

Appendix A: Equipment & Supplies

Base Kit

A Base Kit will be provided to the field crews for all sampling sites that they will go to. Some items are sent in the base kit as extra supplies to be used as needed.

Base Kit Item	Quantity	Protocol
Antibiotic Salve	1	Fish Plug
Aspirator bulb	1	Fish Plug
Beaker (3 L, Nalgene)	1	Water Chemistry
Centrifuge tube stand	1	Enterococci, Chlorophyll A, Periphyton
Centrifuge tubes (sterile, green screw-top, 50-mL) (10/pack)	1 pack	Chlorophyll A Periphyton
Chlorophyll bottle (2 L, brown)	1	Chlorophyll A
Clinometer†	1	Physical Habitat
Compass†	1	Physical Habitat
D-frame Kick Net (500 µm mesh, 52" handle)†	1	Benthics
Delimiter – 12 cm ² area	1	Periphyton
Densimeter - Convex spherical (modified with taped V) †	1	Physical Habitat
Electrical tape - roll*	1	General
FedEx labels, 5 sets of each in file folder (T1, T2, T3, T4/T5, Dry Ice)*	1	Shipping
Filtration chamber adapter	3	Enterococci, Chlorophyll A, Periphyton
Filtration flask	1	Enterococci, Chlorophyll A, Periphyton
Filtration flask stopper (silicone, blue)	2	Enterococci, Chlorophyll A, Periphyton
Filtration unit (sterile 250 ml funnel, cap and filter holder) - spares	5	Enterococci, Chlorophyll A, Periphyton
Fish Voucher supplies (25 netting bags & 50 packaging ties/pack)	1 pack	Fish Voucher
Fish weigh scale, case and extra batteries†	1	Fish plug
Flagging tape (1 red, 1 blue) – rolls	2	Physical Habitat
Foil squares (aluminum, 5x5", 25/pack)*	2 packs	Chlorophyll A Periphyton
Forceps (sterile, disposable) – spares	5	Enterococci, Chlorophyll A, Periphyton
Funnel (15 cm diameter)	1	Periphyton
Gloves (nitrile)*	1 box	General
Graduated cylinder (25 mL)	1	Periphyton
Graduated cylinder (250 mL)	1	Chlorophyll A, Periphyton
HDPE bottle (1 L, white, wide-mouth) (extras)	12	Benthics, Fish Vouchers
HDPE bottle (500 mL, white, wide-mouth) with graduations	1	Periphyton
Laser rangefinder†	1	Physical Habita
Measuring tape (50 meter)†	1	Physical Habitat

Base Kit Item	Quantity	Protocol
Microcentrifuge tubes with glass beads (extras or for filter blanks)	5	Enterococci
Millipore 47 mm polycarbonate 0.4 µ filters (100/box)	1 box	Enterococci
Packing tape (extra rolls)*	2	Shipping
Packing tape dispenser (includes roll of tape)	1	Shipping
Petri dishes 60x15 (disposable, 20/pack)	1 pack	Filter Storage
Pipette (2 mL)*	5	Periphyton
Rubbermaid Action Packer	1	General
Rubbermaid Roughneck tote (3 gallon)	1	General
Sieve bucket (500 µm)†	1	Benthics
Sodium Thiosulfate Tablets ~30 tables (in 10 mL vial)*	1	Enterococci
Sounding rod (PVC 3 m , marked in 0.1 m increments)†	1	Physical Habitat
Surveyor's level	1	Physical Habitat
Surveyor's telescoping leveling rod (rectangular, metric scale, 7.5m)†	1	Physical Habitat
Syringe (60 cc, with tip removed and tubing)*	1	Periphyton
Tape strips (25/pack)*	6 packs	General
Toothbrush (stiff-bristle, with handle bent at 90° angle)	1	Periphyton
Tripod for level†	1	Physical Habitat
Vacuum hand pump and clear plastic tubing†	1	Enterococci Chlorophyll A Periphyton
Wash bottles (1 L Nalgene) – 1 DI, 1 stream/river water	2	General
Whatman 47 mm glass fiber GF/F 0.7 µ filters (100/box)	1 box	Chlorophyll A, Periphyton
Whatman 47 mm glass fiber GF/C 1.2 µ filters (100/box)	1 box	Periphyton

**Items may need to be replenished by field crews during field season*

† Some items are sent in base kit as stock or extra supplies to be used as needed.

Site Kit

A **site kit** will be provided as requested to the field crews for each sampling site. Please submit an electronic request form **well in advance** of field sampling. Kits must be requested at least two weeks before sampling is to take place. Each site kit will include sample labels and packing slips with pre-printed sample IDs and will also include necessary coolers and shipping supplies for the immediately shipped samples. Prior to sampling, inspect each site kit to ensure all supplies are included. Some items may not be used at all sites and should be held until the end of the field season and shipped back. These site kits include:

Site Kit Item	Quantity	Protocol
Centrifuge tubes (sterile green screw-top, 50-mL)	4	Chlorophyll A Periphyton Biomass Periphyton Chlorophyll Periphyton ID
Cooler Liner	1	Shipping
Cubitainer (4 L)	1	Water Chemistry
Fish Tissue Plug Kit	1	Fish Tissue Plugs
Sterile scalpel	1	
Sterile biopsy punch	1	
Sterile disposable forceps	1	
20 mL acid washed glass scintillation vial	1	
Filtration unit (sterile 250 mL filter funnel, cap, and filter holder)	1	Enterococci Chlorophyll A Periphyton
Forceps (sterile, disposable)	2	Enterococci Chlorophyll A Periphyton
Gloves (nitrile)	8	General
HDPE bottle (1 L, white, wide-mouth)	2	Benthics/Fish Voucher
Microcentrifuge tubes w/glass beads (in bubble bag & Ziploc bag)	2	Enterococci
PET bottle (125 mL, sterile, clear, square)	1	Periphyton DNA
PETG bottle (1 L, clear, narrow mouth, sterile)	1	Bacteria DNA
PETG bottle (2 L, clear, narrow mouth, sterile)	1	Bacteria Culture
PETG bottle (250 mL, sterile, clear, square)	1	Enterococci
PETG bottle (500 mL, clear, square)	1	Algal Toxin
Phosphate buffered saline (sterile PBS)	1	Enterococci
Zip ties	2	Shipping

AMR Field Blank Kit

An **antimicrobial resistance (AMR) field blank kit** will be provided to each crew based on their reported number of revisit sites. The AMR field blank is to be taken during Visit 1 to all revisit sites.

AMR Field Blank Kit
AMR Field Blank label
Pre-sterilized 500 mL PETG bottle
Ultra-pure water (500 mL bottle)

Field Crew Supplied Equipment

This equipment will need to be supplied by the field crew.

Crew Supplied Item	Quantity	Protocol
Barometer or elevation chart to use for calibration		Calibration
Batteries		General
Binoculars	1	Physical Habitat
Bleach (1-10 %, or bleach alternative)		Cleaning
Bucket	1	Benthics/Fish
Calibration cups and standards for multi-probe unit		Water Chemistry
Cell phone, 2-way radios, and/or walkie-talkies		General
Chest waders	2 pair	Benthics Physical Habitat
Clipboard	2	General
Compass (Bearing – backpacking type)†	1	Physical Habitat
Digital camera with extra memory card & battery	1	General
Dip Nets (non-conducting, ¼" mesh)	2	Fish Collection
Dry Ice		Storage/Shipping
Electrofishing equipment (boat, barge, and/or backpack units, including variable voltage pulsator unit, wiring cables, generator, electrodes, dip nets, livewell and all safety equipment)	1	Fish Collection
Ethanol (95%)		Sample
Field gear (e.g., protective clothing, sunscreen, insect repellent, hat, water, food, backpack, cell phone)		General
Fisherman's vest (with lots of pockets and snap fittings)		General
Formalin (buffered, 10%)		Preserve Samples
GPS unit (with manual, reference card, extra battery)	1	Site Verification Physical Habitat
Knife or scissors	1	General
Laser rangefinder†	1	Physical Habitat
Linesman gloves		Fish Collection
Measuring board (millimeter scale)		Fish Collection
Measuring tape with reel (50- 100 m)†	1	Physical Habitat
Meter stick (for bank angle measurements)	1	Physical Habitat
Multi parameter meter with pH, DO, temp, and conductivity probes)	1	Water Chemistry
Pencils (#2, for inner benthic and fish voucher labels), Permanent marker (fine tip, for labels)	1	General
Sampling permits and/or access permission letters (if required)		Site Evaluation
Scalpel for slitting open large fish before preservation		Fish Collection
Seine (10' or 20' x 6' minnow or bag seine - ¼ inch mesh) (optional)		Fish Collection
Site maps/access instructions		Site Evaluation
Small spatula, spoon, or scoop to transfer sample	1	Benthics
Surveyor's flagging tape and/or pin flags		Physical Habitat
Watchmakers' forceps	1	Benthics
Water (deionized)		General
Wet ice		Sample Storage

† Item may be requested with Base Kit if needed

Boat and Safety Equipment

This is suggested equipment that would be supplied by the field crew.

Boat Equipment Item
Anchor (with line)
Boat horn
Boat plug (extra)
Bow/Stern lights
Emergency Tool kit
Gas Can
Hand Bilge pump
Lifejackets (1 per person)
Motor
Oars or Paddles
Sonar Unit
Spare Prop Shear Pin
Type IV PFD (Throwable Life Saving device)

Safety Equipment
Waders
Gloves
Sun-blocking Hat
Other appropriate field clothing
Safety glasses
First aid kits
Fire extinguishers
Blankets
Cellular/satellite phones or portable radios
Anti-bacterial soap
Clean water or ethyl alcohol
Medications

Stock Solutions (provided by Sampling Crew)

SOLUTION	USE	PREPARATION										
Bleach (1%)	Clean nets, other gear, and boat.	Add 40 mL bleach to 4 L distilled water.										
Bleach (10%)	Clean periphyton sampling equipment	Add 40 mL bleach to 400 mL distilled water.										
10% Buffered Formalin†	Preservation of periphyton ID sample and fixing Fish Vouchers	<table> <tbody> <tr> <td>Formaldehyde (37-40%)</td> <td>100 ml</td> </tr> <tr> <td>Distilled water</td> <td>900 ml</td> </tr> <tr> <td>NaH₂PO₄</td> <td>4.0 g</td> </tr> <tr> <td>Na₂HPO₄ (anhydrous)</td> <td>6.5 g</td> </tr> <tr> <td colspan="2">Mix to dissolve</td> </tr> </tbody> </table>	Formaldehyde (37-40%)	100 ml	Distilled water	900 ml	NaH ₂ PO ₄	4.0 g	Na ₂ HPO ₄ (anhydrous)	6.5 g	Mix to dissolve	
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Distilled water	900 ml											
NaH ₂ PO ₄	4.0 g											
Na ₂ HPO ₄ (anhydrous)	6.5 g											
Mix to dissolve												
95% Ethanol	Preservative for benthic invertebrate samples and fish vouchers.	No preparation needed (use stock solution as is).										

† 10% Buffered Formalin can also be purchased pre-mixed from various sources

Appendix B: Forms & Labels

The NRSA app will be preloaded on supplied iPads to record field data. Field crews will receive labels packets with the site kits they request through the electronic Supply Request Form. Do not mix labels from different sites. Please submit an electronic Supply Request Form well in advance of field sampling. Paper field forms will be supplied by NARS IM as backups to the App but all data must be submitted through the App.

Item
Field forms on the NRSA App (wadeable): Verification Field Measurement Sample Collection Fish Gear & Sampling Info Fish Collection Physical Habitat Benthic Collection Slope and Bearing Torrent Evidence Assessment Channel Constraint Site Assessment Tracking Federal ESA (<i>to be used by Federal and EPA-Contractors only</i>)
Field forms on the NRSA App (boatable): Verification Field Measurement Sample Collection Fish Gear & Sampling Info Fish Collection Physical Habitat Benthic Collection Torrent Evidence Assessment Channel Constraint Site Assessment Tracking Federal ESA (<i>to be used by Federal and EPA-Contractors only</i>)
Label Packet (included in each site kit): Primary Label sheet Enterococci labels (vials and bag) Benthos inner/outer label sheet (on waterproof paper) T1: NRSA23/24 Daily Water Chemistry Sample Tracking T2: NRSA23/24 Daily Bacteria Sample Tracking T3: NRSA23/24 Frozen Batched Tracking T4: NRSA23/24 Non-Chilled Batched Tracking Additional labels/slips (initial care package from the IM Team – quantity based on number of sites) Complete label packet (to be used as replacements for site kit label packet if needed) Backup paper forms (wadeable/non-wadeable) Blank labels Benthos inner/outer label sheet (on waterproof paper) - <i>extras</i> Fish Voucher Labels/Tags - QA Voucher Fish Voucher Labels/Tags – Unknown/Range Extension QA Voucher Extra Inner Jar Tags (on waterproof paper) and outer labels UNK Voucher Extra Inner Jar Tags (on waterproof paper) and outer labels T5: NRSA23/24 Fish Voucher/Unknown Tracking

Primary Label Sheet (Example only, do not use in field)

Anchor ID: 999000
Site ID: NRS23_ _____ Visit #: O1 O 2

WATER CHEMISTRY (CHEM)

Site ID: NRS23_ _____

Date: ____/____/202__ Visit #: O1 O2



999000

CHLOROPHYLL-a (WCHL)

Site ID: NRS23_ _____

Date: ____/____/202__ Visit #: O1 O2

Volume Filtered: ____mL



999001

PERIPHYTON BIOMASS (PBIO)

Site ID: NRS23_ _____

Date: ____/____/202__ Visit #: O1 O2

Volume Filtered: ____mL



999002

PERIPHYTON CHLOROPHYLL (PCHL)

Site ID: NRS23_ _____

Date: ____/____/202__ Visit #: O1 O2

Volume Filtered: ____mL



999003

WCHL, PBIO, PCHL - OUTER BAG

Site ID: NRS23_ _____

Date: ____/____/202__ Visit #: O1 O2

999001, 999002, 999003



T1

PERIPHYTON ASSEMBLAGE ID (PERI)

Site ID: NRS23_ _____

Date: ____/____/202__ Visit #: O1 O2

Composite Volume: ____mL



999004

PERIPHYTON METAGENOMIC (PDNA)

Site ID: NRS23_ _____

Date: ____/____/202__ Visit #: O1 O2

999005



T3

ALGAL TOXIN (MICX)

Site ID: NRS23_ _____

Date: ____/____/202__ Visit #: O1 O2

999006



T3

BENTHIC MACROINVERTEBRATES (BERW)

(Wadeable Sites)

Site ID: NRS23_ _____

Date: ____/____/202__ Visit #: O1 O2

Jar 1 of ____

999007



T4

BENTHIC MACROINVERTEBRATES (BETB)

(Boatable Sites)

Site ID: NRS23_ _____

Date: ____/____/202__ Visit #: O1 O2

Jar 1 of ____

999008



T4

BACTERIA CULTURE (BCUL)

Site ID: NRS23_ _____

Date: ____/____/202__ Visit #: O1 O2

Jar 1 of ____

999009



T2

BACTERIA DNA (BDNA)

Site ID: NRS23_ _____

Date: ____/____/202__ Visit #: O1 O2

999010



T2

FISH TISSUE PLUG (FPLG)

Site ID: NRS23_ _____

Date: ____/____/202__ Visit #: O1 O2

999011



T3

QA VOUCHER (VERT)

Site ID: NRS23_ _____

Date: ____/____/202__ Visit #: O1 O2

999012



T5

Enterococci Labels (Example only, do not use in field)

Filter : 1 Vol. Filt: _____ mL 999013	ENTEROCOCCI (ENTE) - BAG Site ID: NRS23_____ Date: ____/____/202__ Visit #: <input type="radio"/> 1 <input type="radio"/> 2 Vol. Filt: 1 _____ mL 2 _____ mL 999013
Filter : 2 Vol. Filt: _____ mL 999013	
Filter : Blank Vol. Filt: _____ mL 999013	

Benthos Extra Outer Jar and Inner Labels (Example only, do not use in field)

BENTHIC MACROINVERTEBRATES - Extra Jar Site ID: NRS23_____ Date: ____/____/202__ Visit #: <input type="radio"/> 1 <input type="radio"/> 2 Jar ____ of ____ T4 Sample Type: <input type="radio"/> BERW <input type="radio"/> BETB SAMPLE ID: _____	BENTHIC MACROINVERTEBRATES Site ID: NRS23_____ Site Name: _____ Date Collected: ____/____/202__ Sample Type: <input type="radio"/> BERW <input type="radio"/> BETB # of Transects: _____ Collector(s): _____ Jar ____ of ____ SAMPLE ID: _____
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AMR Field Blank Label (Example only, do not use in field)

AMR BLANK Site ID: NRS23_____ Date: ____/____/202__ Visit #: <input type="radio"/> 1 <input type="radio"/> 2

Blank (Replacement) Labels (Example only, do not use in field)

Sample Type: _____ Site ID: _____ Date: ____/____/202__ Visit #: O1 O2 Sample ID: _____	Sample Type: _____ Site ID: _____ Date: ____/____/202__ Visit #: O1 O2 Sample ID: _____
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Fish QA Voucher Extra Jar Labels (Example only, do not use in field)

QA VOUCHER (VERT) Site ID: NRS23_ _____ Date: ____/____/202__ Visit #: O1 O2  Jar ____ of ____ SAMPLE ID _____	QA VOUCHER (VERT) Site ID: NRS23_ _____ Date: ____/____/202__ Visit #: O1 O2  Jar ____ of ____ SAMPLE ID _____
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Fish Unknown/Range Extension Labels (Example only, do not use in field)

UNK VOUCHER (VERT) Site ID: NRS23_ _____ Date: ____/____/202__ Visit #: O1 O2 Jar ____ of ____	UNK VOUCHER (VERT) Site ID: NRS23_ _____ Date: ____/____/202__ Visit #: O1 O2 Jar ____ of ____
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Fish QA Voucher Tags (Example only, do not use in field)

