Summary of key findings for the Spring 2022 Lake Scugog nearshore spawning habitat survey, to support the Fish Offsetting Plan for the Lake Scugog Enhancement Project.

Kawartha Conservation, August 2022

Introduction

As per the draft Fish Offsetting Plan for the Lake Scugog Enhancement Project, a minimum of 400m^2 of nearshore shoal fish spawning habitat is proposed to be rehabilitated. The primary goal of the rehabilitation efforts is to enhance the quality of nearshore fish habitat (Walleye being the focal species) by increasing the surface area of interstitial spaces.

To help prioritize rehabilitation locations (e.g., areas in which cobble/gravel will be placed on the lakebed) field surveys were undertaken by Kawartha Conservation in April and May 2022 to characterize the primary attributes of the Lake Scugog littoral areas specific to fish habitat.

Sampling locations were chosen by targeting shoreline communities adjacent to mapped (provided by Ministry of Northern Development, Mines, Natural Resources and Forestry) nearshore shoal spawning areas with social media advertising. The property and its nearshore area were sampled if the landowner responded to our 'advertisement' and approved access.

Methods

Data collected at the property level included: length of shoreline (measuring wheel), slope of shoreline (visual: gentle, moderate, steep), construction access constraints, distance from road to shoreline (measuring wheel), water levels (Parks Canada website), and site sketch.

Data along the nearshore area was collected by setting up one transect (measuring tape) perpendicular to shore extending into the lake at the midpoint of narrow waterfronts (most often) or multiple transects along wider waterfronts (rarely). The measuring tape was zero'd at 1-2m above the water's edge and extending offshore until safe wadeable depth, typically 1.0m. At each 0.5m interval along the transect the following was recorded visually with the aid of a glass-bottom bucket:

- water depth: mm (metre stick);
- dominant substrate: boulder (>250mm), cobble (65-250mm), coarse gravel (16-64), fine gravel (2-16mm), sand (0.10 – gritty), silt (0.05 – floury), or clay (0.01 – sticky);
- subdominant substrate (boulder, cobble, coarse gravel, fine gravel, sand, silt, or clay);
- interstitial spaces: high (mostly crevices), moderate (some crevices), or none (no crevices); and,
- aquatic plants (dense, moderate, sparse, or none).

At each 0.5m interval along the transect from the water's edge to 0.5m depth, the median axis (mm) of three random particles was measured. Video footage was also obtained underwater near each transect as well as along the shoreline.

All data has been entered into MS Excel and are available upon request.

Key Findings

Data were collected during 11 days of sampling between April 19th and May 12th, 2022 at 84 unique locations (transects) along 70 properties of 68 landowners. Most of the transects (61%, or 51 of 84) were located on 10 of the 13 mapped spawning shoals (Figure 1). Property waterfrontage on which the transects existed (i.e., candidate rehabilitation areas) ranged from approximately 15m to 140m, and averaged 100m. The majority of properties (66%) had a gentle slope leading down to the water (45m average distance), but half of them had poor construction access, mostly due to steep areas immediately adjacent to the water's edge.

Water levels varied by 0.13m during the sampling period; high and low water levels were 250.13 and 250.26 masl respectively. These levels were marginally higher (by approximately +0.03 to +0.16) than average for Lake Scugog during this time of year. Water depths summarized in this report were not standardized according to daily water levels because of the relatively small variation relative to average water levels and influence of varying wave action.

Depth profiles are shown in Figure 2. The distance to 1000mm depth (or safest wadeable depth), ranged from 2m to 28m offshore, with an average 11.0m. However, the majority of transects (73%, or 61 of 84) extended only 8m offshore, at which length the average depth was 762mm. This corresponds to an average of 95mm increase in depth for every 1m out into the lake to 8m offshore. At 10m offshore (50% of transects, or 42 of 84) water depths averaged 777mm, and ranged from 530 to 980mm. Sampling depths within scope of this survey correspond to the 0.3 to 0.8m optimum depth over eggs on spawning grounds for Walleye[1].

Dominant substrates are shown in Figure 3. As the distance offshore increases, the relative proportion of coarse substrates (e.g., boulder, cobble, and gravel) decreases. From the water's edge extending to 2.5m, the substrates were relatively heterogeneous, with every size class being represented, and dominated (75% of transects). From beyond this point, sand and silt dominates the substrate composition, with occasional boulder. Coarse gravel and cobble, the substrates in which Walleye tend to prefer for spawning purposes (i.e., 25 to 250mm[1]), were absent beyond 11.0m. These substrates were most prevalent within the 2m of shore at 450mm average depth, at approximately half of all transects sampled.

