

Contents

Color Plates	0
Introduction	1
Waters of the Great Lakes Region and Their Fish Associations	3
Zoogeography	7
Postglacial Redispersal	10
Field Study and Collection of Fishes	19
Preservation of Fishes for Study	25
Identification of Fishes	27
Anatomy, Terms, and Methods of Counting and Measuring	29
Keys to the Families of Great Lakes Fishes	41
Families and Species of Great Lake Fishes, with Keys and Species Accounts	54
LAMPREYS FAMILY, Petromyzontidae	55
1 SILVER LAMPREY— <i>Ichthyomyzon unicuspis</i>	
2 NORTHERN BROOK LAMPREY— <i>Ichthyomyzon fossor</i>	
3 CHESTNUT LAMPREY— <i>Ichthyomyzon castaneus</i>	
4 SEA LAMPREY— <i>Petromyzon marinus</i>	
5 AMERICAN BROOK LAMPREY— <i>Lampetra appendix</i>	
PADDLEFISH FAMILY, Polyodontidae	60
6 PADDLEFISH— <i>Polyodon spathula</i>	
STURGEON FAMILY, Acipenseridae	60
7 LAKE STURGEON— <i>Acipenser fulvescens</i>	
GAR FAMILY, Lepisosteidae	61
8 LONGNOSE GAR— <i>Lepisosteus osseus</i>	
9 SPOTTED GAR— <i>Lepisosteus oculatus</i>	
10 SHORTNOSE GAR— <i>Lepisosteus platostomus</i>	

- BOWFIN FAMILY, Amiidae 63
- 11 BOWFIN—*Amia calva*
- MOONEYE FAMILY, Hiodontidae 66
- 12 MOONEYE—*Hiodon tergisus*
- FRESHWATER EEL FAMILY, Anguillidae 66
- 13 AMERICAN EEL—*Anguilla rostrata*
- HERRINGS FAMILY, Clupeidae 66
- 14 ALEWIFE—*Alosa pseudoharengus*
- 15 AMERICAN SHAD—*Alosa sapidissima*
- 16 SKIPJACK HERRING—*Alosa chrysochloris*
- 17 GIZZARD SHAD—*Dorosoma cepedianum*
- SUCKER FAMILY, Catostomidae 70
- 18 BIGMOUTH BUFFALO—*Ictiobus cyprinellus*
- 19 BLACK BUFFALO—*Ictiobus niger*
- 20 SMALLMOUTH BUFFALO—*Ictiobus bubalus*
- 21 NORTHERN QUILLBACK—*Carpiodes cyprinus cyprinus*
- 22 CENTRAL QUILLBACK—*Carpiodes cyprinus hinei*
- 23 HIGHFIN CARPSUCKER—*Carpiodes velifer*
- 24 NORTHERN RIVER CARPSUCKER—*Carpiodes carpio carpio*
- 25 WHITE SUCKER—*Catostomus commersonii commersonii*
- 26 DWARF WHITE SUCKER—*Catostomus commersonii utawana*
- 27 EASTERN LONGNOSE SUCKER—*Catostomus catostomus catostomus*
- 28 DWARF LONGNOSE SUCKER—*Catostomus catostomus nannomyzon*
- 29 NORTHERN HOGSUCKER—*Hypentelium nigricans*
- 30 WESTERN LAKE CHUBSUCKER—*Erimyzon sucetta kennerlii*
- 31 EASTERN CREEK CHUBSUCKER—*Erimyzon oblongus*
- 32 WESTERN CREEK CHUBSUCKER—*Erimyzon claviformis*
- 33 SPOTTED SUCKER—*Minytrema melanops*
- 34 HARELIP SUCKER—*Moxostoma (Lagochila) lacera*
- 35 SILVER REDHORSE—*Moxostoma anisurum*
- 36 BLACK REDHORSE—*Moxostoma duquesnei*
- 37 GOLDEN REDHORSE—*Moxostoma erythrurum*

- 38 NORTHERN SHORthead REDHORSE— *Moxostoma macrolepidotum macrolepidotum*
39 GREATER REDHORSE—*Moxostoma valenciennesi*
40 COPPER REDHORSE—*Moxostoma hubbsi*
41 RIVER REDHORSE—*Moxostoma carinatum*

