



Virginia Department of Game and Inland Fisheries

5/16/2019 12:58:26 PM

Fish and Wildlife Information Service

Taxonomy chapter for Shiner, bridle (010077)

Phylum	Chordata
Subphylum	N/A
Class	Osteichthyes
Subclass	N/A
Species Order	Cypriniformes
Species Suborder	Cyprinoidei
Family	Cyprinidae
SubFamily	Leuciscinae
Genus	Notropis
Species	bifrenatus
Subspecies	N/A
Authority	(Cope, 1869)
ITIS-TSN	163402

Taxonomy Comments

This species was described from Pennsylvania in 1869. It is the type species of the genus-group *Chirope*, a name never in common use. Based partly on a pilot study by Swift (1975), Loos and Fuiman (1978) recognized *Chirope* as a subgenus of *Notropis* and, following Jordan and Everman (1896), included three other small black-lined shiners in the subgenus. Mayden (1986) proposed placing *N. bifrenatus* and several other nonbarbeled *Notropis* in the genus *Hybopsis* *9286*. Geographic variation was not detected in *N. bifrenatus* in a limited study by Jenkins and Zorach in 1970. Oddly for a *Notropis*, the left-side pharyngeal tooth count was 5 in 2 of 7 specimens from the recently discovered Santee drainage population; otherwise the population appeared typical of the species. *Bifrenatus* means two bridled, referring to the black preocular bars that unite across the snout *4205*.

References for Taxonomy

Ref.Id Citation

- 816 Lee, D.S., Gilbert, C.R., Hocutt, C.H., McAllister, R.E., Stauffer, J.R., Jr. (Ed.), 1980, Atlas of North American Freshwater Fishes, 854 pgs., Pub. 1980-12 of N. Car. Biol. Surv, N. C. State Mus. of Nat. Hist., Raleigh, NC
- 2539 Grzimek, B., 1972, Grzimek's animal life encyclopedia
- 4205 Jenkins, R. E., N. M. Burkhead, 1994, Freshwater Fishes of Virginia, 1079 pgs., American Fisheries Society, Bethesda, MD
- 9914 American Fisheries Society, 1991, Common and scientific names of fishes from the United States and Canada, Num. 20, 183 pgs.

Status chapter for Shiner, bridle (010077)

Status Code	Status Description

211	VA Wildlife Action Plan - Tier I - Critical Conservation Need
215	VA Wildlife Action Plan - a - On the ground management strategies/actions exist and can be feasibly implemented.
605	Heritage G5
703	Heritage S3
999	See Comments

Status Comments

This species is proposed for Special Concern status in Virginia, and its status needs to be surveyed in other states *9286*. Because this species is apparently extirpated in three drainages, and its distribution is spotty and density low elsewhere in the state, it was listed Special Concern January 1, 1992. In Virginia, the bridle shiner is persistent only in the James and York river drainages but only to a limited extent. Accordingly, this species may warrant assignment to a higher protective category than Special Concern *10120*.

Wildlife Action Plan

This species would benefit from augmentation and reintroduction efforts. Additional habitat modeling would be useful. This species will be prioritized as Tier 1a.

References for Status

Ref.Id Citation

- 9286 Terwilliger, K.T., 1991, Virginia's endangered species: Proceedings of a symposium. Coordinated by the Virginia Dept. of Game and Inland Fisheries, Nongame and Endangered Species Program, 672 pp. pgs., McDonald and Woodward Publ. Comp., Blacksburg, VA
- 9673 Dept. Game and Inland Fisheries, 1990, 1990 Code of Virginia Section 29.1-100, Revised. Nuisance species definition, 1 pgs.
- 10120 Terwilliger, K., 1991, Virginia's endangered species: Proceedings of a symposium, 672 pgs.
- 11048 Roble, S. M., 1996, Natural Heritage resources of Virginia: Rare animal species. Natural Heritage technical report 96-11, 25 pgs., DCR, Division of Natural Heritage, Richmond, VA
- 12297 Virginia's comprehensive wildlife conservation strategy (Virginia's wildlife action plan), 2005 (Ed.), pg. Virginia Department of Game and , Richmond, Virginia pgs.
- 12464 Virginia Department of Game and Inland Fisheries, 2015, Virginia Wildlife Action Plan, Virginia Department of Game and Inland Fisheries, Richmond, VA 23228

