. Rat presence was confirmed for all islands and a rat eradication/ control plan was written to outline the next steps for rat population control on these islands (Deliverable A.3, 12/2020) to be carried out under Action C.2

A.3.2 Assessment of impact of Yellow-legged Gulls on the Audouin's Gull in SPA Lastovsko otočje

Monitoring of gull colonies in the Lastovo Archipelago was carried out in spring 2019 and a total of 1621 breeding pairs of YLG was observed, with the species being present on pretty much every island in the archipelago (Deliverable A.3 Yellow-legged gull breeding population assessment report, 09/2019). AG was found breeding on only 2 islands with a total of 29 breeding pairs. On these two islands camera traps were installed to monitor the AG nests. The camera footage clearly shows disturbance of nests, and predation of eggs and chicks by YLG. Mitigation measures were discussed with a gull expert and carried out under Action C.3

A.3.3 Assessment of recreational activities impact on seabird colonies

During the field visits in 2019 and 2020 several situations/ activities were observed which could negatively affect breeding seabirds. These threats are discussed in Deliverable A.3 'Overall site assessment of threats' (Deliverable A.3) which was combined with the other A.3 deliverable 'Technical report on recreational activities' (as it is one of the threats) and finalised by 12/2020. Observed threats include predation by introduced invasives; negative interactions with other native species; marine litter found on seabird islands and in their nests; tourists and locals (and their pets) visiting islands with breeding seabirds; recreational fishing; ongoing development of the coast of Lastovo (apartment buildings); light and sound disturbance from anchored yachts; light pollution from nearby restaurants and towns, particularly Zaklopatica. In July, when young YS leave their nest for the first time, the artificial lights are confusing and attract them towards the main island where they fall victim to collisions with buildings, cars driving over them or dogs attacking them. This observation was used to create additional materials for awareness raising under action C.6

All activities were implemented by BIOM.

A.4 Create a comprehensive GIS database for seabird colonies

Foreseen start date: 01/09/2018 Actual start date: 01/09//2018
Foreseen end date: 31/12/2021 Actual end date: 31/12/2021

Baseline data gathered during the A.1 and A.3 actions (including seabird colony locations, threats present at colonies, GPS points for each of the nests, information on breeding success, numbers of birds ringed) was compiled into a single database. The accompanying report with island-specific information (Deliverable A.4 Report on seabird populations in SPAs Lastovsko otočje and Pučinski otoci, including site locations, population numbers, reproductive success, threats and proposed site specific actions) was produced by 12/2020. Throughout the implementation of the project the database was updated with relevant data gathered through Actions C.2, C.3, C.4 and D.1, and will continue to be used and updated after the project is finished.
This activity was implemented by BIOM.

A.5 Complete a feasibility study for invasive mammal eradication at seabird colonies on Sušac Island within the SPA Lastovsko otočje

Foreseen start date: 01/01/2019 Actual start date: 01/01/2019
Foreseen end date: 31/03/2021 Actual end date: 30/09/2022

For this activity the RSPB was subcontracted as expert consultant in the persona of Dr. Karen Varnham. Martin Austad from BLM and Dr. Varnham visited the Lastovo Archipelago, and the island of Sušac, in May 2019. After that the report recommending rat eradication/control techniques on Sušac, and Lastovo Archipelago as a whole was drafted, and completed with comments from BIOM (Deliverable A.5, 10/2019). It informed the activities to be carried out under Action C.2 and also listed some recommendations for the data collection required to develop and inform the feasibility study for complete rat eradication on Sušac. A second visit by BLM and Dr. Varnham to Sušac was planned for September 2020, but this was eventually cancelled due to the travel restrictions due to the COVID-19 pandemic. In the end, the necessary data collection was conducted by BIOM and analysed by Dr. Varnham & BLM remotely, thereby preventing delays in the schedule.
The final feasibility study for a ground-based approach to permanently remove rats from the island of Sušac was completed by 11/2020 (Deliverable A.5). The study found the eradication by ground based methods to be feasible but presented several logistical difficulties including cliff access, cutting trails through dense vegetation and lack of infrastructure to house a large team for several months on the island. The report recommended also to evaluate the possibility of eradication through aerial means. In order to tackle some of these suggestions already, Action A.5 was extended to September 2022.
The Sušac case study was presented at the LIFE PanPuffinus! workshop in October 2021 (attended under Action E.4), which was also attended by Paolo Sposimo from NEMO. Mr. Sposimo is a specialist in aerial baiting, a technique which he performed on several Italian islands during different LIFE projects (incl. LIFE Diomedee, which would be visited as part of Action E.4 Networking). Mr. Sposimo visited Sušac in May 2022 and delivered a report on the feasibility of eradicating rats from the island by aerial means. In the same year, BLM visited Sušac again together with BIOM to assess cliff accessibility on site, the conclusions of which were written up by September 2022. Both reports were added to the one about the feasibility of a ground-based approach creating the final feasibility report. The main conclusion of these studies was that both ground-based and aerial approaches are within LIFE funding which would ensure capacity for the project, but that an aerial approach would be less expensive and complex. The latter, however, would require legal derogation from the EU Biocide Regulation for aerial broadcast. The final conclusions of the work were presented at the Biosecurity for LIFE conference in Edinburgh (March 2023), as well as at the project closing conference in Croatia (May 2023).
This activity was implemented by BLM with support of BIOM.

C.1 Reduce the impact of fishing activities on seabirds by identifying and promoting best practice solutions

Foreseen start date: 01/07/2020 Actual start date: 01/07/2020
Foreseen end date: 30/06/2023 Actual end date: 30/06/2023

The sporadic bycatch of seabirds and limited field knowledge on technical specifications and effectiveness of alternative fishing gear in Croatia, as identified under Action A.2, resulted in changing the project approach (as notified to the project monitor in 06/2021). It was decided to test gear replacement with a small group of fishermen to evaluate the feasibility of applying these solutions in Croatia, considering the specificities of vessels, gear, and fishing methods. The changed approach as well as the restrictions arising from the COVID-19 pandemic delayed some aspects of this activity.

In 2022, IOF was subcontracted for the support in defining technical specification of bycatch reduction fishing gear and its testing. Fishing gear and equipment were purchased for 3 mitigation measures: Hookpod Mini (100 pcs) for pelagic longlines, LED lights (100 pcs) for nets, and demersal longlines with additional weights (250 hooks in total). Also, ice boxes were purchased as a participation reward for each fisherman involved in testing of the bycatch reduction gear. The modified fishing gear was tested with 6 fishermen through a total of 18 fishing trips. All 3 mitigation measures to reduce seabird bycatch were tested for the first time with fishermen in Croatia and LIFE Artina was the first project to test hookpods in the Mediterranean. No seabird bycatch occurred during gear testing. The results of the interviews with the fishermen regarding the adapted fishing gear, the project and its importance are summarized in the 'report on testing modified fishing gear to reduce seabird bycatch in Croatia' (12/2022) and the collected opinions of the fishermen were also used for reports under Actions D.2 and D.4. The measure that was best evaluated by the fishermen is the use of weights on set longlines, as weights are the quickest, simplest, and easiest to use. In order to ensure fishermen's compliance, mitigation measures should be simple, appropriate for each fishing type, cost-effective, practical, safe, and accompanied by economic or social incentives. It also remains crucial to continue raising awareness among fishermen and other stakeholders about seabird bycatch and their role in it.

During the project Sunce and BIOM also participated as official members in the work of the "Committee for Monitoring the Implementation of the Program for Fisheries and Aquaculture of the Republic of Croatia 2021-2027" during which the proposal for the incorporation of bird friendly gear into the Operational programme was presented (Deliverable C.1, 08/2021). We also participated in various international and national workshops related to the bycatch (see Action E.5), as well as in the development of the "Guide for the identification and handling of sensitive marine species", which was produced by the MedBycatch project Phase 2. In 2022, a panel discussion about recommendations for reducing seabird bycatch was organised in Split, with 37 participants from the MoA-DoF, IOF, BIOM, Sunce and several fishermen. The event was also used to show the new project video on seabird bycatch and mitigation measures, followed by a press release.

All activities under the C.1 action resulted in the final report 'Recommendations arising from the testing of adapted gear to reduce accidental seabird bycatch within the LIFE Artina project', as well as a policy brief on measures to reduce the impact of fishing activities on sensitive species of seabirds in Croatia (Deliverable C.1, 09/2023), which were distributed to all relevant national and international stakeholders. Sunce also provided input related to seabird bycatch, marine litter and MPAs on the "Program of Measures for the Protection and Management of the Marine Environment and the Coastal Area of the Republic of Croatia until 2027". This activity was implemented by Sunce with support from BIOM.

C.2 Implement effective predator management and/or biosecurity across all targeted sites with seabird colonies where this management is necessary and feasible

Foreseen start date:15/01/2019 Actual start date: 15/01/2019
Foreseen end date: 30/06/2023 Actual end date: 31/12/2023

When trialling the different 'poison-free' rat eradication techniques on a few islands during the first year of the project (cage traps, snap traps, automatic traps), it quickly became clear that we had to change our main approach to rodenticide baiting (while still using mechanical methods too) in order to allow for targeting more islands in parallel and for working around bad weather days. BLM and the expert from RSPB also recommended this changed approach based on their experiences at home. At the end of 2019 the rat eradication protocol for SPA Lastovsko otočje was completed (Deliverable C.2).
In 2020, after receiving a permit from the MoESD to use rodenticide and after BIOM staff completed the education needed for working with toxic substances, a total of 13 islands with shearwater and/ or AG colonies were successfully targeted: Pod Kopište, Veli & Mali Rutvenjak; Veli & Mali Maslovnjak; Zaklopatica; Mali, Srednji & Gornji Lukovac; Donji, Srednji & Gornji Vlašnik and Obrovac. On Zaklopatica cage traps continued to be used rather than rodenticide, as the island is close to a town (with pets). Regular monitoring for surviving or reinvading rats was carried out on each of the islands. Eventually rats returned to the first 6 islands due to their close proximity to the main island. Automatic A24 traps were installed on these islands to serve as a first line of defence for returning rats, and were left there over winter too. We also trialled rodenticide baiting specifically around shearwater colonies on the island of Sušac, but this was abandoned after a year due to the remoteness of the island. A report summarizing the first two years of work was delivered by 12/2020 (Deliverable C.2).
During the following years (2021-2023), the same effort was maintained (monitoring of rat presence and restarting the work if they returned), and even upscaled to include the islands of Petrovac, Bratin and Kručica due to a second project running in parallel (Adriatic Seabird Guardians, funded by Fondation Segre). In the process, BIOM staff educated rangers from Lastovo NP about rat removal work, and as the project progressed, they supported the work more and more (skippering, baiting, trail clearing, etc.). In the final year a beech marten was recorded and subsequently removed from Zaklopatica. The final predator management and biosecurity report was completed by 11/2023 (Deliverable C.2), delayed due to the additional year of fieldwork carried out. Overall, rats were permanently removed from 7 islands, their numbers annually controlled on 6 more, and a temporary reduction was achieved on 4 more. As a result, the number of breeding pairs of YS on targeted islands increased by 77% (from 266 to 472 nests) and of SS by 27% (from 225 to 285 nests). On the same islands the breeding success of YS increased by 41% (from 35 to 76) and for SS by 27% (from 45 to 72).
Besides rats, a problem for seabirds and all kinds of other wildlife is the growing number of cats inhabiting Lastovo island (and occasionally surrounding islets). Therefore, in February 2023, Lastovo NP reallocated some money for subcontracting veterinary clinic Morna AGRO-MART d.o.o, who ended up sterilising 106 cats in the archipelago. Additionally, poor management of biological waste from restaurants on Lastovo was noted as an indirect threat for seabirds (increasing populations of both rats and YLG). Three electronic composters were purchased and tested in six restaurants during 2022 and 2023. The results were summarised in a report and presented to various stakeholders (restaurant owners, schools, PIs, utility service companies). As the tested composters were too small for handling the daily amount of restaurant waste, they were transferred for further usage to kindergartens at the end.
This activity was done by BIOM with support from Lastovo NP and Sunce.

C.3 Audouin's Gull breeding habitat improvement

Foreseen start date:01/07/2019	Actual start date: 01/01/2019
Foreseen end date: 30/06/2022	Actual end date: 30/06/2022

For this activity, a Croatian gull expert - Luka Jurinović, PhD - was subcontracted to comment on the design of the activities and to support some of the project's fieldwork activities involving gulls (population census and GPS-tagging of both AG and YLG). In his opinion, the planned soft 'breeding prevention' methods for YLG (via laser diverters and inflatable scarecrows) could not be implemented without also disturbing AG breeding on the same colonies as there is no period when YLG is exclusively present on the colonies. Instead he suggested focusing the work on egg piercing of YLG eggs (prior to the egg-laying of AG in order not to confuse the eggs of both species), and to increase rat removal efforts on key AG colonies. His report with recommendations for the conservation work to be carried out during the 2020 breeding season was finished by 01/2020 (Deliverable C.3).

In 2019, egg piercing was trialled on the island of Smokvica (Donji Vlašnik) during which 388 eggs belonging to 151 YLG nests were punctured. In the following year the efforts were upscaled to also include the nearby islands of Srednji and Gornij Vlašnik as YLG from those islands regularly visit Smokvica as well. Overall, 1373 eggs from 528 nests were pierced in 2020. Unfortunately, AG did not end up breeding on those islands that year, making it impossible to assess the impact of the YLG egg culling. As such the practice was abandoned during the remainder of the project. In 2020, rat populations were also fully removed from Donji, Srednji and Gornji Vlašnik (Action C2) and as a result all islands in the Vrhovnjaci archipelago (9 small, relatively barren islands between Lastovo and Mljet) are now rat-free. While AG did not breed on these islands in 2020, the permanent removal of rats from them will also be beneficial to AG in future years when they decide to breed there again.

The breeding population and breeding success of AG fluctuated strongly during the course of the project, and the species changed their breeding sites almost annually. For instance, in 2019 the species bred on 2 islands in the archipelago, while in 2020 it was breeding on six different islands. This aspect made it very difficult to target conservation efforts. The breeding population was highest in 2020 (35-36 bp) and lowest in 2023 (11-18 bp), whereas the breeding success was lowest in 2019 (2%) and highest in 2023 (20-33%). While these outcomes were not as positive as hoped when starting the project, the fact that most of its (historical) colony sites are now rat-free, is still a good step forward. Out of the 10 islands where AG has been observed to breed during the project, 7 are currently rat-free, and they should remain so in the future as well because they are too far away from other rat-infested colonies to be naturally colonized by rats again (>750 m).

