

# Multibeam bathymetry and sidescan-sonar survey of the Duluth-Superior Harbor and nearshore.

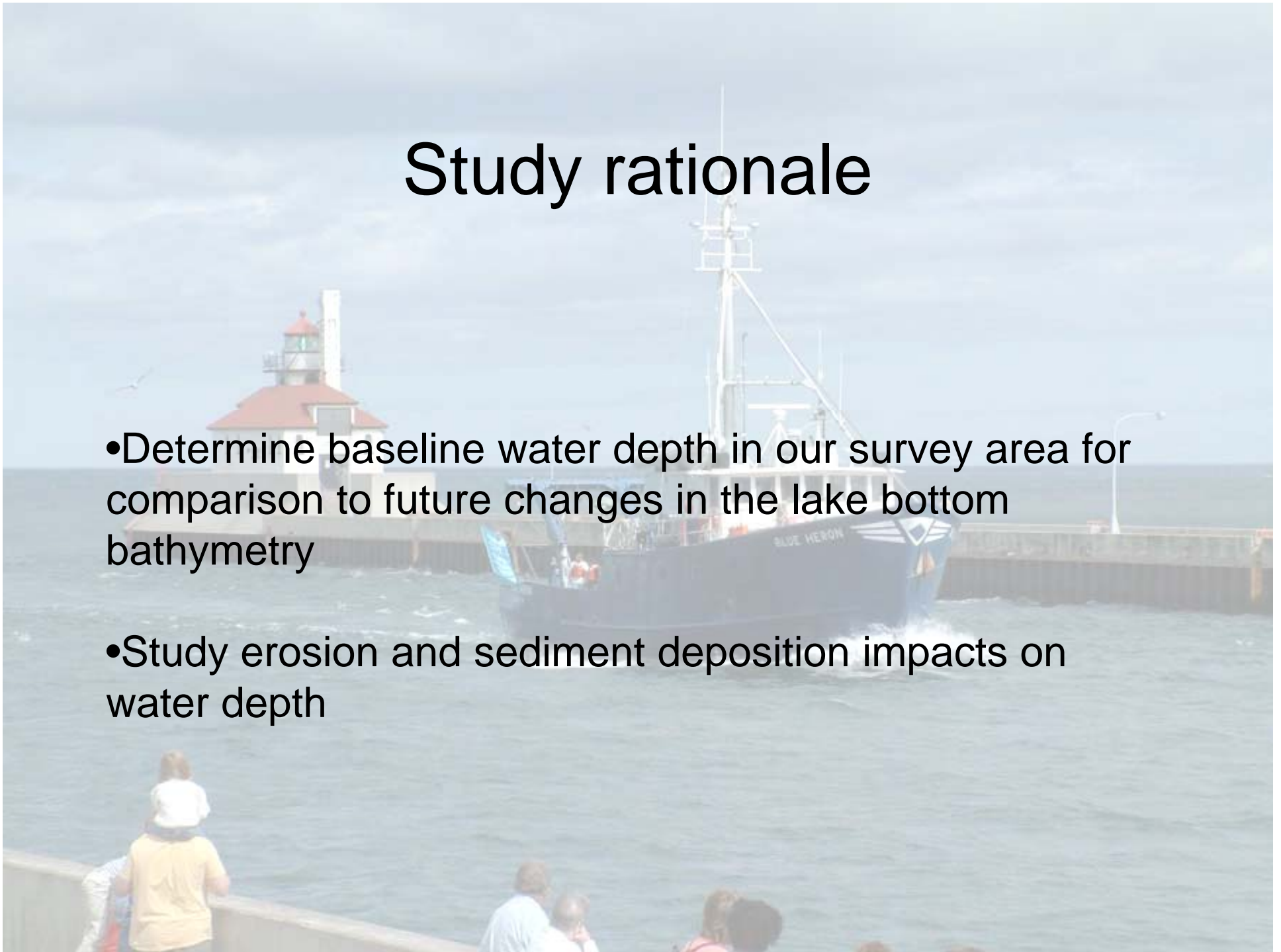
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Large Lakes Observatory  
University of Minnesota Duluth



