LS 2X03 - Lecture 12 – Wetlands

1. What are Wetlands?
2. Wetlands and Human Well-Being
3. The Ottawa National Wildlife Refuge and Human Health
4. Causes of Wetland Loss
5. Status and the Future

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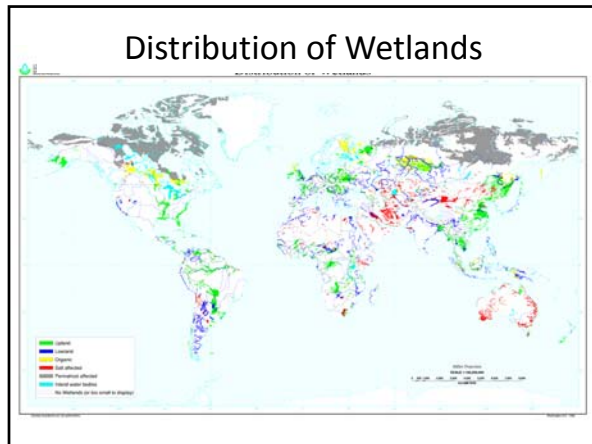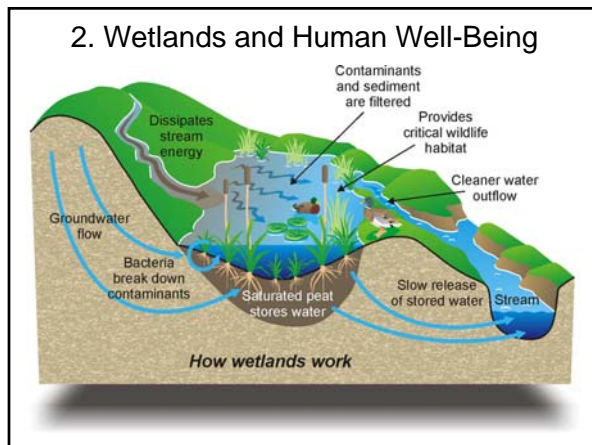_____

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Key Concepts

- Wetlands and their characteristics
- Services provided by Wetlands: provisioning, cultural, regulating, supporting
- The Ottawa National Wildlife Refuge and Human Health Study: context, main findings and conclusions
- Causes of loss and degradation of wetlands
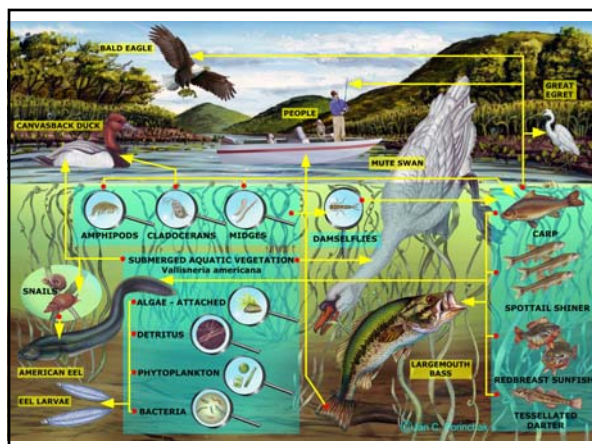- Status of wetlands and stresses; options for improvements

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1. What are Wetlands?

- Areas:

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Distribution of Wetlands

2. Wetlands and Human Well-Being

How wetlands work
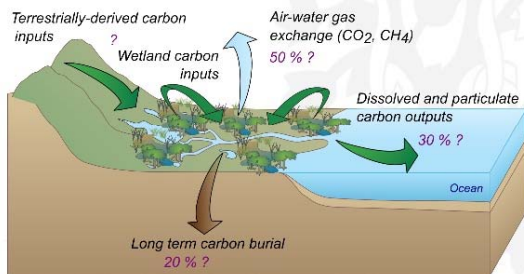
Wetlands as a Source of Fuel

Wetland medicines *WWD 2008*

Aquatic carbon transport
What is the role of wetlands?

Global Wetland area between 6 and 11 % of continents (Downing 2009)

Terrestrially-derived carbon inputs ?

Wetland carbon inputs

Air-water gas exchange (CO_2, CH_4) 50 % ?