QA VOUCHER (VERT) Site ID: NRS23_ _____ ____ / ____ / 202__ 999012		QA VOUCHER (VERT) Site ID: NRS23_ _____ ____ / ____ / 202__ 999012	
QA VOUCHER – BAG TAG: 41	QA VOUCHER – BAG TAG: 42	QA VOUCHER – BAG TAG: 43	QA VOUCHER – BAG TAG: 44
QA VOUCHER – BAG TAG: 37	QA VOUCHER – BAG TAG: 38	QA VOUCHER – BAG TAG: 39	QA VOUCHER – BAG TAG: 40
QA VOUCHER – BAG TAG: 33	QA VOUCHER – BAG TAG: 34	QA VOUCHER – BAG TAG: 35	QA VOUCHER – BAG TAG: 36
QA VOUCHER – BAG TAG: 29	QA VOUCHER – BAG TAG: 30	QA VOUCHER – BAG TAG: 31	QA VOUCHER – BAG TAG: 32
QA VOUCHER – BAG TAG: 25	QA VOUCHER – BAG TAG: 26	QA VOUCHER – BAG TAG: 27	QA VOUCHER – BAG TAG: 28
QA VOUCHER – BAG TAG: 21	QA VOUCHER – BAG TAG: 22	QA VOUCHER – BAG TAG: 23	QA VOUCHER – BAG TAG: 24
QA VOUCHER – BAG TAG: 17	QA VOUCHER – BAG TAG: 18	QA VOUCHER – BAG TAG: 19	QA VOUCHER – BAG TAG: 20
QA VOUCHER – BAG TAG: 13	QA VOUCHER – BAG TAG: 14	QA VOUCHER – BAG TAG: 15	QA VOUCHER – BAG TAG: 16
QA VOUCHER – BAG TAG: 09	QA VOUCHER – BAG TAG: 10	QA VOUCHER – BAG TAG: 11	QA VOUCHER – BAG TAG: 12
QA VOUCHER – BAG TAG: 05	QA VOUCHER – BAG TAG: 06	QA VOUCHER – BAG TAG: 07	QA VOUCHER – BAG TAG: 08
QA VOUCHER – BAG TAG: 01	QA VOUCHER – BAG TAG: 02	QA VOUCHER – BAG TAG: 03	QA VOUCHER – BAG TAG: 04

Fish Unknown/Range Extension Tags (Example only, do not use in field)

UNK/RNG VOUCHER Site ID: NRS23_ _____ ____ / ____ / 202__		UNK/RNG VOUCHER Site ID: NRS23_ _____ ____ / ____ / 202__	
UNK/RNG VOUCHER BAG TAG: 41	UNK/RNG VOUCHER BAG TAG: 42	UNK/RNG VOUCHER BAG TAG: 43	UNK/RNG VOUCHER BAG TAG: 44
UNK/RNG VOUCHER BAG TAG: 37	UNK/RNG VOUCHER BAG TAG: 38	UNK/RNG VOUCHER BAG TAG: 39	UNK/RNG VOUCHER BAG TAG: 40
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T1-T4 Packing Slips (Example only, do not use in field)

<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center; font-size: small;">For Lab Staff only:</p> <p>Lab Sample ID: <input style="width: 100%;" type="text"/></p> </div> <p>T1: NRSA23/24 Daily Water Chemistry Sample Tracking</p> <p>Site ID: <u>NRS23_</u> Visit #: <input type="radio"/> 1 <input type="radio"/> 2</p> <p>Date Collected: <u> </u>/<u> </u>/<u> </u></p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <thead> <tr> <th style="width: 10%;">Sample ID</th> <th style="width: 15%;">Lab Comments (For lab staff only)</th> </tr> </thead> <tbody> <tr><td>CHEM</td><td>999000</td></tr> <tr><td>WCHL</td><td>999001</td></tr> <tr><td>PBIO</td><td>999002</td></tr> <tr><td>PCHL</td><td>999003</td></tr> </tbody> </table> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <p style="text-align: center; font-size: small;">For Lab Staff only:</p> <p>Rec'd by: <input style="width: 150px;" type="text"/> Date Rec'd: <input style="width: 100px;" type="text"/></p> </div>	Sample ID	Lab Comments (For lab staff only)	CHEM	999000	WCHL	999001	PBIO	999002	PCHL	999003	<p>T2: NRSA23/24 Daily Bacteria Sample Tracking</p> <p>Site ID: <u>NRS23_</u> Visit #: <input type="radio"/> 1 <input type="radio"/> 2</p> <p>Date Collected: <u> </u>/<u> </u>/<u> </u></p> <p>Lab Staff: Samples In Box? Sample ID Lab Comments (For lab staff only)</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <tr> <td style="width: 5%; text-align: center; vertical-align: middle;"><input type="checkbox"/></td> <td style="width: 15%; font-size: x-small;">BCUL</td> <td style="width: 15%;">999009</td> <td style="width: 65%;"></td> </tr> <tr> <td style="text-align: center; vertical-align: middle;"><input type="checkbox"/></td> <td style="font-size: x-small;">BDNA</td> <td>999010</td> <td></td> </tr> <tr> <td colspan="4" style="text-align: center; font-size: x-small;">Please cross out sample id(s) not included in shipment.</td> </tr> <tr> <td style="text-align: center; vertical-align: middle;"><input type="checkbox"/></td> <td style="font-size: x-small;">AMR Field Blank included in shipment</td> <td></td> <td></td> </tr> </table>	<input type="checkbox"/>	BCUL	999009		<input type="checkbox"/>	BDNA	999010		Please cross out sample id(s) not included in shipment.				<input type="checkbox"/>	AMR Field Blank included in shipment				
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Appendix C: Shipping Guidelines

General Shipping Guidelines

Samples will be shipped according to the chart below (Table C.2). The Field Crew Leader will complete the appropriate sample tracking information for the samples and will submit tracking information via the NRSA App. The Field Crew Leader will place the samples and a packing slip or slips (in a waterproof bag or plastic sleeve) in the shipment cooler/box, and then the Field Crew Leader will attach the appropriate pre-addressed FedEx label for the appropriate lab. The field crew will either drop off the cooler for shipment at a local FedEx location or arrange for a pickup at the hotel or other appropriate facility. If the field crew has chosen a pickup, they must follow up with the facility at which it has been left and/or track the package through FedEx tracking tools to ensure that the shipment cooler has been picked up by FedEx. Once the package is in the possession of FedEx, the IM Team and Field Logistics Coordinator (FLC) will track the package to its destination and take steps necessary to ensure timely delivery.

Tracking information must be submitted electronically to the IM Team via the NRSA App on the same day as shipping and a packing slip must accompany each sample shipment. The packing slip is to be placed in a resealable plastic bag/pouch secured to the inside of the cooler lid or inside the top of the box. Seal the shipping container. Submit the sample tracking information to the NARS IM Team via the NRSA App to indicate that samples will be in transit to the laboratory. Tracking information must be submitted the same day that the samples are shipped.

Before shipping, it is very important to preserve each sample as directed in the sample collection portion of the appropriate section in the NRSA 2023-24 FOM. General directions for sample processing, shipping and tracking are found below:

- Preserve the samples as specified for each indicator before shipping.
- Be aware of the holding times for each type of sample.
- Always line coolers with a heavy-duty plastic bag (cooler liner) when shipping with wet ice or when shipping preserved samples.
- When shipping samples preserved with ethanol, surround the jars with crumpled newspaper or other absorbent material.

When wet ice is used for shipment:

- Ensure that the ice is fresh before shipment and use adequate amounts of ice to ensure samples will remain cold for up to 36 hours.
- Place samples and ice inside the cooler liner and seal the cooler liner.
- Secure the cooler with packing tape.

When dry ice is used for shipment:

- When shipping frozen batched samples, line the dry ice box with the two-piece liner.
 - Using the larger pad, place one end of the pad in the bottom of the box and lay the second pad segment up one side of the box. The final segment of the larger pad will become the “lid” of the completed dry ice liner.
 - Form the smaller pad into the shape of a “C” and place it on its edge in the box, lining three remaining sides of the box (one with each segment of the pad).
- Ship frozen batched samples with approximately 10 pounds of dry ice.
- When possible, layer samples and dry ice so that as many samples are in contact with dry ice as possible.
 - When using block dry ice, place a 10 lb block on top of the samples when batching 3-4 sites, or place a 10 lb block of dry ice between the samples if batching 1-2 sites.
 - If dry ice pellets are available, fill all the void spaces between samples with pellets.
- Affix a Class 9 Hazardous Goods label (**Figure C.1**) to the outside of the box making sure that it indicates the sender, recipient and amount of dry ice (in kg).



Figure C.1 Class 9 Hazardous Goods label for use with dry ice shipments

NOTE: Not all FedEx locations will accept shipments containing dry ice. Dry ice shipments can be shipped from “FedEx staffed” locations. You can also arrange for a pick-up from your lab or hotel. Dry ice shipments often cannot be shipped from FedEx Office and Print Centers® or FedEx Authorized ShipCenter® locations or FedEx Retail locations like Walgreens or office supply stores. These types of locations are differentiated on FedEx.com in the “Find FedEx Locations” feature. Please be sure to call in advance to ensure your location will accept the package for shipment.

When shipping samples preserved with ETOH or Formalin (non-chilled batched or fish voucher samples):

- Close the lid of each container tightly and securely with electrical tape
- Line the cooler with the provided cooler liner.
- Place sealed sample containers inside cooler liner
- Surround the jars with crumpled newspaper, pads, or other absorbent material. Do not use vermiculite or other granular absorbents.
- Ensure that all 1-liter bottles are standing upright in the cooler and use additional packing material to fill void spaces and keep bottles upright.
- Seal the cooler liner securely with zip tie.
- Secure the cooler with packing tape.

NOTE: Federal regulations and FedEx rules allow for Ground shipping of certain quantities of flammable liquids *WITHOUT* the need for special certifications and labeling. Flammable liquids may *NOT* be shipped via air carrier unless shipper is trained and qualified to do so and specific documentation and labeling requirements are met.

The Code of Federal Regulations (49 CFR Section 173.150) lists the exceptions which allow shipping of flammable liquids via ground carrier without labeling or special certifications. Ethanol and formalin can be considered to be in either Packaging Group 2 or 3, so we use the more stringent PG 2 as our guideline. The limited quantity exclusion allows ground shipping of PG 2 flammable liquids provided that the individual containers inside the package are not over 1.0 liters each, that the gross weight of the package does not exceed 66 pounds, and that the outer packaging is a sturdy container. Please ensure that your shipment meets these criteria to ensure the legal Ground shipment of these samples.

Tracking Form, Packing Slips, and Shipment Types

Whenever NRSA samples are shipped, one or more sections of the Tracking Form is completed in the NRSA App to relay important shipping information to the IM Team, FLC and the destination lab. The Tracking Form is submitted electronically through the NRSA App at the time of shipping and a packing slip is included as a hard copy in the shipping container with the samples.

Each section of the Tracking Form has been assigned a “T” number to help crews identify the correct section of the form to use when sending samples. This “T” number is located on the top of each tracking form section. Crews will also find reference to the same “T” numbers on the individual sample labels and on the top of the pre-printed FedEx return labels provided in the site kits or with batch coolers. The FedEx return labels are pre-paid and allow crews to ship samples to any of the nationally contracted laboratories. States using their own labs for certain samples will need to arrange for shipping on their own.

Packing slips (**Figure C.2**) are postcard sized slips that accompany sample labels in the site kits. When crews order site kits (via the Request Form), a set of sample labels and packing slips will accompany each site kit. Sample IDs for the suite of samples collected at a single site will be pre-populated on both the labels and the packing slips. It is important to keep the labels and packing slips organized so the sample IDs will match when shipping occurs. It is a good idea to write the Site ID, date, and visit number in the header area of all packing slips when preparing the Site Packet, even if the slip will not be used to ship samples right away. This will help ensure that the sample IDs do not get mis-matched. By entering the water chemistry sample ID in the Tracking Form in the NRSA App, the rest of the sample IDs will

auto-populate in the T-sections of the Tracking Form to allow the crew to verify the sample IDs that are assigned to the site visit.

T1: NRS23/24 Daily Water Chemistry Sample Tracking
Site ID: NRS23_ Visit #: 1 2
Date Collected: ____/____/____
Sample ID Lab Comments (For lab staff only)

CHEM	999000	
WCHL	999001	
PBIO	999002	
PCHL	999003	

For Lab Staff only:
Lab Sample ID: _____
Rec'd by: _____ Date Rec'd: _____

T2: NRS23/24 Daily Bacteria Sample Tracking
Site ID: NRS23_ Visit #: 1 2
Date Collected: ____/____/____
Lab Staff: Samples In Box? Sample ID Lab Comments (For lab staff only)

<input type="checkbox"/>	BCUL	999009	
<input type="checkbox"/>	BDNA	999010	
Please cross out sample id(s) not included in shipment.			
<input type="checkbox"/>	AMR Field Blank included in shipment	<input type="checkbox"/>	

T3: NRS23/24 Frozen Batched Tracking
Site ID: NRS23_ Visit #: 1 2
Date Collected: ____/____/____
Lab Staff: Samples In Box? Sample ID Lab Comments (For lab staff only)

<input type="checkbox"/>	ENTE	999013	
<input type="checkbox"/>	PDNA	999005	
<input type="checkbox"/>	MICX	999006	
<input type="checkbox"/>	FPLG	999011	

Please cross out sample id(s) not included in shipment.

T4: NRS23/24 Non-Chilled Batched Tracking
Site ID: NRS23_ Visit #: 1 2
Date Collected: ____/____/____
Lab Staff: Samples In Box? Sample ID Lab Comments (For lab staff only)

<input type="checkbox"/>	BERW	999007	
<input type="checkbox"/>	BETB	999008	
<input type="checkbox"/>	PERI	999004	

Please cross out sample id(s) not included in shipment. 9901360974

Figure C.2. Example of T1-T4 Packing Slips

Crews include the pertinent packing(s) slip in the cooler or box (placed in the plastic sleeve affixed to the inside of the cooler lid or the provided zip-top bag) when they send samples to the labs, and they also must submit the completed section of the Tracking Form that is associated with that sample shipment via the NRSA App. If a cooler or box contains samples from more than one site, then multiple packing slips must be placed in the package and the Tracking Form for each site must be submitted.

When a crew visits a site with the intent to sample, they complete and submit the Verification Form via the NRS23 App. It is very important to submit this form as soon as possible after every attempted sampling event to provide key information such as the date of the event, the crew ID, and whether the site was sampled. Prompt status reports allow the FLC to closely track sampling progress. More importantly, it enables NARS IM to track samples that were collected at each successfully sampled site versus those that were not, and to immediately track the shipment of the time-sensitive samples after each sampling event. Submitting the Verification Form is crucial to report the date of a completed sampling event and must be submitted (along with sample tracking information) on the same day that samples are shipped.

Procedure for filling out and submitting tracking information via the App

1. After ensuring all of the samples to be shipped are properly preserved and prepared for shipment, access the Tracking Form in the App.
2. Ensure the correct water chemistry sample ID has been entered at the top of the form. Doing so will populate the sample IDs of all other collected samples. Samples that were not collected will display a blank sample ID field and the not collected bubble will be transferred from the individual sample collection forms. The not collected bubbles are not editable in the Tracking Form; to change the collection status of a sample, access the pertinent sample collection forms (e.g., Sample Collection, Fish Collection, and/or Benthic Collection forms).
3. In the pertinent section of the Tracking form, check the box under the 'To Ship' column for each sample being sent in the shipment.
4. Click the 'Enter Shipping Details' button and fill out the resulting popup window with the destination lab, date shipped, tracking number, sender, and sender's phone number.
5. Click the 'save shipping info' button to save the details and the Tracking Form .
6. Once the shipping details have been saved in the App, a date will appear in the shipped column of the Tracking Form . If the shipping details for a sample need to be edited, click the date in the shipped column to access the saved shipping details. Editing the details in this manner changes ONLY one sample at a time. The only way to enter shipping details for an entire group of samples is during the initial details entry.
 - a. If the status of the sample needs to change from shipped to not shipped, click the date in the shipped column to access the saved shipping details and delete all the shipping info. Click the "save shipping info" button after deleting all the shipping information. The sample will no longer be marked as shipped and the "to ship" checkbox will reappear.
7. After all pertinent shipping details have been saved, click the SUBMIT menu button and select the button next to 'Tracking' and any other the forms that you wish to submit. Click the green submit button at the bottom of the form list. An email will pop up on your device addressed to NARSFieldData@epa.gov. Copy yourself if desired, any other crew members or managers you wish and click send. To ensure that the email was sent, check the SENT mailbox on your email app and look for the recent email containing the data. If the email is not in the SENT mailbox, it was not sent, and you should try again after verifying an internet connection.
8. At any point, if it is determined that data needs to be revised or updated, crews should feel free to do so in the App and re-submit any edited data or tracking information using the steps above. Newly revised data will automatically take the place of previous data. It is not necessary to re-submit data or tracking forms that were unchanged, however.
9. After submission, a data summary will be automatically emailed back to the email address from which the submission was received. The Field Crew Leader or his/her designee should review this data summary for accuracy and make any corrections necessary and re-submit the pertinent form(s).

Shipping Groups:

T-1 – Daily Water Chemistry Samples

- Complete the T-1 section of the Tracking Form for the water chemistry samples that are shipped immediately after each sampling event (e.g., same day as sampling or the next day):
 - Water chemistry (CHEM)
 - Chlorophyll-a (WCHL)
 - Periphyton chlorophyll (PCHL)
 - Periphyton biomass (PBIO)
- These samples are shipped together in the 48-quart site kit cooler with a heavy-duty liner bag and ample wet ice.
- Submit the Tracking Form and all data forms from the site to the IM Team via the NRSA App.
- Ship all of the T1 samples to the lab in the same cooler with the packing slip that was provided with the label packet. If any sample listed on the packing slip is not being shipped, line out the sample ID to indicate that the sample is not in the cooler.
- Samples need to be shipped on as much fresh wet ice as will fit in the cooler liner. These samples should be shipped within 24 hours of collection (i.e., the same day as sampling or the following day).

