

DISTRIBUTION OF FISH IN THE STREAMS ABOUT CHARLESTON, ILLINOIS.

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Introduction:

The object of this paper is to give a list of the fish known to occur in the streams about Charleston, Illinois, with notes on their distribution, obtained by some ten years of field work in the region by the writer. Use will also be made of data bearing upon fishes of these streams given in the published work on the Fishes of Illinois by S. A. Forbes and R. E. Richardson. The terminology and order of consideration of species used by these writers will be followed in this paper. The fish collections made by the writer and from which the major part of the information here presented was obtained, are all preserved in an accessible condition in the zoology laboratory of the Eastern Illinois Normal school at Charleston. The species determinations have been made by the writer with the assistance of Mr. R. E. Richardson in the case of some forms difficult to identify. For this and other help given by members of the State Laboratory of Natural History, the author is duly grateful.

The streams, the fish life of which is to be considered,

are in Coles county and are accessible within a radius of fifteen miles of Charleston. They belong to the Embarras, the Kaskaskia, and Little Wabash systems, but chiefly to the first mentioned. They lie in country principally of two kinds: level black-soil prairie and rough, commonly hilly territory with light-colored soil and with patches of timber. Country of this last type prevails east and south of a diagonal line across Coles county from the northeast to the southwest corner. Streams of the Embarras and Little Wabash systems are associated chiefly with the hilly country and those of the Kaskaskia with the prairie. The Shelbyville Moraine crosses the southern part of the county and occupies most of the region just south of Charleston. In the north part of Coles county, there are some low prairie ridges that are associated with the Cerro Gordo Moraine. All the region under consideration is in the Wisconsin Glaciation, Coles county being on the southern border.

Based chiefly on size, the streams about Charleston may be fairly well grouped as follows:

1. **Streams of first rank or "Rivers."** These are Embarras and Kaskaskia rivers. In general, they average near a hundred feet in width with a common depth of three or four feet under ordinary water conditions. Except in deep holes, having much fine sediment, the bottom is usually gravelly or sandy with a thin superficial layer of clay.
2. **Streams of second rank or "Large Creeks."** This group includes the lower portions of Kickapoo Creek, Brush Creek and Polecat Creek. These never become dry, and they maintain a permanent connection with larger streams. They average in width between fifty and seventy-five feet and in depth, perhaps two or three feet.
3. **Streams of the third rank or "Small Creeks."** Among these, are the upper portions of those of the second group, as well as Cossel Creek, Indian Creek, Campus Creek, Crabapple Creek and Flat Branch. They never or very rarely become perfectly dry, although they frequently break their connections with parent streams by losing their water on reaching the flood plains of these streams to which they are tributaries. In dry seasons, they become broken into series of disconnected pools. Except during freshets, they are commonly five to fifteen feet in width and from one to two feet deep, rarely, even in "holes" exceeding three feet.
4. **Streams of the fourth rank.** These are the smallest fish-containing streams and are frequently referred to as "branches." There are many of these in the Charleston region flowing into all the other types and forming their headwaters. A number of them are at the bottoms of wooded

ravines and they constitute the smaller drainage ditches of the prairies. They are usually under four or five feet in width and they may be but a few inches wide. The depth is seldom over a foot. They are active for short periods except during unusually wet seasons. Many of them never contain fish.

The following table shows the distribution of the common species of fish in the Charleston region in the four types of streams just described.

Table Giving Distribution of the Thirty-eight Common Species of Fish in the Charleston Region

