

Coastal Monitoring Field Reference May 2019

- 1) **PREPARATION TASKS:** Calibrate Sonde, charge Hydrolab, fill cooler w/ice, rinse carboy/dipper/funnel 3xHCL: 3xDI H₂O
- 2) **SITE:** Look at entire site based on aerial photo polygon.
 - **REJECT SITE:** 1) if not connected to a Great Lake (still sample if seasonal/periodic connection, or benchmark); 2) not a wetland; 3) no safe access for crew (>7 km boat launch, etc.); 4) >2 m elevation above lake level (for riverine); 5) >1 km from lake (riverine, use judgement on lake influence upriver); 6) <4 ha size (≈10 acres, or 200x200 m)
 - Fill out overview worksheet, take photos of land cover. GPS boat launch/access. **Record camera and GPS unit ID's.**
- 3) **ZONES:** Choose **up to 4 monodominant** zones by areal coverage. Dominant is ≥75% Emergent or Floating leaf types.
 - **COMMON ZONE TYPES:** Cattail (*Typha*); Lily (*Nuphar-Nymphaea* combined); Bulrush: inner (dense) /outer (sparse) by stem density (*Schoenoplectus*); Bur-reed (*Sparganium*); Arrow-Arum-Arrowhead-Pickerel weed (*Peltandra-Sagittaria-Pontederia* combined as *Pelt-Pont*); Wild Rice (*Zizania*); Giant Reed (*Phragmites*); SAV; Floating Bog (not for fish); Wet Meadow; Mixed Emergent (last resort only); Open H₂O (really last resort only or benchmark site).
 - **Ignore SAV in EMERGENT and LILY zones when determining monodominance.**
 - **For SAV to qualify it must have <1 stem/m² of FLOATING LEAF and <5 stems/m² of EMERGENT types present.**
 - **WET MEADOW and FLOATING BOG MAT are zones regardless of mixed vegetation.**
 - If vegetation is **truly impenetrable** for either fish or bugs, you do not have to sample it.
 - **OPEN WATER:** if no vegetation in a benchmark (i.e. disturbed site); establish 1 OPEN WATER zone.
 - At zone level: get photo, zone size (m²), contiguous or patches. **If patches, record patch size for each rep.**
 - **Zone size:** must total minimum of 400 m² for contiguous and patches (same for fish and bug).
 - **Patch size:** smallest patch is 100 m² for fish; 25 m² for bugs. Patches max of 250 m, min 20 m apart (for rep spacing).
- 4) **REPLICATES:** Each zone gets 3 replicates. *Max spacing between replicates is ≈ 250 m (≈ 250 m from 1 to 2, and 2 to 3)*
 - Try to place replicates adjacent to different shoreline/landuse combinations to capture the diversity of a zone.
 - At minimum, a zone will be sampled for **WQ and bugs**. Fish sampling may not be possible in every zone.
 - **GPS each rep location** (either at fyke net, or where dnets taken for bugs)
 - **WATER QUALITY:** Take these first to avoid disturbing the water. Taken at each of 3 reps within up to 4 zones.
 - i. Nose into rep location carefully (try to determine where net or bug samples could be taken), get Sonde WQ readings first **at mid-depth of water column**. Record: DO mg/l, DO %, Temp, pH, Scond at minimum 1 rep.
 - ii. In shallow zones you may have to fill sonde cap or similar vessel with water, then take reading from that.
 - iii. **Dip water:** Rinse dipper+carboy+funnel 3X with site water before 1st rep and between zones. Dip 1 L grab sampler 3X at each rep away from boat. **Glug** to get below surface film, pour thru screened funnel into carboy.
 - iv. When all reps have been visited should have 9 L in carboy (3 one L dips at 3 reps). Swirl water in carboy gently; **take secchi tube reading**, then fill 4 L cubitainer. Label and put on ice for WQ later.
 - v. **DUPLICATE WQ:** duplicate sonde reading/cubitainer (split from same composite)/secchi tube of 1 zone, **every 10 zones (if 1 zone/site, then every 5 sites)**. Process as usual. Between dups turn hydrolab off, then back on.
- 5) **QUADRATS:** 1 x 1 m square. Record % of surface (e.g., EM, FL, FL SUB Veg, SUB, OPEN) and sub-surface growth forms /cover types (e.g., SUB, Fila. Algae, Stems, Coarse Detritus, Bare sed) and ID dominant genera of each type.
 - i. **When zone is fished:** place quadrat mid-lead on the right side when facing away from net box in un-trampled area with veg typical of zone.
 - ii. **When zone is not fished:** randomly throw quadrat in area where invert dnets were taken in typical veg.
 - iii. Record water depth at quadrat if depth was not recorded at fyke net (e.g., zone not fished).
 - iv. Record organic sediment depth (**only organics, not inorganic refusal depth**). Use 2 cm diameter rod.
 - v. Take a picture of every quadrat.
 - vi. **SEDIMENT:** Feel texture of sediment and note 2 dom types on either fyke or invert/WQ data sheet.
 - vii. **Organic sed** is a zone-level composite taken near quadrat locations. This data is optional for some crews.
 - Take 10 cm deep core at each rep. Homogenize cores from 3 reps of a zone in a tub or bag.

