



Great Lakes Science Center

Geospatial Analyses and Technologies

Systems

- PC ARC/INFO GIS software running on a specially equipped desktop PC
- pcTIN terrain modeling and analysis software
- Trimble GPS Pathfinder Community Base Station System (12 channel receiver)
- Two Trimble GeoExplorer hand-held mapping-grade GPS receivers (6 channel receivers)
- Laptop computer with Trimble PFINDER GPS processing software and PC ARC/INFO GIS software
- Rockwell International Precision Lightweight GPS Receiver (PLGR)
- Laser transit surveying system
- Mirror stereoscope for airphoto interpretation

Operations

- PC ARC/INFO and pcTIN provide an excellent way to manage, manipulate, and analyze ecological, physical, and two- and three-dimensional spatial data collected from a variety of physically and remotely-sensed sources.
- The GPS base station data collected at the Center are used to post process and differentially correct positional data collected from the GeoExplorers and other GPS receivers.
- Attribute data relative to the study/sampling site can be added, on site, to the GeoExplorer file containing GPS positional data. The file can then be downloaded directly into the GPS processing software and ultimately incorporated into the GIS.
- The PLGR provides real-time highly accurate positional information for navigating to and from study sites.
- Color infrared and black and white aerial photos are analyzed by photointerpretation for vegetation types and land features using a mirror stereoscope.

Applications

- As part of a multi-agency Great Lakes coastal wetland restoration project, aerial photographs of Metzger Marsh, OH, dating from 1940-present were analyzed for vegetation types and boundaries, digitized into ARC/INFO, geo-referenced, and manipulated to create digital coverages.
- GPS systems were used to geo-reference data from side-scan sonar and remotely-operated vehicle mapping studies of historic lake trout spawning habitat and

spread of zebra mussels onto soft substrates in the Great Lakes Basin. These systems allowed for efficient creation of GIS-based analysis and classification maps.

- Sampling sites for zebra mussel studies in Lakes Michigan, Huron, and Erie, the Huron River, and for numerous other studies throughout the Great Lakes Basin were located with positional data collected by the GPS systems.
- GPS positional data and elevational data calculated by laser transit surveying equipment were downloaded to PFINDER software, differentially corrected with GLSC base station data, exported to ARC/INFO, and used to create topographical maps of USGS/USFWS study sites in the Ottawa National Wildlife Refuge.
- The PLGR was used in relocating study sites along multiple transects on Green Bay, Lake Michigan, with extreme accuracy.
- GPS systems were used to determine GIS control points to an accuracy of 2-5 m at Metzger Marsh and other study sites.