

Summary

Conservation Status

Distribution

Image

Comprehensive

New Search



Comprehensive Report: Record 1 of 2 selected.

[<< Previous](#) | [Next >>](#)[See All Search Results](#) | [View Glossary](#)**Cycleptus elongatus** - (Lesueur, 1817)

Blue Sucker

Unique Identifier: AFCJC04010

Informal Taxonomy: Animals, Vertebrates - Fishes

- Bony Fishes - Suckers

[Search for Images on Google](#)

Kingdom	Phylum	Class	Order	Family	Genus
Animalia	Craniata	Actinopterygii	Cypriniformes	Catostomidae	Cycleptus

Genus Size: B - Very small genus (2-5 species)**Concept Reference:** Burr, B. M., and R. L. Mayden. 1999. A new species of CYCLEPTUS (Cypriniformes: Catostomidae) from Gulf Slope drainages of Alabama, Mississippi, and Louisiana, with a review of the distribution, biology, and conservation status of the genus. *Bulletin of the Alabama Museum of Natural History* 20:19-57.**Concept Reference Code:** A99BUR05NAUS**Name Used in Concept Reference:** *Cycleptus elongatus***Taxonomic Comments:** One of only a few species in the subfamily Cycleptinae (two in North America, the other in China) (Burr and Mayden 1999). CYCLEPTUS MERIDIONALIS of the Alabama-Pascagoula drainages formerly was included in C. ELONGATUS. The Rio Grande population of C. ELONGATUS apparently warrants recognition as a distinct species, to be described by Mayden and Burr (Burr and Mayden 2001). See Smith (1992) for a study of the phylogeny and biogeography of the Catostomidae.**Conservation Status****NatureServe Status****Global Status:** G3G4**Global Status Last Reviewed:** 17Aug2001**Global Status Last Changed:** 17Aug2001**Rounded Global Status:** G3**Reasons:**

Wide distribution in large rivers in central North America; regarded as greatly reduced in abundance as a result of dam construction and reductions in water quality, but some researchers point to widespread reproduction and recruitment and regard the species as not in jeopardy.

Nation: United States**National Status:**

N3

U.S. & Canada State/Province Status

United States	Alabama (S2S3), Arkansas (S2), Illinois (S2), Indiana (S2), Iowa (S3), Kansas (S3), Kentucky (S3), Louisiana (S2S3), Minnesota (S3), Mississippi (S3), Missouri (S3), Montana (S2S3), Nebraska (S3), New Mexico (S1), North Dakota (S3), Ohio (SH), Oklahoma (S3), Pennsylvania (SNR), South Dakota (S3), Tennessee (S2), Texas (S3), West Virginia (S1), Wisconsin (S3)
---------------	--

Other Statuses**IUCN Red List Category:** LR - Lower risk

American Fisheries Society Status: Special Concern (01Jan1989)

NatureServe Conservation Status Factors

Global Abundance: FH

Global Abundance Comments: Total population size is unknown but surely exceeds 10,000. Sometimes common in preferred habitat. This fish's habitat makes it difficult to capture, so it is relatively rare in collections and abundance is easily underestimated (Robison and Buchanan 1988, Etnier and Starnes 1993). In Arkansas, frequently caught in commercial fisheries, sometimes as many as 100 individuals per day in spring (Robison and Buchanan 1988). Recent collecting efforts in Alabama (Mettee et al. 1996) yielded a substantial range expansion and evidence of much greater abundance than previously known.

Estimated Number of Element Occurrences: DE

Estimated Number of Element Occurrences Comments: Known from hundreds of sites in dozens of rivers (Burr and Mayden 1999); unknown which are breeding populations. Robison and Buchanan (1988) mapped 26 collection sites in Arkansas; only 1 collection was pre-1960. Etnier and Starnes (1993) mapped 23 collection sites, representing probably at least a dozen distinct occurrences, in Tennessee, but they stated that recent Tennessee records are scarce. Mettee et al. (1996) mapped 36 collection sites in Alabama and the Mobile basin; these represent at least several distinct occurrences. Pflieger (1997) mapped about 60 collection sites in Missouri, only a few of which were pre-1945; these represent three substantial populations in the Missouri River, Mississippi River, and lowland Ft. Francis River, plus smaller populations elsewhere.

Global Short Term Trend: D

Global Short Term Trend Comments: Becoming less common over much of range (Page and Burr 1991), but still common and widely distributed in the Missouri and Mississippi rivers (Pflieger 1997). Declines following droughts were noted by Moss et al. (1983). Far more common in the upper Mississippi River prior to 1900 than since (Pflieger 1997). Arkansas River population in Arkansas is relatively stable and large (Robison and Buchanan 1988). Rated as vulnerable by Warren et al. (2000). Burr and Mayden (1999) characterized this fish as "uncommon and disappearing at the edges of its range," but "reproducing and showing evidence of recruitment at many localities" and "clearly not jeopardized throughout all or a significant portion of its range."

Global Long Term Trend: C

Global Inventory Needs: Monitor population abundance and distribution.