The final report was written by 12/2022 and its title was changed to AG breeding habitat improvement report, rather than YLG nesting prevention report as it covers both the YLG nesting prevention activities, as well as the rat population control/ removal work, which together cover the conservation work carried out for AG during the project (Deliverable C.3).

Based on our new experiences with AG in Croatia, we contributed to a Mediterranean-wide initiative for a joint revision of the International Species Action Plan for Audouin's Gull (an activity of the LIFE Ilhas Barreira project - LIFE18 NAT/PT/000927), which was started during the LIFE Artina project closing conference - Action E.5.3).

This activity was implemented by BIOM.

C.4 At-sea distribution of seabird species and spatio-temporal overlap with fisheries

Foreseen start date: 15/01/2019 Actual start date: 05/01/2019
Foreseen end date: 31/12/2022 Actual end date: 31/07/2023

Bird tracking and distribution at sea

Between 2019 and 2021, BIOM staff fitted GPS/UHF devices to 40 YS and 40 SS, and GPS/GSM devices to 25 AG and 20 YLG. All birds were tagged from colonies around Lastovo during the chick rearing stage of their respective breeding cycles. Afterwards, a kernel density estimation analysis was performed on the raw tracking data to obtain core feeding and roosting areas for seabirds at sea. Combined with the colony data gathered under Action A.1, distribution maps of seabirds were created by February 2022 (Deliverable C.4).

Additionally, between May 2019 and May 2021, 12 sea transects were carried out each month (between March and October), distributed like a petal-shape around the SPA Lastovsko otočje, covering a total survey length of 8418 kilometres. In the end, only two years of sea transect data was collected, instead of the foreseen three, because it became obvious from the tracking data (which covered the entire Adriatic) that the sea transect data was spatially limited, and that two years of data would suffice for the analyses. Besides the project species, Little Gull was the most abundant species observed. The full dataset has been made publicly available on the Global Biodiversity Information Facility (GBIF): ***Engelen D, Ječmenica B, Mihalić I (2024). LIFE Artina (LIFE17 NAT/HR/000594) - Sea transect data 2019-2021 - Lastovo Archipelago, Croatia. Version 1.4. Association BIOM. Sampling event dataset https://doi.org/10.15468/zahhf8***

Both the tracking data and the sea transact data were used to inform the analyses for the marine SPA designation process, carried out under Action C.5. Furthermore, all tracking data gathered (not only by BIOM under this action, but also by BLM under Action A.1) were uploaded to the seabird tracking database (https://www.seabirdtracking.org/). This way the data can also be used for other research/ conservation purposes (with consent from the authors of course). One such example is that the tracking data was used to inform offshore sensitivity mapping for renewable energy in Italy, which was presented on a poster during the Conference on Wind energy and Wildlife impacts in Šibenik in 2023 (see Action E.5).

Overlap with fisheries

This sub-action was delayed because the Fisheries Directorate was not keen to share the VMS (Vessel Monitoring System) data. Eventually they shared some data in raw format which was both spatially and temporarily limited. Therefore, we used not only the VMS data provided by the MoA-DoF, but also AIS (Automatic Identification System) data which can be freely downloaded from the global fishing watch website. The vessel data was overlaid with the bird movement data to identify areas of possible elevated risk for seabird bycatch. BL International (subcontracted as external assistance under Action C.5) supported the analyses and it was also shared and discussed with the PSB on several meetings. The final report about seabird and fisheries interaction (Deliverable C.4) was finished in July 2023 (instead of December 2022) and presented to the members of the PSB and PSC. The results show that the highest fishing activity takes place in the Northern Adriatic and that overall the possible risk of seabird bycatch is higher within the newly designated SPAs than outside of them. One constraint is that the AIS data is biased to larger vessels, while the majority of the Croatian fishing fleet are small pelagics.

Both activities were implemented by BIOM.

C.5 Designation of new marine SPAs in Croatia

Foreseen start date: 01/01/2020 Actual start date: 13/12/2019
Foreseen end date: 30/06/2023 Actual end date: 30/06/2023

The spatio-temporal bird data collected under Actions A.1, C.4 and D.1 were used for the analyses to identify marine IBAs. For this work BL International was subcontracted as external assistance to guide BIOM staff through the Marine Toolkit and the Track2KBA methodology. BL International was also part of the PSB (formed under Action F.1.) together with staff from BIOM, BLM, BLECA, IOF and HAZU. The PSB had 4 meetings during the project period during which the progress and results of the analyses were presented and discussed.
The analyses resulted in the designation of 5 new marine IBAs and the expansion of the borders of two existing ones. The new sites are Northern Adriatic, Hvar Channel, Korčula Channel, Lastovo Channel and East Mljet Channel, while the ones suggested for expansion are Lastovo Archipelago and Offshore Islands. As the identified IBA in the Northern Adriatic is bisected by the Exclusive Economic Zone (EEZ) boundary between Italy and Croatia, both sides have been submitted separately to the IBA database by the respective BirdLife partners in both countries (LIPU and BIOM), resulting in Northern Adriatic IT and Northern Adriatic CRO. For Croatia, these are the first 'only-at-sea' IBAs to have been designated. Each of the sites can be viewed on the BL datazone (Deliverable C.5, 09/2022) and supporting information per site was uploaded to the World Bird/ Biodiversity Database (Deliverable C.5, 09/2022). An expert study "IBA Identification for seabirds in Croatia: supporting designation of marine SPAs" detailing the designation process was produced and serves as the official reference for each of these sites. The report is available for download on both the project website as well as on the BL website.
All newly designated marine IBAs and revised areas of existing IBAs were proposed for inclusion in the existing SPA networks of Croatia and Italy, submitted by BIOM to the MoESD in Croatia, and by LIPU to the Ministry of Environment in Italy (carried out under Action E.1). The names of the newly proposed SPAs would be Alto Adriatico (Italy), Sjeverni Jadran, Hvarski Kanal, Korčulanksi Kanal, Lastovski Kanal and Istočnomljetski Kanal.
Through the process of supporting BIOM to use the Marine Toolkit, BL International used the opportunity to update the toolkit and the accompanying user manual to the newest version renamed the Marine Megafauna Conservation Toolkit. The new toolkit was subsequently tested with YS tracking data from several Mediterranean BL Partners (incl. BIOM and BLM) with the aim to assess if the collective data from all organisations can help to identify knowledge gaps for the species and other IBAs across the Mediterranean and Black Seas. Most BL partners involved in this effort met during the LIFE Artina project closing conference where a special workshop was organized to start this Mediterranean-wide initiative.
This activity was implemented by BIOM, with the support of Sunce and BLM.

C.6 Mitigate the impact of site users in the areas of seabird colonies through influencing their behaviour

Foreseen start date: 01/09/2018 Actual start date: 01/09/2018
Foreseen end date: 30/08/2023 Actual end date: 30/08/2023

C.6.1 Development and distribution of seabird-friendly code of conducts for tourists

The Seabird-friendly code of conduct leaflet (for tourists and boat owners) was produced in time (Deliverable C.6, 05/2019) and distributed among visitors between 2019 and 2023 (48.000/50.000 copies - see Action D.1.3). The plan to provide nautical visitors with rubbish bags (Deliverable C.6) was abandoned as Lastovo NP realised that the collection of rubbish from nautical visitors should not be encouraged at all. It is currently best practice to ask sailors to take rubbish to the nearest land port, as waste management on remote islands cannot handle the vast amounts of rubbish produced by nautical tourists. Experience from other countries confirm that sailors, if informed properly, support this approach. The funds were used instead for additional awareness raising and management of impacts of site users.

C.6.2 Development and implementation of a voluntary seabird-friendly code of conducts for boat operators

Best practice guide for boat owners and seabird-friendly code of conducts for boat operators were merged in one leaflet to avoid making two types of leaflets with similar information. Leaflet was produced 05/2020 (Deliverable C.6) and distributed among boat owners and boat operators by the nature park staff between 2019 and 2023. "Shearwater-aware boat" flags were produced 05/2020 (Deliverable C.6) and distributed among boat operators, boat owners and diving clubs.

C.6.3 Development and distribution of a seabird-friendly code of conducts for fishermen

Seabird-friendly code of conducts for fishermen and communication leaflet were produced 05/2020 (Deliverable C.6) and distributed among fishermen. Code of conduct for fishermen was integrated within the leaflet (Deliverable C.6).

The Croatian national "Protocol for alerting and acting in the event of finding dead, sick or injured strictly protected marine animals" which only covered sea turtles, marine mammals and cartilaginous fish, was updated to also include seabirds (Deliverable C.6, 12/2021). The Protocol was updated to the extent that is possible considering the circumstances – primarily that there is no recovery centre in Croatia that can take seabirds (and substantial investments are needed by the Croatian Government in order to adapt the existing recovery centre for raptors to be able to take seabirds). As of 2021, in case an injured, sick or dead seabird is found, Lastovo NP acts as the information point and the first aid centre. The institution has a veterinarian and there is a plan to build a recovery centre for marine species in the future.

In addition to the above-listed leaflets, two additional leaflets were created by BIOM to address the threat of light pollution (as identified under Action A.3) and what to do when encountering stranded birds (New Deliverable C6). Over the years an increase in the number of local people and visitors reporting stranded birds was observed.

All C.6 activities were implemented by Lastovo NP with support of BIOM.

D.1 Monitoring impacts of conservation actions on threats which directly affect target seabird populations

Foreseen start date: 01/01/2020 Actual start date: 01/09/2018
Foreseen end date: 31/03/2023 Actual end date: 30/09/2023

D.1.1 Monitoring of reproductive output of the target species

A significant increase in shearwater breeding success was observed for both species across all islands with targeted conservation actions (see Action C.2), while that of AG fluctuated between years (Action C.3). In 2023, 100 YS and 100 SS nests on priority colonies were permanently marked, to allow for further monitoring during the After-LIFE phase. BLM shifted budget to subcontract FORTH-ICS to develop a specific call recognition model (to distinguish YS from SS) to support the analyses of sound recorder data gathered under Action A.1. It will likely be a useful tool for the long term monitoring of shearwater populations in Croatia, Malta, and the wider Mediterranean. This activity was done by BIOM.

D.1.2 Monitoring impact of predators and competitors (ship rat and Yellow-legged Gull)

Impact of rat presence was monitored continuously on seabird colonies where rats were removed. In case new rat marks were detected, the eradication work was restarted again. An annual YLG census was carried out in the Lastovo archipelago to monitor their population size, and their movements were studied with GPS-tracking devices. As the species forages a lot in human-dominated landscapes in the wider Balkan region (e.g. rubbish tips, cities, etc.), the current population size seems to be artificially inflated due to excessive food availability outside the project area, and therefore difficult to manage. This activity was done by BIOM.

D.1.3 Monitoring impact of site user engagement

Between 2019 and 2023, Lastovo NP had direct communication with 31239 private boat owners, and 9854 individuals who visited the park via boat operators. The number of visitors was lower during the COVID-19 pandemic in 2020. Brochures and codes of conduct for a variety of stakeholders were distributed by Lastovo NP staff while collecting entrance fees, and during public events, lectures and workshops. Overall 48.000 ‘best practise guide for tourists’, 5000 leaflets for boat operators and boat owners, 490 communication leaflets for fishermen and 455 shearwater-aware boat flags were distributed. This activity was done by Lastovo NP.

D.1.4 Monitoring impact of bycatch mitigation measures in longline fishery

Reports on seabird bycatch are hardly present in any official database on fisheries or nature protection in Croatia. Most interviewed fishermen declared that they do not plan to enter data on bycaught species in their logbooks in the future because it takes time and entails new obligations. At least, no seabird bycatch was observed during the testing periods of the different bycatch mitigation tools (Action C.1). In 2022 the first official report of seabird bycatch at the national level was recorded by a scientific observer (a result that is surely related to the advocacy work carried out during the project). This activity was done by Sunce.

All above mentioned activities are summarized in the ‘Monitoring report on effect of conservation actions (Deliverable D.4) which was completed by 12/2023 instead of 02/2023 because of the additional year of monitoring carried out in 2023.

D.2 Public attitudes baseline and end-line survey to measure impact

Foreseen start date: 01/09/2018 Actual start date: 18/06/2019
Foreseen end date: 28/02/2023 Actual end date: 30/09/2023

The procurement for Actions D.2 and D.4 was merged in one as planned in the project. The Ivo Pilar Institute was subcontracted in July 2019. The public attitudes baseline and end-line surveys to measure impact were performed on three target groups on Lastovo – local community, school children and visitors, and as a fourth the fishermen engaged in the project. Fishermen were surveyed under a separate public procurement related to the C.1 activity, for which the Ivo Pilar Institute was also subcontracted. For each target group there was a separate baseline and end-line survey, as activities they were involved in did not start and/ or end at the same time. Also, different research approaches were used for each target group, although for all of them the main tools were interviews and questionnaires. In the end, separate baseline (Deliverable D.2, 02/2020) and endline reports (Deliverable D.2, 06/2023) were produced for each of the target groups, and one final report summarising all reports and impacts on all target groups (Deliverable D.2, 09/2023). A total of 653 respondents were included in all survey questionnaires. The overall conclusion is that the project had a positive impact on the target groups, and an especially strong positive impact on school children.
There was a delay in starting the action because nobody applied at the first round of the procurement call. The survey of visitors was postponed to 2020 due to late start of the contract. Furthermore, there were some delays in surveys with children and visitors due to COVID-19 and limited possibilities of interactions with target groups representatives. Lastly, the end survey for visitors took place somewhat delayed, in summer 2023, due to the project being prolonged.
This activity was implemented by Sunce with support from Lastovo NP.

D.3 Monitoring of impacts on ecosystem functions

Foreseen start date: 15/01/2019 Actual start date: 15/01/2019
Foreseen end date: 30/06/2023 Actual end date: 30/09/2023

According to plan, the baseline surveys for both lizard diversity and numbers, as well as plant community composition and abundance were carried out on 13 islands in the Lastovo Archipelago in spring 2019. A drone was used for photographing islands in order to aid in the creation of vegetation maps. For the study on lizards Association Hyla was subcontracted. Baseline reports were produced by 12/2019 (Deliverable D.3 Plant community composition and abundance - baseline report; Deliverable D.3 Lizard community composition - baseline report) and the results were compared to those gathered during the same studies carried out at the end of the project, in spring 2023, to see if rat removal/ control (carried out under C.2) had any effects on the plant and lizard communities of these islands. Final reports were produced by 09/2023 (Deliverable D.3 Plant community composition and abundance - final report; Deliverable D.3 Lizard community composition - final report).
The lizard study showed that both species (Dalmatian wall lizard *Podarcis melisellensis* and Sharp-snouted lizard *Dalmatolacerta oxycephala*) were present on all visited islands and that the observed changes in their total numbers were only minor with 4146 lizards recorded in 2019 vs 4293 in 2023 on the same transects. Population density varied more across islands and the conclusion is that the conducted research before and after the implementation of conservation measures indicates the possibility of the existence of an impact and link between the eradication of rats and the number and density of lizard populations, but that additional research should be done (across a longer timespan) to confirm this.
The plant study recorded 103 vascular plant species in total across the 13 islands, with an average of 21 species per island. For comparing the effects of rat removal/ control vegetation plots were compared with a focus on ground vegetation and the herbaceous layer, because in a span of 5 years rats are expected to have the largest impact there (by eating seeds, shoots and fruits). It was concluded that the current impact of rats on the vegetation of islets is minimal as they have been part of these ecosystems for ages and vegetation is already well adapted to their presence. Possibly changes in plant composition will be observed in the future when islands remain rat-free for longer periods of time. For now, rat eradication and gull nesting prevention did not result in significant changes to the ecosystems of islets in Lastovo archipelago, and the slight variations observed are most likely attributed to vegetation seasonality and observer error.
This activity was implemented by BIOM.

