

# KEY TO THE FAMILIES AND GENERA OF PENNSYLVANIA FRESHWATER FISHES AND THE SPECIES OF FRESHWATER FISHES OF THE SUSQUEHANNA RIVER DRAINAGE ABOVE CONOWINGO DAM

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## ABSTRACT

A key to the 86 species of fish known from the Susquehanna River drainage is given. The arrangement allows use to the family or genera level for Pennsylvania and the species level for the Susquehanna. Diagrams and references supplement its use, and cited research includes the majority of the presently known information relative to fishes of the Susquehanna River drainage.

## INTRODUCTION

General keys to fishes are available to researchers and students (Blair et al., 1968; Eddy, 1969). However, these have limitations primarily associated with the fact that each presents all the freshwater fishes of the United States. This results in confusion, especially to beginners. Regional and drainage keys are needed. Some regional keys that include fishes from Pennsylvania are: Trautman, 1957 — Ohio drainage; Buss and Miller, 1965 — pan and game fishes of Pennsylvania; Loos et al., 1972 — minnows of the lower Susquehanna; and Davis, 1974 — applicable to the lower Susquehanna.

No key is presently available that is specific to the Susquehanna River drainage or to the fishes of Pennsylvania. The purpose of this and a companion paper (Denoncourt and Cooper, 1975) is to make available needed information for the identification of Susquehanna River fishes. It also contains keys to the families and genera of Pennsylvania to facilitate broader use. A detailed monograph on the fishes of Pennsylvania is in preparation by Dr. Edwin L. Cooper of Pennsylvania State University (pers. comm.).

This key is primarily applicable to adult or near adult specimens. Young fishes present specialized problems not covered here, but under study by several investigators. It contains a standard couplet arrangement with a key to families followed by separate keys to the genera and species of each family. If only one species is known from the Susquehanna River drainage or if only one genus is known from Pennsylvania, this is given in the key to families. Keys by family are arranged with upper case letters for couplets to genera and arabic numbers for couplets to species. Thus, it can be used to identify fishes to whatever level is appropriate to the user.

Selected anatomical structures, outlines of family representatives, and some diagnostic features to assist in the use of the keys are given in Figures 1 and 2.

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## KEY TO THE FAMILIES OF PENNSYLVANIA FRESHWATER FISHES\*

1. No jaws; seven pairs of external gill openings . . . . . Lampreys, PETROMYZONTIDAE
1. Jaws present . . . . . 2
2. No pelvic fins; body elongated and eel-like; dorsal-caudal-anal fins continuous . . . . . Eels, ANGUILLIDAE  
American eel, *Anguilla rostrata*
2. Pelvic fins present . . . . . 3
3. Caudal fin base heterocercal (upper portion longer than lower) . 4
3. Caudal fin base homocercal (symmetrical) . . . . . 7
4. Vertebrae extend into upper lobe of a forked tail . . . . . 5
4. Vertebrae not conspicuously extended upward; tail rounded . . 6
5. Snout very elongated and paddle-like; skin naked . . . Paddlefish, POLYODONTIDAE (Genus: *Polyodon*)
5. Snout elongated and with 4 barbels on the underside; body with rows of body plates . . . . . Sturgeons, ACIPENSERIDAE
6. Upper and lower jaws elongated; hard, ganoid scales; dorsal has few rays . . . . . Gars, LEPISOSTEIDAE (Genus: *Lepisosteus*)
6. Jaws shorter; scales cycloid; dorsal with 45+ rays . . . . . Bowfins, AMIIDAE Bowfin, *Amia calva*
7. Adipose fin present . . . . . 8
7. Adipose fin absent . . . . . 11
8. Barbels on chin and sides of mouth . . . . . Catfishes, ICTALURIDAE
8. No barbels . . . . . 9
9. Scales ctenoid; spine in anal fin . . Troutperch, PERCOPSIDAE (Genus: *Percopsis*)
9. Scales cycloid; no spine in anal fin . . . . . 10
10. Pointed, flap-like process at base of and above pelvic fin . Trout, SALMONIDAE
10. No pelvic axillary process; less than 75 lateral line scales . Smelts, OSMERIDAE Rainbow smelt, *Osmerus mordax*
11. No spines or only one spine in or anterior to the dorsal fin; one spine in anal of carp and goldfish . . . . . 12
11. Two or more spines in the dorsal, first dorsal, or anterior to the first dorsal fin . . . . . 20
12. Caudal fin clearly rounded . . . . . 13
12. Caudal fin forked . . . . . 16
13. Dorsal fin with 65+ rays; single barbel on chin . . . . . Codfishes, GADIDAE Burbot, *Lota lota*
13. Dorsal with less than 25 rays . . . . . 14
14. Premaxillary protractile (groove separates upper lip from snout) . . . . . 15
14. Premaxillary not protractile (no groove) . . . . . Mudminnows, UMBRIDAE (Genus: *Umbra*)