# Study rationale

- Determine baseline water depth in our survey area for comparison to future changes in the lake bottom bathymetry
- Study erosion and sediment deposition impacts on water depth



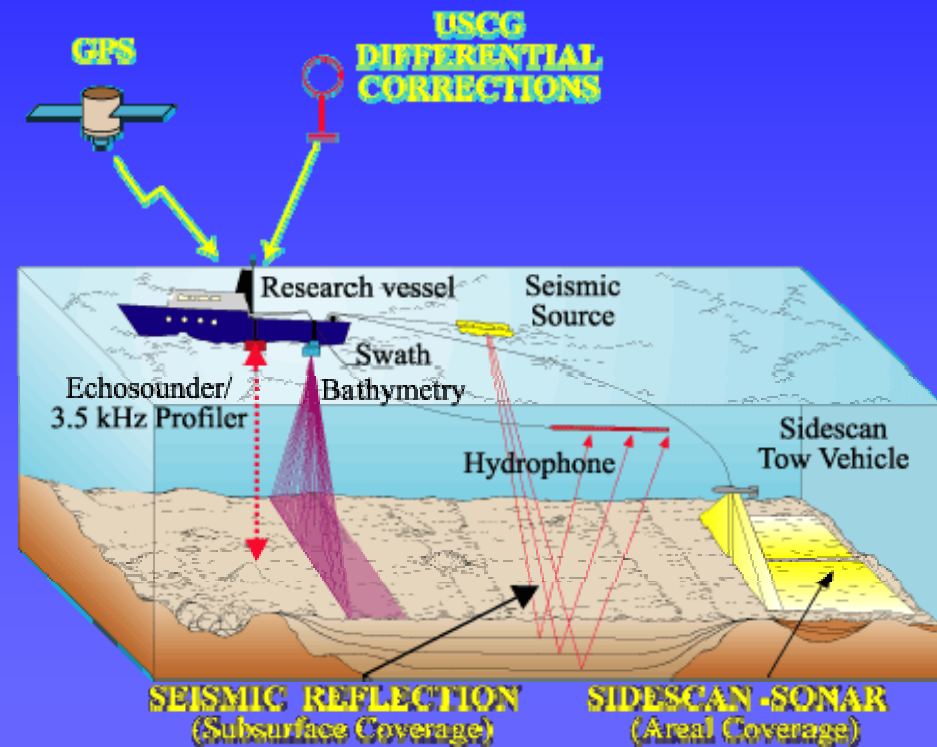
