



A new
toolkit for
**National
Wetlands
Inventories**



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FOREWORD

We know today that we have lost 87% of the world's wetlands since 1900 and that we are losing them faster than forests, making them the most threatened ecosystem on Earth. At the same time, we know that we depend on wetlands for water, food, biodiversity, livelihoods and for protection against floods, droughts and extreme weather hazards, to build resilience of communities to climate change.



Monitoring the extent and health of wetlands and their status overtime is thus critical to inform the needed actions by governments and other actors at all levels.

The Convention on Wetlands has always recognized the importance of the national wetland inventories (NWI) as a key tool for informing national policies and other measures to achieve the conservation and wise use of wetlands. It is thus a priority in the Convention's Strategic Plan. In 2019, Contracting Parties decided that national inventories should be a priority area of focus in the current triennium and that efforts needed to be stepped up to support countries in completing and keeping up to date their national wetlands inventories. It was also a main recommendation from the *Global Wetlands Outlook* (2018), the first ever report on the global status of wetlands.

This decision to give priority to inventories is also related to the commitment of Contracting Parties to provide data on the extent of wetlands, drawing from their inventories, as part of their National Reports. Further, the Convention is together with the United Nations Environment Programme co-custodian of indicator 6.6.1. of the Sustainable Development Goals (SDGs) on change in the extent of water-related ecosystems over time, using the same data provided in National Reports. Measuring the extent of this important ecosystem is also expected to contribute significantly to the Global Biodiversity Framework being developed under the Convention on Biological Diversity.

The launching of this toolkit on wetlands inventory is thus very timely and responds to the request of countries for assistance to implement or update their inventories and report on wetland extent. It provides practical guidance and examples of how to conduct an inventory, including a systematic process and resources to support each recommendation. There are also examples of good practice, methods for data collection, including Earth observation, and use of inventories in decision-making. It also links NWI to SDG targets, including suggestions for building the case for the conservation and wise use of wetlands. The toolkit is to be used by a variety of stakeholders involved in the assessment, monitoring and conservation and wetlands. It will be also used to develop training materials.

The preparation of the toolkit showed that significant progress has been made with 44% of the 171 Contracting Parties to the Convention having completed their inventories. However, it also identified main gaps as well as challenges and needs to initiate, complete and update these critical tools for decision-making in all countries. Efforts are thus urgently needed to support NWIs as an important basis to mobilize and track the needed actions to reverse the unprecedented trends of wetlands loss and ensure the conservation and effective management of all wetlands for nature and people. It will also support Parties to meet their commitments under the Convention, and to achieve the 2030 Sustainable Development Agenda and the aims of the Global Biodiversity Framework in a synergistic manner.

Martha Rojas Urrego, Secretary General

INTRODUCTION

Signatories to the Convention on Wetlands recognise the fundamental importance of wetlands to human wellbeing, sustainable development and climate mitigation and adaptation. As such, Contracting Parties are committed to carrying out National Wetland Inventories and over the past years there has been good progress with many more Contracting Parties completing National Wetland Inventories. However, more Contracting Parties still need to complete a National Wetland Inventory and some have not yet started on the journey to doing so. As highlighted in the Convention on Wetlands Strategic Plan 2016-2024, under strategic goal 3 – wisely using all wetlands, target 8 - National Wetland Inventories are a key tool for effective policies and actions of the Convention on Wetlands mission: the conservation and effective management of all wetlands. Without a National Wetland Inventory, Contracting Parties will find it very challenging to ensure the effective management of wetlands. In the Report and Decisions of the 57th Meeting of the Standing Committee in June 2019, the Contracting Parties decided to focus on the topic of National Wetland Inventories for the current triennium to allow Contracting Parties to undertake measures to address this urgent challenge. Consequently, this toolkit was developed to fulfil the needs of Contracting Parties regarding National Wetland Inventories.

The Secretariat of the Convention on Wetlands, has a mandated role as co-custodian of SDG indicator 6.6.1 (cf. change in the extent of water-related ecosystems) using data coming from National Reports, which used as a main source wetland inventories. To do this, the Secretariat relies on information provided by the network of 171 Contracting Parties, who are committed to carrying out **National Wetland Inventories** (NWIs) and reporting on progress on a regular basis.

Over the past decades, the Convention on Wetlands has developed extensive technical guidance and resource documentation, as well as an extensive body of experience on wetlands. This toolkit does not seek to duplicate these resources nor to provide any new content; rather, it is designed to help Contracting Parties navigate the process of carrying out a National Wetland Inventory. Most importantly, this toolkit aims to place the implementation of a National Wetland Inventory in the broader context of a national development plan and the UN Sustainable Development Goals. Furthermore, it ensures that the outputs are used effectively once an National Wetland Inventory is produced.

This toolkit includes a range of examples to share good practices and experiences, as well as recommendations from the Secretariat of the Convention on Wetlands (hereafter referred to as the Secretariat) based on many years of experience supporting Contracting Parties in developing National Wetland Inventories.

WHAT IS THIS DOCUMENT AND HOW TO USE IT?

What is this document?

This toolkit supports **Contracting Parties** (CPs) in undertaking, completing or updating a National Wetland Inventory (NWI). Its purpose is to provide guidance, recommendations and examples to solve the challenges faced by CPs in completing an NWI. Most CPs indicate that the major constraint to undertaking, completing or updating an NWI is related to limited financial and/or technical resources. Consequently, this toolkit addresses these concerns, as well as other important issues such as linking NWIs to Sustainable Development Goal (SDG) targets. It also sets out the main steps and activities in carrying out an NWI, provides references for specific technical approaches and suggestions on how to utilise and communicate the outputs of an NWI.

This toolkit does not seek to create or duplicate new resources; rather, it is designed to help CPs navigate the process of carrying out an NWI. Consequently, it contains links to existing resources developed by the Convention on Wetlands. Most importantly, this toolkit aims to place the implementation of an NWI in the broader context of the SDGs and decision-making to ensure that the outputs are used effectively once the NWI is completed.

EXAMPLES: Each page contains case study examples of CPs that have carried out relevant activities or research which can be useful for other CPs to learn from. These examples provide concrete and practical information on how the step has been carried out successfully by CPs, as well as links to resources that may be helpful with the particular step or activity in question.

Audience - who is the toolkit designed for?

This toolkit may be used by a variety of stakeholders involved in the development and execution of an NWI. The Convention on Wetlands has issued **guidance** on the formal representation of the Convention in each country, including **Administrative Authorities** and **National Wetlands Committees**. Additionally, the Administrative Authorities may assign **National Focal Points** mandated to work with the Secretariat¹ to implement the Convention on Wetlands. There are three types of focal points: i) **The Convention Focal Points** responsible for the coordination of the implementation of the Convention on Wetlands at the national level; ii) **Scientific and Technical Review Panel Focal Points** with acknowledged expertise on wetland-related subjects; and iii) **Communications, Education and Public Awareness Focal Points** from government and NGOs, responsible for developing communications, education and public awareness action plans. Other concerned stakeholders such as advocacy groups and civil society organisations can support implementation through National Wetlands Committees or similar bodies.

1 The term Secretariat is used in this toolkit to refer to the "Secretariat of the Convention on Wetlands".

Given this range of possible stakeholders, both institutional and individual, the toolkit is structured to engage two main audiences as follows:



Technical staff or stakeholders: individuals carrying out an NWI, or supporting this process, who may require greater levels of detail and access to specialist information and actionable recommendations (e.g., National Focal Points, scientific and technical review panel members and other relevant technical stakeholders, such as universities or other technical agencies within government);



Policy-makers: individuals with responsibility for guiding the overall process, and acting on the results of NWIs, including for fund-raising and policy change, but who do not require all technical details (e.g., **Administrative Authority, policy officers**).

Where possible, the messaging and recommendations in this toolkit are differentiated for these two audiences; the two different icons detailed above are used to indicate which audience is being targeted.