\*Species is given, if only one in the Susquehanna drainage. Genus given, if only one in Pennsylvania. See key to genera or species, if more than one genus in Pennsylvania or more than one species in the Susquehanna River drainage.

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15. Anal fin of male modified for copulation, dorsal origin posterior to anal origin . . . . . Livebearers, POECILIIDAE  
(Genus: *Gambusia*)
15. Anal fin of male similar to dorsal and not modified. Killifishes, CYPRINODONTIDAE
16. Gill slits extended forward ventrally; membranes not attached to isthmus . . . . . 17
16. Gill slits united to isthmus, not extended forward ventrally . . . . . 19
17. Jaws depressed and elongated (duck-billed); body not laterally compressed . . . . . Pikes, ESOCIDAE
17. Jaws not depressed or elongated; body somewhat laterally compressed . . . . . 18
18. Dorsal fin partly or totally posterior to anal origin; lateral line present . . . . . Mooneyes, HIODONTIDAE  
(Genus: *Hiodon*)
18. Dorsal fin completely anterior to anal; lateral line absent . . . . . Herring, CLUPEIDAE
19. Mouth adapted for sucking; lips thickened and papillose (pimple-like) or plicate (ridges); anal origin nearer to base of caudal fin than to origin of dorsal fin; pharyngeal teeth numerous and comb-like . . . . . Suckers, CATSTOMIDAE
19. Mouth and lips not as above; anal origin nearer to dorsal fin origin than to base of caudal fin; pharyngeal teeth less than 9 . . . . . Minnows, CYPRINIDAE
20. Anal opening in throat area, anterior to pelvic fins . . . . . Pirate perches, APHREDODERIDAE (Genus: *Apredoderus*)
20. Anal opening located just anterior to anal fin . . . . . 21
21. Dorsal spines separate, not connected by a membrane . . . . . Sticklebacks, GASTEROSTEIDAE
21. Dorsal spines connected by a membrane . . . . . 22
22. Body scaleless; pectoral fins large; head broad . . . . . Sculpins, COTTIDAE
22. Body scaled . . . . . 23
23. Anal fin longer than combined two dorsals . . . . . Silversides, ATHERINIDAE (Genus: *Labidesthes*)
23. Anal fin shorter than dorsal or combined dorsals . . . . . 24
24. Anal spines three or more . . . . . 25
24. Anal spines one or two; usually two distinct dorsal fins . . . . . 26
25. Opercle with a spine; three anal spines; two separate dorsal fins . . . . . Temperate basses, PERCICHTHYIDAE
25. Opercle without a spine; three or more anal spines; two dorsal fins usually united . . . . . Sunfishes, CENTRARCHIDAE
26. Lateral line extends only to caudal fin base; second anal spine thin and flexible; body not deeper than head length . . . . . Perches PERCIDAE
26. Lateral line extends to end of caudal fin; second anal spine thick and rigid; body deeper than head length . . . . . Drums, SCIAENIDAE  
(Genus: *Aplodinotus*)

