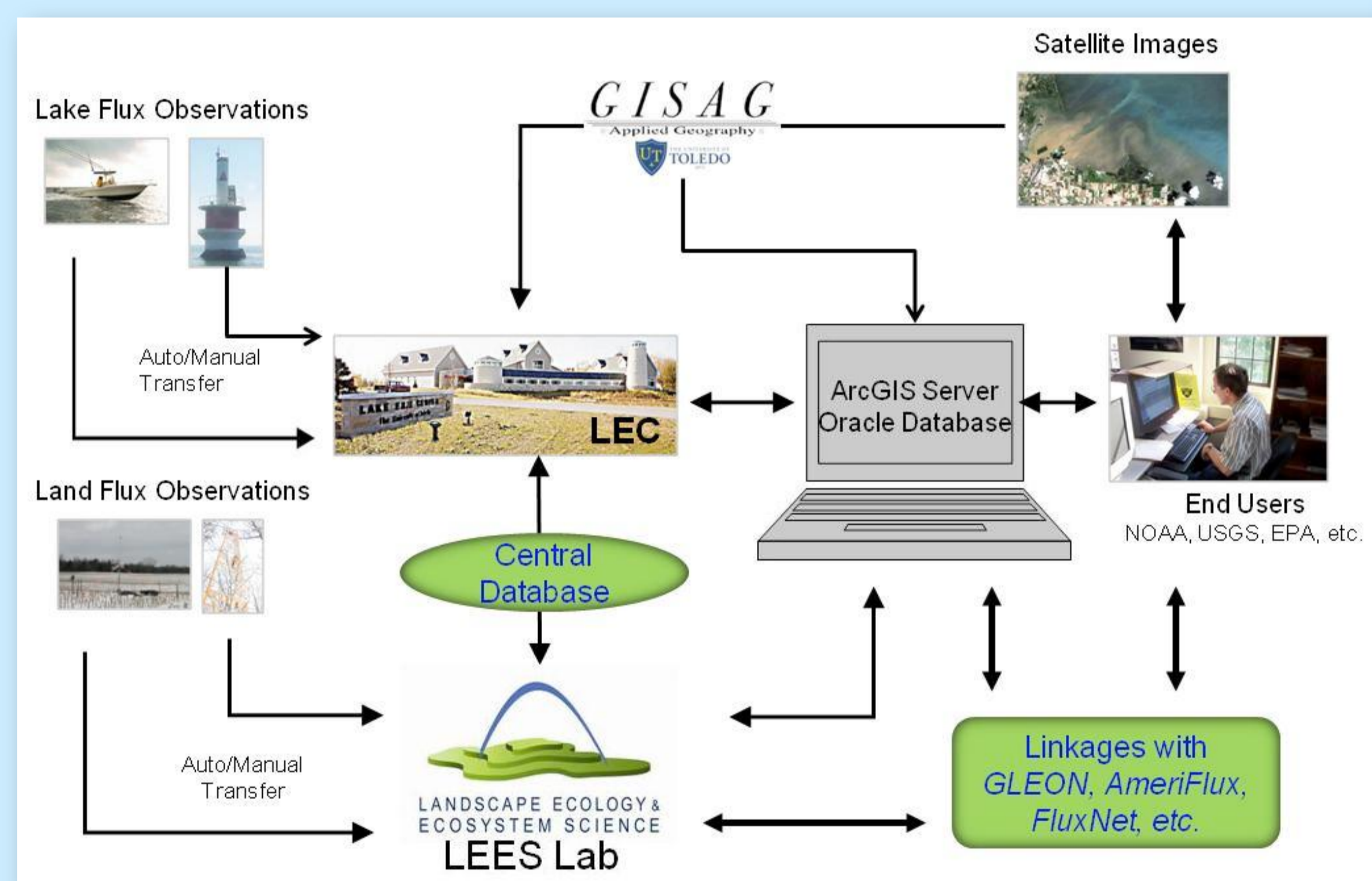


Environmental Sensor Network at the Lake Erie Center

Project Overview

The Environmental Sensor Network (ESN) includes six eddy covariance (EC) flux tower monitoring stations to measure fluxes across the Western basin of Lake Erie, including two stations (*PermS1*, *PermS2*) on permanent structures in Lake Erie, a vessel-mounted station on the LEC's research boat (*BoatS*), a station in an agricultural field, a station in a coastal wetland and large tower station in a mixed oak forest known as "Oak Openings". ESN is a contributing member of the Global Lake Ecological Observatory Network (GLEON) and the AmeriFlux Network. Biometric and chamber based measurements of ancillary ecosystem characteristics are conducted at both the site and watershed scales.



