



Joint IGWCO and AquaWatch Community of Practice Meetings

Koblenz, Germany

June 8, 2016



GEO Water Quality Summit Goal

Define specific requirements of the water quality system components and develop a plan to implement an integrated end-to-end water quality monitoring and forecasting service



Global Water Quality Products and Services

- AquaWatch aims to develop international operational water quality information systems based on Earth observation with a focus on the developing world.
- The Community of Practice has chosen to focus on transforming data to information based on user needs within this water quality theme.

User needs

Data

Products

Information

Knowledge

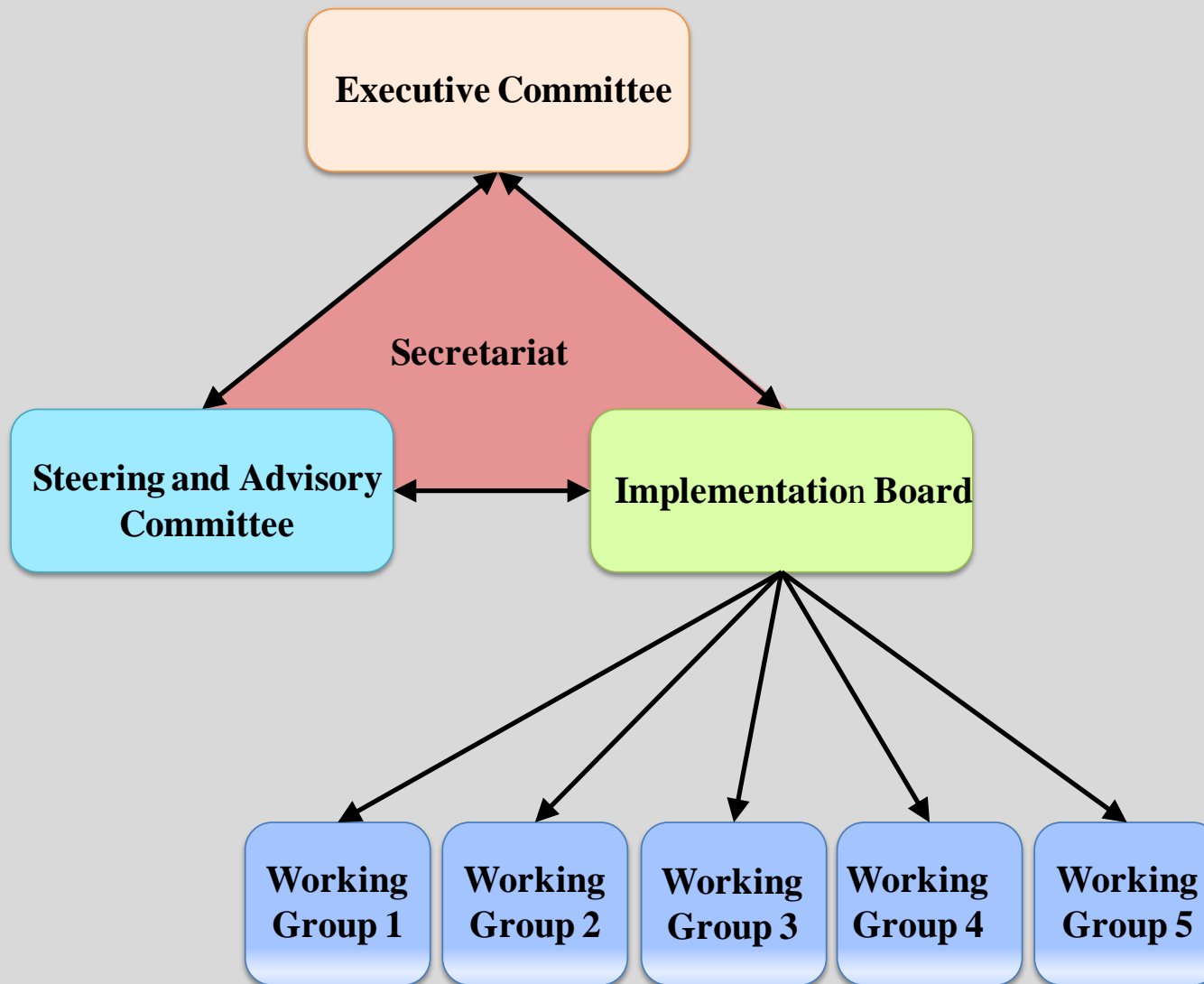


Chesapeake Bay Buoy – NOAA Image

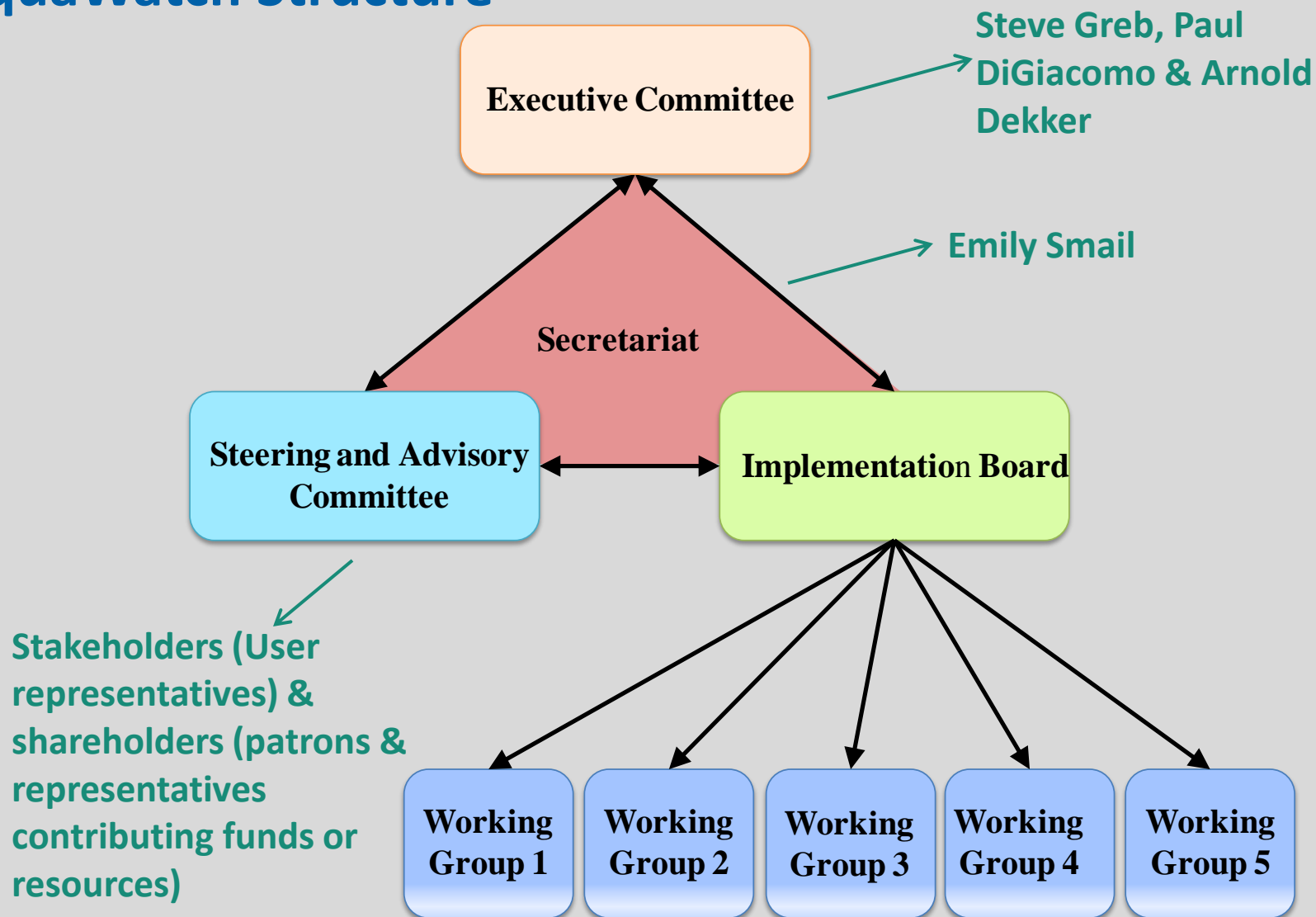


Lakes Mendota & Monona -University of Wisconsin SSEC image

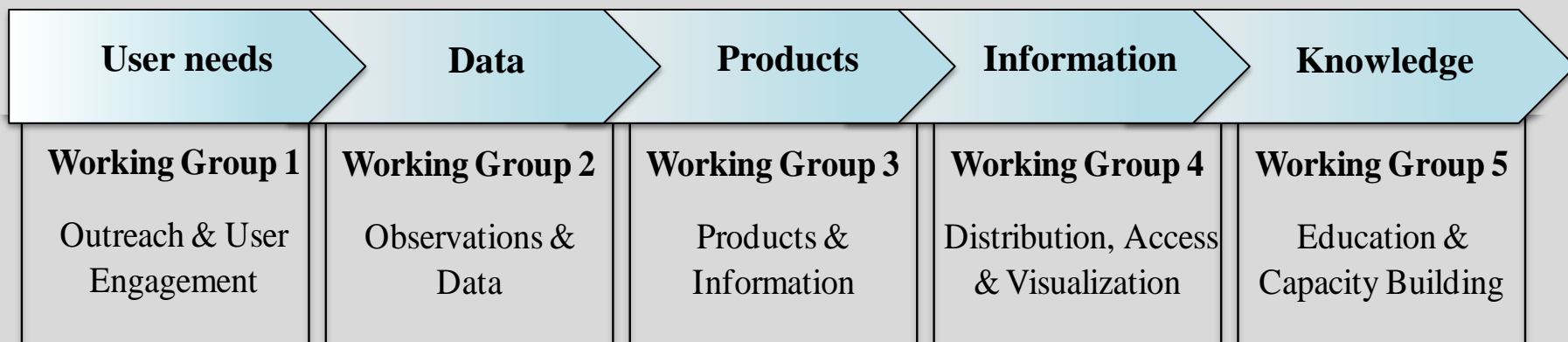
AquaWatch Structure



AquaWatch Structure



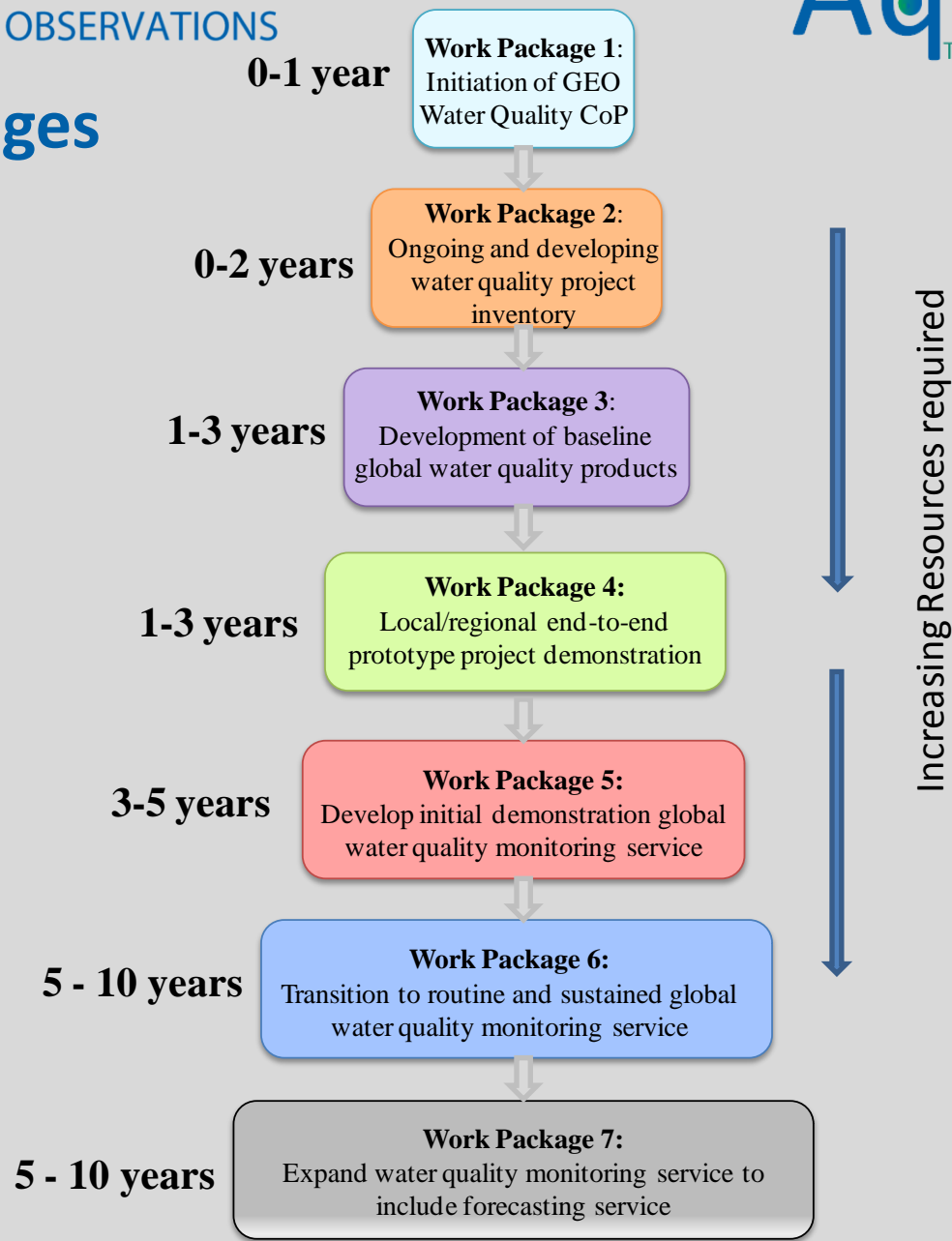
AquaWatch Structure



Working Groups

- **Working group 1 – Outreach & user engagement**
 - 4 members
 - Facilitators: Carsten Brockmann & Emily Smail
- **Working group 2 – Observations & data**
 - 24 members
 - Facilitators: Maycira Costa & Philipp Saile
- **Working group 3 – Products & information**
 - 34 members
 - Facilitators: Blake Schaffer & Ghada El Serafy
- **Working group 4 – Data, access & visualization**
 - 13 members
 - Facilitator: Steve Groom
- **Working group 5 – Education & capacity building**
 - 9 members
 - Andrew Tyler and Bilqis Hoque

