GWEN - Global **W**etland **E**cohydrology **N**etwork: An Agora for Scientists and Study Sites

Synthesis of Group Reports from NEO Workshop 2011

G. Destouni, November 27, 2011

Network objectives

- To *catalyze and sustain collaborative international efforts* in research, education and outreach

- To *investigate on different spatiotemporal scales and in different world regions:*

1. The dynamics of natural and managed wetland networks and individual wetlands (wetlandscapes) across a gradient of different climate, human disturbance, energy and organization conditions

2. The reciprocal interactions between wetland networks and associated watersheds, and how humans influence these interactions

3. How climate change and different human activities, in particular agrosystems, in the wetland watersheds influence the ecohydrology of wetland networks and individual wetlands

4. The ecosystem services provided by networks of wetlands

Network research questions

In view of the network objectives, the following research questions are prioritized for the first network phase:

1.
   a. In what contexts and how are distributed wetlands in a landscape not functionally equivalent to a large wetland?
   b. What general lessons can be learned from cross-regional comparisons of retrospective reconstruction of impacted wetland trajectories and monitoring of restoration efforts?
   c. What strategies, management practices and system criteria contribute to successful and efficient wetland restoration efforts?
   d. What are the socio-economic barriers (e.g., financial, risk aversion) contributing to social "resistance" along the decision paths toward adopting and implementing best practices for sustaining desirable wetland functionalities?

2. How are hydrology, biogeochemistry, biodiversity and ecological functioning at both watershed and wetland scales influenced by:
   a. Landscape attributes (prevalence, connectivity, landscape position) of wetland networks, and internal feedback mechanisms within wetlands?
   b. Management, and non-stationary climate and land-use?

3. What is the connection between wetland (individual and network) evolution and agricultural development-management – from the past, through present time, to future projections - in drainage basins?

4.
   a. Can we identify some set of characteristic wetland network attributes that regulate and can be used in predictive modeling and evaluation of ecohydrological behavior and associated (bundles of) ecosystem services in drainage basins?
   b. How do sediment-water-plant wetland systems, and individual wetlands, in drainage basins modulate the ecosystem services (and associated disservices, in parenthesis) of:
      - Filtering/attenuating (and export loading) of waterborne tracers and pollutants in (from) the drainage basins?
      - Sinks (and emissions to the atmosphere) of greenhouse gases – including water vapor - in (from) the drainage basins?

Network study areas

Active research is being conducted at several sites with diverse scientific foci among the main objectives and research questions outlined above. The GWEN coordination and integration, through data and model synthesis and evaluations is expected to enhance these efforts for the wetland systems of the network.

Existing

Wetlands / wetland systems in:

- Forsmark and Oskarshamn coastal catchments, Sweden (see site description in Appendix A)
- Gialova Lagoon coastal catchment, Greece (*GD to complete site description based on specific workshop group reports*)
- Lake Okeechobee Basin, Florida, USA (*site description to be completed*)
- Tanzania (*site description to be completed*)
- *... additional sites with site descriptions, to be completed ...*

New

New sites will be added strategically, to increase the diversity and global coverage of wetland sites. Criteria for inclusion are:

i. Representation of different system scales
ii. Representation of different site conditions along gradients of:
   - Climate
   - human impacts
   - topographic setting – relief
   - landscape position
   - distributed water storage
   - surface energy-balance
   - management and organization

iii. Diversity of site investigators in terms of disciplinary knowledge, modeling and monitoring approaches, etc.

Prioritized networking goals - work tasks

- Descriptions of existing study sites
- Synthesis and positions paper(s)
- Special sessions at national/international meetings
- Strategic science and implementation plan
- Website and communication platform
- Educational programs related to the science questions – masters student involvement
- Additional sites and investigators
- Proposal(s) for network development funding

Expected benefits of network participation

- Ideas, methods, data exchanges-comparisons-syntheses, and increased development and generalization opportunities across different world regions
- Increased visibility, impact and application opportunities for research results
- Increased competitiveness for attracting research funds as part of international network
- Increased opportunities for development of new and teaching-research connections, context-based collaborative learning, and hierarchical mentoring
- Increased outreach opportunities
- FUN!

Network steering committee

- Nandita Basu
- Matt Cohen
- Irena Creed
- Georgia Destouni (acting chair)
- Antonis Koussis
- Steve Lyon
- Suresh Rao
- Ype van der Velde