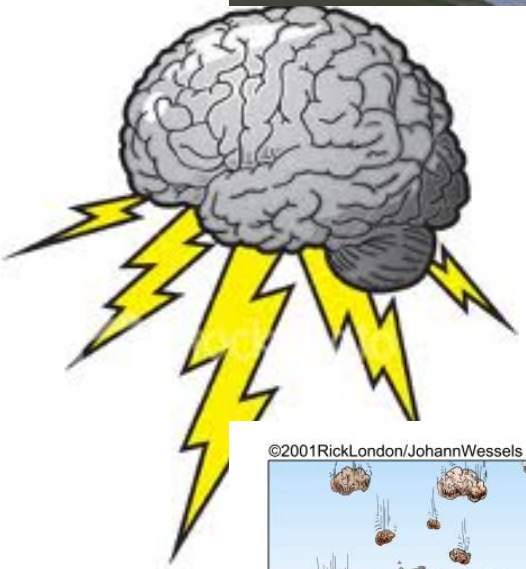
Flooding farm fields, draining wetlands, and damming rivers: *The effects of hydrologic regime change on ecosystem processes*

2012 LTER ASM Working Group-Brainstorming
Monday, Sep 10, 2012, Ruesch Auditorium-Dodge, 16:00-18:00

Organizers: Lauren Kinsman-Costello, Ariane Peralta & Jason Martina

Today's Agenda

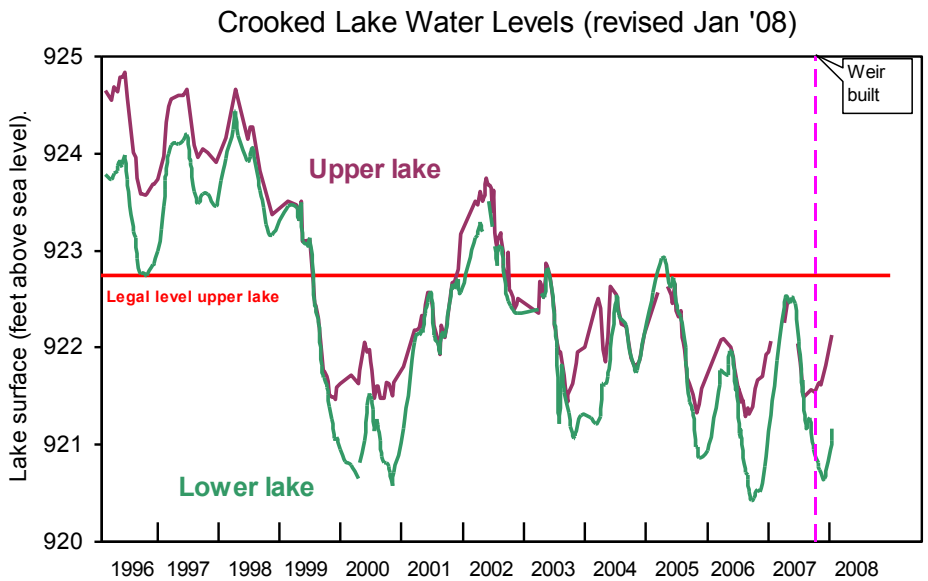
- Introductions
- Brief Background
- Brainstorming
- Regroup/Refocus



First monday of the month the corporate group gets together for a brainstorming session..