| | First rank streams. | Second rank streams. | Third rank streams. | Fourth. rank streams. |
|---------------------------|---------------------------|----------------------------|---------------------------|-----------------------------|
| Chub Sucker | | | X | |
| Common Sucker | | X* | X | |
| Hog Sucker | X | X* | | |
| Common Redhorse | X* | X | | |
| Common Carp | X | | | |
| Stone-roller | X | X | X | X |
| Silvery Minnow | | | X | |
| Black-head Minnow | | | X | |
| Blunt-nosed Minnow | X* | X* | X | |
| Horned Dace | X | X | X* | X |
| Bullhead Minnow | X | | | |
| Straw-colored Minnow | X* | X | | |
| Notropis illecebrosus | X* | X | | |
| Silverfin | X* | X | X | X |
| Common Shiner | X | X | X* | X |
| Blackfin | X* | X* | X | |
| Silver-mouthed Minnow | X* | X* | X | |
| Sucker-mouthed Minnow | X | X* | | |
| Big-eyed Chub | X* | X | | |
| Storer's Chub | X | | | |
| River Chub | X | X | X* | |
| Channel Cat | X* | X | | |
| Yellow Bullhead | X* | X | X | |
| Black Bullhead | X* | X | X | |
| Brindled Stonecat | X* | X | | |
| Top Minnow | X | X* | X | |
| Brook Silversides | X | | | |
| Rock Bass | X* | X | | |
| Blue-spotted Sunfish | X | X | X* | X |
| Long-eared Sunfish | X* | X | X | |
| Large-mouthed BlackBass | X* | X | X | |
| Small-mouthed BlackBass | X | X* | | |
| Hadropterus phoxocephalus | X | | | |

| | First rank streams. | Second rank streams. | Third rank streams. | Fourth. rank streams. |
|--------------------|---------------------------|----------------------------|---------------------------|-----------------------------|
| Black-sided Darter | X* | X | | |
| Green-sided Darter | X* | X | | |
| Johnny Darter | X* | X | X | |
| Sand Darter | X | | | |
| Rainbow Darter | X* | X | X | |

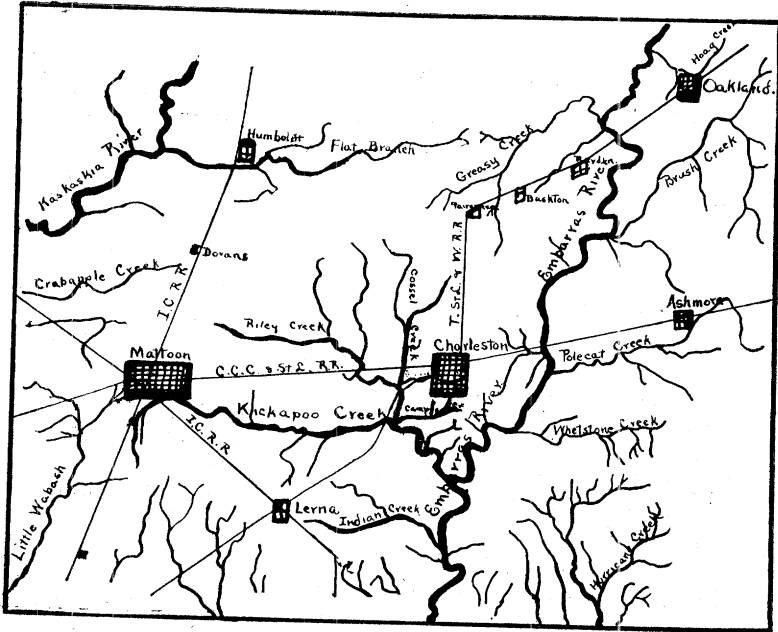
Note: X in the above means that the species is common in the type of stream, at least at some places and at some times.

* Indicates the type or types of stream where the species appears to be best represented.

List of Fish Known to Occur in the Charleston Region with Notes on Their Numbers and Distribution.