D.4 Monitoring of socio-economic impact of project actions

Foreseen start date: 30/09/2021 Actual start date: 29/06/2019
Foreseen end date: 31/10/2022 Actual end date: 30/09/2023

The procurements for Actions D.2 and D.4 was merged in one as planned in the project. The Ivo Pilar Institute was contracted in July 2019. The Action started earlier since the procurement had to also include the study planned under the D.2 action, which had to start earlier. Because of the overall delay of the implementation of project activities due to COVID-19, the report on the socio-economic impact was finalised in June 2023, after the majority of activities was finalised (Deliverable D.4).
The indicators of the socio-economic contribution of the project on which this report is based, refer to the types of activities that were carried out during the project and the (estimated) number of participants in those activities, the types and number of different media publications related to the project, the views of the local population of Lastovo on the effects of the project for the local community and the indirect contribution of project partners to the economy of Lastovo. The research established an indirect contribution to the local economy of Lastovo through the stay of employees and volunteers of project partners on the island (through payment of accommodation, food costs and other services), raising the profile of the area through media appearances and announcements, raising awareness among the local population about the positive socio-economic effects of the project, raising awareness of the need to preserve the environment among kindergarten and school children, and encouragement for future project collaborations related to the Lastovo area.
This activity was implemented by Sunce with support from Lastovo NP.

E.1 Advocacy for designation of marine SPAs in Croatia

Foreseen start date: 15/01/2019 Actual start date: 15/01/2019
Foreseen end date: 31/08/2023 Actual end date: 31/12/2023

Advocacy for the designation of marine SPAs in Croatia was done through the SPA working group within the PSC (as all members expressed an interest to join the working group). Thus, meetings of the SPA working group were done in parallel with the PSC meetings on 31.12.2019, 29.03.2021, 29.04.2022, 01.12.2022 and 31.10.2023. No meeting was held in 2020 due to the COVID-19 pandemic and because it was in the middle of collecting all the necessary data for the analyses. During the first meetings the fieldwork was presented (carried out under Action C.4) and from 2022 onwards the analyses and results of the IBA designation process were discussed (carried out under Action C.5). The expert report created under C.5 describes the analyses and designation process in detail and includes the final list of IBAs suggested for inclusion in the network of SPAs (Deliverable E.1, 09/2022). The entire report was finalised and shared with the MoESD. The sites to be designated were also presented during the project closing conference, which was attended by representatives of the MoESD.
Proposed management measures for each of the proposed SPAs were drafted by 08/2023 (Deliverable E.1) and were presented to the PSB and discussed during prior BL MTF in October 2023. By that time the project had also completed two project policy briefs, one on seabird-friendly marine policy (Deliverable E.1, 09/2023) and one on solutions for mitigation of impact of fishing activities on seabirds in Croatia (under Action C.1), which were shared with the PSC as well as the wider marine and seabird conservation community.
While at first the designation of new marine SPAs seemed to go nicely hand in hand with the European Union's pledge to protect 30% of land and sea area of each of the member states by 2030, it soon became one of the reasons why the process slowed down. The Croatian MoESD insisted on completing the pledge in one go, and therefore had to wait until data on all species groups was delivered to them before drafting a final proposal. In the meantime, there were elections for the national government which further slowed down the process. When it became clear that the designation of the new marine SPAs in Croatia would take a lot longer than anticipated, an official letter was sent to CINEA on 22.03.2024 with the request to postpone the delivery of the final report by a year to 31.03.2025. The letter also included a step-by-step plan of action on how the MoESD would make sure to deliver the designation of the SPAs. The SPA designation date was later moved forward again to 08.06.2025 (also postponing the delivery of the final report - approved by CINEA), so the designation of new marine SPAs would coincide with World Oceans Day.
Eventually the final proposal for updating the existing Natura 2000 network to include 30% of Croatia’s land and sea area as protected areas, included two of the sites suggested by the LIFE Artina project (Northern Adriatic and Lastovo Channel) and the document was published for public consultation in early February 2025. BIOM and Sunce commented on the consultation by stressing again the importance of also designating the remaining 5 proposed marine IBAs (East Mljet Channel, Korčula Channel, Hvar Channel and the proposed expansions of SPAs Lastovsko otočje and Pučinski otoci) to fully cover the main at-sea foraging and roosting sites of the 3 project species.
The activity was implemented by all partners, but coordinated by BIOM.

E.2 Development and implementation of the LIFE Artina communication plan

Foreseen start date: 01/09/2018 Actual start date: 01/09/2018
Foreseen end date: 31/08/2023 Actual end date: 31/08/2023

E.2.1 Development of the LIFE Artina communication plan

A partner meeting for the development of the Communication Plan was held on 20/11/2018. The Communication Plan was subsequently produced in Croatian and English (02/2019 Croatian and 04/2019 English, Deliverable E.2). It was later revised in 2020, 2022 and 2023. There were some minor delays at the beginning of the project, but no further delays or problems were encountered. The activity was coordinated by Sunce with support from all other partners on the development and implementation of the plan.

E.2.2 Development and distribution of the communication tools/ material

The project logo was designed in December 2018 (Deliverable E.2), followed by the launch of a fully functional project website (Deliverable E.2) by 02/2019 (http://www.lifeartina.eu), which was regularly updated. The development of the project website took slightly longer than anticipated due to the process of contracting the company, exchanging ideas among partners, writing texts, and the holiday season around Christmas. Notice boards were installed at three locations in the Nature Park Lastovo Islands during March 2019 (Deliverable E.2).
Project promotional materials were created (Deliverable E.2), including T-shirts, head buffs, 3D paper seabird models, keychains, mugs, backpacks, and felt pens in May, June and July 2019. These materials were distributed among partners and later distributed among key stakeholders during various events. A review of the project partners' needs for promotional materials was conducted in March 2020, and additional materials were produced in March 2023 (only T-shirts and backpacks). Furthermore, promotional materials such as jackets and boots were produced and distributed to fishermen who were interviewed (October 2019), as well as project stickers for equipment and stickers for the Kick-off event. Project leaflets and roll-ups were produced in April 2019 and distributed among partners. Project communication materials were reprinted several times following expressed needs of project partners after distributing existing material, with the purpose of avoiding overprinting material and waste production. Additional communication material, namely beach towels and water bottles were produced in 2023 with the main purpose to be distributed to participants of cleaning actions within the E.5. actions.
A project video encompassing all main project actions and results was produced in 2023 and distributed to stakeholders on-line and through various events, such as during the project closing conference (Action E.5.3). Finally, the project’s Layman’s report was produced in both Croatian and English in December 2023 (Deliverable E.2), be it somewhat delayed, mostly due to the overall project prolongation.
This activity was coordinated by Sunce, but all partners were responsible for some aspects of action E.2.

E.3 LIFE Artina communication and awareness raising events

Foreseen start date: 01/10/2018 Actual start date: 01/10/2018
Foreseen end date: 31/08/2023 Actual end date: 31/12/2023

A number of awareness raising events were organised on Lastovo during the project, starting with a project Kick-off for in May 2019. Later that year the first 'Night of Albatross' was organised (08/2019), an event which would be repeated during following years (07/2021 and 09/2022). Towards the end of the project it was also held on island Vis (10/2022) as part of the replication strategy (Action E.5). Through interactive activities such as colouring, puzzles, memory games, simulated fishing in a sea of plastic, and constructing 3D seabird models, participants learned about the everyday threats faced by seabirds, including invasive species, bycatch, and marine litter. A total of 31 beach and underwater clean-up actions on Lastovo, engaging 97 (local) volunteers. In 2021, five public lectures were held to inform the local community about the project's progress and results. During May and June 2022, as part of the LIFE programme celebrating 30 years, additional events were organized with stand-up comedy on Lastovo and in Split, as well as an online exhibition on seabirds. Finally, on 1/08/2023, the project closing event took place on Lastovo, as part of the fishermen's night during which posters were displayed with the main project results. The event was attended by around 1000 visitors.

Awareness raising also happened by means of posters and information panels. A poster campaign was initiated on the Split – Vela Luka – Ubli ferry starting in June 2019 (Deliverable E.3). Originally, the posters were planned to run for 8 months, but the schedule was adjusted to focus on the two high-season summer months when there is a larger influx of visitors. The campaign ran each year until 2022. On Lastovo, posters on marine litter reduction, as well as sticker magnets (signs), were distributed (07/2020 - Deliverable E.3), and an educational trail was opened with information panels on seabirds and the project (opening delayed due to the COVID-19 pandemic to 11/2020 - Deliverable E.3). Exhibition photographs were printed (Deliverable E.3) and the first exhibition was organised on Lastovo island (08/2019), after which it was opened at the Natural History Museum Split (09/2020) and three schools in Split (11/2020, 03/2021). It was also shown on Vis during the Albatross night organized in Komiža. Furthermore, in response to the COVID-19 pandemic, we developed a virtual tour of the exhibition. Lastly, the planned live streaming of a shearwater nest was cancelled due to technical challenges due to poor GSM signal on the remote islands.

An educational program for kindergartens and elementary school students was developed by 12/2019 (Deliverable E.3), and the program for study visits was finished with a delay by 02/2020 (Deliverable E.3). Due to the COVID-19 pandemic many educational activities were postponed or organized in smaller groups, but in the end a total of 215 students were engaged (82 from Lastovo, 75 from Vis, 58 from Korčula). We collaborated with eight educational institutions, organising a total of 71 different workshops, as well as 5 field workshops for children in grades 1 to 4, and 5 boat trips for those in grades 5 to 8. Additional educational materials (colouring book, memory game, game "Ptičice ne ljuti se", picture book) were developed in 2023 and distributed among children.

Lastly, a bird-watching programme for Nature Park Lastovo Islands was developed with some delay in 03/2021 (Deliverable E.3). This program aimed to promote bird conservation as a potential for ecotourism and local economy development for visitors. Three promotional bird watching tours were organised by 09/2023, in which 38 persons participated. In 2023, an advertisement on Radio Dalmacija further promoted Lastovo as an ecotourism destination and shared the main results of the project.

The activity was implemented by Sunce with support of Lastovo NP.

E.4 Networking with other LIFE projects

Foreseen start date: 01/01/2020 Actual start date: 15/01/2019
Foreseen end date: 31/08/2023 Actual end date: 31/08/2023

Throughout LIFE Artina BIOM attended several BL MTF meetings (in Greece (2018), Sweden (2019) and Portugal (2023)). These meetings provided a great opportunity for networking, experience exchange and for getting to know people within the BL partnership who are working on similar topics in the region. This strongly helped in organizing networking visits with several other relevant LIFE projects, even though this was somewhat delayed due to the COVID-19 pandemic.
The first project which was visited was LIFE PanPuffinus! (LIFE19 NAT/MT/000982), by one staff member from BIOM and one staff member from BLM, which organised a workshop on biosecurity between 4 and 7 October 2021, in La Rochelle, France. The workshop also provided the opportunity to present the LIFE Artina project and exchange experiences with, and receive feedback from other experts in the field of invasive species eradication. One of these experts was Paolo Sposimo from Italy, who has been working on rat eradication for the last 20 years and was at that time also involved in LIFE Diomedee. So it happened that half a year later, from March 6-10, 2022, staff members from BIOM and Lastovo NP visited the Tremiti Islands in Italy to see the work carried out by the LIFE Diomedee (LIFE18 NAT/IT/000920) project team. Topics of the visit included the removal of rats from inhabited islands, rodenticide baiting by helicopter and working with/ engaging the local community. Another expert present at the workshop in France was Laura Bambini, who was coordinating the Biosecurity for LIFE project in the UK. Staff members from BIOM and Sunce visited Wales from July 19-22, 2022, to meet the project staff of Biosecurity for LIFE (LIFE17 GIE/UK/000572) and visit some of the key sites they have been working on (islands of Skomer and Ramsey). The main topic was biosecurity, including working with sniffer dogs, having island wardens, raising awareness on this issue among relevant stakeholders and how to balance tourism and seabird conservation. Also, when Biosecurity for LIFE (LIFE17 GIE/UK/000572) organised their final conference in Edinburgh, Scotland, between 21 and 23 March 2023, one staff member from BIOM and one staff member from BLM attended the event and presented the need to strengthen biosecurity networks across and within countries, and for careful feasibility exercises such as the one carried out for Sušac in A.5 to identify future steps/ projects. Additionally, staff from BIOM, Sunce and Lastovo NP visited the LIFE Ilhas Barreira project in Portugal (LIFE18/NAT/PT/000927) in May 2022, as part of the 'Adriatic Seabird Guardians' project (financed by Fondation Segre). The visit focused on AG, sea life recovery centres, and working with fishermen on mitigating bycatch.
Besides networking with other LIFE projects, a staff member of BIOM also attended the workshop "NEA-PANACEA: From Assessment to Action" held in Aberdeen in May 2022. Experts from different Regional Seas Conventions met and shared approaches on how 'Good Environmental Status for marine birds' is assessed across the four European regions (Black Sea, Mediterranean Sea, North-east Atlantic, Baltic Sea), to identify regional synergies and differences, and to create links for future collaboration.
Lastly, BIOM organized one of the aforementioned MTF meetings in Croatia. This was supposed to be done in 2020, but due to COVID-19 the entire event was held online. Eventually, the opportunity arose in September 2022 for BIOM to host the MTF in-person on Lastovo (Deliverable E.4). The 3-day meeting was attended by 33 participants from different national BL organisations from across Europe, including staff from BLM.
The activity was implemented by BIOM, and joined by Sunce, Lastovo NP and BLM.