# Sea-floor mapping tools

## Surficial & Sub-bottom Systems

**Sidescan-sonar**

**Swath Bathymetry**

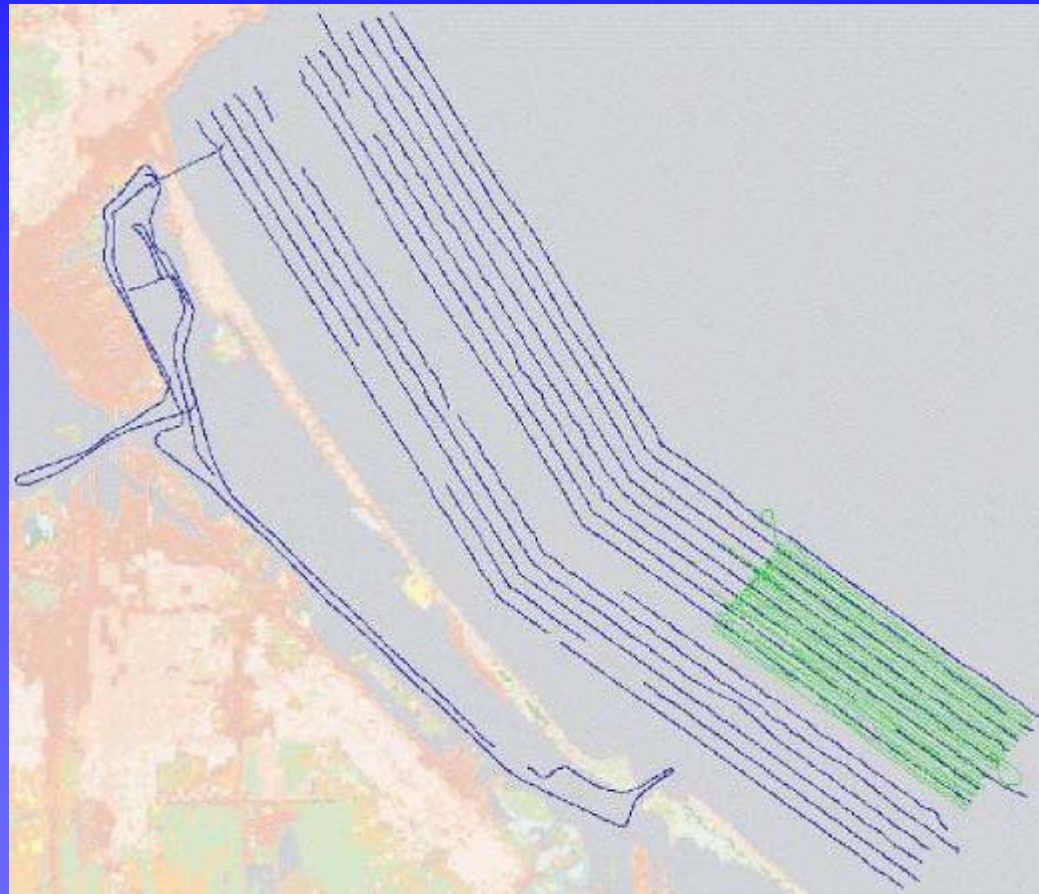
**Seismic Reflection**



# Multibeam and CHIRP side scan sonars

