

HABITAT TASK GROUP EXECUTIVE SUMMARY REPORT MARCH 2011



Introduction - The following provides a brief encapsulation of information presented in the annual report of the Lake Erie Committee (LEC) Habitat Task Group (HTG). The complete report is available from the GLFC's Lake Erie Committee Habitat Task Group website at <http://www.glfcc.org/lakecom/lec/HTG.htm>, or upon request from an LEC, Standing Technical Committee (STC), or HTG representative.

Five charges were addressed by the HTG during 2010-2011: (1) Document habitat related projects. Identify and prioritize relevant projects to take advantage of funding opportunities; (2) Support Lake Erie GIS development and deployment; (3) Assist the Coldwater Task Group with the lake trout habitat assessment initiative; (4) With the assistance of the Walleye Task Group, identify metrics related to walleye habitat for the purpose of re-examining the extent of suitable adult walleye habitat in Lake Erie and (5) Develop strategic research direction for Environmental Objectives.

Habitat Project Documentation - Information pertaining to habitat related initiatives taking place throughout the Lake Erie and Lake St. Clair basins is compiled and made available as an interactive "clickable map" which allows for geographic sorting of projects (by watershed or lake basin). You can access the spatial inventory of projects at: www.glfcc.org/lakecom/lec/spatial_inventory/inventory_index.htm

Details of some notable projects can be found in the HTG Full Annual Report. The next steps for this charge include integration of project information into a query-able database.

Lake Erie GIS - The Great Lakes GIS, including the Lake Erie GIS (LEGIS), was created in order to facilitate the sharing of data and holistic management of the Great Lakes basin as described in the Joint Strategic Plan for Management of Great Lakes Fisheries. The project includes map-delineated spatial units and associated habitat and biological attribute data for terrestrial, tributary rivers, nearshore, and offshore ecosystems.



In 2011-2012, the LEGIS plans to develop an online data viewer and data download portal. Current maps will be updated, including substrate and habitat maps, harvest and research survey summary maps. Lastly, cooperative ecosystem and food web modeling work initiated by scientists at University of Michigan, NOAA GLERL, and several other regional resource agencies and universities will be incorporated. The HTG encourages all interested individuals and groups to visit the GLGIS website (<http://www.glfcc.org/glgis>) and consider how you might be able to use or contribute to this inventory.

Identifying Potential Lake Trout Spawning Habitat

- As part of its commitment to work with the Cold Water Task Group, the HTG continues to make progress toward identifying potential lake trout spawning habitat in Lake Erie. Actions on this charge in 2010 focused on data validation, the completion of north shore substrate interpretation, the standardization of substrate and habitat classifications, the development of a method for

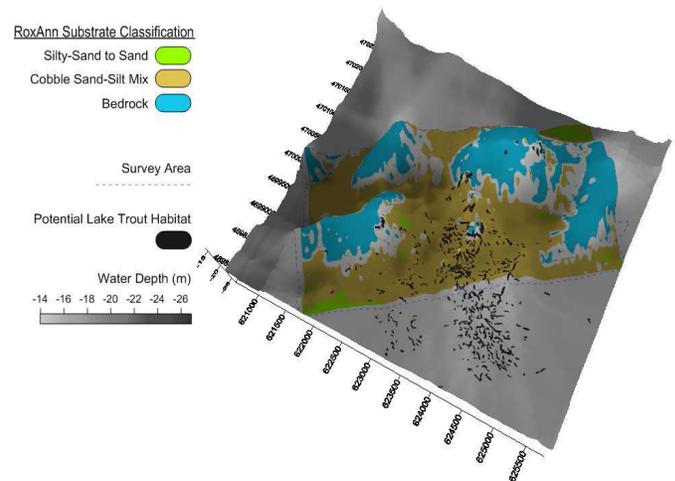


Figure 1. Where coverages overlap at Brocton Shoal and Clear Creek/Long Point Ridge, there was correspondence between the broad category bottom types classified using the coarser scale RoxAnn and desirable substrate identified at finer scales associated with Sidescan sonar surveys. At Brocton Shoal, NY (map, above), over 98% of potential habitat (Sidescan) was found over the cobble sand-silt mix classification (RoxAnn).

comparing sites, and, lastly, the comparing of methodologies (Figure 1).

Although the coarser scale data collection and substrate interpretations are complete and have allowed us to determine areas of potential spawning substrate within each study site, the higher resolution underwater video imagery is also necessary. J. Morse (Oberlin College) has developed an underwater video database to further determine the suitability of these potential spawning substrates at each site. Previous work by Edsall in 1987 shows Brocton Shoal (pre-dreissenid invasion) as having clean, cobble substrate; however a more recent visit (2009) shows that the physical structure of the mussels and associated sedimentation significantly reduce and/or obstruct interstitial spaces that lake trout eggs require for successful development (Figure 2). The identification of potential sites based solely on the proportion of cobble, slope, and water depth may be meaningless in light of yet to be quantified impacts of habitat fouling by mussels, algae, and/or silt.