1. **Lepisosteus osseus** (Linnaeus), Long-nosed Gar.
Occasionally taken from the Embarras River. One seen in Kickapoo Creek in June 1907. Forbes and Richardson record it from the Kaskaskia system in Coles Co.
2. **Amia calva** Linnaeus, The Dogfish.
Apparently scarce. Sometimes caught by hook from the Embarras River.
3. **Dorosoma cepedianum** (Le Sueur), Gizzard Shad.
Reported for the Kaskaskia system in Coles Co., by Forbes and Richardson. Judging from fishermen's reports, it is probably in the Embarras River.
4. **Carpiodes difformis** Cope, Blunt-nosed River Carp.
A few specimens have been taken from the Embarras River and from Kickapoo Creek. Forbes and Richardson report it from the Kaskaskia system.
5. **Carpiodes velifer** (Rafinesque), Quillback.
Some small specimens have been taken from the Embarras and Kaskaskia Rivers and from Kickapoo Creek. Apparently uncommon.
6. **Erimyzon sucetta oblongus** (Mitchell), Chub Sucker.
Prefers deep pools in small creeks where many are often found. Not often taken in the larger streams.
7. **Minytrema melanops** (Rafinesque), Spotted Sucker.
Frequently taken in the Kaskaskia system; scarce in the Embarras system. Seems to prefer the larger streams.
8. **Catostomus commersonii** (Lacepede). Common Sucker.
Locally common. Young numerous in a few creeks both large and small. Adults have been found in numbers only in Kickapoo Creek.
9. **Catostomus nigricans** Le Sueur, Hog Sucker.
Very common on rocky shoals where the water is rapid, in rivers and large creeks.

10. **Moxostoma aureolum** (Le Sueur) Common Red-horse.
Abundant in larger streams: rivers and large creeks.
11. **Moxostoma breviceps** (Cope) Short-headed Red-horse.
Uncommon. Seemingly confined to rivers and large creeks.
12. **Cyprinus carpio** Linnaeus, European Carp.
Common in parts of the Embarras and Kaskaskia Rivers.
No records for tributary streams.
13. **Campostoma anomalum** (Rafinesque), Stone-roller.
Abundant and very generally distributed in the Embarras system, preferring the smaller streams. No records have been obtained for the Kaskaskia system in Coles county.
14. **Hybognathus nuchalis** Agassiz. Silvery Minnow.
Abundant in the Kaskaskia system in small creeks.
Very scarce in the Embarras system.
15. **Pimephales promelas** Rafinesque, Black-head Minnow.
Common in portions of some small creeks where the water is sluggish and where the banks are grassy and shelving. No records have been obtained for its occurrence in the Kaskaskia system from the writer's collections. Forbes and Richardson record it from that system.
16. **Pimephales notatus** (Rafinesque), Blunt-nosed Minnow.
Abundant and very generally distributed in all but the smallest fish-bearing streams. This is undoubtedly the best represented species of fish in numbers of individuals, found in the Charleston region.
17. **Semotilus atromaculatus** (Mitchill), Horned Dace.
Abundant and found in all types of fish bearing streams in the region. It prefers small creeks.
18. **Abramis chrysoleucas** (Mitchill), Golden Shiner.
Uncommon about Charleston, but sometimes found in small numbers about thick growths of aquatic plants.
19. **Cliola vigilax** (Baird and Girard), Bullhead Minnow.
Periodically abundant in some parts of the Embarras River, and a few have been taken from all parts of the stream where collecting has been thoroughly done. Common in the Kaskaskia River. It appears to be confined to these large streams for no specimens have been caught in their tributaries.
20. **Notropis cayuga** Meek.
Recorded from Coles county by Forbes and Richardson. None have been found by the writer.
21. **Notropis blennius** (Girard), Straw-colored Minnow.
Quite common in the Embarras River and in its larger tributaries; none recorded from small creeks. It appears to be absent in the Kaskaskia system.



Principal streams in the vicinity of Charleston.

22. **Notropis illecebrosus** (Girard).
Common locally in the Embarras River and in large creeks connected with it. No record for the Kaskaskia system.
23. **Notropis hudsonius** (DeWitt Clinton), Spot-tailed Minnow.
One taken by the writer in Crabapple Creek, near Coles, Illinois. This is the only record for the region.
24. **Notropis lutrensis** (Baird and Girard), Redfin.
Rare. Only two taken from Flat Branch and one from Crabapple Creek.
25. **Notropis whiplii** (Girard), Silverfin.
Abundant at all times in rivers and larger creeks and at times of high water in small creeks.
26. **Notropis cornutus** (Mitchill), Common Shiner.
Uncommon except in a few localities. It was found in large numbers in Crabapple Creek near Coles and in a part of Polecat Creek.
27. **Notropis atherinoides** Rafinesque, Shiner.
Occasionally taken in the Embarras River and in the Kickapoo Creek near the river. No records for the Kaskaskia system.

