

# Development of a GEO Global Water Quality Monitoring and Forecasting Service



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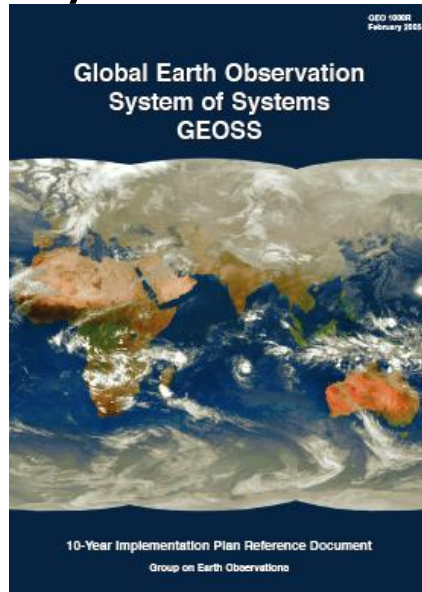
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# The Group on Earth Observation (GEO)

*To realize a future wherein decisions and actions,  
for the benefit of humankind, are informed by  
coordinated, comprehensive and sustained  
Earth observations and information*

# A new framework for Earth Observations: GEOSS: A Global, Coordinated, Comprehensive and Sustained System of Observing Systems



## Relevant Facts:

- Launch in response to 2002 World Summit on Sustainable Development
- Voluntary partnership: ~96 nations and ~89 international organizations
- The GEO community is creating a Global Earth Observation System of Systems (GEOSS) that will link Earth observation resources world-wide
- Coordinated by the Group on Earth Observations (GEO) which implements the GEOSS work plan through the best efforts of its community
- Provide framework to develop new projects and coordinate strategies

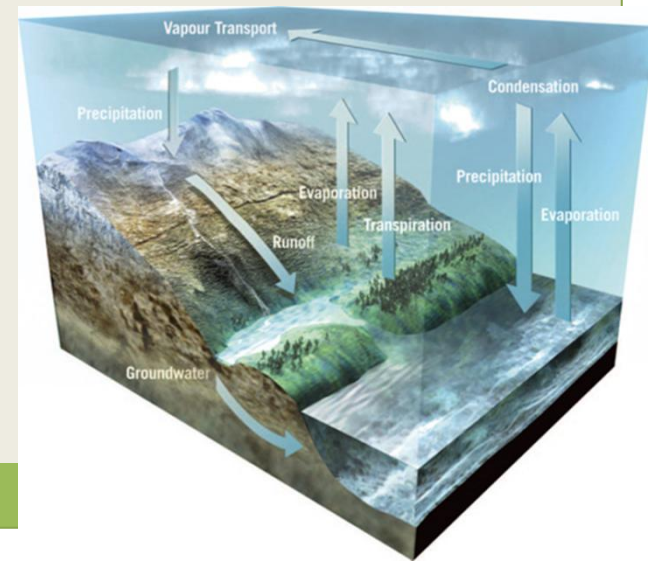
## THE GLOBAL EARTH OBSERVATION SYSTEM OF SYSTEMS



# GEO Inland and Coastal Water Quality Working Group

A component of WA-01: Water Task Work Plan

- 💧 C1 Integrated Water-cycle Products and Services
- 💧 C2 Information Systems for Hydro-meteorological Extremes (incl. Floods and Droughts)
- 💧 C3 Information Service for Cold Regions
- 💧 **C4 Global Water Quality Products and Services**
- 💧 C5 Information System Development and Capacity Building