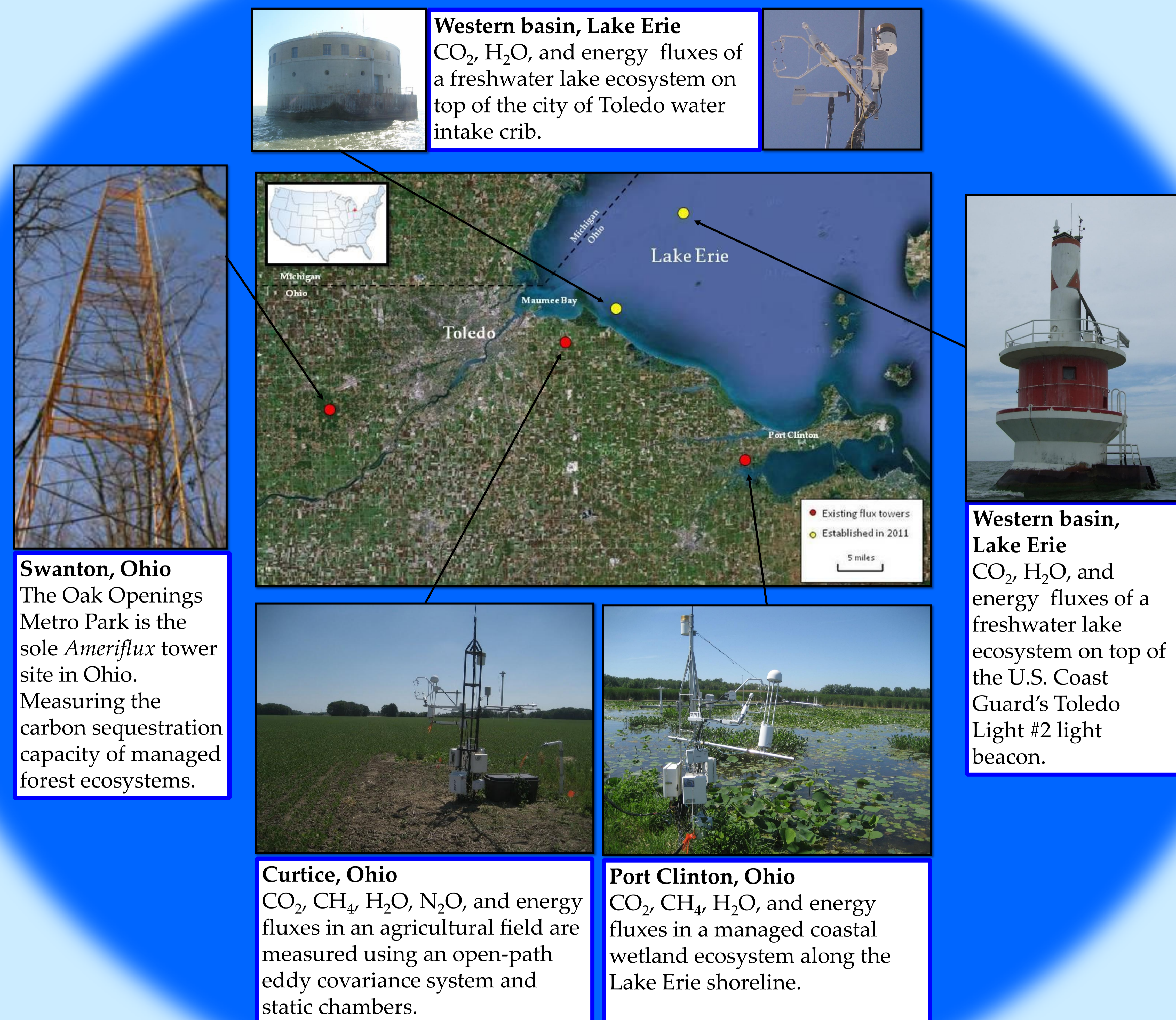
The working framework

The ESN is a real-time platform that focuses on net ecosystem exchange of greenhouse gases (CO_2 , CH_4 , H_2O , and energy) as well as the physical, chemical and biological properties of the western basin of Lake Erie. All data, including those of six flux towers, will be open access to promote education, research, and public awareness.

Acknowledgements

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Western basin, Lake Erie
 CO_2 , H_2O , and energy fluxes of a freshwater lake ecosystem on top of the city of Toledo water intake crib.