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Structure of the toolkit

The toolkit is divided into five main sections:

1. Building the case for a National Wetlands Inventory and why they matter this is important for a country;
2. Preparing for carrying out a National Wetlands Inventory process;
3. Implementing the National Wetland Inventory;
4. Using the outputs of the National Wetlands Inventory once it is completed; and
5. A list of all the documents which are referenced in this toolkit.

The sections of this toolkit have the same format. Each section contains a summary of steps or activities, explaining what these comprise of and why they are important, as well as expected outputs and any tips and recommendations. Each section also contains links to resources presented in a traffic light system for basic and advanced scenarios, that can be selected depending on specific needs and level of progress. The difference between the scenarios is as follows:

- Basic: resources for CPs which have not yet undertaken an NWI or are only in the planning stage; and
- Advanced: resources for CPs which have completed an NWI or are in the process of completing an NWI.

However, for two specific topics covered by this toolkit, namely Earth Observation and monitoring, an additional category of 'moderate' resources is included, in part because these were highlighted by CPs and at the request of the Secretariat.

How to use it?

Interactive resources are embedded within the text and identified by different colours as follows:

- Text in **blue** font indicates a pop-up where an explanatory text box will appear if the cursor is placed over the highlighted words;
- Text in red font indicates a [link](#) to external resources, which are available throughout the document. Note that some linked resources are not available in French or Spanish.

OUTPUTS

This section provides users with examples of the indicative results that CPs can expect to obtain after carrying out the steps and associated activities set out within each section.

BASIC RESOURCES

CPs with limited experience in carrying out an NWI can access the required resources needed to undertake an NWI.

ADVANCED RESOURCES

CPs with advanced experience and making more progress toward implementing an NWI can access more in-depth or specialised resources that will support them in finalising or updating the NWI.

[Note: in specific cases, including the sections on Earth Observation and monitoring, a ‘middle’ level of resources is included to provide a greater range of materials for different user groups].

RECOMMENDATIONS

Each section ends with a set of recommendations or tips for important aspects relating to the activities in question. These recommendations are based on the insights from the Secretariat and handbooks, based on many years of experience. Users are encouraged to take the time to look at these to learn lessons and get inspiration for the different steps and activities in an NWI.



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1.0 BUILDING A CASE FOR UNDERTAKING A NATIONAL WETLAND INVENTORY

1.1 THE IMPORTANCE OF NATIONAL WETLAND INVENTORIES IN RELATION TO THE **SDGs**

Wetlands are essential to human wellbeing, sustainable development and climate mitigation and adaptation, as well as for biodiversity.

Wetlands provide water for human consumption and agriculture. They protect shorelines and help make cities and other human settlements safe and resilient. They are also the Earth's greatest natural carbon stores and support biodiversity, as well as abundant and unique nature. Wetlands are a vital resource to mitigate and adapt to climate change. They provide sustainable livelihoods and are essential to human health and wellbeing and biodiversity.

Consequently, the multiple benefits and services provided by wetlands are essential to achieving the SDGs.

- More specifically, by completing an NWI, CPs are supporting progress towards four SDG targets:
- 6.6 Protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes;
- 11.4 Protect and safeguard the world's cultural and natural heritage;
- 14.5 Conserve at least 10% of coastal and marine areas; and
- 15.1 Ensure conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems.

EXAMPLE OF GOOD PRACTICE IN MAKING THE CASE FOR WETLAND INVENTORIES FOR THE SDGs: SWEDEN



Sweden has successfully linked the benefits of maintaining wetland ecosystems and their commitment to the SDGs. Some examples of the arguments they are using to demonstrate these linkages are as follows:

Water regulation

Coastal wetlands provide shoreline stabilisation by preventing coastal erosion through retaining sediment and accumulating new sediment that is transported from terrestrial flood systems ([target 15.1](#)).

Practising sustainable agriculture in local communities reduces the risk of food and water shortages, which, in turn, decreases costs for economically vulnerable groups ([target 1.5](#), [target 6.1](#) and [target 6.4](#), and [target 13.1](#)).

Climate regulation

Peatlands are natural climate regulators since they slow down the heating of the atmosphere ([target 13.1](#)). Protecting and restoring peatlands reduces the amount of CO₂ available in the atmosphere by stocking it as well as the amount of energy that can be absorbed for a **climate event** ([target 13.1](#)). This decreases the intensification of extreme weather events ([target 6.4](#)) that leave vulnerable ecosystems and populations exposed to overheating and water stress ([target 15.1](#) and [target 15.5](#)). Conversely, when peatlands are drained, carbon and nitrogen are released as greenhouse gases to the atmosphere and nitrate to the surface water.

Increasing resilience

Natural wetlands provide water storage and [protection against floods](#). They are cheaper to maintain and restore than the cost of losses to residential properties inflicted by sea-level rise without wetlands in place to act as a natural barrier. In some cases, such coastal flooding disproportionately affects poorer families and the elderly (Arkema, et al., 2013) ([target 1.5](#)).

Water purification

Human-made wetlands used for the treatment of sewage water achieve positive reductions in biological oxygen demand, chemical oxygen demand, suspended solids and faecal coliforms ([target 6.3](#) and [target 15.1](#)).

OUTPUTS

- A set of strong, evidence-based arguments to support the benefits and reasoning for a country to protect its wetlands and develop an NWI.
- Wetland conservation, [wise use](#) and restoration are integrated into the country’s SDG planning and implementation activities.
- An advocacy strategy in relation to the SDGs for improved policies and practices for the conservation and wise use of wetlands to reverse current and future wetland loss and degradation.

BASIC RESOURCES

- [Scaling up wetland conservation, wise use and restoration to achieve the SDGs](#)
- [Wetlands and the SDGs](#)
- [Valuing wetlands: Guidance for valuing the benefits derived from wetland ecosystem services](#)

ADVANCED RESOURCES

- [Priorities and Interactions of SDGs with Focus on Wetlands](#)
- [The Ramsar Convention on Wetlands towards SDG 15](#)
- [Act now on wetlands for Agenda 2030](#)
- [World must act now to strengthen protection of most important wetlands](#)
- [The economics of ecosystem and biodiversity for water and wetlands report](#)

RECOMMENDATIONS



Being clear about the benefits of wetlands in the specific country context – or sub-national areas within a country – is a key starting point to raising awareness about the need to carry out an NWI and maintain and expand valuable wetlands. Wherever possible, make clear and explicit linkages between the benefits of wetlands and specific SDGs and targets, which can be used for awareness-raising and lobbying to increase support for carrying out an NWI.

1.2 WHY UNDERTAKING A NATIONAL WETLAND INVENTORY IS IMPORTANT AND WHAT ARE THE OBJECTIVES?

Wetlands are areas of marsh, fen, peatland or water – whether natural or artificial, permanent or temporary – with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres.

Why undertake a National Wetland Inventory?

Conservation and **wise use** of wetlands are vital for human livelihoods and, as illustrated in 1.1 above, for achieving many of the SDG targets. The wide range of ecosystem services that wetlands provide means that they sit at the heart of sustainable development processes. However, policy and decision-makers often underestimate the value of wetlands' benefits to nature and humankind. Understanding these benefits and what is happening to wetlands is critical to ensuring their conservation and wise use, as well as building the case for restoration of wetlands that have already been lost or degraded.

What is the objective of a National Wetland Inventory?

An NWI is designed to identify the extent and current physical, chemical and environmental conditions of wetlands. NWIs provide critical information which can be used as a starting point for decision-making on wetland management, restoration and protection.

By completing an NWI, CPs will obtain a baseline assessment of wetland extent. The results of the NWI, including all data, should be stored and made available through a publicly accessible platform. It is very important that CPs then update the NWI to be able to assess future wetland extent change. If the aim is to **update an existing NWI**, the required steps and activities are the same as those for undertaking one in the first instance; therefore this toolkit can also be used for this purpose. Without an NWI, CPs cannot effectively track and evaluate the current status and trends relating to wetlands over time.