KEY, BY FAMILY, TO THE GENERA OF PENNSYLVANIA  
FRESHWATER FISHES AND SPECIES OF THE  
SUSQUEHANNA RIVER DRAINAGE ABOVE CONOWINGO  
DAM (not already given in the key to families)\*

PETROMYZONTIDAE — Lampreys

- A. Two dorsal fins, myomeres over 60 . . . . . B
- A. One continuous dorsal fin, myomeres less than 60 . . . . . *Ichthyomyzon*
- B. Conspicuous teeth radiating from mouth; single bicuspid tooth above mouth . . . . . *Petromyzon*
- B. Teeth grouped, not radiating . . . . . *Lampetra*

ACIPENSERIDAE — Sturgeons

- A. Upper caudal fin lobe prolonged into a filament; caudal peduncle with overlapping bony plates . . . . . *Scaphirhynchus*
- A. Upper caudal fin lobe not extensively prolonged; bony plates on caudal do not overlap . . . . . *Acipenser*

ICTALURIDAE — Catfishes

- A. Adipose fin continuous with caudal or with only a small notch; margin of caudal dark . . . . . Margined madtom, *Noturus insignis*
- A. Adipose fin free from caudal fin . . . . . B
- B. Lower jaw longer than upper jaw; dorsal margin of caudal fin light in color . . . . . *Pylodictus*
- B. Jaws equal or lower jaw shorter; no light color on upper margin of caudal fin . . . . . *Ictalurus* — 1
1. Caudal fin forked . . . . . 2
1. Caudal fin not forked . . . . . 3
2. Barbels white; belly clear white; anal rays 18-24 . . . . . White catfish, *Ictalurus catus*
2. Barbels long and with melanophores (spots of black pigment); anal rays 30-36 . . . . . Channel catfish, *Ictalurus punctatus*
3. Barbels under the jaw dark with melanophores; anal rays 21-24 . . . . . Brown bullhead, *Ictalurus nebulosus*
3. Barbels white or yellowish, without melanophores; anal rays 23-28 . . . . . Yellow bullhead, *Ictalurus natalis*

SALMONIDAE — Trouts

- A. Scales large, 100 or less in lateral line; mouth small, maxillary not reaching beyond anterior margin of eye . . . . . *Coregonus* — 1
- A. Scales small, over 100; mouth large, maxillary reaches beyond anterior of eye . . . . . B
- B. Usually 13+ anal rays . . . . . *Oncorhynchus* — 2
- B. Usually 12 or less anal rays . . . . . C
- C. Black spots on light body . . . . . *Salmo* — 3
- C. Light spots on dark background; white leading edge on pelvic and anal fins . . . . . *Salvelinus* — 5
1. Premaxillary wider than long; anterior edge of upper jaw directed backward; gill rakers on first arch less than 32 . . . . . Lake whitefish, *Coregonus clupeaformis*
1. Premaxillary longer than wide; anterior edge of upper jaw directed forward; gill rakers 39-52 . . . . . Cisco, *Coregonus artedii*
2. Gill rakers on first arch 25 or less; distinct black spots on caudal fin and dorsum of body . . . . . Coho Salmon, *Oncorhynchus kisutch*
2. Gill rakers 29+; no black spots on caudal fin and dorsum of body . . . . . Sockeye Salmon, *Oncorhynchus nerka*
3. Caudal fin with dark spots in rows; never red spots; often a pinkish streak on sides . . . . . Rainbow trout, *Salmo gairdneri*
3. Caudal fin usually unspotted, never in rows; may have reddish spots . . . . . 4
4. Vomerine teeth and few and weak; dorsal rays usually 11 . . . . . Atlantic salmon, *Salmo salar*
4. Vomerine teeth many well developed; dorsal rays usually 9 . . . . . Brown trout, *Salmo trutta*
5. Caudal fin obviously forked; never bright colors or spots on body . . . . . Lake trout, *Salvelinus namaycush*
5. Caudal fin not forked; often pink or red spots on body . . . . . Brook trout, *Salvelinum fontinalis*

