

Nongame Fish Identification Workshop: A Potential Regional Chapter Activity

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by

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While many NANFA members are fish and fisheries professionals who have received formal training in fish identification, many members are not. That can make the identification of nongame fishes quite challenging and intimidating to non-professionals and newcomers to the native fishes hobby. But it doesn't have to be.

Members of the Illinois-Indiana Regional NANFA Chapter recently had the opportunity to attend a Nongame Fish Identification Workshop conducted at Purdue University, as part of the continuing Education Program of the American Fisheries Society. We learned how to use fish identification keys, such as those found in the various *Fishes of (State)* books, and fish morphology techniques such as those outlined in Peterson's *Field Guide to Freshwater Fishes North of Mexico*. It was a successful program, the benefits of which I hope will encourage other Chapters to hold similar workshops in their regions.

Purdue's Dr. Anne Spacie began the workshop with an enlightening historical and evolutionary overview of fish movements—sort of a “fish geography”—throughout the Illinois and Indiana watershed and drainage areas. She focused on the Tippecanoe River, where the next day's field trip occurred. Her extensive knowledge and enthusiasm for fishes set an exciting stage for workshop participants, and her voucher collection provided subjects for the laboratory sessions.

Dr. Spacie stressed the importance of understanding hydrologic and substrate differences when identifying fishes. “Make sure you consult range maps and distribution maps to expedite the identification process,” she said. “It is important to know where your specimen is from in order to eliminate a

lot of possibilities. Once you answer the question ‘Where is this from?’, you can anticipate the most common species. Don't rule out the lesser common, but look at the most common first to save time overall.”

Greg Seegert, of E.A. Science and Technology, an environmental consulting firm in Deerfield, Illinois, steered participants through the use of several identification keys. He also provided some valuable supplementary “crib sheets” that drew attention to the subtle differences between species among several difficult groups of fishes, including shiners, chubs, suckers, catfishes (Table 1) and darters (Table 2).

The participation of professionals like Greg, for whom fish identification is a routine part of the job, brought another benefit: We were able to learn advanced techniques—such as counting pharyngeal teeth and gill rakers—which might otherwise not have been addressed in a beginner's class.

The day after the lab work we visited the beautiful Tippecanoe River near Brookston, Indiana, north of Lafayette. We collected fishes in a number of ways, including shocker boats and large and small pull seines. We sampled a variety of habitats—shallow and deep water, riffles and quiet pools, shoreline overhangs, boulders, rubble, sand bottoms, and areas with submerged leaves, trees and brush.

Greg Seegert emphasized the importance of keeping good *in situ* field notes regarding habitat, water conditions, and the coloration of species immediately after capture. “Look for something different in the specific fish you are trying to identify,” he said.

**Table 1.** Confusing Indiana Ictalurids (compiled by Greg Seegert). **Bold face** denotes most important characteristics.