28. **Notropis umbratilis atripes** (Jordan), Blackfin.
Abundant in the Embarras and Kaskaskia Rivers and in the larger creeks connected with these rivers.
29. **Ericymba buccata** Cope, Silver-mouthed Minnow.
Abundant and very generally distributed in the rivers and all creeks but the smallest ones of both systems-creeks. The adults prefer larger streams.
30. **Phenacobius mirabilis** (Girard), Sucker-mouthed Minnow.
Not common but frequently taken in the rivers and large creeks of both systems.
31. **Hybopsis dissimilis** (Kirtland), Spotted Shiner.
Very rare. Recorded for the region by Forbes and Richardson. None taken by the writer.
32. **Hybopsis amblops** (Rafinesque), Big-eyed Chub.
Quite common in the Embarras and Kaskaskia Rivers and in their larger tributaries. Avoids small creeks.
33. **Hybopsis storerianus** (Kirtland), Storer's Chub.
Abundant in the Embarras River, where it is often taken on worm-baited hooks. Not found in tributaries of this stream except near their mouths.
34. **Hybopsis kentuckiensis** (Rafinesque), River Chub.
Abundant in the Kaskaskia system. Only two have been found by the writer in the Embarras system. These came from Polecat Creek. Forbes and Richardson record it for the Embarras River in Douglas Co.
35. **Ictalurus anguilla** Evermann and Kendall, Eel Cat.
A catfish caught by hook in the Embarras River on July 1, 1912, by Mr. C. P. Lantz, answers the description of this species.
36. **Ictalurus punctatus** (Rafinesque), Channel Cat.
Abundant in the Embarras River, and found in some numbers in parts of its larger tributaries.
37. **Ameiurus natalis** (Le Sueur), Yellow Bullhead.
Frequently taken by hook from deep holes in the rivers and from similar places in creeks. Large numbers of the very young of this species are often found in small creeks. The adults prefer larger streams.
38. **Ameiurus melas** (Rafinesque), Black Bullhead.
Common especially in large streams. Distribution similar to that of natalis. The two species appear to be closely associated.
39. **Leptops olivaris** (Rafinesque), Mud Cat.
Found in small numbers in the Embarras and Kaskaskia Rivers.
40. **Schilbeodes gyrinus** (Mitchill), Tadpole Cat.
Found in small numbers in the Kaskaskia system. No records for the Embarras system.

41. **Schilbeodes nocturnus** (Jordan and Gilbert), Freckled Stonecat.
Very rare; only three taken; one from Kickapoo Creek, one from the Kaskaskia River and one from Flat Branch.
42. **Schilbeodes exilis** (Nelson), Slender Stonecat.
Very rare. One taken in the Kaskaskia River in Coles county, September 3, 1908, by the writer.
43. **Schilbeodes miurus** (Jordan), Brindled Stonecat.
Abundant in the Embarras system where the bottom is rocky. Confined to this stream and its larger tributaries. No records for the Kaskaskia system.
44. **Esox vermiculatus** Le Sueur, Little Pickerel.
Frequently found in shallow bays of the Embarras River; none have been found elsewhere by the writer. Forbes and Richardson, however, say that it is in weedy branches of this stream. They also record it for the Kaskaskia system.
45. **Fundulus notatus** (Rafinesque), Top Minnow.
Common in those parts of large streams where the water is quiet and where there is much aquatic vegetation. Rarely found in small creeks.
46. **Labidesthes sicculus** (Cope), Brook Silversides.
Appears to be confined strictly to the Embarras River, for the writer has not found it elsewhere in the Charleston region. It is present in large numbers just below the dam and is scarce in other parts of the stream fished in the neighborhood of Charleston.
47. **Aphredoderus sayanus** (Gilliams), Pirate Perch.
A few taken from the Kaskaskia system. It undoubtedly occurs in the Embarras streams in small numbers for it has been taken in these in Douglas county by the writer.
48. **Pomoxis annularis** Rafinesque, White Crappie.
Frequently caught by hook in the Embarras River, and it is abundant in the Mattoon Reservoir, which belongs to the Little Wabash system. No records have been obtained for regions other than these.
49. **Pomoxis sparoides** Lacepede, Black Crappie.
Abundant in the Mattoon Reservoir. Not found elsewhere in Coles county by the writer.
50. **Ambloplytes rupestris** (Rafinesque) Rock Bass.
Locally common in the Embarras and larger tributaries. Prefers waters having large rocks. Forbes and Richardson have found it in the Kaskaskia River near Coles county.
51. **Chaenobryttus gulosus** (Cuvier and Valenciennes), Warmouth Bass.

