



Poyang Lake Ecology Study

Program Overview

The UNEP/GEF Siberian Crane Wetland Project is supporting a **long term study of the ecological relationships among plants, water and wintering waterbirds within Poyang Lake National Nature Reserve (PLNR) in Jiangxi Province, China.** Initiated in 1998 by the International Crane Foundation (ICF) and PLNR, this research focuses on the habitat use patterns of representative bird species, such as Siberian Cranes, within the reserve and the factors that influence those patterns. With an ecological understanding it is possible to design conservation programs for the entire lake basin and better implement targeted management strategies within protected areas.

For species that eat the tubers of *Vallisneria*, a genus of submerged aquatic plant, two drivers are important: the accessibility of those tubers during the winter, low water period and the production of tubers as they relate to growing conditions during summer. Winter access to tubers by the birds is determined by water level and tuber location. In summer, plant growth is driven by light penetration through the water column of the dynamic, open water wetlands found throughout the lake. Light penetration, in turn, is driven by factors such as water level, turbidity, and the timing of water level fluctuations during the summer growing season when Poyang Lake, the largest freshwater lake in China, typically reaches its maximum depth and surface area.

Efforts to understand these ecological relationships focus on the collection of field data at PLNR. Observations are made at four study lakes representing a range of physical characteristics and hydrological connections to the greater Poyang Lake. Within each lake monitoring occurs year-round. Data collected include the water elevation of each lake and the two main rivers flowing through the reserve, turbidity within the lakes during the summer growing season, above and below ground biomass and densities of *Vallisneria*, and the location and numbers of wintering migratory birds. In 2004, additional monitoring began within two of the four study lakes. Our goal is to sample more intensively for *Vallisneria* biomass and densities and water depths as they relate to bird use.

A Geographic Information System (GIS) for the Poyang Lake Basin has been developed by the Mountain, River and Lake Information Center (MRL) in Jiangxi Province. This **GIS is being used to develop models that can extrapolate ecological relationships described from PLNR to the Poyang Lake Basin as a whole. Once these models are developed, they will be used to assess potential impacts from projects that alter land-use or hydrology within the Poyang Lake basin.**



Wintering Siberian Cranes and Greater White-fronted Geese at Poyang Lake National Nature Reserve, China.
Photo by Ji Weitao

The UNEP/GEF Siberian Crane Wetland Project (SCWP) is a six-year effort to protect a network of globally important wetlands in Asia that are of critical importance for migratory waterbirds and other wetland biodiversity. The project uses the globally threatened Siberian Crane (*Grus leucogeranus*) as a flagship species, linking activities at 16 key wetlands along the species' western and eastern flyways in Russia, Kazakhstan, Iran and China.



*Researchers sampling tubers at Poyang Lake National Nature Reserve, China.
Photo by Jeb Barzen*

Already this research, together with related studies by others concerning hydrology, land use, and light availability for *Vallisneria*, is helping the Chinese Government understand what the Siberian Crane and related waterbirds need to survive during the winter months at Poyang. Currently, this research is evaluating the implications of developments now being considered within the lake, including a variety of water-control projects in the basin, any of which would drastically alter the hydrology of the system. Additionally, these data are also illustrating previously unsuspected impacts of new aquaculture practices within PLNR.

These research efforts have identified several significant trends within the reserve. Primary among these is the recognition of the role that winter water levels within the reserve play on Siberian Cranes accessing the tubers of *Vallisneria*. Regardless of how many tubers may be present within a lake, preliminary results indicate that if water levels are beyond 50cm, Siberian Cranes have difficulty accessing the tubers and will search out other locations to forage. For the first time, ICF and PLNR are proposing habitat selection models by Siberian Cranes for application to other areas of Poyang Lake and attempting to predict where suitable Siberian Cranes habitat may be. Additionally, these results are assisting Chinese agencies interested in restoring other shallow-water wetlands within the middle reaches of the Yangtze River for use by migratory waterbirds.

Program Highlights

- Since 2003 the SCWP has supported ecological monitoring activities by PLNR staff and the construction of a database that contains over 3,800 individual observations of more than 70 bird species.
- The SCWP has supported training in wetland evaluation and monitoring techniques and basic database design and management for PLNR staff. With the aid of the SCWP, several reserve staff members are also completing two or four-year college degrees.
- In July, 2006 and November, 2007 international conferences were held in Nanchang, China to bring together individuals and organizations interested in studying the Poyang Lake ecosystem. The conferences focused on formalizing research questions looking at natural-human coupled systems. Representatives from over 17 governmental, non-governmental, and university organizations from China, United States, and Europe participated.
- Our monitoring program has provided key data for other organizations interested in testing the impact of sand dredging within the lake basin and modeling light availability to *Vallisneria* across the entirety of the lake.



For more information on the SCWP, visit www.scwp.info or contact the International Crane Foundation, E11376 Shady Lane Rd, Baraboo WI, USA
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