TR 81-4

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

Fisheries Division

Technical Report: No. 81-4

September, 1981

SERIES: The Trout Streams of Michigan

No. 34 Indian River

John D. Schrouder, Fisheries Biologist

SERIES: The Trout Streams of Michigan
No. 34 Indian River

John D. Schrouder, Fisheries Biologist

The Indian River Watershed includes 108 lineal miles of mainstream and tributaries and drains 126,080 acres. The Indian River flows southeasterly through Alger, Delta and Schoolcraft Counties before joining the Manistique River near Manistique (Figure 1). Most of the Indian River mainstream is composed of marginal or second quality trout water, but it grows trophy-sized brown and brook trout. Top quality trout water is found in many tributaries and the upper mainstream. It is unique among most Upper Peninsula streams in that it supports: 1) a self-sustaining population of lake sturgeon, a threatened species; 2) produces exceptional mayfly (Hexagenia limbata) hatches that stimulate feeding of trophy-sized brown trout during early summer evenings; and 3) it flows through 8,400 acre Indian Lake. The mainstream is a popular canoeing route from the "Widewaters" U.S. Forest Service Campground, located above FH13, down to FH2212, the last take out above the "spreads." The river is bridged by FH13, FH2258, Co. 437, FH2213 (at Steuben), Co. P441 and M-94. Ninety percent of the watershed is in public ownership by the U.S. Forest Service (USFS) managed as the Hiawatha National Forest. Only about 15,000 acres are privately owned and most of the private acreage is contained in the Little Indian Hunt and Fish Club. Primary land uses in the watershed are timber production and recreation. There is no heavy industry or other sources of serious water pollution. Four USFS campgrounds are located in the watershed. Residential development is concentrated only at Steuben. Canoeing and fishing are the primary recreational uses of the river.

Dry, infertile sands and wet sandy soils are the chief soil types of the watershed. These permeable soils and vegetative cover greatly reduce surface runoff and result in relatively stable stream flows.

Forty-three lakes and ponds, with a total surface area of 3,043 acres discharge into the Indian River (Table 1). These lakes and ponds offer a wide variety of fishing opportunities. They are also responsible for summer water temperatures that are marginal for trout in portions of the mainstream and some tributaries. Although 36 lakes empty into the river upstream of M-94, the lower reaches receive enough ground water to sustain optimal conditions for brown trout. Most of the brooks in the mainstream seek groundwater in the form of springs and seepages during hot weather.

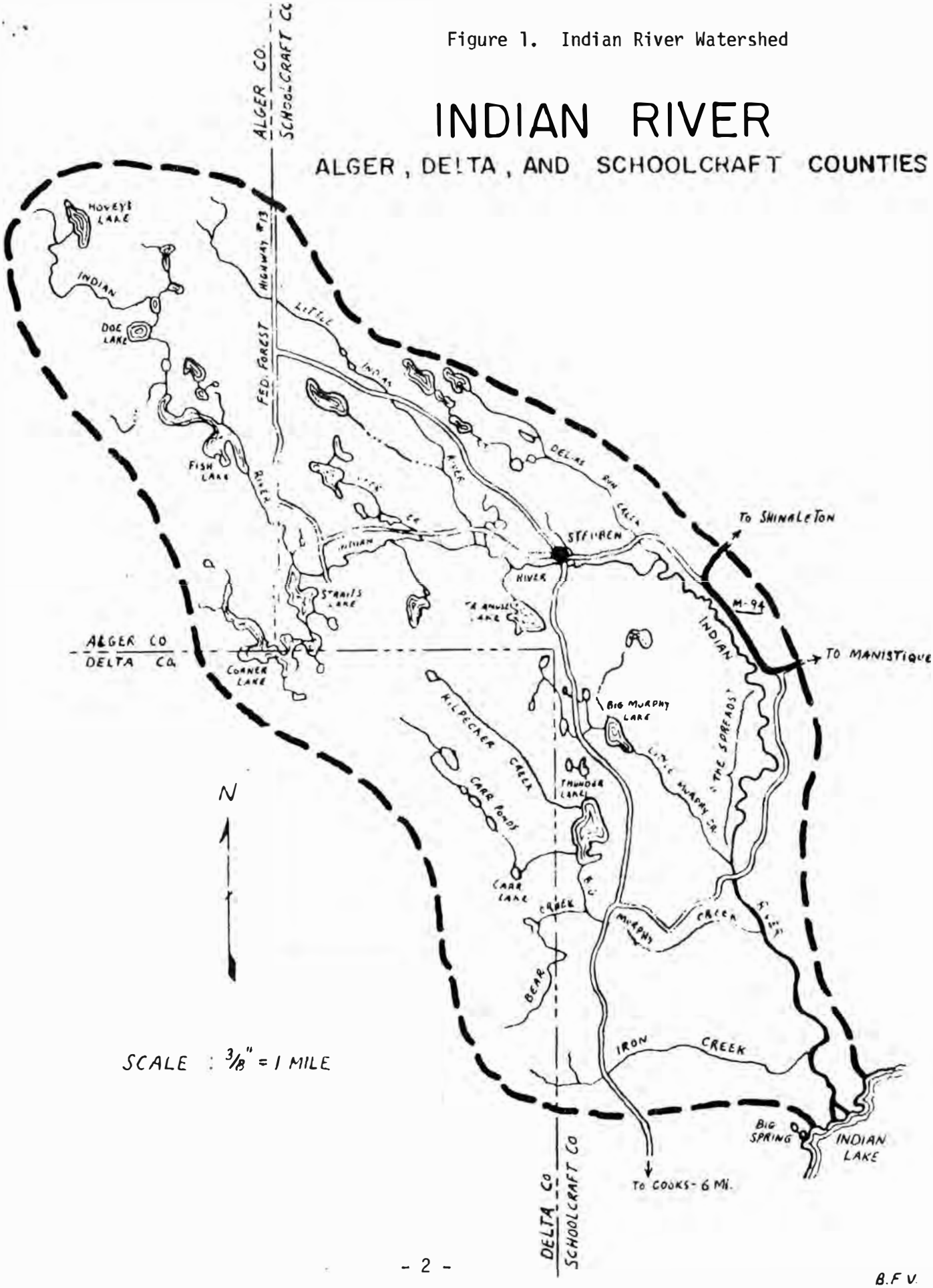
Over 66 miles of tributaries supply water to the Indian, the largest being the Little Indian (10.5 miles). Other major tributaries include: Big Murphy; Little Murphy; Delias Run; Deer; Bear; Kilpecker; Carr; Big Ditch; and Iron creeks (Table 2).