- Probably occurs in the Embarras River, judging from descriptions given by anglers. None found in the region by the writer. Forbes and Richardson record it for the Kaskaskia in Coles county.
52. **Lepomis cyanellus** Rafinesque, Blue-spotted Sunfish.
Abundant; the most widely distributed of any species of fish in the region. Found in all types of fish-bearing streams and in ponds, but it prefers deeper, quieter portions of small creeks.
 53. **Lepomis megalotis**, (Rafinesque), Long-eared Sunfish.
Abundant in rivers and large creeks. Scarce in small creeks. The most common sunfish in our larger streams. It is an important species from the standpoint of local anglers.
 54. **Lepomis humilis** (Girard), Orange-spotted Sunfish.
Common in Flat Branch, and some have been taken from the Kaskaskia River. No records for it in the Embarras system near Charleston, but it has been found in this system in Douglas county.
 55. **Lepomis pallidus** (Mitchill), Blue-gill.
Only one taken by the writer in the region, and that was from Kickapoo Creek. Forbes and Richardson record it for the Kaskaskia near Coles county.
 56. **Micropterus dolomieu** Lacepede, Small-mouthed Black Bass.
A few specimens have been taken by the writer in the Embarras River, Polecat Creek, and Kickapoo Creek during the present year, 1913. None have been found by him prior to this year, although it was recorded for the Charleston region by Forbes and Richardson.
 57. **Micropterus salmoides** Lecepede, Large-mouthed Black-Bass.
Abundant in the Embarras River and in its tributaries not far from the main stream. It prefers the deeper water of these streams and is most frequently found about masses of submerged tree roots. None are present in my collections from the Kaskaskia system, although Forbes and Richardson record it from there.
 58. **Stizostedion canadense griseum** (De Kay), Gray Pike.
Taken in the Kaskaskia system close to the west boundary of Coles county, according to Forbes and Richardson.
 59. **Percina caprodes** (Rafinesque), Log-Perch.
Uncommon. A few have been taken from the Embarras River, from the Kaskaskia River and from Kickapoo Creek.
 60. **Hadropterus phoxocephalus** (Nelson).

- Uncommon. Taken from the Embarras and Kaskaskia Rivers but not from any of their tributaries.
61. **Hadropterus aspro** (Cope and Jordan), Black-sided Darter.
Common in the Embarras and in the Kaskaskia Rivers and in large creeks. Scarce in small creeks.
 62. **Hadropterus sciurus** Swain.
Apparently very rare. Two were taken by the writer in the Embarras River.
 63. **Diplesion blennoides** (Rafinesque), Green-sided Darter.
Abundant in certain parts of the Embarras River and its larger tributaries, where the water is shallow and swift and where there are considerable algae (*Cladophora*.)
None have been found in small creeks; and there are no records for the Kaskaskia system.
 64. **Boleosoma nigrum** (Rafinesque), Johnny Darter.
Abundant; chiefly in rivers and large creeks.
 65. **Boleosoma camurum** Forbes.
One taken in the Kaskaskia River by the writer. This is the only record for the region.
 66. **Ammocrypta pellucida** (Baird), Sand Darter.
Found in considerable numbers in some parts of the Embarras River where the bottom is sandy. Not obtained from any other stream in the region.
 67. **Etheostoma jessiae** (Jordan and Brayton).
Rare; one taken from the Embarras River and one from the Kaskaskia River in Coles county, by the writer.
 68. **Etheostoma caeruleum** Storer, Rainbow Darter.
Abundant on stony shoals in the Embarras River and in its larger tributaries. Uncommon in small creeks. No records have been obtained for the Kaskaskia system, in the Charleston region.
 69. **Etheostoma flabellare** (Rafinesque), Fan-tail Darter.
Often taken in the Embarras and in its larger tributaries; not abundant anywhere. No records for the Kaskaskia system in the Charleston region.
 70. **Boleichthys fusiformis** (Girard).
Only one taken in the region by the writer, and this was from the Embarras River. This is the only record obtained for the region.

