Project Title:	ECOPOTENTIAL: IMPROVING FUTURE ECOSYSTEM BENEFITS THROUGH EARTH OBSERVATIONS
Project number:	641762
Project Acronym:	ECOPOTENTIAL
Proposal full title:	IMPROVING FUTURE ECOSYSTEM BENEFITS THROUGH EARTH OBSERVATIONS
Type:	Research and innovation actions
Work program topics addressed:	SC5-16-2014: "Making Earth Observation and Monitoring Data usable for ecosystem modelling and services"

Deliverable 11.3

Policy recommendations mainstreamed into GEO/GEOSS (in particular in the GEO Ecosystem Task)

Due date of deliverable:	31.05.2019
Actual submission date:	30.10.2019
Version:	V1
Main Authors:	Matthias Jurek, Jessica Bitsch

This project has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 641762

Project ref. number	**641762**
Project title	**ECOPOTENTIAL: IMPROVING FUTURE ECOSYSTEM BENEFITS THROUGH EARTH OBSERVATIONS**

Deliverable title	Policy recommendations mainstreamed into the GEO/GEOSS
Deliverable number	11.3
Deliverable version	V1
Contractual date of delivery	Month 40
Actual date of delivery	30.10.2019
Document status	Final
Document version	1
Online access	https://www.ecopotential-project.eu/products/deliverables.html
Diffusion	Public
Nature of deliverable	Report
Workpackage	WP11
Partner responsible	UNEP
Author(s)	Matthias Jurek, Jessica Bitsch
Editor	
Approved by	Antonello Provenzale, Carmela Marangi, Silvia Giamberini
EC Project Officer	Gaëlle Le Bouler

Abstract	This report summarizes the activities that were undertaken to mainstream (policy) recommendation developed in the ECOPOTENTIAL project into the GEO community. Based on the original call and policy needs expressed with this by the EC, this document provides "answers" to some of these needs. Special focus is on the contribution of ECOPOTENTIAL to GEO/GEOSS which itself was one of the requirements in the call.

Keywords	(Policy) Recommendations, GEO/GEOSS, Future PAs

This project has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 641762

Co-funded by the European Union

Table of Contents

Co-funded by the European Union

1. Executive summary

One of the main objectives of the ECOPOTENTIAL project was to contribute to GEO and GEOSS by improving future ecosystem benefits through Earth Observation (EO). Existing and new remote sensing data as well as in situ data was used to support Protected Areas' (PAs) management. The large scope of the ECOPOTENTIAL project including 25 PAs allowed for addressing questions related to the status and ongoing changes of ecosystem functions and services in varied environmental conditions at different protection levels. Based on this, the needs of future PAs could be defined. With its strong focus on PAs mainly in Europe, the ECOPOTENTIAL project is a main contributor to the GEO Work Programme, supporting goals of the initiatives GEO ECO, GEO GNOME and EuroGEOSS.

This report outlines the activities that were undertaken to mainstream policy recommendations that were developed during the ECOPOTENTIAL project, based on the main research findings and interactions with PAs (e.g. summarized in the Synthesis Report ECOPOTENTIAL Deliverable 11.2) Recommendations target at decision-makers in general and the GEO community in particular.

The activities developed in WP10, aiming to implement the VLAB (described in D10.4) have been presented at the last two GEO Plenary meetings in Washington (2017) and Kyoto (2018). Based on the interactions at these events, a set of recommendations targeting at the improvement of the effectiveness of the GEO activities have been developed by ECOPOTENTIAL. Special focus is on intellectual property rights, on the potential exploitation of open data by big companies, on the open-access science model, on the capacity building on the use of EO, on the use of concept of ecosystem services and on the establishment of Essential Variables and on the dialogue among scientists, users and policy makers on the definition of indicators and conservation policies.

In addition to the recommendations to GEO, dedicated policy recommendations were developed and presented at the Science Policy Briefing event at the European Parliament in 2019. The policy recommendations transform main findings from ECOPOTENTIAL into recommendations that should be considered by decision-makers in their decision-making processes in order to support the use of EO data for environmental management.

Both sets of recommendations were finally presented to the GEO community. At first, at the EuroGEOSS workshop in Lisbon in July 2019 and at a meeting of GEO and ECOPOTENTIAL in Geneva in October 2019, which was dedicated to discuss the legacy of ECOPOTENTIAL results in the GEO community.