The following sections provide detailed descriptions of the Indian River mainstream and its tributaries.

Little Indian River

The Little Indian is the largest and most productive brook trout water in the Indian drainage. Arising from several small springs in eastern Alger County,

Figure 1. Indian River Watershed



B.F.V.
3-9-60

Table 1. Connecting lakes of Indian River Watershed

Name	Area	Maximum Depth
Hovey's Lake	100 acres	
Fish Lake	120 acres	
Hartney Lake	40 acres	
Doe Lake	50 acres	
Mud Lake	35 acres	
Grimes Lake	30 acres	
Council Lake	35 acres	
Hike Lake*	11 acres	38 feet (trout)
Rock Lake*	10 acres	25 feet (trout)
Round Lake	80 acres	
Blue Lake	Included in Corner Lake	
Skeels Lake	Included in Corner Lake	
Thunder Lake	350 acres	20 feet
Upper Thunder Lake	80 acres	
Mud Lake	5 acres	
Minerva Lake	50 acres	20 feet
Lorraine Lake	10 acres	
Big Murphy Lake	140 acres	
Little Bass Lake	160 acres	17 feet
Triangle Lake	166 acres	30 feet
Verdant Lake	90 acres	
Straits Lake	189 acres	29 feet
Island Lake*	30 acres	
Corner Lake	156 acres	50 feet
Deep Lake	Included in Corner Lake	
Mike White Lake	25 acres	
Cooksons Lake	55 acres	33 feet
Little Island Lake	40 acres	
Red Lake	40 acres	
McKeever Lake	130 acres	55 feet
Grassy Lake	176 acres	30 feet
Hermans Lake	80 acres	
Vance Lake	40 acres	
Center Lake	10 acres	
Coattail Lake	40 acres	
Big Island Lake	130 acres	35 feet
Townline Lake	80 acres	
Klondyke Lake	170 acres	25 feet
March Lake	30 acres	
Carr Lake	15 acres	(trout)
Carr Ponds	10 acres	(trout)
Bow Lake*	10 acres	
Pot Lake	5 acres	
Foote Lake	20 acres	
Unnamed Lakes (10)		
Grand Total	1,043 acres	

*Landlocked

Table 2. Tributaries of Indian River

Stream	Linear Length	Flow - CFS[1] Upper	Lower	MDNR Stream Classification
Indian River	41.0 mi.	13.0	12.0	SQCM
L. Indian River	10.5 mi.	3.8	9.4	TQCT
Murphy Creek	5.0 mi.	27.0	38.8	SQCT
L. Murphy Creek	3.0 mi.	5.3	9.5	SQCT
Delias Run Creek	6.0 mi.	-	2.7	SQCT
Deer Creek	2.5 mi.	-	2.8	SQWT
Bear Creek	3.5 mi.	-	6.6	SQWT
Kilpecker Creek	3.0 mi.	-	-	TQCT
Carr Creek	5.0 mi.	-	-	TQCT
Iron Creek	8.0 mi.	-	-	SQWT
Misc. Trib.	20.0 mi.	-	-	TQCT to SQWT
Total	107.5 mi.			