| Species                                   | IN Distribution                                                                            | Habitat                                                                         | Best Key Characteristics                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| black bullhead,<br><i>Ameiurus melas</i>  | statewide                                                                                  | lakes, ponds, sluggish rivers                                                   | <ul style="list-style-type: none"> <li>• dark chin barbels</li> <li>• <b>17-21 anal rays (counting even the smallest rudimentary rays)</b></li> <li>• usually 17-19 gill rakers</li> <li>• side of body uniformly colored</li> <li>• <b>posterior edge of pectoral spine relatively smooth</b></li> <li>• membrane between fin elements jet black</li> <li>• belly of breeding males usually bright yellow</li> </ul> |
| brown bullhead,<br><i>A. nebulosus</i>    | mainly in glacial lakes in the north but also sporadically distributed in southern Indiana | similar to black bullhead                                                       | <ul style="list-style-type: none"> <li>• dark chin barbels</li> <li>• <b>21-24 anal rays</b></li> <li>• <b>usually 13-15 gill rakers</b></li> <li>• <b>side of body usually mottled</b></li> <li>• posterior edge of pectoral spine moderately serrated</li> <li>• membrane between fin elements dark but not jet black</li> <li>• belly of breeding males white or cream</li> </ul>                                  |
| yellow bullhead,<br><i>A. natalis</i>     | statewide                                                                                  | similar to black bullhead, but more common in streams and rivers                | <ul style="list-style-type: none"> <li>• <b>white or yellow chin barbels</b></li> <li>• <b>24-27 anal rays</b></li> <li>• 12-18 gill rakers</li> <li>• posterior edge of pectoral spine barbed</li> <li>• belly of males whitish to light yellow</li> </ul>                                                                                                                                                           |
| tadpole madtom,<br><i>Noturus gyrinus</i> | statewide but most common in the north                                                     | sluggish streams and rivers, weedy lakes                                        | <ul style="list-style-type: none"> <li>• <b>lower and upper jaw equal in length</b></li> <li>• no lateral backward extension of tooth patch on roof of mouth</li> <li>• posterior margin of pectoral spine smooth</li> <li>• round, chunky body</li> </ul>                                                                                                                                                            |
| stonecat,<br><i>N. flavus</i>             | statewide                                                                                  | rocky streams and riffles in small rivers                                       | <ul style="list-style-type: none"> <li>• <b>lower jaw shorter than upper; underslung mouth</b></li> <li>• <b>obvious lateral backward extensions of tooth patch on roof of mouth</b></li> <li>• posterior margin of pectoral spine smooth</li> <li>• slender, dorsal-ventrally flattened body</li> </ul>                                                                                                              |
| freckled madtom,<br><i>N. nocturus</i>    | southern half of state                                                                     | medium to large rivers in low to moderate gradient                              | <ul style="list-style-type: none"> <li>• <b>lower jaw shorter than upper</b></li> <li>• no lateral backward extensions of tooth patch on roof of mouth</li> <li>• posterior margin of pectoral spine moderately serrated</li> <li>• freckling on sides and belly</li> </ul>                                                                                                                                           |
| brindled madtom,<br><i>N. miurus</i>      | statewide except Kankakee drainage                                                         | small to medium streams; occasionally in rivers; often with debris and detritus | <ul style="list-style-type: none"> <li>• blotches on side</li> <li>• <b>pectoral spine strongly serrated</b></li> <li>• <b>black blotch on distal end of dorsal fin</b></li> <li>• blotch on adipose fin extends to margin of fin</li> </ul>                                                                                                                                                                          |
| mountain madtom,<br><i>N. eleutherus</i>  | similar to brindled madtom but less common in the north                                    | rivers; typically over cobble in fast water                                     | <ul style="list-style-type: none"> <li>• blotches on side</li> <li>• <b>pectoral spine strongly serrated</b></li> <li>• no black blotch on dorsal fin</li> <li>• <b>blotch extends only halfway up the adipose fin</b></li> </ul>                                                                                                                                                                                     |
| northern madtom,<br><i>N. stigmosus</i>   | Wabash/White drainage but very rare                                                        | similar to mountain madtom                                                      | <ul style="list-style-type: none"> <li>• nearly identical to mountain madtom but has more rays in caudal fin (&gt;50 vs. &lt; 50) and 11 preopercular mandibular pores vs. 10 in mountain madtom</li> </ul>                                                                                                                                                                                                           |

**Table 2.** Confusing Indiana Percids (compiled by Greg Seegert). **Bold face** denotes most important characteristics. \* threatened. \*\* endangered.