Dissolved and particulate carbon outputs 30 % ?
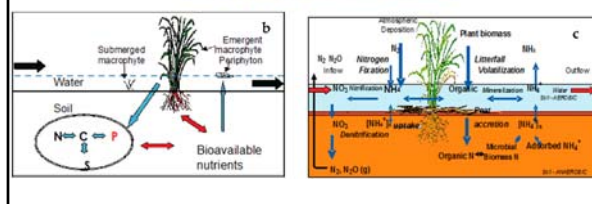
Ocean

Long term carbon burial 20 % ?

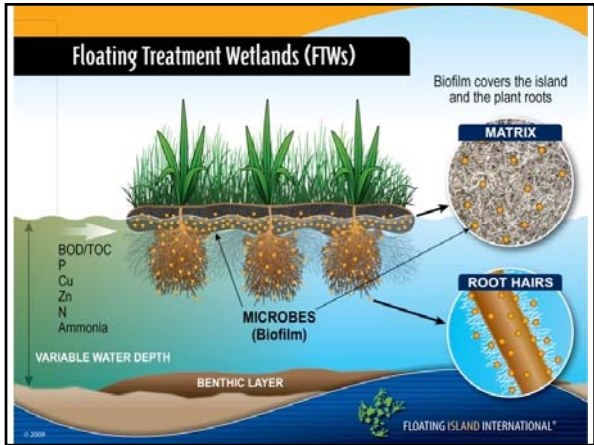Edward P. Morris   edward.morris@csic.es   Donana Air-water carbon dioxide fluxes   8 / 20

Nutrient Cycling

Floating Treatment Wetlands (FTWs)

Ellis Creek Water Treatment Facility in Petaluma, California

3. The Ottawa National Wildlife Refuge and Human Health

LAKE SUPERIOR

LAKE ONTARIO

LAKE HURON

LAKE MICHIGAN

LAKE ERIE

The E-Coli Bacterium

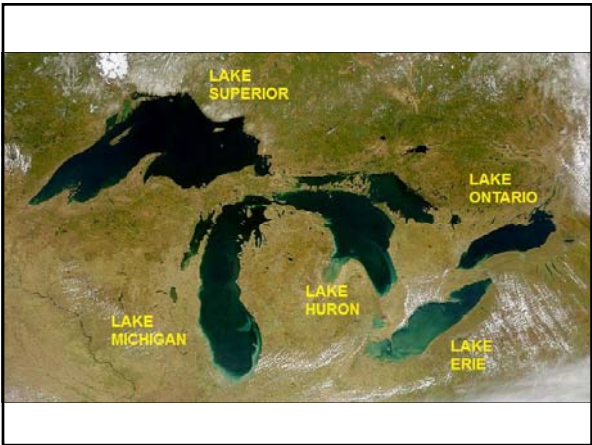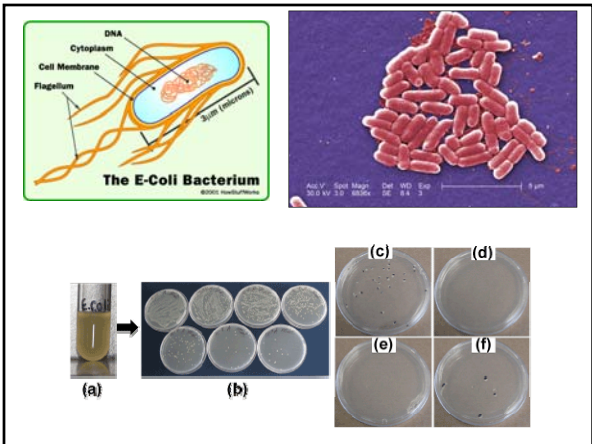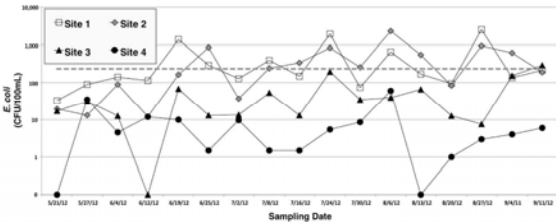Canadian and U.S. Areas of Concern in the Great Lakes Basin

Summary of Measurements Across all Sampling Sites at Ottawa National Wildlife Refuge and the Lake Erie Beach -
May - September 2012 (Median Values)