[1] October, 1956 flow estimates.

SQCM - Second Quality Coldwater Mainstream

TQCT - Top Quality Coldwater Tributary

SQCM - Second Quality Coldwater Mainstream

SQWT - Second Quality Warmwater Tributary

it flows southeasterly into the Indian in Section 23, T44N, R18W. About 85 percent of the frontage is owned by the USFS.

The lower reaches of this stream are darkly stained due to leaching organic soils and swamp conifer, tannic acid input. Upstream of FH13 in Alger County, the Little Indian is crystal clear. Fish production capability is quite low by statewide standards but average for streams in the eastern Upper Peninsula. Water temperatures average 60°F and rarely exceed 65°F during summer months. Flooding is rare; normal seasonal stage fluctuations are less than 6 inches. A description of the Little Indian River from headwaters to mouth follows:

a) Between FH-13 and FH-2173 - In the headwaters area above FH13, the stream is characterized by slow to moderate current and a silt and sand bottom. Downstream from FH13 current and channel dimensions are variable. Several small lakes and ponds on the stream are interspersed with swift, gravel and rubble bottomed areas supplied with abundant spring seepage. Channel cross section ranges from 25 to 35 feet in width and 0.5 to 2.5 feet in depth. Current velocity averages 1 to 1.5 fps and discharge increases from 10 cfs in Section 32 to 20 cfs at FH2173. The instream trout cover consists of undercut banks, submerged logs and brush. The Michigan Department of Natural Resources (MDNR) Fisheries Division installed three artificial trout spawning riffles below Lost Lakes Road (Sec. 14) during 1978 to enhance brook trout reproduction above FH13. Below FH13 natural reproduction of brooks is excellent and fish between 7 and 13 inches are fairly common. Fishing pressure is light in this area owing to accessibility. Some minor tag alder encroachment problems were identified by the USFS and MDNR during 1979-1980. Selective alder removal and placement of 1/2 log trout covers is planned for 1981 by the USFS.

b) FH2173 to North Section Line, Sec. 15 (Little Indian Club) - In this reach the stream is of more uniform pool-riffle character and there are no permanent ponds (some beaver activity occurs). Stream substrate is composed of 25% gravel and rubble cobble and 75% sand. Some spring seepages occur but they are not as numerous as in the section above. Channel cross section ranges from 25 to 35 feet in width and 0.5 to 3.5 feet in depth. Stream discharge ranges from 20 to 25 cfs. Riffles suitable for trout spawning account for about 15 percent of the stream channel. Brook and brown trout reproduction is limited in this reach compared to the reach upstream of FH2173. For example, similar 300 foot electro-fishing stations upstream and downstream of FH2173 during 1978 produced 57 and 10 young-of-the-year (yoy) brook trout respectively. Fishing pressure is moderate to heavy in this reach during spring and early summer. Brook trout account for most of the catch with only an occasional brown trout taken. Creeled trout range from 7 to 16 inches.

c) Section 15 to Mouth - The reach between Section 15 and the mouth of the Little Indian is very sandy, almost no gravel is present and very little spring seepage is apparent. Channel cross section ranges from 20 to 30 feet in width and 0.5 to 3.0 feet in depth. Discharge is approximately 30 cfs at FH2257. Log jams are numerous. Lack of spawning gravel and spring seepage is reflected in the fish population. One 300 foot electro-fishing station sampled during August, 1978 yielded only 4 brooks (1 yoy) and 2 browns (1 yoy). Access is limited in this reach by Little Indian Club ownership. A few large brooks and browns, up to 17 inches, are taken

early and late downstream of FH2257 where angling pressure is moderate to heavy. It is believed that many of the larger fish in this reach migrate up into the Little Indian from the mainstream to avoid warm summer water temperatures. The Little Indian River is mostly top quality trout water and supplemental stocking is presently considered unnecessary. Past management practices by the MDNR included yearling and legal-sized brook (1947 and 1949), and brown trout (1947 to 1962, 1965 to 1968, and 1970 to 1977) stocking. Brown trout releases were terminated after 1977 to maintain the wild brook trout population. Browns have replaced brooks in many Lower Peninsula waters where suitable spawning habitat was present. Present management goals of the MDNR and USFS also include: prevention of beaver impoundments in trout spawning areas, holding the line on vehicular access improvements and greater angling exploitation, and maintenance of timber canopy and/or discouragement of tag alder as streamside vegetation (artificially maintained meadows are preferable to alder encroachment).