| Species                                            | IN Distribution                              | Habitat                                                                    | Best Key Characteristics                                                                                                                                                                                                                                                                                                   |
|----------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| bluntnose darter,<br><i>Etheostoma chlorosomum</i> | mainly in the SW; rare in the Kankakee River | slack water areas in streams and rivers                                    | <ul style="list-style-type: none"> <li>• <b>one anal spine</b></li> <li>• upper lip completely separate from snout</li> <li>• <b>continuous black bridle across snout</b></li> <li>• <b>cheek fully scaled</b></li> <li>• never colorful</li> </ul>                                                                        |
| johnny darter,<br><i>E. nigrum</i>                 | statewide (common)                           | almost any size stream, river or lake                                      | <ul style="list-style-type: none"> <li>• <b>one anal spine</b></li> <li>• upper lip completely separate from snout</li> <li>• <b>black bridle across snout not continuous</b></li> <li>• <b>cheek naked</b></li> <li>• never colorful</li> </ul>                                                                           |
| Iowa darter,<br><i>E. exile</i>                    | northern Indiana                             | sluggish, weedy streams and small rivers, lakes                            | <ul style="list-style-type: none"> <li>• <b>two anal spines</b></li> <li>• upper lip connected to snout</li> <li>• colorful in breeding condition</li> <li>• lateral line curved slightly upward</li> </ul>                                                                                                                |
| slough darter,<br><i>E. gracile</i>                | SW                                           | swamps and low gradient streams and rivers                                 | <ul style="list-style-type: none"> <li>• <b>two anal spines</b></li> <li>• lateral line highly arched anteriorly and incomplete</li> </ul>                                                                                                                                                                                 |
| channel darter,<br><i>Percina copelandi</i>        | Wabash drainage where very rare              | medium to large rivers, usually over small gravel                          | <ul style="list-style-type: none"> <li>• premaxillary frenum absent or slight</li> <li>• midline of belly often with row of modified scales</li> </ul>                                                                                                                                                                     |
| rainbow darter,<br><i>E. caeruleum</i>             | statewide (common)                           | gravel riffles in streams and occasionally large rivers                    | <ul style="list-style-type: none"> <li>• <b>cheek naked</b></li> <li>• <b>males brightly colored; reds and blues</b></li> <li>• <b>males with orange in anal fin</b></li> <li>• infraorbital canal complete</li> </ul>                                                                                                     |
| mud darter,<br><i>E. asprigene</i>                 | Wabash/White drainage                        | typically in large rivers; substrate variable                              | <ul style="list-style-type: none"> <li>• <b>cheek well scaled</b></li> <li>• <b>males with more somber colors</b></li> </ul>                                                                                                                                                                                               |
| orangethroat darter,<br><i>E. spectabile</i>       | statewide except for the Kankakee basin      | small to medium streams; runs and riffles                                  | <ul style="list-style-type: none"> <li>• upper sides with short rows of horizontal spots</li> <li>• infraorbital canal incomplete</li> <li>• <b>cheek naked</b></li> <li>• <b>no orange in anal fin of breeding male</b></li> </ul>                                                                                        |
| gilt darter,<br><i>P. evides</i> *                 | Tippecanoe River                             | riffle/run areas in large streams & small-medium rivers over medium gravel | <ul style="list-style-type: none"> <li>• usually 11-13 dorsal spines</li> <li>• <b>breeding male colorful (reds, oranges)</b></li> <li>• usually 20-23 scale rows around the caudal peduncle</li> <li>• black blotches squarish and continue across the back</li> </ul>                                                    |
| blackside darter,<br><i>P. maculata</i>            | statewide                                    | pools & runs in medium-large streams; rare in large rivers                 | <ul style="list-style-type: none"> <li>• single basicaudal spot</li> <li>• <b>breeding male not colorful (no oranges or reds)</b></li> <li>• usually 24-29 scale rows around the caudal peduncle</li> <li>• black blotches on side ovoid and do not continue across back</li> <li>• usually 13-15 dorsal spines</li> </ul> |