Work Packages



Work Package 2

GEO Water Quality Community of Practice				WQ Inventory_v1				Edit Workbook ▾					Print	Share ▾	Data ▾	...
	A	B	C	D	E	F	G	H	I	J	K	L				
	Project Name	Organization	Project Summary	Funding Entity/Other	Point of Contact	Region/s of Interest	Status	Obs/measurements collected & generated	Platforms/Sensors/Equipment used (Field, Remote, Lab)	Algorithm/Validation/Sampling Protocols	Frequency of Observations	Applications/Man/s/Users Support				
1		EPA, NASA, NOAA, USGS	Several states have adopted WHO thresholds for human health exposure to microcystins (a class of cyanobacteria toxins).	EPA, NASA, NOAA, USGS	Blake Schaeffer (EPA): schaeffer.blake@epa.gov or Jeremy Werdell (NASA): mark@cyanolakes.com	U.S. lakes and estuaries	R&D mode to move towards operational status	(1) model output from in situ radiometry vs. in situ metrics for cyanobacteria; (2) satellite radiometry vs. biogeochemistry, phytoplankton enumeration and identification, radiometry, absorption	field/lab: cyanobacteria counts, abundance, or phycocyanin pigment concentration, latitude, longitude, depth, date	Algorithm: propose to adopt second derivative spectral shape algorithms	Goal is availability of products on a weekly basis	Create a standard & uniform approach for early identification of algal blooms that is useful and accessible to National Authorities, Decision Makers, & the general public				
2	CyAN (Cyanobacteria EONEMP (The Earth Observation National Eutrophication Monitoring Programme))	Cyanolakes (pty) Ltd.	EONEMP is a three year project (2015-2018) funded by the South African Water Research Commission.	Water Research Commission, Department of Water and Sanitation, South African National Science Foundation	Mark Matthews: mark@cyanolakes.com	South Africa	R&D project, pre-operational	Biogeochemistry, phytoplankton enumeration and identification, radiometry, absorption	Envisat Medium Resolution Imaging Spectrometer, Sentinel-3 Ocean and Land Colour Instrument	Maximum Peak Height (MPH) algorithm; Ocean Optics Protocols	Weekly/Daily	National Authorities, Decision Makers, & the general public				
3	GeoWaterQuality	EOMAP	GeoWaterQuality services are commercially provided.	Funded by commercial projects and investments, with long-term developments co-funded through DFD/	Thomas Heege (EOMAP) heege@eomap.de	Globally	Operational	Measurements made: turbidity, chlorophyll-a, total suspended matter, visibility (SDD), total absorption (ABS), sum	Satellite sensors: Landsat 5/7/8, Sentinel-2a/b 20m resolution, MODIS A/T, Sentinel-3, MERIS (2002-2012)	Processing system: Physics-based Modular Inversion and Processing System (MIPS). Processors: Data can be used for validation; they have developed a chlorophyll-a algorithm based on Rrs fluorescence peak	Daily: 500 - 250m Weekly: 30 - 10 m Up to daily on request: 5m - 1m	Directive and environmental monitoring for water environmental agencies (e.g. BAIA and LUL) and other scientists				
4	The COLOURS database	Royal Netherlands Institute for Sea Research	Long-term RS-monitoring project, since August 2001, for automated determination of	Royal Netherlands Institute for Sea Research	Marcel Wernand (Royal Netherlands Institute for Sea Research): marcel.wernand@nioz.nl For Project: Prof. Daniel Hering, University Duisburg Essen, Daniel.Hering@uni-	The Wadden Sea	Operational	Since August 2001 these optical devices provide continuous data every 15 minutes (available for	3 optical hyper-spectral sensor and two netCams	Data can be used for validation; they have developed a chlorophyll-a algorithm based on Rrs fluorescence peak	Every 15 minutes	Supported implementation of the European Water Framework Directive for many European countries				