Murphy Creek

Murphy Creek arises from the Thunder Lakes in western central Schoolcraft County. Channel cross setion ranges from 20 to 40 feet in width and 0.5 to 3.0 feet in depth. The stream is considered marginal trout water. It is predominately sandy with clear to light brown colored water. Ground water inflow is lacking. Severe tag alder encroachment also limits its trout management potential.

An August, 1979 electro-fishing survey yielded a few 9 to 12 inch brooks and a few 9 to 21 inch browns, and several other species including; yellow perch, northern pike, largemouth bass, rock bass, burbot, suckers, creek chubs, dace, golden and common shiners, darters, sculpin, log perch, and brook lamprey.

Maintenance trout stocking by the MDNR began in 1940 and was discontinued after 1972 for lack of consistent results. Competition and predation by other species (principally pike) on the planted stock is considered the major cause of stocking failure. In spite of its problems, the Big Murphy does grow a few trophy sized brook and brown trout in its lower reaches.

Little Murphy Creek

Little Murphy Creek is better trout water than Big Murphy Creek, but requires maintenance stocking to sustain a trout fishery. Little Murphy Creek is clear, 20 to 40 feet wide, 0.5 to 2.0 feet deep, and originates in wetlands north of Leg Lake in Schoolcraft County. It flows southeasterly about 5 miles to its confluence with the Indian River in Section 27, T43N, R17W. The USFS administers all but 0.75 miles of privately owned frontage in portions of Sections 8, 17 and 27. Maximum summer water temperatures probably exceed 70^{o}F for short periods. Flooding is unusual. Normal seasonal water level fluctuation is 4 to 8 inches. Following is a summary of stream characteristics from the source to the mouth:

a) Source to Leg Lake - This section is slow flowing with only occasional spring seepage. Most of this reach is of "pool" character with much substrate. Estimated discharge is 4 cfs. Instream vegetation is abundant. Brook trout and trout spawning habitat is sparse.

b) Leg Lake to Big Murphy Lake - Stream gradient increases somewhat in contrast to the upper section. There is a small lake midway between Leg and Murphy lakes. Channel cross section ranges from 8 to 20 feet wide and 0.5 to 2.0 feet deep. As in the upstream section, trout numbers, reproduction and suitable spawning areas are sparse.

c) Big Murphy Lake to Mouth - Some brook and brown trout reproduction was noted here in August, 1979, however, trout numbers and spawning habitat are also limited. The trout population increases nearer the mouth. Gradient remains low, averaging 1.5 feet per mile. Substrate is composed of approximately 5 percent gravel, 85 percent sand-silt and 15 percent organic. Stream discharge averages about 18 cfs and current velocity from 1 to 1.15 fps. Dense log jams are widely scattered through the section. Instream vegetation is sparse. Brook and/or brown trout were stocked by the MDNR annually from 1947 to 1967 every year except 1958. Creel census data gathered from 1949 to 1964 indicated good angling success (1.3 trout/hour) for stocked fish. Stocking was discontinued after 1967 due to a lack of sufficient sized stock for planting. Maintenance stocking should be resumed when yearlings are available. A fishery for wild trout in Little Murphy Creek is not expected to improve unless the following substantial habitat improvements are made: (1) spawning riffles; (2) hiding cover improvements; (3) selective alder removal; and (4) control of beaver populations through riparian vegetative management and liberalized trapping.

Delias Run Creek

Delias Run Creek starts in the Big Island Chain of Lakes in northwest Schoolcraft County and flows southeasterly to the Indian River. The stream is generally slow flowing, wide and marshy in the headwaters. Occasional beaver impoundments and natural lakes result in marginal or excessive summer water temperatures for brook trout. Good minnow populations exist. Gradient increases considerably in T44N, R17W, SE¼, SW¼, Sec. 7 and NW¼, NE¼, Sec. 18 where substrate is mostly gravel and rubble and suitable for trout spawning. Invertebrates are abundant as are creek chubs and blacknose dace. Fish hiding cover is also very good. Although trout were not collected in the August, 1979 USFS electro-fishing survey, local anglers report catching trout in the spring. Midsummer water temperatures reach the mid-70's.