Summary and Conclusions.

Records of seventy species of fish occurring in the vicinity of Charleston, Illinois, and within the boundaries of Coles county, have been obtained.

Besides these seventy species, there are, according to the distribution data given in Forbes and Richardson's work on the Fishes of Illinois, twenty-three species that possibly oc-

cur about Charleston, but no authentic instance of their being found in the region has come to the knowledge of the writer of this paper. These are given in the following hypothetical list

- Lepisosteus platostomus* Rafinesque, Short-nosed Gar.
- Anguilla chrysypa* Rafinesque, American Eel.
- Hiodon alosoides* (Rafinesque), Northern Mooneye.
- Ictiobus cyprinella* (Cuvier and Valenciennes), Red-mouth Buffalo.
- Ictiobus urus* (Agassiz), Mongrel Buffalo.
- Ictiobus bubalus* (Rafinesque), Small-mouthed Buffalo.
- Moxostoma anisurum* (Rafinesque), White-nosed Sucker.
- Phalcopharynx duquesnei* (Le Sueur).
- Notropis heterodon* (Cope), Black-chinned Minnow.
- Notropis gilberti* Jordan and Meek.
- Notropis jejunus* (Forbes).
- Ictalurus furcatus* (Le Sueur), Blue Cat.
- Ameiurus nebulosus* (Le Sueur).
- Noturus flavus* Rafinesque, Stonecat.
- Fundulus dispar* (Agassiz).
- Lepomis mineatus* Jordan.
- Eupomotis heros* (Baird and Girard).
- Stizostedion vitreum* (Mitchill).
- Hadropterus ouachitae* (Jordan and Gilbert).
- Cottogaster shumardii* (Girard).
- Crystallaria asperella* (Jordan).
- Etheostoma zonale* (Cope), Banded Darter.
- Etheostoma squamiceps* Jordan.

There are thirty-eight of the seventy species recorded about Charleston that may be considered either common or abundant. A list of these is given in the table on pages 104-5.

One of the most interesting features concerning the distribution of fish in the streams about Charleston is the dissimilarity between the fish faunas of the Kaskaskia and the Embarras systems in the region. There are five species in the latter that are either absent or very scarce in the former. These are the stone-roller, Storer's chub, brindled stonecat, green-sided darter, and the rainbow darter; and then there are six species, each forming quite a conspicuous part of the Kaskaskia fish fauna, which are absent of very scarce in the Embarras system about Charleston. These are: the spotted sucker, silvery minnow, river chub, tadpole cat, pirate perch and orange-spotted sunfish. These faunal differences are not remarkable when we consider that the two streams are in very different drainage basins, the Mississippi and the Wabash; but they signify a marked distinctness of the two systems geographically in the Charleston region.

Each of the species of fish most carefully studied favors certain types of streams and certain places in these streams. A study of the factors that determine these preferences is now being made, and the results of this work are intended for other publications. Some notes on these habitat preferences are given in this paper in the annotated list and in the table.

The Charleston region is well adapted for the study of the local distribution of stream fish, for there are many streams present, and these are of a number of different types. They are also located in country of two distinct kinds, prairie and wooded morainal, each of which is typical of that found in large portions of our state. The streams are also interesting because they are along the line, separating the Lower Illinois Glaciation from the Wisconsin Glaciation. These two regions are very distinct ichthyologically, as shown by the work of Forbes and Richardson. The Coles county fish fauna is most like that of the Wisconsin Glaciation.