Thus, these activities complemented activities done under ECOPOTENTIAL regarding the science-policy interface, targeting the global, European and local level. On the global level, the GEO community and its work programme is the main target point for dissemination activities and implementation of ECOPOTENTIAL results into EO related activities and infrastructures. On the European level, science-policy related activities targeted at the European Commission, the European Parliament as well as DG Environment. On the local level, especially WP9 worked on interactions with PAs to identify main challenges and needs of PA managers which were the basis to develop the policies recommendations for decision-makers.

This deliverable 11.3 is linked to Task 11.2 "Enhanced use of EO and in situ data in decision making". The goal of this task was to analyse potential for capacity building (training) among local decision makers and related stakeholder groups. Activities included capacity-building/training for ecosystem management using EO and in-situ data and models/tools (developed in the other WPs in particular the one developed in WP7); policy-upscaling through defining the needs and future demand for EO in resource management and monitoring, including inputs for strategies and plans promoting the integration of EO data in PA monitoring and management.

In the following report, the before-mentioned ECOPOTENTIAL activities to mainstream the developed recommendations to the GEO community and to decision makers will be outlined.

Co-funded by the European Union

2. Dissemination of policy recommendations developed within the ECOPOTENTIAL project

2.1 Policy requirements from the call "Making Earth Observation and Monitoring Data usable for ecosystem modelling and services."

Call: Enhance the participation of all players in social and political decisions regarding the protection and management of key ecosystems and the definition of future protected areas.

The GEO Ecosystem Community of Practice (WP1) was created under ECOPOTENTIAL alongside with knowledge-based policy strategies and decision-making (WP11). Dissemination, capacity building at all levels and citizen science was the focus of WP12; the requirements of future PAs in changing climates was addressed by WP9.

ECOPOTENTIAL (WP2) created a scientific framework for EO remote and in situ data synthesis and interpretation, largely based on Essential Biodiversity, Ocean and Climate Variables and their possible extensions. The interoperable ECOPOTENTIAL Virtual Laboratory Platform (VLAB) (WP10) was produced to make data and project results widely available. The VLAB is consistent with the GEOSS approach and is an important tool to integrate the ECOPOTENTIAL results into the GEO community. It will contribute to the creation of the GEO Knowledge Hub.

The VLAB is a valuable contribution to GEO and GEOSS, not limited to the Ecosystem Tasks, but to all the GEO Tasks aiming at knowledge generation and support to informed policy-making, in particular, referring to the United Nations Sustainable Development Goals (SDG). Thus, ECOPOTENTIAL can specifically contribute to the GEO initiative "Earth Observations in Service of the 2030 Agenda for Sustainable Development" which aims at encouraging nations and stakeholders to use Earth observations as part of their SDG activities.

All these activities combined support the mainstreaming of ECOPOTENTIAL results into decision-making processes at PA, European and global level.

Call: Undertake pilot actions in selected protected areas to further develop the Global Earth Observation System of Systems (GEOSS) and foster a knowledge base regarding ecosystem observations for the Copernicus (Global Monitoring for Environment and Security) initiative.

ECOPOTENTIAL was built around a large set of internationally recognized PAs, in which pilot actions and knowledge generation were initiated. Many of these sites contribute to LTER, GBIF and OBIS and the data and results will feed into the GEO Global Ecosystem Monitoring activities and GEOSS through the GEO Knowledge Hub.

2.2 European level: Mainstreaming of policy recommendations into EuroGEO

The EuroGEOSS Workshop took place from 3 to 5 July 2019 in Lisbon (Portugal) and was co-organised by the Portuguese Foundation for Science and Technology (FCT) and the European Commission. It brought together European players interested in and actively contributing to the Global Earth Observations System of Systems (GEOSS). The aim was to look for synergies across projects, initiatives, to offer networking opportunities to the participants and to discuss how Europe can contribute to the efforts undertaken on an international level to support EO. This year's emphasis was on Ocean observations and on user requirements for EuroGEOSS.

ECOPOTENTIAL members participated and presented ECOPOTENTIAL outcomes, methods, tools, models and recommendations in various sessions, delivering nine presentations and three posters. The "Ecosystems and Biodiversity" session was jointly organized by ECOPOTENTIAL, CNR Italy and the GEO-ECO Initiative. The session's main objective was to illustrate and discuss current knowledge-based, user-oriented and co-designed approaches to the conservation and management of biodiversity and ecosystem functions and services, considering the interplay of local challenges and continental-scale conservation priorities. Furthermore, ECOPOTENTIAL members had a strong contribution to the session on "Best practices and how to involve users" in order to communicate insights of ECOPOTENTIAL on how to co-design research with PA managers and make benefits of EO data available to them.