From SE¼, NE¼, Sec. 18 downstream to Co. 437 the gradient is low and substrate is predominately sand, with some gravel present at the bridge crossings on the Haywire Trail. Spring seepage is common, providing a slightly better summer habitat for brook trout than in the area above, however, only 1 brook trout was collected in two 300 foot stations during 1979. There is beaver activity near Jar Lake where soft organic substrate impedes wading. Tag alder is very dense immediately above Co. 437 but has not fallen into the stream enough to cause excessive widening. Cover is good. The best brook trout population occurs between Co. 437 and the mouth. Eight brook trout were collected in one 300 foot station in 1979. Local anglers report good early season fishing in this section of Delias Run. Maximum water temperature rarely exceeds 70°F. Gravel spawning habitat is available immediately below Co. 437 and near the mouth, though the latter is of marginal quality. Beaver dams below the Haywire Trail in this section have created small impoundments which have little effect on water

temperature but may impede trout movement from the Indian River to upstream spawning habitat. A 15 inch minimum length and 1 fish per day limit with single pointed hook and artificial lure only rule applies to the upper area of Delias Run (stream section located south of the Haywire Grade) that flows through the Big Island Lake Complex.

Legal sized brook trout were stocked 1947, 1948 and 1950 to 1954 by the MDNR. Present management plans to be implemented with USFS funding include: (1) removal of offending beaver dams in Sections 20, 21 and 28 and installing beaver proof culverts; (2) adding more gravel to existing marginal spawning riffles near the mouth; and (3) stabilizing the 40 foot long eroding bank near the riffle above the mouth.

Deer Creek

This small second quality warmwater tributary is 2.5 miles long and originates from McKeever Lake. From McKeever Lake it flows through a series of beaver ponds in Sections 16 and 17, then flows through Cookson Lake before its confluence with the Indian River in Section 22, T44N, R18W. Except for an occasional brook trout taken from the beaver ponds below McKeever Lake, the fishery is dominated by warmwater species and minnows.

Bear Creek

This second quality warmwater tributary flows through and is influenced by a warmwater lake and several beaver ponds. It arises from wetlands in eastern Delta County, which impart its dark brown color, and flows northeasterly into Big Murphy Creek. Near the Delta-Schoolcraft County line it flows through Bear Lake. An occasional wild brook trout is taken above Bear Lake and a few large browns are caught by the occasional angler above its confluence with the Big Murphy.

Kilpecker Creek

Although the Little Indian River is probably the best brook trout water in the Indian River system, Kilpecker and Carr creeks are probably the second and third best. Kilpecker Creek arises from excellent quality springs in northeast Delta County and flows southeasterly to Thunder Lake. Much of this clear water creek flows through a narrow valley surrounded by rolling sand plain vegetated by jack pine, red pine and aspen. A narrow (30 to 60 feet) band of tag alder and other shrubs border one or both banks of the stream for about 65 percent of its length. During 1978, the USFS began a pilot tag alder clearing study along 1.3 miles (9.4 acres) of stream with control sections to measure trout habitat improvements and changes in the trout population. Parameters currently being monitored include: stream water temperatures; channel morphometry; aquatic vegetation; development of overhanging banks; trout standing crop; trout growth; and fishing pressure.

To date, only modest, 3 to 4^{o}F, increases in summer stream water temperatures were noted the first year after the cut and these differences have decreased by about 1^{o}F per year since. Mean daily water temperature was 51^{o}F in August. Prior to tag alder clearing, three study sections contained 30 to 50 pounds of trout per mile and represent average trout density compared with other Upper

Peninsula waters. Most were yoy fish. Very few legal sized trout were present. Since clearing, fishing effort has increased about three-fold, considerable cover in the form of log debris has been uncovered, and the stream channel is appreciably narrower and deeper.

Carr Creek

This stream arises from springs in the same general area as Kilpecker Creek in northeast Delta County. This small, 10 to 15 feet wide trout stream flows through four ponds (Upper, Middle, and Lower Carr, and Zigmaul Pond) and Carr Lake before it enters Thunder Lake, Schoolcraft County. Carr Creek is classified as a top quality coldwater tributary and sustains both natural reproduction of brook and brown trout.

All the ponds mentioned above provide excellent trout fishing opportunity for wading and canoe fishermen. To enhance natural reproduction of trout above Carr Lake, the MDNR constructed three spawning riffles between Carr Lake and Zigmaul Pond. A rough fish barrier was also installed about 100 yards below Carr Lake to keep out suckers and northern pike. Manual removal of rough fish will be undertaken periodically above this barrier as needed. Routine maintenance stocking of trout by the MDNR was discontinued after 1977, but some stocking may be resumed in selected areas especially following manual removal operations.