Life history chapter for Shiner, bridle (010077)

Life History

Physical description: This is a small shiner with a subacute snout and the dorsal fin is slightly posterior in position. The midlateral stripe is prominent and the caudal spot is enlarged and distinct from the lateral stripe. The snout is encircled by an anteriorly constricted dark band. The adults are from 28-40 mm SL. The body is somewhat slender and slightly elevated at the dorsal origin. The dorsal fin origin is just slightly above or posterior to the pelvic origin. The head and eye are moderate and the snout is slightly pointed. The mouth is subterminal and slightly oblique. The nuptial male has minute tubercles on the head which are densest over the occiput. There are minute tubercles on the nape and the pectoral has a shagreen of tubercles. The female is nontuberculate. The genital papillia of both sexes is small and obscured by the anal papillia. There are 4-4 pharyngeal teeth and the lateral line is incomplete in small adults while complete or nearly complete in large

adults. There are (31)33-35(37) midlateral scales, (20)23-24(27) circumbody scales, (10)11-12 circum-peduncle scales and (11)13-15(16) predorsal scales with (11)13-14(15) predorsal scale rows. There are (6)7(8) anal rays 12-13(14) pectoral rays and the cephalic lateralis canals tend to be highly interrupted. The breast is usually 90-100% scaled and the belly is fully scaled. The dorsum is straw colored and the dorsolateral scales are black-olive edged. The supralateral stripe is straw colored and the mid-lateral stripe is black with a green-blue iridescence. The lower side and venter are pale straw with scattered silver. The head dorsum and snout are dusky brown and the snout band and horizontal upper opercular bar are black. The cheek and lower opercle are pale. The dorsal fin is pale. The basicaudal spot is black, and the caudal base has a yellow-orange wash. The anal fin base has black pigment and the leading edge of the pectoral is black. Nuptial males are bright straw yellow *4205*. Reproduction: This species breeds from late May to mid-July in water temperatures from 14.4 to 26.7 degrees C *4205*. Incubation takes 57-71 hours at 24 degrees C *2583*. The female has urogenital papillae *2965*, and the male turns yellow-gold *835,2965,1229*. They have limited nuptial tubercles *2964,1229*. This species matures at one year of age *4205,2963,1229*, and at 10 degrees the breeding color and genital development begins. At 15 degrees spawning initiates *2965*. The nuptial pursuits are discussed in the literature *2966*. The male noses the ripe female *2964*, and pursuits begin at the bottom and continue to the surface where breeding occurs *2966*. Multiple spawning between 1 pair has been noted with 232 eggs dropped by the female *2966*. There are from 1060-2100 eggs per female 34-44 mm long *4205,1229*. Both sexes are polygamous *4205*. Behavior: This species spawns in shallow water *816,2583*, with heavy vegetation *816,2583,835,1229*. The life span is 3 years *4205,2963*. The yolk sac larvae (4-7 mm) has a fin fold, and pectoral fin buds. The postlarvae (7-13 mm) has incipient caudal rays, pelvic fin buds, and a lateral stripe. The juvenile (13+ mm) is adult in appearance *835,1229*. Population parameters: This species lives to be 3 years of age *4205*. Fecundity ranges from 1060-2100 eggs *4205*.

