The GEO-Wetlands Initiative
Towards a Global Wetlands Observation System (GWOS)

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Inform the STRP about the **GEO-Wetlands** activities and plans, and discuss ways to contribute:

1. What is GEO-Wetlands?
2. Why do we need GEO-Wetlands?
3. How will GEO-Wetlands make a difference?
4. How to contribute to the work of GEO-Wetlands?
What is GEO-Wetlands?

**GEO-Wetlands mission**: Develop sustained & global approaches to wetland inventory, mapping, monitoring and assessment

- A new GEO Initiative focusing on wetland ecosystem/habitat monitoring and on the specific needs of the Ramsar/wetlands community (policy & user driven)

- A community and open platform of wetland observation practitioners including academia, NGOs, national agencies, private companies, space agencies & international conventions (international collaborative effort)

- A framework for the co-design of the Global Wetlands Observation System (GWOS) (wetland monitoring knowledge-hub)
Group on Earth Observations (GEO)

Earth Observations for “informed” decision making
GEO 2017-19 Work Programme

GEO Community Activities

- Defines user needs
- Develops concepts and applications. Community building

GEO Initiatives

- Contributes to user needs
- Demonstrates pilot or prototype services. Members / PO / CoP coordinate

GEO Flagships

- Satisfies user needs
- Develops pre-operational services. Members / PO / CoP operate

Support for GEOSS implementation

GEO Foundational Tasks

Over-arching activities described in the GEO WP initiated by GEO Secretariat.
In 2008, STRP-14 launched the concept of Global Wetlands Observation System (GWOS) to improve the community capabilities in large scale wetland assessments and support “informed” decision making on wetland policies.

2011-2014: Development of a GWOS conceptual framework during various workshops, under WI leadership, with the support of GEO BON.

But insufficient resources for implementation.
Why do we need GEO-Wetlands?

Wetlands

- provide essential ecosystem services
- one of the most endangered ecosystem types worldwide
- Are heterogeneous and dynamics ecosystems difficult to map and monitor

Policy instruments for improved wetland monitoring

- Ramsar Convention on Wetlands
- 2020 Aichi Biodiversity Targets of the CBD
- Sustainable Development Goals (SDG 6.6 and other targets/indicators)
Policy and programmatic drivers

### Sustainable Development Goals

- **Target 6.6**
  Protect and restore water-related ecosystems

- **Target 15.1**
  Conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services

### Convention on Wetlands

- **SP Target 2.5**
  Ecological character of Ramsar sites is maintained or restored

- **SP Target 2.7**
  Sites at risk of loss of ecological character have their threats addressed.

- **SP Target 3.8**
  Completion of national wetland inventories.

- **SP Target 4.14**
  Scientific and technical guidelines at global and regional levels

- **SP Target 4.15**
  Reinforced regional initiatives

### STRP 2016-2018 Work Plan

- **Collaboration tasks**
  SoWWS, GWOS

- **TWA 1**
  Best practices on wetlands inventory, monitoring and assessment

### Convention on Biological Diversity
## GEO-Wetlands contribution the STRP TWAs

### STRP core Ad-hoc Advisory / Collaboration Tasks:
*Ad-hoc advisory functions and collaboration with other International bodies and processes*

<table>
<thead>
<tr>
<th>Task</th>
<th>Task Description</th>
<th>Outputs</th>
<th>Target Audience</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2018 edition of the State of the World’s Wetlands and their Services to People (SoWWS) with links to the Strategic Plan and other international processes (i.e. SDGs, Aichi Biodiversity Targets, Global Biodiversity Outlook).</td>
<td>A global report with derived outputs for specific audiences (i.e. Policy Briefs/Briefing Notes),</td>
<td>Policy Makers and Practitioners</td>
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<tr>
<td></td>
<td>Engagement with the development of the Global Wetlands Observation System (GWOS)</td>
<td></td>
<td>Practitioners</td>
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### Thematic Work Area No. 1:
*Best practice methodologies/tools to monitor Ramsar Sites, including surveying, mapping and inventorying recognizing traditional practices of indigenous peoples and local communities*