CYPRINODONTIDAE — Killifishes

1. Lateral line scales 44-68; many vertical bars on the body . . . . . Banded killifish, *Fundulus diaphanus*
1. Lateral line scales 31-38; vertical bars few; head wide and snout shorter . . . . . Mummichog, *Fundulus heteroclitus*

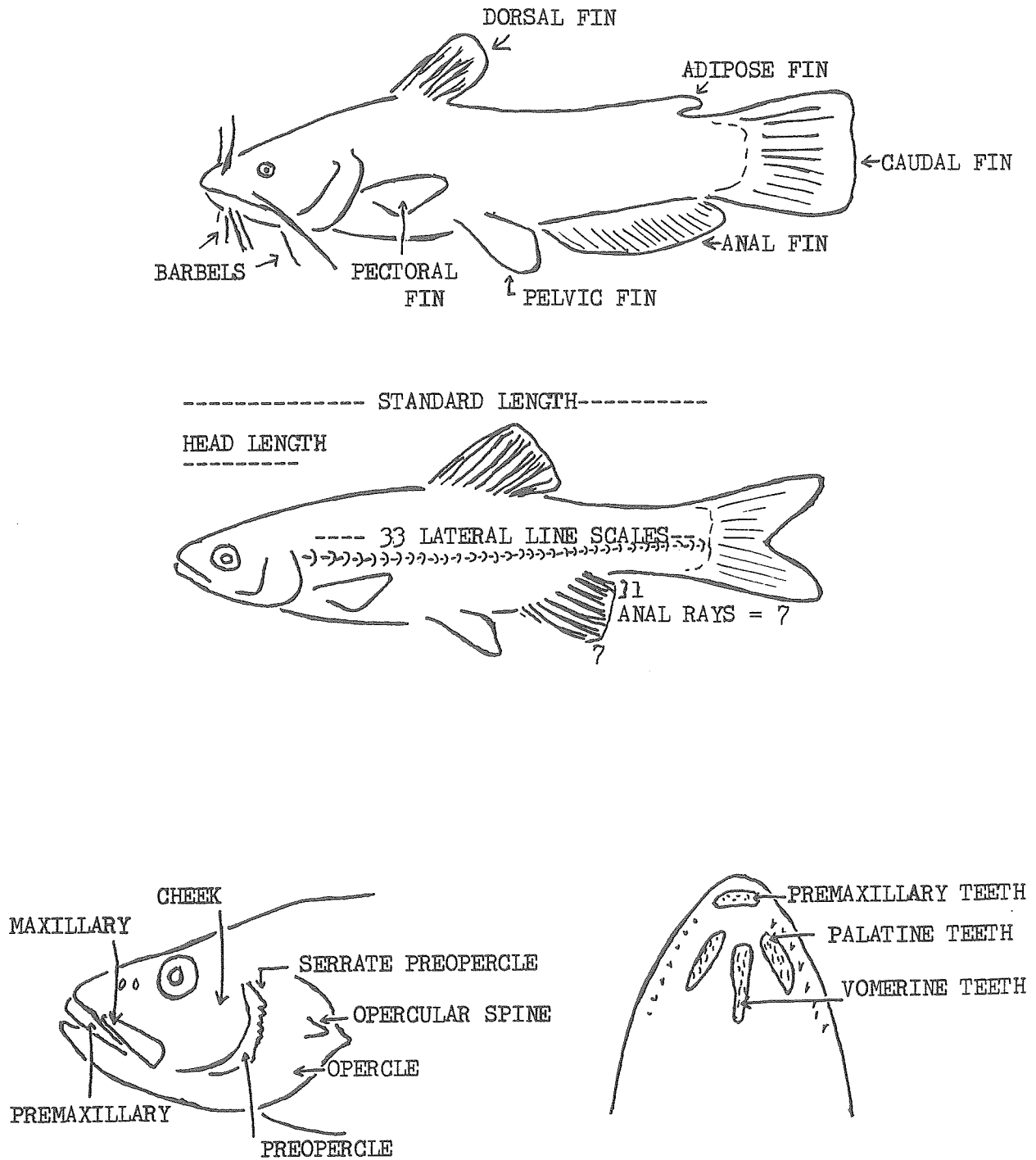


FIGURE 1. Selected anatomical structures of fishes needed for use with this key.