E.5 Dissemination of LIFE Artina project results

Foreseen start date: 01/01/2022 Actual start date: 01/01/2022
Foreseen end date: 31/08/2023 Actual end date: 31/12/2023

E 5.1 Production and dissemination of relevant reports and papers

Over the course of the project 2 policy briefs and a total of 38 reports were produced. The last one being the Seabird Recovery Report (Deliverable E.5, 12/2023). All reports are available on the project website (except for sensitive information) and have been shared with MoESD and MoA. A variety of scientific outputs were also produced during the project, including conference posters and abstracts, the published sea transect database (Action C.4) as well as the drafting of several scientific manuscripts (Deliverable E.5, 12/2023), which are expected to be published after the project has finished. Conferences where LIFE Artina outcomes were presented were the 22nd conference of the European Bird Census Council (Lucerne CH, 4 to 8.04.2022), the 12th Croatian Biological Congress (Pula, 12 to 16.10.2022) and the 7th Conference on Wind energy and Wildlife impacts (Šibenik, 18 to 22.09.2023).
Other events that were attended during the project which are not mentioned under prior actions include:
- An interdisciplinary conference on priorities in waste management, Beyond Plastic Croatia (Split, 15-16.9.2022) where Sunce presented the Marine litter monitoring protocol and results from the Lastovo Islands Nature Park
- A national online workshop on bycatch of sensitive species on 08.02.2022.
- Online training course on the identification and handling of seabirds bycaught in the Mediterranean & Black Seas, organised by the GFCM on 09.02.2022.
- Round table „Joint approach to reduce bycatch in Adriatic fisheries“ including a presentation of seabird mitigation measures in the LIFE Artina project (Zagreb, 16.03.2022)
- International Bycatch Meeting organised by IUCN in Spain (Malaga, 04-06.10.2022).
- Round table “Trawling and Marine Litter” organised by MoA-DoF (Zadar, 08.05.2023)
- Official visit of the EU Parliament delegation, European Parliament's Committee on Fisheries (PECH), to the Pakleni Island, Croatia, 20.6.2023 where we presented our work and discussed the issue of designating new marine protected areas in the Adriatic Sea.
- “Annual meeting of the conservation departments of public institutions for the management of protected areas” (Brijuni NP, 12.10.2023), where Lastovo NP presented the project results.
- International conference “Importance of protected Areas for the Protection of Natural and Cultural Heritage and Local Community Sustainable Development” (Šibenik, 19.10.2023) where we presented posters with the main project results.
- 4th Symposium of the Small Islands organized by the PIM Initiative (Lipari, 16-19.10.2023) where Sunce held a presentation on biodiversity protection, including LIFE Artina results.
- A conference on the protection of waters and seas from plastic and micro-plastic pollution held 29.11.2023 in Zagreb.
- BIOM held a lecture at the University of Pula in the scope of the study programme Marine sciences. As the main professor is also working on the LIFE Euroturtles project, the visit had an added value in terms of networking since we used the opportunity to discuss potential synergies in research of sea turtles and seabirds (e.g. at-sea monitoring methods).
The activity was implemented by BIOM with support from Sunce, Lastovo NP and BLM.

E 5.2 Replicability of project results and findings

Towards the end of the project’s 4th year a transfer and replication strategy was created (Deliverable E5, 12/2022) which was implemented during the final year of the project. The

strategy included both in-person replication activities with relevant stakeholders, as well as a series of five webinars. In-person replications included:
- Hands-on training on rat removal techniques and/ or seabird monitoring methods carried out by BIOM with the PIs of Split-Dalmatia County (More i Krš), Dubrovnik-Neretva county, Zagreb City (Maksimir), Mljet National Park and Brijuni National Park.
- Hands-on training for marine litter monitoring was held on Smokvina beach, 27.11.2023 for the PI for the Management of Protected Areas of Dubrovnik-Neretva County, the Tourist board Dubrovačko primorje and the Dept. for Tourism of Dubrovnik-Neretva County. Also, two memorandums of future cooperation in implementing coastal cleaning actions and marine litter monitoring were signed between Sunce and PI for the Management of Protected Areas of Dubrovnik-Neretva County and utility service company Peovica d.o.o. from Omiš.
- Coastal cleaning actions organised with several local communities/institutions (25.09.2023 - Omiš, 33 participants; 04.10.2023 - Stari Grad, Hvar, 25 participants; 19.10.2023 - Pantan protected area, 51 participants; 18.11.2023 - Drvenik Veli, 17 participants; 27.11.2023 - Plaža Smokvina, 11 participants; 14.12.2023 - Omiš, 26 participants).
- Hands-on training for PI representatives about the 'Seabirds educational program for children' was held in Sali, Dugi otok 7.-8.11.2023 for 7 participants from the Nature Park Telašćica and National Park Brijuni management institutions.
The series of five webinars, listed below, were organized in collaboration with the Croatian Network of MPAs, including representatives of protected areas management institutions, educational institutions, CSOs and ministries.
1) "Marine litter – how to monitor and suppress", 28.3.2023, 50 participants
2) "A bird has no place on a hook", 18.4.2023, 35 participants,
3) "Seabirds and children - from unknown to guardians", 16.5.2023., 30 participants
4) "Taking care of our seabird colonies", 7.3.2023., 43 participants
5) "Designation of marine protected areas", 6.6.2023., 36 participants
In the end, the number of replication events was much larger than anticipated when starting the project. This activity was implemented by BIOM and Sunce.

E 5.3 Organisation of project closing conference

The project closing conference was held 9-11 May 2023 in Seget Donji, Croatia. The agenda (Deliverable E.5, 01/2023) included two days of presentations and discussions and a one-day field trip. The conference was opened by the LIFE Artina team and a representative from the MoESD, after which presentations and moderated discussions followed focusing on 5 major themes: 1) Rat eradication from large inhabited islands; 2) Census methods for burrow-nesting seabirds; 3) Community involvement in seabird conservation; 4) Designation and management of Marine Protected Areas; 5) Conservation of AG in the Central and Eastern Mediterranean. Each session had an invited keynote speaker, several presentations from other (LIFE-funded) projects and a presentation about the results and findings of LIFE Artina. The conference also hosted a mini-workshop, led by BL International, to present the Marine Toolkit and the Track2KBA methodology to support a Mediterranean-wide initiative for IBA designation for the endangered YS. Overall, the conference was attended by 45 participants from Croatia and abroad, coming from different sectors (NGOs, universities, public institutions, governments, private companies). A conference booklet (Deliverable E.5, 08/2023) was shared with all attendants as well as other relevant people connected to the field of marine conservation.
The activity was implemented by BIOM, with support of Sunce, Lastovo NP and BLM.

F.1 Project management

Foreseen start date: 01/09/2018 Actual start date: 01/09/2018
Foreseen end date: 31/08/2023 Actual end date: 31/12/2023

Bilateral partnership agreements were signed after the start of the project and the project management board was found shortly after, consisting of representatives from each of the partners. The PMB had quarterly online meetings, sometimes more regular, depending on partners' needs and the intensity of the work. The project was presented at the LIFE17 Kick-off event in Brussels on 8 and 9 of November 2019.

Besides the PMB, a Project Steering Committee was formed consisting of staff from each of the Croatian partners as well as representatives of the MoESD and the MoA (DoF). The PSC monitored the overall project implementation and was involved in the advocacy parts of the project (e.g. SPA designation, permits for rat removal work, seabird bycatch-related activities). It had six meetings over the course of the project (on 15.05.2029, 31.12.2019, 29.03.2021, 29.04.2022, 01.12.2022 and 31.10.2023). No meeting was held in 2020 due to the COVID-19 pandemic and because it was in the middle of the most intense fieldwork part of the project. Lastly, there was the Project Scientific Board, which was formed at the beginning of 2021, and included staff from BIOM, BLM, BL International, BLECA, IOF and HAZU. Throughout the project a total of 4 online meetings were held (08.02.2021, 28.03.2022, 17.11.2022, 26.10.2023) during which results were discussed from the IBA designation process as well as the seabird bycatch analysis. to discuss the analyses, the results and their implications.

During the implementation we were successful in acquiring co-financing for which the details can be found under Section 5. Staff changes that occurred during the project are listed in the same section. The project team maintained regular communication with the external monitor from NEEMO/ELMEN-EEIG, Mr. Nikica Skroza. We had 5 monitor visits and 20 Notification letters as well as 2 Amendment requests. The first one was to inform the change of the legal address of the coordinating beneficiary (submitted together with the midterm report). The second one, submitted in June 2023, asked for a 4-month extension of the project, some final budget reallocations and the extension of the due dates of some project deliverables.

The 1st Progress report was submitted on 30/09/2019 (Deliverable F.1) and the Midterm report was submitted in June 2020 (Deliverable F.1.), nine months ahead of schedule due to finishing the budget provided during the first instalment. The 2nd progress report was not required anymore so it was not delivered. Towards the end of the project, audits were carried out for BIOM and Sunce and both reports were combined into one document and uploaded to Butler (Deliverable F.1, 02/2024). As the formal process of SPA designation went a lot slower than anticipated (and was also interrupted by national elections for a new government), a request was sent to CINEA to postpone the delivery of the final report with one year to 31.03.2025, accompanied with a step-by-step plan from the Ministry on how to complete the designation process. The request was approved and the final report was delivered on the newly agreed date (Deliverable F.1, 03/2025).

This activity was implemented by BIOM, with support from all other project partners.

F.2 Monitor and measure project specific indicators

Foreseen start date: 01/09/2018 Actual start date: 01/09/2018
Foreseen end date: 31/08/2023 Actual end date: 31/12/2023

The LIFE performance indicators were defined by 03/2019 and submitted with the first progress report (Deliverable F.2, 09/2019). Based on different data gathered through activities under sections A, C, D and E, the final assessment was done at the end of the project implementation and everything was put in the KPI database. The final table is submitted with this report (Deliverable F.2, 03/2025) and more details can be found under Section 7.
This activity was implemented by BIOM.

F.3 Development of the After-LIFE Plan

Foreseen start date: 01/01/2022 Actual start date: 01/01/2022
Foreseen end date: 31/08/2023 Actual end date: 31/12/2023

The project team began working on the After-LIFE plan in the final phase of the project. A table with activities for the After-LIFE phase of the project was presented and discussed during the last meeting of the PSC. The final After-LIFE plan was completed by February 2024 (Deliverable F.3) and includes a section with suggestions for updating the management plan of Lastovo Islands Nature Park, once its revision is due in 2027. One of the main responsibilities for Lastovo NP will be to continue carrying out rat population control on key seabird colony sites as identified through the project. For this purpose, Lastovo NP purchased additional equipment at the end of LIFE Artina. BIOM and Sunce will apply to new projects to guarantee the implementation of some of the After-LIFE activities, as well as to expand the work in the region and to build the capacity of other public institutions. As part of a larger partnership, BIOM successfully applied for LIFE TETIDE (Project 101113950 — LIFE22-NAT-IT-LIFE TETIDE), which will focus on island biosecurity and scale up the work to neighbouring SPAs as well. Sunce will apply for Interreg funding and for a grant from the Dalmatian Island Environment Foundation to continue the work on combating marine litter.
This activity was coordinated by BIOM with support of Sunce and Lastovo NP.

6.2. Main deviations, problems and corrective actions implemented

The main difficulties encountered during the project are listed below. More details regarding major deviations in terms of costs can be found in section 8 of this report.

The **COVID-19 pandemic** had direct and indirect impact on all project activities, especially those that involved social contacts. It caused many uncertainties, problems with planning, travel, delays and in general lower level of target groups participation in all project activities. Planning and implementation of the educational program for school children was especially challenging, due to a number of legal and logistical constraints. We have adapted to the situation by maintaining close collaboration with teachers, organising much more workshops for a smaller number of children per workshop, adapting workshops content and increasing significantly Sunce staff workload. Work with fishermen was even more complicated as they are mainly older persons, avoiding social contacts due to the pandemic while also not as keen to engage in a digital type of communication. We had to put extra effort to reach each one of them on an individual basis, in addition to workshops that had low response rates. The project had delays in implementing a second round of interviews on impact on target groups, primarily tourists (as their numbers were much lower during the pandemic and people were hesitant to interact. This was dealt with by having volunteers do the questionnaires towards the end of the project (so that staff could focus on other project activities in parallel). Organisation of any kind of public event was also very challenging, we still organised them, but they had low participation rate, as expected. Even more so, as the majority of the population on project area islands is older and restrained themselves from social contacts. Many meetings, workshops and knowledge transfer was organised on-line, causing savings in travel and other related costs (meeting rooms, refreshments etc.).

The project had a significant **budget to purchase bird-friendly fishing gear for bycatch mitigation**. However, the level of seabird bycatch in Croatia was completely unknown at the project planning phase. Research conducted within the project showed that seabird bycatch does happen, but as it 'only' concerns few birds per year per fishermen, it didn't make it logical to change the entire gear of one or more fishermen. Also, fishermen didn't know how this new gear would impact their everyday fishing activities and fish catches. Gear already available on the market did not fit the technical characteristics of Croatian fishermen's regular gear (e-g- size of the hooks on hookpods). This project activity was therefore adapted in the form of testing gear and measures together with several fishermen, and the remaining budget was reallocated to other project activities. This was notified to the contracting body. Another problem is that only few fishermen were motivated enough to participate in testing and it was also very complicated to plan when to go with them on fishing since they rely on weather and make last minute decisions to go on the sea or not. For testing new gear, they had to invest extra time, and there was no administrative way to financially compensate their working time and boat fuel they invested in this. As all of this was also happening during the COVID-19 pandemics, there were additional problems with social contacts as well as huge increases in fuel prices. We have managed this situation by investing a lot of our staff time and energy in communication with fishermen, focusing on few but motivated fishermen, taking time and consultations with experts in designing mitigation gear, purchasing ice boxes for fishermen that participated in testing.

In the project application we set out the aim of conducting eradication programs without the use of poison, but after one year of testing different kinds of mechanical traps we quickly noticed that relying solely on those would make it impossible to achieve a satisfying level of

eradication and to completely ensure the sustainability of Action C.2. As such, we **shifted to the use of rodenticide as a means to eradicate rats**, which is commonly used in most projects dealing with seabird conservation across Europe (and globally). The changed approach made it possible to target more islands in parallel, and to work around periods of bad weather (as mechanical traps require much more regular visits). Mechanical traps were still used in parallel to rodenticide baiting and for biosecurity purposes during periods of absence of the field team, to offer rats more options. Islands close to inhabited places were fully continued mechanically, in order not to risk pets from eating poisoned rats. Furthermore, to prevent **the direct consumption of toxic by non-target species**, in particular gulls and crows, bait boxes and bait cubes were installed in such a way to limit their accessibility.