T-2 – Daily Bacteria Samples

- Complete the T-2 section of the Tracking Form for the antimicrobial resistance samples that are shipped immediately after each sampling event (e.g., same day as sampling or the next day):
 - Bacteria culture (BCUL)
 - Bacteria DNA (BDNA)
 - AMR Field Blank (*collected at visit 1 to revisit sites only*)
- These samples are shipped together in the 18-quart cooler that accompanies each site kit with a heavy-duty liner bag and ample wet ice.
- Submit the Tracking Form and all data forms from the site to the IM Team via the NRSA App.
- Ship all of the T2 samples to the lab in the same cooler with the packing slip that was provided with the labeled packet. If either of the bacteria samples listed on the packing slip is not being shipped, line out the sample ID to indicate that the sample is not in the cooler.
- If the AMR field blank is being included in the shipment, be sure to check the box on the packing slips that indicates this.
- Samples need to be shipped on as much fresh wet ice as will fit in the cooler liner. These samples should be shipped within 24 hours of collection (i.e., the same day as sampling or the following day).

T-3 – Frozen Batched Samples

- Complete the T-3 section of the Tracking form when shipping the frozen batched samples:
 - Enterococci (ENTE)
 - Fish plug (FPLG)
 - Algal toxins (MICX)
 - Periphyton Metagenomics (PDNA)
- These samples are shipped together in a dry ice box (ordered via the Request Form) with a two-piece dry ice liner and approximately 10 pounds of dry ice.
- Up to 4 site's worth of samples may be shipped together in a single box.

- Ship all of the T3 samples from a site to the lab in the same box with the packing slip that was provided with the label packet. If any sample listed on the packing slip is not being shipped, line out the sample ID to indicate that the sample is not in the cooler. If samples from multiple sites are shipped together, then multiple packing slips must be used.
- To pack the dry ice box:
 - Using the larger dry ice liner pad, place one end of the pad in the bottom of the box and lay the second pad segment up one side of the box. The final segment of the larger pad will become the “lid” of the completed dry ice liner.
 - Form the smaller pad into the shape of a “C” and place it on its edge in the box, lining three remaining sides of the box (one with each segment of pad).
 - Ship frozen batched samples with approximately 10 pounds of dry ice.
 - When possible, layer samples and dry ice so that as many samples are in contact with dry ice as possible.
 - When using block dry ice, place a 10 lb block on top of the samples when batching 3-4 sites, or place a 10 lb block of dry ice between the samples if batching 1-2 sites.
 - If dry ice pellets are available, fill all the void spaces between samples with pellets.
 - Affix a Class 9 Hazardous Goods label to the outside of the box making sure that it indicates the sender, recipient and amount of dry ice (in kg).
- Frozen batched samples should be shipped at least every week.
- In cases where a state lab is processing some, but not all of the samples, first select “To Ship” checkboxes for the samples being sent to the national lab and select the appropriate lab in the shipping details popup window. The T-3 packing slip should be placed in the cooler being shipped to the national lab and should only indicate the sample(s) being shipped in that cooler. Line out the sample IDs to indicate which samples are not in the cooler. Select “To Ship” checkboxes for the remaining samples being sent to the state lab and select the appropriate lab in the shipping details popup window.
- Verify the sample IDs for the sample(s) being shipped.
- Submit the Tracking form to NARS IM in the NRSA App using the steps above.

T-4 – Non-Chilled Batched Samples

- Complete the T4 section of the Tracking Form for shipping batches of non-chilled samples:
 - Benthic macroinvertebrates (BERW/BETB)
 - Periphyton ID (PERI)
- These samples are shipped together in a 48-quart cooler (ordered via the Request Form) with a heavy-duty liner bag and no ice.
- The number of samples that will fit in a cooler will depend on the number of benthos bottles collected from each site. In most cases, samples from three to six site visits will fit in a cooler together. NEVER split samples from one site into more than one cooler and do not include more than 15 benthos bottles in any single cooler.
- Ship all of the T4 samples from a site to the lab in the same cooler with the packing slip that was provided with the label packet. If samples from multiple sites are shipped together, then multiple packing slips must be used.
- Place 1-liter benthos bottles upright in the lined cooler and use newspaper or cardboard to fill any empty space between benthos bottles to keep them in an upright position during shipping. Do not use vermiculite or other granular absorbents.
- Ensure that all 1-liter bottles are standing upright in the cooler and use additional packing material to fill void spaces and keep bottles upright.

- Non-chilled batched shipped samples should be shipped within two weeks of collection.
- In cases where a state lab is processing some, but not all of the samples, first select “To Ship” checkboxes for the samples being sent to the national lab and select the appropriate lab in the shipping details popup window. The T-4 packing slip should be placed in the cooler being shipped to the national lab and should only indicate the sample(s) being shipped in that cooler. Line out the sample IDs to indicate which samples are not in the cooler. Select “To Ship” checkboxes for the remaining samples being sent to the state lab and select the appropriate lab in the shipping details popup window.
- Verify the sample IDs for the sample(s) being shipped.
- Submit the Tracking form to NARS IM in the NRSA App using the steps above.

T-5 – Fish Voucher Samples

Crews sampling fish at NRSA sites will be assigned a set of fish voucher sites at which the fish taxonomist will collect specimens representing each species collected during the site visit. Whenever possible, these will be preserved specimens, although photovouchers are an acceptable substitute when the crew is not permitted to collect physical specimens or when the individuals collected are too large to be preserved.

Photovouchers will be uploaded to the NRSA SharePoint site and preserved voucher specimens will be shipped to the GLEC lab or an approved state lab.

To track the fish voucher samples and to communicate with the QA Taxonomist, a T5 packing slip should be filled out for every voucher sample. This same form can also be used when submitting unknown fish for lab identification.

- Complete the header with the site ID, visit number, and date.
- Fill in either the QA Vouchers bubble or the Unknowns bubble to indicate the sample type. If the sample is a QA Voucher, enter the sample ID which is pre-printed on the QA Voucher label from the label sheet found in your site kit.
- On the left side of the T5 packing slip, enter the Tag number that you assigned to the line of fish data in the Fish Collection Form. Note that line numbers and tag numbers will not necessarily be the same because the same species may occur on multiple lines, but any given species should only be assigned a single tag number.
- Enter the number of preserved specimens that are being sent to the QA taxonomist for each tag number. If a Tag will be represented by photovouchers only, enter 0 in this field.
- Enter the number of photovouchers that have been prepared and upload them to SharePoint in the designated crew folder. Make sure each photo is named as designated in the Fish Collection Form.
- Since QA Voucher identifications are to be independent of the field identification, do not include fish names or other identifying information on the packing slip, photos, file names, or on any of the sample labels or tags. Also, do not complete any portion of the right side of the slip, this is for lab staff only.
- Complete the T5 section of the Tracking Form for shipping batches of fish voucher samples:
- These samples are shipped together in a 48-quart cooler (ordered via the Request Form) with a heavy-duty liner bag and no ice.

- Ship all of the fish voucher samples from a site to the lab in the same cooler with the completed T5 packing slip. If fish voucher samples from multiple sites are shipped together, then multiple packing slips must be used.
- Place 1-liter voucher bottles upright in the lined cooler and use newspaper or cardboard to fill any empty space between bottles to keep them in an upright position during shipping. Do not use vermiculite or other granular absorbents.
- Ensure that all 1 liter bottles are standing upright in the cooler and use additional packing material to fill void spaces and keep bottles upright.
- Submit the Tracking form to NARS IM in the NRSApp using the steps above.

APPENDIX C: SHIPPING GUIDELINES



Figure C.3. Sample packaging and shipping summary

Table C.2 Sample preservation and holding times

SAMPLE		PRESERVATIVE	PACKAGING FOR SHIPMENT	HOLDING TIME
T1 WATER CHEMISTRY SAMPLES	Water Chemistry CHEM	Wet ice	Ship in lined cooler with wet ice	24 hours; ship these samples together PESD-AL lab - Corvallis or State approved lab
	Chlorophyll- <i>a</i> WCHL	Dry ice in field		
	Periphyton Chlorophyll PCHL	Dry ice in field		
	Periphyton Biomass PBIO	Dry ice in field		
T2 ANTIMICROBIAL RESISTANCE SAMPLES	Bacteria Culture BCUL	Wet ice	Ship in lined cooler with wet ice	24 hours; ship these samples together to EPA lab - Cincinnati
	Bacteria DNA BDNA	Wet ice		
	AMR Field Blank <i>(V1 to revisit sites only)</i>	Wet ice		
T3 FROZEN BATCHED SAMPLES	Algal Toxins MICX	Wet ice in field, Freeze as soon as possible	Ship in dry ice box with 2-piece dry ice liner with 10 pounds of DRY ICE	Batch; ship weekly to GLEC or State approved lab
	Enterococci ENTE	Dry ice in field; MUST be filtered & frozen within 6 hours of collection Hold in freezer or on dry ice		
	Fish Tissue Plugs FPLG	Dry ice in field; Hold in freezer or on dry ice		
	Periphyton Metagenomics PDNA	Wet ice in field, freeze as soon as possible		
T4 NON-CHILLED BATCHED SAMPLES	Benthic macroinvertebrates BERW or BETB	95% Ethanol	Ship in lined cooler with absorbent material	Batch; ship every 2 weeks GLEC or approved state lab
	Periphyton – ID PERI	Formalin		
T5 FISH VOUCHERS	Fish QA Vouchers* VERT	95% Ethanol	Ship in lined cooler with absorbent material	Batch; when vouchers are fully prepared ship to GLEC or approved state lab

*Fish vouchers are collected at selected site only.

Appendix D: Standard Common and Scientific Names of Fish and Amphibians

Table D-1. Standard Common and Scientific Names of Fish

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME
Acipenseriformes	Acipenseridae	<i>Acipenser oxyrinchus</i>	atlantic sturgeon
Acipenseriformes	Acipenseridae	<i>Acipenser medirostris</i>	green sturgeon
Acipenseriformes	Acipenseridae	<i>Acipenser fulvescens</i>	lake sturgeon
Acipenseriformes	Acipenseridae	<i>Acipenser brevirostrum</i>	shortnose sturgeon
Acipenseriformes	Acipenseridae	<i>Acipenser transmontanus</i>	white sturgeon
Acipenseriformes	Acipenseridae	<i>Scaphirhynchus suttkusi</i>	alabama sturgeon
Acipenseriformes	Acipenseridae	<i>Scaphirhynchus albus</i>	pallid sturgeon
Acipenseriformes	Acipenseridae	<i>Scaphirhynchus platyrhynchus</i>	shovelnose sturgeon
Acipenseriformes	Polyodontidae	<i>Polyodon spathula</i>	paddlefish
Amiiformes	Amiidae	<i>Amia calva</i>	bowfin
Anguilliformes	Anguillidae	<i>Anguilla rostrata</i>	american eel
Anguilliformes	Congridae	<i>Conger oceanicus</i>	conger eel
Anguilliformes	Ophichthidae	<i>Myrophis punctatus</i>	speckled worm eel
Atheriniformes	Atherinopsidae	<i>Labidesthes sicculus</i>	brook silverside
Atheriniformes	Atherinopsidae	<i>Membras martinica</i>	rough silverside
Atheriniformes	Atherinopsidae	<i>Menidia beryllina</i>	inland silverside
Atheriniformes	Atherinopsidae	<i>Menidia audens</i>	mississippi silverside
Atheriniformes	Atherinopsidae	<i>Menidia extensa</i>	waccamaw silverside
Atheriniformes	Atherinopsidae	<i>Menidia menidia</i>	atlantic silverside
Beloniformes	Belonidae	<i>Strongylura marina</i>	atlantic needlefish
Carcharhiniformes	Carcharhinidae	<i>Carcharhinus leucas</i>	bull shark
Characiformes	Characidae	<i>Astyanax mexicanus</i>	mexican tetra
Clupeiformes	Clupeidae	<i>Alosa alabamae</i>	alabama shad
Clupeiformes	Clupeidae	<i>Alosa pseudoharengus</i>	alewife
Clupeiformes	Clupeidae	<i>Alosa sapidissima</i>	american shad
Clupeiformes	Clupeidae	<i>Alosa aestivalis</i>	blueback herring
Clupeiformes	Clupeidae	<i>Alosa mediocris</i>	hickory shad
Clupeiformes	Clupeidae	<i>Alosa chrysochloris</i>	skipjack herring
Clupeiformes	Clupeidae	<i>Dorosoma cepedianum</i>	gizzard shad
Clupeiformes	Clupeidae	<i>Dorosoma petenense</i>	threadfin shad
Clupeiformes	Clupeidae	<i>Harengula jaguana</i>	scaled sardine
Clupeiformes	Clupeidae	<i>Opisthonema oglinum</i>	atlantic thread herring
Clupeiformes	Clupeidae	<i>Brevoortia patronus</i>	gulf menhaden
Clupeiformes	Engraulidae	<i>Anchoa mitchilli</i>	bay anchovy
Cypriniformes	Catostomidae	<i>Carpionodes velifer</i>	highfin carpsucker
Cypriniformes	Catostomidae	<i>Carpionodes cyprinus</i>	quillback
Cypriniformes	Catostomidae	<i>Carpionodes carpio</i>	river carpsucker
Cypriniformes	Catostomidae	<i>Catostomus discobolus</i>	bluehead sucker
Cypriniformes	Catostomidae	<i>Catostomus columbianus</i>	bridgelip sucker
Cypriniformes	Catostomidae	<i>Catostomus clarkii</i>	desert sucker

APPENDIX D: STANDARD COMMON AND SCIENTIFIC NAMES OF FISH AND AMPHIBIANS

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME
Cypriniformes	Catostomidae	<i>Catostomus latipinnis</i>	flannelmouth sucker
Cypriniformes	Catostomidae	<i>Catostomus snyderi</i>	klamath largescale sucker
Cypriniformes	Catostomidae	<i>Catostomus rimiculus</i>	klamath smallscale sucker
Cypriniformes	Catostomidae	<i>Catostomus macrocheilus</i>	largescale sucker
Cypriniformes	Catostomidae	<i>Catostomus catostomus</i>	longnose sucker
Cypriniformes	Catostomidae	<i>Catostomus microps</i>	modoc sucker
Cypriniformes	Catostomidae	<i>Catostomus platyrhynchus</i>	mountain sucker
Cypriniformes	Catostomidae	<i>Catostomus fumeiventris</i>	owens sucker
Cypriniformes	Catostomidae	<i>Catostomus plebeius</i>	rio grande sucker
Cypriniformes	Catostomidae	<i>Catostomus occidentalis</i>	sacramento sucker
Cypriniformes	Catostomidae	<i>Catostomus santaanae</i>	santa ana sucker
Cypriniformes	Catostomidae	<i>Catostomus insignis</i>	sonora sucker
Cypriniformes	Catostomidae	<i>Catostomus tahoensis</i>	tahoe sucker
Cypriniformes	Catostomidae	<i>Catostomus ardens</i>	utah sucker
Cypriniformes	Catostomidae	<i>Catostomus warnerensis</i>	warner sucker
Cypriniformes	Catostomidae	<i>Catostomus commersonii</i>	white sucker
Cypriniformes	Catostomidae	<i>Catostomus bernardini</i>	yaqui sucker
Cypriniformes	Catostomidae	<i>Chasmistes cujus</i>	cui-ui
Cypriniformes	Catostomidae	<i>Chasmistes liorus</i>	june sucker
Cypriniformes	Catostomidae	<i>Chasmistes brevirostris</i>	shortnose sucker
Cypriniformes	Catostomidae	<i>Chasmistes muriei</i>	snake river sucker
Cypriniformes	Catostomidae	<i>Cycleptus elongatus</i>	blue sucker
Cypriniformes	Catostomidae	<i>Cycleptus meridionalis</i>	southeastern blue sucker
Cypriniformes	Catostomidae	<i>Deltistes luxatus</i>	lost river sucker
Cypriniformes	Catostomidae	<i>Erimyzon oblongus</i>	creek chubsucker
Cypriniformes	Catostomidae	<i>Erimyzon sucetta</i>	lake chubsucker
Cypriniformes	Catostomidae	<i>Erimyzon tenuis</i>	sharpfin chubsucker
Cypriniformes	Catostomidae	<i>Hypentelium etowanum</i>	alabama hog sucker
Cypriniformes	Catostomidae	<i>Hypentelium nigricans</i>	northern hog sucker
Cypriniformes	Catostomidae	<i>Hypentelium roanokense</i>	roanoke hog sucker
Cypriniformes	Catostomidae	<i>Ictiobus cyprinellus</i>	bigmouth buffalo
Cypriniformes	Catostomidae	<i>Ictiobus niger</i>	black buffalo
Cypriniformes	Catostomidae	<i>Ictiobus bubalus</i>	smallmouth buffalo
Cypriniformes	Catostomidae	<i>Minytrema melanops</i>	spotted sucker
Cypriniformes	Catostomidae	<i>Moxostoma ariommum</i>	bigeye jumprock
Cypriniformes	Catostomidae	<i>Moxostoma duquesnei</i>	black redhorse
Cypriniformes	Catostomidae	<i>Moxostoma poecilurum</i>	blacktail redhorse
Cypriniformes	Catostomidae	<i>Moxostoma cervinum</i>	blacktip jumprock
Cypriniformes	Catostomidae	<i>Moxostoma erythrurum</i>	golden redhorse
Cypriniformes	Catostomidae	<i>Moxostoma congestum</i>	gray redhorse
Cypriniformes	Catostomidae	<i>Moxostoma lachneri</i>	greater jumprock
Cypriniformes	Catostomidae	<i>Moxostoma valenciennesi</i>	greater redhorse