Interstitial spaces are shown in Figure 4. Given that interstitial spaces is linked to the presence of coarse substrates (e.g., no interstitial spaces were recorded for dominant sand or silt), it follows the same general pattern. The occurrence and quality of interstitial spaces is greatest close to shore and progressively decreases out into the lake. High interstitial spaces were present on at least some transects up to 7.0m, but the majority of them occurred between shore and 2.5m. A significant number of transects had moderate, or no interstitial spaces within cobble and coarse gravel substrates. There are no provincial 'optimum criteria' for interstitial spaces, but given that developing eggs do benefit from being protected (e.g., reduction in predation) among rock crevices, these data suggests that several habitat enhancement opportunities do exist within existing coarse substrate dominated areas.

[1] Ministry of Natural Resources. 2009. Fisheries Management Plan for Zone 17. Peterborough District. Available online at: https://docs.ontario.ca/documents/2644/264321.pdf

Preferred Rehabilitation Areas

Several criteria are used to short-list candidate rehabilitation areas on Lake Scugog, for rock placement, including:

- Length of waterfrontage: wider properties are more priority than several smaller properties.
- Substrates: placement of coarse substrate adjacent to an existing shoal (e.g., an extension of existing) is more priority than placing rock over an existing shoal.
- Interstitial spaces: areas with no or moderate interstitial spaces are more priority.
- Construction access: areas with good construction access are more priority than areas with poor access.
- Areas as identified by Ontario Ministry of Northern Development, Mines, Natural Resources and Forestry as preferred areas are priority.

For more information, please contact:

Brett Tregunno, Aquatic Biologist

Kawartha Conservation

705.328.2271 x222

btregunno@kawarthaconservation.com

*Special thanks to the landowners who allowed access to the lake from their shorelines.

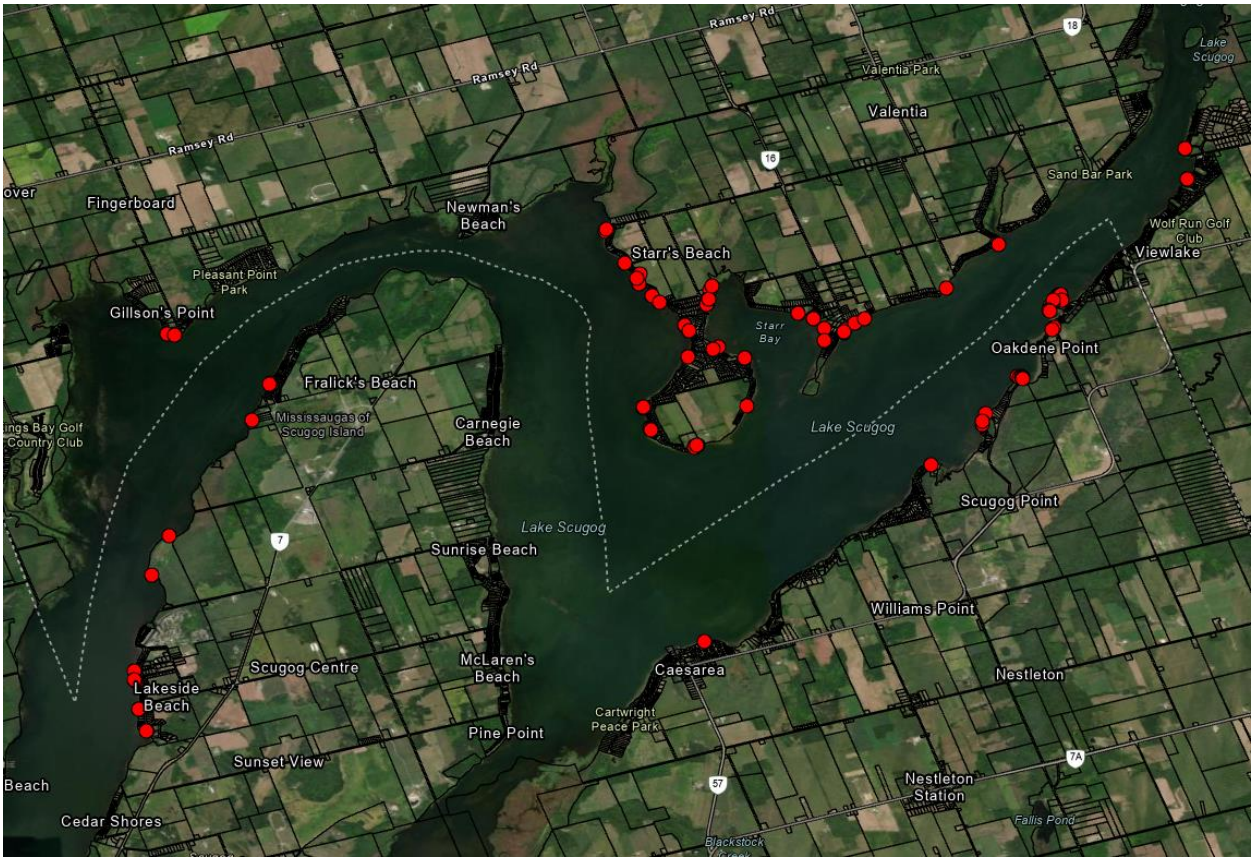

Figure: Map of transects sampled (red dots).