Changes in activities for AG breeding habitat improvement were introduced following the report written by the subcontracted gull expert, Luka Jurinović, PhD (Action C.3). In his opinion diverting YLG from breeding could not be done without also affecting AG breeding on the same sites. As such, we didn't purchase the equipment intended for YLG disturbance - laser diverter, inflatable scarecrows and car batteries. Instead, the gull expert proposed to put more effort towards YLG chick hatching prevention by piercing their eggs on a broader scale, as well as to upscale the rat removal activities to include more islands. Direct **conservation of AG was complicated due to the nomadic breeding ecology of the species,** which made it difficult to predict which islands to target each year. By the permanent removal of rats from several of their (historic) breeding colonies, at least these sites will have more favourable breeding conditions when the species decides to return.

Weather conditions (rain, strong winds, waves) proved to be quite a challenge, especially during winter and early spring. This was mitigated by changing the rat removal approach to rodenticide baiting (allowing for more flexibility when visiting the colonies), by intensifying our work effort during good weather days and by ensuring a permanent core team present on Lastovo. We also included volunteers, secured via the European Solidarity Corps, to support the fieldwork during each of the years from 2020 onwards.

During the course of the project we have had **significantly higher boat maintenance, boat storage and boat fuel costs than planned**. At the time of project preparation, based on calculations and information provided by companies and individuals we contacted regarding procurement of the boat, we believed the maintenance costs will include regular service intervals. In hindsight, this was somewhat naive from our side as the boat is one of the most crucial elements of our fieldwork, which was used extensively and often in non-typical conditions (docking near islands without proper mooring options, etc.). As such we had to replace parts beyond the regular repair (e.g. damaged propellers, lost anchors, etc.). Budget for boat storage during the winter months was simply forgotten, but placing it on the dry dock really helped preserve the boat until the end of the project (and even afterwards). We used savings from other budget lines to cover these unforeseen expenses.

6.3. Evaluation of Project Implementation

Objectives vs. results

Action	Foreseen in the revised proposal	Achieved	Evaluation
A.1	**Objectives:** Assess the colony locations, colony sizes and reproductive output of YS, SS and AG in the project area. **Expected results:** 1. Technical report on presence, abundance and impact of introduced mammals on all seabird colonies addressed by this project. 2. Data gathered will feed into GIS-database developed under Action A.4, and act as baseline for monitoring the implementation of the conservation actions (under Action D.1)	1. Yes. 2. Yes.	Activity implemented and completed according to plan. Several new shearwater colonies were found during the surveys.
A.2	**Objectives:** Detailed assessment and quantification of all prevalent threats for seabirds occurring in their marine environment **Expected results:** 1. Technical report regarding the extent of the use of longline fishing gear in the project area, and the scale of seabird bycatch. 2. Assessment of potential for introducing bird-friendly fishing gear. 3. Marine litter pollution in SPA Lastovsko otočje assessed and permanent monitoring scheme introduced.	1. Yes. Although seabird bycatch happens sporadically, it is not negligible considering the size of Croatian seabird populations. 2. Yes, outcomes affected the set-up of Action C.1. 3. Yes.	Activity implemented and completed with some delays. Work with fishermen was difficult due to a lack of motivation from their side (additional costs and time), last-minute decisions whether to go to sea or not and the general restrictions due to the COVID-19 pandemic. The situation was managed by investing a lot of staff time and energy in communication with fishers, focusing on a few motivated ones, taking time and consulting with experts in designing mitigation gear and purchasing ice boxes for

			fishermen that participated in testing. The developed marine litter monitoring plan for SPA Lastovsko otočje will be incorporated in the revised management plan (2027 - 2036), ensuring that it will be implemented every few years.
A.3	**Objectives:** Detailed assessment and quantification of all prevalent threats operating at major seabird colonies in SPA Lastovsko otočje **Expected results:** 1. Technical report on presence, abundance and impact of threats on all seabird colonies addressed by this project. 2. Data gathered will feed into a GIS-database developed under Action A.4, and act as baseline for monitoring the implementation of the conservation actions (under Action D.1).	1. Yes. 2. Yes.	Activity implemented and completed according to plan. Light pollution was identified as an additional threat affecting several seabird colonies, which was not foreseen when writing the project proposal. Additional leaflets were produced under Action C.6 to address the issue.

A.4	**Objectives:** Set up a comprehensive GlS database for colonies of YS, SS, AG and YLG in SPA Lastovsko otočje and Palagruža islands (SPA Pučinski otoci). **Expected results:** 1. A comprehensive GlS database of colony site locations, population size, reproductive success and site specific threats for all colonies in the project area. This will be used to create a detailed report informing on all site specific conservation actions for each site.	1. Yes.	Activity implemented and completed according to plan. The database will continue to be updated and used, also after the project finishes.
A.5	**Objectives:** Assess how the situation on larger seabird colonies in SPA Lastovsko otočje could be resolved, by taking Sušac island as an example of a Mediterranean seabird island on which a total eradication of invasive mammals (rats) may be possible due to its remoteness. **Expected results:** 1. Lay the foundation for securing Sušac island as an invasive mammal free island.	1. Yes.	Activity implemented and completed according to plan, but kept open longer. Not only was a feasibility study created for a ground-based approach to achieve complete rat removal from Sušac, but also one for an aerial approach, as well as an assessment of cliff access. Working with experts from the UK and Italy (whom we met through networking) provided a very good foundation for any future large scale rat eradication project on Sušac or any other Croatian islands.

C.1	**Objectives:** Fishing gear and fishing procedures that will be recognised as most promising will be demonstrated on 4 fishing vessels in order to test and showcase their functionality in practice **Expected results:** 1. At least 4 longline fishing vessels equipped with bird-friendly fishing gear, nearly 10% of the longline fishing fleet operating in the SPAs. 2. A policy report about the feasibility of the broader use of bird friendly fishing gear in the Croatian Adriatic. 3. Proposal for the incorporation of bird friendly fishing gear into Operational programme for maritime affairs and fishery and related rulebooks submitted to relevant authorities.	1. No, but testing of 3 types of modified fishing gear was conducted with 6 fishermen during 18 fishing trips. 2. Yes. 3. Yes.	Activity implemented and completed with some delay and with feasible modifications following the results of Action A.2. All 3 mitigation measures were tested for the first time in Croatia, with hookpods trialled for the first time in the Mediterranean. A video on seabird bycatch and the testing of mitigation measures was produced and distributed to stakeholders. Seabird bycatch is a new topic for Croatia so it will take time before it is acknowledged as a serious threat by everyone across the chain (fishers, scientific observers, policy makers). The project made some important first steps, but still a long way to go.

C.2	**Objectives:** Predator management on seabird colonies in SPA Lastovsko otočje, focused primarily on rat removal. **Expected results:** 1. On at least 10 islets with breeding colonies of YS and SS rats are eradicated or controlled. 2. On two islets with AG effects of rat control measures are tested. 3. At the end of the project, the number of nesting pairs at sites where predator management has been implemented will have increased by 10%. 4. The reproductive output of the shearwater species will be increased by on average 25%.	1. Yes. 2. Yes, tested on 4 islands. 3. Yes. On islands with rat control the number of breeding pairs of YS increased by 77% (from 266 to 472 nests). The number of SS increased by 27% (from 225 to 285 nests). 4. Yes. On islands with rat control the breeding success of YS increased by 41% (from 35 to 76). For SS it increased by 27% (from 45 to 72).	Activity implemented and completed with some slight deviations in the used methodology, as well as the addition of some activities. Switching from using only mechanical traps and cages to the use of rodenticide greatly increased the (cost) effectiveness of our work and our ability to deal with periods of adverse weather. The removal of rats had immediate visible effects on the breeding success of the shearwaters, which went up significantly from one year to the next. However, actual population size increases will only become visible over time when the chicks that survived during the project will return to start breeding themselves. Two additional reports were produced including short- and long-term solutions for disposal of bio-waste on the island (the inappropriate management of which has indirect negative effects on seabirds by boosting populations of rats and YLG.

C.3	**Objectives:** Test and apply different methods of YLG nesting prevention at selected project sites in SPA Lastovsko otočje aiming to ultimately improve the breeding success of AG **Expected results:** 1. Evidence if soft prevention methods (scaring, disturbing) may prevent breeding of the YLG or if egg removal has to be conducted. 2. Increased number of breeding pairs of AG in SPA Lastovsko otočje with higher breeding success, up to 10%.	1. Yes. 2. No. Overall a slight decrease in the number of breeding pairs was observed, while the breeding success varied greatly across years.	Activity implemented and completed to the best of our abilities with deviations in the methodology used. The conservation efforts did not result in an increased number of breeding pairs for AG. Soft prevention methods abandoned based on gull expert's opinion. Eventually the egg piercing method also stopped. Increased rat removal efforts. Most (historical) breeding islands for AG in SPA Lastovsko otočje are now rat-free, which will benefit future breeding AG on these sites. YLG remains a big problem for AG and its numbers are artificially inflated because the species feeds on landfills and in cities far beyond the borders of the SPA. Proper waste management on a European level will be the only solution to controlling the species' population size. Contributed to the revision of the international species action plan for AG.

C.4	**Objectives:** Seabird tracking with data logger devices combined with boat based surveys. Assessing spatio-temporal overlap of seabirds activity and fisheries. **Expected results:** 1. At least 105 of 4 seabird species tagged and monitored. 2. The buffer zone of 9 nautical miles around the SPA Lastovsko otočje is surveyed by boat during 3 consecutive breeding seasons. 3. Distribution maps of each of the tracked seabird species made available. 4. Analysis of the spatio-temporal overlap of seabird populations and fishing fleet.	1. Yes, 125 individuals were tracked in total (40 YS, 40 SS, 25 AG & 20 YLG) 2. Yes, but only 2 seasons were covered with a total survey length of 8418 kilometres. 3. Yes. 4. Yes.	Activity implemented and completed with some delays. Problems obtaining fishing VMS data from the responsible MoA-DoF. This was solved by using the publicly available AIS data, which, although mostly representing a different kind of fleet, could still be used to infer general fishing vessel movements in the Adriatic. The produced analysis was the first of its kind in Croatia.
C.5	**Objectives:** Identification and designation of new marine SPAs in Croatia **Expected results:** 1. New and updated marine SPAs and IBAs in Croatia that will increase protection of the target seabirds	1. Yes, two new SPAs were designated in Croatia: Sjeverni Jadran (HR1000041) and Lastovski Kanal (HR1000042).	Activity implemented and completed, but final outcome significantly delayed due to external factors. This project produced the first fully marine SPAs in Croatia, which were also part of Croatia delivering on the 30y30 pledge (part of EU 2030 Biodiversity Strategy). For the long term effectiveness of these sites management plans will still need to be implemented. Collaboration with BL helped the further development of the Marine Megafauna Conservation Toolkit and also laid the foundation for a Mediterranean-wide

			initiative (involving partners from different EU member states) to designate missing IBAs for YS across the Mediterranean and Black Seas.
C.6	**Objectives:** Mitigate the impact of site users in the areas of seabird colonies in SPA Lastovsko otočje through influencing their behaviour **Expected results:** 1. Site users are more aware of the seabirds, their importance and impacts on seabirds. 2. Behaviour of site users improved.	1. Yes, as monitored under D.2. 2. Yes.	Activity implemented and completed with slight deviations in the plan. Printed rubbish bags cancelled and reallocated to printing of leaflets for boat owners and fishermen. The extra leaflets produced regarding the impact of light pollution and what to do when finding stranded birds have been effective as more stranded birds have been reported since the start of the project.
D.1	**Objectives:** Monitor the impacts of conservation actions on threats on land and at sea which directly affect target seabird populations to see whether threats have been reduced. **Expected results:** 1. Report informing on the success of the conservation actions, at the end of the fourth breeding season, including the monitoring of a) reproductive output of the target species; b) impact of predators and competitors (ship rat and YLG); c) impact of site user engagement; d) impact of bycatch mitigation measures in longline fishery.	1. Yes.	Activity implemented and completed according to plan, but kept open longer to allow for an additional year of monitoring success of the conservation actions. The development of the shearwater call recognition software can be useful for estimating colony sizes and assessing long-term population trends across the Mediterranean breeding range. 1st official report of seabird bycatch in Croatia was documented by a scientific observer in 2022, most likely as a result of project advocacy on the topic.

D.2	**Objectives:** Measuring public attitudes at the beginning and at the end of the project in order to measure the impact of project activities. **Expected results:** 1. Public attitudes improved. 2. Awareness of seabirds, their importance and impacts on seabirds raised significantly among targeted groups. 3. Behaviour of the site users improved. 4. At least 2 excursion boats obtained a project badge: the 'shearwater-aware boat' flag.	1. Yes. 2. Yes. 3. Yes. 4. Yes.	Activity implemented and completed with some delay. The public attitudes baseline and end-line surveys to measure the project's impact were performed on four target groups: local community, school children, visitors (Lastovo) and on fishermen engaged in the project. A total of 653 respondents were included in all questionnaires. Overall conclusion is that the project had a positive impact on the target groups' awareness and attitudes, especially school children.
D.3	**Objectives:** Monitoring of impacts on ecosystem functions through plant communities and lizards as indicators. **Expected results:** 1. At the end of the first breeding season (Year 1), prior to the application of conservation actions, a preliminary report about the lizard and plant communities will be completed that will be used as baseline data. 2. After the conservation actions another survey will be executed in the last year.	1. Yes. 2. Yes.	Activity implemented and completed according to plan. No significant effects found of rat removal on the lizard and plant communities on islands, but the time interval of less than 5 years is likely not enough to notice changes. Effects may still become apparent when islands remain rat-free for longer periods of time.

D.4	**Objectives:** Socio-economic impact of project actions on the local economy and population assessed through the socio-economic survey. **Expected results:** 1. More income for the local community through project implementation and increased popularity through new and sustainable tourism offers.	1. Yes, the project contributed to the local economy of Lastovo through the stay of employees and volunteers of project partners on the island (through payment of accommodation, food costs and other services), as well as by raising the profile of the area through media appearances and announcements.	Activity implemented and completed according to plan. The bird-watching program developed during the project aims to promote birds as a potential for ecotourism, even after the project has ended.
E.1	**Objectives:** Push the government into considering identified marine IBAs and SPAs for designation. **Expected results:** 1. Advocacy work should result in raised awareness of government officials that are responsible for designating marine SPAs and in designation of marine SPAs.	1. Yes.	Activity implemented and completed according to plan, but the final designation of SPAs was delayed for over a year due to external factors. A total of 7 sites were proposed for marine SPA designation. At the end of the project, two were factually designated, while the other three new sites, as well as the revised borders of two existing sites, will need more consultations with other sectors before being established.
E.2	**Objectives:** Raise awareness of target groups on seabird conservation in general and more specifically related to the project actions and need for their implementation. **Expected results:** 1. LIFE Artina Communication Plan developed and implemented.	1. Yes. 2. Yes.	Activity implemented and completed according to plan. In addition to the planned materials a project video was created which was shared on many occasions.