No Life History Comments

References for Life History

Ref.Id Citation

- 816 Lee, D.S., Gilbert, C.R., Hocutt, C.H., McAllister, R.E., Stauffer, J.R., Jr. (Ed.), 1980, Atlas of North American Freshwater Fishes, 854 pgs., Pub. 1980-12 of N. Car. Biol. Surv, N. C. State Mus. of Nat. Hist., Raleigh, NC
- 835 Cooper, E.L., 1983, The Fishes of Pennsylvania, Penn. State Univ. Press, University Park
- 1229 Jones, P. W., Martin, F. D., Hardy, Jr. J. D., 1978, Development of fishes of the mid-Atlantic Bight. Vol. 1, 366 pgs., U. S. Fish and Wildl. Serv., Washington, D. C.
- 2583 Hubbs, C.L., Lagler, K.F., 1970, , , 0 pgs.
- 2963 Harrington, R.W., Jr., 1948, The life cycle of the bridled shiner, *Notropis bifrenatus* (Cope), Am. Midl. Nat., Vol. 39, pg. 83-92
- 2964 Jenkins, R.E., Zorach, T., 1970, Zoogeography and characters of the American Cyprinid fish, *Notropis bifrenatus*, Chesapeake Sci., Vol. 11, pg. 174-182
- 2965 Harrington, R.W., Jr., 1950, Preseasonal breeding by the bridled shiner, *Notropis bifrenatus*, induced under light-temperature control, Copeia, Vol. 1950, pg. 304-311
- 2966 Harrington, R.W., Jr., 1951, Notes on spawning in an aquarium by the bridled shiner, *Notropis bifrenatus*, with counts of the eggs deposited, Copeia, Vol. 1951, pg. 85-86
- 4205 Jenkins, R. E., N. M. Burkhead, 1994, Freshwater Fishes of Virginia, 1079 pgs., American Fisheries Society, Bethesda, MD

Occurrence chapter for Shiner, bridle (010077)

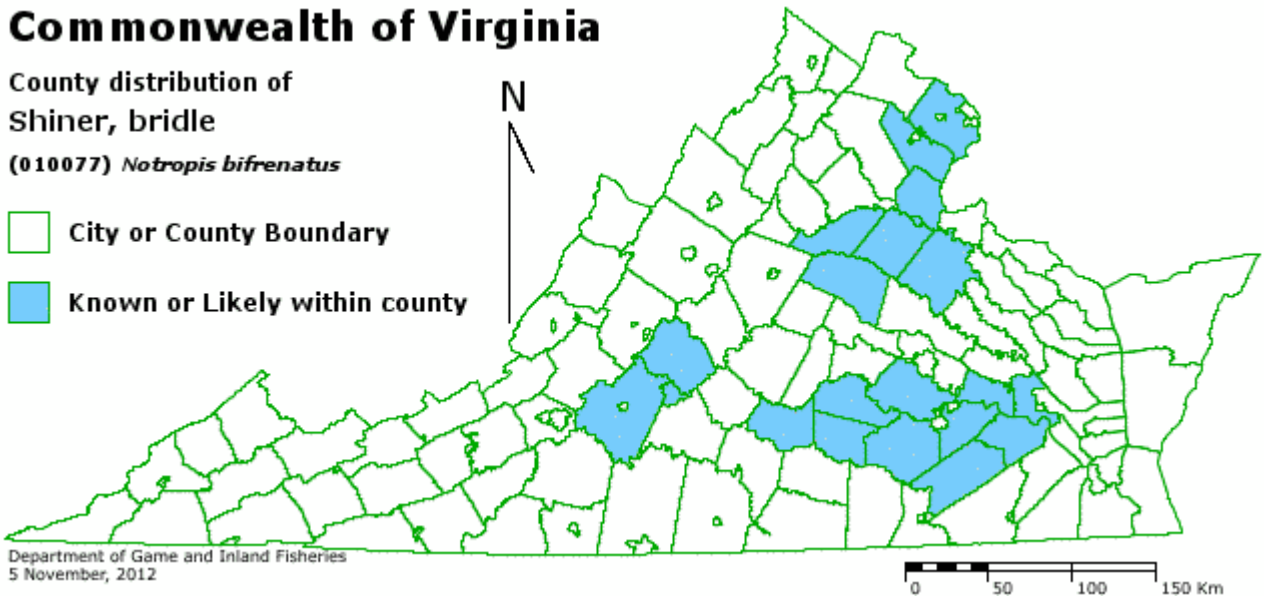
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Commonwealth of Virginia