Global Protection: U

Global Protection Needs: Protect spawning areas by land purchases; construct fishways around dams to allow passage of migrating fish.

Degree of Threat: Widespread, low-severity threat

Threat Scope: High

Threat Severity: Low

Threat Immediacy: High

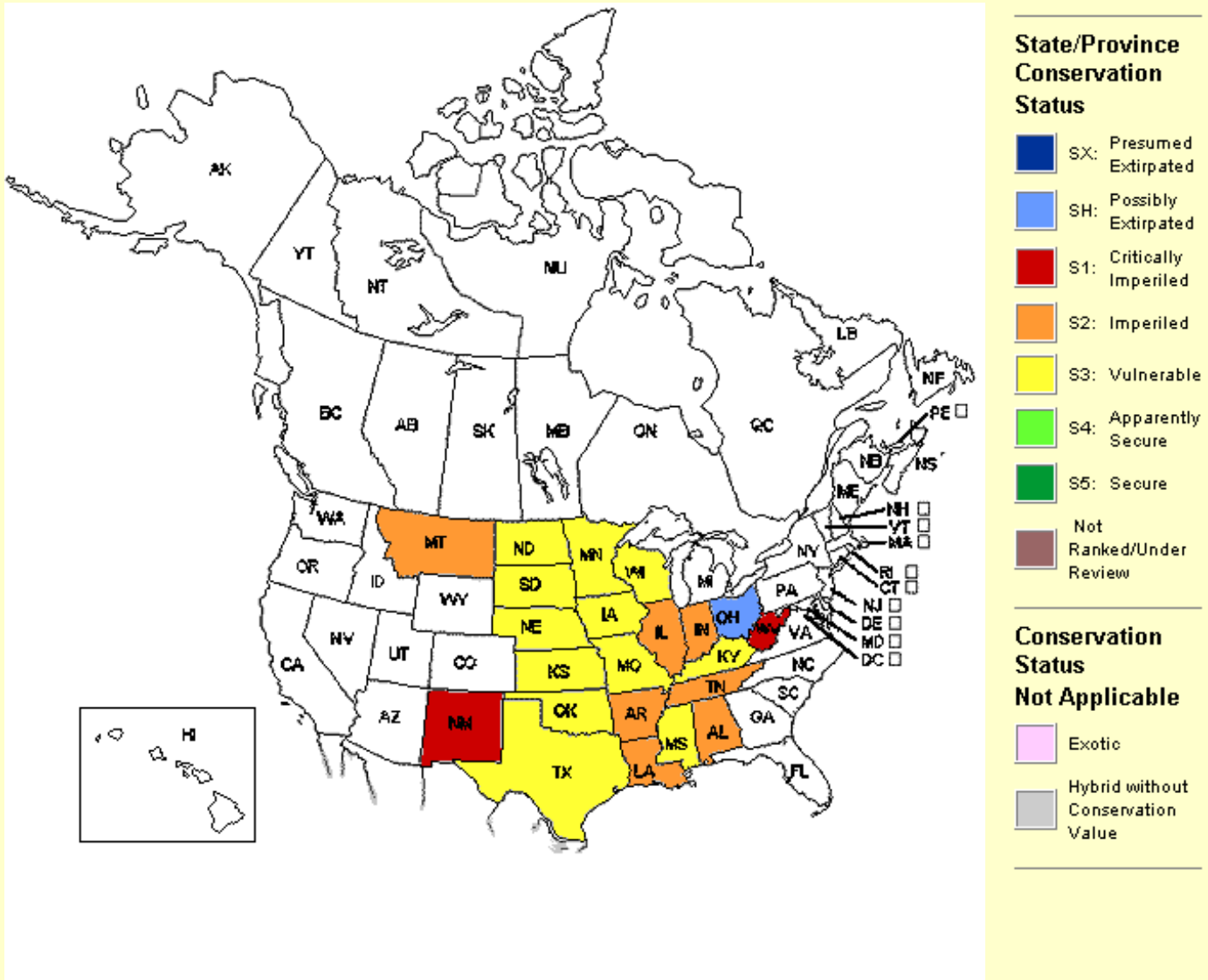
Threats: Cited causes of decline include depletion of surface water, poor water quality stemming from sewage effluent and agricultural runoff, interruption of migrations by dams, and stranding in irrigation canals (Robison and Buchanan 1988, Sublette et al. 1990, Pflieger 1997). Reductions in river velocity could also inhibit reproductive success (Eberle 1993:2). Tolerant of high turbidity if sufficient current prevents silt deposition (Pflieger 1997). Threats are difficult to alleviate.

Environmental Specificity: B

Other Considerations: As of 2001, among 23 states in the range, ranks are SR?, SH, S1, S2, or S3; not S4 or S5 anywhere.

Distribution

U.S. States and Canadian Provinces



Endemism: occurs (regularly, as a native taxon) in multiple nations

U.S. & Canada State/Province Distribution

United States	AL, AR, IA, IL, IN, KS, KY, LA, MN, MO, MS, MT, ND, NE, NM, OH, OK, PA, SD, TN, TX, WI, WV
---------------	--

Range Map

No map available.