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|-------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>dusky darter,<br/><i>P. sciera</i></p>                   | <p>Wabash/White drainage</p>                                                    | <p>large streams up to large rivers, often in woody debris</p>                        | <ul style="list-style-type: none"> <li>• breeding male not colorful</li> <li>• <b>usually 11-13 dorsal spines</b></li> <li>• <b>three basicaudal spots, often connected</b></li> <li>• darker-appearing compared to blackside darter</li> </ul>   |
| <p>greenside darter,<br/><i>E. blennioides</i></p>          | <p>statewide except Kankakee drainage</p>                                       | <p>medium to large streams</p>                                                        | <ul style="list-style-type: none"> <li>• <b>large (up to 140 mm)</b></li> <li>• <b>U-shaped marks on sides</b></li> <li>• short snout</li> <li>• no frenum, with fused maxillary and preorbital</li> <li>• usually 12-14 dorsal spines</li> </ul> |
| <p>banded darter,<br/><i>E. zonale</i></p>                  | <p>Kankakee River drainage and SE</p>                                           | <p>medium to large streams, rivers; runs and riffles</p>                              | <ul style="list-style-type: none"> <li>• small (max ~76 mm)</li> <li>• usually 11-12 dorsal spines</li> <li>• cheek scaled</li> </ul>                                                                                                             |
| <p>harlequin darter,<br/><i>E. histrio</i>**</p>            | <p>very rare in White/Wabash drainage</p>                                       | <p>medium-large rivers, often with woody debris</p>                                   | <ul style="list-style-type: none"> <li>• <b>typically 9-10 dorsal spines</b></li> <li>• small (max ~76 mm)</li> <li>• very long pectoral fins</li> <li>• <b>two large basicaudal spots</b></li> </ul>                                             |
| <p>Eastern sand darter,<br/><i>Ammocrypta pellucida</i></p> | <p>statewide except for Kankakee drainage but local</p>                         | <p>medium streams to large rivers over clean sand</p>                                 | <ul style="list-style-type: none"> <li>• <b>no post-opercular spine</b></li> <li>• <b>typically 11-13 transverse scale rows</b></li> </ul>                                                                                                        |
| <p>Western sand darter,<br/><i>A. clara</i></p>             | <p>mainly in White/Wabash drainage; rare in Kankakee River drainage</p>         | <p>medium to large rivers over clean sand</p>                                         | <ul style="list-style-type: none"> <li>• <b>post-opercular spine present</b></li> <li>• <b>typically 3-4 transverse scale rows</b></li> </ul>                                                                                                     |
| <p>bluebreast darter,<br/><i>E. camurum</i>**</p>           | <p>uncommon and local within the White/Wabash drainage and southern Indiana</p> | <p>large streams and medium rivers in high velocity areas with cobble and boulder</p> | <ul style="list-style-type: none"> <li>• <b>blunt snout</b></li> <li>• red spots on side</li> <li>• <b>black edging on caudal fin and soft dorsal fin</b></li> </ul>                                                                              |
| <p>spotted darter,<br/><i>E. maculatum</i>**</p>            | <p>similar to bluebreast darter but even rarer</p>                              | <p>similar to bluebreast darter</p>                                                   | <ul style="list-style-type: none"> <li>• <b>snout more pointed</b></li> <li>• red spots on side</li> <li>• <b>no black edging on fins</b></li> </ul>                                                                                              |
| <p>fantail darter,<br/><i>E. flabellare</i></p>             | <p>statewide (common)</p>                                                       | <p>small to medium streams, preferably with slab rocks</p>                            | <ul style="list-style-type: none"> <li>• <b>pointed snout</b></li> <li>• <b>lower jaw longer than upper jaw</b></li> <li>• <b>gill membranes broadly connected</b></li> <li>• opercle unscaled</li> </ul>                                         |
| <p>spottail darter,<br/><i>E. squamiceps</i></p>            | <p>SW</p>                                                                       | <p>small streams</p>                                                                  | <ul style="list-style-type: none"> <li>• snout not as pointed</li> <li>• jaws subequal</li> <li>• gill membranes only slightly connected</li> <li>• opercle scaled</li> </ul>                                                                     |
| <p>stripetail darter,<br/><i>E. kennicotti</i></p>          | <p>extreme SW?</p>                                                              | <p>small streams</p>                                                                  | <ul style="list-style-type: none"> <li>• jaws are subequal</li> <li>• gill membranes slightly to moderately connected</li> <li>• opercle naked</li> </ul>                                                                                         |