The policy recommendations to decision-makers and the recommendations to the GEO community developed in ECOPOTENTIAL were presented by UNEP, who was the leader of WP11. As EuroGEOSS is the European regional initiative of GEO, the presentation had a strong focus on the European policy framework and connections with EO, overlaps of the EuroGEOSS objectives with the ECOPOTENTIAL goals and activities and the policy recommendations which target decision-makers on a European level in order to support the use of EO data for PA management.

The workshop was a valuable opportunity to strengthen partnerships with main European research initiatives like LifeWatch ERIC, which are of major importance fur the future implementation of ECOPOTENTIAL results and the recommendations after the end of the project. The contributions of the ECOPOTENTIAL members were appreciated and the policy recommendations were well accepted by members of the European Commission and EuroGEOSS members.

The EuroGEO initiative is a key stakeholder for the future legacy of ECOPOTENTIAL and for the mainstreaming of ECOPOTENTIAL results into further EO related projects at the European level. As such, the initiative can also be a focal point for the implementation of EO tools into PA management on the European policy level. At the event, the policy recommendations of ECOPOTENTIAL were specifically well received by the representatives of DG Environment, in which ECOPOTENTIAL has a high reputation and level of recognition. Thus, after the end of the ECOPOTENTIAL project EuroGEO can function as a dissemination point of the recommendations to its members and support the implementation of the recommendations on the national level.

2.3 Global level: Mainstreaming of policy recommendations into GEO/GEOSS on the GEO-ECOPOTENTIAL meeting in Geneva, October 2019

A meeting between ECOPOTENTIAL members and the GEO community was organised to identify key relations of the ECOPOTENTIAL project with the GEO work programme and possible ways to mainstream ECOPOTENTAL results and tools but also approaches into the GEO activities. The focus of the meeting was to outline from the perspective of ECOPOTENTIAL how the project outcomes can be of use for the activities of GEO, in order to support GEO efforts to promote EO but also to increase the sustainability of the project. Gilberto Camara represented the GEO Secretariat and Gilles Ollier from the European Commission took part in the meeting as well.

The presentations covered the integration of the VLAB and its tools into GEOSS, DataCubes and the Map Browser as technologies and services to provide EO data for PAs, the integration of user needs into the design of tools, future threats of PAs to climate change and the (policy) recommendations to the GEO community and decision-makers.

In addition, representatives of LifeWatch ERIC and eLTER represented two main European research infrastructures which can implement and disseminate the results of the ECOPOTENTIAL project, also partly working as data repository.

In general, the GEO-ECOPOTENTIAL meeting made very clear that the project is a very important contributor to the GEO work programme (and to GEO ECO, GEO GNOME and EuroGEO in particular). The recommendations that were developed by ECOPOTENTIAL were discussed commonly between ECOPOTENTIAL members and Gilberto Camara.

There was a strong commitment of GEO to foster awareness raising for open data and EO data in general. The recommendation of the ECOPOTENTIAL community to GEO to establish a working group on Intellectual Property Rights was discussed. In this context, GEO suggested to confront this challenge with using Creative Commons for the produced data sets. ECOPOTENTIAL as well as the European Commission also mentioned community-based solutions to publish data. In general, whereas GEO established data sharing principles on a voluntary basis, there should be binding principles on the national level to establish a framework for publishing data like in projects like ECOPOTENTIAL. The topic of the potential exploitation of open data by big data companies was raised and should be addressed in the future. For this, the ECOPOTENTIAL recommendations will be brought to a higher level in GEO, e.g. the Executive board to discuss and tackle these challenges. Further topics, like the confusing and non-coherent terminology and frameworks (like DPSIR/IUCN categories, Ecosystem Service approach) was addressed and a mismatch of scales mentioned.

This further led to the discussion on how GEO could support the dissemination of the policy recommendations with its member states and, more generally, how to oblige governments to take decisions for the conservation of nature and the use of EO data and technologies to achieve that. As the UN is a neutral body, they cannot force governments to take decisions in a certain direction. However, the ECOPOTENTIAL policy recommendations deliver guidelines for governments how to include EO for environmental management in their decision-making process. Moreover, the SDGs can be a good starting point to EO on the political agenda of national governments. Based on the SDGs as a kind of “legal framework”, more specific targets can be developed and implemented. The GEO-ECO initiative will in the future go stronger into the direction to base their activities on the SDGs. For this, a collaboration with UNEP would be very valuable. This future orientation will go hand in hand with an expansion of the work with European PAs to collaboration with PAs on a global scale. Thus, a future step can be to adapt the policy recommendations which were developed for the European context to the global level.

Co-funded by the European Union

3. Summary

Two sets of recommendations were developed under the ECOPOTENTIAL project: recommendations specifically dedicated to the GEO community and policy recommendations addressed to decision-makers on the integration of EO into environmental management.