County distribution of
Shiner, bridle

(010077) *Notropis bifrenatus*

- City or County Boundary
- Known or Likely within county

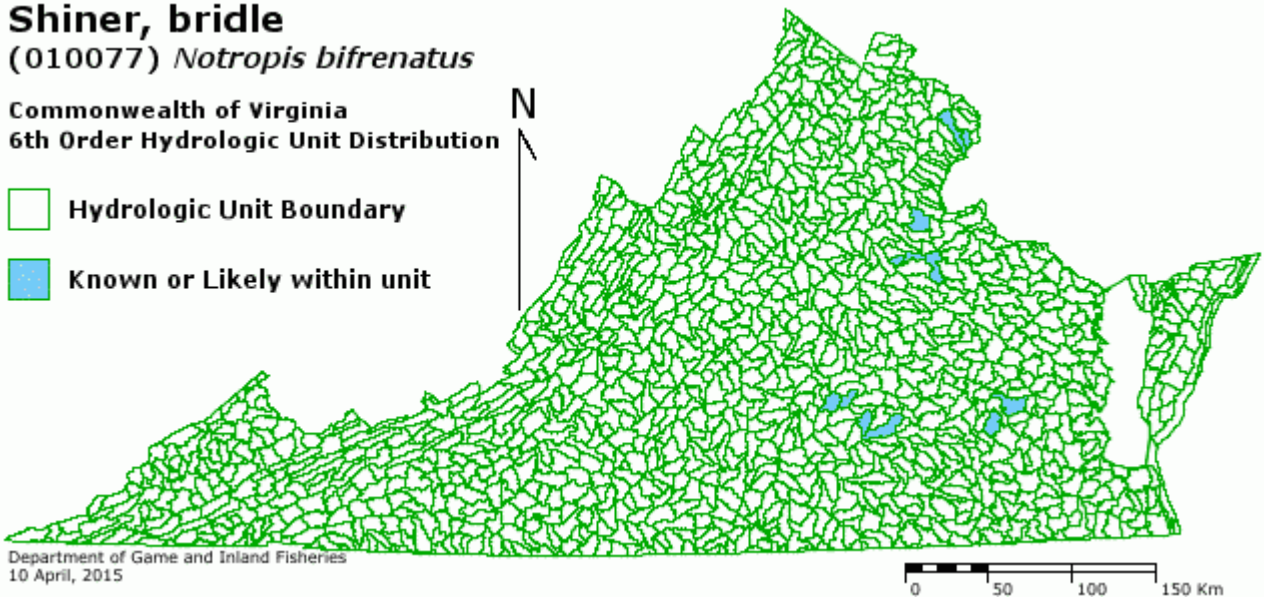


Shiner, bridle

(010077) *Notropis bifrenatus*

Commonwealth of Virginia
6th Order Hydrologic Unit Distribution

- Hydrologic Unit Boundary
- Known or Likely within unit



County Occurrences

County	County Name	General Occurrence	Resident Occurrence	Seasonal Occurrence
007	Amelia	1 - Known	1 - Known	
009	Amherst	1 - Known	1 - Known	
019	Bedford	1 - Known	1 - Known	
033	Caroline	1 - Known	1 - Known	

036	Charles City	1 - Known	1 - Known	
041	Chesterfield	2 - Likely		
053	Dinwiddie	1 - Known	1 - Known	
059	Fairfax	1 - Known		
095	James City	1 - Known	1 - Known	
109	Louisa	1 - Known	1 - Known	
135	Nottoway	2 - Likely		
137	Orange	1 - Known		
147	Prince Edward	1 - Known	1 - Known	
149	Prince George	1 - Known	1 - Known	
153	Prince William	1 - Known		
177	Spotsylvania	1 - Known	1 - Known	
179	Stafford	1 - Known	1 - Known	
181	Surry	1 - Known	1 - Known	
183	Sussex	1 - Known	1 - Known	
630	Fredericksburg City	1 - Known	1 - Known	
680	Lynchburg City	2 - Likely		

General Occurrence Comments: The Virginia populations of the bridle shiner are largely localized and most streams seem extirpated or nearly so. All confirmed Potomac drainage records are from 1935 or earlier. The Rappahannock population may be extirpated since the only record is from a Flat Creek site in 1933. Recently the drainage was extensively surveyed and that site was sampled. In the York drainage the bridle shiner has been found, sporadically and as recent as 1983, only in the upper Mattaponi system. The James drainage is tenanted by the most successful Virginia populations. In the Piedmont of the Appomattox system during 1983 we found the bridle shiner at the lowermost, middle, and uppermost sites. However, the bridle shiner is not generally distributed in the Appomattox. The Coastal Plain records are from lower Chickahominy River and tributaries during 1949-1986; Herring Creek in 1975; and James River marsh and "beach seine" areas during 1968-1976. The Chowan population is known only from Stoney Creek in the vicinity of the route 301 bridge. *N. bifrenatus* was taken in four of six collections made during 1967-1968, but not in the four samples which were taken during 1971-1984 *9286*.