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ESOCIDAE — Pikes

- 1. Opercle and cheek fully scaled. . . . . 2
- 1. Opercle scaled on upper half only. . . . . 3
- 2. Branchiostegal rays 11-13; lateral line scales usually less than 110; snout short, less than distance from eye to end of gill cover; lower fins often reddish or orange; sides often with bars. . . . . Redfin pickerel, *Esox americanus*
- 2. Branchiostegal rays 14-17; lateral line scales usually 112-135; snout long, more than distance from eye to end of gill cover; chain-like pattern on sides. . . . . Chain pickerel, *Esox niger*
- 3. Dark, oval spots on light body . . . . . Amur pike, *Esox reichei*
- 3. Without dark, oval spots on light body. . . . . 4
- 4. Cheeks fully scaled; pores on underside of jaw usually 5; yellowish oval spots on body . . . . . Northern pike, *Esox lucius*
- 4. Cheeks scaled on upper half only; sides of body with bars; pores on underside of jaw 6 to 9. . . . . Muskellunge, *Esox masquinongy*

CLUPEIDAE — Herrings

- A. Last ray of dorsal fin elongated; mouth small, maxillary does not reach eye; anal rays over 25. . . . . Gizzard shad, *Dorosoma cepedianum*
- A. Last ray of dorsal fin the shortest; mouth large, maxillary reaches or passes anterior of eye; anal rays less than 25 . . . . . *Alosa* - 1
  - 1. Lower jaw, when closed, about equal to upper and fits into a groove of upper; 3-6 dark spots form horizontal row just posterior to upper opercle; maxillary reaches posterior of eye. American shad, *Alosa sapidissima*
  - 1. Lower jaw, when closed, reaches beyond upper jaw; often one prominent spot posterior to opercle; maxillary barely reaches middle of eye. . . . . 2
  - 2. Eye large, equal to or greater than snout length; peritoneum silvery. . . . . Alewife, *Alosa pseudoharengus*
  - 2. Eye small, less than snout length; peritoneum usually dark . . . . . Blueback herring, *Alosa aestivalis*

CATOSTOMIDAE — Suckers

- A. Dorsal fin with 20+ rays. . . . . B
- A. Dorsal fin with 18 or less rays. . . . . D
- B. Lateral line scales 50+ . . . . . Cycleptus
- B. Lateral line less than 50 scales. . . . . C
- C. Anterior part of dorsal fin high, about 5X the shortest rays, and pointed; mouth inferior; maxillary about equal eye diameter . . . . . Quillback, *Carpiodes cyprinus*
- C. Anterior part of dorsal 3 or less times height of shortest rays; mouth terminal; maxillary about 2X eye diameter . . . . . Ictiobus
- D. Lateral line absent or incomplete. . . . . E
- D. Lateral line present; lips with ridges or papillae. . . . . F
- E. Black spot on anterior of each scale, forming lateral rows; partial lateral line may be present; lateral scale rows 43-45 . . . . . Minytrema
- E. No black spots on scales; lateral line always absent; lateral scale rows 35-51. . . . . Creek chubsucker, *Erimyzon oblongus*
- F. Lateral line scales 55+; lips papillose . White sucker, *Catostomus commersoni*
- F. Lateral line scales 50 or less. . . . . G
- G. Head concave between the eyes; three or more dark bands on dorsum of body; lips papillose . Northern hog sucker, *Hypentelium nigricans*
- G. Head not concave; lips with ridges; swim bladder in three parts . . . . . Shorthead redhorse, *Moxostoma macrolepidotum*

CYPRINIDAE — Minnows and Carps

- A. More than 15 dorsal rays, anterior spine in dorsal fin. . . . . B
- A. Less than 10 dorsal soft rays, no spines. . . . . C