- Put **500** ml in a gallon ziplock for zone. Overpack all zone sediment together in 1 gal ziplock for the site.

Label bags internal and externally with: site code, zone, date, crew, crew chief. Put on ice, freeze later.

- 6) **FYKE NETS:** Set with leads completely in zone. Frame may be on edge of zone if wings block edge-swimming fish.
- To fish:** Must be able to get 3 nets/zone, min 20 m, max 250 m apart. Water depth of 20-100 cm.
 - Nets must have identity and contact information visible from distance.** Nets set overnight (12-24 hrs)
 - All small mesh (3/16"), leads 25' long, wings 6' long. Large net funnel 6.5" diameter, small net funnel 4" diameter. Use small frames in 20-50 cm and large frame in 50-100 cm depth.
 - Try to orient lead pointing to nearest shoreline, set wings at 45° angle, **always set cod end out of water.**
 - Large and small frame nets can be used in any combination which matches water depth. **Most important: funnels underwater, frame not submerged, lead and wings in full contact with bottom but not submerged.**
 - NARROW ZONES:** No min dimension if you can get the lead into the zone (not fishing "edge"), and if the total zone size is $\geq 400 \text{ m}^2$, or smallest patch $\geq 100 \text{ m}^2$. Patch/replicate spacing of 20 - 250 m still applies.
 - Fyke net and replicate GPS points will be the same. Record distance to depth 0 and direction.
 - Always record date/time/water depth at frame of fyke net when **set and pulled.**
 - Measure (TL mm) 25 individuals of each species per net, then provide counts. If there are YOY mixed with other age classes of the same species create two rows in data sheet; one for YOY and one for OTHER.
 - Count crawfish in fyke nets (native vs non). **ID, and measure plastron length of turtles** (but not snappers).
 - Note mortalities, anomalies, fish pictures on fyke data sheet.
 - Do not measure/ID/bottle any fish under 20 mm. And only measure fish that were alive when captured (died in net is OK to measure and count).**
 - RESET NETS:** If 2 of the 3 nets in a zone did NOT fish **OR** if all 3 nets in a zone did not capture 10 fish TOTAL, nets must be re-set for another night. A net does not fish if collapsed, funnels out of water, or holes >dime underwater. If 2 of 3 nets do not fish on the re-set, notify supervisor to decide if a 3rd re-set is needed.
 - UNKNOWN FISH:** Take picture of large fish with card containing all the information which would normally be put on a label. Small fish can be bottled for lab ID; label bottle and **circle the fish length** on the fyke data sheet so it is obvious which individuals were preserved (important if multiple species are in one bottle). Make clear on fyke data sheet (front pg, upper rt corner) and bottles which net/zone/site bottles are from.
- 7) **INVERTS:** 3 reps per zone in up to 4 zones. Water depth of 5 – 150 cm.
- A zone will always be bugged,** otherwise there wouldn't be enough water for WQ samples and is not a zone.
 - If zone is fished, take inverts near fyke net in similar veg but in untrampled area a bit away from net.
 - Use dnet with frame ≈ 26 cm wide, 500 μm mesh.
 - Perform ca. **ten 1-m sweeps** of bottom to surface, **keep track of total sweep #**, empty contents into tray.
 - Large pieces of vegetation, algal mats can be rinsed off into dnet and discarded so as not to fill picking tray.
 - Pick one grid clean before moving to next grid; put all inverts of a rep into one bottle if possible.
 - Time picking to equal 30 person-picking minutes, or stop time when 150 bugs. **50 bugs minimum per rep.**
 - TIMING EX:** 3 ppl pick for 10 min, 4 ppl for 7.5 min, 5 ppl for 6 min. If 3 ppl picking get 150 bugs after 8:23; effort to record on data sheet is 8:23 x 3 = 25:00 person picking minutes (only record to nearest whole min).
 - If not at 150 by 30 min:** pick to next interval of 50, record extra sweeps and time until target is reached.
 - IF ZONE NOT FISHED:** Still need 400 m^2 total area to bug; but water depths between 5 - 150 cm, minimum distance between reps is 15 m, and smallest patch size is 25 m^2 . Record all information on invert sheet.
 - LABEL INVERT SAMPLES INTERNAL AND EXTERNAL:** site, zone, rep, date, crew, crew chief. Add preservative.
- 8) **COMPLETION TASKS:** Process WQ from cubitainers (must be done within 12 hrs). Draw fyke net and zone locations on aerial photo, upload GPS points and pictures to laptop, check data sheets for completeness, keep unique lodging/boat launch info in site folder, samples preserved/frozen.
- 9) **REQUIREMENTS TO CLEAN GEAR:** Always: drain boat & lower unit, pick veg/mud from gear/boat when leaving.
- **Away trip: 2% Virkon Aquatic & CAR WASH:** if traveling between lakes or lake sections or traveling >100 mi to next site. At car wash spray gear with 2% Virkon and let sit 20 mins wet, then rinse with high pressure.
 - **Local trip:** Wash with hot water pressure sprayer (water temps >140 °F).