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References for County Occurrence

Ref.Id Citation

4205 Jenkins, R. E., N. M. Burkhead, 1994, Freshwater Fishes of Virginia, 1079 pgs., American Fisheries Society, Bethesda, MD

10949 Virginia Department of Game and Inland Fisheries, 1995, Collections Database

USGS National 6th Order Watershed Occurrences

HU6	6th Order Watershed Name
JA25	Flat Creek-Beaverpond Creek
JA26	Nibbs Creek
JA32	Deep Creek-Sweathouse Creek
JA37	Namozine Creek
JL14	Upper Chippokes Creek
JL29	Chickahominy River-Morris Creek
PL27	Dogue Creek
PL30	Accotink Creek
RA46	Rappahannock River-Hazel Run
YO43	Mat River
YO45	Matta River
YO47	Mattaponi River-Campbell Creek

6th Order Hydrologic Unit Comments: 6th order hydrologic unit distribution reviewed in year 2009 by Virginia Department of Game and Inland Fisheries Taxonomic Advisory Committees.

References for 6th Order Hydrologic Unit**Ref.Id Citation**

12325 VDGIF, 2009, Tiered Species Distributions by 6th Order Watershed, as Reviewed by VDGIF's Taxonomic Advisory Committees

Occurrence chapter for Shiner, bridle (010077)**County Occurrences**

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053	Dinwiddie	1 - Known	1 - Known	
059	Fairfax	1 - Known		
095	James City	1 - Known	1 - Known	
109	Louisa	1 - Known	1 - Known	
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137	Orange	1 - Known		
147	Prince Edward	1 - Known	1 - Known	
149	Prince George	1 - Known	1 - Known	
153	Prince William	1 - Known		
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PL27	Dogue Creek
PL30	Accotink Creek
RA46	Rappahannock River-Hazel Run
YO43	Mat River
YO45	Matta River
YO47	Mattaponi River-Campbell Creek

6th Order Hydrologic Unit Comments: 6th order hydrologic unit distribution reviewed in year 2009 by Virginia Department of Game and Inland Fisheries Taxonomic Advisory Committees.

References for 6th Order Hydrologic Unit

Ref.Id Citation

12325 VDGIF, 2009, Tiered Species Distributions by 6th Order Watershed, as Reviewed by VDGIF's Taxonomic Advisory Committees

County abundance chapter for Shiner, bridle (010077)

County Abundance

No Records found.

Comments concerning Relative Abundance within City/County

This species is rare to uncommon throughout its range *9286*.

References for Relative Abundance within City/County

No References found for Relative Abundance within City/Countys.

Average Annual Population for Last 5 years within City/County

No Records found.

Comments concerning Annual Population within City/County No Comments Available.

References for Annual Population within City/County

No References found for Annual Population within City/Countys.

Average Annual Harvest for Last 5 years within City/County

No Records found.

Comments concerning Annual Harvest within City/County

No Comments Available.

References for Annual Harvest within City/County

No References found for Annual Harvest within City/Countys.

Distributions with in administrative units chapter for Shiner, bridle (010077)

USFWS Refuges Code(s)

Id	USFWS Refuge Name
51620	Presquile

References for USFWS Refuge

Ref.Id Citation

4205 Jenkins, R. E., N. M. Burkhead, 1994, Freshwater Fishes of Virginia, 1079 pgs., American Fisheries Society, Bethesda, MD

NPS Park and Recreation Areas

Id	NPS Park and Recreation Area Name
326	Fredericksburg/Spotsylvania Memorial National Military Park
367	Richmond National Battlefield Park

References for NPS Park and Recreation Area

Ref.Id Citation

4205 Jenkins, R. E., N. M. Burkhead, 1994, Freshwater Fishes of Virginia, 1079 pgs., American Fisheries Society, Bethesda, MD

10949 Virginia Department of Game and Inland Fisheries, 1995, Collections Database

USFS Ranger Districts

No USFS Ranger District listed.