- B. Two barbels on each side of mouth; lateral line scales 30-32 . Carp *Cyprinus carpio*
- B. No barbels; lateral line scales 25-27 . . Goldfish, *Carassius auratus*
- C. Premaxillary not protractile. . . . . D
- C. Premaxillary protractile (groove between lip and snout) . . . . . E
- D. Lower jaw tri-lobed; body stout. . . . . Cutlips minnow, *Exoglossum maxillingua*
- D. Lower jaw normal; barbel at end of maxillary . . . . . *Rhinichthys* — 1
- E. Lower jaw with cartilaginous plate; intestine wound around air bladder. . . . . Stoneroller, *Capmostoma anomalum*
- E. Not as above. . . . . F
- F. Barbel on each side of mouth, may be small or hidden in groove above maxillary. . . . . G
- F. No barbels. . . . . H
- G. Barbel at terminal end of maxillary . . . . . River chub, *Nocomis micropogon* . . . . . Genus *Hybopsis* also
- G. Barbel in groove above maxillary . . . . . *Semotilus* — 2
- H. Abdomen behind pelvics with a fleshy keel; body laterally flattened; anal fin rays 12-13; mouth angled upward . . . . . Golden shiner, *Notemigonus crysoleucas*
- H. Without keel; body more fusiform; anal rays 11 or less . . . . . I
- I. Visible translucent, cavernous chambers in maxillary, suborbital and subopercle bones . . . . . Silverjaw minnow, *Ericymba buccata*
- I. Without cavernous chambers. . . . . J
- J. Lateral line scales, more than 45. . . . . K
- J. Lateral line scales less than 45. . . . . L
- K. Lateral line scales usually less than 70; mouth large, reaches beyond front of eye. . . . . *Clinostomus* — 4
- K. Lateral line scales more than 70; mouth small, does not reach to eye. . . . . Northern redbelly dace, *Phoxinus eos*
- L. Scales on dorsum behind head small and crowded; body stout; first dorsal half-ray stout and separated by membrane from next. . . . . *Pimephales* — 5
- L. Scales not small; body variable; first dorsal half-ray thin and tight to next. . . . . M
- M. Intestine more than twice length of head and body; intestinal lining black. . . . . *Hybognathus*
- M. Intestine less than twice the length of head and body . *Notropis*—6
  - 1. Lateral band through tip of snout, mouth terminal . Blacknose dace, *Rhinichthys atratulus*
  - 1. Lateral band indistinct; snout projecting beyond inferior mouth. . . . . Longnose dace, *Rhinichthys cataractae*
  - 2. Lateral line scales less than 50; anterior margin of dorsal fin above anterior margin of pelvic fin; mouth reaches beyond anterior of eye. . . . . Fallfish, *Semotilus corporalis*
  - 2. Lateral line scales more than 50; dorsal fin margin posterior to anterior edge of pelvic fin. . . . . 3
  - 3. Usually a spot in the basal, anterior part of the dorsal fin; mouth reaches beyond anterior of eye . . . . . Creek chub, *Semotilus atromaculatus*
  - 3. Some scales on sides dark and give blotched appearance; mouth small, does not reach eye; no spot in dorsal fin; often an orange streak below lateral line . . . . . Pearl dace, *Semotilus margarita*
  - 4. Lateral line scales 48-57; body deep, usually 4X into standard length. . . . . Rosyside dace, *Clinostomus funduloides*
  - 4. Lateral line scales 59-70; body less deep, usually 5X into standard length. Redside dace, *Clinostomus elongatus*
  - 5. Lateral line absent; small terminal mouth. Fathead minnow, *Pimephales promelas*
  - 5. Lateral line present; snout blunt; mouth subterminal . Bluntnose minnow, *Pimephales notatus*
  - 6. Anal rays 10+; dorsal posterior to pelvics. . . . . 7
  - 6. Anal rays usually less than 10. . . . . 8
  - 7. Anal when spread is falcate; dorsal with first rays longest;