MINNOW FAMILY, Cyprinidae 90

- 42 CARP—*Cyprinus carpio*
43 GOLDFISH—*Carassius auratus*
44 RUDD—*Scardinius erythrophthalmus*
45 GRASS CARP—*Ctenopharyngodon idella*
46 BLACK CARP—*Mylopharyngodon piceus*
47 FALLFISH—*Semotilus corporalis*
48 MODERN CREEK CHUB—*Semotilus atromaculatus*
49 HORNyHEAD CHUB—*Nocomis biguttatus*
50 RIVER CHUB—*Nocomis micropogon*
51 LAKE NORTHERN CHUB—*Couesius plumbeus plumbeus*
52 CREEK NORTHERN CHUB—*Couesius plumbeus dissimilis*
53 ALLEGHENY PEARL DACE—*Margariscus margarita*
54 NORTHERN PEARL DACE—*Margariscus nachtriebi*
55 FINESCALE DACE—*Phoxinus neogaeus*
56 NORTHERN REDBELLY DACE—*Phoxinus eos*
57 SOUTHERN REDBELLY DACE—*Phoxinus erythrogaster*
58 REDSIDE DACE—*Clinostomus elongatus*
59 EASTERN BLACKNOSE DACE—*Rhinichthys atratulus*
60 WESTERN BLACKNOSE DACE—*Rhinichthys obtusus*
61 GREAT LAKES LONGNOSE DACE—*Rhinichthys cataractae cataractae*
62 EASTERN TONGUETIED MINNOW—*Exoglossum laurae laurae*
63 CUTLIPS—*Exoglossum maxillingua*
64 OHIO STONEROLLER—*Campostoma anomalum anomalum*
65 CENTRAL STONEROLLER—*Campostoma anomalum pullum*
66 LARGESCALE STONEROLLER—*Campostoma oligolepis*
67 SUCKERMOUTH MINNOW—*Phenacobius mirabilis*
68 SILVER CHUB—*Macrhybopsis storeriana*

- 69 EASTERN GRAVEL CHUB—*Erimystax x-punctata trautmani*
- 70 BIGEYE CHUB—*Notropis amblops*
- 71 PUGNOSE MINNOW—*Notropis emiliae*
- 72 PUGNOSE SHINER—*Notropis anogenus*
- 73 EASTERN GOLDEN SHINER—*Notemigonus crysoleucas crysoleucas*
- 74 WESTERN GOLDEN SHINER—*Notemigonus crysoleucas auratus*
- 75 SATINFIN SHINER—*Cyprinella analostanus*
- 76 SPOTFIN SHINER—*Cyprinella spiloptera*
- 77 RED SHINER—*Cyprinella lutrensis*
- 78 NORTHERN REDFIN SHINER—*Lythrurus umbratilis cyanocephalus*
- 79 NORTHERN COMMON SHINER—*Luxilus cornutus*
- 80 STRIPED SHINER—*Luxilus chrysocephalus*
- 81 EMERALD SHINER—*Notropis atherinoides*
- 82 SILVER SHINER—*Notropis photogenis*
- 83 ROSYFACE SHINER—*Notropis rubellus*
- 84 SPOTTAIL SHINER—*Notropis hudsonius*
- 85 RIVER SHINER—*Notropis blennius*
- 86 CENTRAL BIGMOUTH SHINER—*Notropis dorsalis dorsalis*
- 87 EASTERN BIGMOUTH SHINER—*Notropis dorsalis keimi*
- 88 SILVERJAW MINNOW—*Notropis buccatus*
- 89 NORTHEASTERN SAND SHINER—*Notropis stramineus*
- 90 SWALLOWTAIL SHINER—*Notropis procne*
- 91 MIMIC SHINER—*Notropis volucellus*
- 92 GHOST SHINER—*Notropis buchani*
- 93 BRIDLED SHINER—*Notropis bifrenatus*
- 94 BIGEYE SHINER—*Notropis boops*
- 95 BLACKNOSE SHINER—*Notropis heterolepis*
- 96 IRONCOLOR SHINER—*Notropis chalybaeus*
- 97 WEED SHINER—*Notropis texanus*
- 98 BLACKCHIN SHINER—*Notropis heterodon*
- 99 BLUNTNOSE MINNOW—*Pimephales notatus*
- 100 FATHEAD MINNOW—*Pimephales promelas promelas*
- 101 BULLHEAD MINNOW—*Pimephales vigilax*
- 102 BRASSY MINNOW—*Hybognathus hankinsoni*

