

## **Ecorse Creek Water, Sediment, and Biota Assessment Proposal (Preliminary)**

### **General Purpose:**

To examine water chemistry, sediment pollution, and biotic parameters of the Ecorse Creek Main Branch, as well as the Ecorse Creek North and South Branches and their headwater tributaries, in order to assess the present health of the Ecorse Creek watershed.

In addition, collected data from this study will be compared with an extensive 1969 DNR assessment of the Ecorse Creek in order to ascertain historical trends in pollutant contamination and/or recovery of previously degraded habitat.

Since the Ecorse Creek watershed has been situated in an area of “urban sprawl” near heavily industrialized Southwest Detroit and the Downriver metropolitan area, it is prudent to obtain possible contaminant data on a waterway that empties into, and affects the water quality of, the Detroit River and the Great Lakes Basin (which provides drinking water to over 40 million people).

In total, 20 sites will be studied, with the breakdown of sites as follows:

### **Site #: General Description of Location:**

#### **ECORSE CREEK MAIN BRANCH**

- 1      \_West of W. Jefferson Bridge (Wyandotte-Ecorse)
- 2      \_West of Railroad Overpass (Wyandotte-Ecorse)

#### **ECORSE CREEK SOUTH BRANCH (SEXTON-KILFOIL DRAIN)**

- 3      \_544 North Dr. (Swiecki Residence/Wyandotte-L.P.)
- 4      \_Beaver Park (Wyandotte-L.P.)
- 5      \_East of Fort St. (1029 Harrison/Lincoln Park)
- 6      \_East of Dix-Toledo Rd. (Big Boy/Lincoln Park)
- 7      \_East of Allen Rd. (Allen Park)
- 8      \_East of Telegraph Rd. (Taylor)
- 9      \_East of Middle Belt Rd. (Romulus)
- 10     \_Harrison Rd./Sloss & Ganong Drain (Romulus)

#### **ECORSE CREEK NORTH BRANCH**

- 11     \_Council Point Park/Southeast of LeBlanc Drain Outfall (Lincoln Park)
- 12     \_South of Southfield Rd. Overpass (Lincoln Park/Ecorse)
- 13     \_East of Fort St. at Outer Dr. (Lincoln Park/Ecorse)

### ECORSE CREEK NORTH BRANCH (sites cont.)

- 14      \_East of Dix-Toledo Rd. at Outer Dr. (Lincoln Park/Melvindale)
- 15      \_West of Jackson Ave. (approx. 1/4 mi.) between Annapolis and Van Born Rds.  
          (Dearborn Hts.)
- 16      \_East of Beech Daly Rd./North of Van Born Rd.
- 17      \_East of Inkster Rd. at Annapolis Rd. (Butler Drain)
- 18      \_East of Inkster Rd./North of Van Born Rd.
- 19      \_East of Middle Belt Rd. between Ecorse and Beverly Rds. (Lamareau  
          Drain/Romulus)
- 20      \_East of Middle Belt Rd. between Ecorse and Smith Rds. (Romulus)

### I. Water Testing (Day 2--To coincide w/benthic organism analysis)

#### **A. Purpose:**

To test Ecorse Creek water samples for dissolved oxygen (DO) content, pH and temperature.

The dissolved oxygen measurements will serve as indirect indicators of biochemical oxygen demand (BOD), and possible organic--both oils and sewage--contamination, within the creek.

The pH measurements will provide useful data for ascertaining how acidic the aquatic milieu may be, and what kinds of organisms may be expected to thrive or languish under such pH conditions.

The temperature readings will be useful when comparing pH and DO samples taken at different times of the year to illustrate what correlations exist between temperature and pH/DO measurements. Also, particularly during the summer months, temperature readings will help elucidate the extent to which various organisms may be expected to thrive or languish at the temperatures to be obtained.

Taken together, all three physico-chemical parameters will serve as indicators of the health (or ill-health) of the Ecorse Creek aquatic ecosystem.

#### **B. Materials:**

-2 Hach pH/Temp. meters

-2 Hach DO 175 Dissolved Oxygen meters

#### **C. Procedure:**

- 1.) For pH/Temp. readings, lower probe into flowing water approximately 4 inches below water surface at a point as close to the mid-creek zone as possible. ("Mid-creek zone" is a point that is roughly the same distance from each opposing shoreline of the creek).
- 2.) Allow measurements to stabilize (at least one minute) before recording results.

Note: Measurements will be taken as near to the mid-creek zone as equipment, safety gear, and general safety precautions will allow.

## II. Sediment Pollutant Sampling/Testing (Day 1)

### **A. Purpose:**

To collect sediment samples from the Ecorse Creek watershed and test for concentrations of heavy metal and synthetic organic contaminants.