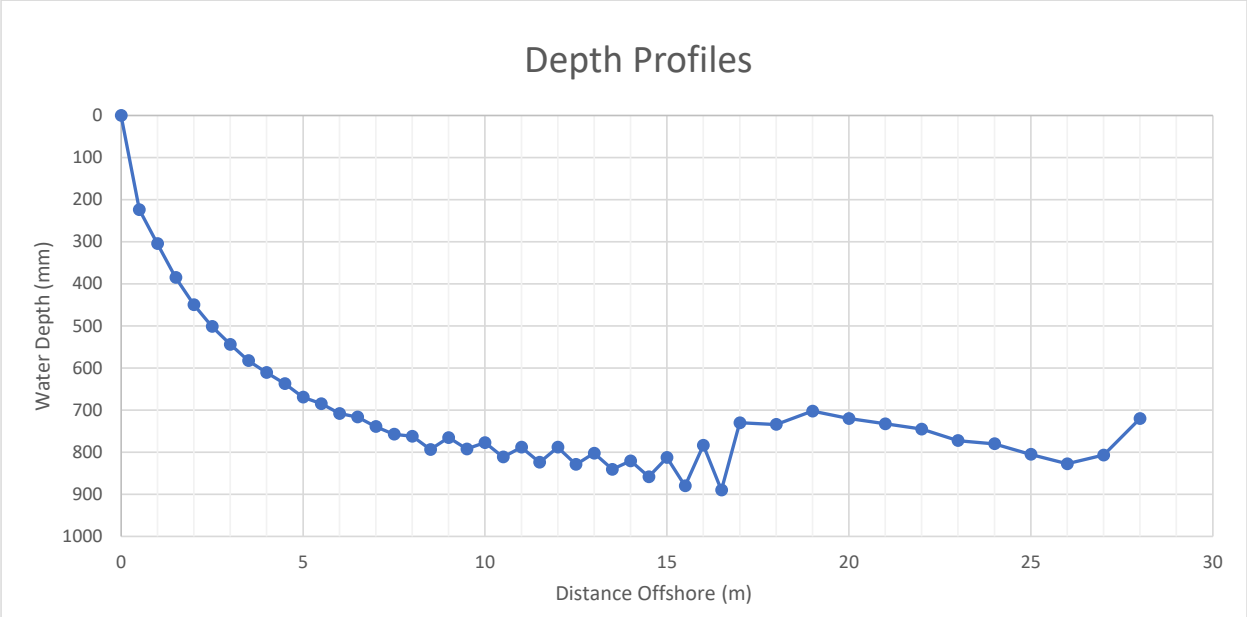

Figure 2. Depth profiles, average depth and distance offshore.