Big Ditch Creek

Big Ditch Creek was constructed in the early 1900's to drain an area on which mint was grown. The former mint field sites and ditches became State and Federal property in tax reversion sales during the 1930's. Today the "mint farm" area above M-94 through which Big Ditch flows is a State Wildlife Management Area which features sharptail grouse. Unfortunately, soil banks 8 to 15 feet high along the ditch are eroding in scattered areas. In spite of the erosion problems, the stream is developing a natural meandering pattern with a pool-riffle sequence.

Groundwater input maintains midsummer water temperatures below 60^{o}F and prevents ice formation in all but the coldest weather. The stream is clear, 16 to 18 feet wide, with a discharge of approximately 20 cfs.

In spite of the sandy substrate and moderate turbidity, invertebrate trout food is exceptionally plentiful compared to other area streams. Wild brook and brown trout spawn in Big Ditch below M-94, but populations are sparse. There are no records of this stream being stocked with trout by the MDNR, but if yearling sized trout were available, they would provide an attractive fishery.

Iron Creek

Iron Creek is classified as a second quality warmwater tributary. It arises from wetlands in eastern Delta County, is 5 to 10 feet wide, and is the last tributary of the Indian before it flows into Indian Lake. The creek is extremely sluggish, deeply stained by ferrous iron compounds and supports only minnows and suckers.

Indian River Mainstream

The Indian River mainstream originates in east central Alger County and flows through a series of lakes (Doe-Hartney Chain) in its upper length. In spite of the lake influence, an excellent native brook trout fishery exists below Hovey and Hartney lakes. Although summer water temperatures approach marginal levels for brook trout, adequate cool water from spring seepage and cool tributaries are present for good trout survival. Between Crow Lake (Section 3) and FH13, a warmwater fishery predominates due to the influence of the Fish-Barr Lake Chain. Temperatures begin recovering below FH13 and optimum summer feeding levels (July monthly mean of 68^{O}F) for brown trout develop between Co. 449 and FH2213. Maximum daily water temperatures in the Indian below FH2258, during the hottest months, remain well within the thermal tolerance limits of both brook and brown trout. The MDNR has stocked the mainstream of the Indian River in Schoolcraft County with brook, rainbow and brown trout since 1947 (Table 3). Present program includes yearling, 5 to 7 inch, brown trout releases annually totalling about 6,000 fish at seven locations below FH2258. Watershed reconnaissance surveys were conducted by the MDNR Lake and Stream Improvement personnel and USFS in 1957 and 1980 respectively. These detailed resource management opportunities and problems on the tributaries and mainstream. Results of the 1980 survey indicate marked improvement in water temperature regimes and contribution of wild trout to the fishery. The most recent survey (1979) also documented a sizable spawning run (50 to 75) of lake sturgeon upstream to the Steuben area from Indian Lake and the lower river. These 3 to 5 feet long fish use the rocky cobble and riffles in the vicinity of the USFS campground. Sturgeon begin moving about mid May and reach spawning areas by late May to early June. Origin to mouth description of the Indian from the 1957 and 1980 inventories follows:

Headwater to FH13

The uppermost reach of this section originates from Hovey Lake and is excellent native brook trout water downstream to Crow Lake. Channel width varies from 15 feet to 35 feet and gradient fluctuates 4 to 6 feet per mile. About 1000 feet of eroding stream bank is present. Old Civilian Conservation Corps trout cover structures, in various states of disrepair, are common throughout the area. Substrate is primarily sand with small areas of gravel and cobble.

The fish fauna is dominated by brook trout. Natural reproduction is adequate and forage is abundant. Fish cover is sparse and needs improvement. Table 4 depicts the trout population and the need for cover (lack of legal sized fish). Below Crow Lake the river can be best described as a river-lake zone. The river flows through the Fish-Barr Lake Chain and its fishery reflects the species which reside in these lakes; principally yellow perch, northern pike, rock bass, smallmouth bass, walleye, sunfish, and bullheads. Stream flow discharge, measured during October, 1957, increases from 13 to 42 cfs from immediately below Hovey Lake to FH13. There are several osprey fishing this area and at least one eagle nest. The USFS widewaters camping and day use area is located at the downstream end of this section along the north bank. Car top boat and canoe launching is available here.