Metals to be tested for will include the following: Lead (Pb); Cadmium (Cd); Mercury (Hg); Zinc (Zn); Copper (Cu); Manganese (Mn); Chromium (Cr); Nickel (Ni); Iron (Fe); and, Cobalt (Co).

Synthetic organics to be tested for will include PCBs, PAHs, and Benzene-derivatives (excluding phenols).

Collected samples will be sent to, and analyzed by, Michigan Department of Environmental Quality (DEQ) experts utilizing E.P.A.-accepted procedures and mass spectrometer/gas chromatogram analyses (??).

Many of the aforementioned elements/compounds are of particular interest because of their deleterious effects on living organisms, even at very low concentrations due to their bioaccumulative properties (and biomagnification through higher trophic levels).

Heavy metals and synthetic organics are highly suspected of being ubiquitous chemical contaminants in the Downriver, metro-Detroit area due to the siting of numerous steel mill operations, oil refining facilities, plastics manufacturers, pesticide makers, and other miscellaneous producers of toxic substances that were generated and released into the environment either as legally permitted waste by-product discharges, accidental emissions, and/or historical unregulated "midnight dumping" by both unscrupulous industries and citizens alike.

Also, the extreme dependence of such densely-populated areas (like metro Detroit) on fossil fuels for the running of combustion engines to power vehicles of transportation, as well as for powering electric-generating facilities, has resulted in inordinate PICs (Products of Incomplete Combustion), as well as excessive aromatically-tainted oil and fuel runoff from pavements and parking lots into storm drains which

all-too-often empty into watershed tributaries--such as the Ecorse Creek--during rainstorms.

Therefore, it is important--especially in urban areas--to monitor watershed health with a particular eye to heavy metal and synthetic organic pollution.

### **B. Materials:**

- |  |  |
|--|--|
| -2 Petite Ponar Grab Samplers                                  | -10 pairs Heavy-duty rubber gloves     |
| -24 Sampling Bottles   | -2 Large Stainless Steel Mixing Spoons |
| -2 Cold Storage Sample Transport Containers                    | -2 Large Stainless Steel Mixing Bowls  |
| -6 Rubber Aprons   | -2 Carboys (5.5 Gal.)w/tap water       |
| -8 Chest Waders  | -4 Wire Brushes                        |
| -8 Boxes Latex Gloves (4 Med./4 L.)                            | -2 Bottles of Liquid Ivory Soap        |
| -16 Towels   |  |
| -4 double-lined plastic garbage bags (for equipment transport) |  |

#### Safety Materials:

- 2 Bottles Antibacterial Soap
- 2 Safety Ropes
- 2 First Aid Kits

#### Materials for M.C. Testing Only:

- Hach DR 2000 Spectrophotometer
- 20 plastic (500ml) sample bottles
- 2, 2.5 Gal. Absopure Distilled H<sub>2</sub>O

-2 CB radios/2 Walkie-Talkies

-2 Digital Scales

## II. (Cont.)

### **C. Procedure:**

At each of the 20 Ecorse Creek sites detailed above, the following sampling procedure will be followed:

1. Keeping constant tension on tow rope, steadily lower Petite Ponar Grab Sampler (PGS) into creek water--at a point approximately equidistant from each opposing shoreline--until contact with sediment is made.
2. Quickly tug tow rope to insure spring-loaded pin is disengaged, thereby allowing the "jaws" of the PGS to close.
3. With steady tension on rope, pull up PGS.
4. Empty contents of PGS into large stainless steel collection pan.
5. Repeat steps 1-4 at two points approximately equidistant from the initial mid-creek sampling point and the two respective opposing shorelines.
6. With a large, stainless steel mixing spoon stir the three sludge samples until an homogeneous, composite sludge sample is attained.
7. Transfer ?? portion of composite sample into ??-ml sampling container.
8. Store container with sample in cold storage for transport to lab.
9. Analyze sediment samples for heavy metal, PCB, PAH, and benzene-derivative fractions and record results.

**\_Note: Split samples will be prepared for one site on the North Branch and one site on the South Branch of the Ecorse Creek for control purposes.**

## III. Benthic Organism Analysis (Day 2)

### **A. Purpose:**

To explore the benthic biodiversity of the Ecorse Creek watershed in order to assess biotic health, and indirectly the extent to which pollution has adversely affected the benthic biotic community of the Ecorse Creek watershed.