Hydrology shapes ecosystems

Hydrology is not static



Climate Change =

Climate-driven variation becoming less predictable

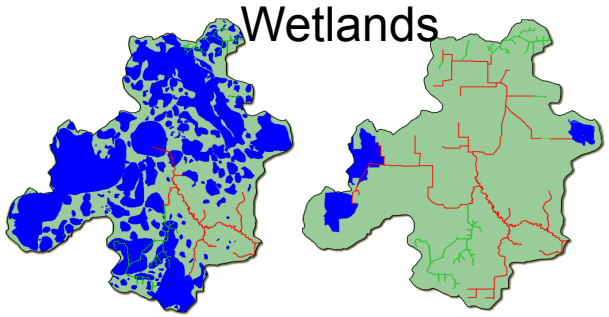
Reasons	Hydrologic Change
Food Supply	Irrigation
Food Supply	Wetland Drainage
Navigation	Dredging, Channelization
Flood Control	Levees, Dikes
Electricity Generation	Damming Rivers
Recreation	Water Level Stabilization
Ecosystem Restoration	Re-flooding Drained Areas
Resource Extraction	Extreme=Mountain Stream Burial
Development	Simplification, Stream Burial, Loss of Connectivity

Images of other examples

Others?

River → Lake

Seven Mile Creek Watershed Wetlands



1917: ~8,000 Acres

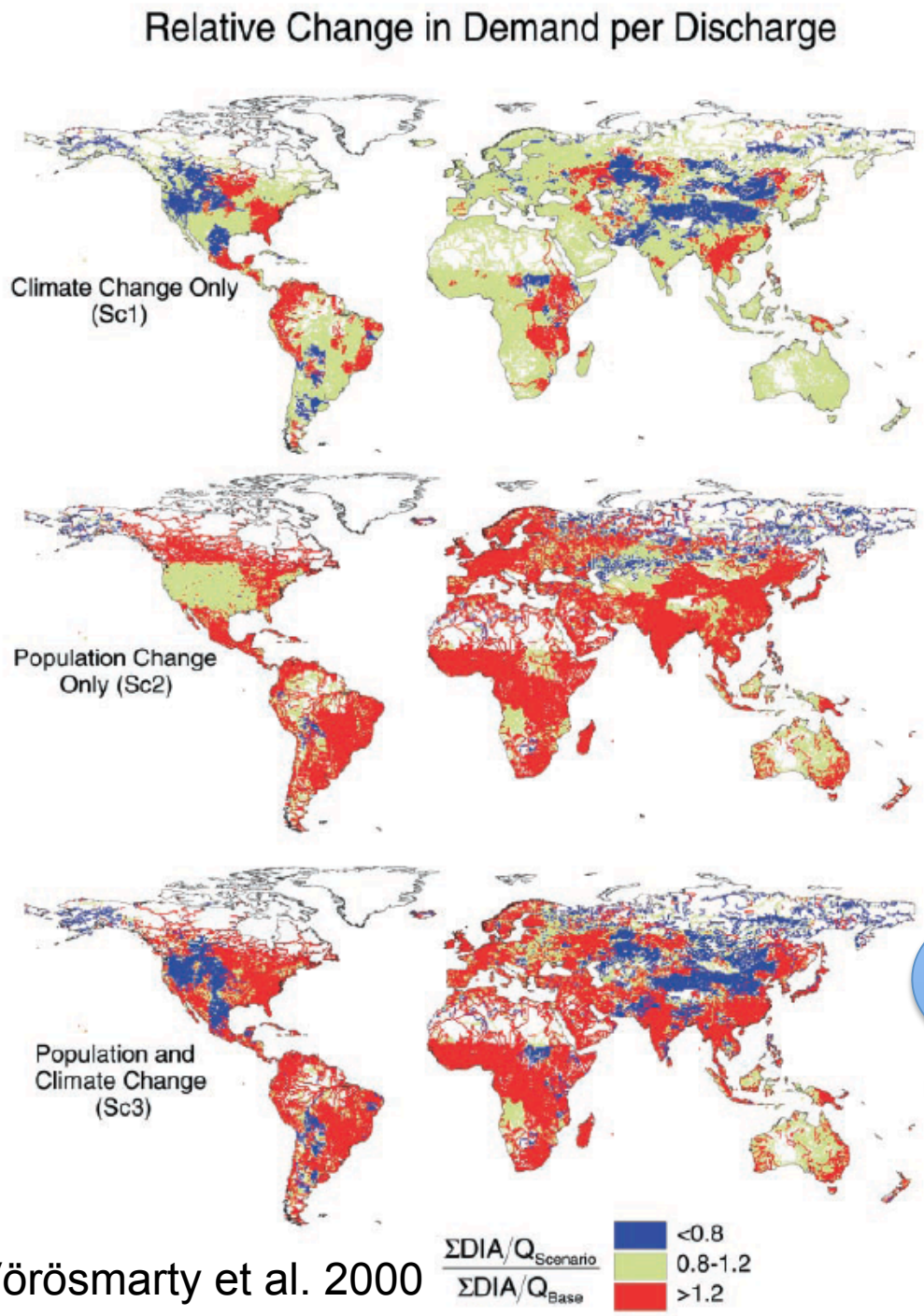
1985: ~1,307 Acres

Wetland → Ag Field

Ag Field → Wetland

Compare across time & space?

Timberlake Restoration



Vörösmarty et al. 2000

Human Management vs. Climate Change

Threats to Water Supply:

Human Population Change

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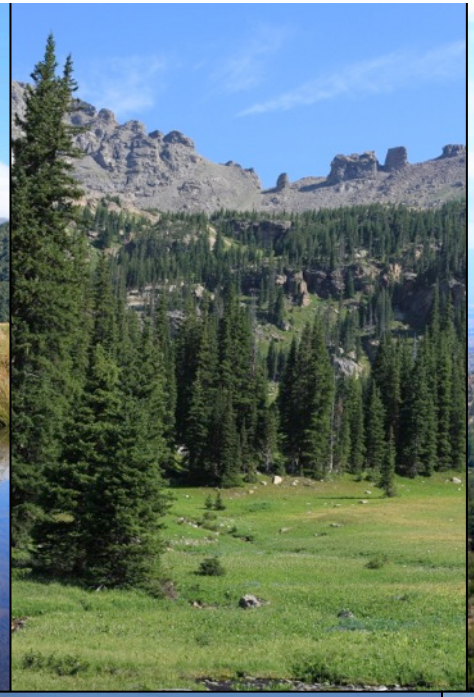
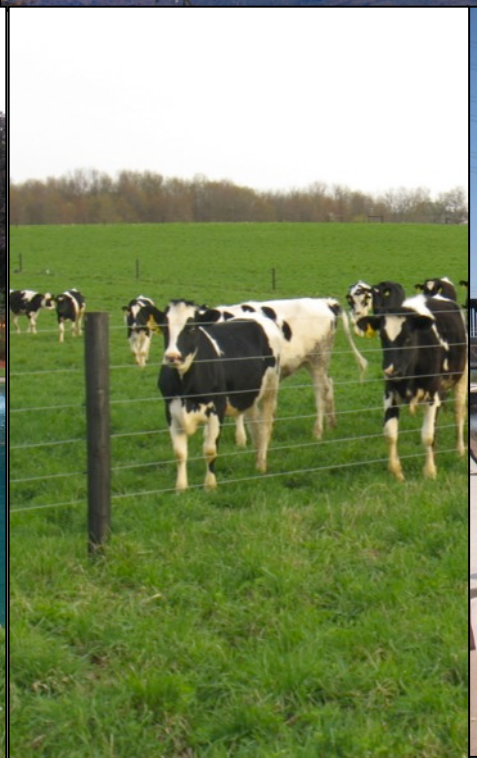
Climate Change

Threats to ecosystem functions & services?