The motivation for undertaking an NWI may vary between CPs and over time, and could be driven by a number of incentives. For example, by national government policy, advocacy from civil society environmental groups, international agendas and

CURRENT PROGRESS IN CARRYING OUT AN NATIONAL WETLAND INVENTORY



In mid-2019, the Secretariat commissioned a gap analysis to determine the current progress and status of NWIs; the main findings indicate:

45% of CPs have completed an NWI based on the 150 National Reports that were submitted to COP13. 27% of NWIs are in progress, while 17% of CPs have not undertaken an NWI yet and 9% of CPs have planned for one. 74 CPs provided a baseline figure for wetlands extent for SDG indicator 6.6.1, representing 49% of the 150 National Reports submitted. 34% of the 150 of CPs indicated an exact number and 15% of CPs provided an approximate figure.

EXAMPLE: UPDATING COSTA RICA'S NATIONAL WETLAND INVENTORY

Costa Rica has updated its NWI and it will be used as a tool for protecting and restoring wetlands as well as promoting species protection. Updating the NWI is a participatory and continuous process; as such the required technical equipment, **methodological instructions** and capacity building activities have been provided in the conservation areas. The roles and responsibilities for updating the NWI and sharing the new data have been clearly established during the NWI process.

targets, or for fund-raising purposes. Therefore, it is important to clearly articulate the reason(s) for undertaking an NWI, why the information is currently required, how it will be used and how this may change over time.

Such reasoning will vary depending on the purpose and intended audiences. For example, for policy-makers seeking to access funding, it will depend on the source of that funding (e.g., national ministry of finance, in-country donor agencies or international funding mechanisms) and the intended use of the funding. For internal government audiences, a case could be made to demonstrate the commitment to meeting SDG target 6, whereas for an international audience, it could be for meeting the commitments under the Paris Agreement.



OUTPUTS

- Clearly articulated reasons, with the purpose and objectives for carrying out an NWI, to communicate what it is, what outputs will be generated and how these will benefit the country.
- This rationale will include any tailor-made reasoning and arguments for different stakeholders, including other government ministries, civil society, indigenous groups and potential funders. Where necessary, it will also differentiate between local, national and international audiences.
- A decision to undertake, complete or update an NWI.

BASIC RESOURCES

[Global Wetland Outlook. State of the world's wetlands and their services to people 2018](#)

[Handbook 15: Wetland inventory](#)

[The Fourth Ramsar Strategic Plan 2016–2024](#)

ADVANCED RESOURCES

[Guidelines for inventories of tropical peatlands to facilitate their designation as Ramsar Sites](#)

RECOMMENDATIONS



Assess the country standing in relation to its neighbours in the region in terms of progress towards carrying out an NWI – this can be a useful way to motivate stakeholders and colleagues to progress further with an NWI.



The data collected for the NWI may vary between CPs. However, the Convention on Wetlands advises identifying at least the extent and status as basic requirements.



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2.0 PREPARING FOR THE NATIONAL WETLAND INVENTORY PROCESS

2.1 DEFINE A DATA COLLECTION STRATEGY FOR THE NATIONAL WETLAND INVENTORY

The steps outlined below are based on the guidance provided by the Convention on Wetlands in the NWI methodology ([Handbook 15](#)) and should be followed sequentially.

1. Define who is responsible for each step and coordinate between stakeholders

An NWI is comprised of several steps, each of which requires a specific stakeholder or focal point that should be identified across all types of partners (e.g., government, research and education centres, international partners and civil society). All steps may be carried out by the same institution and focal person, or by different institutions depending on the national situation under a coordinated approach.

In the specific case of federal states and countries with devolved government, effective coordination between all relevant institutions and bodies should be clearly addressed from the outset and a national co-ordinating group may be needed. Roles and responsibilities must be clearly established, as well as communication channels and the frequency of engagement around the NWI. This is essential to avoid data existing in silos, resulting in partial inventories and a failure to compile an NWI.

2. Set up the overall schedule of the National Wetland Inventory

The implementation schedule should be based on the human and material resources available, as well as the funding required to produce the NWI. An overall timetable should be developed, with fixed milestones. Relevant stakeholders need to be involved in coordinating meetings, agreeing on required activities and periodic assessments of progress.

EXAMPLE OF GOOD PRACTICE IN HIGH RESOLUTION MAPPING: CANADA



Accurate wetland mapping is challenging, especially on a large scale, given the variable and fragmented nature of many landscapes. Examples of precise, consistent and comprehensive wetland inventories on a national- or provincial-scale are limited globally, [with most studies focused on the generation of local-scale maps from limited remote sensing data](#) (Mahdianpari, et al., 2018).

The Canadian research agency produced the first provincial-scale, fine resolution (i.e., 10 metres) wetland inventory map based on a large scale volume of [satellite imagery](#). It identified both small and large heterogeneous wetlands on the Island of Newfoundland, Canada, covering an area of approximately 106,000 km².

In this example, several factors determined the scale chosen. These were the resolution for wetland classification ([object-based classification](#) versus a [pixel-based approach](#)), the significance of the area of the country and the replicability of the results obtained in wetlands with similar ecological characteristics for scaling up the process.

3. Review existing inventory methods

Valuable information may have already been collected for many parts of the world and detailed wetlands inventories may have been carried out in the past. This information may be fragmented across different organisations and/or formats. To ensure that all the existing information has been identified and collated, it is recommended to:

- Establish a list of sources of available information and methods used;
- Select the most appropriate method to review the existing data; and
- Develop and/or update Geographic Information Systems (GIS) and databases.

4. Defining the scale and resolution of the National Wetland Inventory

The spatial scale used for an NWI is inseparable from its objective and therefore influences the selection of the methods to be used. When choosing the scale, it is necessary to first determine the objective of the NWI and then assess how this can be achieved through a chosen scale.

The choice of scale is also related to the size of the geographic area involved and the accuracy required and achievable with available resources. When the scale is selected, a minimum mapping unit is required. This reflects the minimum acceptable accuracy for that given scale. For example, a land systems map compiled to a scale of 1:250,000 typically involves taking one on-the-ground site observation for every 600 hectares surveyed, while maps at 1:50,000 scale have a minimum mapping unit of one hectare.



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OUTPUTS

- A schedule for the NWI with clearly defined steps, activities and stakeholders to be involved.
- A list of institutions or agencies with named focal persons who will be responsible for engaging in the NWI process.
- Selection of the scale and resolution required to achieve the agreed-upon purpose and objective of the NWI.

BASIC RESOURCES

[Handbook 15: Wetland inventory](#)

ADVANCED RESOURCES

[GlobWetlands Africa products](#)

RECOMMENDATIONS



Be realistic about what can be done with the resources currently available – or that can be generated – especially regarding the level of detail and mapping resolution that can be used to make sure that it is affordable and that funding will not run out part way through the process.



Inform NGOs, scientific institutions and any other relevant stakeholders from the outset of the process, as they may hold valuable information that is required for the NWI but which has not yet been shared or disseminated.

2.1 (continued)

Suitable scales for wetland inventory within a hierarchical approach are:

- a) Wetland regions within a continent, with maps at a scale of 1:1,000,000 – 250,000;
- b) Wetland aggregations within each region, with maps at a scale of 1:250,000 – 50,000; and
- c) Wetland sites within each aggregation, with maps at a scale of 1:50,000.

5. Identify the core or minimum data sets

Minimum data sets are those that are sufficient to describe the location and size of the wetland(s) and any special features. The specific details of the data set are inseparable from the level of complexity and the spatial scale demanded of the NWI. It is recommended that the minimum data set should be collected to enable the major wetland habitats to be delineated and characterised for at least one point in time. Table 2 in [Handbook 15](#) provides a list of core NWI data and information fields that are required.