5	WISER (Water bodies in Europe; Integrative System to assess Ecological status and Recovery)	25 European research institutions	Database of water quality monitoring data (total phosphorus, water colour, temperature and	The European Union under the 7th Framework Programme, Theme 6 (Environment including	For Project: Prof. Daniel Hering, University Duisburg Essen, Daniel.Hering@uni-	Water bodies in Europe	Operational monitoring used in R&D Project	Measurements from field samples	Existing data and field data.	The project analysed existing field monitoring data from more than 20 European countries. Field-	Monthly – often just summer months, for one or more years	Supported implementation of the European Water Framework Directive for many European countries				
6	MARS Project (Managing aquatic ecosystems and water resources under multiple stress)	24 European research institutions and organizations representing 17 countries will address	MARS is a research project that supports European policies, such as the Water Framework Directive	Union under the 7th Framework Programme, Contract No. 603378	For Project: Prof. Daniel Hering, University Duisburg Essen, Daniel.Hering@uni-	Europe (>20 countries)	Operational monitoring & R&D Project data	Existing field measurements	Field	The project is analysing existing data from > 30 long-term lake time series (at least monthly data for 10 years) and	Monthly – often just summer months, for one or more years	Supports implementation of the European Water Framework Directive for many European countries				
7	EMIS (Environmental Marine Information System)	European Commission	The Marine Geoportal EMIS relies on biological and physical variables generated from both	European Commission	Nicolas Hoepffner: nicolas.hoepffner@jrc.ec.europa.eu	European Seas	Operational	EMIS relies on biological and physical variables generated from both hydrodynamic models. GIMS relies on biological and physical variables generated from satellite remote sensing. A number of	Sensors MERIS, MODIS, SeaWiFS, PATHFINDER, VIIRS Hydrodynamic model: GETM	Satellite level 1 data are (re-) processed using regularly updated NASA SeaDAS software with standard Data retrieved from NASA GSFC and re-sampled at GIMS grid	Monthly means & 8-Day time-series over sensor's duration	EMIS includes navigation and statistical tools for assessment of the user's identified m				
8	GIMS (Global Marine Information System)	European Commission	The Marine Geoportal GIMS relies on biological and physical variables generated from satellite remote	European Commission	Nicolas Hoepffner: nicolas.hoepffner@jrc.ec.europa.eu	Global Ocean	Operational	GIMS relies on biological and physical variables generated from satellite remote sensing. A number of	Sensors MERIS, MODIS, SeaWiFS, PATHFINDER, VIIRS	Data retrieved from NASA GSFC and re-sampled at GIMS grid	Monthly time-series over sensor's duration	Resource manager and policy-makers				
9	GLOS (Great Lakes observing system)	GLOS - IOOS regional partner	The mission of GLOS is to connect providers	Primarily NOAA-IOOS, other federal	Kelli Paige: kpaige@glos.us	The Great Lakes and St. Lawrence River	N/A	GLOS does not directly own or operate	varied	An overview of the QA/QC processes	varied	Resource manager and policy-makers				