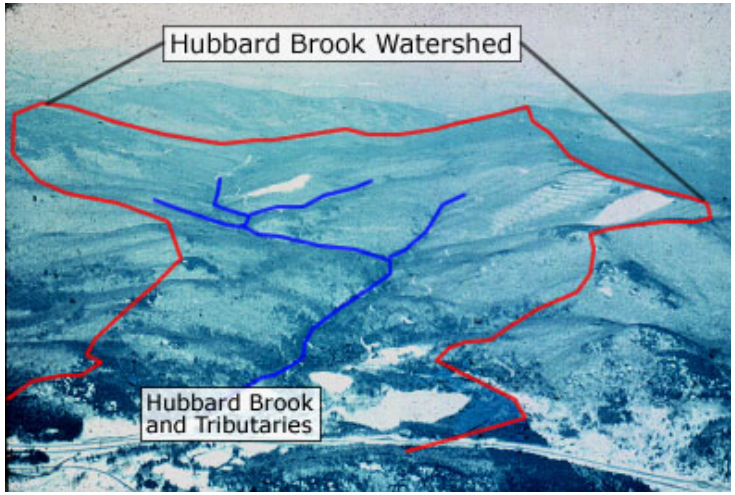


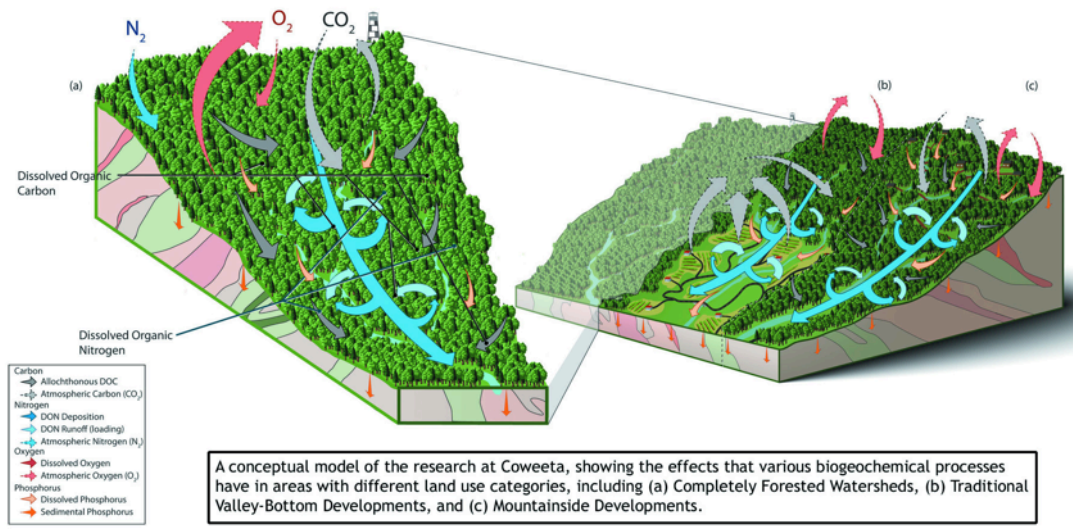



STAY OUT
OF POND
Harmful
Chemicals!


Catchment-Scale Studies & Syntheses

What are the benefits & limitations?





A conceptual model of the research at Coweeta, showing the effects that various biogeochemical processes have in areas with different land use categories, including (a) Completely Forested Watersheds, (b) Traditional Valley-Bottom Developments, and (c) Mountainside Developments.

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Hypothesis:

"Human modifications overwhelm local biophysical and structural heterogeneities, transforming complex natural systems into more homogenous, engineered, and predictable systems"

Basu et al. 2011, Water Resour. Res

LTER Network

Diverse:
-Ecosystem Types
-Research Interests
-Management Intensity

Scope?
Potential Focal Questions/Topics

Test Basu et al. Hypothesis

Management scenario trade-offs

Drastic Hydrologic Change

Alteration of Wetland Hydrology

Climate Change
vs.
Human Infrastructure?

Pick a Process:
C cycling: Productivity/Decomposition
N cycling: N-transformation processes
P cycling: Adsorption/Desorption; Uptake/Mineralization; Transport

Others?

Our Goals for Today

- Solicit input & participation from:
  - Diverse LTER sites & Research Interests
  - Hydrologists
  - Social Scientists
- Identify focal research questions & themes to guide synthesis work