Table 3. Record of trout stocking in the Indian River 1947-1980

Year	Number and Sizes		
	Brook	Brown	Rainbow
1947	3,475 L	4,800 L	----
1948	1,550 L	800 L	1,950 L
1949	---	3,025 L	6,100 L
1950	2,420 L	5,325 L	7,550 L
1951	6,050 L	2,100 L	12,200 L
1952	4,500 L	6,000 L	6,100 L
1953	2,525 L	7,425 L	6,825 L
1954	3,200 L	4,850 L	1,800 L
1955	8,400 L	4,700 L	1,500 L
1956	3,200 L	4,500 L	2,000 L
1957	3,600 L	1,800 L	4,700 L
1958	---	5,000 L	14,400 L
1959	1,700 L	1,000 L	5,800 L
1960	2,750 L	2,150 L	4,400 L
1961	1,650 L	350 L	1,600 L
1962	1,600 L	900 L	---
1963	2,000 L	---	---
1964	1,450 L	---	---
1965	150 L	350 L	250 L
	3,100 SF	1,400 SF	1,400 SF
1966	4,000 Y	3,500 Y	----
1967	10,000 SF	7,000 F	----
1968	30,000 SF	35,000 SF	----
1969	---	---	----
1970	30,000 SF	3,000 Y	----
1971	3,000 Y	750 Y	----
1972	3,000 Y	---	----
1973	3,000 Y	3,000 Y	----
1974	1,000 Y	3,000 Y	----
1975	1,900 FF	2,000 Y	----
1976	5,400 FF	2,000 Y	----
1977	---	1,800 Y	----
1978	---	2,500 SF	----
1979	---	7,000 Y	----
1980	---	6,500 SF	----

L - Legal-sized fish
SF - Spring Fingerlings
FF - Fall Fingerlings
Y - Yearlings

Table 4. Population estimate for brook trout in Indian River (SE¼, NW¼ Sec. 20, T45N, R19W) 1 mile below Hovey Lake, Alger County

on

August 13, 1979

	Size (mm)			
	<100	100-150	>150	Total
No. Marked 1st Run (M)	98	41	12	
No. Recaptured 2nd Run (R)	25	14	10	
Total No. 2nd Run (C)	94	32	12	
Population Estimate ($\hat{P}$)	358	90	14	462

FH13 to FH2258

Ninety five percent of this section is wadeable. Gravel riffles are present at the upper and lower ends of this section.

Although water temperatures in the main channel become marginal for brown trout, and too high for brook trout, cooler water in the range of 55 to 65°F from spring seeps is available along most of the stream banks during late June-August providing trout refuge from warm water. Bank erosion was present along 260 lineal feet of stream in 1978 and becomes more severe downstream. Stream flow in this section during October, 1957 was measured as 62.4 cfs at FH2258.

FH2258 to Mouth of Little Indian River

Severe bank erosion (2,070 lineal feet), marginal water temperatures, and a lack of instream trout cover are factors contributing to this section's poor trout fishery. Inadequate trout fish hiding cover, sparse amounts of spawning gravels and lack of deep holes (roughly 90 percent of this section is wadeable) result from the heavy bedload of sand from eroding banks here. Over 700 lineal feet of eroding banks were repaired by the USFS during 1979-1980 and some rock was allowed to spill out into the channel to provide badly needed cover. A June, 1979 electro-fishing survey by USFS for 1000 feet below FH2258 found 8 browns, 6.0 to 7.6 inches (7 with an adipose fin clip from the June, 1979 hatchery plant); 1 northern pike, 18 inches; 11 yellow perch, 3 to 4 inches; 2 largemouth bass, 1.8 to 2.0 inches; 24 rock bass, 2.2 to 9.3 inches; 1 burbot, 7.2 inches; 1 white crappie, 5.0 inches; 2 brown bullheads, 7.8 to 9.9 inches; 40 white suckers, 2.2 to 17.6 inches (including 33 yoy); and numerous minnows.

Little Indian River to Co. Rd. 437

Stream water temperatures suitable for trout begin to improve here. Spring seepage along the banks is more prevalent than in the upstream section. Optimum brown trout feeding temperatures (65 to 68°F) are achieved during July-August. Bank erosion problems are moderate, with only 595 lineal feet of erosion documented during 1978. Rock and riffle areas become more numerous and 85 percent of this section is wadeable. Catches of 10 to 18 inch brown trout are fairly common and a few large brook trout are also hooked above County Road 437 early in the season. An August, 1979 electro-fishing survey produced 37 brown trout 2.8 to 12.9 inches (17 hatchery origin and 16 wild yoy) in one 1,000 feet station. The trout population in this reach approximates 44 browns per 1,000 feet (see Table 5). Stream flow is increased about 20 cfs (based on October, 1957 measurements) in this section to 80 cfs mainly from flow contributed by the Little Indian River.