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME
Cypriniformes	Catostomidae	<i>Moxostoma lacerum</i>	harelip sucker
Cypriniformes	Catostomidae	<i>Moxostoma austrinum</i>	mexican redhorse
Cypriniformes	Catostomidae	<i>Moxostoma collapsum</i>	notchlip redhorse
Cypriniformes	Catostomidae	<i>Moxostoma pisolabrum</i>	pealip redhorse
Cypriniformes	Catostomidae	<i>Moxostoma carinatum</i>	river redhorse
Cypriniformes	Catostomidae	<i>Moxostoma robustum</i>	robust redhorse
Cypriniformes	Catostomidae	<i>Moxostoma macrolepidotum</i>	shorthead redhorse
Cypriniformes	Catostomidae	<i>Moxostoma anisurum</i>	silver redhorse
Cypriniformes	Catostomidae	<i>Moxostoma breviceps</i>	smallmouth redhorse
Cypriniformes	Catostomidae	<i>Moxostoma rupiscartes</i>	striped jumprock
Cypriniformes	Catostomidae	<i>Moxostoma pappillosum</i>	v-lip redhorse
Cypriniformes	Catostomidae	<i>Moxostoma cf. poecilurum</i>	apalachicola redhorse
Cypriniformes	Catostomidae	<i>Moxostoma cf. lachneri</i>	brassy jumprock
Cypriniformes	Catostomidae	<i>Pantosteus lahontan</i>	lahontan sucker
Cypriniformes	Catostomidae	<i>Thoburnia atripinnis</i>	blackfin sucker
Cypriniformes	Catostomidae	<i>Thoburnia hamiltoni</i>	rustyside sucker
Cypriniformes	Catostomidae	<i>Thoburnia rhothoeca</i>	torrent sucker
Cypriniformes	Catostomidae	<i>Xyrauchen texanus</i>	razorback sucker
Cypriniformes	Cobitidae	<i>Misgurnus anguillicaudatus</i>	oriental weatherfish
Cypriniformes	Cyprinidae	<i>Acrocheilus alutaceus</i>	chiselmouth
Cypriniformes	Cyprinidae	<i>Agosia chrysogaster</i>	longfin dace
Cypriniformes	Cyprinidae	<i>Campostoma pauciradii</i>	bluefin stoneroller
Cypriniformes	Cyprinidae	<i>Campostoma anomalum</i>	central stoneroller
Cypriniformes	Cyprinidae	<i>Campostoma oligolepis</i>	largescale stoneroller
Cypriniformes	Cyprinidae	<i>Campostoma ornatum</i>	mexican stoneroller
Cypriniformes	Cyprinidae	<i>Carassius auratus</i>	goldfish
Cypriniformes	Cyprinidae	<i>Clinostomus elongatus</i>	redside dace
Cypriniformes	Cyprinidae	<i>Clinostomus funduloides</i>	rosyside dace
Cypriniformes	Cyprinidae	<i>Couesius plumbeus</i>	lake chub
Cypriniformes	Cyprinidae	<i>Ctenopharyngodon idella</i>	grass carp
Cypriniformes	Cyprinidae	<i>Cyprinella callistia</i>	alabama shiner
Cypriniformes	Cyprinidae	<i>Cyprinella xaenura</i>	altamaha shiner
Cypriniformes	Cyprinidae	<i>Cyprinella leedsii</i>	bannerfin shiner
Cypriniformes	Cyprinidae	<i>Cyprinella formosa</i>	beautiful shiner
Cypriniformes	Cyprinidae	<i>Cyprinella venusta</i>	blacktail shiner
Cypriniformes	Cyprinidae	<i>Cyprinella caerulea</i>	blue shiner
Cypriniformes	Cyprinidae	<i>Cyprinella callitaenia</i>	bluestripe shiner
Cypriniformes	Cyprinidae	<i>Cyprinella camura</i>	bluntface shiner
Cypriniformes	Cyprinidae	<i>Cyprinella pyrrhomelas</i>	fieryblack shiner
Cypriniformes	Cyprinidae	<i>Cyprinella chloristia</i>	greenfin shiner
Cypriniformes	Cyprinidae	<i>Cyprinella callisema</i>	ocmulgee shiner
Cypriniformes	Cyprinidae	<i>Cyprinella lepida</i>	plateau shiner

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME
Cypriniformes	Cyprinidae	<i>Cyprinella proserpina</i>	proserpine shiner
Cypriniformes	Cyprinidae	<i>Cyprinella lutrensis</i>	red shiner
Cypriniformes	Cyprinidae	<i>Cyprinella zanema</i>	santee chub
Cypriniformes	Cyprinidae	<i>Cyprinella analostana</i>	satinfish shiner
Cypriniformes	Cyprinidae	<i>Cyprinella spiloptera</i>	spotfin shiner
Cypriniformes	Cyprinidae	<i>Cyprinella whipplei</i>	steelcolor shiner
Cypriniformes	Cyprinidae	<i>Cyprinella gibbsi</i>	tallapoosa shiner
Cypriniformes	Cyprinidae	<i>Cyprinella labrosa</i>	thicklip chub
Cypriniformes	Cyprinidae	<i>Cyprinella trichroistia</i>	tricolor shiner
Cypriniformes	Cyprinidae	<i>Cyprinella nivea</i>	whitefin shiner
Cypriniformes	Cyprinidae	<i>Cyprinella galactura</i>	whitetail shiner
Cypriniformes	Cyprinidae	<i>Cyprinus carpio</i>	common carp
Cypriniformes	Cyprinidae	<i>Dionda diaboli</i>	devils river minnow
Cypriniformes	Cyprinidae	<i>Dionda nigrotaeniata</i>	guadalupe roundnose minnow
Cypriniformes	Cyprinidae	<i>Dionda argentosa</i>	manantial roundnose minnow
Cypriniformes	Cyprinidae	<i>Dionda serena</i>	nueces roundnose minnow
Cypriniformes	Cyprinidae	<i>Dionda episcopa</i>	roundnose minnow
Cypriniformes	Cyprinidae	<i>Eremichthys acros</i>	desert dace
Cypriniformes	Cyprinidae	<i>Erimonax monachus</i>	spotfin chub
Cypriniformes	Cyprinidae	<i>Erimystax insignis</i>	blotched chub
Cypriniformes	Cyprinidae	<i>Erimystax x-punctatus</i>	gravel chub
Cypriniformes	Cyprinidae	<i>Erimystax harrisi</i>	ozark chub
Cypriniformes	Cyprinidae	<i>Erimystax cahni</i>	slender chub
Cypriniformes	Cyprinidae	<i>Erimystax dissimilis</i>	streamline chub
Cypriniformes	Cyprinidae	<i>Exoglossum maxillingua</i>	cutlip minnow
Cypriniformes	Cyprinidae	<i>Exoglossum laurae</i>	tonguetied minnow
Cypriniformes	Cyprinidae	<i>Gila alvordensis</i>	alvord chub
Cypriniformes	Cyprinidae	<i>Gila orcuttii</i>	arroyo chub
Cypriniformes	Cyprinidae	<i>Gila coerulea</i>	blue chub
Cypriniformes	Cyprinidae	<i>Gila elegans</i>	bonytail
Cypriniformes	Cyprinidae	<i>Gila boraxobius</i>	borax lake chub
Cypriniformes	Cyprinidae	<i>Gila nigrescens</i>	chihuahua chub
Cypriniformes	Cyprinidae	<i>Gila intermedia</i>	gila chub
Cypriniformes	Cyprinidae	<i>Gila nigra</i>	headwater chub
Cypriniformes	Cyprinidae	<i>Gila cypha</i>	humpback chub
Cypriniformes	Cyprinidae	<i>Gila pandora</i>	rio grande chub
Cypriniformes	Cyprinidae	<i>Gila robusta</i>	roundtail chub
Cypriniformes	Cyprinidae	<i>Gila ditaenia</i>	sonora chub
Cypriniformes	Cyprinidae	<i>Gila crassicauda</i>	thicktail chub
Cypriniformes	Cyprinidae	<i>Gila bicolor</i>	tui chub
Cypriniformes	Cyprinidae	<i>Gila atraria</i>	utah chub

APPENDIX D: STANDARD COMMON AND SCIENTIFIC NAMES OF FISH AND AMPHIBIANS

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME
Cypriniformes	Cyprinidae	<i>Gila seminuda</i>	virgin chub
Cypriniformes	Cyprinidae	<i>Gila purpurea</i>	yaqui chub
Cypriniformes	Cyprinidae	<i>Hemitremia flammea</i>	flame chub
Cypriniformes	Cyprinidae	<i>Hesperoleucus symmetricus</i>	california roach
Cypriniformes	Cyprinidae	<i>Hybognathus hankinsoni</i>	brassy minnow
Cypriniformes	Cyprinidae	<i>Hybognathus hayi</i>	cypress minnow
Cypriniformes	Cyprinidae	<i>Hybognathus regius</i>	eastern silvery minnow
Cypriniformes	Cyprinidae	<i>Hybognathus nuchalis</i>	mississippi silvery minnow
Cypriniformes	Cyprinidae	<i>Hybognathus placitus</i>	plains minnow
Cypriniformes	Cyprinidae	<i>Hybognathus amarus</i>	rio grande silvery minnow
Cypriniformes	Cyprinidae	<i>Hybognathus argyritis</i>	western silvery minnow
Cypriniformes	Cyprinidae	<i>Hybopsis amblops</i>	bigeye chub
Cypriniformes	Cyprinidae	<i>Hybopsis winchelli</i>	clear chub
Cypriniformes	Cyprinidae	<i>Hybopsis hypsinotus</i>	highback chub
Cypriniformes	Cyprinidae	<i>Hybopsis lineapunctata</i>	lined chub
Cypriniformes	Cyprinidae	<i>Hybopsis amnis</i>	pallid shiner
Cypriniformes	Cyprinidae	<i>Hybopsis rubrifrons</i>	rosyface chub
Cypriniformes	Cyprinidae	<i>Hypophthalmichthys nobilis</i>	bighead carp
Cypriniformes	Cyprinidae	<i>Hypophthalmichthys molitrix</i>	silver carp
Cypriniformes	Cyprinidae	<i>Iotichthys phlegethontis</i>	least chub
Cypriniformes	Cyprinidae	<i>Lavinia exilicauda</i>	hitch
Cypriniformes	Cyprinidae	<i>Lepidomeda vittata</i>	little colorado spinedace
Cypriniformes	Cyprinidae	<i>Lepidomeda altivelis</i>	pahranagat spinedace
Cypriniformes	Cyprinidae	<i>Lepidomeda mollispinis</i>	virgin spinedace
Cypriniformes	Cyprinidae	<i>Lepidomeda albivallis</i>	white river spinedace
Cypriniformes	Cyprinidae	<i>Leuciscus idus</i>	ide
Cypriniformes	Cyprinidae	<i>Luxilus zonistius</i>	bandfin shiner
Cypriniformes	Cyprinidae	<i>Luxilus zonatus</i>	bleeding shiner
Cypriniformes	Cyprinidae	<i>Luxilus cardinalis</i>	cardinal shiner
Cypriniformes	Cyprinidae	<i>Luxilus cornutus</i>	common shiner
Cypriniformes	Cyprinidae	<i>Luxilus cerasinus</i>	crescent shiner
Cypriniformes	Cyprinidae	<i>Luxilus pilsbryi</i>	duskystripe shiner
Cypriniformes	Cyprinidae	<i>Luxilus chrysocephalus</i>	striped shiner
Cypriniformes	Cyprinidae	<i>Luxilus coccogenis</i>	warpaint shiner
Cypriniformes	Cyprinidae	<i>Luxilus albeolus</i>	white shiner
Cypriniformes	Cyprinidae	<i>Lythrurus atrapiculus</i>	blacktip shiner
Cypriniformes	Cyprinidae	<i>Lythrurus roseipinnis</i>	cherryfin shiner
Cypriniformes	Cyprinidae	<i>Lythrurus lirus</i>	mountain shiner
Cypriniformes	Cyprinidae	<i>Lythrurus snelsoni</i>	ouachita shiner
Cypriniformes	Cyprinidae	<i>Lythrurus matutinus</i>	pinewoods shiner
Cypriniformes	Cyprinidae	<i>Lythrurus bellus</i>	pretty shiner
Cypriniformes	Cyprinidae	<i>Lythrurus umbratilis</i>	redfin shiner

APPENDIX D: STANDARD COMMON AND SCIENTIFIC NAMES OF FISH AND AMPHIBIANS

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME
Cypriniformes	Cyprinidae	<i>Lythrurus fumeus</i>	ribbon shiner
Cypriniformes	Cyprinidae	<i>Lythrurus ardens</i>	rosefin shiner
Cypriniformes	Cyprinidae	<i>Lythrurus fasciolaris</i>	scarlet shiner
Cypriniformes	Cyprinidae	<i>Lythrurus alegnotus</i>	warrior shiner
Cypriniformes	Cyprinidae	<i>Macrhybopsis marconis</i>	burrhead chub
Cypriniformes	Cyprinidae	<i>Macrhybopsis tetranema</i>	peppered chub
Cypriniformes	Cyprinidae	<i>Macrhybopsis australis</i>	prairie chub
Cypriniformes	Cyprinidae	<i>Macrhybopsis hyostoma</i>	shoal chub
Cypriniformes	Cyprinidae	<i>Macrhybopsis meeki</i>	sicklefin chub
Cypriniformes	Cyprinidae	<i>Macrhybopsis storeriana</i>	silver chub
Cypriniformes	Cyprinidae	<i>Macrhybopsis aestivalis</i>	speckled chub
Cypriniformes	Cyprinidae	<i>Macrhybopsis gelida</i>	sturgeon chub
Cypriniformes	Cyprinidae	<i>Margariscus margarita</i>	pearl dace
Cypriniformes	Cyprinidae	<i>Meda fulgida</i>	spikedace
Cypriniformes	Cyprinidae	<i>Moapa coriacea</i>	moapa dace
Cypriniformes	Cyprinidae	<i>Mylocheilus caurinus</i>	peamouth
Cypriniformes	Cyprinidae	<i>Mylopharodon conocephalus</i>	hardhead
Cypriniformes	Cyprinidae	<i>Mylopharyngodon piceus</i>	black carp
Cypriniformes	Cyprinidae	<i>Nocomis platyrhynchus</i>	bigmouth chub
Cypriniformes	Cyprinidae	<i>Nocomis leptocephalus</i>	bluehead chub
Cypriniformes	Cyprinidae	<i>Nocomis raneyi</i>	bull chub
Cypriniformes	Cyprinidae	<i>Nocomis biguttatus</i>	hornyhead chub
Cypriniformes	Cyprinidae	<i>Nocomis asper</i>	redspot chub
Cypriniformes	Cyprinidae	<i>Nocomis effusus</i>	redtail chub
Cypriniformes	Cyprinidae	<i>Nocomis micropogon</i>	river chub
Cypriniformes	Cyprinidae	<i>Notemigonus crysoleucas</i>	golden shiner
Cypriniformes	Cyprinidae	<i>Notropis girardi</i>	arkansas river shiner
Cypriniformes	Cyprinidae	<i>Notropis rupestris</i>	bedrock shiner
Cypriniformes	Cyprinidae	<i>Notropis boops</i>	bigeye shiner
Cypriniformes	Cyprinidae	<i>Notropis dorsalis</i>	bigmouth shiner
Cypriniformes	Cyprinidae	<i>Notropis heterodon</i>	blackchin shiner
Cypriniformes	Cyprinidae	<i>Notropis melanostomus</i>	blackmouth shiner
Cypriniformes	Cyprinidae	<i>Notropis heterolepis</i>	blacknose shiner
Cypriniformes	Cyprinidae	<i>Notropis atrocaudalis</i>	blackspot shiner
Cypriniformes	Cyprinidae	<i>Notropis simus</i>	bluntnose shiner
Cypriniformes	Cyprinidae	<i>Notropis bifrenatus</i>	bridle shiner
Cypriniformes	Cyprinidae	<i>Notropis asperifrons</i>	burrhead shiner
Cypriniformes	Cyprinidae	<i>Notropis cahabae</i>	cahaba shiner
Cypriniformes	Cyprinidae	<i>Notropis mekistocholas</i>	cape fear shiner
Cypriniformes	Cyprinidae	<i>Notropis percobromus</i>	carmine shiner
Cypriniformes	Cyprinidae	<i>Notropis wickliffi</i>	channel shiner
Cypriniformes	Cyprinidae	<i>Notropis chihuahua</i>	chihuahua shiner

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME
Cypriniformes	Cyprinidae	<i>Notropis potteri</i>	chub shiner
Cypriniformes	Cyprinidae	<i>Notropis petersoni</i>	coastal shiner
Cypriniformes	Cyprinidae	<i>Notropis amoenus</i>	comely shiner
Cypriniformes	Cyprinidae	<i>Notropis xaenocephalus</i>	coosa shiner
Cypriniformes	Cyprinidae	<i>Notropis cummingsae</i>	dusky shiner
Cypriniformes	Cyprinidae	<i>Notropis atherinoides</i>	emerald shiner
Cypriniformes	Cyprinidae	<i>Notropis edwardraneyi</i>	fluvial shiner
Cypriniformes	Cyprinidae	<i>Notropis buchanani</i>	ghost shiner
Cypriniformes	Cyprinidae	<i>Notropis chlorocephalus</i>	greenhead shiner
Cypriniformes	Cyprinidae	<i>Notropis altipinnis</i>	highfin shiner
Cypriniformes	Cyprinidae	<i>Notropis micropteryx</i>	highland shiner
Cypriniformes	Cyprinidae	<i>Notropis hypsilepis</i>	highscale shiner
Cypriniformes	Cyprinidae	<i>Notropis chalybaeus</i>	ironcolor shiner
Cypriniformes	Cyprinidae	<i>Notropis ortenburgeri</i>	kiamichi shiner
Cypriniformes	Cyprinidae	<i>Notropis longirostris</i>	longnose shiner
Cypriniformes	Cyprinidae	<i>Notropis volucellus</i>	mimic shiner
Cypriniformes	Cyprinidae	<i>Notropis spectrunculus</i>	mirror shiner
Cypriniformes	Cyprinidae	<i>Notropis scabriceps</i>	new river shiner
Cypriniformes	Cyprinidae	<i>Notropis ammophilus</i>	orange-fin shiner
Cypriniformes	Cyprinidae	<i>Notropis nubilus</i>	ozark minnow
Cypriniformes	Cyprinidae	<i>Notropis ozarcanus</i>	ozark shiner
Cypriniformes	Cyprinidae	<i>Notropis albizonatus</i>	palezone shiner
Cypriniformes	Cyprinidae	<i>Notropis perpallidus</i>	peppered shiner
Cypriniformes	Cyprinidae	<i>Notropis orca</i>	phantom shiner
Cypriniformes	Cyprinidae	<i>Notropis ariommus</i>	popeye shiner
Cypriniformes	Cyprinidae	<i>Notropis anogenus</i>	pugnose shiner
Cypriniformes	Cyprinidae	<i>Notropis chrosomus</i>	rainbow shiner
Cypriniformes	Cyprinidae	<i>Notropis bairdi</i>	red river shiner
Cypriniformes	Cyprinidae	<i>Notropis harperi</i>	redeye chub
Cypriniformes	Cyprinidae	<i>Notropis chiliticus</i>	redlip shiner
Cypriniformes	Cyprinidae	<i>Notropis jemezianus</i>	rio grande shiner
Cypriniformes	Cyprinidae	<i>Notropis blennius</i>	river shiner
Cypriniformes	Cyprinidae	<i>Notropis suttkusi</i>	rocky shiner
Cypriniformes	Cyprinidae	<i>Notropis rubellus</i>	rosyface shiner
Cypriniformes	Cyprinidae	<i>Notropis baileyi</i>	rough shiner
Cypriniformes	Cyprinidae	<i>Notropis semperasper</i>	roughhead shiner
Cypriniformes	Cyprinidae	<i>Notropis sabiniae</i>	sabine shiner
Cypriniformes	Cyprinidae	<i>Notropis rubricroceus</i>	saffron shiner
Cypriniformes	Cyprinidae	<i>Notropis stramineus</i>	sand shiner
Cypriniformes	Cyprinidae	<i>Notropis szepticus</i>	sandbar shiner
Cypriniformes	Cyprinidae	<i>Notropis oxyrhynchus</i>	sharpnose shiner
Cypriniformes	Cyprinidae	<i>Notropis photogenis</i>	silver shiner