- 103 EASTERN SILVERY MINNOW—*Hybognathus regius* xiii
- LOACH FAMILY, Cobitidae 134
- 104 ORIENTAL WEATHERFISH—*Misgurnus anguillicaudatus*
- NORTH AMERICAN CATFISHE FAMILY, Ictaluridae 136
- 105 CHANNEL CATFISH—*Ictalurus punctatus*
- 106 WHITE CATFISH—*Ameiurus catus*
- 107 BLACK BULLHEAD—*Ameiurus melas*
- 108 BROWN BULLHEAD—*Ameiurus nebulosus*
- 109 YELLOW BULLHEAD—*Ameiurus natalis*
- 110 FLATHEAD CATFISH—*Pylodictis olivaris*
- 111 STONECAT—*Noturus flavus*.
- 112 TADPOLE MADTOM—*Noturus gyrinus*
- 113 MARGINED MADTOM—*Noturus insignis*
- 114 BRINDLED MADTOM—*Noturus miurus*
- 115 NORTHERN MADTOM—*Noturus stigmosus*
- SMELT FAMILY, Osmeridae 144
- 116 RAINBOW SMELT—*Osmerus mordax*
- SALMON FAMILY, Salmonidae 144
- WHITEFISH SUBFAMILY, Coregoninae 144
- 117 ROUND WHITEFISH—*Prosopium cylindraceum quadrilaterale*
- 118 PYGMY WHITEFISH—*Prosopium coulterii*
- 119 LAKE WHITEFISH—*Coregonus clupeaformis*
- 120 CISCO—*Coregonus artedii artedii*
- 121 IVES LAKE CISCO—*Coregonus hubbsi*
- 122 NIPIGON TULLIBEE—*Coregonus nipigon*
- 123 MICHIGAN BLACKFIN CISCO—*Coregonus nigripinnis nigripinnis*
- 124 NIPIGON BLACKFIN CISCO—*Coregonus nigripinnis regalis*
- 125 SHORTJAW CISCO—*Coregonus zenithicus*
- 126 SISKIWIT LAKE CISCO—*Coregonus zenithicus bartletti*
- 127 DEEPWATER CISCO—*Coregonus johanna*
- 128 SHORTNOSE CISCO—*Coregonus reighardi*
- 129 BLOATER—*Coregonus hoyi*
- 130 MICHIGAN KIYI—*Coregonus kiyi kiyi*
- 131 ONTARIO KIYI—*Coregonus kiyi orientalis*

- GRAYLING SUBFAMILY, Thymallinae 150
- 132 ARCTIC GRAYLING—*Thymallus arcticus signifes*
- SALMON, TROUT, AND CHARS SUBFAMILY,
Salmoninae 151
- 133 BROOK TROUT—*Salvelinus fontinalis*
- 134 LAKE TROUT—*Salvelinus namaycush namaycush*
- 135 SISCOWET—*Salvelinus namaycush siscowet*
- 136 ATLANTIC SALMON—*Salmo salar*
- 137 BROWN TROUT—*Salmo trutta*
- 138 RAINBOW TROUT—*Oncorhynchus mykiss*
- 139 COHO SALMON—*Oncorhynchus kisutch*
- 140 CHINOOK SALMON—*Oncorhynchus tshawytscha*
- 141 PINK SALMON—*Oncorhynchus gorbuscha*
- PIKE FAMILY, Esocidae 168
- 142 WESTERN GRASS PICKEREL—*Esox americanus
vermiculatus*
- 143 CHAIN PICKEREL—*Esox niger*
- 144 NORTHERN PIKE—*Esox lucius*
- 145 GREAT LAKES MUSKELLUNGE—*Esox masquinongy
masquinongy*
- MUDMINNOW FAMILY, Umbridae 172
- 146 CENTRAL MUDMINNOW—*Umbra limi*
- TROUTPERCH FAMILY, Percopsidae 172
- 147 TROUTPERCH—*Percopsis omiscomaycus*
- PIRATE PERCH FAMILY, Aphredoderidae 173
- 148 WESTERN PIRATE PERCH—*Aphredoderus sayanus
gibbosus*
- FRESHWATER COD FAMILY, Lotidae 173
- 149 BURBOT—*Lota lota*
- LIVEBEARER FAMILY, Poeciliidae 176
- 150 MOSQUITOFISH—*Gambusia affinis*
- KILLIFISH and TOPMINNOW FAMILY, Fundulidae 176
- 151 EASTERN BANDED KILLIFISH—*Fundulus
diaphanus diaphanus*
- 152 WESTERN BANDED KILLIFISH—*Fundulus
diaphanus menona*
- 153 NORTHERN STARHEAD TOPMINNOW—
Fundulus dispar
- 154 BLACKSTRIPE TOPMINNOW—*Fundulus notatus*

SILVERSIDE FAMILY, Atherinopsidae 180

- 155 NORTHERN BROOK SILVERSIDE—*Labidesthes
sicculus*

STRIPED BASS FAMILY, Moronidae 180

- 156 WHITE BASS—*Morone chrysops*
[157] STRIPED BASS—*Morone saxatilis*
157 Hybrid STRIPED BASS x WHITE BASS—*Morone
saxatilis* × *Morone chrysops*
158 YELLOW BASS—*Morone mississippiensis*
159 WHITE PERCH—*Morone americana*