Figure 2. Degree of cover by dreissenid mussels at historic Lake trout spawning area (Brocton Shoal). Left image is from 1987 (Edsall) and right image is current (2009).

Findings from the more high resolution surveys may help to explain why few lake trout are captured at historic deepwater spawning areas. Locations that may have once been suitable for successful spawning have been altered in recent years. Results from recent gill net surveys conducted by PADEP show that lake trout are utilizing shallow, nearshore spawning locations. If these substrates are indeed shown to be used by lake trout as spawning habitat, this may prompt a re-consideration of nearshore, shallow water, highly fractured bedrock areas in other parts of the lake as potential spawning habitat for lake trout (e.g. Tecumseh Reef on the north shore). Even if used by lake trout, their appropriateness as habitat for successful reproduction may be limiting if the higher energy of these areas negatively impact incubation, hatching and /or larval dispersal, or if local currents do not provide connectivity to appropriate nursery habitat.

Identify metrics related to walleye habitat - The fishery quota for Lake Erie walleye is currently allocated based on a sharing formula (% surface area) that defines walleye habitat as nearshore water ($\leq 13\text{m}$ deep) in Michigan, Ohio and Ontario (Management Units 1-3; Figure 2).

With the assistance of the Walleye Task Group and lead by researchers at the University of Windsor, we utilized a logistic regression approach (Pandit et al.) to establish the relationships between a variety of abiotic conditions and the probability of occurrence of walleye (presence / absence) from a set of fishery and environmental variable linked datasets (Ontario Partnership Index Gillnet). This species-habitat model for adult walleye uses environmental variables that were not only deemed appropriate for walleye but also for which datasets currently exist and provide somewhat broad-scale (location and time) coverage, including temperature, dissolved oxygen, and light attenuation (Secchi depth). Consistent with the literature, the probability of



Figure 2. Present quota sharing allocation ($\leq 13\text{m}$; light blue) by jurisdiction (red).

encountering walleye increased in shallower, warmer and more turbid waters. Continuous, rasterized (interpolated) maps for each environmental variable for the Ontario waters of the east and west basins were generated. A walleye suitability index (0 to 1) was calculated for each cell (50 m) using the species-habitat model and the total area of weighted walleye habitat for each region was derived. In general, the west basin had more suitable habitat than the east basin. There was less

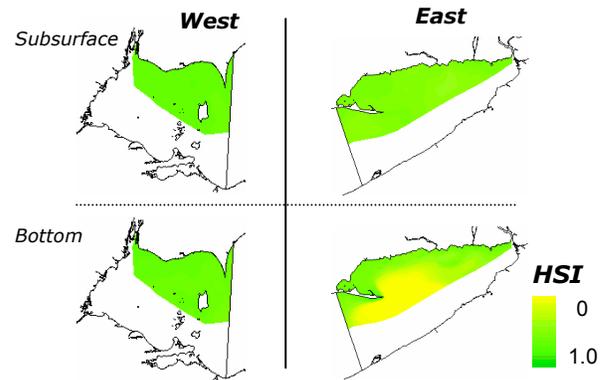


Figure 3. Habitat Suitability Index (HSI) maps derived from the species-habitat model for adult Lake Erie walleye at the subsurface and the bottom in Ontario waters of the West and East basins. Maps represent the average HSI over three years (2006-2008), ranging from 0 (unsuitable) to 1 (suitable).

of habitat in epibenthic waters compared to subsurface waters in the east, but there was little difference in the west (Figure 3).

To date, a lakewide analysis, including examination of seasonal and inter-annual dynamics that may result in changes in the amount of habitat by jurisdiction, is difficult without the availability of a comprehensive database of the necessary abiotic variables. Over the next year, we will work towards collating various databases in order to make them more readily-available for such use.

Strategic research direction for Lake Erie's Environmental Objectives (EOs) - The EO's for Lake Erie describe the ecological conditions necessary for realizing the lake's Fish Community Goals and Objectives (FCGOs, Ryan et al. 2003).

As part of a strategic approach to habitat management, the HTG is proposing to summarize the current state, trends, and potential threats for each of the Environmental Objectives in a White Paper in order to better understand the types of research questions and answers that will be required by the Lake Erie Committee to achieve the FCGOs. We will utilize a scenario process designed to systematically identify and address data gaps, lack of knowledge, and lack of understanding by evaluating current and potential future threats and trends for each of the Environmental Objectives, and how those threats and trends may impact our ability to achieve the FCGOs.

The EO document can be found at: <http://www.glfco.org/lakecom/lec/lehome.php>