References for USFS Ranger District

No References found for USFS Ranger Districts.

VDGIF Wildlife Management Areas (VWMA)

Id	VDGIF Wildlife Management Area Name
003	Briery Creek
007	Chickahominy
012	Game Farm Marsh
006	Kittewan

References for VDGIF Wildlife Management Area**Ref.Id Citation**

4205 Jenkins, R. E., N. M. Burkhead, 1994, Freshwater Fishes of Virginia, 1079 pgs., American Fisheries Society, Bethesda, MD

10949 Virginia Department of Game and Inland Fisheries, 1995, Collections Database

Physiographic Provinces

Id	Physiographic Province Name
1	Coastal Plain
2	Piedmont

References for Physiographic Province**Ref.Id Citation**

4205 Jenkins, R. E., N. M. Burkhead, 1994, Freshwater Fishes of Virginia, 1079 pgs., American Fisheries Society, Bethesda, MD

Administrative Area Comments

Distribution for Refuges, Parks, Ranger Districts, and Wildlife Management Areas is based on known or likely county distribution.

Site Distribution Comments**General Distribution Comments**

The Virginia populations of the bridle shiner are largely localized and most streams seem extirpated or nearly so. All confirmed Potomac drainage records are from 1935 or earlier. The Rappahannock population may be extirpated since the only record is from a Flat Creek site in 1933. Recently the drainage was extensively surveyed and that site was sampled. In the York drainage the bridle shiner has been found, sporadically and as recent as 1983, only in the upper Mattaponi system. The James drainage is tenanted by the most successful Virginia populations. In the Piedmont of the Appomattox system during 1983 we found the bridle shiner at the lowermost, middle, and uppermost sites. However, the bridle shiner is not generally distributed in the Appomattox. The Coastal Plain records are from lower Chickahominy River and tributaries during 1949-1986; Herring Creek in 1975; and James River marsh and "beach seine" areas during 1968-1976. The Chowan population is known only from Stoney Creek in the vicinity of the route 301 bridge. *N. bifrenatus* was taken in four of six collections made during 1967-1968, but not in the four samples which were taken during 1971-1984 *9286*.

Management practices chapter for Shiner, bridle (010077)**Beneficial Management Practices**

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Code	Description
101	Maintaining undisturbed/undeveloped areas

Management Practice Comments

Habitat alteration appears to be the general factor afflicting *N. bifrenatus* *9286*.

References for Management Practices

Ref.Id Citation

9286 Terwilliger, K.T., 1991, Virginia's endangered species: Proceedings of a symposium. Coordinated by the Virginia Dept. of Game and Inland Fisheries, Nongame and Endangered Species Program, 672 pp. pgs., McDonald and Woodward Publ. Comp., Blacksburg, VA

Food habits chapter for Shiner, bridle (010077)

Trophic: Omnivore

Adults Food Comments: This species consumes microcrustaceans, mites, aquatic insects, worms and detritus *4205,9286*.

Food Utilized By Life Stage

Life Stage	Food	Part
A-Adult	0900-PLANTS	X-Not Specified
A-Adult	6700-Insects	X-Not Specified
G-General	0050-MICROORGANISMS	X-Not Specified
G-General	0900-PLANTS	X-Not Specified
G-General	3950-Detritus	X-Not Specified
G-General	4000-ANIMALS	X-Not Specified
G-General	6600-Crustaceans	S-See Comments
G-General	6700-Insects	X-Not Specified

References for Food Habits

Ref.Id Citation

816 Lee, D.S., Gilbert, C.R., Hocutt, C.H., McAllister, R.E., Stauffer, J.R., Jr. (Ed.), 1980, Atlas of North American Freshwater Fishes, 854 pgs., Pub. 1980-12 of N. Car. Biol. Surv, N. C. State Mus. of Nat. Hist., Raleigh, NC