Whereas the recommendations to GEO target at the global level, the policy recommendations mainly address decision makers on the European level. Various events were used to disseminate the recommendations with the GEO community and with the European Commission and the European Parliament. The policy recommendations for post2020 environmental management strategies were specifically presented at the European Parliament during a Science Policy Briefing event in 2018.

The policy recommendations, which are an essential part of the legacy of ECOPOTENTIAL, were furthermore presented to the GEO community at the EuroGEOSS workshop in Lisbon in July 2019 and at the GEO/ECOPOTENTIAL meeting in Geneva in October 2019 where they have been discussed with the GEO secretariat, and were well received at each of the events. Especially EuroGEO can play a significant role in disseminating these guidelines to decision-makers, based on their activities with European member states of the initiative.

The recommendations are already partly implemented, but main challenges regarding EO for environmental management, like Intellectual Property Rights of open data, still remain. These topics will be raised at the Executive Board of GEO to find solutions in the future. Apart from the specific problematic areas and challenges addressed, the recommendations represent the approach followed by ECOPOTENTIAL in their collaboration with PAs in Europe and beyond. The project showed what are key elements of good and constructive communication with PAs, what are their needs for daily management, which kind of tools PAs ask for and which challenges they face regarding the implementation of EO data and tools. Thus, the recommendations encompass very practical insights from European PAs and scientific knowledge and insights gained within ECOPOTENTIAL. As a consequence, the recommendations can support the GEO community in the sense to point out the way forward for enhancing the use of EO data in future environmental management in Europe, but also worldwide.

Co-funded by the European Union

4. Appendix

4.1 Agenda of the "Biodiversity and Ecosystems" session at the EuroGEOSS workshop in Lisbon, 2019

Session Name: **Biodiversity and Ecosystems**			
Organiser: ECOPOTENTIAL project, GEO ECO Initiative, CNR Italy			
Chair Name: Antonello Provenzale			
Session overview Terrestrial and marine biodiversity and ecosystems are currently threatened by direct and indirect human pressures such as climate and land-use change, pollution, invasive species and over-exploitation. Addressing nature conservation and management in times of rapid change and multiple interacting stressors requires knowledge-based approaches able to use all available technological tools from Earth Observations (in the field and remotely sensed), new modelling frameworks, interoperable data portals and user-friendly virtual research environments. In this session we discuss some of the concrete results achieved by different European projects and programmes, providing a unified, user-oriented and co-designed vision of natural capital conservation in the XXI century central to the EuroGEOSS activities.			
Session Objective Illustrate and discuss current knowledge-based, user-oriented and co-designed approaches to the conservation and management of biodiversity and ecosystem functions and services, considering the interplay of local challenges and continental-scale conservation priorities.			
Time	Title of the presentation /Topic	Name of the Speaker	Affiliation
11:15 – 11:25	Introduction to the GEO-ECO Initiative	TBD	
11:25 – 11:35	The ECOPOTENTIAL "Protected Areas from Space" map browser	Joan Masò	CREAF Spain
11:35 – 11:45	What models can do for conservation: lessons learned in ECOPOTENTIAL	Carmela Marangi	CNR Italy
11:45 – 11:55	The Global Change Observatory of Sierra Nevada: the case of high-altitude lakes	Manuel Villar	University of Granada, Spain
11:55 – 12:05	NextGEOSS Pilot: Remote Sensing-enabled Essential Biodiversity Variables for Biodiversity Monitoring	Elnaz Neinavaz	University of Twente, NL
12:05 – 12:15	The LifeWatch ERIC Virtual Research Environments	Antonio Jose Saenz-Albanes	LifeWatch ERIC
12:15 – 12:25	Insights from ECOPOTENTIAL: (policy-related) recommendations on the use of EO	Jessica Bitsch	UN Environment
12:25 – 12:45	Final discussion: local challenges versus continental-scale conservation priorities	Moderator: TBD	

