
TEXAS
PARKS &
WILDLIFE

The Use of Fish In Biological Assessments

Fish Bioassessment Guidelines

Objectives

Collection and characterization of a representative sample of the fish assemblage.

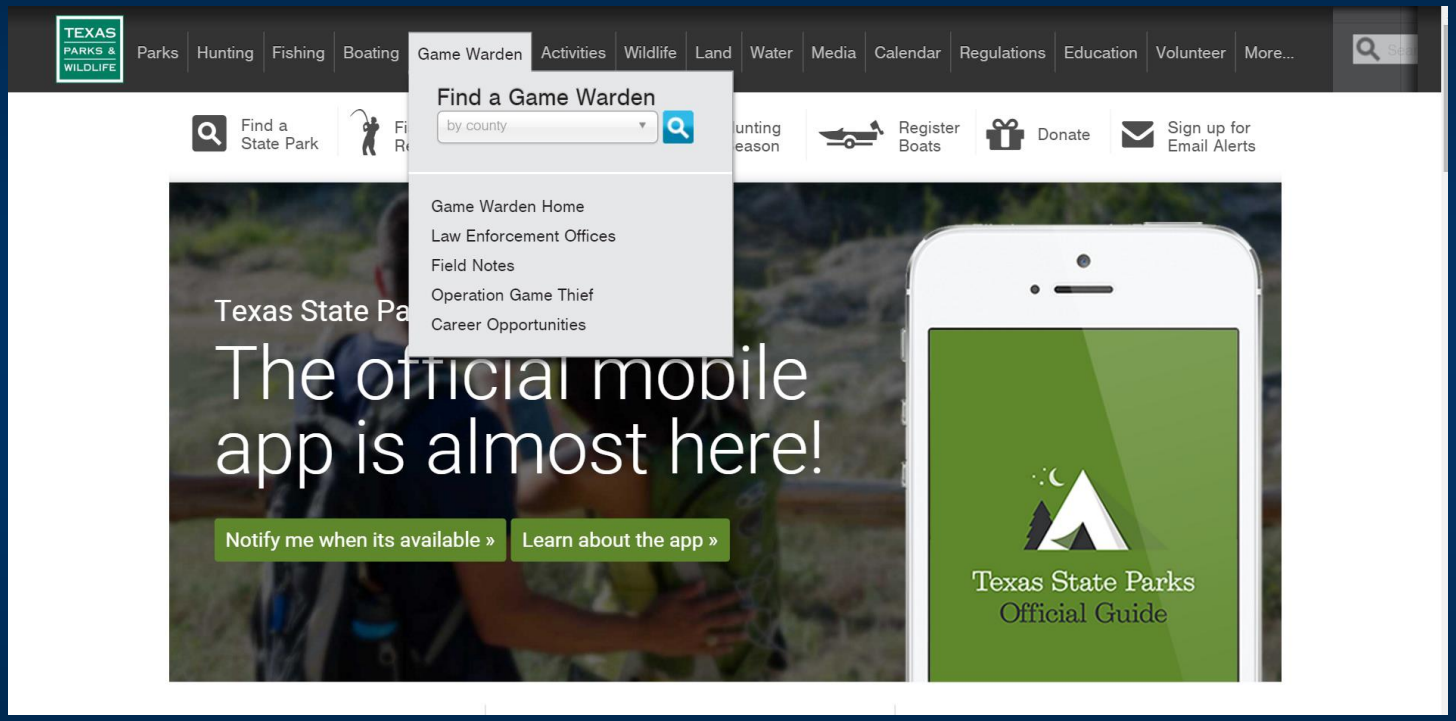
Bioassessment data are mainly used by the TCEQ Water Quality Standards Team and the SWQM Team to:

- Help establish Aquatic Life Use (ALU) designations
- Determine whether existing ALU designations are appropriate
- Determine whether existing ALU designations are being attained
- Provide baseline data

Scientific Collection Permit

- Anyone who collects fish for scientific purposes from waters of the State of Texas.
  - Permits are obtained through Texas Parks & Wildlife Dept.
    - http://tpwd.texas.gov/publications/pwdforms/media/pwd_0381_w7000_app_for_scientific_research_permit.doc
    - or call (512) 389 - 4491
    - Permittee or subpermittee must notify TPWD not less than 24 hrs and no more than 72 hrs prior to collecting.
    - Subpermittees must carry a photocopy of the permit during collection activities
    - Persons not listed may participate in collection activities with notification to TPWD not less than 24 hrs prior to collection.