Global Range: GH

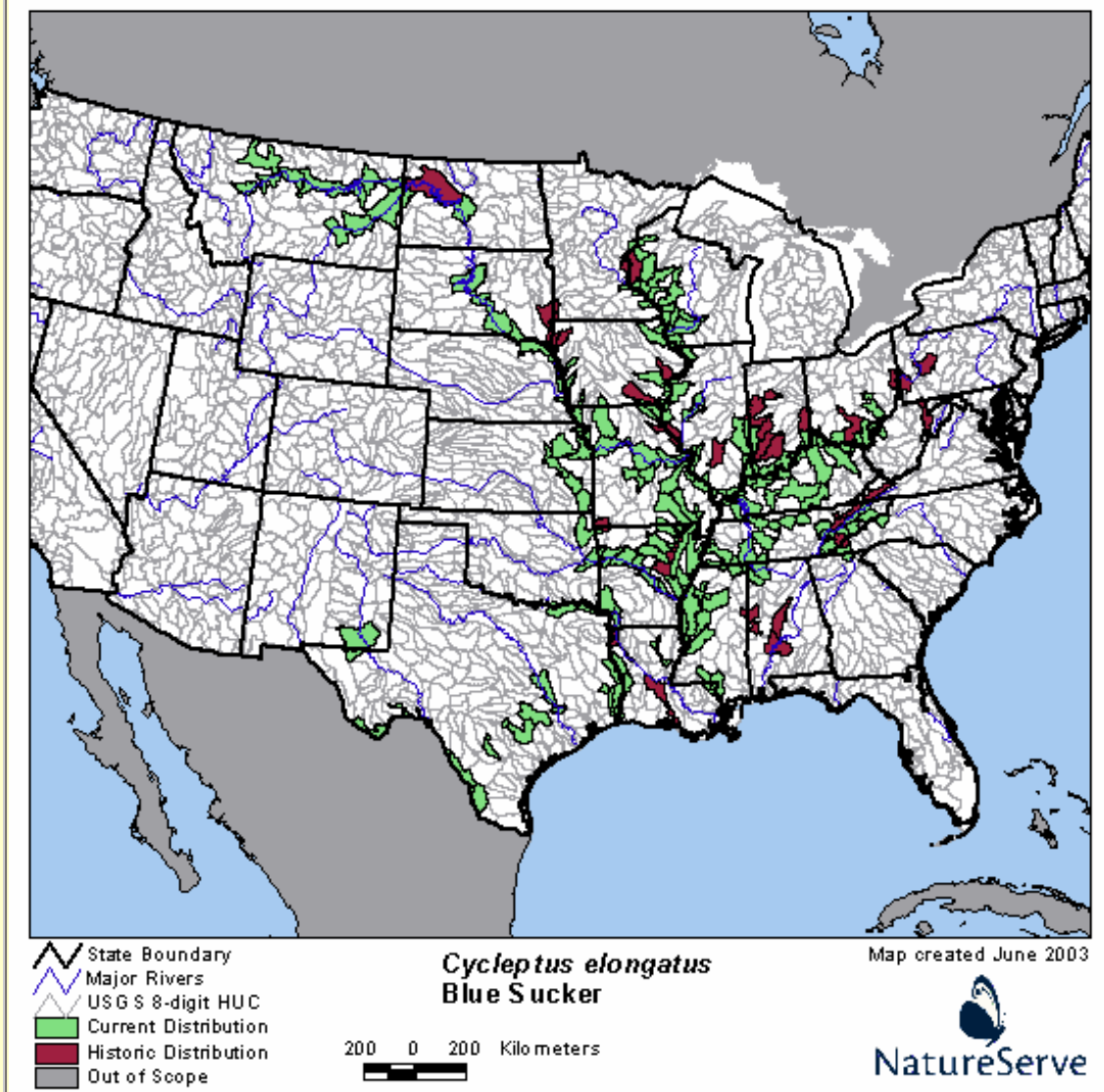
Global Range Comments: Gulf Slope drainages from the Sabine River to the Rio Grande/Pecos River drainage, Texas, New Mexico, and Mexico; north in Mississippi River basin to Minnesota, Missouri River drainage of Montana, and Ohio River drainage of western Pennsylvania (extirpated in Pennsylvania) (Burr and Mayden 1999). Seemingly common now only in the Missouri and Neosho rivers and middle Rio Grande (Etnier and Starnes 1993); also the Mississippi River south of the Missouri River in Missouri (Pflieger 1997). Rio Grande population is to be described as a distinct species (Buth and Mayden 2001).