Swanton, Ohio
The Oak Openings Metro Park is the sole AmeriFlux tower site in Ohio. Measuring the carbon sequestration capacity of managed forest ecosystems.

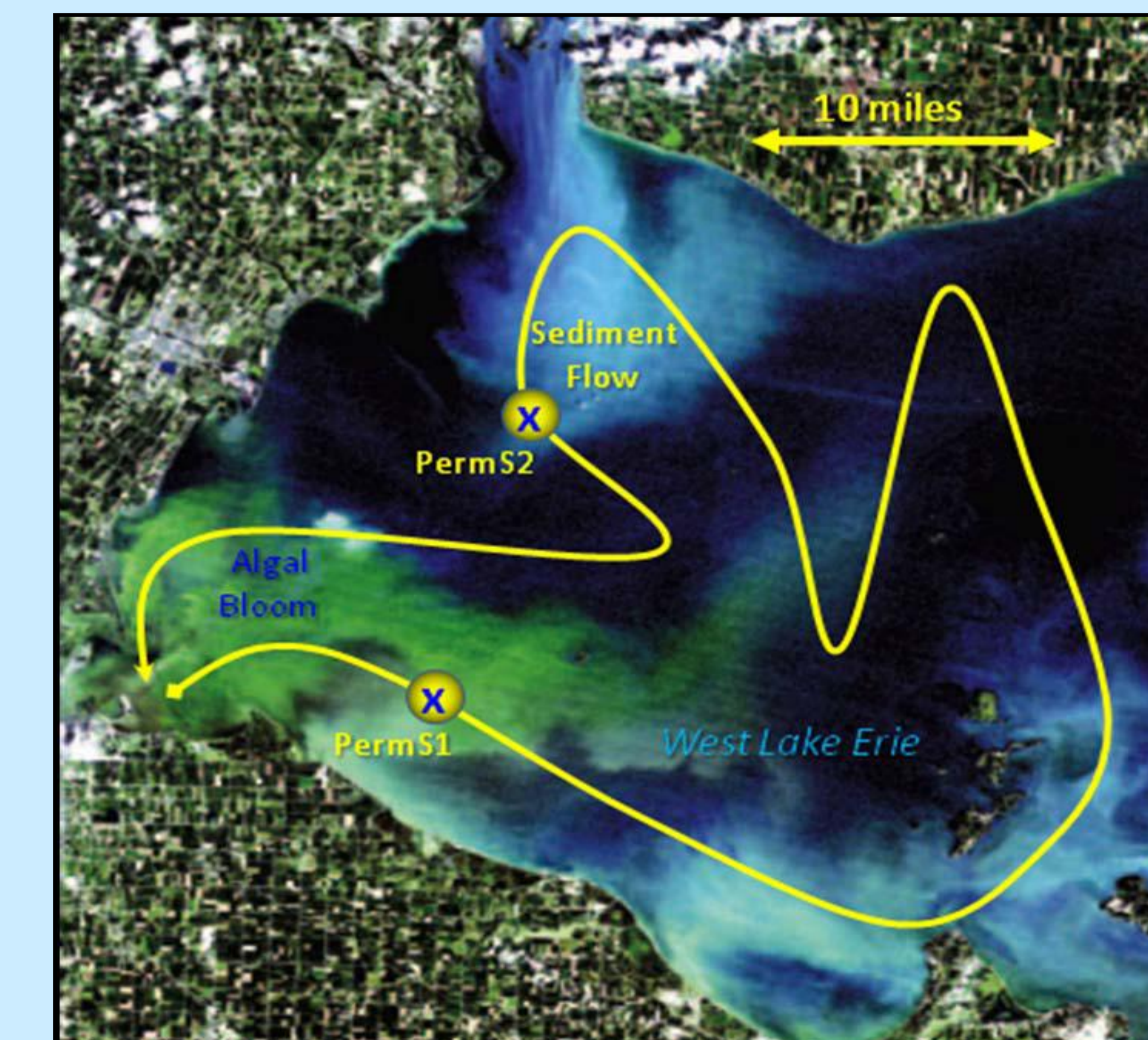