Work Package 3: Development of baseline global water quality products

- The goal of work package 3 is to develop preliminary, visible demonstration products of water quality parameters. Parameters selected for work package 3 projects should be those that have advanced science, available resources and resonate with the end user community. Parameters should also be appropriate for analysis of inland and coastal waters. The spatial and temporal scales for the projects will be discussed and concurred upon based on expert input from Community of Practice members. Ideally, at least one physical and one biogeochemical parameter should be selected for work package 3. Potential parameters include:
 - Optically active constituents such as chlorophyll , cyanobacteria pigments, Total Suspended Solids & Coloured Dissolved Organic Matter
 - Vertical attenuation of downwelling light (kd)
 - Secchi disk depth
 - Transparency and Turbidity
 - Water surface Temperature

Work Package 4: Local/regional end-to-end prototype project demonstration

- The goal of work package 4 is to develop local or regional prototype projects that demonstrate the potential of water quality monitoring projects utilizing both remote sensing and in situ data. Work package 4 should include at least 2 prototype projects that address a combination of inland and coastal water bodies in developed and developing countries. Projects can build upon existing work or development of new tools depending on funding availability and interest.
- Prototype projects will aim to link current activities and existing efforts to develop end-to-end products. The projects should focus on utilizing currently produced data to meet user needs. Prototype projects should ultimately demonstrate the use of water quality data and information in management and decision making.

2016 Goals

1. **Identify Implementation Board (leads and co-leads of Working Groups)**
2. **Identify initial members of the Steering and Advisory Committee**
3. **Complete work package 2 and distribute to Community of Practice (living document)**
4. **Identify specific tasks for working groups for work packages 3 and 4**
5. **Select projects for work packages 3 and 4**
6. **Identify project leaders for work packages 3 and 4**
7. **Identify sub tasks required to complete work packages 3 and 4**
8. **Acquire funding and/or in kind support for work packages 3 and 4**
9. **Begin work on work packages 3 and 4**

Questions?

GEO Work Programme Symposium – May 2016

- Review of the 2016-2025 GEO Strategic Plan
- Role of the Secretariat & Foundational Tasks
- Recommendations on the 2017-2019 work programme content

2016-2025 Strategic Plan – key points

- GEO as a broker of Earth Observation data
- GEO as a facilitator of policy-level dialogue
- GEOSS Implementation
 - Empower countries and organizations to strengthen contributions to GEOSS
 - Link GEOSS to socio-economic data through partnerships (e.g. UN Statistics Division)

GEO & Policy

- Encouraging linkages to UN Sustainable Development Goals and international mandates and conventions



Ensure availability and sustainable management of water and sanitation for all



Conserve and sustainably use the oceans, seas and marine resources for sustainable development