6. Establish a habitat classification that suits the purpose of the inventory

The Convention on Wetlands has a long-established wetland [classification system](#) that provides a common framework for NWIs and reporting. The Secretariat recommends the use of this internationally accepted system adopted by the CPs for NWIs.

7. Choose an inventory method

Methods must be appropriate to the NWI based on the agreed minimum data sets and be viable given available budgets, as well as providing value for money. It is necessary to be aware of the advantages and disadvantages of the alternative methods in relation to the purpose and objectives of the proposed inventory work. For more specific details on all the methods available and how to choose between them, review Appendix's I, III and IV of [Handbook 15](#).

EARTH OBSERVATION: BRIEF FOR POLICYMAKERS



Earth Observation refers to the acquisition of data through the use of satellite-based remote sensing. The term “remote sensing” is the acquisition of information about the surface of the Earth from a distance, a process which is typically achieved by aircraft or satellite-based sensors to record reflected or emitted energy, and the processing of these data into information and products for further use.

The utility of different remote sensing datasets for NWIs, assessments and monitoring is well established. For example, [Land Use/Land Cover](#) maps characterising a particular ecosystem, and the analysis of time series data (remote sensing datasets collected consistently over a particular time period) are used to determine land use and land cover changes. Earth Observation has come to be seen as a best practice tool for addressing the information gaps faced by wetland managers and practitioners (see examples of Earth Observation platforms below).

The [Geo Wetlands Initiative](#) aims to provide Contracting Parties with the necessary Earth Observation methods and tools to better fulfil their commitments and obligations toward the Convention on Wetlands. It also contributes directly to the development and implementation of best monitoring practices for the UN SDGs on Target 6.6.

8. Establish a data management system

Clear protocols need to be established for collecting, recording and storing data, including archiving data in electronic and/or hardcopy formats, which are open source. It is important to clarify which variables need to be collected, where the data is going to be stored, the frequency of updating, and how the data will be analysed and visualised. The protocols should enable free and [open access](#) to the data, as well as allowing future users to determine the source of the data, its accuracy and the date of collection. The data management system should plan future updates of the NWI, which follows the same methodology as the initial NWI. This can be done individually for each wetland based on the agreed national methodology or coordinated at the national level. This will depend on the data management strategy established.



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OUTPUT

- A defined minimum data set, habitat classification and the inventory methods needed for achieving the NWI objective.
- A data management system with clearly defined protocols for collecting, recording and storing data that is agreed upon and disseminated to all key stakeholders. Data collected as part of any NWI process should be readily available to everybody and stored on a publicly-accessible platform in an open-source format.

BASIC RESOURCES

[Handbook 15: Wetland inventory](#)

MODERATE RESOURCES

[Technical report:10 the use of earth observation for wetland inventory, assessment and monitoring](#)

ADVANCED RESOURCES

[Geo-map](#)
[GEOSS Portal – capacity building](#)
[Wetlands Mapper](#)

RECOMMENDATIONS

Use the Ramsar Classification System for Wetland Type as a classification basis for NWIs.

Take a collaborative and collective approach to develop a new, or modify an existing, data management system so that all stakeholders will support this process in the long-term.

Physical-chemical and biological sampling should be undertaken whenever possible by standard laboratory and field methods that are well documented and readily available in a published format.



2.1 (continued)

9. **Establish a time schedule specific for each activity and the level of resources needed**

Based on previous experience and [Handbook 15](#), a clear list of activities should be agreed on. A specific time schedule must be determined for each activity within the planning of the NWI, as well as for collecting, processing and interpreting the data collected. If field sampling is required, a detailed work plan will be needed. A specific person should be identified and made responsible for each activity within the NWI. The time required for each activity should be estimated and each activity should have a deadline that is linked with the overall project milestones.

10. **Assess whether the required resources are available**

Financial, human and material resources should be identified for each activity. Before carrying out the NWI, it is important to assess if there are enough resources for each step and for completing the whole NWI.

11. **Establish a procedure for reporting all results in a timely and cost-effective manner**

The results obtained will be useful for other stakeholders, as well as in the future. Consequently, the methodology, data and results should be easily accessible and interpreted for other users. The results should be saved in a centralised data storage system. The process should be recorded and include a summary of the challenges and lessons learnt when carrying out the NWI.

12. **Establish a review and evaluation process**

Throughout the NWI, it is necessary to review progress and, as required, adapt the agreed-upon strategy. The review and evaluation process should be developed during the planning stage and included in the budget. Changes should be recorded and communicated to all those involved in the NWI.

EXAMPLES OF USING EARTH OBSERVATION



The [Copernicus](#) programme used by the European Space Agency aims to provide full, free and open access to data to facilitate global monitoring of the environment. Specifically, the sensors from Sentinel missions [1](#) and [2](#) provide an unprecedented opportunity to collect high-resolution spatial data for global wetland mapping.

Sentinel 1 focuses on providing data on oceans and land, while Sentinel 2 aims to monitor variability in land surface conditions, providing information, for example, on vegetation, soil and coastal areas.

The existing Wetland of International Importance of Lake Burullus in Egypt

Under [GlobWetland Africa](#), the recent status of Lake Burullus (Egypt) was mapped from multi-date Sentinel-2 imagery.

Sample sites were identified through visual interpretation of very high-resolution imagery available from Google Earth, combined with a reference from local land cover and land use databases. These datasets were then used to [train and calibrate](#) a computer programme to classify subsequent observations (supervised classifier) and produce a map of the spatial distribution of key wetland types and the surrounding land use. The status mapping was complemented by an assessment of the long-term changes in Lake Burullus derived from images acquired by the [Landsat mission](#) during the 1990s and 2000s.

13. Plan a pilot study to test and adjust the method, team and equipment used

The pilot study phase is the time to make any necessary adjustments to the method, activities, timeframe and team responsibilities. Field equipment and the methodology should be tested and, if necessary, modified based on practical experience.

OUTPUTS

- A schedule with timelines and the resources needed for all of the activities required to complete the NWI.
- A reporting and storage system where all users can have access to the data.
- An evaluation and review of the NWI process; the evaluation should contain a mid-term review and a final assessment.
- A pilot study to fine-tune and adjust the approaches and methodologies for the NWI.

BASIC RESOURCES

[Handbook 15: Wetland inventory](#)

[Technical report: the use of earth observation for wetland inventory, assessment and monitoring](#)

ADVANCED RESOURCES

[Japan Aerospace Exploration Agency](#)

[GlobWetland Africa](#)

[Guidelines for the rapid ecological assessment of biodiversity in inland water, coastal and marine areas](#)

RECOMMENDATIONS

When planning the pilot study, select a representative number of sample locations to gain experience of a wide range of operational environments and to test for potential difficulties that may be confronted during the NWI. These could include logistical challenges, travelling to remote areas, accessing GPS data and checking equipment for potential faults.

Small islands States require specific considerations given the limited inland wetlands and the importance of their coastal and marine systems, as well as general lack of information about their biodiversity and limited institutional capacity. Therefore, rapid assessment methods are particularly valuable.





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3.0 IMPLEMENTING A NATIONAL WETLAND INVENTORY

3.1 COLLECTING THE DATA FOR THE NATIONAL WETLAND INVENTORY

Once all preparations and planning for the NWI have been completed, the following steps will be required to carry out the NWI itself.

Desk review of current data available

Previous research and local inventories are likely to have been carried out in the past. They should be reviewed before starting the NWI as they may contain useful information which could potentially be used.

Be aware that partial inventories may have already been carried out that only cover a specific area (or areas) of the country or only has data for some types of wetlands. It is crucial to have access to all this data. For some CPs with a partial inventory, most of the data may already exist, but may be fragmented and held across different government institutions and technical agencies. In cases of **federal states** or countries with **devolved government**, it is possible that different institutions at different levels may be unaware of what data is being held by other parts of government. Moreover, data may be stored by NGOs or other scientific institutions outside of government. To obtain any existing data that could be useful for the NWI, it is necessary to contact all relevant organisations and identify key persons within these bodies who could potentially share such data.