APPENDIX D: STANDARD COMMON AND SCIENTIFIC NAMES OF FISH AND AMPHIBIANS

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME
Cypriniformes	Cyprinidae	<i>Notropis shumardi</i>	silverband shiner
Cypriniformes	Cyprinidae	<i>Notropis buccatus</i>	silverjaw minnow
Cypriniformes	Cyprinidae	<i>Notropis candidus</i>	silverside shiner
Cypriniformes	Cyprinidae	<i>Notropis stilbius</i>	silverstripe shiner
Cypriniformes	Cyprinidae	<i>Notropis uranoscopus</i>	skygazer shiner
Cypriniformes	Cyprinidae	<i>Notropis buccula</i>	smalleye shiner
Cypriniformes	Cyprinidae	<i>Notropis hudsonius</i>	spottail shiner
Cypriniformes	Cyprinidae	<i>Notropis procne</i>	swallowtail shiner
Cypriniformes	Cyprinidae	<i>Notropis maculatus</i>	taillight shiner
Cypriniformes	Cyprinidae	<i>Notropis braytoni</i>	tamaulipas shiner
Cypriniformes	Cyprinidae	<i>Notropis telescopus</i>	telescope shiner
Cypriniformes	Cyprinidae	<i>Notropis leuciodus</i>	tennessee shiner
Cypriniformes	Cyprinidae	<i>Notropis amabilis</i>	texas shiner
Cypriniformes	Cyprinidae	<i>Notropis topeka</i>	topeka shiner
Cypriniformes	Cyprinidae	<i>Notropis greenei</i>	wedgespot shiner
Cypriniformes	Cyprinidae	<i>Notropis texanus</i>	weed shiner
Cypriniformes	Cyprinidae	<i>Notropis alborus</i>	whitemouth shiner
Cypriniformes	Cyprinidae	<i>Notropis rafinesquei</i>	yazoo shiner
Cypriniformes	Cyprinidae	<i>Notropis lutipinnis</i>	yellowfin shiner
Cypriniformes	Cyprinidae	<i>Opsopoeodus emiliae</i>	pugnose minnow
Cypriniformes	Cyprinidae	<i>Oregonichthys crameri</i>	oregon chub
Cypriniformes	Cyprinidae	<i>Oregonichthys kalawatseti</i>	umpqua chub
Cypriniformes	Cyprinidae	<i>Orthodon microlepidotus</i>	sacramento blackfish
Cypriniformes	Cyprinidae	<i>Phenacobius crassilabrum</i>	fatlips minnow
Cypriniformes	Cyprinidae	<i>Phenacobius teretulus</i>	kanawha minnow
Cypriniformes	Cyprinidae	<i>Phenacobius catostomus</i>	riffle minnow
Cypriniformes	Cyprinidae	<i>Phenacobius uranops</i>	stargazing minnow
Cypriniformes	Cyprinidae	<i>Phenacobius mirabilis</i>	suckermouth minnow
Cypriniformes	Cyprinidae	<i>Phoxinus cumberlandensis</i>	blackside dace
Cypriniformes	Cyprinidae	<i>Phoxinus neogaeus</i>	finescale dace
Cypriniformes	Cyprinidae	<i>Phoxinus saylori</i>	laurel dace
Cypriniformes	Cyprinidae	<i>Phoxinus oreas</i>	mountain redbelly dace
Cypriniformes	Cyprinidae	<i>Phoxinus eos</i>	northern redbelly dace
Cypriniformes	Cyprinidae	<i>Phoxinus erythrogaster</i>	southern redbelly dace
Cypriniformes	Cyprinidae	<i>Phoxinus tennesseensis</i>	tennessee dace
Cypriniformes	Cyprinidae	<i>Pimephales notatus</i>	bluntnose minnow
Cypriniformes	Cyprinidae	<i>Pimephales vigilax</i>	bullhead minnow
Cypriniformes	Cyprinidae	<i>Pimephales promelas</i>	fathead minnow
Cypriniformes	Cyprinidae	<i>Pimephales tenellus</i>	slim minnow
Cypriniformes	Cyprinidae	<i>Plagopterus argentissimus</i>	woundfin
Cypriniformes	Cyprinidae	<i>Platygobio gracilis</i>	flathead chub
Cypriniformes	Cyprinidae	<i>Pogonichthys ciscooides</i>	clear lake splittail

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME
Cypriniformes	Cyprinidae	<i>Pogonichthys macrolepidotus</i>	splittail
Cypriniformes	Cyprinidae	<i>Pteronotropis grandipinnis</i>	apalachee shiner
Cypriniformes	Cyprinidae	<i>Pteronotropis hubbsi</i>	bluehead shiner
Cypriniformes	Cyprinidae	<i>Pteronotropis welaka</i>	bluenose shiner
Cypriniformes	Cyprinidae	<i>Pteronotropis euryzonus</i>	broadstripe shiner
Cypriniformes	Cyprinidae	<i>Pteronotropis signipinnis</i>	flagfin shiner
Cypriniformes	Cyprinidae	<i>Pteronotropis merlini</i>	orangetail shiner
Cypriniformes	Cyprinidae	<i>Pteronotropis hypselopterus</i>	sailfin shiner
Cypriniformes	Cyprinidae	<i>Ptychocheilus lucius</i>	colorado pikeminnow
Cypriniformes	Cyprinidae	<i>Ptychocheilus oregonensis</i>	northern pikeminnow
Cypriniformes	Cyprinidae	<i>Ptychocheilus grandis</i>	sacramento pikeminnow
Cypriniformes	Cyprinidae	<i>Ptychocheilus umpqua</i>	umpqua pikeminnow
Cypriniformes	Cyprinidae	<i>Relictus solitarius</i>	relict dace
Cypriniformes	Cyprinidae	<i>Rhinichthys atratulus</i>	eastern blacknose dace
Cypriniformes	Cyprinidae	<i>Rhinichthys deaconi</i>	las vegas dace
Cypriniformes	Cyprinidae	<i>Rhinichthys falcatus</i>	leopard dace
Cypriniformes	Cyprinidae	<i>Rhinichthys cobitis</i>	loach minnow
Cypriniformes	Cyprinidae	<i>Rhinichthys cataractae</i>	longnose dace
Cypriniformes	Cyprinidae	<i>Rhinichthys osculus</i>	speckled dace
Cypriniformes	Cyprinidae	<i>Rhinichthys umatilla</i>	umatilla dace
Cypriniformes	Cyprinidae	<i>Rhinichthys evermanni</i>	umpqua dace
Cypriniformes	Cyprinidae	<i>Rhinichthys obtusus</i>	western blacknose dace
Cypriniformes	Cyprinidae	<i>Rhodeus sericeus</i>	bitterling
Cypriniformes	Cyprinidae	<i>Richardsonius egregius</i>	lahontan redbase
Cypriniformes	Cyprinidae	<i>Richardsonius balteatus</i>	redside shiner
Cypriniformes	Cyprinidae	<i>Richardsonius X Rhinichthys balteatus x osculus</i>	redside shiner x speckled dace
Cypriniformes	Cyprinidae	<i>Scardinius erythrophthalmus</i>	rudd
Cypriniformes	Cyprinidae	<i>Semotilus atromaculatus</i>	creek chub
Cypriniformes	Cyprinidae	<i>Semotilus thoreauianus</i>	dixie chub
Cypriniformes	Cyprinidae	<i>Semotilus corporalis</i>	fallfish
Cypriniformes	Cyprinidae	<i>Semotilus lumbee</i>	sandhills chub
Cypriniformes	Cyprinidae	<i>Snyderichthys copei</i>	leatherside chub
Cypriniformes	Cyprinidae	<i>Tinca tinca</i>	tench
Cypriniformes	Cyprinidae	<i>Cyprinella cf. zanema</i>	thinlip chub
Cypriniformes	Cyprinidae	<i>Hypophthalmichthys molitrix</i>	silver carp
Cypriniformes	Catostomidae	<i>Catostomus cf. latipinnis</i>	little colorado river sucker
Cypriniformes	Catostomidae	<i>Moxostoma robustum</i>	smallfin redhorse
Cypriniformes	Cyprinidae	<i>Macrhybopsis cf. aestivalis</i>	coosa chub
Cypriniformes	Cyprinidae	<i>Semotilus X Luxilus atromaculatus x chrysocephalus</i>	creek chub x striped shiner

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME
Cypriniformes	Cyprinidae	<i>Cyprinus carpio</i>	mirror carp
Cypriniformes	Cyprinidae	<i>Hypophthalmichthys nobilis</i>	bighead carp
Cypriniformes	Cyprinidae	<i>Notropis amplamala</i>	longjaw minnow
Cypriniformes	Cyprinidae	<i>Notropis cf. spectrunculus</i>	sawfin shiner
Cypriniformes	Cyprinidae	<i>Pteronotropis stonei</i>	lowland shiner
Cyprinodontiformes	Aplocheilidae	<i>Rivulus hartii</i>	giant rivulus
Cyprinodontiformes	Aplocheilidae	<i>Rivulus marmoratus</i>	mangrove rivulus
Cyprinodontiformes	Cyprinodontidae	<i>Cyprinodon nevadensis</i>	amargosa pupfish
Cyprinodontiformes	Cyprinodontidae	<i>Cyprinodon elegans</i>	comanche springs pupfish
Cyprinodontiformes	Cyprinodontidae	<i>Cyprinodon eximius</i>	conchos pupfish
Cyprinodontiformes	Cyprinodontidae	<i>Cyprinodon macularius</i>	desert pupfish
Cyprinodontiformes	Cyprinodontidae	<i>Cyprinodon diabolis</i>	devils hole pupfish
Cyprinodontiformes	Cyprinodontidae	<i>Cyprinodon bovinus</i>	leon springs pupfish
Cyprinodontiformes	Cyprinodontidae	<i>Cyprinodon radiosus</i>	owens pupfish
Cyprinodontiformes	Cyprinodontidae	<i>Cyprinodon pecosensis</i>	pecos pupfish
Cyprinodontiformes	Cyprinodontidae	<i>Cyprinodon rubrofluviatilis</i>	red river pupfish
Cyprinodontiformes	Cyprinodontidae	<i>Cyprinodon salinus</i>	salt creek pupfish
Cyprinodontiformes	Cyprinodontidae	<i>Cyprinodon arcuatus</i>	santa cruz pupfish
Cyprinodontiformes	Cyprinodontidae	<i>Cyprinodon variegatus</i>	sheepshead minnow
Cyprinodontiformes	Cyprinodontidae	<i>Cyprinodon eremus</i>	sonoyta pupfish
Cyprinodontiformes	Cyprinodontidae	<i>Cyprinodon tularosa</i>	white sands pupfish
Cyprinodontiformes	Cyprinodontidae	<i>Jordanella floridae</i>	flagfish
Cyprinodontiformes	Fundulidae	<i>Fundulus diaphanus</i>	banded killifish
Cyprinodontiformes	Fundulidae	<i>Fundulus cingulatus</i>	banded topminnow
Cyprinodontiformes	Fundulidae	<i>Fundulus julisia</i>	barrens topminnow
Cyprinodontiformes	Fundulidae	<i>Fundulus pulvereus</i>	bayou killifish
Cyprinodontiformes	Fundulidae	<i>Fundulus nottii</i>	bayou topminnow
Cyprinodontiformes	Fundulidae	<i>Fundulus olivaceus</i>	blackspotted topminnow
Cyprinodontiformes	Fundulidae	<i>Fundulus notatus</i>	blackstripe topminnow
Cyprinodontiformes	Fundulidae	<i>Fundulus euryzonus</i>	broadstripe topminnow
Cyprinodontiformes	Fundulidae	<i>Fundulus chrysotus</i>	golden topminnow
Cyprinodontiformes	Fundulidae	<i>Fundulus parvipinnis</i>	guadalupe cardinalfish
Cyprinodontiformes	Fundulidae	<i>Fundulus grandis</i>	gulf killifish
Cyprinodontiformes	Fundulidae	<i>Fundulus lineolatus</i>	lined topminnow
Cyprinodontiformes	Fundulidae	<i>Fundulus confluentus</i>	marsh killifish
Cyprinodontiformes	Fundulidae	<i>Fundulus heteroclitus</i>	mummichog
Cyprinodontiformes	Fundulidae	<i>Fundulus kansae</i>	northern plains killifish
Cyprinodontiformes	Fundulidae	<i>Fundulus catenatus</i>	northern studfish
Cyprinodontiformes	Fundulidae	<i>Fundulus zebrinus</i>	plains killifish
Cyprinodontiformes	Fundulidae	<i>Fundulus sciadicus</i>	plains topminnow
Cyprinodontiformes	Fundulidae	<i>Fundulus rubrifrons</i>	redface topminnow
Cyprinodontiformes	Fundulidae	<i>Fundulus escambiae</i>	russetfin topminnow

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME
Cyprinodontiformes	Fundulidae	<i>Fundulus jenkinsi</i>	saltmarsh topminnow
Cyprinodontiformes	Fundulidae	<i>Fundulus seminolis</i>	seminole killifish
Cyprinodontiformes	Fundulidae	<i>Fundulus stellifer</i>	southern studfish
Cyprinodontiformes	Fundulidae	<i>Fundulus rathbuni</i>	speckled killifish
Cyprinodontiformes	Fundulidae	<i>Fundulus luciae</i>	spotfin killifish
Cyprinodontiformes	Fundulidae	<i>Fundulus dispar</i>	starhead topminnow
Cyprinodontiformes	Fundulidae	<i>Fundulus bifax</i>	stippled studfish
Cyprinodontiformes	Fundulidae	<i>Fundulus waccamensis</i>	waccamaw killifish
Cyprinodontiformes	Fundulidae	<i>Fundulus blairae</i>	western starhead topminnow
Cyprinodontiformes	Fundulidae	<i>Fundulus albolineatus</i>	whiteline topminnow
Cyprinodontiformes	Fundulidae	<i>Leptolucania ommata</i>	pygmy killifish
Cyprinodontiformes	Fundulidae	<i>Lucania goodei</i>	bluefin killifish
Cyprinodontiformes	Fundulidae	<i>Lucania parva</i>	rainwater killifish
Cyprinodontiformes	Goodeidae	<i>Crenichthys nevadae</i>	railroad valley springfish
Cyprinodontiformes	Goodeidae	<i>Crenichthys baileyi</i>	white river springfish
Cyprinodontiformes	Goodeidae	<i>Empetrichthys merriami</i>	ash meadows poolfish
Cyprinodontiformes	Goodeidae	<i>Empetrichthys latos</i>	pahrump poolfish
Cyprinodontiformes	Poeciliidae	<i>Belonesox belizanus</i>	pike killifish
Cyprinodontiformes	Poeciliidae	<i>Gambusia amistadensis</i>	amistad gambusia
Cyprinodontiformes	Poeciliidae	<i>Gambusia gaigei</i>	big bend gambusia
Cyprinodontiformes	Poeciliidae	<i>Gambusia senilis</i>	blotched gambusia
Cyprinodontiformes	Poeciliidae	<i>Gambusia heterochir</i>	clear creek gambusia
Cyprinodontiformes	Poeciliidae	<i>Gambusia holbrooki</i>	eastern mosquitofish
Cyprinodontiformes	Poeciliidae	<i>Gambusia geiseri</i>	largespring gambusia
Cyprinodontiformes	Poeciliidae	<i>Gambusia rhizophorae</i>	mangrove gambusia
Cyprinodontiformes	Poeciliidae	<i>Gambusia nobilis</i>	pecos gambusia
Cyprinodontiformes	Poeciliidae	<i>Gambusia georgei</i>	san marcos gambusia
Cyprinodontiformes	Poeciliidae	<i>Gambusia speciosa</i>	tex-mex gambusia
Cyprinodontiformes	Poeciliidae	<i>Gambusia affinis</i>	western mosquitofish
Cyprinodontiformes	Poeciliidae	<i>Heterandria formosa</i>	least killifish
Cyprinodontiformes	Poeciliidae	<i>Poecilia formosa</i>	amazon molly
Cyprinodontiformes	Poeciliidae	<i>Poecilia reticulata</i>	guppy
Cyprinodontiformes	Poeciliidae	<i>Poecilia sphenops</i>	mexican molly
Cyprinodontiformes	Poeciliidae	<i>Poecilia latipinna</i>	sailfin molly
Cyprinodontiformes	Poeciliidae	<i>Poecilia mexicana</i>	shortfin molly
Cyprinodontiformes	Poeciliidae	<i>Poeciliopsis occidentalis</i>	gila topminnow
Cyprinodontiformes	Poeciliidae	<i>Poeciliopsis gracilis</i>	porthole livebearer
Cyprinodontiformes	Poeciliidae	<i>Xiphophorus hellerii</i>	green swordtail
Cyprinodontiformes	Poeciliidae	<i>Xiphophorus maculatus</i>	southern platyfish
Cyprinodontiformes	Poeciliidae	<i>Xiphophorus variatus</i>	variable platyfish
Elopiformes	Elopidae	<i>Elops saurus</i>	ladyfish
Elopiformes	Elopidae	<i>Elops affinis</i>	machete