In addition to habitat alterations, pollution--either inorganic heavy metals, synthetic organics, or sewage sludge--can negatively impact the biotic structure and health of aquatic ecosystems. The metals and synthetic organics can bioaccumulate in larger aquatic arthropods and water-dependent vertebrates (such as frogs, salamanders, turtles, snakes, fish, and water birds); thereby, leading to acute or chronic poisoning and/or reproductive defects.

Sewage contamination of aquatic ecosystems, especially small, slow-moving waterways (such as the Ecorse Creek), can result in the rapid bacterial depletion of dissolved oxygen (as well as the rapid proliferation of sewage-tolerant benthic organisms) within the creek. Such alterations lead to the dieoff of pollution-intolerant organisms, especially those dependent upon higher levels of DO for survival--particularly macroinvertebrates like dragonfly nymphs, as well as the nonamphibious organisms like fish species.

Also, because there is a shift in biodiversity toward fewer species in greater numbers which inhabit the sediment/sludge interface at the creek's bottom, then the feeding patterns of higher organisms necessarily become altered to take advantage of the abundant benthic food sources. However, since toxic pollutants tend to adsorb to sediment particles within the aquatic milieu, higher organisms are likely to be exposed to increased concentrations of toxic pollutants as a result of feeding on benthic organisms

whose life cycle begins and ends in such toxically-tainted sludge.

### III. (Cont.):

#### **B. Materials:**

- |  |   |
|--|---|
| -2 Petite Ponar Grab Samplers                                  | -8 Chest Waders                           |
| -22 Large Sampling Storage Bottles<br>(w/preservative)         | -10 Pairs Heavy-duty rubber gloves        |
| -12 Tweezers   | -8 Boxes Latex Gloves (4 Med./4 L.)       |
| -12 Probes   | -2 Large Stainless Steel Spoons           |
| -2 Transport Containers  | -2 Stainless Steel Collection Bowls       |
| -4 sets Tyler Sieves<br>(Nos. 18 and 100)                      | -16 Foam boards(for sorting of organisms) |
| -6 Rubber Aprons   | -2 Carboys (5.5 Gal.)w/tap water          |
| -6, 2.5 Gal. Absopure Distilled H <sub>2</sub> O               | -4 Wire Brushes                           |
| -4 double-lined plastic garbage bags (for equipment transport) | -16 Towels                                |
| -25 Large Labeled Collection Containers w/Preservative         | -Absorbent paper                          |

#### Safety Materials:

- |                               |                               |
|-------------------------------|-------------------------------|
| -2 Bottles Antibacterial Soap | -2 CB radios/2 Walkie-Talkies |
| -2 Safety Ropes               | -2 First Aid Kits             |

#### **C. Procedure:**

At each of the 20 Ecorse Creek sites detailed above, the following sampling procedure will be followed:

1. Keeping constant tension on tow rope, steadily lower Petite Ponar Grab Sampler (PGS) into creek water--at a point that is approximately one-third of the distance from the shoreline--until contact with sediment is made.
2. Quickly tug tow rope to insure spring-loaded pin is disengaged, thereby allowing the "jaws" of the PGS to close.
3. With steady tension on rope, pull up PGS.
4. Empty contents of PGS into large stainless steel collection pan.
5. Repeat steps 1-4 at a second point that is approximately one-third of the distance from the opposing shoreline (so that approximately one square foot total area of sediment has been collected).
6. With a large, stainless steel mixing spoon, carefully transfer spoonfuls of sediment samples into the stainless steel sieves to drain away excess water, but still impounding the organisms of interest.
7. Using tweezers, carefully remove visible organisms and deposit into appropriate, site-labeled preservation container.
8. Empty sieves with sediment onto large white foam boards and sift through material with probes and tweezers for benthic organisms.
9. Transfer all organisms into appropriately-labeled preservation containers.
10. Repeat steps 6-9 until all sediment has been thoroughly examined.
11. Place specimen containers into storage box.
12. Transport collected specimens to lab for sorting into the following categories: sludgeworms; leeches; snails; midges; and, sowbugs.
13. Sequentially place each category of organisms on a No. 100 fine mesh Tyler sieve and gently wash with distilled water.
14. Place washed organisms on absorbent paper to remove excess moisture.

**III. C. (Cont.)**

15. Transfer organisms to a scale and record total mass (in grams) for each category of organisms collected.
16. Extrapolate **biomass of organisms/sq. foot sediment** into **pounds of biomass/acre** (which is a more familiar term of measurement) for each category of organisms collected.
17. With the aid of experts, quantify the number of different types (or species) of organisms present for each of the 20 samples collected, and record as "biodiversity measurement".

**Target Test Dates:**

**Day One: Thurs., May 2, 1996**

**Day Two: Fri., May 3, 1996**

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