Identifying where the data is and collecting and harmonising data across these different sources is a major step prior to the decision to collect any new data.

Collect missing data based on the [data strategy](#)

After reviewing previous data and identifying data gaps, data collection should begin. This can include fieldwork and/or collecting Earth Observations. There is a large quantity of [free and publicly](#) available Earth Observation data. This data collection step will consume most of the time and resources available for the NWI.

EXAMPLE OF THE PROCESS OF PREPARING THE NATIONAL WETLAND INVENTORY: BHUTAN



During a training workshop in the Kingdom of Bhutan, a framework for the subsequent development and implementation of an NWI was established. Some of the main activities undertaken during the workshop are presented below; these included a mix of information and working sessions:

Setting the scene and understanding the basics: this session covered general introductions and set the scene for developing an NWI: what is an NWI? and the application guidance from the Convention on Wetlands. The potential applications of an NWI and how to develop a consistent national framework were also discussed.

Developing a wetland inventory framework: this focused on the purpose, objective and scope of the Bhutan National Wetland Inventory and the availability of data. During the session, a range of geospatial datasets and issues relating to scale were discussed, as well as the required resolution and the potential to digitise data sources. The type of data that could be recorded and captured within an NWI, linking data to defining wetland types and the possibility of combining data sources and modelling outputs were analysed. The sessions finished by capturing how best to develop an overall framework for the NWI.

Field visit and review day: this activity provided an opportunity to review progress and to consider applications for the NWI. Challenges with mapping mosaics of wetland types, understanding boundary conditions between wetlands and adjacent uplands, especially under ephemeral conditions, and defining specific categories of wetlands were all discussed.

Carry out external data quality control in country

The process should be assessed by an external partner who could provide new insights into the process. During the quality control, positional and attribute accuracy, logical consistency and completeness should be reviewed. Moreover, the Secretariat can provide advise on the results presented.

OUTPUTS

- Identification and compilation of any existing data relating to wetlands. An analysis of the missing information required to complete the NWI, based on a review of all currently available data.
- A database containing all data collected during the NWI in a clear and user-friendly format.
- The quality control of data and outputs is completed in-country and where possible by a third party. Additional advice may be provided by the Secretariat on the results of the NWI when needed.

BASIC RESOURCES

[Handbook 15: Wetland inventory](#)

[A Framework for a Wetland Inventory Metadatabase](#)

ADVANCED RESOURCES

[Handbook 14: Data and information needs](#)

[Bhutan's process of preparing the NWI](#)
[Dataforms for data collection](#)

RECOMMENDATIONS

If there is a partial inventory, it is important to ensure that any previous data and newly collected data can be merged into one common dataset. Depending on when the older data was collected, this may be challenging if the data is considered outdated.

Ensure that data records are secured and duplicate copies are kept in safe (off-site) locations in case of any losses.

While the assessment should recognise, and build on data and information products and processes already in place, it should be driven by what is needed, not by what already exists.

The open and free data policies of government-funded satellite images, together with the assurance of long-term continuity of observations, are important incentives for CPs of the Convention on Wetlands and wetland practitioners to routinely integrate Earth Observation into their work. Remember that this may require checking for any information held in languages other than English.



3.2 DATA ANALYSIS AND SUMMARISING RESULTS

Once existing data has been identified, and any new data is collected through the NWI, the data analysis phase can begin. For most country cases, specifically those doing their first NWI, this phase will lead to three main outputs as detailed below. The fourth output is only applicable for CPs with data from previous NWIs.

Although the primary output of an NWI is a map, it is often useful to produce reports in an accessible format to summarise and explain the main findings and key points. For example, [Kenya has produced an extensive report on their NWI results](#). This information may then also be used to produce a range of additional products, such as short policy briefs for senior managers and politicians, management tools, videos or social media content.

1. Produce a **[national wetland map](#)**, presenting the spatial extent

As presented in the example from Mexico, it should be possible to obtain a national map of the wetland resources from GIS. This type of output which makes the data visual is a key stage for ensuring that wetlands data is communicated more widely and used effectively. It allows CPs and others stakeholders to visualise wetlands as well as their status and features. It should contain the key information that has been identified previously ([minimum data set](#)). Information should be accessible in the attribute table so it can easily be extracted if needed; it is therefore important to bear in mind that this attribute table constitutes the final database of the NWI.

Based on the outputs of the NWI, it is possible to assess the extent of wetlands in the country for [reporting on Indicator 6.6.1 under the Convention on Wetlands](#). GIS and Earth Observation are tools available to support the process of providing a total wetland extent in square kilometres and details for the three major wetlands categories, namely: marine or coastal, inland and human-made wetlands.

2. Assess the current status of wetlands

Based on the criteria [selected](#), it is possible to evaluate a range of variables relating to wetland status. For example, these may include biodiversity, water quality, ecosystem process and services. By using the results of this analysis, it is then possible to report more accurately on wetland extent change, thereby

[EXAMPLE OF HOW TO USE AN NATIONAL WETLAND INVENTORY TO STRENGTHEN PROTECTED AREAS: MEXICAN NATIONAL WETLAND INVENTORY](#)



Mexico is using its NWI as a starting point for [decision-making](#) and to support the current management of wetlands. This inventory is part of the overarching National Water Program. Based on the results obtained, the government has established the future objectives for wetlands management.

For example, the Mexican government aims to focus on wetland legislation and legal protection by creating protected wetlands parks, which is not currently the case for all wetland areas. Moreover, the government was able to map specific regions, such as Texcoco lake, Tláhuac and Xochimilco, where further efforts are needed.

Mexico's NWI can be [accessed online](#) and provides hydrological, spatial and geographic information related to wetlands management.

Mexico published this after three years of work, with a total cost of US \$700,000.



supporting the attainment of SDG target 6, indicator 6.6.1. Furthermore, depending on the criteria selected, critical information may be obtained for several other related sectors in the country, such as agriculture, water and sanitation or tourism.

3. Carry out a descriptive analysis of previously identified indicators

Use the NWI database to carry out a descriptive analysis of specific indicators that are most relevant for the institution in charge of wetlands. For example, it should be possible to assess water quality averages and compare it with the national norm. These results could then be used to raise awareness in other ministries such as agriculture or water and sanitation.

4. Carry out an historical analysis

If data from previous years is available, it will be possible to carry out an historical analysis by comparing data over time. For example, changes in wetlands extent to report on SDG 6, Indicator 6.6.1 or in relation to policies.



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OUTPUTS

- A national wetland map, providing a visualisation of the spatial extent of the wetlands – SDG 6.6.1.
- A report outlining the current status of wetlands.
- A descriptive analysis of indicators used to obtain baseline values for monitoring.
- A report with historical analysis using data from previous wetland inventories.

BASIC RESOURCES

[Global Wetland Outlook: State of the world's wetlands and their services to people 2018](#)

ADVANCED RESOURCES

[GlobWetland Africa pilot areas](#)
[Digital Earth Australia](#)

RECOMMENDATIONS



Although precise data is required to produce the NWI and associated map, it is important to remember that there is likely to be a range of different audiences who are non-technical and who will require information presented in different formats which they can understand and interpret more easily.

Consider using short summary documents, briefing notes, text for the press, videos or other social media channels to disseminate NWI findings.



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4.0 USING THE OUTPUTS OF THE NATIONAL WETLAND INVENTORY

4.1 HOW TO USE THE OUTPUTS OF THE NATIONAL WETLAND INVENTORY FOR MANAGEMENT PURPOSES

Carrying out an NWI is the starting point for determining the current condition of wetlands. The NWI is a key resource to enable informed decisions about which measures to implement, and how to protect and support wetlands through management, protection and restoration.