PERCH FAMILY, Percidae 184

- 160 YELLOW PERCH—*Perca flavescens*
161 SAUGER—*Sander canadense*
162 BLUE PIKE—*Sander glaucus*
163 WALLEYE—*Sander vitreus*
164 RUFFE—*Gymnocephalus cernuus*
165 RIVER DARTER—*Percina shumardi*
166 BLACKSIDE DARTER—*Percina maculata*
167 SLENDERHEAD DARTER—*Percina phoxocephala*
168 GILT DARTER—*Percina evides*
169 CHANNEL DARTER—*Percina copelandi*
170 OHIO LOGPERCH—*Percina caprodes caprodes*
171 NORTHERN LOGPERCH—*Percina caprodes
semifasciata*
172 WESTERN SAND DARTER.—*Ammocrypta clara*
173 NORTHERN SAND DARTER—*Ammocrypta
pellucida*
174 CENTRAL JOHNNY DARTER—*Etheostoma nigrum
nigrum*
175 SCALY JOHNNY DARTER—*Etheostoma nigrum
eulepis*
176 TESSELLATED DARTER—*Etheostoma olmstedi*
177 BLUNTNOSE DARTER—*Etheostoma chlorosomum*
178 EASTERN BANDED DARTER—*Etheostoma zonale
zonale*
179 NORTHERN GREENSIDE DARTER—*Etheostoma
blennioides blennioides*
180 IOWA DARTER—*Etheostoma exile*
181 LEAST DARTER—*Etheostoma microperca*
182 RAINBOW DARTER—*Etheostoma caeruleum*

- 183 NORTHERN ORANGETHROAT DARTER—
Etheostoma spectabile spectabile
- 184 BARRED FANTAIL DARTER—*Etheostoma flabellare flabellare*
- 185 STRIPED FANTAIL DARTER—*Etheostoma flabellare lineolatum*
- SUNFISHES AND BASS FAMILY, Centrarchidae 202
- 186 SMALLMOUTH BASS—*Micropterus dolomieu*
- 187 LARGEMOUTH BASS—*Micropterus salmoides salmoides*
- 188 WARMOUTH—*Lepomis gulosus*
- 189 GREEN SUNFISH—*Lepomis cyanellus*
- 190 NORTHERN LONGEAR SUNFISH—*Lepomis peltastes*
- 191 PUMPKINSEED—*Lepomis gibbosus*
- 192 REDEAR SUNFISH—*Lepomis microlophus*
- 193 BLUEGILL—*Lepomis macrochirus macrochirus*
- 194 ORANGESPOTTED SUNFISH—*Lepomis humilis*
- 195 NORTHERN ROCK BASS—*Ambloplites rupestris*
- 196 WHITE CRAPPIE—*Pomoxis annularis*
- 197 BLACK CRAPPIE—*Pomoxis nigromaculatus*
- SCULPINS FAMILY, Cottidae 214
- 198 DEEPWATER SCULPIN—*Myoxocephalus thompsonii*
- 199 SPOONHEAD SCULPIN—*Cottus ricei*
- 200 SLIMY SCULPIN—*Cottus cognatus gracilis*
- 201 NORTHERN MOTTLED SCULPIN—*Cottus bairdii bairdii*
- 202 GREAT LAKES MOTTLED SCULPIN—*Cottus bairdii kumlieni*
- GOBY FAMILY, Gobiidae 218
- 203 ROUND GOBY—*Neogobius melanostomus*
- 204 TUBENOSE GOBY—*Proterorhinus marmoratus*
- STICKLEBACK FAMILY, Gasterosteidae 220
- 205 BROOK STICKLEBACK—*Culaea inconstans*
- 206 THREESPINE STICKLEBACK—*Gasterosteus aculeatus*
- 207 FOURSPINE STICKLEBACK—*Apeltes quadracus*
- 208 NINESPINE STICKLEBACK—*Pungitius pungitius*
- DRUM FAMILY, Sciaenidae 224
- 209 FRESHWATER DRUM—*Aplodinotus grunniens*

RIGHT-EYE FLOUNDER FAMILY, Pleuronectidae 224

210 EUROPEAN FLOUNDER—*Platichthys flesus*

xvii

Appendix: Diagnostic Shapes and Pigment Patterns of Larvae of
Some Species of Great Lakes Fishes 227

References 237

Acknowledgments for the 1964 Printing 255

Acknowledgments for the 2004 Edition 257

Index 259