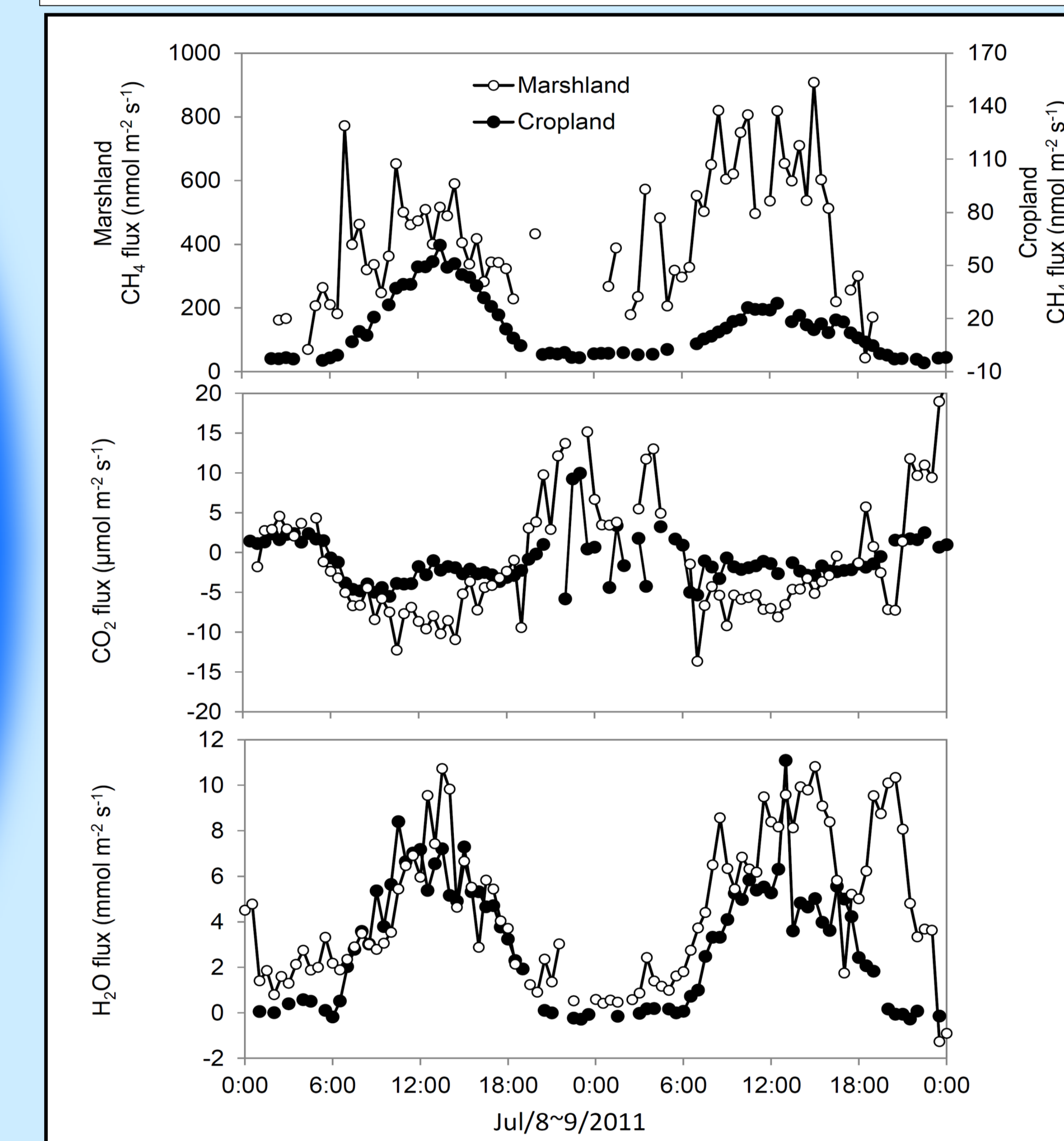
Western basin, Lake Erie
 CO_2 , H_2O , and energy fluxes of a freshwater lake ecosystem on top of the U.S. Coast Guard's Toledo Light #2 light beacon.