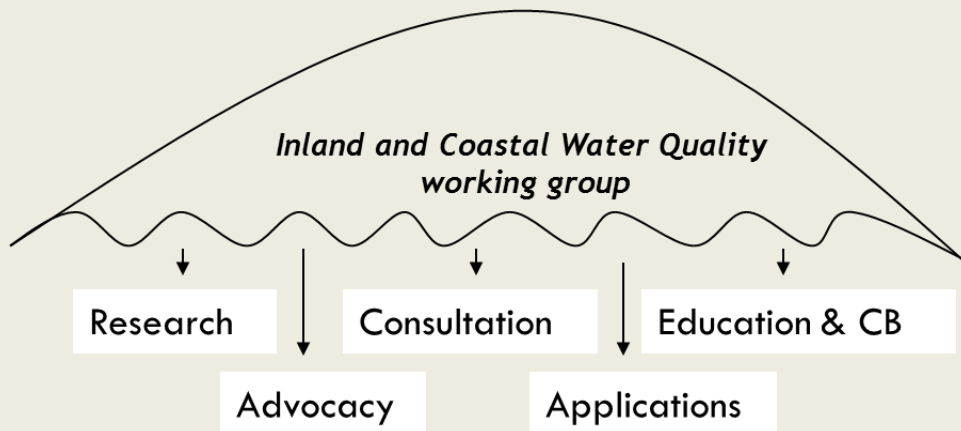
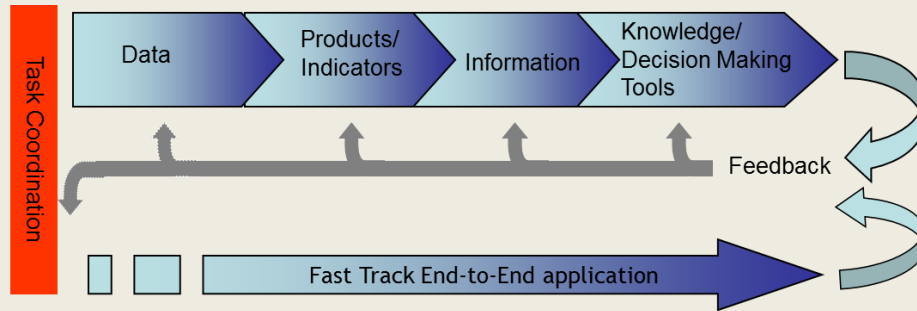




# C4 Global Water Quality Products and Services



Overall GEO WQ Task Goal: Develop, implement and maintain a global inland and coastal water quality monitoring and forecasting service. This task will be facilitated by a newly implemented GEO Water Quality (GEO-WaQ) Community of Practice.



Lakes Mendota & Monona - University of Wisconsin SSEC image

Over 100 members in WQ working group

# GEO Water Quality Summit

Geneva

April 20-22, 2015



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

52 participants  
18 countries



# GEO Water Quality Summit Deliverables

Develop a.) Strategic implementation and b.) a *phased* action plan including baseline (goal, ample funding) and threshold (funding constrained) service build-outs, with both a short-term (0-5 year) build-out plan for pilot/prototype regional service(s) and a long-term (6-10 year) plan for a global-scale water quality monitoring and forecasting service.