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME
Elopiformes	Megalopidae	<i>Megalops atlanticus</i>	tarpon
Esociformes	Esocidae	<i>Esox niger</i>	chain pickerel
Esociformes	Esocidae	<i>Esox masquinongy</i>	muskellunge
Esociformes	Esocidae	<i>Esox lucius</i>	northern pike
Esociformes	Esocidae	<i>Esox americanus</i>	redfin pickerel
Esociformes	Esocidae	<i>Esox americanus vermiculatus</i>	grass pickerel
Esociformes	Esocidae	<i>Esox lucius x masquinongy</i>	tiger muskellunge
Esociformes	Umbridae	<i>Dallia pectoralis</i>	alaska blackfish
Esociformes	Umbridae	<i>Novumbra hubbsi</i>	olympic mudminnow
Esociformes	Umbridae	<i>Umbra limi</i>	central mudminnow
Esociformes	Umbridae	<i>Umbra pygmaea</i>	eastern mudminnow
Gadiformes	Gadidae	<i>Lota lota</i>	burbot
Gadiformes	Gadidae	<i>Microgadus tomcod</i>	atlantic tomcod
Gasterosteiformes	Gasterosteidae	<i>Apeltes quadracus</i>	fourspine stickleback
Gasterosteiformes	Gasterosteidae	<i>Culaea inconstans</i>	brook stickleback
Gasterosteiformes	Gasterosteidae	<i>Gasterosteus aculeatus</i>	espinoco
Gasterosteiformes	Gasterosteidae	<i>Pungitius pungitius</i>	ninespine stickleback
Gasterosteiformes	Syngnathidae	<i>Microphis brachyurus</i>	opossum pipefish
Gasterosteiformes	Syngnathidae	<i>Syngnathus scovelli</i>	gulf pipefish
Gasterosteiformes	Gasterosteidae	<i>Gasterosteus aculeatus</i>	threespine stickleback
Hiodontiformes	Hiodontidae	<i>Hiodon alosoides</i>	goldeye
Hiodontiformes	Hiodontidae	<i>Hiodon tergisus</i>	mooneye
Lepisosteiformes	Lepisosteidae	<i>Atractosteus spatula</i>	alligator gar
Lepisosteiformes	Lepisosteidae	<i>Lepisosteus platyrhincus</i>	florida gar
Lepisosteiformes	Lepisosteidae	<i>Lepisosteus osseus</i>	longnose gar
Lepisosteiformes	Lepisosteidae	<i>Lepisosteus platostomus</i>	shortnose gar
Lepisosteiformes	Lepisosteidae	<i>Lepisosteus oculatus</i>	spotted gar
Mugiliformes	Mugilidae	<i>Agonostomus monticola</i>	mountain mullet
Mugiliformes	Mugilidae	<i>Mugil cephalus</i>	striped mullet
Mugiliformes	Mugilidae	<i>Mugil curema</i>	white mullet
Myliobatiformes	Dasyatidae	<i>Dasyatis sabina</i>	atlantic stingray
Osteoglossiformes	Notopteridae	<i>Chitala ornata</i>	clown knifefish
Perciformes	Belontiidae	<i>Trichopsis vittata</i>	croaking gourami
Perciformes	Centrarchidae	<i>Acantharchus pomotis</i>	mud sunfish
Perciformes	Centrarchidae	<i>Ambloplites constellatus</i>	ozark bass
Perciformes	Centrarchidae	<i>Ambloplites cavifrons</i>	roanoke bass
Perciformes	Centrarchidae	<i>Ambloplites rupestris</i>	rock bass
Perciformes	Centrarchidae	<i>Ambloplites ariommus</i>	shadow bass
Perciformes	Centrarchidae	<i>Archoplites interruptus</i>	sacramento perch
Perciformes	Centrarchidae	<i>Centrarchus macropterus</i>	flier
Perciformes	Centrarchidae	<i>Enneacanthus obesus</i>	banded sunfish
Perciformes	Centrarchidae	<i>Enneacanthus chaetodon</i>	blackbanded sunfish

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME
Perciformes	Centrarchidae	<i>Enneacanthus gloriosus</i>	bluespotted sunfish
Perciformes	Centrarchidae	<i>Lepomis symmetricus</i>	bantam sunfish
Perciformes	Centrarchidae	<i>Lepomis macrochirus</i>	bluegill
Perciformes	Centrarchidae	<i>Lepomis marginatus</i>	dollar sunfish
Perciformes	Centrarchidae	<i>Lepomis cyanellus</i>	green sunfish
Perciformes	Centrarchidae	<i>Lepomis megalotis</i>	longear sunfish
Perciformes	Centrarchidae	<i>Lepomis humilis</i>	orangespotted sunfish
Perciformes	Centrarchidae	<i>Lepomis gibbosus</i>	pumpkinseed
Perciformes	Centrarchidae	<i>Lepomis auritus</i>	redbreast sunfish
Perciformes	Centrarchidae	<i>Lepomis microlophus</i>	redear sunfish
Perciformes	Centrarchidae	<i>Lepomis miniatus</i>	redspotted sunfish
Perciformes	Centrarchidae	<i>Lepomis punctatus</i>	spotted sunfish
Perciformes	Centrarchidae	<i>Lepomis gulosus</i>	warmouth
Perciformes	Centrarchidae	<i>Micropterus treculii</i>	guadalupe bass
Perciformes	Centrarchidae	<i>Micropterus salmoides</i>	largemouth bass
Perciformes	Centrarchidae	<i>Micropterus coosae</i>	redeye bass
Perciformes	Centrarchidae	<i>Micropterus cataractae</i>	shoal bass
Perciformes	Centrarchidae	<i>Micropterus dolomieu</i>	smallmouth bass
Perciformes	Centrarchidae	<i>Micropterus punctulatus</i>	spotted bass
Perciformes	Centrarchidae	<i>Micropterus notius</i>	suwannee bass
Perciformes	Centrarchidae	<i>Pomoxis nigromaculatus</i>	black crappie
Perciformes	Centrarchidae	<i>Pomoxis annularis</i>	white crappie
Perciformes	Centropomidae	<i>Centropomus undecimalis</i>	common snook
Perciformes	Centropomidae	<i>Centropomus parallelus</i>	smallscale fat snook
Perciformes	Centropomidae	<i>Centropomus ensiferus</i>	swordspine snook
Perciformes	Centropomidae	<i>Centropomus pectinatus</i>	tarpon snook
Perciformes	Channidae	<i>Channa marulius</i>	bullseye snakehead
Perciformes	Channidae	<i>Channa argus</i>	snakehead
Perciformes	Cichlidae	<i>Astronotus ocellatus</i>	oscar
Perciformes	Cichlidae	<i>Cichla ocellaris</i>	butterfly peacock bass
Perciformes	Cichlidae	<i>Cichlasoma bimaculatum</i>	black acara
Perciformes	Cichlidae	<i>Cichlasoma nigrofasciatum</i>	convict cichlid
Perciformes	Cichlidae	<i>Cichlasoma meeki</i>	firemouth cichlid
Perciformes	Cichlidae	<i>Cichlasoma octofasciatum</i>	jack dempsey
Perciformes	Cichlidae	<i>Cichlasoma managuense</i>	jaguar guapote
Perciformes	Cichlidae	<i>Cichlasoma urophthalmus</i>	mayan cichlid
Perciformes	Cichlidae	<i>Cichlasoma citrinellum</i>	midas cichlid
Perciformes	Cichlidae	<i>Cichlasoma cyanoguttatum</i>	rio grande cichlid
Perciformes	Cichlidae	<i>Cichlasoma salvini</i>	yellowbelly cichlid
Perciformes	Cichlidae	<i>Geophagus surinamensis</i>	redstriped eartheater
Perciformes	Cichlidae	<i>Hemichromis letourneuxi</i>	african jewelfish
Perciformes	Cichlidae	<i>Heros severus</i>	banded cichlid

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME
Perciformes	Cichlidae	<i>Oreochromis aureus</i>	blue tilapia
Perciformes	Cichlidae	<i>Oreochromis mossambicus</i>	mozambique tilapia
Perciformes	Cichlidae	<i>Oreochromis niloticus</i>	nile tilapia
Perciformes	Cichlidae	<i>Oreochromis urolepis</i>	wami tilapia
Perciformes	Cichlidae	<i>Sarotherodon melanotheron</i>	blackchin tilapia
Perciformes	Cichlidae	<i>Tilapia zillii</i>	redbelly tilapia
Perciformes	Cichlidae	<i>Tilapia mariae</i>	spotted tilapia
Perciformes	Elassomatidae	<i>Elassoma zonatum</i>	banded pygmy sunfish
Perciformes	Elassomatidae	<i>Elassoma okatie</i>	bluebarred pygmy sunfish
Perciformes	Elassomatidae	<i>Elassoma boehlkei</i>	carolina pygmy sunfish
Perciformes	Elassomatidae	<i>Elassoma evergladei</i>	everglades pygmy sunfish
Perciformes	Elassomatidae	<i>Elassoma okefenokee</i>	okefenokee pygmy sunfish
Perciformes	Elassomatidae	<i>Elassoma alabamae</i>	spring pygmy sunfish
Perciformes	Eleotridae	<i>Dormitator maculatus</i>	fat sleeper
Perciformes	Eleotridae	<i>Eleotris amblyopsis</i>	largescaled spinycheek
Perciformes	Eleotridae	<i>Eleotris perniger</i>	smallscaled spinycheek
Perciformes	Eleotridae	<i>Eleotris picta</i>	spotted sleeper
Perciformes	Eleotridae	<i>Gobiomorus dormitor</i>	bigmouth sleeper
Perciformes	Eleotridae	<i>Guavina guavina</i>	guavina
Perciformes	Eleotridae	<i>Eleotris amblyopsis</i>	largescaled spinycheek sleeper
Perciformes	Embiotocidae	<i>Cymatogaster aggregata</i>	shiner perch
Perciformes	Embiotocidae	<i>Hysterocarpus traskii</i>	tule perch
Perciformes	Gerreidae	<i>Diapterus auratus</i>	irish pompano
Perciformes	Gerreidae	<i>Eucinostomus harengulus</i>	tidewater mojarra
Perciformes	Gerreidae	<i>Eugerres plumieri</i>	striped mojarra
Perciformes	Gerreidae	<i>Gerres cinereus</i>	yellowfin mojarra
Perciformes	Gobiidae	<i>Acanthogobius flavimanus</i>	yellowfin goby
Perciformes	Gobiidae	<i>Awaous banana</i>	river goby
Perciformes	Gobiidae	<i>Clevelandia ios</i>	arrow goby
Perciformes	Gobiidae	<i>Ctenogobius fasciatus</i>	blotchcheek goby
Perciformes	Gobiidae	<i>Ctenogobius boleosoma</i>	darer goby
Perciformes	Gobiidae	<i>Ctenogobius shufeldti</i>	freshwater goby
Perciformes	Gobiidae	<i>Ctenogobius claytonii</i>	mexican goby
Perciformes	Gobiidae	<i>Ctenogobius pseudofasciatus</i>	slashcheek goby
Perciformes	Gobiidae	<i>Eucyclogobius newberryi</i>	tidewater goby
Perciformes	Gobiidae	<i>Gillichthys mirabilis</i>	longjaw mudsucker
Perciformes	Gobiidae	<i>Gobioides broussonetii</i>	violet goby
Perciformes	Gobiidae	<i>Gobiosoma bosc</i>	naked goby
Perciformes	Gobiidae	<i>Lophogobius cyprinoides</i>	crested goby
Perciformes	Gobiidae	<i>Microgobius gulosus</i>	clown goby
Perciformes	Gobiidae	<i>Neogobius melanostomus</i>	round goby

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME
Perciformes	Gobiidae	<i>Proterorhinus marmoratus</i>	tubenose goby
Perciformes	Gobiidae	<i>Tridentiger bifasciatus</i>	shimofuri goby
Perciformes	Gobiidae	<i>Tridentiger barbatus</i>	shokihaze goby
Perciformes	Haemulidae	<i>Orthopristis chrysoptera</i>	pigfish
Perciformes	Lutjanidae	<i>Lutjanus griseus</i>	gray snapper
Perciformes	Moronidae	<i>Morone saxatilis</i>	striped bass
Perciformes	Moronidae	<i>Morone chrysops</i>	white bass
Perciformes	Moronidae	<i>Morone americana</i>	white perch
Perciformes	Moronidae	<i>Morone mississippiensis</i>	yellow bass
Perciformes	Moronidae	<i>Morone na</i>	wiper
Perciformes	Percidae	<i>Ammocrypta pellucida</i>	eastern sand darter
Perciformes	Percidae	<i>Ammocrypta bifascia</i>	florida sand darter
Perciformes	Percidae	<i>Ammocrypta beanii</i>	naked sand darter
Perciformes	Percidae	<i>Ammocrypta vivax</i>	scaly sand darter
Perciformes	Percidae	<i>Ammocrypta meridiana</i>	southern sand darter
Perciformes	Percidae	<i>Ammocrypta clara</i>	western sand darter
Perciformes	Percidae	<i>Crystallaria asprella</i>	crystal darter
Perciformes	Percidae	<i>Etheostoma ramseyi</i>	alabama darter
Perciformes	Percidae	<i>Etheostoma cragini</i>	arkansas darter
Perciformes	Percidae	<i>Etheostoma euzonum</i>	arkansas saddled darter
Perciformes	Percidae	<i>Etheostoma sagitta</i>	arrow darter
Perciformes	Percidae	<i>Etheostoma cinereum</i>	ashy darter
Perciformes	Percidae	<i>Etheostoma zonifer</i>	backwater darter
Perciformes	Percidae	<i>Etheostoma zonale</i>	banded darter
Perciformes	Percidae	<i>Etheostoma zonistium</i>	bandfin darter
Perciformes	Percidae	<i>Etheostoma obeyense</i>	barcheck darter
Perciformes	Percidae	<i>Etheostoma forbesi</i>	barrens darter
Perciformes	Percidae	<i>Etheostoma rubrum</i>	bayou darter
Perciformes	Percidae	<i>Etheostoma nigripinne</i>	blackfin darter
Perciformes	Percidae	<i>Etheostoma duryi</i>	blackside snubnose darter
Perciformes	Percidae	<i>Etheostoma blennioides</i>	blenny darter
Perciformes	Percidae	<i>Etheostoma sanguifluum</i>	bloodfin darter
Perciformes	Percidae	<i>Etheostoma camurum</i>	bluebreast darter
Perciformes	Percidae	<i>Etheostoma jessiae</i>	blueside darter
Perciformes	Percidae	<i>Etheostoma chlorosoma</i>	bluntnose darter
Perciformes	Percidae	<i>Etheostoma wapiti</i>	boulder darter
Perciformes	Percidae	<i>Etheostoma lynceum</i>	brighteye darter
Perciformes	Percidae	<i>Etheostoma burri</i>	brook darter
Perciformes	Percidae	<i>Etheostoma edwini</i>	brown darter
Perciformes	Percidae	<i>Etheostoma bison</i>	buffalo darter
Perciformes	Percidae	<i>Etheostoma osburni</i>	candy darter
Perciformes	Percidae	<i>Etheostoma collis</i>	carolina darter

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME
Perciformes	Percidae	<i>Etheostoma scotti</i>	cherokee darter
Perciformes	Percidae	<i>Etheostoma etneri</i>	cherry darter
Perciformes	Percidae	<i>Etheostoma cervus</i>	chickasaw darter
Perciformes	Percidae	<i>Etheostoma davisoni</i>	choctawhatchee darter
Perciformes	Percidae	<i>Etheostoma hopkinsi</i>	christmas darter
Perciformes	Percidae	<i>Etheostoma colorosum</i>	coastal darter
Perciformes	Percidae	<i>Etheostoma ditrema</i>	coldwater darter
Perciformes	Percidae	<i>Etheostoma coosae</i>	coosa darter
Perciformes	Percidae	<i>Etheostoma aquali</i>	coppercheek darter
Perciformes	Percidae	<i>Etheostoma basilare</i>	corrugated darter
Perciformes	Percidae	<i>Etheostoma collettei</i>	creole darter
Perciformes	Percidae	<i>Etheostoma corona</i>	crown darter
Perciformes	Percidae	<i>Etheostoma susanae</i>	cumberland darter
Perciformes	Percidae	<i>Etheostoma uniporum</i>	current darter
Perciformes	Percidae	<i>Etheostoma proeliare</i>	cypress darter
Perciformes	Percidae	<i>Etheostoma percnum</i>	duskytail darter
Perciformes	Percidae	<i>Etheostoma pseudovulatum</i>	egg-mimic darter
Perciformes	Percidae	<i>Etheostoma baileyi</i>	emerald darter
Perciformes	Percidae	<i>Etheostoma etowahae</i>	etowah darter
Perciformes	Percidae	<i>Etheostoma flabellare</i>	fantail darter
Perciformes	Percidae	<i>Etheostoma pyrrhogaster</i>	firebelly darter
Perciformes	Percidae	<i>Etheostoma fonticola</i>	fountain darter
Perciformes	Percidae	<i>Etheostoma crossopterum</i>	fringed darter
Perciformes	Percidae	<i>Etheostoma vitreum</i>	glassy darter
Perciformes	Percidae	<i>Etheostoma denoncourti</i>	golden darter
Perciformes	Percidae	<i>Etheostoma parvipinne</i>	goldstripe darter
Perciformes	Percidae	<i>Etheostoma jordani</i>	greenbreast darter
Perciformes	Percidae	<i>Etheostoma chlorbranchium</i>	greenfin darter
Perciformes	Percidae	<i>Etheostoma blennioides</i>	greenside darter
Perciformes	Percidae	<i>Etheostoma lepidum</i>	greenthroat darter
Perciformes	Percidae	<i>Etheostoma oophylax</i>	guardian darter
Perciformes	Percidae	<i>Etheostoma swaini</i>	gulf darter
Perciformes	Percidae	<i>Etheostoma histrio</i>	harlequin darter
Perciformes	Percidae	<i>Etheostoma lawrencei</i>	headwater darter
Perciformes	Percidae	<i>Etheostoma kantuckeense</i>	highland rim darter
Perciformes	Percidae	<i>Etheostoma brevirostrum</i>	holiday darter
Perciformes	Percidae	<i>Etheostoma exile</i>	iowa darter
Perciformes	Percidae	<i>Etheostoma nigrum</i>	johnny darter
Perciformes	Percidae	<i>Etheostoma kanawhae</i>	kanawha darter
Perciformes	Percidae	<i>Etheostoma rafinesquei</i>	kentucky darter
Perciformes	Percidae	<i>Etheostoma microperca</i>	least darter
Perciformes	Percidae	<i>Etheostoma chuckwachatte</i>	lipstick darter