TPWD Game Warden Notification



Or call one of the TPWD Communication Centers
Austin: (512) 389 – 4848
Houston: (281) 842 – 8100

Documentation

- Date, time, names of collectors
- Site Description – TCEQ Station ID, ambient conditions, site characteristics, field parameters, etc…
- Collection Methods
  - Seine (# of hauls, length of hauls)
  - Electrofish (duration, voltage, amperage, pulse cycle)

Texas Commission on Environmental Quality
Surface Water Quality Monitoring Program

Fish Collection Reporting Form

***Scientific Collection Permit #:**			
***Water body**:		***Date**:	***Time**:
***Location**:			
Station ID:		***County**:	
Weather:		Lat/Long:	
Secchi depth (m):	Flow (cfs):	Avg depth:	Max depth:
Water temp (1'):	DO (1'):	Spec cond (1'):	pH (1'):
**Collectors:			
Gear Used			
Boat Mounted Electrofisher	Low range:	High range:	AC or DC?
	Pulses/sec:	% on:	
	Amps: a	Duration: sec	
Backpack Electrofisher	Voltage: v	Frequency: pps	
	Pulse width: msec	Duration: sec	
Gill net	Mesh size:	Length:	Duration of set:
Trawl	Width:	# Hauls:	Duration of haul:
Seine	Length:	# Hauls:	Duration of haul:
Cast net	Diameter:	# Casts:	or Duration of casting:
Other (specify)			
Habitat(s) sampled:			
Observations/comments:			

* ***Required Information*** when reporting fish collection data to Texas Parks and Wildlife Department (TPWD). Scientific collection permit holders are required to submit an annual collection summary to TPWD.

** Collectors must be listed in Appendix I of the Scientific Collection Permit. Each permit contains detailed requirements.

Fish Collection Reporting Form (continued)

*Common Name/Scientific Name	Total Length (units)	Weight (units)	*Total Number	*Number Saved for Analysis	*Physical Defects (see below)

Physical Defect Codes
1 – Discoloration 2 – Deformities 3 – Eroded Fins 4 – Excessive Mucus 5 – Excessive External Parasites
6 – Fungus 7 – Poor Conditions 8 – Reddening 9 – Scoliosis 10 – Tumors 11 – Ulcers 12 - Other

Documentation

- Labelling
  - Label outside of the jar and place paper label inside jar
  - Use quality grade of paper (cotton based) and write with pencil or water proof ink.
  - Labels should contain –
    - TCEQ Station ID and site description
    - Date and time of collection
    - Collection method
    - Names of collectors
    - Preservative
    - Drainage

Preservation of Specimens

- Full strength formalin is 37-40% formaldehyde
- Fish specimens to be brought back to the lab should be preserved in a 10% formalin solution which consists of:
  - 1 part formalin to 9 parts water
  - Formalin may be mixed with ambient water if relatively clear or with distilled water
  - Or a premixed 10% formalin solution may be brought to the field.
  - Formalin solution is acidic so buffering may be desired
    - Buffer with **Sodium phosphate dibasic (anhydrous) 6.5g/L or Sodium phosphate monobasic 4.0g/L**

Preservation of Specimens

- Fish should be placed in formalin while still alive to retain their distinctive markings
- Large fish should be slit along the right ventral side to ensure adequate preservation
- Fish will not be properly preserved if too many are crowded into a container
- Photo Voucher

Fish Collection

- If possible, both seining (≥ 6 hauls) and electrofishing (≥900 seconds) should be employed.
- Level of effort expended and habitat types sampled should be comparable between sites and succeeding years.
- Be aware of reach length (40 times the average stream width) which will be > 150m and < 500m.
- If new species are collected, continue past the minimum seining or electrofishing efforts.
- Sample all possible habitat types for each gear type.