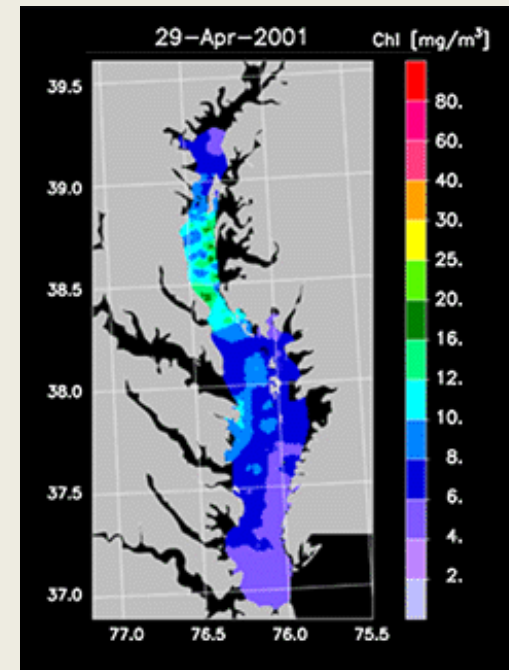


Image courtesy of Maryland Sea Grant

# GEO Water Quality Summit Deliverables



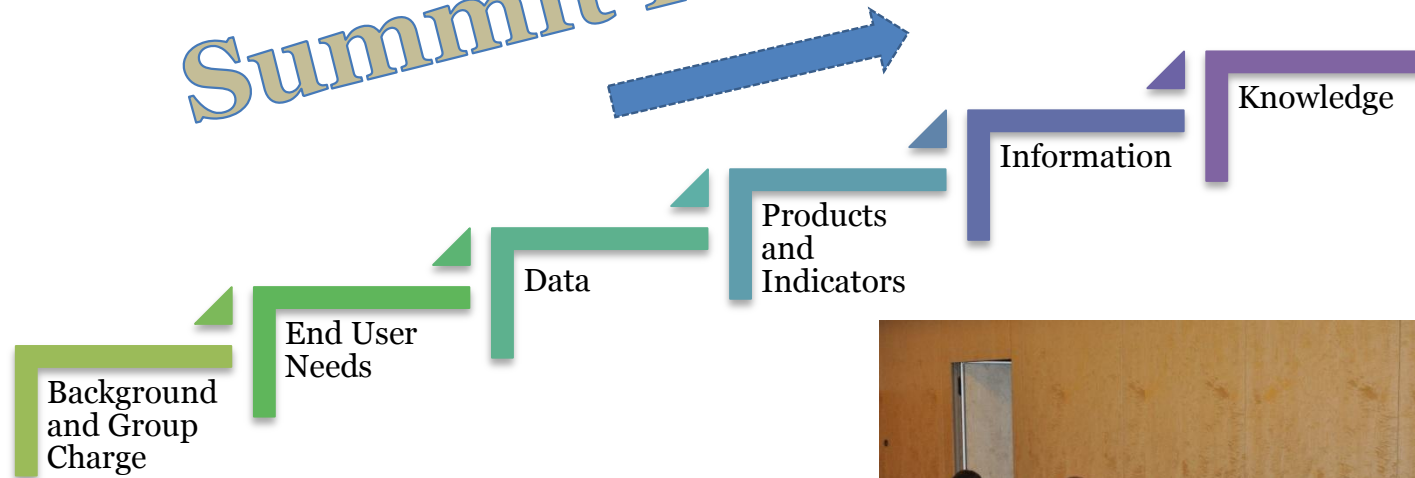
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Formation of a GEO Water Quality (GEO-WaQ) Community of Practice bringing together relevant data providers and users who will work collaboratively to implement, utilize, maintain and enhance the regional (initially) and (ultimately) global water quality monitoring and forecasting service.





