

GREAT LAKES UNIONID REFUGE FIELD PROTOCOLS 2011

STEP 1: Site set up

- conduct brief reconnaissance to determine if unionids are present (if not already known) – time searched depends on size of refuge and number of people searching.
- Site information:
 - Name of the refuge (bay/march/river)
 - nearest road name or highway number (i.e., OH-2)
 - Nearest city, village
 - County
 - State
 - Give site code (3 letter code + 2 digit number; e.g., CCR-01 = Crane Creek site 1)
- 100 m x 50 m (0.5 hectare) site – up to 4 per “refuge” (marsh, embayment, rivermouth, etc.), dependant on size of refuge.
- use GPS to measure find corners of site (using MARK and GOTO features)
 - a small boat makes this faster
- Mark corners of site with stakes and high visibility flagging tape/paint
- Record GPS coordinates of site corners (decimal degrees, WGS 84 datum – usually default setting)

STEP 2: Water quality parameters (do this while/ immediately after setting site coordinates)

- **3 replicates/site of each parameter: 1 @ corner, 1 in middle of site, 1 @ far corner:**
 - Temperature (deg C)
 - Hach strips (Phosphate, Nitrate/Nitrite, 5-in-1 for Alkalinity/ Tot Hardness/ pH)
 - 5-in-1 test strips (Chlorine x 2, Tot Hardness, Alkalinity, pH):
<http://www.hach.com/hc/search.product.details.invoker/PackagingCode=2755250/NewLinkLabel=5+in+1+Water+Quality+Test+Strips%2C+50+tests/SESSIONID|BkV6TURVNE5EVTVNeIExTXpJbVozVmxjM1JaVmc9PUFsZGFTag==|>
 - Nitrate/Nitrate test strips:
<http://www.hach.com/hc/search.product.details.invoker/PackagingCode=2745425/NewLinkLabel=>
 - Phosphate test strips:
<http://www.hach.com/hc/search.product.details.invoker/PackagingCode=2757150/NewLinkLabel=Phosphorus%2C+Orthophosphate+%28reactive%29+Test+Strips%2C+0-50+mg%26frasl%3BL%2C+50+tests/SESSIONID|B3hNREV6TXpZNE1DWm5kV1Z6ZEsSFIXskdNUT09QmpNd05Uaw==|>
 - Turbidity (60 cm secchi tube)
 - http://www.forestry-suppliers.com/product_pages/view_Catalog_Page.asp?id=5073
 - indicate if >60 cm
 - Water depth (cm) – use metal or plastic meter stick or homemade PVC stadia rod
 - Soft substrate depth (cm) – use metal or plastic meter stick

STEP 3: Timed Search (2 person hours at each sampling site – if site is very productive more time can be spent)

- Time search efforts: time spent, number of people searching
- Search: visual/ tactile/ clam rakes (or baskets)
- Range of depths searched: minimum/ maximum
- Searched by: wading/ snorkel/ diving (SCUBA)
- Number of rakers? Better for deeper water (if no SCUBA)
- Live unionids, record for each live mussel collected
 - species
 - length (mm)
 - weight (g) – if Dreissena present on shell
 - sex (M, F – if possible)
 - gravid female?
 - Dreissena presence on shell (yes, no)
 - dreissenid total live weight (g)
 - evidence of past dreissenid infestation (presence of byssal threads)
 - individual mussel code (for genetic work & dreissenid count, see Species Code Sheet)
 - tissue taken for genetic work (yes, no, swab/mantle clip)
- Shells collected:
 - species
 - shell condition (recently dead, long dead, subfossil)
- Qualitative density of dreissenids @ site (absent, low, medium, high density (“few mussels/aggregations”, “many mussels/aggregations”, “all suitable substrates covered by dreissenids”))
- other unionids found outside the 100x50 m site
 - species
 - numbers/abundance
 - live/ fresh dead/ long dead

STEP 4: After Timed Search (waders/ snorkelers/ divers report to recorder)

- Additional abiotic data:
 - depths range searched (m)
 - substrate (%):
 - bedrock;
 - large boulders (>45 cm);
 - boulders (>25 - 45 cm);
 - cobble (>6 - 25 cm);
 - gravel (>6 - 60 mm);
 - sand (0.06 - 6 mm);
 - mud/silt (<0.06 mm)
 - Macrophyte overgrowth (visual):
 - % submerged macrophyte overgrowth (bottom cover)
 - % emergent macrophyte overgrowth (bottom cover)
 - dominant species (if known)
 - Current threats (visual, qualitative):
 - sediment disturbance (filling, grading, removal of vegetation, building construction, etc)
 - pollution (point sources? agricultural sources? industry? municipal?)
 - watershed development (immediate area: agriculture?, diked wetlands?, industry?, residential?, marina?)