U.S. Distribution by County (based on available natural heritage records) ?	
State	County Name (FIPS Code)
AL	Baldwin (01003), Choctaw (01023), Clarke (01025), Dallas (01047), Elmore (01051), Mobile (01097), Monroe (01099), Montgomery (01101), Perry (01105), Pickens (01107), Wilcox (01131)
AR	Arkansas (05001), Desha (05041), Hempstead (05057), Jackson (05067), Lafayette (05073), Little River (05081), Miller (05091), Mississippi (05093), Prairie (05117)
IA	Harrison (19085), Johnson (19103), Linn (19113)
IL	Calhoun (17013)
IN	Clark (18019), Clay (18021), Dubois (18037), Fountain (18045), Gibson (18051), Knox (18083), Martin (18101), Parke (18121), Pike (18125), Posey (18129), Putnam (18133), Spencer (18147), Sullivan (18153), Switzerland (18155), Tippecanoe (18157), Vermillion (18165), Vigo (18167), Warren (18171)
KS	Allen (20001), Coffey (20031), Doniphan (20043), Douglas (20045), Johnson (20091), Labette (20099), Morris (20127), Neosho (20133), Pottawatomie (20149), Riley (20161), Woodson (20207), Wyandotte (20209)
KY	Fulton (21075), Hickman (21105)
LA	Calcasieu (22019), Concordia (22029), Morehouse (22067), Rapides (22079), Red River (22081), Union (22111), Vernon (22115)
MN	Brown (27015), Carver (27019), Chippewa (27023), Chisago (27025), Dakota (27037), Goodhue (27049), Hennepin (27053), Houston (27055), Le Sueur (27079), Nicollet (27103), Pine (27115), Ramsey (27123), Wabasha (27157), Washington (27163), Winona (27169)
MO	Andrew (29003), Atchison (29005), Boone (29019), Butler (29023), Callaway (29027), Cape Girardeau (29031), Carroll (29033), Carter (29035), Chariton (29041), Daviess (29061), Dunklin (29069), Franklin (29071), Gasconade (29073), Holt (29087), Howard (29089), Lafayette (29107), Marion (29127), Miller (29131), Moniteau (29135), Montgomery (29139), New Madrid (29143), Oregon (29149), Osage (29151), Perry (29157), Ray (29177), Ripley (29181), Saline (29195), Scott (29201), St. Charles (29183), St. Louis (29189), Stoddard (29207), Wayne (29223)
MS	Claiborne (28021), Hinds (28049), Issaquena (28055), Panola (28107), Tallahatchie (28135), Washington (28151), Yazoo (28163)
MT	Blaine (30005), Cascade (30013), Chouteau (30015), Custer (30017), Dawson (30021), Fergus (30027), Hill (30041), Liberty (30051), McCone (30055), Phillips (30071), Prairie (30079), Richland (30083), Roosevelt (30085), Rosebud (30087), Valley (30105), Wibaux (30109)
ND	Burleigh (38015), Emmons (38029), McKenzie (38053), McLean (38055), Mercer (38057), Morton (38059), Mountrail (38061), Oliver (38065), Sioux (38085), Williams (38105)
NE	Cass (31025), Cedar (31027), Cuming (31039), Dakota (31043), Douglas (31055), Knox (31107), Logan (31113), Nemaha (31127), Otoe (31131), Richardson (31147), Sarpy (31153), Washington (31177)
NM	Eddy (35015)
OH	Hamilton (39061), Scioto (39145)
OK	Bryan (40013), Choctaw (40023), McCurtain (40089), Sequoyah (40135)
SD	Bon Homme (46009), Charles Mix (46023), Clay (46027), Hughes (46065), Hutchinson (46067), Lincoln (46083), Stanley (46117), Union (46127), Yankton (46135)
TN	Claiborne (47025), Cocke (47029), Davidson (47037), Dyer (47045), Greene (47059), Hancock (47067), Hardin (47071), Haywood (47075), Humphreys (47085), Knox (47093), Lauderdale (47097), Loudon (47105), Monroe (47123), Roane (47145), Sevier (47155), Shelby (47157), Smith (47159), Stewart (47161), Tipton (47167)
WI	Buffalo (55011), Burnett (55013), Chippewa (55017), Columbia (55021), Crawford (55023), Dane (55025), Dunn (55033), Eau Claire (55035), Grant (55043), Iowa (55049), Jackson (55053), La Crosse (55063), Pepin (55091), Pierce (55093), Polk (55095), Richland (55103), Sauk (55111), St. Croix (55109), Trempealeau (55121), Vernon (55123)

U.S. Distribution by Watershed (based on available natural heritage records) ?