Co-funded by the European Union

4.2 Agenda of the "Best practices on how to involve users" session at the EuroGEOSS workshop in Lisbon, 2019

Best practices on how to involve users **Library** Chair: Haris Kontoes (NOA) Rapporteurs: Eleni Christia & Mirka Rossi (NOA)		
The importance of sustained EO data and EO-based services becomes even greater in a period marked by the advent of Big Data – spearheaded by Copernicus free, full and open data policy, and the emergence of new business models. In this context, the aim of the break out session is to lively exchange experiences on the different approaches and best practices for users' engagement adopted by key EU funded GEO projects, and to highlight action plans and roadmaps for strengthening the coordination and uptake of EO activities, at European and regional level. The overarching goal is to move towards the sustainable delivery of EO services and products, in line with the reported priorities for SDGs and the development of cross sector value added chains. It is imperative to explore effective ways and tools to co-design with users long-term, high-impact applications for the uptake of GEOSS and Copernicus within EuroGEOSS, to enable measuring the benefits from the use of EO and communicate them to relevant stakeholders.		
14:00	Co-design in e-shape project: developing an EO-specific co-design method to create more socio-economics value with EO data.	Raphaëlle BARBIER (ARMINES) Pascal LE MASSON (ARMINES)
14:10	A user engagement process and the roadmap for sustainable EO services in the regions of N. Africa M. East, Balkans and Black Sea, linked to GEO, EUROGEOSS, and Copernicus.	Alexia Tsouni (NOA)
14:20	NextGEOSS User Engagement Process.	Marie-Françoise Voidrot (OGC)
14:30	Research co-design in protected areas for nature conservation: the ECOPOTENTIAL Project experience.	Silvia Giamberini (CNR)
14:40	Results from the distributed INSPIRE hackathon: Patras DataBio hackathon & Lisbon INSPIRE hackathon	Bente Lilja BYE (BLB)
14:50	Lessons learnt from ECOPOTENTIAL: The Science Policy Interface and engagement with Protected Areas	Matthias Jurek (UN)
15:00	ERA-PLANET stakeholder engagement: from the UN to the city level.	Evangelos Gerasopoulos (NOA)
15:10	Round table discussion & Questions	

4.3 Agenda of the ECOPOTENTIAL – GEO meeting in Geneva, 2019

ECOPOTENTIAL – GEO meeting, 24 October 2019
Geneva, GEO Headquarters

10:00	G. Camara	Introduction to GEO and the scope of the meeting
10:15	G. Ollier	Welcome address from the EU and the role of EuroGEOSS
10:30	A. Provenzale	The ECOPOTENTIAL project – overview of scope and results
10:40	Mazzetti/Marangi	The ECOPOTENTIAL Virtual LAB and the modelling tools
10:55	I. Manakos	On-line services for the use of Remote Sensing data
11:05	C. Domingo Marimon	The ECOPOTENTIAL Map Browser
11:15	Giuliani/Domingo/Manakos	The ECOPOTENTIAL Data Cubes
11.25	R. Lucas	The EODESM – EO Data for Ecosystem Mapping system
11:40	J. Peterseil/D. Poursanidis	In-situ data and the DEIMS portal
11.50	Giamberini/Bustamante	Users' data and knowledge needs: Report from the Researchers-Users workshop in Doñana Biological Station

12:00 – 12:30 Questions and discussion of data archives and on-line services

12:30	A. Karnieli	European-scale ecosystem assessment from remote sensing
12:40	C. Beierkuhnlein	Threats of climate change to protected areas
12:50	J. Bitsch	Policy recommendations from ECOPOTENTIAL

13:00 – 14:30 lunch

14:30	A. Basset/F. Sanchez	ECOPOTENTIAL and LifeWatch ERIC
14:40	J. Peterseil	ECOPOTENTIAL and eLTER
14:50	G. El Serafy	GEO ECO
15:00	C. Adler/E. Palazzi	GEO GNOME
15:10	D. Cripe	GEO LDN

15:30 General Discussion on the legacy of ECOPOTENTIAL to GEO, led by G. Camara

17:30 end of meeting

Co-funded by the European Union

5. References

- Nolte A, Alfthan B, Danks F et al. (2018). Synthesis Report – Analysis of Ecosystem Services and Earth Observation Understanding and Needs by ECOPOTENTIAL Protected Areas ECOPOTENTIAL Deliverable 11.2
- Alfthan B, Jurek M, Danks F, Andresen M (2018). Earth Observation for Environmental Management Science for post 2020 Environmental targets: Insights from Earth Observation of Protected Areas.
- Provenzale A, Marangi C, Giamberini S, Mazzetti P, Palazzi E (2019). Recommendations for the activities of GEO/GEOSS and GEOGNOME. ECOPOTENTIAL Deliverable No: 1.6
- Wanke S, Ziemba A, El Serafy G et al. (2019). Roadmap for current and future novel PAs. ECOPOTENTIAL Deliverable No: 9.4
- Science Policy Briefing event at the European Parliament 2018 (https://www.ecopotential-project.eu/news-meetings/2015-10-16-13-48-29/231-science-policy-briefing-event-at-the-eu-parliament.html and https://www.ecopotential-project.eu/images/ecopotential/img_news/Science-Policy_Brief-Document.pdf).