# Summit Progression

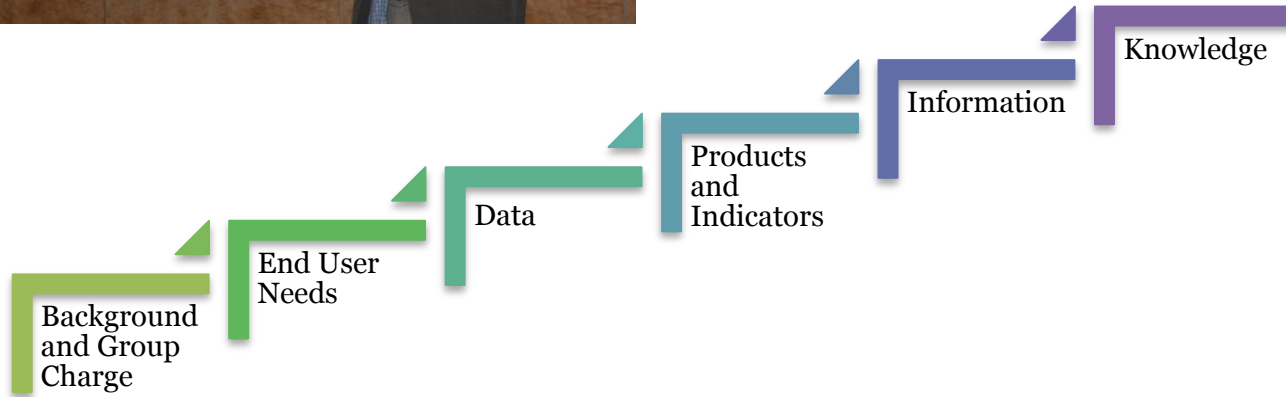
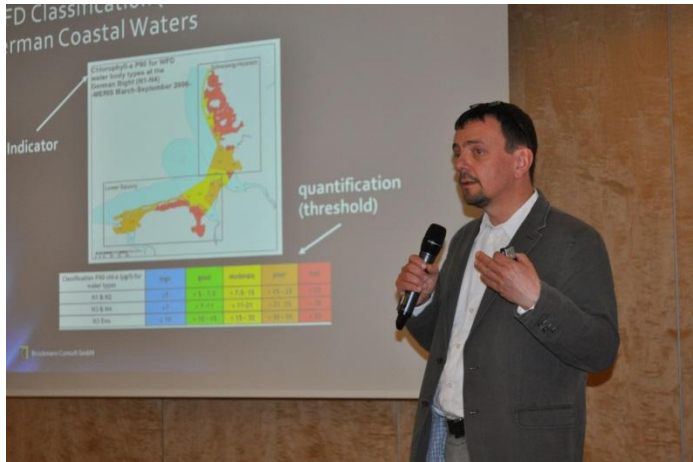


# Summit Progression



# Breakout Sessions





Strategic Implementation Plan

Phased Action Plan



# Excerpts from the Strategic Implementation plan, and resource discussion



- **Goal:** established a multi-stream multi-scale WQ monitoring service serving multiple users and providing a baseline set of consistent products for all users and a framework for the development of further products, indicator and knowledge
- Recognition that there are aspects of WQ monitoring that are “mature” enough for sustained/operational production – The time is now!

## Excepts from the Strategic Implementation plan, and resource discussion (contd.)



- A suggested “target” for an initial global “Core” Service could be the first baseline assessment for the water quality in the UN Sustainable Development Goals(SDG) process. This would raise visibility and provide “global” justification to the effort
- The sustained global core WQ service should be complimented by distinct end-to-end demonstration for specific WQ sectors/users at the regional/local scale. Successful pilots could receive some type of GEO branding

# Excepts from the Strategic Implementation plan, and resource discussion (contd.)



- Research and the Science Community:

The emphasis on advancing a sustained/operational and end-user driven pilots shouldn't taken away from the acknowledged need for continued research in advancing the state-of-the-art. The WQ CoP should provide periodic 2-yearly documents presenting pressing research needs to advance WQ monitoring , to present through GEO to member and other funding entities

# The GEO WQ Action Plan



- The phased action plan includes:
  - ✦ baseline (goal, ample funding) and
  - ✦ threshold (funding constrained)
  - ✦ service build-outs, with both a short-term (0-5 year) build-out plan for pilot/prototype regional service(s)
  - ✦ and a long-term (6-10 year) plan for a global-scale water quality monitoring and forecasting service.
  - ✦ The building blocks of the action plan are milestones

# Critical Milestones



What (MS Description)	When	Success measures	Actions required to achieve it	Responsible person/organisation	Comments

## Milestone #1:

- What:
  - baseline:
  - threshold:
- When:
- Measures of success:
- Action 1.1:
  - What:
  - Who:
  - When:
- Action 1.2:
- ...