- gular with a point of pigment extending posterior . . . . . Comely shiner, *Notropis amoenus*
7. Anal when spread is straight; dorsal rounded with first rays shorter than next few; gular area with little pigment; sometimes reddish on cheeks and base of pectoral fins . . . . . Rosyface shiner, *Notropis rubellus*
8. Scales along anterior part of lateral line 3 or 4X higher than long; eye large; anal rays 9 . . . . . Common shiner, *Notropis cornutus*
8. Not as above . . . . . 9
9. Spot in posterior dorsal membranes; scales along sides often outlined with pigment and give cross-hatch appearance; scales along lateral line about 2X as high as long; mouth terminal and snout pointed . . . . . 10
9. No spot in dorsal fin membranes . . . . . 11
10. Anal rays usually 8; lateral line scales 37-39; little pigment near the anal base or in the anterior membranes of dorsal fin . . . . . Spot fin shiner, *Notropis spilopterus*
10. Anal rays usually 9; lateral line 34-35; pigment (melanophores) on membranes near anal base and on membranes of anterior part of dorsal fin . . . . . Satinfish shiner, *Notropis spilopterus*
11. Anal rays usually 8 . . . . . 12
11. Anal rays usually 7 . . . . . 13
12. Spot at base of caudal fin, usually rectilinear; lateral line scales 38-42 . . . . . Spottail shiner, *Notropis hudsonius*
12. No spot at base of caudal fin; lateral line scales 33-40; lateral band usually present; dorsal fin origin posterior to pelvic fin origin . . . . . Blacknose shiner, *Notropis heterolepis*
13. Small triangular spot on base of caudal fin membranes; lateral band does not go around snout . . . . . Swallowtail shiner, *Notropis procne*
13. Without caudal spot; lateral band goes around snout . . . . . 14
14. Lateral line complete; lateral band goes onto lower jaw and chin is black . . . . . Blackchin shiner, *Notropis heterodon*
14. Lateral line incomplete; lateral band does not go onto the lower jaw . . . . . Bridle shiner, *Notropis bifrenatus*
- GASTEROSTEIDAE — Sticklebacks**
- A. Dorsal spines three; bony, vertical plates on sides . . . . . *Gasterosteus*
- A. Dorsal spines 3 to 6; no bony plate . . . . . B
- B. Usually 4, sometimes 5 or 6 dorsal spines; first and second spines longer than eye diameter; spines angle to opposite sides . . . . . Four-spine stickleback, *Apeltes quadracus*
- B. Usually 5, sometimes 6 dorsal spines; all spines shorter than eye diameter . . . . . Brook stickleback, *Culaea inconstans*
- COTTIDAE — Sculpins**
1. Palatine teeth present; pelvics usually 1 spine and 4 rays; caudal peduncle length less than post-orbital head length . . . . . Mottled sculpin, *Cottus bairdi*
1. Palatine teeth absent; pelvics usually 1 spine and 3 rays; caudal peduncle length greater than post-orbital head length . . . . . Slimy sculpin, *Cottus cognatus*
- PERCICHTHYIDAE — Temperate basses**
1. Dorsal fins slightly joined; one opercular spine; second and third anal spines about equal in length; anal rays usually 9 . . . . . White perch, *Morone americanus*
1. Dorsal fins separate; usually 2 opercular spines; anal spines graduated in length; several horizontal lateral stripes . . . . . 2
2. Anal rays 9-11; anal spines short, longest less than one half the anal fin height; body shallow . . . . . Striped bass, *Morone saxatilis*
2. Anal rays 12-13; longest anal spine equal to or greater than half the anal fin height; body deep . . . . . White bass, *Morone chrysops*
- CENTRARCHIDAE — Basses**
- A. Anal spines 3 . . . . . B
- A. Anal spines 5 to 7 . . . . . D
- B. Caudal fin rounded; pale or light blue spots in soft dorsal and caudal . . . . . Bluespotted sunfish, *Enneacanthus glortosus*
- B. Caudal fin forked . . . . . C
- C. Lateral line scales less than 55; length less than 3X body depth . . . . . *Lepomis* — 1