Managing wetlands

A management plan is a tool for managing wetlands. It is a technical document, which may be a requirement of sector policy and in some circumstances, is adopted as a commitment under national legislation. It should be used as part of a dynamic and continuous process and kept under review and adjusted to consider the outcomes of monitoring processes, changing priorities and emerging issues. A dedicated authority (a ministry department or agency) should be appointed to implement the management planning process and to be responsible for updating it over time.

Restoring wetlands

Wetlands are declining fast; wetland plants and animals are in crisis and with a quarter of species at risk of extinction. The rapid degradation of wetlands is due to migration patterns and the un-controlled development of land. Therefore, countries need to do more to protect existing wetlands and to restore those that have already been lost. Working with other sectors related to water resources can be an effective strategy for restoring wetlands, as they may often have alternative sources of funding and other environmental responsibilities to fulfil. A clear understanding and statement of goals, objectives and performance standards are all critical for successful wetland restoration: having an updated NWI is the starting point for this process.

EXAMPLE: GULF OF MEXICO WETLAND RESTORATION



Since 2013, the Gulf of Mexico Program and the Brownsville Public Utilities Board (the main utility owned by the municipal government in the city of Brownsville, Texas, USA) have created a joint wetland habitat restoration programme located in the Rio Grande basin in Texas.

This programme focuses on restoring both aquatic and riparian habitats (habitats located on the bank of a natural watercourse). Years of agricultural impact, the development of roads and houses and the use of bulkheads have resulted in decreased water depth, poorer water quality and lower water circulation. Sediment, trash and other debris have built up over the years, impeding water flow in these waterways.

As part of the programme, regular testing and analysis will be performed to ensure water quality, with samples collected to test for specific parameters both before and after restoration to measure improvements. This programme will result in restoring the Resaca by increasing the quality of water, providing a more natural bank, incorporating the native species of plants and increasing water flows.

Protecting wetlands

Current land use can be identified using the results of the NWI; there is also the potential to assess land tenure issues within wetland areas. Depending on available information, it may be possible to gain valuable insights about the same issues for land bordering the wetlands. Depending on the country context, this can vary significantly. For public land tenure, see the Government of Mexico [example](#). In cases where wetlands are located or partially located on private land, landowners should be involved in wetland protection. A [conservation agreement](#) is a useful tool that provides long-term legal protection for wetlands and the plants and animals that live in them.

Improve and/or develop monitoring system for wetlands

The accuracy of global wetland area data is increasing; however, in many countries, only limited data is currently available. Monitoring is an important tool for determining the status of wetlands, the change in their extent over time and how effective site management strategies are proving to be. A monitoring system is therefore essential, and indicators should be adapted to the country’s specific objectives, which will also dictate the scale needed for monitoring. For example, from an environmental perspective, the extent of inundation, vegetation condition, the status of biodiversity and the pollution status of rivers could all be assessed.



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OUTPUTS

An integrated wetland site management plan, that sits within broader environmental management planning, including river basin and coastal zone management dimensions.

A wetland’s protection and restoration programme.

A monitoring system specific to the needs of the country and at the scale which is most appropriate to the objectives of the national strategic plan for conservation.

BASIC RESOURCES

[Handbook 13: Inventory, assessment, and monitoring](#)

[Handbook 18: Managing wetlands](#)

MODERATE RESOURCES

[Ramsar sites management toolkit](#)

ADVANCED RESOURCES

[Principles and guidelines for wetland restoration](#)

RECOMMENDATIONS

The maintenance and conservation of existing wetlands is always preferable and less costly than their subsequent restoration.

Do not confuse outputs and outcomes for wetland management. A management plan is an output; however, the final goal (the overall outcome) is to protect wetlands. It is possible to produce a management plan, but still not ensure the sustainability of wetlands in the country.

Whenever possible, the minimum acceptable scale for wetland restoration planning should be at the catchment level.



4.2 HOW TO USE THE OUTPUTS OF THE NATIONAL WETLAND INVENTORY FOR COMMUNICATION PURPOSES

The learning and information gained from producing an NWI are only useful if they can be communicated clearly and to the right audiences nationally and internationally. The Convention on Wetlands has identified several strategic aspects of communication.

Increasing transparency

The NWI is only useful if stakeholders can have easy and open access to it. Key results should be shared with relevant stakeholders and should be presented in language and formats that are easily accessible to the general public. Ensure that any communication strategy allows the results and learning from the NWI to be shared widely and that it is fully costed and implemented.

Increasing awareness and cultural identity

Improve the individual and collective capacity and opportunities of people to participate in and contribute to using wetlands wisely. The establishment and operation of wetland education centres are major steps to ensure this, as well as organising activities at the local, national, regional and global levels.

Participation of stakeholder groups with cultural or economic links to wetlands and communities depending on wetlands for their livelihoods should be a high priority and promoted at the national level. A wetland can be an important focal point of cultural identity with a unique socio-cultural history, way of living, species and products, and the communication strategy should promote these positive features.

Disseminating knowledge to different stakeholders

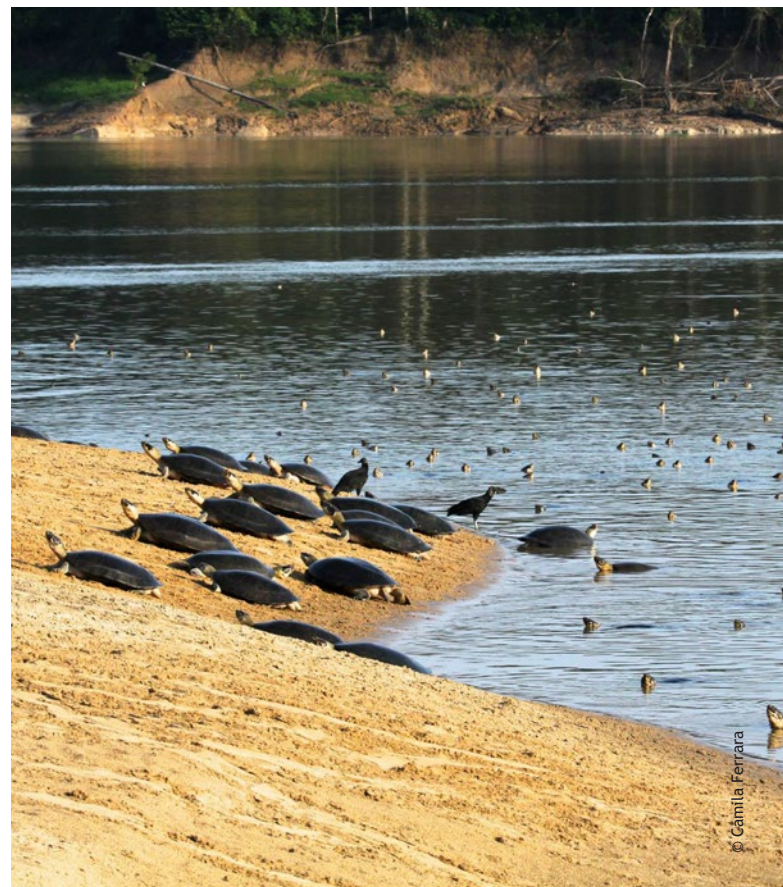
Outputs from the NWI are important for other sectors such as agriculture, infrastructure and development, water and sanitation and tourism. Additionally, other national stakeholders could benefit from the results and support wetland protection. Use the outcomes to inform communication efforts and for outreach to schools, universities, research centres, civil society groups and charities.

EXAMPLE: INVENTORY OF ARGENTINA'S PARANA-PARAGUAY WETLANDS



The NWI of Argentina was planned in three phases, with the first two phases focussing on the delineation and characterisation of the wetland landscape's systems. The third phase complemented the characterisation of the wetland landscape systems with specific information regarding fish species and natural protected areas. This work was prepared by the Convention on Wetlands National Focal Point, the Environment and Sustainable Development Secretariat, Bureau of the National Cabinet of Ministers.