Watershed Region 	Watershed Name (Watershed Code)
03	Lower Tallapoosa (03150110), Cahaba (03150202), Middle Alabama (03150203), Lower Alabama (03150204), Middle Tombigbee-Lubbub (03160106), Middle Tombigbee-Chickasaw (03160201), Mobile - Tensaw (03160204)
05	Middle Ohio-Laughery (05090203), Tippecanoe (05120106), Middle Wabash-Little Vermilion (05120108), Middle Wabash-Busseron (05120111), Lower Wabash (05120113), Lower White (05120202), Eel (05120203), Lower East Fork White (05120208), Upper Cumberland-Cordell Hull (05130106), Lower Cumberland-Sycamore (05130202), Lower Cumberland (05130205), Silver-Little Kentucky (05140101), Lower Ohio-Little Pigeon (05140201)
06	Lower French Broad (06010107), Nolichucky (06010108), Watts Bar Lake (06010201), Lower Little Tennessee (06010204), Upper Clinch (06010205), Lower Clinch (06010207), Lower Tennessee-Beech (06040001), Lower Duck (06040003)
07	Upper St. Croix (07030001), Lower St. Croix (07030005), Rush-Vermillion (07040001), Buffalo-Whitewater (07040003), La Crosse-Pine (07040006), Black (07040007), Lower Chippewa (07050005), Eau Claire (07050006), Red Cedar (07050007), Coon-Yellow (07060001), Grant-Little Maquoketa (07060003), Castle Rock (07070003), Baraboo (07070004), Lower Wisconsin (07070005), Kickapoo (07070006), Middle Cedar (07080205), Lower Cedar (07080206), Lower Iowa (07080209), The Sny (07110004), Peruque-Piasa (07110009), Cahokia-Joachim (07140101), Meramec (07140102), Upper Mississippi-Cape Girardeau (07140105), Whitewater (07140107)
08	Lower Mississippi-Memphis (08010100), Lower Hatchie (08010208), Wolf (08010210), Lower St. Francis (08020203), Little River Ditches (08020204), Lower White-Bayou Des Arc (08020301), Lower Arkansas (08020401), Lower Mississippi-Greenville (08030100), Little Tallahatchie (08030201), Tallahatchie (08030202), Upper Yazoo (08030206), Deer-Steele (08030209), Bayou Bartholomew (08040205), Lower Red (08040301), Lower Mississippi-Natchez (08060100), Lower Big Black (08060202), Bayou Pierre (08060203)
10	Upper Missouri-Dearborn (10030102), Belt (10030105), Marias (10030203), Teton (10030205), Bullwhacker-Dog (10040101), Judith (10040103), Fort Peck Reservoir (10040104), Lower Milk (10050012), Beaver (10050014), Rock (10050015), Prarie Elk-Wolf (10060001), Redwater (10060002), Poplar (10060003), Charlie-Little Muddy (10060005), Big Muddy (10060006), Lower Tongue (10090102), Lower Powder (10090209), Lower Yellowstone-Sunday (10100001), Rosebud (10100003), Lower Yellowstone (10100004), O'fallon (10100005), Lake Sakakawea (10110101), Painted Woods-Square Butte (10130101), Upper Lake Oahe (10130102), Lower Heart (10130203), Fort Randall Reservoir (10140101), Lower James (10160011), Lewis and Clark Lake (10170101), Vermillion (10170102), Lower Big Sioux (10170203), Lower Platte (10200202), South Loup (10210004), Lower Elkhorn (10220003), Blackbird-Soldier (10230001), Big Papillion-Mosquito (10230006), Tarkio-Wolf (10240005), Little Nemaha (10240006), Independence-Sugar (10240011), Upper Kansas (10270101), Lower Kansas (10270104), Lower Big Blue (10270205), Upper Grand (10280101), Lower Grand (10280103), Lower Osage (10290111), Lower Missouri-Crooked (10300101), Lower Missouri-Moreau (10300102), Lower Missouri (10300200)
11	Upper Black (11010007), Current (11010008), Spring (11010010), Eleven Point (11010011), Upper White-Village (11010013), Neosho headwaters (11070201), Upper Neosho (11070204), Middle Neosho (11070205), Robert S. Kerr Reservoir (11110104), Bois D'arc-Island (11140101), Pecan-Waterhole (11140106), Lower Little (11140109), Mckinney-Posten Bayous (11140201), Middle Red-Coushatta (11140202)
12	Lower Sabine (12010005)
13	Upper Pecos-Black (13060011)

U.S. Distribution by Watershed (based on multiple information sources) ?



Economic Attributes

Economic Comments: One of the finest freshwater food fishes; formerly an important part of commercial fisheries in Mississippi drainage (Sublette et al. 1990).

Management Summary

Restoration Potential: "It seems unlikely that its plight will improve" (Etnier and Starnes 1993).

Biological Research Needs: Investigate systematics, life history, and migration.

Ecology & Life History

Short General Description: A fish (sucker) that reaches a length of 93 cm.

Reproduction Comments: Spawns in spring (in May at water temperatures of 20-23 in Kansas). Males are sexually mature at age III-IV, females usually at age VI in Mississippi River. In Kansas, females lived to 9 years, males to 7 years (Moss et al. 1983). See Yeager and Semmens (1987) for a description of early developmental stages.

Habitat Type: Freshwater

Non-Migrant: N

Locally Migrant: Y

Long Distance Migrant: N

Mobility and Migration Comments: Migrates upstream into riffle areas for spawning (Becker 1983). Individuals may move more than 100 miles between spawning and nonspawning habitats (Mettee et al. 1996).

Riverine Habitat(s): BIG RIVER, Low gradient, MEDIUM RIVER, Moderate gradient, Pool, Riffle

Lacustrine Habitat(s): Deep water, Shallow water

Special Habitat Factors: Benthic

Habitat Comments: Largest rivers and lower parts of major tributaries. Usually in channels and flowing pools with moderate current (1.0-2.6 m/sec). Also in some impoundments. Adults probably winter in deep pools. Young in shallower and less swift water than adults.