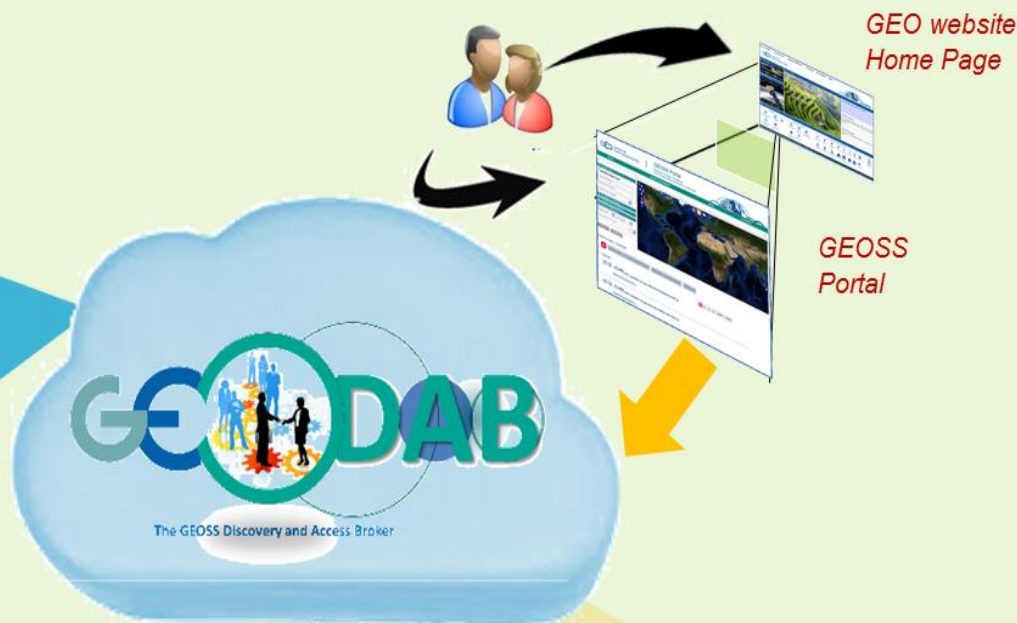
Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Role of the Secretariat & Foundational Tasks

- GEOSS Development and GEOSS Common Infrastructure (GCI) Operations
- Community Developments
- Secretariat Operations

GEOSS and GCI Development (GD-01 through GD-11)

GEOSS Information System



Community Developments

- CD-01- GEO Cab portal: <http://www.geocab.org/>



- CD-02: Reinforcing engagement at national and regional level
- CD-03: Assess the benefits of Eos and their socio-economic value

Secretariat Operations

- SO-01: Management and Support
- SO-02: Communications and Engagement
 - New GEO website under development & increased focus on social media
- SO-03: Monitoring and Evaluation
- SO-04: Resources Mobilization

Recommendations for the 2017-2019 work programme

- Encouraging linkages with policy and Sustainable Development Goals
- Relationships with statistical agencies
- Organization within societal benefit areas

Related GEO Community Activities

- **CA-07: Integrated Water-cycle Products and Services**
- CA-08: Water Vapor and Clouds
- CA-09: Precipitation
- CA-10: Evapotranspiration
- **CA-12: River Discharge**
- CA-13: Ground Water
- **CA-14: GEO Water Quality**
- **CA-15: Water Cycle Capacity Building**
- **CA-17: GEO Great Lakes Activity**
- CA-18: Water Cycle Integrator (WCI)
- CA-19: E2E Water Indicators
- CA-20: EarthH2Observe
- CA-21: Total Water Prediction: Observations Infrastructure
- CA-22: Linking water tasks with wider societal benefit areas and the post-2015 global development framework
- **CA-30: Harmful Algal Bloom (HAB) Early Warning System**
- CA-31: For Global Mangrove Monitoring

Related GEO Initiatives

- GI-02: GEOBON – Global Biodiversity Observation
- GI-06: AfriGEOSS
- GI-07: Blue Planet Initiative
- GI-18: Earth Observations in Service of the 2030 Agenda for Sustainable Development
- GI-19: AmeriGEOSS
- GI-20: GEO Global Water Sustainability (GEOGLOWS)
- GI-22: Asia-Oceania GEOSS
- GEO Wetlands

Questions?