During the NWI process, stakeholders were involved from numerous institutions, including universities, foundations, research centres, as well as technical staff from provincial and national government agencies.



Share the results from the NWI to influence policy processes

Results from an NWI can be a useful source of data for influencing policy within the environment sector and may also be used in related sectors, such as agriculture, water and sanitation or tourism. Results from an NWI can provide powerful evidence for policymakers to develop political arguments, which can lead to a catalytic effect on policies and potentially leverage new funding.



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OUTPUTS

A communication strategy has been put into practice and shares key information and involves other stakeholders and communities.

Access to data and results presented in an open-source format and in languages that are appropriate for different audiences.

Indicators and milestones for tracking the progress of the agreed communication strategy.

BASIC RESOURCES

[Handbook 7: Participatory skills](#)

[Developing CEPA Action Plans – a tool for CEPA Focal Points and other planners Wetland Link](#)

[International](#) (a support network for wetland education centres)

ADVANCED RESOURCES

[The Ramsar CEPA e-lists in English, French and Spanish](#)

[The Mediterranean Wetlands Initiative](#)

RECOMMENDATIONS



The communication strategy should include a carefully designed social media approach to maximise results. Facebook, LinkedIn, Twitter and Instagram can be powerful tools to keep the public updated, increase awareness, strengthen lobbying and reach new demographics such as younger generations and populations living in remote areas.



Pay particular attention to local communities in the communication strategy; such populations may use different channels of information and it is important to include efforts to incorporate them as an NWI project stakeholder and ensure that they are aware of each step of the process.

Among other benefits, wetlands provide cultural services, which should be considered in the communication strategy to ensure that unique cultural identities are respected and promoted.

4.3 HOW TO USE THE NATIONAL WETLAND INVENTORY FOR DECISION MAKING PURPOSES

Having up to date information and data provides an important tool for raising awareness among key decision-makers within governments and society more generally. Targeted use of the outputs of an NWI can help to influence national and local policies, strengthen efforts to protect wetlands and raise funds to help in this process.

Contributing to reaching SDGs target 6 indicator 6.6.1

By completing an NWI and reporting wetlands extent to the Secretariat, the country is contributing to the knowledge needed to achieve a better and more sustainable future for all by completing SDG indicator 6.6.1.

Influencing policy to protect wetlands

Developing a national wetland policy is an important step for recognising associated problems and planning targeted action to deal with them. It provides an opportunity to recognise wetlands as unique ecosystems requiring different approaches for effective management and conservation. Having a specific policy for wetlands can raise awareness and avoid wetland priorities being diluted under broader and more generic environmental concerns.

An [Environmental Impact Assessment](#) is a procedure fostering wise use of wetlands which should be formalised under policy.

Increasing budget allocation

As [indicated by CPs](#), limited financial resources are often a major constraint to undertaking, completing or updating NWIs, which reflects budget constraints and prioritisation of funding for wetland management more broadly. It is therefore essential that mechanisms for financing are identified both nationally and at the international level. These mechanisms may include corporate and social responsibility investment by private businesses, which can finance an NWI or support the completion of a partial inventory.

LOW COST GIS-BASED WETLAND INVENTORY



The development of the NWI in Myanmar utilized a limited resource budget, relying primarily on freely available digital geospatial datasets and a limited amount of digitization of existing Government information. The development of the inventory was facilitated through cooperation between the governments of Myanmar and Norway in the field of Conservation of Biodiversity and Management of Protected Areas.

Myanmar's NWI provides national data on the location and extent of range of wetland classes broadly linked to the the Convention on Wetlands classification of wetland types. The inventory will assist Myanmar to deliver on the wise use of wetlands through activities such as prioritising sites for designation as Wetlands of International Importance, site management planning, participatory approaches to resource conflicts and strategic spatial planning.

The low cost, GIS-based approach developed in Myanmar has transferability to any other country. Currently, the Government of Bhutan is following a similar model in order to develop their national wetland inventory.

The development of the NWI in Myanmar utilised the guidance from the Convention on Wetlands to develop an approach that met the specific needs of the Contracting Party and that was also pragmatic.

Several options exist for securing funding, including [conservation easements](#), [cost-share](#), [financial assistance](#), [loans and grants](#). In the case that other sectors such as agriculture, water and sanitation, industry or tourism are involved, it may be easier to obtain funds from cost-sharing-programmes or income-generating activities; for example, for agricultural land use or from allowing easements.

Funding can also be lobbied for at the national level; having an in-depth understanding of institutional arrangements, financial flows and public budgeting will all be essential in successfully obtaining new financing from public sources. With the information and data generated by the NWI, it will be possible to build a stronger case for accessing public funding from the ministry of finance.



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OUTPUTS

A national wetland policy is in place and integrated with other sectors' policies and is being implemented at the local level.

A Strategic Environmental Assessment is in place for policies, programmes and plans that impact wetlands. Specific funds are secured for an NWI and wetland management.

BASIC RESOURCES

[Handbook 2: National Wetland Policies](#)

[List of donors for wetland management](#)

[GEF Small Grants Programme](#)

[Green Climate Fund](#)

[Small Grant Opportunities](#)

OTHER RELEVANT RESOURCES FOR GOVERNMENTS

Check the [toolbox](#) developed by the UN to promote best practices and other initiatives to boost the private financing of the SDGs, as well as cooperation with public sector entities. The purpose of this website is to present the steps needed to increase private investment in SDG sectors, such as agriculture and infrastructure, as well as to improve the sustainability and inclusivity of private investments, which can make a lasting contribution to the SDGs.

[Funding organisation database](#)

RECOMMENDATIONS

View the NWI as a valuable asset that can help demonstrate commitment to the protection of these important natural resources.

Use the NWI to provide evidence and as a 'door-opener' both within the ministry of environment (or relevant ministry that is acting as the Convention on Wetlands Administrative Authority) and as a champion within government to lobby other line ministries, the ministry of finance and with external donors.





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CITATIONS

- Arkema, K. K. et al., 2013. Coastal habitats shield people and property from sea-level rise and storms. Volume 3.
- Mahdianpari, M. et al., 2018. The First Wetland Inventory Map of Newfoundland at a Spatial Resolution of 10 m Using Sentinel-1 and Sentinel-2 Data on the Google Earth Engine Cloud Computing Platform. Remote sensing, pp. 5-22.