Seining

- Minimum effort is 6 seine hauls approximately 10 m each
  - Multiple shorter hauls may be combined for an equivalent of one 10 m haul.
  - Only count the seine hauls which can be deemed effective (no fish in a particular haul is not necessarily an ineffective haul).
  - Increase seining efforts if stream conditions do not allow electrofishing (high conductivity, stream too deep)
  - Deep pools may be sampled with a 30’ x 6’ x ¼” seine whereas riffles, runs, and small pools may be sampled with a 15’ x 6’ x 3/16” seine

Seining

- Seining may be conducted in an upstream or downstream direction dependent on current velocity and habitat type.
- A seining crew should consist of at least 2 persons
- Make every attempt to prevent escape of fish, i.e. keep lead line down, repair holes in nets…
- Maintain fish in a bucket or live well equipped with an aeration device

Electrofishing

- Wadeable Streams Requirements
- Minimum effort is 900 seconds (15 min)
  - Increase electrofishing effort if stream conditions do not allow seining, i.e. numerous snags.
  - ALL species observed but not captured should be noted as such.
  - Sample ALL available habitat types (riffles, pools, undercut banks, snags, vegetation, man-made structures, etc…)
- Safety Considerations

Electrofishing Safety

- Only use commercially produced electrofishers with adequate safety devices.
  - Tilt switches, overload devices, kill switch, immersion switch
  - NEVER shock alone
  - Wear proper PPE
    - Rubber lineman gloves
    - Neoprene waders

Electrofishing

- Prior to the start of sampling
  - Verify that the safety features are functioning
  - Adjust voltage, frequency, and pulse width to fit the ambient water conditions
    - 60 Hz, 6ms, 100v
  - Once the controls are adjusted, reset the timer prior to sampling

Electrofishing

- The SWQM Manual Vol II – Chapter 3
  - Lower voltage for high conductivity
  - High voltage for low conductivity
  - Smith-Root recommends
    - 100 to 300 volts for conductance of 400 to 1,600 µS/cm
    - 400 to 700 volts for conductance of 200 to 400 µS/cm
    - 800 to 1,100 volts for conductance < 200 µS/cm

Electrofishing

- Use a backpack electrofisher in conductivities up to 1500 µS/cm
- Reset Timer
- Work from a downstream to upstream direction to avoid turbidity caused by wading.
- Netters should be on either side of the person operating the electrofisher.
- Fish discrete habitats only.
- Maintain fish in a bucket or live well with an aeration device.

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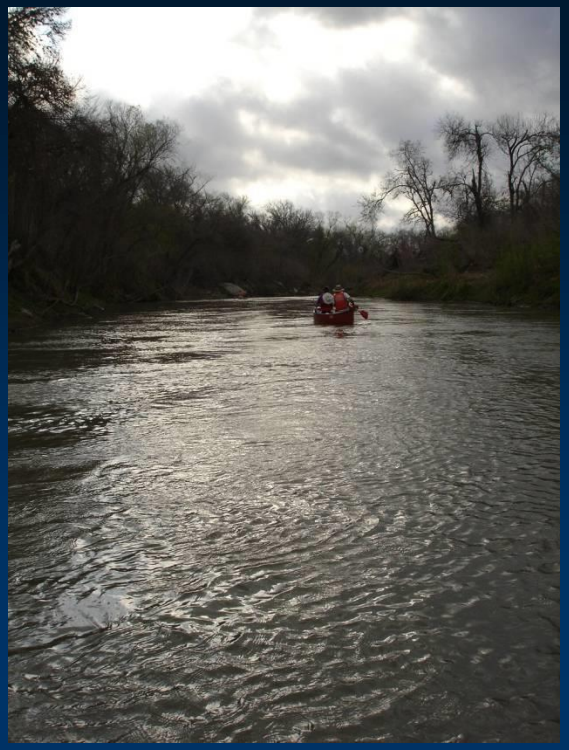
Summary

- Notify Game Wardens/Scientific Collection Permit.
- Documentation is VERY important
- Minimum of 6 seine hauls/900 seconds electrofishing
- Continue collecting until no new species are collected.