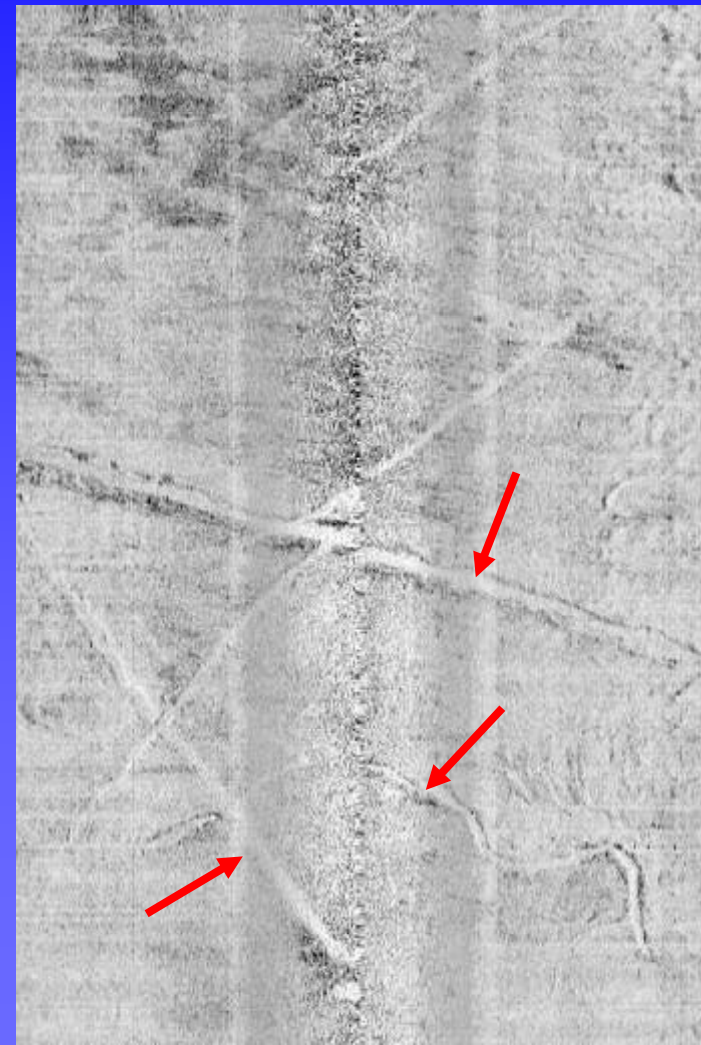


## Sidescan and multibeam tracklines for the 2006 survey

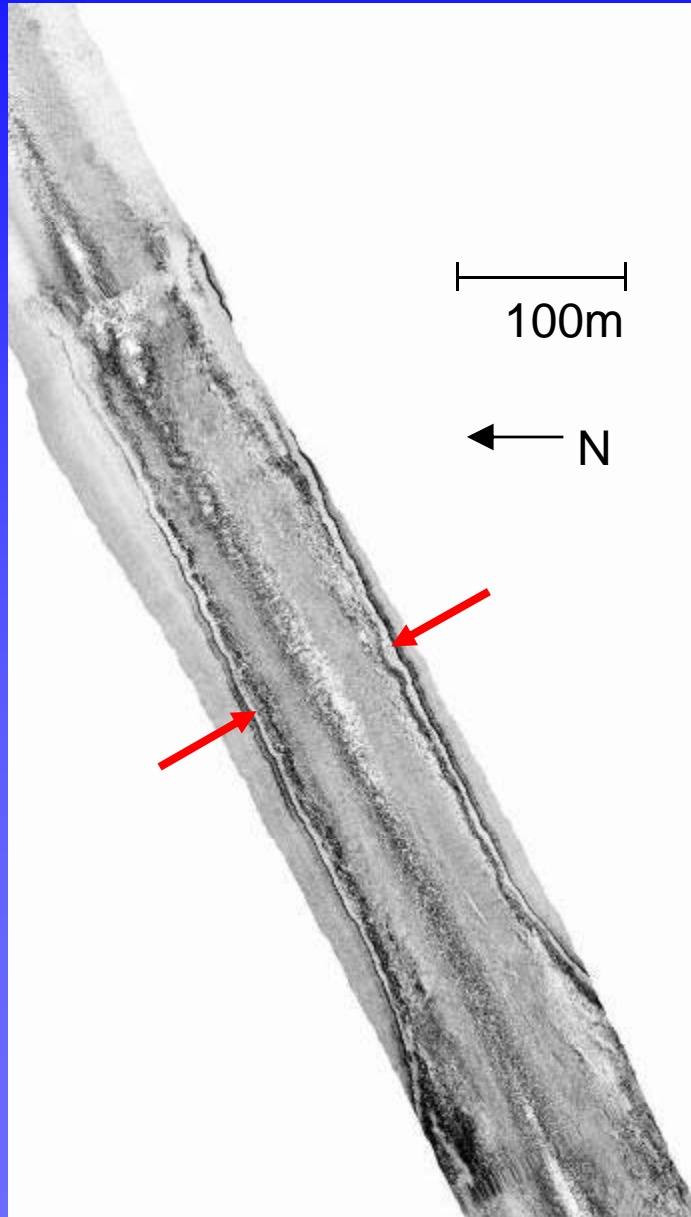


— sidescan survey lines  
— multibeam survey lines

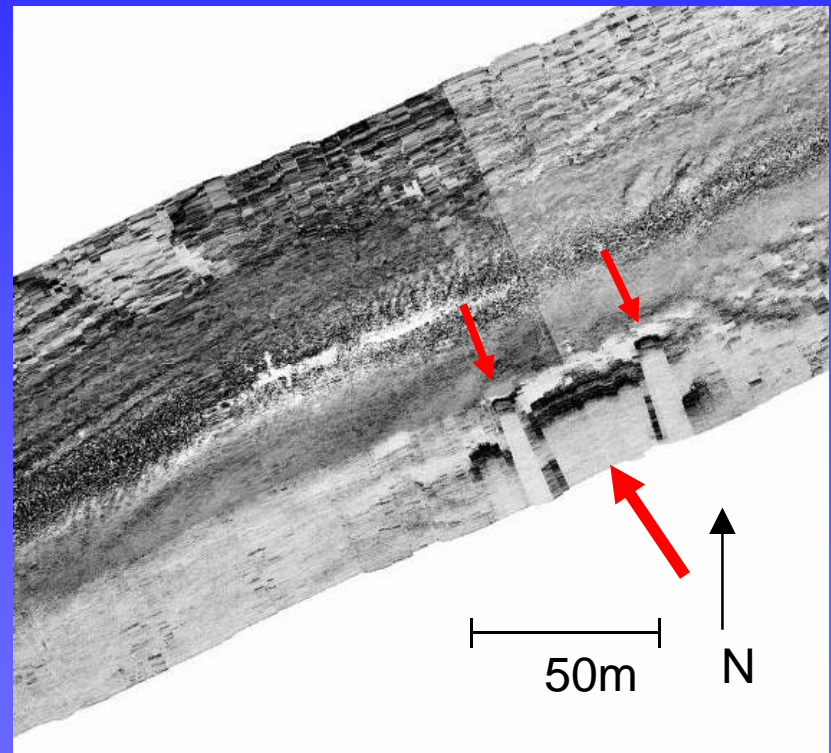
