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- NRSA -

National Rivers and Streams Assessment

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Environmental Institute of Houston
University of Houston-Clear Lake

SWQM Workshop
October 29, 2013
NRSA Background

• What is NRSA?
  – second nationwide survey of the condition of the nation’s rivers and streams

• Goals of NRSA
  – Measure Health
  – Evaluate protection and restoration efforts
  – Prevent pollution

• Timeline

NRSA Site Locations

1,800 Sites
68 Sites in Texas
(72 events)
Some sites were missing a key ingredient...
Logistics

WRS Samples
- Cubitainer (4 L)
- CHEM
- (3) filters in centrifuge tubes (50 mL), in zip-top bag
- CHLA
- PBIO
- PCHL

Non-Chilled Samples (Batched) – per site
- (1 or more) 1 L wide-mouth bottle
- BERW (wadeable)
- BETB (boatable)
- (1) Centrifuge tube (screw-top, 50-mL)
- PERI
- (1 or more) 1 L wide-mouth bottle
- VERT (at QA voucher sites only)

Frozen Samples (Batched) – per site
- (1) HDPE bottle (500 mL, white, wide-mouth)
- MICX
- (2) Filters in centrifuge tubes in bag (plus blank if revisit site V1)
- ENTE
- (5) Fish in Large plastic (compost)

Frozen Whole Fish Tissue Samples* (Batched) – per site

Completed Data Packs (Batched)
- All data forms from a site, reviewed for completeness, in PFLG

* At a subset of pre-selected sites, whole fish tissue samples will be collected instead of fish tissue plugs

Pack 1 site’s worth of samples in lined cooler with ice in bags
Pack 3-5 site’s worth of samples in lined cooler with NO ICE
Pack 3-5 site’s worth of samples in lined cooler with NO ICE
Pack 3-5 site’s worth of samples in lined cooler with NO ICE

SHIP WITHIN 24 HOURS (MON-FRI)
SHIP EVERY 2 WEEKS ANYTIME
SHIP EVERY 3 WEEKS ANYTIME

FedEx Express
FedEx Ground
FedEx Express
FedEx Express
FedEx Express
FedEx Express
Boatable Site Layout

- Upstream endpoint is “Transect A”
- Downstream endpoint is “Transect K”
- Distance between transects = 4 x mean wetted width
- Sampling Stations
  - L = left; R = right
  - 1st station (at transect A) determined randomly; subsequent stations assigned systematically
  - Stations extend 15m from bank and 5m up & downstream from each transect (10m x 15m)

Total reach length = 40 x mean wetted width (min = 150 m; max = 4 km)
Boatable Site Layout

<table>
<thead>
<tr>
<th></th>
<th>Latitude</th>
<th>Longitude</th>
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<tbody>
<tr>
<td>A</td>
<td>30.577310°</td>
<td>-95.017328°</td>
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<tr>
<td>B</td>
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<td>E</td>
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<tr>
<td>F (X-site)</td>
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<tr>
<td>G</td>
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<td>H</td>
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<tr>
<td>I</td>
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<tr>
<td>J</td>
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</tr>
<tr>
<td>K</td>
<td>30.576656°</td>
<td>-94.978739°</td>
</tr>
</tbody>
</table>

Comments:
Boat ramp located approximately 3 miles downstream on US 59 (30.570319°, -94.949635°)

Reach Length: 3,840 m
Subreach Length: 384 m
Wetted width: 96 m
Wadeable Site Layout

Distance between transects = 4 times mean wetted width at X

Total reach length = 40 times mean wetted width at X

FLOW

X-site

SAMPLING POINTS
- L=Left C=Center R=Right
- First point (transect A) determined at random
- Subsequent points assigned in order L, C, R

-site (minimum=150 m)
Wadeable Site Layout

<table>
<thead>
<tr>
<th>Transect</th>
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<th>Longitude</th>
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Reach Length: 640m
Subreach Length: 64m
Wetted Width: 16m

Comments:
Access directly under bridge (narrow shoulders along road with fast moving traffic). X-site ~1/4 mi. upstream of bridge. Lots of large boulders/cobble between bridge and transect A. Lots of shallow, portable areas between transects A-C. Deep pools (>1.5m depth) between transects C-H.
Samples Collected

- Water Sample Collection
- Benthic Macroinvertebrates
- Periphyton
- Physical Habitat Characterization
- Fish Assemblage
Water Sample Collection

**In situ measurements (DO, pH, temperature, conductivity)**
- Multi-probe from mid channel of stream.
- Measurements taken at 0.5m deep. If site is <1M deep collect at mid-depth.

**Water chemistry samples**
- All sampling supplies (beaker, cubitainer, lid) rinsed three times with stream water.
- Fill 4L cubitainer using nalgene beaker.
- Wear nitrile gloves! Ensure no air bubbles.
- Place pre-labeled, sealed cubitainer on ice after collection.

**Chlorophyll-a (Water Column)**
- Rinse amber bottle 3x with stream water.
- Fill using nalgene beaker.
- Keep on ice until filtration.

**Algal Toxins (Microcystins)**
- Rinse 500ml bottle 3x with stream water.
- Fill pre-labeled bottle using nalgene beaker.
- Place on ice until frozen at base site.
Benthic Macroinvertebrates

Boatable

Wadeable
Benthic Macroinvertebrates

Combine ALL kick net samples collected from ALL transects

TRANSECT SAMPLES (1 per transect)
Sampling point at each transect selected systematically after random start
Sampling points proceed in L, C, R pattern upstream
Modified D-frame kick net
1 square foot quadrat sampled for 30 seconds

COMPOSITE SAMPLES FROM ALL TRANSECTS
- Sieve bucket or other bucket(s)

SIEVE SAMPLE
- 500 μm sieve bucket
- Remove and wash large objects

COMPOSITE AND PRESERVE SAMPLE
- 1 liter bottle(s) (max of 4 bottles if possible)
- Fill no more than 50% with sample
- Preserve with 95% ethanol for a final concentration of at least 70%
Periphyton

Sample Collection:
- Area delimiter: 12 cm$^2$
- 45mL wash each transect
- Composite from 11 transects

Samples:
- Periphyton Assemblage
- Chlorophyll
- Biomass
Physical Habitat Characterization
Physical Habitat Characterization

- Thalweg Profile
- Large Woody Debris
- Substrate
- Chanel Classification
- Bank Characteristics
- Canopy Cover
- Instream Fish Cover
- Human Influence
Physical Habitat Characterization

- Slope & Bearing

- Flow
Fish Assemblage
Fish Assemblage & Tissue Collection
EIH Field Sampling Crew

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Jenny Oakley

TCEQ Project Manager
Christine Kolbe

Team Leader TX2
Misty Shepard

EIH Project PI
George Guillen

Kristen Vale
Fish Taxonomist
Stephen Curtis

Mandi Moss

Mike Lane

Rob Cook
EPA Region 6

Debbie Bush

Mike Vanbuskirk

Laila Melendez

Mike Caldwell

Michelle Blair

Richard Baetz

Le Blair

Mike Vanbuskirk
Amarillo Region 1
Tyler Region 5
Corpus Christi Region 14