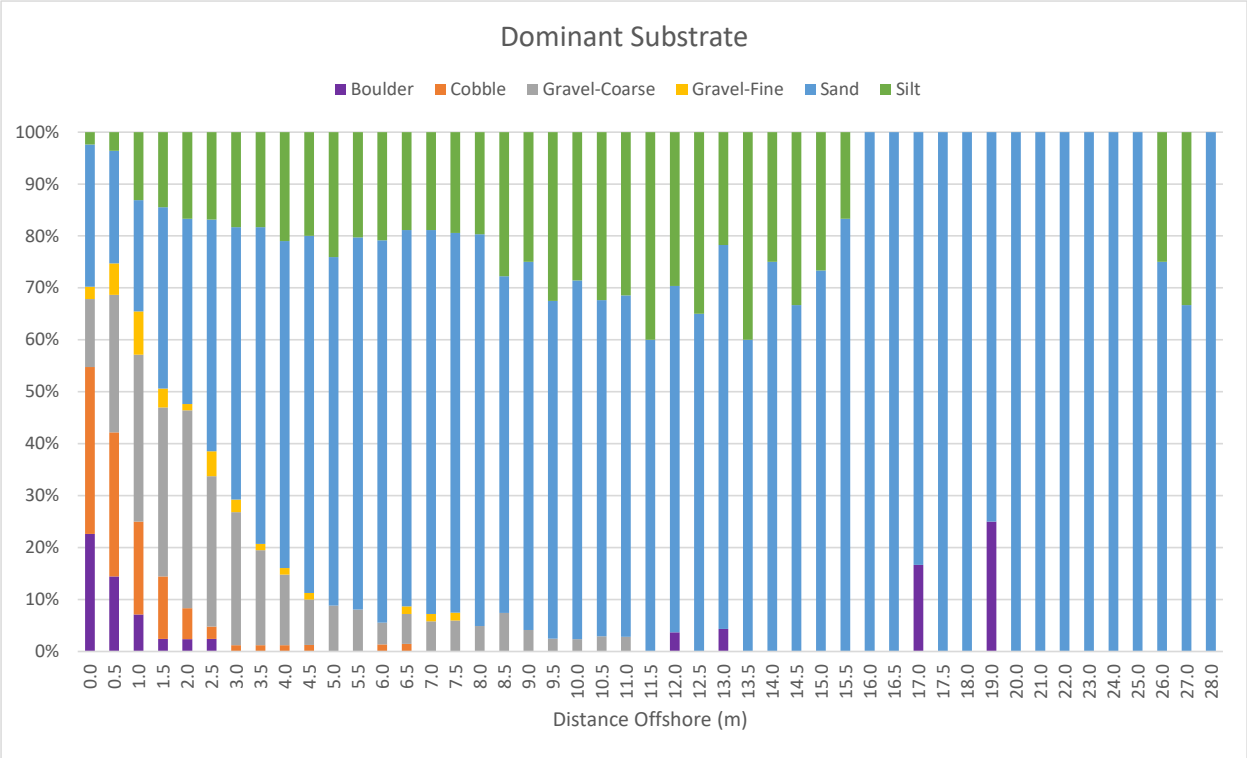

Figure 3. Dominant substrate.

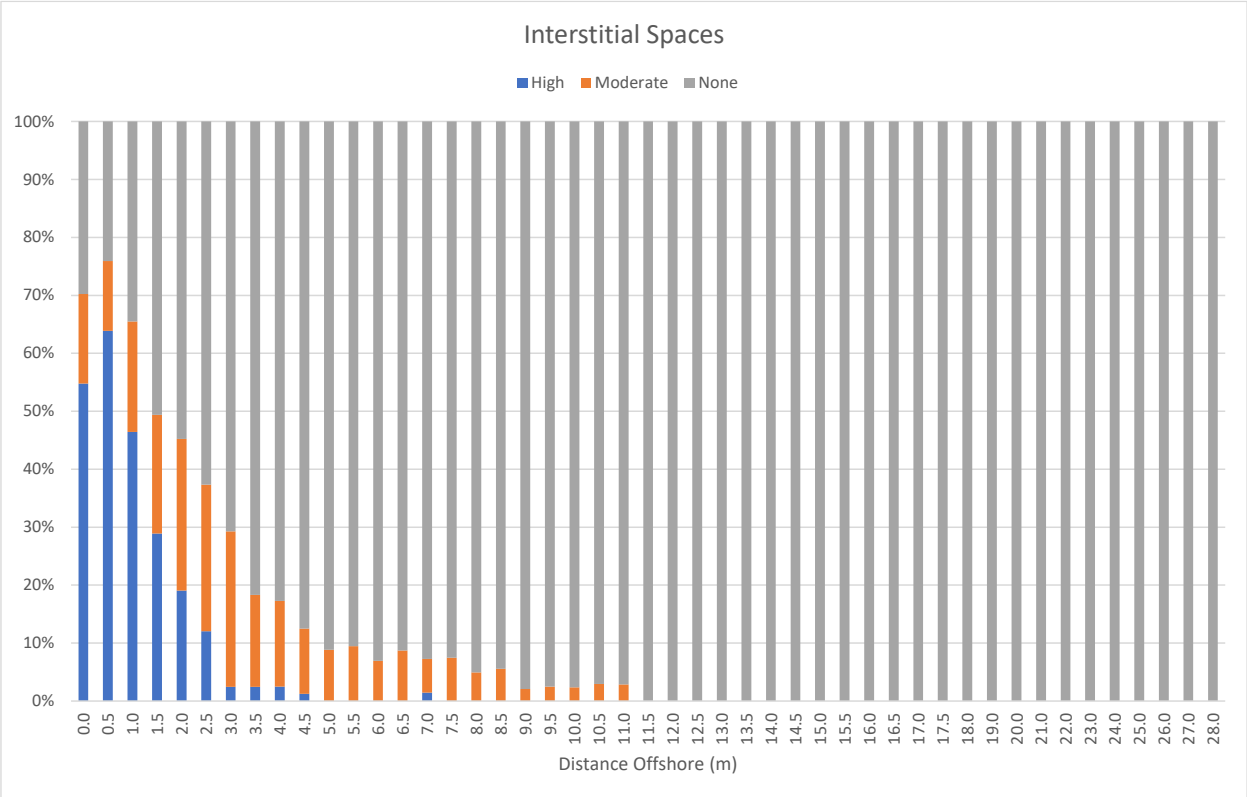

Figure 4. Interstitial spaces.