What (MS Description)	When	Success measures
1 global product available	Apr 16	Data product QC'ed, documented and out on the Web
Proposal for a inland WQ ECV ready	July 15	White paper submitted to TOPC
White paper to NRC	Oct 15	White paper submitted to NRC
Catalogue (meta data) about existing services	Jun 17	
Demonstration of a linked System of Systems	Jun 17	(1) Technical link of regional systems (2) Link of data source (needs rephrasing)
User Work Plan agreed and published	Apr 16	
Working Group on def. of global products: publication draft ready for submission	Jun 16	
Report on Interactions with UN organisations	Dec 17	
WQ Group improved recognition at GEO		(1) Formally accepted as CoP (2) WQ proposed as a Flagship
Preliminary suite of global WQ products implemented (indicators, Sentinels, VIIRS)	Apr 20	
Transisiton from regional to global system, knowledge transfer progress report	Apr 20	
WQ CoP Secretariat and work plan in place	Apr 16	Regular progress reports of the WQ CoP

# Groupings of milestones into “Work Packages”



**WP 1.** Community of Practice organization and function

**WP 2.** Data and Information Inventories (“meta” tasks) supporting CoP

**WP 3.** Development of Global baseline WQ product(s)

**WP 4.** Local/Regional end-to-end service demonstration, development and integration

Example

## List of milestones for WP2

Milestones	2015	2016	2017	2018	2019	2020
WP 2 Data and Information Inventories						
WP 2.1 Draft and maintain a WQ research agenda <sup>1</sup>	-----	Dec.				
WP 2.2 Catalogue (meta data) about existing services <sup>2</sup>	July					
WP 2.3 GEO WQ web portal/web services		-----	-----	-----	-----	-----
WP 2.4 User requirements engagement	-----	April				

<sup>1</sup> *This should be a periodic output e.g. every 2-3 yr*

<sup>2</sup> *should also include past and present research projects i.e. a curated knowledge base*