Curtice, Ohio
 CO_2 , CH_4 , H_2O , N_2O , and energy fluxes in an agricultural field are measured using an open-path eddy covariance system and static chambers.

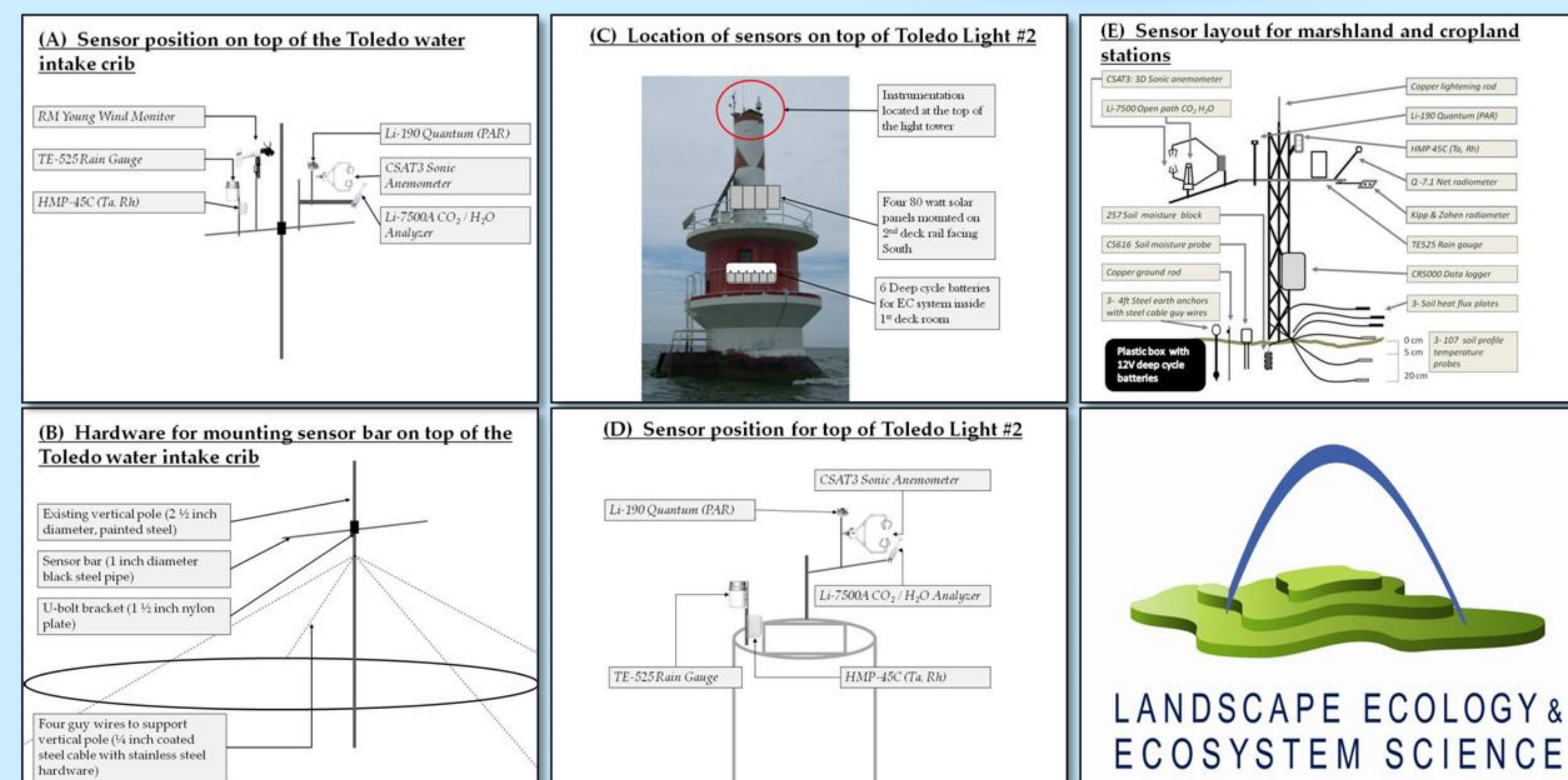
Port Clinton, Ohio
 CO_2 , CH_4 , H_2O , and energy fluxes in a managed coastal wetland ecosystem along the Lake Erie shoreline.

Selected Preliminary Results

Early analysis of the fluxes at the marshland site revealed that the wetland released evident methane especially during daytime at a much higher magnitude than other temperate wetlands. The cropland generally releases methane during the daytime, and uptakes small amounts of methane at night. However, the orders of methane fluxes in the cropland are much smaller than in the marshland.



Proposed route of the vessel-mounted eddy covariance flux tower (*BoatS*) through the algal bloom at the estuarine of the Maumee River and the sedimentary flow south of the Detroit River within the route of the permanent flux towers (*PermS1*, *PermS2*).



The layout

Eddy covariance flux towers associated with the ESN (A) City of Toledo water intake crib (*PermS2*), (B) hardware for the City of Toledo water intake crib (*PermS2*), (C) Toledo Light #2 light beacon (*PermS1*), (D) sensors for the Toledo Light #2 light beacon, (E) the flux towers located in a cropland in Curtice, Ohio and a marshland in Port Clinton, Ohio.