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME
Perciformes	Percidae	<i>Etheostoma neopteron</i>	lollypop darter
Perciformes	Percidae	<i>Etheostoma longimanum</i>	longfin darter
Perciformes	Percidae	<i>Etheostoma sellare</i>	maryland darter
Perciformes	Percidae	<i>Etheostoma tetrazonum</i>	missouri saddled darter
Perciformes	Percidae	<i>Etheostoma asprigene</i>	mud darter
Perciformes	Percidae	<i>Etheostoma nianguae</i>	niangua darter
Perciformes	Percidae	<i>Etheostoma okaloosae</i>	okaloosa darter
Perciformes	Percidae	<i>Etheostoma radiosum</i>	orangebelly darter
Perciformes	Percidae	<i>Etheostoma bellum</i>	orangefin darter
Perciformes	Percidae	<i>Etheostoma spectabile</i>	orangethroat darter
Perciformes	Percidae	<i>Etheostoma pallidorsum</i>	paleback darter
Perciformes	Percidae	<i>Etheostoma mariae</i>	pinewoods darter
Perciformes	Percidae	<i>Etheostoma caeruleum</i>	rainbow darter
Perciformes	Percidae	<i>Etheostoma luteovinctum</i>	redband darter
Perciformes	Percidae	<i>Etheostoma whipplei</i>	redfin darter
Perciformes	Percidae	<i>Etheostoma rufilineatum</i>	redline darter
Perciformes	Percidae	<i>Etheostoma artesiae</i>	redspot darter
Perciformes	Percidae	<i>Etheostoma chienense</i>	relict darter
Perciformes	Percidae	<i>Etheostoma grahmi</i>	rio grande darter
Perciformes	Percidae	<i>Etheostoma podostemone</i>	riverweed darter
Perciformes	Percidae	<i>Etheostoma rupestre</i>	rock darter
Perciformes	Percidae	<i>Etheostoma phytophilum</i>	rush darter
Perciformes	Percidae	<i>Etheostoma flavum</i>	saffron darter
Perciformes	Percidae	<i>Etheostoma fricksium</i>	savannah darter
Perciformes	Percidae	<i>Etheostoma serrifer</i>	sawcheek darter
Perciformes	Percidae	<i>Etheostoma thalassinum</i>	seagreen darter
Perciformes	Percidae	<i>Etheostoma acuticeps</i>	sharphead darter
Perciformes	Percidae	<i>Etheostoma tecumsehi</i>	shawnee darter
Perciformes	Percidae	<i>Etheostoma smithi</i>	slabrock darter
Perciformes	Percidae	<i>Etheostoma boschungii</i>	slackwater darter
Perciformes	Percidae	<i>Etheostoma gracile</i>	slough darter
Perciformes	Percidae	<i>Etheostoma microlepidum</i>	smallscale darter
Perciformes	Percidae	<i>Etheostoma simoteron</i>	snubnose darter
Perciformes	Percidae	<i>Etheostoma olivaceum</i>	sooty darter
Perciformes	Percidae	<i>Etheostoma stigmaeum</i>	speckled darter
Perciformes	Percidae	<i>Etheostoma barrenense</i>	splendid darter
Perciformes	Percidae	<i>Etheostoma squamiceps</i>	spottail darter
Perciformes	Percidae	<i>Etheostoma maculatum</i>	spotted darter
Perciformes	Percidae	<i>Etheostoma punctulatum</i>	stippled darter
Perciformes	Percidae	<i>Etheostoma derivativum</i>	stone darter
Perciformes	Percidae	<i>Etheostoma fragi</i>	strawberry darter
Perciformes	Percidae	<i>Etheostoma striatulum</i>	striated darter

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME
Perciformes	Percidae	<i>Etheostoma virgatum</i>	striped darter
Perciformes	Percidae	<i>Etheostoma kennicotti</i>	stripetail darter
Perciformes	Percidae	<i>Etheostoma fusiforme</i>	swamp darter
Perciformes	Percidae	<i>Etheostoma swannanoa</i>	swannanoa darter
Perciformes	Percidae	<i>Etheostoma tallapoosae</i>	tallapoosa darter
Perciformes	Percidae	<i>Etheostoma barbouri</i>	teardrop darter
Perciformes	Percidae	<i>Etheostoma olmstedi</i>	tessellated darter
Perciformes	Percidae	<i>Etheostoma tippecanoe</i>	tippecanoe darter
Perciformes	Percidae	<i>Etheostoma lachneri</i>	tombigbee darter
Perciformes	Percidae	<i>Etheostoma trisella</i>	trispot darter
Perciformes	Percidae	<i>Etheostoma gutselli</i>	tuckasegee darter
Perciformes	Percidae	<i>Etheostoma inscriptum</i>	turquoise darter
Perciformes	Percidae	<i>Etheostoma tuscumbia</i>	tuscumbia darter
Perciformes	Percidae	<i>Etheostoma douglasi</i>	tuskaloosa darter
Perciformes	Percidae	<i>Etheostoma variatum</i>	variegate darter
Perciformes	Percidae	<i>Etheostoma chermocki</i>	vermilion darter
Perciformes	Percidae	<i>Etheostoma perlongum</i>	waccamaw darter
Perciformes	Percidae	<i>Etheostoma bellator</i>	warrior darter
Perciformes	Percidae	<i>Etheostoma nuchale</i>	watercress darter
Perciformes	Percidae	<i>Etheostoma vulneratum</i>	wounded darter
Perciformes	Percidae	<i>Etheostoma raneyi</i>	yazoo darter
Perciformes	Percidae	<i>Etheostoma moorei</i>	yellowcheek darter
Perciformes	Percidae	<i>Etheostoma juliae</i>	yoke darter
Perciformes	Percidae	<i>Etheostoma meadiae</i>	bluespar darter
Perciformes	Percidae	<i>Etheostoma planasaxatile</i>	duck darter
Perciformes	Percidae	<i>Etheostoma orientale</i>	eastrim darter
Perciformes	Percidae	<i>Etheostoma occidentale</i>	westrim darter
Perciformes	Percidae	<i>Gymnocephalus cernuus</i>	ruffe
Perciformes	Percidae	<i>Perca flavescens</i>	yellow perch
Perciformes	Percidae	<i>Percina antesella</i>	amber darter
Perciformes	Percidae	<i>Percina gymnocephala</i>	appalachia darter
Perciformes	Percidae	<i>Percina macrolepida</i>	bigscale logperch
Perciformes	Percidae	<i>Percina nigrofasciata</i>	blackbanded darter
Perciformes	Percidae	<i>Percina maculata</i>	blackside darter
Perciformes	Percidae	<i>Percina burtoni</i>	blotchside logperch
Perciformes	Percidae	<i>Percina cymatotaenia</i>	bluestripe darter
Perciformes	Percidae	<i>Percina palmaris</i>	bronze darter
Perciformes	Percidae	<i>Percina nevisense</i>	chainback darter
Perciformes	Percidae	<i>Percina copelandi</i>	channel darter
Perciformes	Percidae	<i>Percina brevicauda</i>	coal darter
Perciformes	Percidae	<i>Percina jenkinsi</i>	conasauga logperch
Perciformes	Percidae	<i>Percina sciera</i>	dusky darter

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME
Perciformes	Percidae	<i>Percina stictogaster</i>	frecklebelly darter
Perciformes	Percidae	<i>Percina lenticula</i>	freckled darter
Perciformes	Percidae	<i>Percina evides</i>	gilt darter
Perciformes	Percidae	<i>Percina aurolineata</i>	goldline darter
Perciformes	Percidae	<i>Percina suttkusi</i>	gulf logperch
Perciformes	Percidae	<i>Percina pantherina</i>	leopard darter
Perciformes	Percidae	<i>Percina caprodes</i>	logperch
Perciformes	Percidae	<i>Percina macrocephala</i>	longhead darter
Perciformes	Percidae	<i>Percina nasuta</i>	longnose darter
Perciformes	Percidae	<i>Percina kathae</i>	mobile logperch
Perciformes	Percidae	<i>Percina squamata</i>	olive darter
Perciformes	Percidae	<i>Percina fulvitaenia</i>	ozark logperch
Perciformes	Percidae	<i>Percina aurora</i>	pearl darter
Perciformes	Percidae	<i>Percina crassa</i>	piedmont darter
Perciformes	Percidae	<i>Percina shumardi</i>	river darter
Perciformes	Percidae	<i>Percina roanoka</i>	roanoke darter
Perciformes	Percidae	<i>Percina rex</i>	roanoke logperch
Perciformes	Percidae	<i>Percina vigil</i>	saddleback darter
Perciformes	Percidae	<i>Percina oxyrhynchus</i>	sharpnose darter
Perciformes	Percidae	<i>Percina peltata</i>	shield darter
Perciformes	Percidae	<i>Percina phoxocephala</i>	slenderhead darter
Perciformes	Percidae	<i>Percina tanasi</i>	snail darter
Perciformes	Percidae	<i>Percina austroperca</i>	southern logperch
Perciformes	Percidae	<i>Percina uranidea</i>	stargazing darter
Perciformes	Percidae	<i>Percina notogramma</i>	stripeback darter
Perciformes	Percidae	<i>Percina aurantiaca</i>	tangerine darter
Perciformes	Percidae	<i>Percina carbonaria</i>	texas logperch
Perciformes	Percidae	<i>Percina burtoni</i>	blotchside darter
Perciformes	Percidae	<i>Sander canadensis</i>	sauger
Perciformes	Percidae	<i>Sander vitreus</i>	walleye
Perciformes	Percidae	<i>Sander lucioperca</i>	zander
Perciformes	Percidae	<i>Sander canadensis x vitreus</i>	saugeye
Perciformes	Pomatomidae	<i>Pomatomus saltatrix</i>	bluefish
Perciformes	Sciaenidae	<i>Aplodinotus grunniens</i>	freshwater drum
Perciformes	Sciaenidae	<i>Bairdiella icistia</i>	bairdiella
Perciformes	Sciaenidae	<i>Bairdiella chrysoura</i>	silver perch
Perciformes	Sciaenidae	<i>Cynoscion xanthalmus</i>	orangemouth corvina
Perciformes	Sciaenidae	<i>Cynoscion nebulosus</i>	spotted seatrout
Perciformes	Sciaenidae	<i>Leiostomus xanthurus</i>	spot
Perciformes	Sciaenidae	<i>Micropogonias undulatus</i>	atlantic croaker
Perciformes	Sciaenidae	<i>Sciaenops ocellatus</i>	red drum
Perciformes	Sparidae	<i>Archosargus probatocephalus</i>	sheepshead

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME
Perciformes	Sparidae	<i>Lagodon rhomboides</i>	pinfish
Perciformes	Centrarchidae	<i>Micropterus salmoides</i>	largemouth bass (yoy)
Perciformes	Centropomidae	<i>Centropomus parallelus</i>	fat snook
Perciformes	Percidae	<i>Etheostoma tennesseense</i>	tennessee darter
Percopsiformes	Amblyopsidae	<i>Amblyopsis spelaea</i>	northern cavefish
Percopsiformes	Amblyopsidae	<i>Amblyopsis rosae</i>	ozark cavefish
Percopsiformes	Amblyopsidae	<i>Chologaster cornuta</i>	swampfish
Percopsiformes	Amblyopsidae	<i>Forbesichthys agassizii</i>	spring cavefish
Percopsiformes	Amblyopsidae	<i>Speoplatyrhinus poulsoni</i>	alabama cavefish
Percopsiformes	Amblyopsidae	<i>Typhlichthys subterraneus</i>	southern cavefish
Percopsiformes	Aphredoderidae	<i>Aphredoderus sayanus</i>	pirate perch
Percopsiformes	Percopsidae	<i>Percopsis transmontana</i>	sand roller
Percopsiformes	Percopsidae	<i>Percopsis omiscomaycus</i>	trout-perch
Petromyzontiformes	Petromyzontidae	<i>Ichthyomyzon castaneus</i>	chestnut lamprey
Petromyzontiformes	Petromyzontidae	<i>Ichthyomyzon greeleyi</i>	mountain brook lamprey
Petromyzontiformes	Petromyzontidae	<i>Ichthyomyzon fossor</i>	northern brook lamprey
Petromyzontiformes	Petromyzontidae	<i>Ichthyomyzon bdellium</i>	ohio lamprey
Petromyzontiformes	Petromyzontidae	<i>Ichthyomyzon unicuspis</i>	silver lamprey
Petromyzontiformes	Petromyzontidae	<i>Ichthyomyzon gagei</i>	southern brook lamprey
Petromyzontiformes	Petromyzontidae	<i>Lampetra appendix</i>	american brook lamprey
Petromyzontiformes	Petromyzontidae	<i>Lampetra camtschatica</i>	arctic lamprey
Petromyzontiformes	Petromyzontidae	<i>Lampetra hubbsi</i>	kern brook lamprey
Petromyzontiformes	Petromyzontidae	<i>Lampetra similis</i>	klamath lamprey
Petromyzontiformes	Petromyzontidae	<i>Lampetra aepyptera</i>	least brook lamprey
Petromyzontiformes	Petromyzontidae	<i>Lampetra minima</i>	miller lake lamprey
Petromyzontiformes	Petromyzontidae	<i>Lampetra tridentata</i>	pacific lamprey
Petromyzontiformes	Petromyzontidae	<i>Lampetra lethophaga</i>	pit-klamath brook lamprey
Petromyzontiformes	Petromyzontidae	<i>Lampetra ayresii</i>	river lamprey
Petromyzontiformes	Petromyzontidae	<i>Lampetra richardsoni</i>	western brook lamprey
Petromyzontiformes	Petromyzontidae	<i>Petromyzon marinus</i>	sea lamprey
Petromyzontiformes	Petromyzontidae	<i>Lampetra similis</i>	klamath river lamprey
Pleuronectiformes	Achiridae	<i>Trinectes maculatus</i>	hogchoker
Pleuronectiformes	Paralichthyidae	<i>Citharichthys spilopterus</i>	bay whiff
Pleuronectiformes	Paralichthyidae	<i>Paralichthys lethostigma</i>	southern flounder
Pleuronectiformes	Pleuronectidae	<i>Platichthys stellatus</i>	starry flounder
Pristiformes	Pristidae	<i>Pristis pectinata</i>	smalltooth sawfish
Salmoniformes	Osmeridae	<i>Hypomesus transpacificus</i>	delta smelt
Salmoniformes	Osmeridae	<i>Hypomesus olidus</i>	pond smelt
Salmoniformes	Osmeridae	<i>Hypomesus pretiosus</i>	surf smelt
Salmoniformes	Osmeridae	<i>Hypomesus nipponensis</i>	wakasagi
Salmoniformes	Osmeridae	<i>Osmerus mordax</i>	rainbow smelt
Salmoniformes	Osmeridae	<i>Spirinchus thaleichthys</i>	longfin smelt

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME
Salmoniformes	Osmeridae	<i>Thaleichthys pacificus</i>	eulachon
Salmoniformes	Salmonidae	<i>Coregonus autumnalis</i>	arctic cisco
Salmoniformes	Salmonidae	<i>Coregonus laurettae</i>	bering cisco
Salmoniformes	Salmonidae	<i>Coregonus nigripinnis</i>	blackfin cisco
Salmoniformes	Salmonidae	<i>Coregonus hoyi</i>	bloater
Salmoniformes	Salmonidae	<i>Coregonus nasus</i>	broad whitefish
Salmoniformes	Salmonidae	<i>Coregonus artedi</i>	cisco
Salmoniformes	Salmonidae	<i>Coregonus johanna</i>	deepwater cisco
Salmoniformes	Salmonidae	<i>Coregonus pidschian</i>	humpback whitefish
Salmoniformes	Salmonidae	<i>Coregonus kiyi</i>	kiyi
Salmoniformes	Salmonidae	<i>Coregonus clupeaformis</i>	lake whitefish
Salmoniformes	Salmonidae	<i>Coregonus sardinella</i>	least cisco
Salmoniformes	Salmonidae	<i>Coregonus zenithicus</i>	shortjaw cisco
Salmoniformes	Salmonidae	<i>Coregonus reighardi</i>	shortnose cisco
Salmoniformes	Salmonidae	<i>Oncorhynchus tshawytscha</i>	chinook salmon
Salmoniformes	Salmonidae	<i>Oncorhynchus keta</i>	chum salmon
Salmoniformes	Salmonidae	<i>Oncorhynchus kisutch</i>	coho salmon
Salmoniformes	Salmonidae	<i>Oncorhynchus clarkii</i>	cutthroat trout
Salmoniformes	Salmonidae	<i>Oncorhynchus gilae</i>	gila trout
Salmoniformes	Salmonidae	<i>Oncorhynchus gorbuscha</i>	pink salmon
Salmoniformes	Salmonidae	<i>Oncorhynchus mykiss</i>	rainbow trout
Salmoniformes	Salmonidae	<i>Oncorhynchus nerka</i>	sockeye salmon
Salmoniformes	Salmonidae	<i>Oncorhynchus clarkii utah</i>	bonneville cutthroat trout
Salmoniformes	Salmonidae	<i>Oncorhynchus clarkii lewisi</i>	westslope cutthroat trout
Salmoniformes	Salmonidae	<i>Oncorhynchus apache x mykiss</i>	apache x rainbow trout
Salmoniformes	Salmonidae	<i>Oncorhynchus mykiss x aguabonita</i>	rainbow x golden trout
Salmoniformes	Salmonidae	<i>Prosopium abyssicola</i>	bear lake whitefish
Salmoniformes	Salmonidae	<i>Prosopium gemmifer</i>	bonneville cisco
Salmoniformes	Salmonidae	<i>Prosopium spilonotus</i>	bonneville whitefish
Salmoniformes	Salmonidae	<i>Prosopium williamsoni</i>	mountain whitefish
Salmoniformes	Salmonidae	<i>Prosopium coulterii</i>	pygmy whitefish
Salmoniformes	Salmonidae	<i>Prosopium cylindraceum</i>	round whitefish
Salmoniformes	Salmonidae	<i>Salmo salar</i>	atlantic salmon
Salmoniformes	Salmonidae	<i>Salmo trutta</i>	brown trout
Salmoniformes	Salmonidae	<i>Salmo X Salvelinus trutta x fontinalis</i>	tiger trout
Salmoniformes	Salmonidae	<i>Salvelinus alpinus</i>	arctic char
Salmoniformes	Salmonidae	<i>Salvelinus fontinalis</i>	brook trout
Salmoniformes	Salmonidae	<i>Salvelinus confluentus</i>	bull trout
Salmoniformes	Salmonidae	<i>Salvelinus malma</i>	dolly varden