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<th>Task</th>
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<tr>
<td>1.1</td>
<td>Earth Observation as a “best practice” tool for inventorying, mapping and monitoring wetlands, including Ramsar Sites</td>
<td>Ramsar Technical Report (RTR) (as a component of SoWWS)</td>
<td>Practitioners</td>
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<td></td>
<td>Source: GMW, GW Africa, SWOS</td>
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<tr>
<td>1.3</td>
<td>Development of guidelines for inventories of peatlands for possible designation as Wetlands of International Importance</td>
<td>Briefing Note for practitioners Revised guidelines as annex to a draft resolution</td>
<td>Policy Makers and Practitioners</td>
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Target 6.6
Water-related ecosystems

“By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes”

Indicator 6.6.1
Change in the extent of water-related ecosystems over time

SDG 6.6.1 Custodian Agency: UNEP with Ramsar secretariat
<table>
<thead>
<tr>
<th>Ecosystem types</th>
<th>Extent/Volume/Flow sub-indicators</th>
<th>Ecosystem health sub-indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetlands (water dominated ecosystems such as swamps, marshes and peatlands)</td>
<td>Spatial extent/area</td>
<td>Wetland health indices</td>
</tr>
<tr>
<td>Inland open waters (lakes and reservoirs)</td>
<td>Spatial extent/area, Quantity (volume)</td>
<td>Lake health indices, <strong>Water quality (6.3.2)</strong></td>
</tr>
<tr>
<td>Rivers and estuaries</td>
<td>Quantity (streamflow)</td>
<td>River health indices, Water quality (6.3.2)</td>
</tr>
<tr>
<td>Groundwater aquifers</td>
<td>Quantity (depth to groundwater table)</td>
<td>Groundwater interaction with surface water, Water quality (6.3.2)</td>
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</tbody>
</table>
How does GEO-Wetlands work?

**Community of Practice**
- Collaboration, development

**GWOS**
- Maps, indicators, knowledge

GWOS user community at different levels (practitioners to policy makers)

**Feedback**

**Governance**
- Global Stakeholders

**Implementation**
- **Community of Practice**
  - Working Groups
  - Ad-Hoc Task Teams
- **Contributing Projects**
- **Supporting Initiatives**
- **Wetland Practitioners**
- **Researchers / Scientists**

**GWOS**
- Portal
- Knowledge-hub
GEO-Wetlands and GEO BON

**Bon in a Box**
- Methodological guidelines
- S/W ToolBox
- Service Platforms
- Training Material

**Freshwater BON**
- Inland Wetland Extent & changes
- Wetland Habitat Mapping
- Wetland Inundation Regimes
- Inland Water Quality
  - GWOS Portal i/f

**Marine BON**
- Mangroves Extent & Changes
- Mangrove Characterisation
- River Basin Hydrological Modeling (sediments influxes)
  - GWOS Portal i/f

**EBVs**
- Methods and data sets on Wetland Ecosystem Extent & Fragmentation, Habitat Structure
  - GWOS Portal i/f
- Methods and data sets on Mangrove Ecosystem Extent

**Freshwater Information platform i/f**
- Freshwater species distribution
- Water-related Ecosystem Health Index (starting with rivers)

**Marine Data Portal i/f (OBIS/GBIF)**
- Coral Reefs Extent
- Coral Bleaching events
How does GEO-Wetlands make a difference?

- Different projects provide **initial funding** for GWOS development
  - Wetland Extent Index (UNEP WCMC)
  - GlobWetland II (ESA) (finished in 2015 – demonstrator of a regional GWOS)
  - Global Mangrove Watch (JAXA – ongoing)
  - SWOS - Satellite-based Wetland Observation Service (H2020 – started 2015)
  - GlobWetland-Africa (ESA – started 2015)
  - DeMo-Wetlands (DLR – started 2016)

Others coming....

GEO-Wetlands develops an **open, inclusive and cooperative** framework for sustainably maintaining, evolving and providing the GWOS services and products.
Loss of freshwater wetlands worldwide from 1997-2011 valued at US$ 2.7 trillion per year

Over 30% of wetlands loss in the past 40 years
Contributing projects: **GlobWetland II**

- Development and qualification of EO approaches and tools for *wetland habitat mapping and monitoring*.
- **GWOS regional pilot project** for Nat./Reg. wetland observatories.
- GlobWetland II maps and tools used by MedWet (Ramsar Mediterranean Initiative, 26 countries) to assess *trends in Mediterranean coastal wetlands* over the last 30y.
- GlobWetland II approaches selected amongst Ramsar **Best Case Practices** to estimate the State of the World Wetlands.