REFERENCE DOCUMENTS

- Cobierno de Mexico. Humedales de la República Mexicana - Inventario Nacional de Humedales (INH) <https://www.gob.mx/conagua/acciones-y-programas/inventario-nacional-de-humedales-inh>
- Cobierno de Mexico. Objectives <https://www.gob.mx/conagua/acciones-y-programas/objetivos-80559>
- Cobierno de Mexico. Visualizador de Humedales de la República Mexicana - Inventario Nacional de Humedales <https://www.gob.mx/conagua/acciones-y-programas/visualizador-de-humedales-de-la-republica-mexicana-inventario-nacional-de-humedales>
- Convention on Wetlands . Country Profiles <https://www.ramsar.org/country-profiles>
- Convention on Wetlands. How the Ramsar Strategic Plan contributes to the Sustainable Development Goals https://www.ramsar.org/sites/default/files/ramsarsp4_sdglinks_poster_e.pdf
- Convention on Wetlands Technical report 3.: Guidance for valuing the benefits derived from wetland ecosystem services. https://www.ramsar.org/sites/default/files/documents/pdf/lib/lib_rtro3.pdf
- Convention on Wetlands Technical report 4.: A Framework for a Wetland Inventory Metadatabase: https://www.ramsar.org/sites/default/files/documents/pdf/lib/lib_rtro4.pdf
- Convention on Wetlands Technical report 10.: the use of earth observation for wetland inventory, assessment and monitoring https://www.ramsar.org/sites/default/files/documents/library/rtr10_earth_observation_e.pdf
- Convention on Wetlands. Ramsar Sites Information Service: Laguna de la Cocha <https://rsis.ramsar.org/ris/1047?language=en>
- Convention on Wetlands. Ramsar sites management toolkit <https://www.ramsar.org/resources/ramsar-sites-management-toolkit>
- Convention on Wetlands. What are Wetlands? <https://www.ramsar.org/sites/default/files/documents/library/info2007-01-e.pdf>
- Convention on Wetlands. 1996. Management Guidance Procedure Report Issues for Nariva Swamp <https://www.ramsar.org/news/management-guidance-procedure-report-issued-for-nariva-swamp>
- Convention on Wetlands. 1999. "People and Wetlands: The Vital Link" 7th Meeting of the Conference of the Contracting Parties to the Convention on Wetlands (Ramsar, Iran, 1971), San José, Costa Rica, 10-18 May 1999 https://www.ramsar.org/sites/default/files/documents/library/key_res_vii.o8e.pdf
- Convention on Wetlands. 2002. Principles and guidelines for wetland restoration <https://www.ramsar.org/sites/default/files/documents/pdf/guide/guide-restoration.pdf#page=9%3E>
- Convention on Wetlands. 2010. Handbook 2: National Wetland Policies <https://www.ramsar.org/sites/default/files/documents/library/hbk4-02.pdf>
- Convention on Wetlands. 2010. Handbook 6: Wetland CEPA <https://www.ramsar.org/sites/default/files/documents/library/hbk4-06.pdf>
- Convention on Wetlands. Handbook 7: Participatory skills <https://www.ramsar.org/sites/default/files/documents/pdf/lib/hbk4-07.pdf>
- Convention on Wetlands. 2010. Handbook 14: Data and information needs <https://www.ramsar.org/sites/default/files/documents/pdf/lib/hbk4-14.pdf>
- Convention on Wetlands. 2010. Handbook 15: Wetland inventory <https://www.ramsar.org/sites/default/files/documents/pdf/lib/hbk4-15.pdf#page=14%E2%80%B3%3Elink%20text%3C/a%3E>
- Convention on Wetlands. 2010. Handbook 16: Impact Assessment <https://www.ramsar.org/sites/default/files/documents/pdf/lib/hbk4-16.pdf>
- Convention on Wetlands. 2010. Handbook 18: Managing wetlands <https://www.ramsar.org/sites/default/files/documents/pdf/lib/hbk4-18.pdf#page=17%E2%80%B3%3Elink%20text%3C/a%3E>
- Convention on Wetlands. 2012. Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance of the Convention on Wetlands (Convention on Wetlands, Iran, 1971) – 2012 revision <https://www.ramsar.org/sites/default/files/documents/library/cop11-reso8-e-anx2.pdf>

Convention on Wetlands 2013. Inventario de los humedales de Argentina. Sistemas de paisajes de humedales del Corredor Fluvial Parana-Paraguay. <https://www.ramsar.org/sites/default/files/inventario-humedales-parana-paraguay.pdf>

Convention on Wetlands. 2016. The Fourth Ramsar Strategic Plan 2016–2024 https://www.ramsar.org/sites/default/files/hb2_5ed_strategic_plan_2016_24_e.pdf

Convention on Wetlands. 2018. Global Wetland Outlook: State of the world’s wetland their services to people in 2018 https://www.ramsar.org/sites/default/files/flipbooks/ramsar_gwo_english_web.pdf#page=22

Convention on Wetlands. 2018. Guidelines for inventories of tropical peatlands to facilitate their designation as Ramsar Sites. https://www.ramsar.org/sites/default/files/bn9_peatland_inventory_e_o.pdf

Convention on Wetlands. 2018. Scaling up wetland conservation, wise use and restoration to achieve the SDGs https://www.ramsar.org/sites/default/files/documents/library/wetlands_sdgs_e.pdf

Convention on Wetlands. 2018. The Ramsar Convention on Wetlands towards SDG 15 https://sustainabledevelopment.un.org/content/documents/26857Rivera_RamsarSDG15.pdf

Convention on Wetlands. 2018. Guidelines for inventories of tropical peatlands to facilitate their designation as Ramsar Sites. https://www.ramsar.org/sites/default/files/bn9_peatland_inventory_e_o.pdf

European Space Agency. Overview http://www.esa.int/Applications/Observing_the_Earth/Copernicus/Overview4

European Space Agency. Sentinel-1 <https://sentinel.esa.int/web/sentinel/missions/sentinel-1>

European Space Agency. Sentinel-2 <https://sentinel.esa.int/web/sentinel/missions/sentinel-2>

European Space Agency. Global Earth Observation System of Systems (GEOSS) Portal <https://www.geoportal.org/community/guest/about>

FUNGAP-Grupo Antigua. 2005. Experiencias destacadas de Gestión Ambiental Participativa en Humedales de las Américas http://www.fungap.org/docs/libros/libro_fungap_01.pdf

GEO. 2017. GEO Wetlands Initiative <https://www.earthobservations.org/activity.php?id=122>

GEOSS. Capacity building <https://www.earthobservations.org/cb.php>

GEOSS. Geo-map <https://www.geoportal.org/>

GlobWetland Africa. Welcome to GlobWetland Africa <http://globwetland-africa.org/>

IUCN. 2018. World must act now to strengthen protection of most important wetlands <https://www.iucn.org/news/water/201809/world-must-act-now-strengthen-protection-most-important-wetlands>

Jaramillo, F., et al. 2019. Priorities and Interactions of SDGs with Focus on Wetlands https://www.researchgate.net/publication/331998788_Priorities_and_Interactions_of_Sustainable_Development_Goals_SDGs_with_Focus_on_Wetlands

Kenya, Ministry of Environment and Mineral Resources. 2012. Kenya Wetlands Atlas. https://na.unep.net/siouxfalls/publications/Kenya_Wetlands.pdf

Mahdianpair, M. et al. 2019. The First Wetland Inventory Map of Newfoundland at a Spatial Resolution of 10 m Using Sentinel-1 and Sentinel-2 Data on the Google Earth Engine Cloud Computing Platform <https://www.mdpi.com/2072-4292/11/1/43/htm>

National Wetlands Committee. 2002. National Policy and Programmes on Wetland Conservation for Trinidad and Tobago https://www.ramsar.org/sites/default/files/documents/library/national_wetland_policies_-_trinidad_tobago.pdf#targetText=The%20only%20clear%20statements%20of,National%20Wetlands%20Committee%20in%201995.

New South Wales Government. 2019. How wetlands are protected <https://www.environment.nsw.gov.au/topics/water/wetlands/protecting-wetlands/how-wetlands-are-protected>

Norden. 2015. Peatlands, climate change mitigation and biodiversity conservation. https://www.ramsar.org/sites/default/files/documents/library/ny_2_korrektur_anp_peatland.pdf

Programa de Naciones Unidas para el Desarrollo-Costa Rica. 2018. Inventario Nacional de humedales de Costa Rica. <http://www.sinac.go.cr/ES/docu/Inventario%20Nacional%20Humedales/INVENTARIO%20NACIONAL%20DE%20HUMEDALES%20-%20Final.pdf>

The United States Environmental Protection Agency. 2017. Why is Habitat Restoration Near the Gulf of Mexico Essential <https://www.epa.gov/gulfofmexico/why-habitat-restoration-near-gulf-mexico-essential>


UN-Water. Indicator 6.6.1 – Water-related ecosystems <https://www.sdg6monitoring.org/indicators/target-66/indicators661/>

Wetlands International. Act now on wetlands for achieving the Sustainable Development Goals (Agenda 2030) <https://www.wetlands.org/publications/act-now-on-wetlands-for-agenda-2030/>

Wetlands International. List of donors for wetlands management <https://www.wetlands.org/our-network/donors/>

Wetland Link International <https://wli.wwt.org.uk/>

World Investment Forum. A Toolbox of Resources for all Stakeholders <https://worldinvestmentforum.unctad.org/financing-for-the-sdgs/>



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