	2. Communication tools/ materials developed and distributed.		
E.3	**Objectives:** Organisation of events in order to raise awareness on seabird conservation and the project. **Expected results:** 1. Posters on-board the ferry boat 2. Seabirds photographs exhibition 3. Night of Albatross 4. Marine litter reduction awareness raising posters and signs. 5. Marine litter awareness raising cleaning actions 6. Seabirds interpretation trail 7. Bird watching tour program 8. Live-streaming of a nest 9. Children educational workshops 10. Study visits for school children 11. Project Kick-off and Closing events	1. Yes. 2. Yes, in 6 locations and online, visited by 434 people. 3. Yes, three times on Lastovo and once on island Vis. 4. Yes. 5. Yes, 31 beach and underwater cleanings were organized. 6. Yes. 7. Yes, and 3 tours were organized. 8. No, it was not possible due to the islands not having any signal to support live-streaming. 9. Yes, 71 workshops and 5 field workshops were held with participating schools from Vis, Lastovo and Korčula 10. Yes, 3 study trips organized. 11. Yes.	Activity implemented and completed with delays. Many logistic and work plan adaptations were needed due to COVID-19 pandemics, especially in implementing the educational programme. Besides the events listed under expected results, additional ones were organized (e.g. stand-up comedy, public lectures, exhibitions). Additional material was also produced and distributed such as educational material for children.

E.4	**Objectives:** Share information on management, census techniques and conservation measures for target seabird species. Interact with LIFE projects dealing with comparable or related conservation problems. **Expected results:** 1. Synergies developed and experience exchanged with other relevant projects in Europe and Croatia, in particular LIFE projects.	1. Yes, a total of 4 LIFE projects were visited during the project, with each visit focused on its own set of topics.	Activity implemented and completed according to plan. Networking resulted in a new collaboration with the Italians, specifically Paolo Sposimo (who carried out the feasibility study for aerial baiting on Sušac), with whom we also successfully applied for a new LIFE project on island biosecurity: Project 101113950 — LIFE22-NAT-IT-LIFE TETIDE
E.5	**Objectives:** Disseminating project results to relevant stakeholders. Supporting transfer of project results and their replication in other areas. **Expected results:** 1. Transfer and replication strategy 2. Seabird Recovery Report 3. Two policy/ position statement documents 4. Two scientific papers drafted 5. Project Closing conference	1. Yes. 2. Yes. 3. Yes. 4. Yes, also a published database and three posters at conferences. 5. Yes, attended by 45 participants	Activity implemented and completed with some small delays. More in-person replications events than anticipated during the writing of the project due to eagerness from PIs to learn more about the results of the project and the methods used. This resulted amongst others in 1) PI More i Krš becoming a project partner in LIFE TETIDE, 2) NP Brijuni seriously considering to remove or control rat populations from European Shag and Common Tern colonies in the park area. Seabird data collected during the project (e.g. movement, at-sea distribution, colony sizes, breeding success) will still serve for several scientific papers to come in the coming years.

F.1	**Objectives:** Efficient administrative, technical and financial project management, monitoring its progress and meeting LIFE reporting obligations. **Expected results:** 1. Successful project management.	1. Yes.	Activity implemented and completed according to plan (including a 4-month extension of the project). Some planned in person meetings were moved online due to the COVID-19 pandemic, but this did not affect the project implementation.
F.2	**Objectives:** Monitor and measure project specific indicators. **Expected results:** 1. Evaluating the project performance through the use of a set of indicators during the project duration and for 5 years after the project end.	1. Yes, KPI database filled out at the start of the project and revised and completed at the end of the project.	Activity implemented and completed according to plan (including a 4 month extension of the project).
F.3	**Objectives:** Development of the After-LIFE Plan. **Expected results:** 1. After-LIFE Plan.	1. Yes, available in both English and Croatian.	Activity implemented and completed according to plan (including a 4-month extension of the project). The After-LIFE plan includes recommendations for the revision of the management plan of Lastovo Islands Nature Park after 2027.

6.4. Analysis of benefits

1. Environmental benefits:

a. Direct / quantitative environmental benefits:

The project improved the conservation status of YS, SS and AG (all listed in Annex 1 of the Bird Directive) both on their breeding colonies in the existing SPA Lastovsko otočje, as well as through establishing two new marine SPAs to secure core foraging and roosting areas for these seabird species. The two newly designated marine SPAs - HR1000041 Sjeverni Jadran and HR1000042 Lastovski kanal - are of particular importance for the EU Biodiversity Strategy as the EC recognized the lack of such sites for seabirds as a hindrance to completing the Natura 2000 network in Croatia.

Within the SPA Lastovsko otočje black rat populations were permanently removed from 6 islands, and their populations have been annually controlled since 2020 from another 5 islands. This has directly benefited shearwaters breeding on these islands (and this positive trend is expected to continue after the project finishes), both in terms of how many pairs attempt to

breed per year, as well as in their reproductive output. The number of breeding pairs for YS steadily increased from 91 to 569, and their overall breeding success increased from 35% to 75%; for SS the number of breeding pairs increased from 96 to 369, and their breeding success went up from 56% to 63%. Due to increased nest monitoring efforts carried out during the project 2 new YS colonies were found, and 4 new SS colonies. Furthermore, sound recorders confirmed YS as a breeding species for the Palagruža islands (part of SPA Pučinksi otoci). On the other hand, the breeding population and breeding success for AG has been fluctuating from year to year, which is inherent to the nomadic ecology of the species, making it hard to target conservation efforts. Nevertheless, several colony sites used by the species have been permanently cleared from rats, so this will benefit the species when it returns to those sites again in the future.
The increased number of seabirds breeding on islands where rats have been removed or reduced will benefit the ecosystem service carried out by seabirds on these sites (bringing nutrients to these remote places). The removal of rats, which is a non-native invasive species on these sites, will also improve the general ecosystem condition and trend.

b. Qualitative environmental benefits:
As concluded in the last paragraph the islands where rats have been removed, or those where their populations are annually reduced, have improved ecosystem conditions which benefits the seabirds breeding on them as well as other native wildlife on these islands. For these 11 islands the threat of rats has been mitigated and the effort to control rat populations on key seabird colonies will continue to be carried out by Lastovo NP after the project finishes. These activities are already planned within the Lastovo Islands Nature Park Management Plan and will be updated once the plan gets revised in 2027. As part of the new LIFE TETIDE the eradication efforts will be supported by installing biosecurity measures on main sites from where rat reinvasions occur. Also, the feasibility study carried out on the island of Sušac showed that upscaling the rat removal work to this large, remote and uninhabited island should be possible, which would have long-term permanent benefits for the shearwater population on this island (and thus the SPA Lastovsko otočje) once such a project is successfully carried out. This shows great potential for eliminating the threat of rats even more in the future. As part of LIFE TETIDE similar feasibility studies are also planned on several large islands with shearwater populations situated in SPA Pučinski otoci.
Regarding the identified lack of capacity within the PI managing the Lastovo Islands Nature Park, this has been mitigated by training the Lastovo NP and by having them participate in many project activities. It is further mitigated by prioritising key seabird colonies for conservation work, and by supporting Lastovo NP via LIFE TETIDE. From being the youngest nature park in Croatia, Lastovo NP is now the most experienced protected area management authority with regards to seabird conservation, especially regarding dealing with rats, organisation of cleaning actions and education of children. They already used opportunities to share this knowledge with other PIs and will continue to do so in the future. All these efforts ensured the sustainability of the project results.
As for the threat of interspecific competition of YLG and AG, the project has not been successful within the SPA Lastovsko otočje circumstances, but has still gained valuable insights, mostly regarding what is not working. In order to really reduce YLG numbers in the long term it is needed that waste management in the larger western Balkans area is improved by closing open landfills and reducing other opportunities for YLG to forage on waste. Also, to have a better understanding of the annual changes of the breeding sites of AG, it is important that parallel colony monitoring is carried out each year by staff from all PIs responsible for areas in which the species breeds. The in-person replication visits to NP Mljet and Dubrovnik-

Neretva county were very helpful to address this matter and showcase how the monitoring should be carried out.
The anticipated threat of lack of data has been largely overcome during this project. The systematic nest searches, the regular island visits and the use of sound recorders and camera traps have greatly helped in, first of all, assessing which islands have breeding colonies (several new colonies were found during the project namely) and on which islands rats are present (some AG colonies were naturally rat-free), and to better understand the interactions between rats and each of the three seabird species on these islands. Also, the breeding population estimates for YS, SS and AG have been much more refined compared to the pre-2019 estimates for SPA Lastovsko otočje. Lessons learned and methods used will be applied during the new LIFE TETIDE to tackle knowledge gaps in shearwater breeding populations in SPA Pučinski otoci as well. Furthermore, the boat-based surveys and the GPS-tracking of all three seabird species have helped greatly in understanding where the birds forage and rest when at-sea, thereby identifying seven new marine IBAs. The project drafted conservation objectives and measures for these areas which were discussed and shared with the competent ministry. In June 2025, the Croatian Government officially designated two new marine SPAs to be included in the Natura 2000 network. The remaining five identified IBAs will still be considered for SPA designation in the future as well.
The threat of seabird bycatch in fishing gear was only addressed as a pilot activity. As seabird bycatch mitigation measures were tested only for the first time in Croatia, it was not possible to have quantitative data on this threat reduction. However, valuable recommendations were put together regarding future approaches and regarding concrete mitigation measures. At least the first official record of seabird bycatch in Croatia was reported during the project, thereby showing the effects of bringing this topic under the attention of fishermen, independent observers, PIs and relevant ministries. During the project implementation, BIOM additionally secured funding (MedBycatch Phase 2) to influence fisheries policies in Croatia with regards to seabird bycatch and significantly raise the advocacy and policy capacities of LIFE Artina. It was jointly implemented by BIOM and WWF Adria and produced guidelines for the development of the action plan for vulnerable marine species bycatch, which were developed with MoA-DoF and MoESD. LIFE Artina also carried out a first analysis of overlaying seabird movement data and fishing vessel movement data to identify areas with increased risk of bycatch. However, in order to actually tackle seabird bycatch in Croatia a lot of work is still to be done.
The threat of impact of visitors and tourists, as well as other site users was assessed and conservation activities were implemented to influence the site users. These include a wide array of activities including working with boat operators (shearwater-friendly boats) and fishers (bycatch mitigation); working with kindergarten and school children; raising awareness of the local community as well as (nautical) tourists; working with local restaurants on light pollution - a threat identified during the implementation of the project. Lastovo NP will ensure continuation of activities regarding behaviour change within the SPA Lastovsko otočje as part of their operations. There is particular interest and support from the local community, e.g. local school, for these activities, which ensures that the long-term awareness of the local community will keep improving. Lastovo NP will also continue to raise awareness of visitors during the tourist season. For example, Lastovo NP will continue to organise the Albatross Night after LIFE Artina (most likely as part of the annual fishermen's night event), as this was proved to be a successful approach to awareness raising of both locals and visitors. The topic of light pollution has really struck a chord with the local community and when a new project of the Lastovo Municipality was being drafted to change public lights to be eco-friendly, restaurant owners were ready to join in. There is also a desire to have the Lastovo Islands Nature Park listed under the 'Dark Sky Park' initiative, so this helps in enforcing the implementation of

measures needed to reduce light pollution. During the project Lastovo NP staff was trained in what to do when finding stranded birds, so they will continue to be the contact point for rescue operations after the project is finished as well.
Lastly, while the threat of marine litter is still very present, sustainable progress with regard to this topic was made during the project. The systematic marine litter monitoring carried out in SPA Lastovsko otočje was the first of its kind in a marine protected area in Croatia. The monitoring protocol was refined as part of the project and the national monitoring protocol was updated based on the results. To ensure continuity of this monitoring protocol, the activity will be included in the revised management plan of Lastovo Islands Nature Park (in 2027). The issue of marine litter has also been a great proxy for awareness raising and LIFE Artina managed to catalyse several activities in SPA Lastovsko otočje – from beach clean-ups to sea bottom clean-up activities with the diving community. These activities have raised significant attention of the public and the media, a lot of volunteers have participated and there is a continuation of these efforts led by Lastovo NP, in cooperation with Sunce and other NGOs. The project also drew attention to the organic waste management problem on the island (which supports rat and YLG populations) and provided an analysis of the situation and proposed possible solutions.

2. Economic benefits:
The project generated 4 new (part-time) positions, two in BIOM and two in Sunce. These roles were project administrator (47 months), conservation officer (26 months), communications officer (34 months) and fisheries + marine litter officer (46 months). The total number of months (153) divided by the length of the project (64 months) gives 2.4 FTE. By raising their capacities, the three of the newly hired staff kept being employed by the project partners after the project had finished, while the fourth changed his job from BIOM to Lastovo NP.
The project also contributed to the local economy in the project area, most notably on the island of Lastovo, as shown by the socio-economic analysis of project impact which was produced by the Ivo Pilar Institute under Action D.4. Through the stay of employees and volunteers of the project partners on the island, an estimated 178.687,00 Euro was spent on salaries, accommodation, food costs and other services on the island.

3. Social benefits:
Besides the local economic benefits mentioned under the previous point, the socio-economic analysis also showed that the project contributed to raising the recognition of the area through media appearances and announcements. The educational activities and clean-up actions especially were viewed as very positive by the local community, and clearly increased awareness among the inhabitants, in particular school children, of the need to preserve the environment and the willingness to engage in future projects related to the Lastovo area. Throughout the project we tried to communicate to local people and fishermen about the uniqueness of Lastovo in Croatia: a home to three nationally endangered seabird species! The goal of this is to make the seabirds part of the identity of Lastovo. While this still needs time, small changes were noted, e.g. Lastovo NP printing t-shirts for tourists with seabirds on them. The project also helped to create a basis for bird watching tourism on the island (Action E.3) and this initiative was picked up by one regional tourist agency, thereby improving the sustainable tourism offer on the island. Furthermore, local excursion boat operators that included bird-friendly storytelling, as well as other nature conservation aspects in (the promotion of) their tours were given the ‘shearwater-friendly’ boat flags (Action C.6). However, it is hard to assess if this positively impacted their income.