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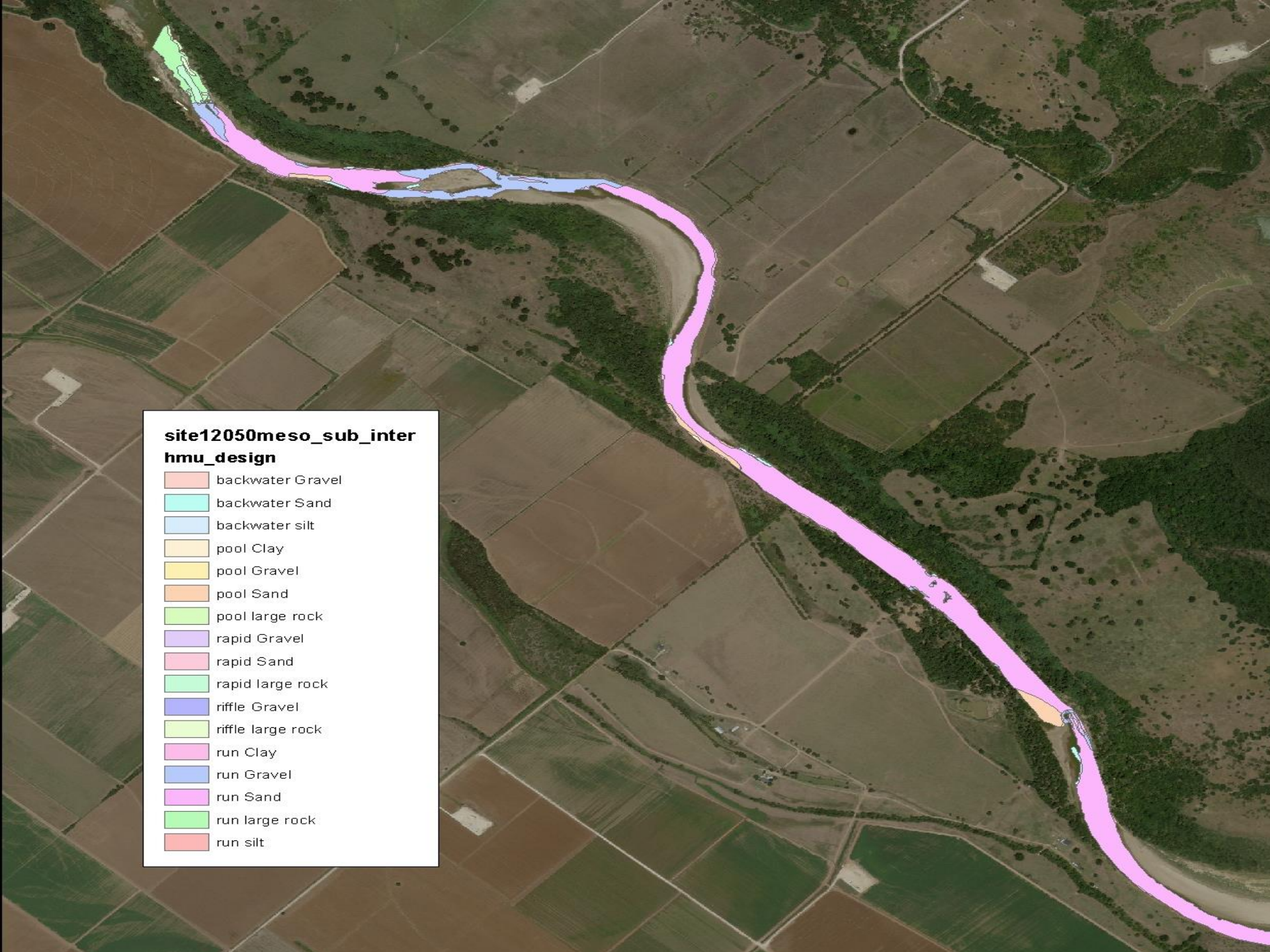
site12050meso_sub_inter
hmu_design
backwater Gravel
backwater Sand
backwater silt
pool Clay
pool Gravel
pool Sand
pool large rock
rapid Gravel
rapid Sand
rapid large rock
riffle Gravel
riffle large rock
run Clay
run Gravel
run Sand
run large rock
run silt


Pools
6 12:29 PM


Backwater


Riffles


Runs


Vegetation
17 9:56 AM


Woody Debris


Undercut Banks


Clear Water


DEADLIEST
CATCH

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Weather/Water Safety

- Check the weather before you go out
- If possible, check the flow of the stream

Formalin Safety

- Will cause irritation of the upper respiratory tract if inhaled
- Contact with eyes or skin may cause irritation or burns

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