Migrates upstream to spawn on riffles. In Kansas, spawned in deep riffles (1-2 m) with cobble and bedrock substrate (Moss et al. 1983).

Adult Food Habits: Herbivore, Invertivore

Immature Food Habits: Herbivore, Invertivore

Food Comments: Bottom feeder. Eats insects, crustaceans, and plant material, including algae (Becker 1983); also SPHAERIUM clams. Diet of adults and young often includes larvae and pupae of midges and caddisflies and plant material (see Sublette et al. 1990 and Moss et al. 1983).

Length: 93 centimeters

Population/Occurrence Delineation

Group Name: LARGE SUCKERS

Use Class: Not applicable

Subtype(s): Spawning Area

Minimum Criteria for an Occurrence: Occurrences are based on evidence of historical presence, or current and likely recurring presence, at a given location. Such evidence minimally includes collection or reliable observation and documentation of one or more individuals (including eggs and larvae) in appropriate habitat.

Mapping Guidance: Occupied locations that are separated by a gap of 10 km or more of any aquatic habitat that is not known to be occupied represent different occurrences. However, it is important to evaluate migrations and seasonal changes in habitat to ensure that spawning areas and nonspawning areas for a single population are not artificially segregated as different occurrences simply because there have been no collections/observations in an intervening area that may exceed the separation distance. For example, individual blue suckers may move more than 160 km between spawning and nonspawning habitats; these widely separated locations are part of the same occurrence.

Separation Barriers: Dam lacking a suitable fishway; high waterfall; upland habitat.

Separation Distance for Unsuitable Habitat: 20 km

Separation Distance for Suitable Habitat: 20 km

Separation Justification: Data on dispersal and other movements generally are not available. In some species, individuals may migrate variable distances between spawning areas and nonspawning habitats.

Separation distances (in aquatic kilometers) for catostomids are arbitrary but reflect the presumption that movements and appropriate separation distances generally should increase with fish size. Hence small, medium, and large catostomids,

respectively, have increasingly large separation distances. Separation distance reflects the likely low probability that two occupied locations separated by less than several kilometers of aquatic habitat would represent truly independent populations over the long term.

Because of the difficulty in defining suitable versus unsuitable habitat, especially with respect to dispersal, and to simplify the delineation of occurrences, a single separation distance is used regardless of habitat quality.

Occupied locations that are separated by a gap of 20 km or more of any aquatic habitat that is not known to be occupied represent different occurrences. However, it is important to evaluate seasonal changes in habitat to ensure that an occupied habitat occurrence for a particular population does not artificially separate spawning areas and nonspawning areas as different occurrences simply because there have been no collections/observations in an intervening area that may exceed the separation distance.

Date: 22May2001

Author: Hammerson, G.

Notes: This Specs Group includes catostomids that typically are larger than 40 cm in adult standard length.

Population/Occurrence Viability

Authors/Contributors

NatureServe Conservation Status Factors Edition Date: 16Aug2001

NatureServe Conservation Status Factors Author: Hammerson, G., R. Jennings, and F. Dirrigl, Jr.

Element Ecology & Life History Edition Date: 17Aug2001

Element Ecology & Life History Author(s): Hammerson, G.

Zoological data developed by NatureServe and its network of natural heritage programs (see [Local Programs](#)) and other contributors and cooperators (see [Sources](#)).

References

- ALLEN, CRAIG R., STEPHEN DEMARAIS, AND R. SCOTT LUTZ. 1994. RED IMPORTED FIRE ANT IMPACT ON WILDLIFE: AN OVERVIEW. TEXAS J. SCI. 46(1):51-59.
- ANDERSON, ALLISON A., CLARK HUBBS, KIRK O. WINEMILLER, AND ROBERT J. EDWARDS. 1995. TEXAS FRESHWATER FISH ASSEMBLAGES FOLLOWING THREE DECADES OF ENVIRONMENTAL CHANGE. SOUTHWEST. NAT. 40(3):314-321.
- Becker, G. C. 1983. Fishes of Wisconsin. Univ. Wisconsin Press, Madison. 1052 pp.
- Burr, B. M., and M. L. Warren, Jr. 1986. A distributional atlas of Kentucky fishes. Kentucky Nature Preserves Commission, Scientific and Technical Series 4. 398 pp.
- Burr, B. M., and R. L. Mayden. 1999. A new species of CYCLEPTUS (Cypriniformes: Catostomidae) from Gulf Slope drainages of Alabama, Mississippi, and Louisiana, with a review of the distribution, biology, and conservation status of the genus. Bulletin of the Alabama Museum of Natural History 20:19-57.
- Buth, D. G., and R. L. Mayden. 2001. Allozymic and isozymic evidence for polytypy in the North American catostomid genus CYCLEPTUS. Copeia 2001:899-906.
- Cooper, E. L. 1983. Fishes of Pennsylvania and the northeastern United States. Pennsylvania State Univ. Press, University Park. 243 pp.
- Cross, F. B. 1967. Handbook of fishes of Kansas. University of Kansas Museum of Natural History Miscellaneous Publication No. 45. 357 pp.
- Cross, F. B., and J. T. Collins. 1995. Fishes in Kansas. Second Edition, revised. University of Kansas Museum of Natural History. xvii + 315 pp.
- Douglas, Neil H. 1974. Freshwater fishes of Louisiana. Claitor's publ. div. Baton Rouge, Louisiana. 443 pp.
- Etnier, D. A., and W. C. Starnes. 1993. The Fishes of Tennessee. University of Tennessee Press, Knoxville, Tennessee. xiv + 681 pp.
- Etnier, David A. and Wayne C. Starnes. 1993. The Fishes of Tennessee. University of Tennessee Press, Knoxville. 681 pp.
- HUBBS, CLARK. 1988. PERSONAL COMMUNICATION. CONVERSATION WITH ANDY PRICE. 13 APRIL 1988.
- Lee, D. S., C. R. Gilbert, C. H. Hocutt, R. E. Jenkins, D. E. McAllister, and J. R. Stauffer, Jr. 1980. Atlas of North American