835 Cooper, E.L., 1983, The Fishes of Pennsylvania, Penn. State Univ. Press, University Park

2963 Harrington, R.W., Jr., 1948, The life cycle of the bridled shiner, *Notropis bifrenatus* (Cope), Am. Midl. Nat., Vol. 39, pg. 83-92

4205 Jenkins, R. E., N. M. Burkhead, 1994, Freshwater Fishes of Virginia, 1079 pgs., American Fisheries Society, Bethesda, MD

Habitat chapter for Shiner, bridle (010077)

Habitat: Aquatic

References for Habitat

Ref.Id Citation

- 816 Lee, D.S., Gilbert, C.R., Hocutt, C.H., McAllister, R.E., Stauffer, J.R., Jr. (Ed.), 1980, Atlas of North American Freshwater Fishes, 854 pgs., Pub. 1980-12 of N. Car. Biol. Surv, N. C. State Mus. of Nat. Hist., Raleigh, NC
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- 1230 Wang, J.C.S., Kernehan, R.J., 1979, Fishes of the Delaware estuaries, 410 pgs., Ecological Analysts, Inc., Towson, Md
- 2583 Hubbs, C.L., Lagler, K.F., 1970, , , 0 pgs.
- 2926 Fowler, H.W., 1945, A study of the fishes of the southern Piedmont and Coastal Plains, Acad. Nat. Sci. (Philadelphia) Memo 7
- 2963 Harrington, R. W., Jr., 1948, The life cycle of the bridled shiner, *Notropis bifrenatus* (Cope), Am. Midl. Nat., Vol. 39, pg. 83-92
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- 2966 Harrington, R. W., Jr., 1951, Notes on spawning in an aquarium by the bridled shiner, *Notropis bifrenatus*, with counts of the eggs deposited, Copeia, Vol. 1951, pg. 85-86
- 4205 Jenkins, R. E., N. M. Burkhead, 1994, Freshwater Fishes of Virginia, 1079 pgs., American Fisheries Society, Bethesda, MD

Habitat Forest Size Class

No Habitat Forest Size found.

References for Habitat Forest Size

No References found for Habitat Forest Sizes.

Habitat Society of American Foresters (SAF)

No Habitat SAF found.

References for Habitat SAF References

No References found for Habitat SAF References.

Habitat Land Use

Code	Land Use
50	Water
51	Streams and Canals
52	Lakes

References for Land Use**Ref.Id Citation**

- 816 Lee, D.S., Gilbert, C.R., Hocutt, C.H., McAllister, R.E., Stauffer, J.R., Jr. (Ed.), 1980, Atlas of North American Freshwater Fishes, 854 pgs., Pub. 1980-12 of N. Car. Biol. Surv, N. C. State Mus. of Nat. Hist., Raleigh, NC
- 1229 Jones, P. W., Martin, F. D., Hardy, Jr. J. D., 1978, Development of fishes of the mid-Atlantic Bight. Vol. 1, 366 pgs., U. S. Fish and Wildl. Serv., Washington, D. C.
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- 4205 Jenkins, R. E., N. M. Burkhead, 1994, Freshwater Fishes of Virginia, 1079 pgs., American Fisheries Society, Bethesda, MD

Habitat USFWS National Wetland Inventory (NWI)

Major Code	Minor Code	Modifier Code	Specific Code
R. - Riverine	SB. - Streambed	H - Nontidal, permanent	0 - Fresh
R2 - Riverine, lower perennial	SB2 - Streambed, sand	H - Nontidal, permanent	0 - Fresh
R2 - Riverine, lower perennial	SB3 - Streambed, mud	H - Nontidal, permanent	0 - Fresh

References for USFWS National Wetland Inventory (NWI)**Ref.Id Citation**

- 816 Lee, D.S., Gilbert, C.R., Hocutt, C.H., McAllister, R.E., Stauffer, J.R., Jr. (Ed.), 1980, Atlas of North American Freshwater Fishes, 854 pgs., Pub. 1980-12 of N. Car. Biol. Surv, N. C. State Mus. of Nat. Hist., Raleigh, NC
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- 9286 Terwilliger, K.T., 1991, Virginia's endangered species: Proceedings of a symposium. Coordinated by the Virginia Dept. of Game and Inland Fisheries, Nongame and Endangered Species Program, 672 pp. pgs., McDonald and Woodward Publ. Comp., Blacksburg, VA