4. Replicability, transferability, cooperation:

LIFE Artina was the first ever seabirds' conservation project in Croatia and the potential and need for replicability and transferability has been very significant. Projects running in parallel such as the Fondation Segre-funded Adriatic Seabird Guardians and MedBycatch Phase 2 allowed for additional conservation and awareness raising actions related to marine clean-up and monitoring actions, bycatch reduction and IAS control, which in turn generated more replication/ transferability potential for these topics. The demand from other protected areas management authorities has been increasing steadily, especially since there is now funding available from the MoESD for the implementation of concrete conservation measures. Methodologies for seabird conservation developed during LIFE Artina are starting to be implemented or are planned in other areas relevant for seabirds in Croatia, as well as for other species of seabird (e.g. Mediterranean Shag & Common Tern). First of all, the start of the new LIFE TETIDE project, with a new national partner (PI More i Krš) in a new geographic area for concrete seabird conservation and monitoring activities (Vis archipelago). Also, NP Brijuni is now considering the removal of rats from some of their shag and tern colonies and the private entity in charge of the management of the Silbanski Greben, hosting the largest shag colony in Croatia, has picked up an interest in the topic as well. The use of some of the tools is even being replicated on seabird colonies in lakes and rivers around Zagreb (managed by PI Maksimir). Besides direct conservation techniques, the seabirds educational program for children was transferred to several protected areas management authorities and schools, and hands-on training to implement such education was provided. Educational activities have continued both on Lastovo and in other protected areas (e.g. NP Telašćica, NP Brijuni). Sunce also established many collaborations along the Adriatic coast to showcase and carry out marine litter cleaning and monitoring actions.
The project increased cooperation both nationally and internationally, achieved through multiple networking, dissemination and replication events. As a result, the feasibility study carried out on Sušac (Action A.5) was much improved during the project, with more experts being able to visit the island and provide additional expertise. The permanent removal of rats from the island is deemed possible, and this would definitely be a project to consider in the future. BIOM is also increasingly recognized as an expert organisation for seabird conservation, as for instance shown by 1) the invitation by Italian colleagues to join the new LIFE TETIDE project; 2) the request to contribute to updating the International Species Action Plan for Audouin's Gull and 3) by supporting the development of the BirdLife Marine Megafauna Conservation Toolkit which allows other BirdLife partners to apply the same methodology as well to support their marine IBA designation processes as well. Lastly, the movement, distribution and colony-specific data gathered during the project will still serve the publication of several scientific papers in years following the end of the project.

5. Best Practice lessons:
Having BLM as a sort of mentor in this project ensured that several best practices regarding working with seabirds and the removal of rats were implemented right from the start of LIFE Artina. Examples of this are the deployment of GPS-tags on shearwaters, or the best way to carry out rodenticide baiting (based on Thomas, S., Varnham, K. & Havery, S. 2017. Current Recommended Procedures for UK (bait station) rodent eradication projects (Version 3.0) Royal Society for the Protection of Birds, Sandy, Bedfordshire). Later on, when the threat of light pollution was identified around Lastovo, BLM also shared their experiences from Malta which helped setting up a protocol on how to deal with stranded birds. They also suggested involving volunteers in some of the project actions to increase the conservation and outreach impacts.
At the same time, as the project was the first of its kind in Croatia, several documents and protocols created over its course can be used as best practices lessons for follow-up projects, or be adapted to suit other PIs or areas (in Croatia). Examples of this are the rat eradication/

control plan for the Lastovo Archipelago (Action A.3), the simplified marine litter monitoring plan (Action A.2) and the educational program (Action E.3). The project built on existing national efforts to develop and implement an efficient marine litter monitoring system. New monitoring stations were identified, existing protocols tested and adapted to local circumstances and new staff trained to implement monitoring.

6. Innovation and demonstration value:
As mentioned before, the project was the first of its kind in Croatia, so many of the techniques used, materials produced and activities carried out were innovative on a national scale. As such, they also had a demonstrative value for many (governmental) institutions working on similar topics (as discussed under point 4 also). All work and activities carried out in the scope of seabird bycatch were new, as the threat was not recognized in Croatia until the start of the project. For the first time bird-friendly fishing gear was introduced (additional weights, signal LED lights, hookpods), with hookpods even being trialled for the first time in the Mediterranean. The testing of this bird-friendly fishing gear had numerous useful recommendations: from measures intended to collect data and determine the extent of seabird bycatch, through measures aimed at reducing seabird bycatch, to very clear comments on the testing itself and how it should be implemented in the future. Also, during the project, the first official record for Croatia of a bycaught seabird was documented.
While shearwater nest monitoring, rat removal and GPS-tracking of seabirds were trialled sporadically prior to the start of the project, the scale on which it was carried out and the methods used (e.g. rodenticide baiting) during LIFE Artina were definitely new for Croatia. Several new small shearwater colonies were found during the project and the improved nest monitoring resulted in a much more accurate national assessment of the shearwater breeding population compared to the rough estimates prior to the project. Also, compared to other countries working with the same shearwater species, their breeding situation around Lastovo is even unique, allowing for a large sample of nests to be monitored, thereby providing more insights into the reason for nest failure, etc. The shearwater call recognition software that was developed during the project was innovative and has the potential for wider application across the entire breeding range of these species, where both species often breed in less accessible locations. The accessibility of the nests in Croatia also made it relatively easy to get a large sample of individuals for GPS-tracking purposes. The acquired comprehensive movement dataset of these three seabirds in Croatia served as a great case study to update/ improve the BirdLife Marine Toolkit, resulting in the new Marine Megafauna Conservation Toolkit. The subsequent application of this new toolkit on all YS movement data from the Mediterranean helped to identify missing IBAs across the species' breeding range. The seabird movement data was also used for the first time to examine possible interactions with fishery activities in the Croatian Adriatic. The protocol for data processing was developed within LIFE Artina, with a very useful procedure to filter and overlay seabird and fisheries data which can be applied for similar analysis outside Croatia as well.

7. Policy implications:
The project directly contributed to implementing the EU Birds Directive as it focused on improving the conservation status of 3 seabird species listed on Annex I of this directive. This was achieved by tackling IAS on some of their main breeding colonies in Croatia, as well as by designating marine SPAs to protect important foraging and roosting sites. In addition, the project started tackling seabird bycatch in fisheries, which was not recognized as a threat in Croatia.
The designation of marine SPAs was particularly important as the European Commission identified that Croatia was behind in the matter of completing the Natura 2000 network. As the

project progressed, the EU-wide pledge to have all member states protect 30% of their terrestrial and 30% of marine habitats by 2030 as part of the EU Biodiversity Strategy further helped to keep this topic relevant on the agenda of the Ministry. The project developed conservation objectives and measures for all 7 designated IBAs, focusing primarily on threats at sea (but not limited to them), which were used by the competent ministry when designating the two new SPAs. While Croatia delivered on the pledge to protect 30% of its land and sea in June 2025, it still needs to designate 10% of the area as strictly protected sites. The project partners will also continue to push for the remaining designated IBAs to become SPAs. Furthermore, it is recommended that other seabird species from the Annex 1 of the EU's Bird Directive - Common Tern, Little Tern and Mediterranean Shag - will still be included in the Croatian marine Natura 2000 network to ensure safe foraging and roosting sites for these species as well.

The project produced two policy briefs, one regarding the future of bird-friendly marine policy in Croatia and one focused on the measures for the mitigation of impact of fishing activities on sensitive seabird species in Croatia. These were produced and distributed to relevant stakeholders and the media, and serve as position papers for the project partners on these issues.

The project influenced the fisheries policy in Croatia for it to recognize the threat of bycatch in fishing gear and to start implementing real conservation measures, since prior to LIFE Artina Croatia always reported that there was no bycatch. This has started to change, albeit very slowly. Other projects, such as MedBycatch Project Phase 2 also contributed to this. The project worked with fishers at the local level and used both bottom-up and top-down (by engaging the MoA-DoF) approaches to move forward the issue. Project partners developed and communicated the recommendations for the EMFAF 2021-2027 to the MoA-DoF. It is hard to determine if any changes were made to the EMFAF, because its content is very high-level, but the recommendations definitively pushed forward the seabird bycatch agenda in Croatia. As part of the MedBycatch Project Phase 2, project partners also produced guidelines for the development of an action plan for vulnerable marine species bycatch, which were developed jointly with the MoA-DoF and MoESD.

With regards to the legislation on IAS eradication and control, some provisions are not applicable on remote uninhabited islands, especially regarding the use of rodenticides for conservation purposes, or the possibility to dispense them by means of aerial dispense. There is poor cooperation between the nature conservation and veterinary sectors, which results in uncertainty for those who are implementing rodenticides for IAS control. LIFE Artina shared its experience regarding IAS and rodenticide use and is also pushing for improving the relevant policy. Considering that the Directorate of Veterinary and Food Safety of MoA is also involved in the LIFE BALKAN DETOX and LIFE SUPport projects, opportunities are being used by the coordinating beneficiary to improve these policies. The new LIFE TETIDE will also continue to work on updating and improving relevant laws regarding IAS and the use of rodenticides.

7. Key Project-level Indicators

KPIs added

Compared to the KPI targets submitted at the start of the project, several indicators have been added. Most importantly, the designation of marine SPAs was not captured in the first snapshot and has now been included under several categories (under 1.5 project area, 7.1 ecosystem assessment, and 10.1.3 risk-based compliance/ enforcement system put in place). The same applies to the topic of marine litter, which has now been added under 3.2 (marine litter), documenting both the beach clean-ups as well as the underwater clean-ups. Indicator 11.3

'surveys carried out regarding awareness of the environmental/climate problem addressed' was also added to capture the surveys carried out under Action D2.

KPIs removed or altered

On the other hand, some KPIs provided initially have been removed or altered. First of all, under 7.2 (ecosystem services assessment), the indicator pest control was removed as its meaning was misinterpreted. The project removing a 'pest' from the ecosystem (rats) has nothing to do with the ecosystem providing a pest control service. Instead, the seabirds breeding on the islands perform a service by bringing nutrients to these remote places. As such the KPI was altered to assess the actual impact of our work.

Furthermore, the area reported under 7.1 (ecosystem assessment) and 7.4 (wildlife species) was reduced to only reflect the area where concrete conservation measures were carried rather than the entire project area. On the other hand, under 1.5 (project area) the value was enlarged to also include the places where work with fishermen, school children and other stakeholders took place. Also, as more islands with seabird colonies were found during the project, the total area of sites where rats pose a problem was increased under 7.5.1 (threats).

Lastly, several indicator values were added under sections 1.6 (humans influenced by the project), 10 (governance), 11 (information and awareness raising to the general public) and 12 (capacity building) allowing for a better, more refined, assessment of the project achievements. Malta-specific indicators were also added under section 10.

Higher KPI values than expected

One of the most rewarding results of the project is the increase in both the number of breeding pairs of YS and SS, as well as their increased breeding success. The achieved values were much higher than anticipated, especially for YS (reported under 7.4). While both species continue to be threatened, the outlook is somewhat more positive as rats have been permanently removed from some of their colonies while on some other sites rat numbers are suppressed on an annual basis (which will continue also after the project has ended). As a result, their provided ecosystem services to those islands is expected to improve as well (reported under 7.2). Furthermore, several marine SPAs were designated to protect the main foraging and roosting areas of the species (reported under 1.5, 7.1 and 10.1.3), providing a base for at-sea protection as well. However, for a truly positive trend, rats should be permanently removed from larger, more remote colonies as well (e.g. Sušac) and appropriate conservation measures should be put in place in the newly designated marine sites.

As the project had many more education, dissemination, replication and networking events than anticipated, the KPIs reflecting these topics have all been achieved with higher values than predicted (sections 1.6, 10, 11 and 12). More events (including beach and underwater clean-ups) were organized, more reports, leaflets, publications and articles in print media were produced, and two project videos were created (under 11.2 tools for reaching/ awareness raising of the general public). Ultimately, the project reached more tourists than anticipated (under 1.6), achieved a larger involvement of volunteers, NGOs private for profit, public bodies, and other CSOs (reported under 10.2 involvement of NGOs and other stakeholders in project activities), educated more pupils, students, laymen and Croatian professionals (under 12.2 professional training or education) than foreseen and networked with more foreign professionals/ experts (12.1 networking).

KPI values reported under section 14 (contribution to economic growth) have mostly been achieved or surpassed. Project spending was higher than anticipated, also due to opportunities arising from projects on similar topics running in parallel (such as Adriatic Seabird Guardians & MedBycath Phase 2). Furthermore, the successful networking and replication activities have resulted in the application or acceptance of several follow-up projects already, focused both at

maintaining the results achieved on Lastovo, as well as expanding into new regions and new partnerships. This also allows for securing jobs generated during LIFE Artina. One example is LIFE TETIDE (Project 101113950 - LIFE22-NAT-IT-LIFE TETIDE), a new collaboration with PI More i Krš and several Italian partners.

Lower KPI values than expected

The main KPI which turned out lower than anticipated was the expected increase in the number of breeding pairs of AG by the end of the project (under 7.4). The nomadic breeding ecology of the species made it hard to target conservation efforts and its small population size left it heavily outnumbered by its direct competitor and predator the YLG (whose population is kept high by the poor waste management practises on a European scale). Interestingly, while the project was going on, the IUCN also changed the red list status of the species from Least Concern to Vulnerable, showing that the species is not only doing poorly in Croatia, but in fact on a global scale. Despite the negative population trend, at least rats have been permanently removed from several (historical) breeding sites around Lastovo, providing safer future breeding conditions, and marine SPAs have been designated to protect the main foraging and roosting sites for the species at-sea.

The other KPI value which was lower than foreseen at the project's start was the number of website visits (under 11.1 website). This could be due to people engaging more and more on social media rather than through actual project websites.

Finally, the calculation of FTEs (under 13 jobs) was changed according to the definition in the KPI guide and resulted in 2.4 FTE generated through the project, rather than 9.09 (which wrongly included staff that was already hired prior to the start of the project).

8. Comments on the financial report

8.1. Summary of Costs Incurred

The following table shows the project costs incurred compared to the approved budget. The reporting period covers the 64 months from 01.09.2018 to 31.12.2023, including the 4 months approved extension of the project. Overall, there are no discrepancies that resulted in exceeding the allowed flexibility of the 20% limit. The budget transfer percentage between cost categories for the whole project amounts to around 6% of the total budget.