Freshwater Fishes. North Carolina State Museum of Natural History. 867 pp.

- Lee, David, Carter R. Gilbert, Charles H. Hocult, Robert E. Jenkins, Don E. McAllister, and Jay R. Stauffer, Jr. 1980. Atlas of North American freshwater fishes. N. Carolina Biol. Survey Publ. 1980-12. 867 pp.
- Mettee, M. F., P. E. O'Neil, and J. M. Pierson. 1996. Fishes of Alabama and the Mobile Basin. Oxmoor House, Birmingham, Alabama. 820 pp.
- Moss, R. E., J. W. Scanlan, and C. S. Anderson. 1983. Observations on the natural history of the blue sucker (*Cycleptus elongatus* Le Sueur) in the Neosho River. Am. Midl. Nat. 109:15-22.
- Nelson, J. S. 1984. Fishes of the world. Second edition. John Wiley & Sons, New York. xv + 523 pp.
- Page, L. M., and B. M. Burr. 1991. A field guide to freshwater fishes: North America north of Mexico. Houghton Mifflin Company, Boston, Massachusetts. 432 pp.
- Pflieger, W. L. 1997. The fishes of Missouri. Revised edition. Missouri Department of Conservation, Jefferson City. vi + 372 pp.
- ROSS, STEPHEN T. 1996. INLAND FISHES OF MISSISSIPPI. SELECTED SPECIES ACCOUNTS. COAUTHORED WITH W. M. BRENNEMAM, W.T. SLACK, M.T. O'CONNELL, AND T.L. PETERSON. ILLUSTRATED BY D.G. ROSS. DRAFT COPY.
- Robins, C. R., et al. 1991. Common and scientific names of fishes from the United States and Canada. American Fisheries Society, Special Publishing 20. 183 pp.
- Robison, H. W., and T. M. Buchanan. 1988. Fishes of Arkansas. University of Arkansas Press, Fayetteville, Arkansas. 536 pp.
- Simon, Thomas. 1993. Letter to Robert Anderson re Fish Collection Localities in Indiana. 2 pp.
- Smith, G. R. 1992. Phylogeny and biogeography of the Catostomidae, freshwater fishes of North America and Asia. Pages 778-826 in Mayden, R. L., editor. Systematics, historical ecology, and North American freshwater fishes. Stanford Univ. Press, Stanford, California. xxvi + 969 pp.
- Smith, P. W. 1979. The fishes of Illinois. Univ. Illinois Press, Urbana. 314 pp.
- Starnes, W. C. 1995. Taxonomic validation for fish species on the U.S. Fish and Wildlife Service Category 2 species list. 28 pp.
- Sublette, J. E., M. D Hatch, and M. Sublette. 1990. The fishes of New Mexico. University New Mexico Press, Albuquerque, New Mexico. 393 pp.
- Trautman, M. B. 1981. The fishes of Ohio. Second edition. Ohio State Univ. Press, Columbus. 782 pp.
- Warren, M. L., Jr., B. M. Burr, S. J. Walsh, H. L. Bart, Jr., R. C. Cashner, D. A. Etnier, B. J. Freeman, B. R. Kuhajda, R. L. Mayden, H. W. Robison, S. T. Ross, and W. C. Starnes. 2000. Diversity, distribution, and conservation status of the native freshwater fishes of the southern United States. Fisheries 25(10):7-31.
- Williams, J. E., J. E. Johnson, D. A. Hendrickson, S. Contreras-Balderas, J. D. Williams, M. Navarro-Mendoza, D. E. McAllister, and J. E. Deacon. 1989. Fishes of North America endangered, threatened, or of special concern: 1989. Fisheries 14:2-20.
- Yeager, B. L., and K. J. Semmens. 1987. Early development of the blue sucker, *CYCLEPTUS ELONGATUS*. Copeia 1987:312-316.