# Sidescan images, anchor drag marks



Sidescan image, Duluth Entry piers



Sidescan image, High Bridge footings



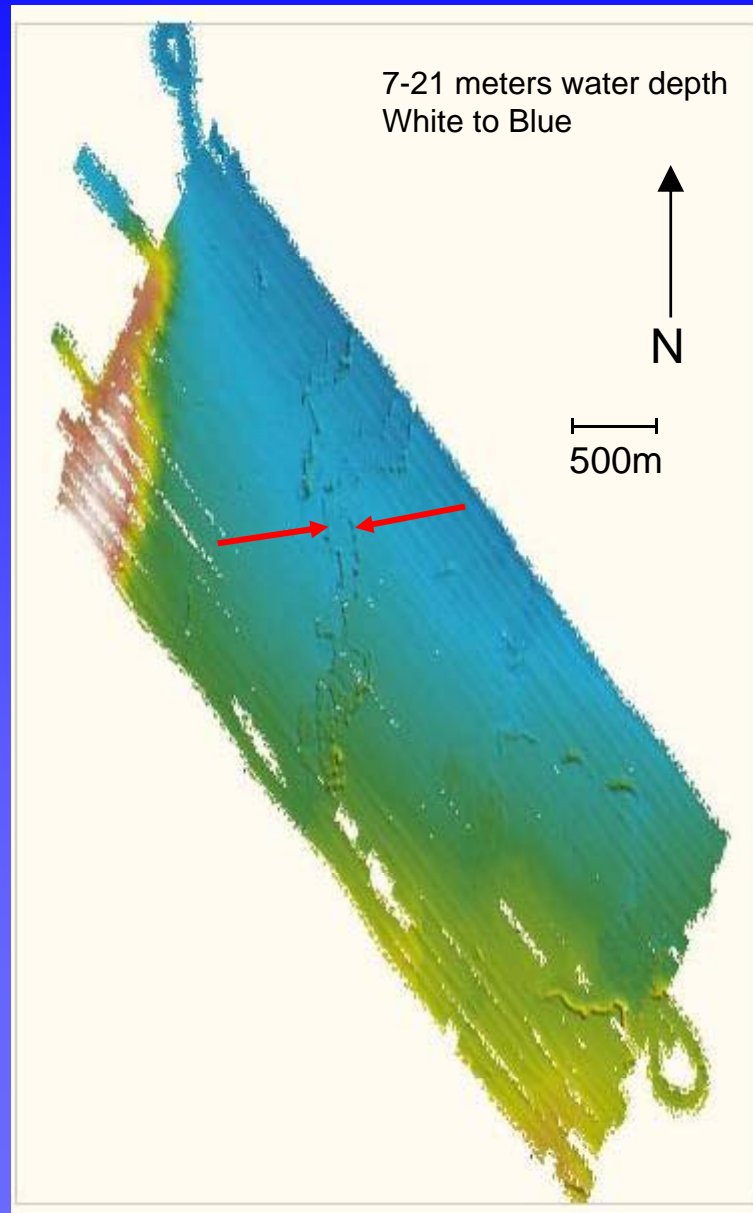
## Sidescan and multibeam tracklines for the 2006 survey