Example

## List of milestones for WP2

Milestones	2015	2016	2017	2018	2019	2020
WP 2 Crosscutting / “meta” efforts supporting CoP						
WP 2.1 Draft and maintain a WQ research agenda <sup>1</sup>	-----	Dec.				
WP 2.2 Catalogue (meta data) about existing services <sup>2</sup>	July	-----				
WP 2.3 GEO WQ web portal/web services						
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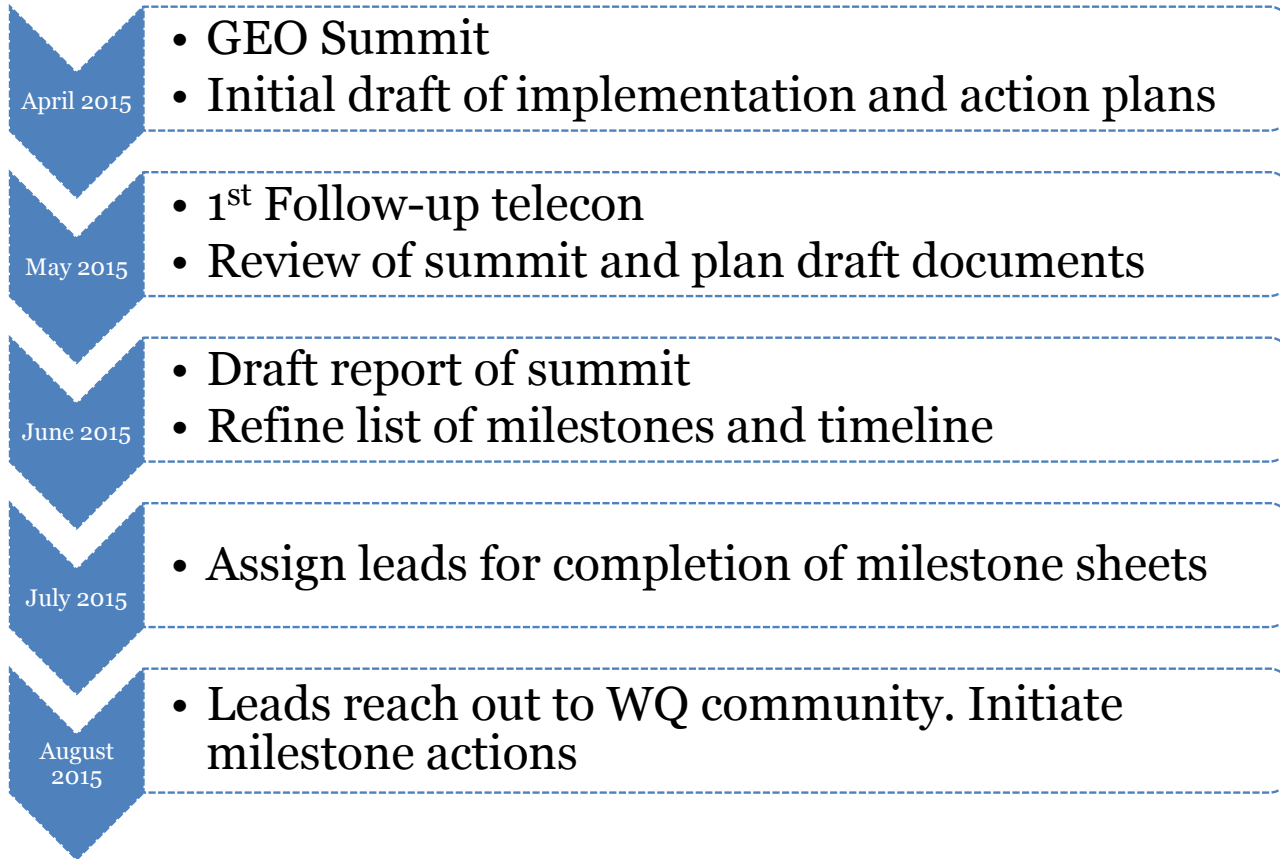
<sup>2</sup> should also include past and present research projects i.e. a curated knowledge base

## WP 2.1 worksheet



- What: Draft and maintain a WQ research agenda
  - baseline:
  - threshold:
- When: review every 2 years
- Measures of success:
- Action 2.1.1: Formulate research requirements
  - What: currently identified research topics:
    - ✦ protocols harmonisation
    - ✦ Algorithms ...
  - Who:
  - When:
- Action 2.1.2: Lobby for R&D activities on modelling and forecasting through EO data assimilation; link to GODAE (coastal)
  - What:
  - Who:
  - When:
- Action 2.1.3:
  - What:
  - Who:

# Near-term Next Steps.....



Visit our website:

<http://www.geo-water-quality.org/home>

Thank You

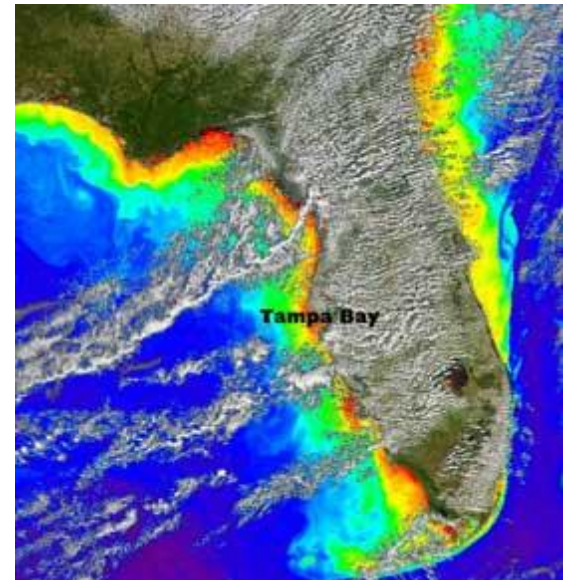


Image courtesy of NASA Goddard