- C. Lateral line scales more than 55; body depth greater than 3X body depth . . . . . *Micropterus* — 4
- D. Dorsal spines 11-12; anal length about half dorsal length; branchiostegal rays usually 7 . . . . . Rock bass, *Ambloplites rupestris*
- D. Dorsal spines 5-10; anal length about equal to dorsal fin length; branchiostegal rays usually 6 . . . . . *Pomoxis* — 5
1. Mouth large, maxillary extends beyond anterior margin of eye; pectoral fin short and rounded, not reaching front of anal . . . . . 2
1. Mouth small, maxillary does not extend beyond anterior of eye; pectoral fin long and pointed, reaching beyond front of anal . . . . . 3
2. Gill rakers long, about 6X width at base; lateral line scales 45+; usually a black spot in basal membranes of posterior part of dorsal fin; edges of dorsal-anal-caudal fins often lighter or orange . . . . . Green sunfish, *Lepomis cyanellus*
2. Gill rakers short, less than 3X width at base; lateral line scales 43-48; no spot in dorsal fin; breast often orange . . . . . Redbreast sunfish, *Lepomis auritus*
3. Gill rakers long, more than 2X base; lateral line scales 40+; often distinct vertical bars; usually a black spot encompasses membranes of middle, posterior part of dorsal fin . . . . . Bluegill *Lepomis macrochirus*
3. Gill rakers short, less than 2X base; spot of orange on posterior part of opercular flap . . . . . Pumpkinseed, *Lepomis gibbosus*
4. Posterior end of maxillary extends beyond mid-point of eye; juveniles with lateral bar; lateral line scales 58-69 . . . . . Largemouth bass, *Micropterus salmoides*
4. Posterior end of maxillary not beyond mid-point of eye; juveniles with tri-colored tail; lateral line scales 67-81 . . . . . Smallmouth bass, *Micropterus dolomieu*
5. Dorsal spines 5-6; dorsal fin length less than distance dorsal fin to just above eye; vertical barring common . . . . . White crappie, *Pomoxis annularis*
5. Dorsal spines 7-10; dorsal fin length about equal distance from dorsal fin to just above eye; pattern mottled . . . . . Black crappie, *Pomoxis nigromaculatus*
- PERCIDAE — Perches**
- A. Preopercle toothed; branchiostegal rays 7-8; urinary papilla not conspicuous . . . . . B
- A. Preopercle not obviously toothed; branchiostegal rays 5-6; urinary papilla conspicuous . . . . . C
- B. Anal soft rays 6-8; large canine teeth . . . . . Walleye, *Stizostedion vitreum*
- B. Anal soft rays 12-13; no canine teeth . . . . . Yellow perch *Perca flavescens*
- C. Body very slender, depth 7 or more into standard length; 1 anal spine . . . . . *Ammocrypta*
- C. Body usually less than 7 into standard length; usually 2 anal spines . . . . . D
- D. Midline of abdomen without scales or with a row of enlarged scales; anal fin about equal or longer than dorsal . . . . . *Percina* — 1
- D. Midline of abdomen usually scaled; anal fin usually smaller than second dorsal . . . . . *Etheostoma* — 2
1. Snout elongated beyond upper lip; sides with many vertical bars . . . . . Logperch, *Percina caprodes*
1. Snout not elongated; sides with dark blotches . . . . . Shield darter, *Percina peltata*
2. Premaxillary with a frenum, not protractile . . . . . 3
2. Premaxillary without frenum, protractile . . . . . 4
3. Dorsal spines 6-8; caudal rounded, snout pointed and mouth terminal; dorsal spines shorter than rays . . . . . Fantail darter, *Etheostoma flabellare*

3. Dorsal spines 10-11; caudal not rounded; snout blunt and mouth subterminal; often with green barring . . . Banded darter, *Etheostoma zonale*
4. Sides with "X" and "W" markings; one anal spine . . . Tessellated darter, *Etheostoma olmstedi*
4. Sides with "U" or "dittoe" shaped marks or blotches; snout rounded and extends beyond lip groove . . . Greenside darter, *Etheostoma blennioides*

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