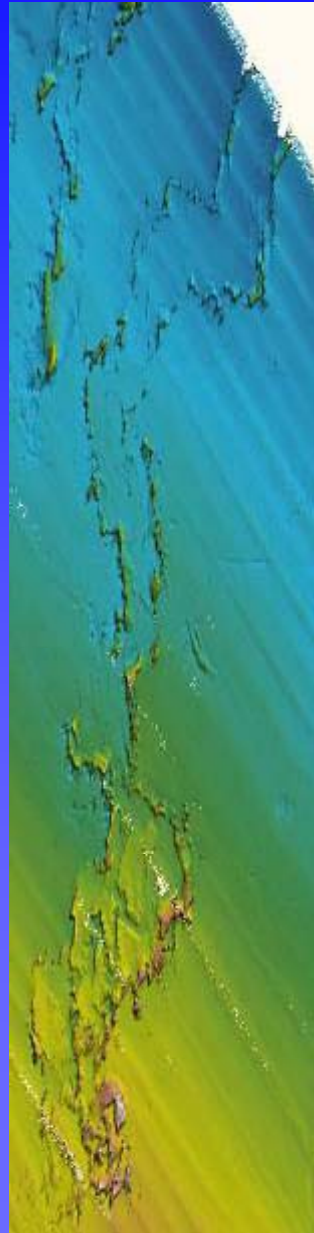
— sidescan survey lines  
— multibeam survey lines