Habitat Potential Natural Vegetation (PNV)

Code	Potential Natural Vegetation
101	Oak-Hickory-Pine Forest

References for Potential Natural Vegetation (PNV)**Ref.Id Citation**

4205 Jenkins, R. E., N. M. Burkhead, 1994, Freshwater Fishes of Virginia, 1079 pgs., American Fisheries Society, Bethesda, MD

Habitat Association: This is a slackwater shiner found in streams and creeks in quiet pools and also in ponds and lakes. This species occurs over mud, silt or detritus covered bottoms usually in association with aquatic vegetation. It will rarely enter tidal fresh and brackish water *4205*. Many upland and lowland records are from large marshes or marsh-fringed shores. In such areas the bridle shiner's specific affiliation may be with submersed vegetation. Some records are from beaches. It is a freshwater oligohaline fish with a propensity for clear water *9286*.

Animal or Plant Association:

Animal or Plant Comments They are associated with moderate to abundant submersed aquatic vegetation *9286*.

References for Animal or Plant Association

No References found for Animal or Plant Associations.

USFWS Habitat Evaluation Procedures

No USFWS Habitat Evaluation Procedures Found

References for USFWS Habitat Evaluation Procedures

No References found for USFWS Habitat Evaluation Procedures.

Environmental associations chapter for Shiner, bridle (010077)**Environmental Association**

Lifestage	Environmental Association
Breeding Adult	00020B - Water Temperature: Between 21-27 degrees C
Breeding Adult	00020C - Water Temperature: Between 15-21 degrees C
Breeding Adult	00020D - Water Temperature: Below 15 degrees C
Breeding Adult	00140C - Density of Aquatic Vegetation: High
Breeding Adult	00290A - Water Depth Preference: Less than 1 ft.
Egg	00020S - Water Temperature: Specified in Comments
General	00090A - Substrate: Mud or silt
General	00090S - Substrate: Specified in Comments
General	00100D - Relation to Substrate: Unattached - normally free living
General	00110A - Bottom Type [Aquatic]: Mud or silt
General	00110H - Bottom Type [Aquatic]: Organic debris

General	00140B - Density of Aquatic Vegetation: Moderate
General	00140C - Density of Aquatic Vegetation: High
General	00220C - Salinity: Salt concentrations 500-30
General	00430B - Aquatic Features: Pool areas
Limiting	00220S - Salinity: Specified in Comments

Environmental Association General Comments:

This species is found in creeks and streams in quiet pools and also in ponds and lakes. It occurs over mud, silt or detritus covered bottoms usually in association with aquatic vegetation. It rarely enters tidal fresh and brackish water. The maximum salinity record is 11.8 ppt in Chesapeake Bay *4205*. This species is not particularly acid tolerant. The pH was 7.0 at a North Carolina Coastal Plain locality. Possibly exceptional was the pH of 5.5 at a Lake Marion, South Carolina, capture site. Also perhaps extreme for the species, the pH was 8.0 at the Jolly Pond outlet, situated in a Calcareous area of the Chickahominy system, Virginia. The water this species occupies ranges from colorless to moderately stained. Some areas at one station had an oily surface slick. Salinity is generally less than 2 o/oo *9286*.

Environmental Association Comments for Breeding Adults:

Spawning occurs in localized areas of quiet pools, just below the surface and above beds of submergent macrophytes *9286*.

Environmental Association Comments for Egg:

The optimum temperature for eggs is 24 degrees C *2583*.

References for Environmental Association

Ref.Id Citation

- 816 Lee, D.S., Gilbert, C.R., Hocutt, C.H., McAllister, R.E., Stauffer, J.R., Jr. (Ed.), 1980, Atlas of North American Freshwater Fishes, 854 pgs., Pub. 1980-12 of N. Car. Biol. Surv, N. C. State Mus. of Nat. Hist., Raleigh, NC
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References chapter for Shiner, bridle (010077)

Ref.Id Citation

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