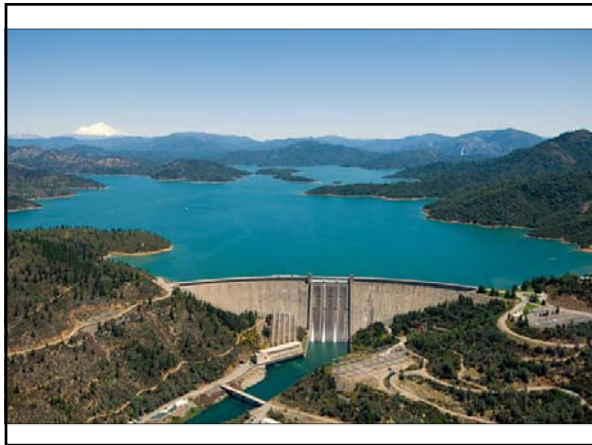|	Site 1	Site 2	Site3	Site 4
E. coli (CFU/100 mL)	150	117	32	5
Total P (micrograms/L)	529	208	57	30
Total N (micrograms/L)	44	42	8	16

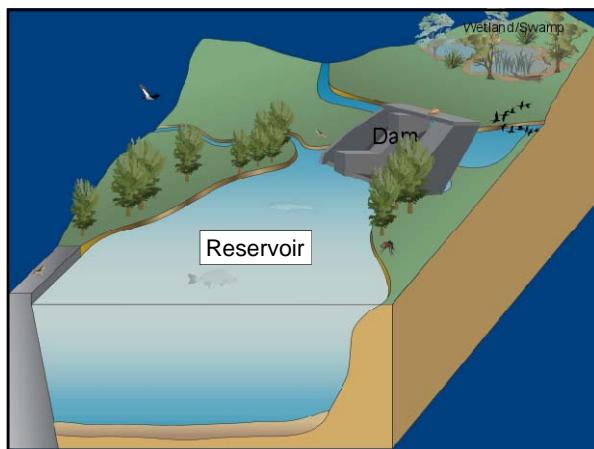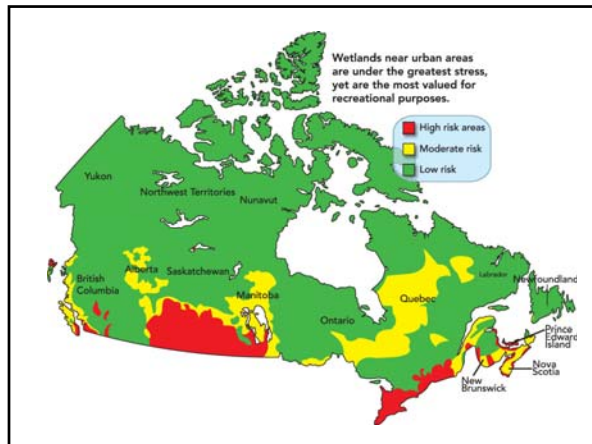Temporal variation of *E. coli* concentrations from the 4 study sites at ONWR - May to September 2012

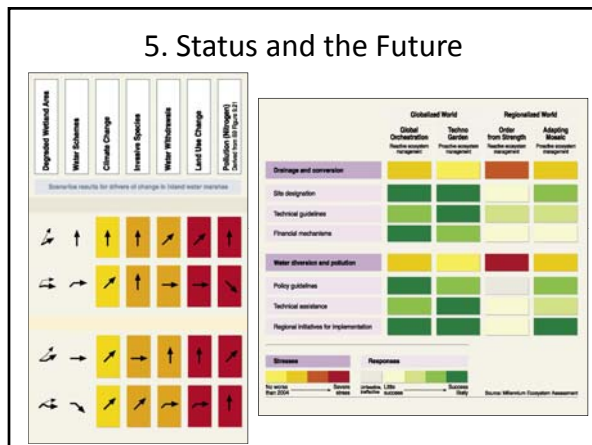*dashed line:* U.S. EPA single sample maximum (235 CFU/100 mL)

4. Causes of Wetland Loss/Degradation

Wetlands near urban areas are under the greatest stress, yet are the most valued for recreational purposes.

High risk areas
Moderate risk
Low risk

5. Status and the Future

Some Options

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• Increased emphasis on the use of the natural environment and nonstructural measures for flood control

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• Investments in agricultural science and technology

Conclusion

- Wetlands are areas where the land is saturated by water for at least a few days per year

- They provide multiple services that contribute to human well-being

- They play a critical role in improving water quality around the Great Lakes

- Wetlands are at risk globally, and particularly around the Great Lakes

End of Lecture Question

1. Wetlands are now artificially constructed to filter aquatic pollutants, e.g. wastewater

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TO DO!

1. For next Lecture: read Article 13

2. Tutorials this week: Group Discussion (Bring Group Discussion Sheet) + Preparation for Group Presentations