# Multibeam bathymetry



# Multibeam bathymetry, Nemadji River



13-20  
meters  
water depth  
White to  
Blue

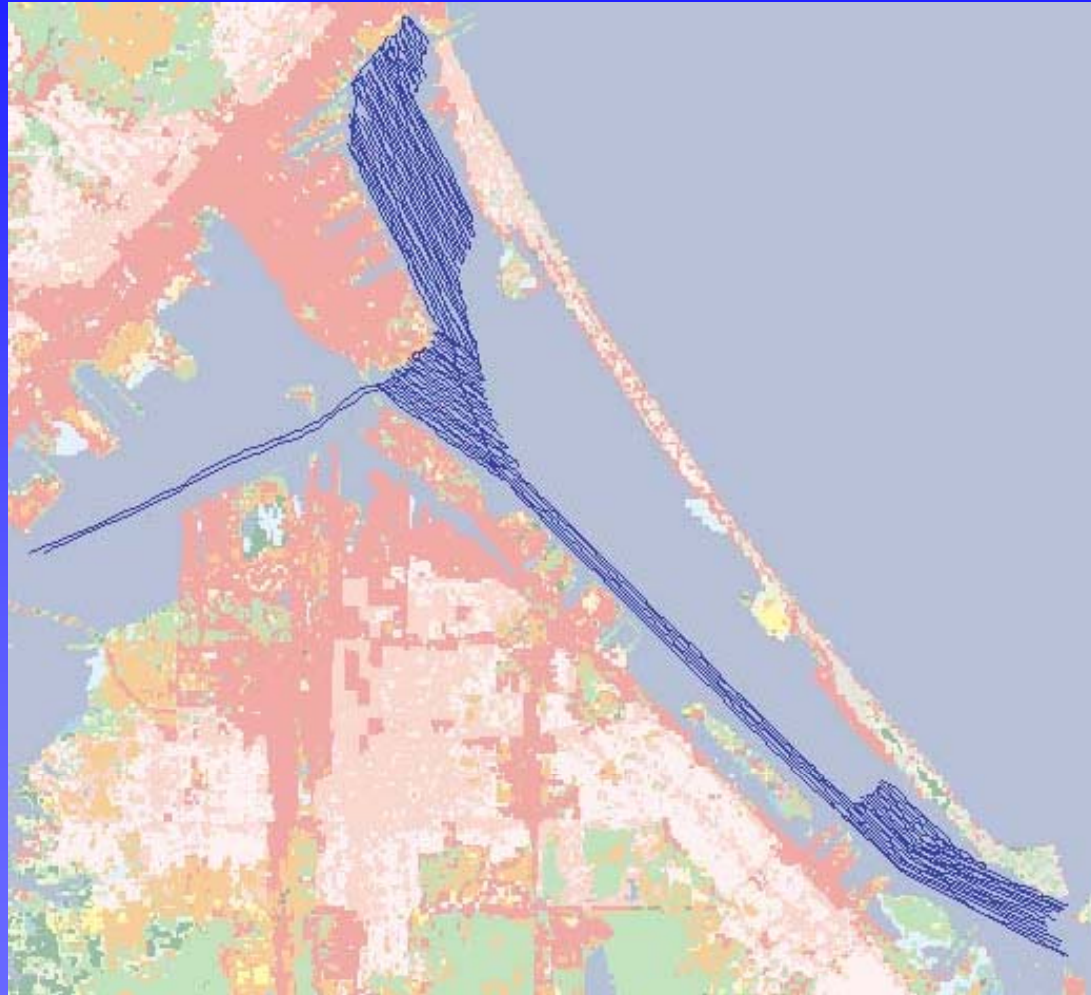


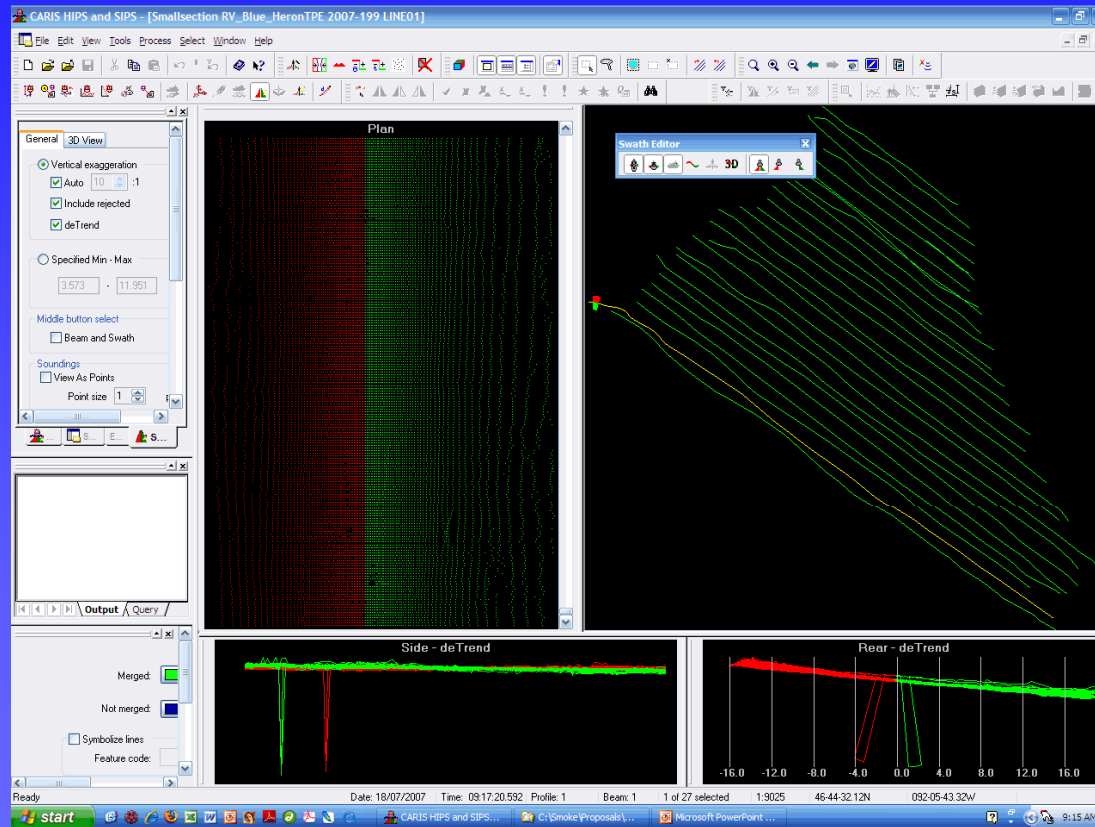
N



200 m

# Multibeam tracklines for the 2007 survey





Currently  
processing  
harbor  
multibeam data

# Taconite Harbor

An example of 3-D visualization of multibeam data