PROJECT COSTS INCURRED				
	Cost category	Budget according to the grant agreement in €*	Costs incurred within the reporting period in €	%**
1.	Personnel	984.450,00	1.070.290,92	108,72%
2.	Travel and subsistence	146.645,00	89.853,92	61,27%
3.	External assistance	202.700,00	251.288,05	123,97%
4.	Durables goods: total non-depreciated cost	285.926,00	284.123,54	99,37%
	- Infrastructure sub-tot.	N/A	N/A	N/A
	- Equipment sub-tot.	285.926,00	284.123,54	99,37%
	- Prototype sub-tot.	N/A	N/A	N/A
5.	Consumables	136.907,00	77.219,51	56,40%
6.	Other costs	39.356,00	43.274,42	109,96%
7.	Overheads	125.403,00	126.754,76	101,08%
	TOTAL	**1.921.387,00**	**1.942.805,12**	**101,11%**

*) If the Agency has officially approved a budget modification through an amendment, indicate the breakdown of the revised budget. Otherwise this should be the budget in the original grant agreement.
**) Calculate the percentages by budget lines: e.g. the % of the budgeted personnel costs that were actually incurred

Main discrepancies per cost category compared to the initial budget are summarised below:

Personnel
The increased expenditure on personnel costs was driven by several key factors throughout the project, including its extended duration, expanded dissemination and replication efforts, additional educational, networking and advocacy activities and an extra year of monitoring the impact of the conservation actions. These changes necessitated increased staff involvement across various project activities.
Personnel costs also increased due to extensive work on determining specific fishing gear as well as determining optimal testing conditions. Additional staff support was needed for assisting fishermen with gear installation, overseeing testing on board fishing vessels, and

developing performance questionnaires. Staff played a crucial role in organizing events to engage fishermen, particularly in areas significant for seabird conservation.
Further efforts included developing educational and outreach materials, such as presentations on seabird bycatch, marine litter, and conservation education programs. Results from composter testing were also presented to coastal restaurants. Increased personnel involvement was necessary for marine litter cleaning actions, monitoring initiatives, and coordinating educational activities. Additional efforts were made to enhance collaboration between civil society, public institutions managing protected areas, and educational institutions through workshops and dissemination efforts.
Project partners developed a replication and transferability strategy, which increased staff engagement in the final year for various in-person and online activities. While costs for the conservation manager were reduced, there was an overspend on conservation officers, who undertook additional field activities, data analysis, and reporting beyond initial plans. One major contributor to additional personnel costs was the development and administration of sound analysis. Significant effort was required to label calls and collaborate with computer experts to analyse sound data using existing methodologies while recognizing their limitations. Throughout the project, networking activities exceeded initial expectations and budget allocations. Increased collaborations and interactions among stakeholders necessitated greater personnel engagement, further contributing to the rise in staff costs.

Travel and subsistence
In the travel category, spending decreased substantially and primarily due to the cancellation of many planned trips, mostly on a national level, as a result of the COVID-19 pandemic. Additionally, a significant number of meetings were conducted online instead. However, this did not impact the implementation of the project in any way. Project meetings took place as planned, and, in fact, networking activities during the project far exceeded initial expectations.

External assistance
Proportionally, most overspending occurred in this budget category, across a range of project activities. This included hiring experts for the bycatch mitigation fishing gear testing, as the necessary expertise was not available among the project partners. A specialist was contracted to define technical specifications, oversee gear procurement, assist fishermen, and analyse performance data. Additional costs were also incurred for skipper services and occasional boat rentals. For the first three years of the project, we had a person employed as a boat operator, but in the fourth and fifth years, when field visits became less frequent and did not require a full-time skipper anymore, we filled that position with external service contracts.
External assistance was also used to support the implementation of two additional activities which emerged while the project was ongoing to further strengthen its conservation impact under Action C2, namely the sterilisation of feral cats (Lastovo NP) and the testing of composters with local restaurant owners (Sunce). Also, under Action D1 BLM shifted budget to develop a species-specific call recognition model for application on the sound recorder data. Recordings were annotated by BLM and BIOM as YS and SS calls or noise, while the neural networks model was outsourced to FORTH-ICS, Crete.
Moreover, a new budget line was introduced for media promotion of key project events, and funds were set aside for translating project results into English to facilitate international collaboration. Project partners also produced two project videos, one on LIFE Artina and one specifically on seabird bycatch and mitigation measures. These videos served as an advocacy tool, showcasing project achievements and raising awareness about seabird conservation. Also, as communicated through Amendment 2, Lastovo NP reallocated some budget to external

assistance for increased awareness and educational efforts, including radio commercials, educational materials, bird watching tours and marine litter clean-up actions.
Overall, reallocations allowed for an expanded impact and a broader reach than initially planned.

Equipment - Durables goods:
Spending in the equipment category was a little bit lower than planned, primarily due to a shift in the approach regarding YLG diversion methods. BIOM initially planned to purchase a laser diverter, inflatable scarecrows, and car batteries to deter YLG, but these were ultimately not acquired, based on the advice of the subcontracted gull expert. BIOM also did not purchase the planned boat trailer. Instead, the budget was spent on a semi-rigid inflatable boat with a more powerful engine than originally foreseen. After consultations with suppliers and experienced skippers, it became clear that a stronger, 200 HP, engine was necessary for safe and efficient operation, ensuring fieldwork to be carried out (also on remote islands).
Another significant change involved the project vehicle purchased by Sunce. The original plan was to purchase an electric car, aligning with sustainability goals. However, due to limited options within budget and Croatia's inadequate charging network, a high-quality second-hand plug-in hybrid was chosen instead. Although slightly over budget, this ensured long-term reliability and performance. Sunce also purchased three small electric composters to reduce restaurant food waste disposal in communal bins and in the sea, as mentioned under the previous section.
BLM shifted budget to specialized equipment for sound analysis, including a PC and storage devices for the purpose of labelling and storing recordings, as well as running the model which was developed with the help of external assistance. The model was finalised in July 2023 and applied to all the sound recorder data collected during the project.
Lastly, funds were allocated to Lastovo NP to purchase equipment necessary for implementing part of the conservation activities as listed in the after-LIFE plan (e.g. rat control work). Essential tools and protective gear were procured, such as chainsaws, clearing saws, GPS devices, and a camera for documentation.
Overall, spending adjustments ensured the project remained effective while adapting to unforeseen challenges and long-term conservation needs.

Consumables
Spending in the consumables category was significantly lower than planned, mainly due to changes in the approach to testing bird-friendly fishing gear. Initially, the project intended to equip at least four longline fishing vessels with hook-shielding devices, allocating a substantial budget for this initiative. However, based on surveys and discussions with fishermen, a small-scale trial was conducted instead, as bycatch levels were lower than expected and the mitigation gear already on the market was not adaptable to the Croatian fleet. Testing involved up to six fishermen using various mitigation measures, including weighted demersal longlines, hook-shielding devices in pelagic longlines (hookpods), and LED lights in gillnets. This shift resulted in substantial savings, which were reallocated to other areas (such as the purchasing of ice boxes which were given to participating fishermen to store their catch and any seabirds accidentally caught for further analysis. Also, due to the change in the rat eradication method from mechanical trapping to rodenticide baiting not all originally planned traps were purchased. Furthermore, it was determined that the abseiling equipment, initially planned for accessing seabird nests on cliffs, was unnecessary, leading to further savings. Overall, while spending was lower in some planned areas, savings were effectively redirected to cover essential costs, in particular the underestimated costs for boat fuel by BIOM and Lastovo NP (due to increased fieldwork carried out) as well as the unforeseen costs concerning the project

boat to cover maintenance and boat storage during the winter season. Lastovo NP used some of the available budget on consumables to purchase reusable plastic cups which were used at the project closing event (as requested in the 2nd Amendment).

Other costs
Spending in this category increased due to several key factors. One of the reasons was the need to mobilize volunteers for conducting interviews with tourists on the island of Lastovo as part of the D Actions. The COVID-19 pandemic made it difficult to collect a sufficient number of responses, as many tourists avoided unnecessary interactions. Additionally, during the tourist season, Lastovo NP staff were occupied with other everyday responsibilities, and local volunteers were unavailable due to work or holidays. To address this, volunteers were brought to Lastovo in June, July, and August over the last two years, with costs covering their travel, food, and accommodation.
Furthermore, the travel expenses of 'non-project employees' from BIOM to support the fieldwork were budgeted under this category. Their involvement provided additional manpower for carrying out all conservation activities. Another significant expense was the increased travel costs for external collaborators. Initially, these costs were expected to fall under the "Travel" category, but they were later correctly categorized under "Other costs". This miscalculation led to a higher-than-expected expenditure in this section.
Lastly, additional costs were incurred during project awareness raising and dissemination activities The Albatross Nights initiative expanded beyond the originally planned scope and attracted more participants than anticipated, requiring additional funding. Also, final project events, including the closing conference, required additional resources as more was spent on travel costs for key speakers, ensuring high-quality presentations and expert discussions to maximize project impact.
Overall, while costs in this category exceeded initial projections, these reallocations were necessary to ensure effective outreach, fieldwork, and expert engagement in key project activities.

As already explained in the midterm report, BIOM informed the project advisor on 03/05/2019 that we could no longer deduct prepaid VAT on invoices financed from grants. According to the Value Added Tax Act, legal entities which are financed from grants and from their own economic activity are allowed to deduct VAT only from invoices paid from money gained through economic activity and not from grants. This omission by the accounting service was recognized and corrections in VAT calculation for 2018 were made. The VAT deducted from invoices paid from grants was accordingly paid to the State budget. From January 1, 2019, BIOM is not deducting VAT from invoices paid from grants. As such, the total (gross) amount on invoices will be considered as an expense to be covered from grants, affecting all cost categories, but mostly notably the budget for equipment and durable goods.

8.2. Accounting system

In BIOM's accounting system each project is identified with a unique code and for the LIFE Artina project this code is marked as profit centre LIFE Artina. For the project BIOM receives co-financing from the Government of the Republic of Croatia Office for Cooperation with NGOs and from the Environmental Protection and Energy Efficiency Fund, but separate codes for co-funded costs are not used. Based on its code, all project costs can be extracted from the accounting software.

In Sunce's accounting system each EU project is identified with a unique code and for the LIFE Artina project this code is marked as profit centre LIFE Artina - LIFE17 NAT/HR/000594. For the project Sunce receives co-financing from the Government of the Republic of Croatia Office for Cooperation with NGOs and from the Environmental Protection and Energy Efficiency Fund, but separate codes for co-funded costs are not used. When the incurred costs are extracted from the accounting system and exported to PDF, one can filter for the project code and identify all project costs related to LIFE Artina.
In Lastovo NP's accounting system each project is identified with a unique code and for the LIFE Artina project this code is marked as profit centre 00019 LIFE Artina. For the project Lastovo NP receives co-financing from the Joint Funds for Parks of Croatia, but separate codes for co-funded costs are not used. When the incurred costs are extracted from the accounting system and exported to pdf, one can filter for the project code and identify all project costs related to LIFE Artina.
The accounting software in use at BLM is SAGE 50 v13. This system allows the implementation of an effective cost centre system, based on independent departments. An independent current bank account (without accrued interest) was opened and used in order to help identify the costs related to the project. The unique cost centre for the project has been identified from 2018 as department 703. It was assigned to the project and accepted with no objections when communicated to the monitor. As a result, the use of a separate bank account became optional but BLM continued to primarily use it until the project's end.

Project costs codes for each beneficiary are presented in the table below.

Beneficiary	Project costs code
BIOM	LIFE Artina
Sunce	LIFE Artina - LIFE17 NAT/HR/000594
Lastovo NP	00019 Life Artina
BLM	703

Procedure of approving costs
Every received invoice is sent for approval to the project manager, i.e., the project coordinator or their substitute. After approval, it is processed (assigned a project code, marked with the approver's name, and scheduled for payment), then sent for payment and subsequently recorded in the accounting system, where the expense is recorded and tagged with the project code. Dedicated persons for approval of costs are defined by internal rules and therefore vary among beneficiaries depending on the work positions and the amount to be approved, but in general the project costs have to be approved by project coordinators before the purchase.

Reference to the LIFE project on invoices
As a general rule, every incoming invoice must include the project's short name and reference code. The same is ensured in a way that either the suppliers are asked to have a clear reference to the LIFE project (when issuing an invoice or this is listed in a contract for external assistance). Where this is not possible (usually some travel related invoices), a project reference stamp is used. Every beneficiary has a project reference stamp.

Time recording system
Each staff member is obliged to record his/her time spent when working in an online spreadsheet template. Standard time sheets are filled in by staff on a daily basis, recording time dedicated to work and to any breaks. All absences (such as weekends, holidays and sick leaves) are recorded in the sheets too, on a daily basis. The time sheets must be signed and dated by

the employee and his/her line manager. Annual leave days are requested by the employees using internal forms or in spoken communication with their supervisors. Requests must be approved by the line managers/head of the unit before the holidays start. Formal check of the presence of signatures (in reasonable time) is done from the project administrators. The following BIOM employees did not use time sheets as they have an employment contract stating that they work exclusively on the project (full time) or an instruction letter has been issued stating a fixed percentage of the working time that they work on the project:

- Željka Rajković, Project Manager (100% between 9/2018-6/2023)
- Sven Kapelj, Conservation Ornithologist (100% between 9/2018-12/2022)
- Boris Mihačević (9/2019-1/2020) / Sanja Bogdanić (2/2020-12/2020), Project Administrators (both 100%)
- Stjepan Ivelja, Conservation Officer (Periods in which he was employed, he worked 100% on the project: 3/2019-10/2019; 1/2020-10/2020 and 2/2021-9/2021)
- Andreas Engelen, Conservation Officer (100% between 4.2020-12.2021)
- Hrvoje Čeprnja, Conservation Officer (100% between 9.2020-12.2020)

8.3. Partnership arrangements (if relevant)

The financial transactions between the coordinating beneficiary and the associated beneficiaries have taken place as suggested in the Grant Agreement and are regulated by the bilateral Partnership Agreements between the coordinating beneficiary and each associated beneficiary. Each beneficiary reported quarterly. Beneficiaries filled out the claim form and sent supporting documents (personnel – timesheets, salary slips and bank statements; all other costs – invoices and bank statements). Coordinating beneficiary checked the individual claim forms and put together the consolidated cost statement.

8.4. Certificate on the financial statement

Audits were carried out for BIOM and Sunce, and both reports have been merged into one document which was submitted to Butler as the deliverable ‘Audit report’ under Action F.1.

8.5. Estimation of person-days used per action

Action type	Budgeted person-days	Estimated % of person-days spent
All projects when applicable Action A: Preparatory actions	2338	111,14%
NAT and CLIMA projects Action B: Purchase/lease of land and/or compensation payment for payment rights	N/A	N/A
NAT projects Action C – Concrete conservation actions	2164	112,79%
NAT and CLIMA projects	683	173,84%

Action D: Monitoring and impact assessment		
NAT and CLIMA projects Action E: Communication and Dissemination of results	2416	122,52%
NAT and CLIMA projects Action F: Project management (and progress)	2175	104,51%
TOTAL	**9776**	**117,22%**