- 200 wetlands, 3 epochs (75, 90, 05), 10 Mediterranean countries, Landsat
- In partnership with Ramsar and the Mediterranean Wetland Observatory
- GWOS Pilot project for the State of the World Wetlands (SOWW)
Project key facts
• 5 MEUR budget
• 3 years duration (starting from 1. June 2015)
• 15 project partners – direct user engagement
• Free and open data policy
• Provision of free of charge and open source EO tools

Contributing projects: SWOS

• Assessment of user/policy needs
• Definition of standards
• Development of GWOS infrastructure (Portal)
• Development of a SWOS Toolbox
• Demonstration via Multi-level Service Cases
• Training / Capacity Building

SWOS team:
Contributing projects: **GlobWetland Africa**

**Project key facts**
- 1.5 MEUR budget
- 3 years duration (starting from 1. November 2015)
- More than 25 African and international partners
- Free and open data policy
- Provision of free of charge and open source EO toolbox

- **Regional GWOS pilot** in Africa
- Development of **GlobWetland Africa Toolbox**
- EO Tools **for 6 products types**
- **Capacity-building** in Africa

GlobWetland-Africa team:
Contributing projects: GMW

Project key facts
- 2014-2016, 2017 funding yet to be resolved
- 4 partners
- Free and open data policy
- Development of maps and algorithms

- Thematic GWOS pilot: Mangroves
- Radar-based mangrove monitoring
- Production of global Mangrove change maps
- Classification software

GMW team:
Contributing projects: **DeMo-Wetlands**

**DeMo-Wetlands team:**

- Demonstration of satellite-based **wetland monitoring on national level** in Rwanda
- Development of **Wetland EO Tools and Products**
- **Automated** wetland EO processing chain

**Project key facts**
- 400,000 EUR budget
- 3 years duration (starting from 1. April 2016)
- 2 partners – cooperation with African partners
- Free and open data policy
- Development of tools and national demonstrator
GEO-Wetlands Portal & Knowledge Hub

Portal
Soon http://www.geowetlands.org

Maps & Products

Automated satellite image processing capabilities
A collaborative framework for **international cooperation**, co-design of **innovative solutions** and **community engagement**
GEO-Wetlands Working Groups & Task Teams

Working Groups

- Capacity building
- Wetlands inventory
- Mangroves

GEO-Wetlands Portal

- Toolbox
- Peatlands

s/w Tools

Platforms

Data Sets

EO Methods

Show Cases

Trainings

Ad-hoc Task Teams

- Website development
- Mapping & monitoring guidelines
- Proposals & Reports preparation

Methodological guidelines

Proposals, Reports
For further information please contact:

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Lammert Hilarides, Lammert.Hilarides@wetlands.org
BACKUP SLIDES
**Why GEO-Wetlands?**

<table>
<thead>
<tr>
<th>Develop a Global Wetlands Observation System</th>
<th>Build GWOS</th>
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<tbody>
<tr>
<td>• with <strong>EO best-practice methods and tools</strong></td>
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<tr>
<td>• for <strong>wetlands inventory, mapping and monitoring</strong>, from <strong>global to regional, national and local scales</strong>,</td>
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<td>• in support to international conventions and “informed” decision-making</td>
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<th>Establish a community and governance structure to maintain and evolve the system</th>
<th>Respond to evolving User and Policy Needs</th>
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| Build on existing efforts to maximise efficiency                                                        | Increase international cooperation       |
# GEO-Wetlands and the EBVs

## Ecosystem Structure

<table>
<thead>
<tr>
<th>EBV Classes</th>
<th>EVB Candidates</th>
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<tbody>
<tr>
<td>Genetic composition</td>
<td>Co-ancestry, Allelic diversity, Population genetic differentiation, Breed and variety diversity</td>
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<tr>
<td>Species populations</td>
<td>Species distribution, Population abundance, Population structure</td>
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<tr>
<td>Species traits</td>
<td>Phenology, Body mass, Natal dispersion distance, Migratory behavior, Demographic traits, Physiological traits</td>
</tr>
<tr>
<td>Community composition</td>
<td>Species richness, Species interactions</td>
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<tr>
<td>Ecosystem function</td>
<td>Net primary productivity, Secondary productivity, Nutrient retention, Disturbance regime</td>
</tr>
<tr>
<td>Ecosystem structure</td>
<td>Habitat structure, Ecosystem extent and fragmentation, Ecosystem composition by functional type</td>
</tr>
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