The Small Print: Trademark, Copyright, Citation Guidelines, Restrictions on Use, and Information Disclaimer.

Note: Data presented in NatureServe Explorer at <http://www.natureserve.org/explorer> were updated to be current with NatureServe's central databases as of **February 2005**.

Note: This report was printed on **June 2, 2005** .

Trademark Notice: "NatureServe", NatureServe, NatureServe Explorer, The NatureServe logo, and all other names of NatureServe programs referenced herein are trademarks of NatureServe. Any other product or company names mentioned herein are the trademarks of their respective owners.

Copyright Notice: Copyright © 2005 NatureServe, 1101 Wilson Boulevard, 15th Floor, Arlington Virginia 22209, U.S.A. All Rights Reserved. Each document delivered from this server or web site may contain other proprietary notices and copyright information relating to that document. The following citation should be used in any published materials which reference the web site.

Citation for data on website including Watershed and State Distribution maps:

NatureServe. 2005. NatureServe Explorer: An online encyclopedia of life [web application]. Version 4.4. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: June 2, 2005).

Citation for Bird Range Maps of North America:

Ridgely, R.S., T.F. Allnutt, T. Brooks, D.K. McNicol, D.W. Mehlman, B.E. Young, and J.R. Zook. 2003. Digital Distribution Maps of the Birds of the Western Hemisphere, version 1.0. NatureServe, Arlington, Virginia, USA.

Acknowledgement Statement for Bird Range Maps of North America:

"Data provided by NatureServe in collaboration with Robert Ridgely, James Zook, The Nature Conservancy - Migratory Bird Program, Conservation International - CABS, World Wildlife Fund - US, and Environment Canada - WILDSPACE."

Citation for Mammal Range Maps of North America:

Patterson, B.D., G. Ceballos, W. Sechrest, M.F. Tognelli, T. Brooks, L. Luna, P. Ortega, I. Salazar, and B. E. Young. 2003. Digital Distribution Maps of the Mammals of the Western Hemisphere, version 1.0. NatureServe, Arlington, Virginia, USA.

Acknowledgement Statement for Mammal Range Maps of North America:

"Data provided by NatureServe in collaboration with Bruce Patterson, Wes Sechrest, Marcelo Tognelli, Gerardo Ceballos, The Nature Conservancy-Migratory Bird Program, Conservation International-CABS, World Wildlife Fund-US, and Environment Canada-WILDSPACE."

NOTE: Full metadata for the Bird Range Maps of North America is available at:

<http://www.natureserve.org/library/birdDistributionmapsmetadatav1.pdf>.

Full metadata for the Mammal Range Maps of North America is available at:

<http://www.natureserve.org/library/mammalsDistributionmetadatav1.pdf>.

Restrictions on Use: Permission to use, copy and distribute documents delivered from this server is hereby granted under the following conditions:

1. The above copyright notice must appear in all copies;
2. Any use of the documents available from this server must be for informational purposes only and in no instance for commercial purposes;
3. Some data may be downloaded to files and altered in format for analytical purposes, however the data should still be referenced using the citation above;
4. No graphics available from this server can be used, copied or distributed separate from the accompanying text. Any rights not expressly granted herein are reserved by NatureServe. Nothing contained herein shall be construed as conferring by implication, estoppel, or otherwise any license or right under any trademark of NatureServe. No trademark owned by NatureServe may be used in advertising or promotion pertaining to the distribution of documents delivered from this server without specific advance permission from NatureServe. Except as expressly provided above, nothing contained herein shall be construed as conferring any license or right under any NatureServe copyright.

Information Warranty Disclaimer: All documents and related graphics provided by this server and any other documents which are referenced by or linked to this server are provided "as is" without warranty as to the currentness, completeness, or accuracy of any specific data. NatureServe hereby disclaims all warranties and conditions with regard to any documents provided by this server or any other documents which are referenced by or linked to this server, including but not limited to all implied warranties and conditions of merchantability, fitness for a particular purpose, and non-infringement. NatureServe makes no representations about the suitability of the information delivered from this server or any other documents that are referenced to or linked to this server. In no event shall NatureServe be liable for any special, indirect, incidental, consequential damages, or for damages of any kind arising out of or in connection with the use or performance of information contained in any documents provided by this server or in any other documents which are referenced by or linked to this server, under any theory of liability used. NatureServe may update or make changes to the documents provided by this server at any time without notice; however, NatureServe makes no commitment to update the information contained herein. Since the data in the central databases are continually being updated, it is advisable to refresh data retrieved at least once a year after its receipt. The data provided is for planning, assessment, and informational purposes. Site specific projects or activities should be reviewed for potential environmental impacts with appropriate regulatory agencies. If ground-disturbing activities are proposed on a site, the appropriate state natural heritage program(s) or conservation data center can be contacted for a site-specific review of the project area (see [Visit Local Programs](#)).

Feedback Request: NatureServe encourages users to let us know of any errors or significant omissions that you find in the data through (see [Contact Us](#)). Your comments will be very valuable in improving the overall quality of our databases for the benefit of all users.