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME
Salmoniformes	Salmonidae	<i>Salvelinus namaycush</i>	lake trout
Salmoniformes	Salmonidae	<i>Stenodus leucichthys</i>	inconnu
Salmoniformes	Salmonidae	<i>Thymallus arcticus</i>	arctic grayling
Salmoniformes	Salmonidae	<i>Oncorhynchus tshawytscha</i>	chinook salmon (yoy)
Salmoniformes	Salmonidae	<i>Oncorhynchus clarkii clarkii</i>	coastal cutthroat trout
Salmoniformes	Salmonidae	<i>Oncorhynchus clarkii pleuriticus</i>	colorado river cutthroat trout
Salmoniformes	Salmonidae	<i>Oncorhynchus clarkii x mykiss</i>	cutbow
Salmoniformes	Salmonidae	<i>Oncorhynchus clarkii henshawi</i>	lahontan cutthroat trout
Salmoniformes	Salmonidae	<i>Oncorhynchus mykiss</i>	rainbow trout (steelhead)
Salmoniformes	Salmonidae	<i>Oncorhynchus mykiss gairdneri</i>	redband rainbow trout
Salmoniformes	Salmonidae	<i>Oncorhynchus aguabonita</i>	golden trout
Salmoniformes	Salmonidae	<i>Salmo salar</i>	atlantic salmon juvenile
Scorpaeniformes	Cottidae	<i>Clinocottus acuticeps</i>	sharpnose sculpin
Scorpaeniformes	Cottidae	<i>Cottus carolinae</i>	banded sculpin
Scorpaeniformes	Cottidae	<i>Cottus extensus</i>	bear lake sculpin
Scorpaeniformes	Cottidae	<i>Cottus baileyi</i>	black sculpin
Scorpaeniformes	Cottidae	<i>Cottus caeruleomentum</i>	blue ridge sculpin
Scorpaeniformes	Cottidae	<i>Cottus aleuticus</i>	coastrange sculpin
Scorpaeniformes	Cottidae	<i>Cottus hubbsi</i>	columbia sculpin
Scorpaeniformes	Cottidae	<i>Cottus princeps</i>	klamath lake sculpin
Scorpaeniformes	Cottidae	<i>Cottus bendirei</i>	malheur sculpin
Scorpaeniformes	Cottidae	<i>Cottus klamathensis</i>	marbled sculpin
Scorpaeniformes	Cottidae	<i>Cottus marginatus</i>	marginated sculpin
Scorpaeniformes	Cottidae	<i>Cottus bairdii</i>	mottled sculpin
Scorpaeniformes	Cottidae	<i>Cottus hypselurus</i>	ozark sculpin
Scorpaeniformes	Cottidae	<i>Cottus beldingii</i>	paiute sculpin
Scorpaeniformes	Cottidae	<i>Cottus pitensis</i>	pit sculpin
Scorpaeniformes	Cottidae	<i>Cottus girardi</i>	potomac sculpin
Scorpaeniformes	Cottidae	<i>Cottus asper</i>	prickly sculpin
Scorpaeniformes	Cottidae	<i>Cottus paulus</i>	pygmy sculpin
Scorpaeniformes	Cottidae	<i>Cottus perplexus</i>	reticulate sculpin
Scorpaeniformes	Cottidae	<i>Cottus gulosus</i>	riffle sculpin
Scorpaeniformes	Cottidae	<i>Cottus asperrimus</i>	rough sculpin
Scorpaeniformes	Cottidae	<i>Cottus confusus</i>	shorthead sculpin
Scorpaeniformes	Cottidae	<i>Cottus greenei</i>	shoshone sculpin
Scorpaeniformes	Cottidae	<i>Cottus tenuis</i>	slender sculpin
Scorpaeniformes	Cottidae	<i>Cottus cognatus</i>	slimy sculpin
Scorpaeniformes	Cottidae	<i>Cottus ricei</i>	spoonhead sculpin
Scorpaeniformes	Cottidae	<i>Cottus rhotheus</i>	torrent sculpin

APPENDIX D: STANDARD COMMON AND SCIENTIFIC NAMES OF FISH AND AMPHIBIANS

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME
Scorpaeniformes	Cottidae	<i>Cottus echinatus</i>	utah lake sculpin
Scorpaeniformes	Cottidae	<i>Cottus leiopomus</i>	wood river sculpin
Scorpaeniformes	Cottidae	<i>Cottus chatahoochee</i>	chatahoochee sculpin
Scorpaeniformes	Cottidae	<i>Cottus cf. broadband sculpin</i>	clinch sculpin
Scorpaeniformes	Cottidae	<i>Cottus tallapoosae</i>	tallapoosa sculpin
Scorpaeniformes	Cottidae	<i>Leptocottus armatus</i>	pacific staghorn sculpin
Scorpaeniformes	Cottidae	<i>Myoxocephalus thompsonii</i>	deepwater sculpin
Scorpaeniformes	Cottidae	<i>Myoxocephalus quadricornis</i>	fourhorn sculpin
Scorpaeniformes	Cottidae	<i>Cottus kanawhae</i>	kanawha sculpin
Siluriformes	Ariidae	<i>Ariopsis felis</i>	hardhead catfish
Siluriformes	Callichthyidae	<i>Hoplosternum littorale</i>	brown hoplo
Siluriformes	Clariidae	<i>Clarias batrachus</i>	walking catfish
Siluriformes	Doradidae	<i>Platydoras armatulus</i>	southern striped raphael
Siluriformes	Ictaluridae	<i>Ameiurus melas</i>	black bullhead
Siluriformes	Ictaluridae	<i>Ameiurus nebulosus</i>	brown bullhead
Siluriformes	Ictaluridae	<i>Ameiurus platycephalus</i>	flat bullhead
Siluriformes	Ictaluridae	<i>Ameiurus brunneus</i>	snail bullhead
Siluriformes	Ictaluridae	<i>Ameiurus serracanthus</i>	spotted bullhead
Siluriformes	Ictaluridae	<i>Ameiurus catus</i>	white catfish
Siluriformes	Ictaluridae	<i>Ameiurus natalis</i>	yellow bullhead
Siluriformes	Ictaluridae	<i>Ictalurus furcatus</i>	blue catfish
Siluriformes	Ictaluridae	<i>Ictalurus punctatus</i>	channel catfish
Siluriformes	Ictaluridae	<i>Ictalurus lupus</i>	headwater catfish
Siluriformes	Ictaluridae	<i>Ictalurus pricei</i>	yaqui catfish
Siluriformes	Ictaluridae	<i>Noturus funebris</i>	black madtom
Siluriformes	Ictaluridae	<i>Noturus miurus</i>	brindled madtom
Siluriformes	Ictaluridae	<i>Noturus phaeus</i>	brown madtom
Siluriformes	Ictaluridae	<i>Noturus taylori</i>	caddo madtom
Siluriformes	Ictaluridae	<i>Noturus furiosus</i>	carolina madtom
Siluriformes	Ictaluridae	<i>Noturus flavater</i>	checkered madtom
Siluriformes	Ictaluridae	<i>Noturus elegans</i>	elegant madtom
Siluriformes	Ictaluridae	<i>Noturus munitus</i>	frecklebelly madtom
Siluriformes	Ictaluridae	<i>Noturus nocturnus</i>	freckled madtom
Siluriformes	Ictaluridae	<i>Noturus hildebrandi</i>	least madtom
Siluriformes	Ictaluridae	<i>Noturus insignis</i>	marginated madtom
Siluriformes	Ictaluridae	<i>Noturus eleutherus</i>	mountain madtom
Siluriformes	Ictaluridae	<i>Noturus placidus</i>	neosho madtom
Siluriformes	Ictaluridae	<i>Noturus stigmosus</i>	northern madtom
Siluriformes	Ictaluridae	<i>Noturus gilberti</i>	orange-fin madtom
Siluriformes	Ictaluridae	<i>Noturus lachneri</i>	ouachita madtom
Siluriformes	Ictaluridae	<i>Noturus albater</i>	ozark madtom
Siluriformes	Ictaluridae	<i>Noturus stanauli</i>	pygmy madtom

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME
Siluriformes	Ictaluridae	<i>Noturus trautmani</i>	scioto madtom
Siluriformes	Ictaluridae	<i>Noturus exilis</i>	slender madtom
Siluriformes	Ictaluridae	<i>Noturus baileyi</i>	smoky madtom
Siluriformes	Ictaluridae	<i>Noturus leptacanthus</i>	speckled madtom
Siluriformes	Ictaluridae	<i>Noturus flavus</i>	stonecat
Siluriformes	Ictaluridae	<i>Noturus gyrinus</i>	tadpole madtom
Siluriformes	Ictaluridae	<i>Noturus flavipinnis</i>	yellowfin madtom
Siluriformes	Ictaluridae	<i>Pylodictis olivaris</i>	flathead catfish
Siluriformes	Ictaluridae	<i>Satan eurystomus</i>	widemouth blindcat
Siluriformes	Ictaluridae	<i>Trogloglanis pattersoni</i>	toothless blindcat
Siluriformes	Loricariidae	<i>Hypostomus plecostomus</i>	suckermouth catfish
Siluriformes	Loricariidae	<i>Pterygoplichthys pardalis</i>	amazon sailfin catfish
Siluriformes	Loricariidae	<i>Pterygoplichthys multiradiatus</i>	orinoco sailfin catfish
Siluriformes	Loricariidae	<i>Pterygoplichthys anisitsi</i>	southern sailfin catfish
Siluriformes	Loricariidae	<i>Pterygoplichthys disjunctivus</i>	vermiculated sailfin catfish
Siluriformes	Ictaluridae	<i>Noturus fasciatus</i>	saddled madtom
Synbranchiformes	Synbranchidae	<i>Monopterus albus</i>	asian swamp eel

Table D-2. Standard Common and Scientific Names of Amphibians¹

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME
Anura	Ascaphidae	<i>Ascaphus truei</i>	tailed frog
Anura	Ascaphidae	<i>Ascaphus truei</i>	tailed frog (tadpole)
Anura	Bufo	<i>Bufo boreas</i>	western toad
Anura	Bufo	<i>Bufo microscaphus</i>	arizona toad
Anura	Bufo	<i>Bufo hemiophrys</i>	canadian toad
Anura	Bufo	<i>Bufo punctatus</i>	red-spotted toad
Anura	Bufo	<i>Bufo woodhousii</i>	woodhouse's toad
Anura	Hyla	<i>Hyla arenicolor</i>	canyon treefrog
Anura	Hyla	<i>Pseudacris maculata</i>	boreal chorus frog
Anura	Hyla	<i>Pseudacris cadaverina</i>	california treefrog
Anura	Hyla	<i>Pseudacris regilla</i>	pacific tree frog
Anura	Pipa	<i>Xenopus laevis</i>	african clawed frog
Anura	Rana	<i>Lithobates pipiens</i>	leopard frog
Anura	Rana	<i>Lithobates blairi</i>	plains leopard frog
Anura	Rana	<i>Lithobates chiricahuensis</i>	chiricahua leopard frog
Anura	Rana	<i>Rana catesbeiana</i>	bullfrog
Anura	Rana	<i>Rana catesbeiana</i>	bullfrog tadpole
Anura	Rana	<i>Rana aurora</i>	red-legged frog
Anura	Rana	<i>Rana cascadae</i>	cascade frog
Anura	Rana	<i>Rana luteiventris</i>	columbia spotted frog
Anura	Rana	<i>Rana boylei</i>	foothill yellow-legged frog
Anura	Rana	<i>Rana clamitans</i>	green frog
Anura	Rana	<i>Rana yavapaiensis</i>	lowland leopard frog
Anura	Rana	<i>Rana muscosa</i>	mountain yellow-legged frog
Anura	Rana	<i>Rana pretiosa</i>	spotted frog
Anura	Rana	<i>Rana sylvatica</i>	wood frog
Caudata	Ambystomatidae	<i>Ambystoma macrodactylum</i>	longtoed salamander
Caudata	Ambystomatidae	<i>Dicamptodon tenebrosus</i>	pacific giant salamander
Caudata	Ambystomatidae	<i>Dicamptodon ensatus</i>	california giant salamander
Caudata	Ambystomatidae	<i>Dicamptodon aterrimus</i>	idaho giant salamander
Caudata	Rhyacotritonidae	<i>Rhyacotriton kezeri</i>	columbia torrent salamander
Caudata	Salamandridae	<i>Taricha granulosa</i>	rough-skinned newt
Caudata	Salamandridae	<i>Taricha torosa</i>	california newt

¹ Although not required, you may note amphibians and reptiles captured on the fish collection form.

Appendix E: Example Electrofishing Settings

Example Backpack Output Goals

Waveform: PDC (fish catching settings, e.g., 60 pps, 25% duty cycle)
Electrodes: Ring anode, rattail cathode
R100: 275 Ohms
Fish Cond.: 115 µS/cm

Water Conductivity (Ambient)	Applied Voltage Goal (Peak)	Applied Amperage Goal (Peak)
25	669	0.61
50	394	0.72
60	349	0.76
80	291	0.85
100	257	0.93
150	211	1.15
200	188	1.37
250	174	1.59
300	165	1.80
400	154	2.24
500	147	2.67
600	142	3.11
700	139	3.54
800	137	3.98
900	135	4.41
1000	133	4.85
1500	129	7.02
2000	126	9.20
2500	125	11.37
3000	124	13.54

Adapted from:

<http://electrofishing.net/2018/01/11/output-goal-tables-for-backpacks-towbarges-and-boats/>

If your conductivity meter cannot measure **ambient** conductivity, you can “uncorrect” specific conductance at 25 °C to ambient conductivity using the following equation:

- Ambient conductivity=Specific conductance x (1+([water temp-25 °C] x 0.02))

Example Towed-barge Output Goal Table (1 anode)

Waveform: 80 pps, 40% duty cycle
 Anode: One Ring 14" diameter (35.56 cm)
 Cathode: Plate 66" x 45" (167.6 cm x 114 cm)
 R100: 147 Ohms with one anode
 Fish Cond.: 115 µS/cm

Water Conductivity (Ambient)	Applied Voltage Goal (Peak)	Applied Amperage Goal (Peak)
25	921	1.58
50	543	1.87
60	480	1.98
80	401	2.20
100	354	2.43
150	291	3.00
200	259	3.56
250	240	4.13
300	228	4.69
400	212	5.82
500	202	6.95
600	196	8.08
700	192	9.21
800	188	10.34
900	186	11.47
1000	183	12.60
1500	177	18.26
2000	174	23.91
2500	172	29.56
3000	171	35.21

Adapted from:

<http://electrofishing.net/2018/01/11/output-goal-tables-for-backpacks-towbarges-and-boats/>

If your conductivity meter cannot measure **ambient** conductivity, you can “uncorrect” specific conductance at 25 °C to ambient conductivity using the following equation:

- Ambient conductivity=Specific conductance x (1+([water temp-25 °C] x 0.02))

Example 2-boom Boat Output Goal Table

Waveform: PDC (fish catching settings, e.g., 60 pps, 25% duty cycle)
 Anode: Two booms Wisconsin rings 4 – 6 droppers
 Cathode: Boat hull (16 – 18’ length)
 R100: 35 Ohms
 Fish Cond.: 115 µS/cm

Water Conductivity (Ambient)	Applied Voltage Goal (Peak)	Applied Amperage Goal (Peak)
25	851	6.09
50	502	7.17
60	443	7.61
80	371	8.48
100	327	9.35
150	269	11.52
200	239	13.70
250	222	15.87
300	210	18.04
400	196	22.39
500	187	26.74
600	181	31.09
700	177	35.43
800	174	39.78
900	171	44.13
1000	169	48.48
1500	164	70.22
2000	161	91.96
2500	159	113.70
3000	158	135.43

Adapted from:

<http://electrofishing.net/2018/01/11/output-goal-tables-for-backpacks-towbarges-and-boats/>

If your conductivity meter cannot measure **ambient** conductivity, you can “uncorrect” specific conductance at 25 °C to ambient conductivity using the following equation:

- Ambient conductivity=Specific conductance x (1+([water temp-25 °C] x 0.02))

Rationale for boats:

We are seeing from several sources that 10 – 12 amps are the required minimum for successful fishing at 115 µS/cm with a 2-boom electrofishing boat using rectangular-wave pulsed DC. Rounded wave PDC, as produced from GPP units, appear to require higher amperages (12 – 14 amp range at 115 µS/cm). The above table uses a 35 Ohm boat electrode system (2 booms with 4 – 6 droppers each, unpainted boat hull) and the low end of the rectangular wave requirements (10 amps at 115 µS/cm).

The best output to standardize by is current. However, in low conductivity water, or when using low power units as backpacks, voltage may be a better choice to use instead of current.

Here’s the big catch. If you plan to use these as starting guides, then the electrode arrangement should be similar to that described for each table. For example, spherical boat electrodes are not similar enough to Wisconsin Rings for this purpose. We all know that electrode arrangements will differ (different length hulls, 4 droppers instead of 6, etc). The cool thing is that current targets will be more consistent while voltage targets will vary more.

For a good blog with data on this concept, see:

<http://electrofishing.net/2016/05/21/boat-fleet-fishing-thresholds/>

For information on different boat and raft electrode arrangements, next look at this:

<http://electrofishing.net/2017/03/20/estimating-electrofishing-thresholdswithout-fish/>