Co. Rd. 437 to Delias Run

This area can be characterized as very good trout water. Water temperatures are optimum for browns and, at worst, marginal for brook trout during the hottest months. Several unnamed tributaries in this section probably provide cool water refuge for brooks as needed. Nearly 75 percent of this section is wadeable and the entire reach is composed of swift gravel bottomed riffles punctuated by long runs and short pools. Instream cover is adequate in the form of boulders, submerged logs plus overhanging alder in some areas.

Table 5. Population estimates for brown trout in Indian River near Steuben, Michigan (NE¼, SE¼, Sec. 28, T44N, R18W) based on 1000 foot electro-fishing samples collected on August 23, 1979.

	Hatchery Origin		Wild	
	Size (mm) 179-223	72-93	Size (mm) 177-327	Total
No. marked 1st run (M)	14	14	4	
No. recaptured 2nd run (R)	5	5	4	
Total No. 2nd run (C)	8	7	4	
Population estimate ($\hat{P}$)	21	19	4	44

A USFS 2,000 feet electro-fishing station immediately below FH2213 during August, 1979 found 9 brooks, 3.8 to 10.0 inches (3 yoy) and 22 browns, 3.5 to 21.5 inches (6 yoy) plus 60 burbot (lawyers), 3.7 to 11.5 inches.

Delias Run to Indian River Picnic Grounds

This is also fair to good trout water but stream bank erosion increases here to 1,625 lineal feet based on June, 1978 observations. Attempts to control erosion may be impractical as most of the worst banks are 50 feet high or higher requiring extensive, costly toe structures. Numerous log jams in this section impede movement of bedload sediments covering flats that otherwise would be gravel and rock. Log jams make canoeing hazardous for inexperienced canoeists. About 50 percent of this section is too deep to wade. USFS also surveyed here (1.75 miles above picnic area) in July of 1979. Eight brook trout, 3.6 to 13.2 inches (3 yoy) and 25 brown trout, 2.8 to 15.2 inches were captured within 1,000 feet.

The USFS maintains a modest sized picnic and camping area off M-94 along the east bank of the Indian River. A stairway and canoe skid over and down the 40 foot bank to the river is available plus a small dock and landing on the riverbank.

USFS Picnic Grounds to FH2212

FH2212 is the last convenient take out point above Indian Lake. The bridge is no longer present, but vehicular access is available from the east/west approaches. Between FH2212 and the picnic area, the river separates into many small braided channels ("spreads") due to heavy sand deposits. During the fall of 1980, most of the canoeable water was located on the left side channels heading downstream. Native brook trout and stocked and wild brown trout are found along undercut banks in the spreads and their growth rates are excellent (see Table 6). Excellent mayfly (Hexagenia limbata) hatches occur just above and below the picnic area in late June - early July that stimulate lunker (16 to 28 inch) browns on warm, humid, early summer nights. Anglers well protected against mosquitos with head nets and liberal coats of insect repellent can catch trophy fish here. Wading after dark tends to be hazardous due to submerged logs. In the downstream portions of this section, pike, rock bass and other coolwater species become more prevalent and mark the end of the better trout water on the Indian system.

FH2212 to Indian Lake

Although a few large brown trout are occasionally taken below FH2212 the fish population in this reach is more reflective of Indian Lake. Walleye, northern pike, rock bass and some smallmouth dominate. The river bottom is nearly 100 percent sand and organic, punctuated by log debris strewn through river bend holes up to 10 feet deep. Macrophyte vegetation (Potamogeton spp.) is common. A total of 18 walleye 10.0 to 20.0 inches, 3 northern pike 19.3 to 22.7 inches, 1 brown trout 23.0 inches and assorted perch, sunfish, rock bass and white sucker were observed with electro-fishing gear from the mouth at Indian Lake to a point 1 mile upstream by USFS crews in June, 1979. Stream flow discharge at FH2212 was 121 cfs during October, 1957.

Indian Lake to Manistique River

The river exits Indian Lake (8,400 acres) in Section 24, T42N, R16W and flows about 3.5 miles before its confluence with the Manistique River opposite the Jamestown Slough. Two dams are maintained on this reach; one is a 1954 lake

Table 6. Age and growth of trout from the Indian River August, 1979; T43N, R17W; T44N, R17W; T44N, R18W, Section 25.

Brown Trout (no fin clips)

Length (inches) at Age

	I+	II+	III+	IV+	V+	VI+
No. Fish	20	5	3	1	2	1
Mean Length	8.0	9.8	14.0	16.1	22.2	24
Length Range	6.6-9.0	9.1-10.7	12.9-15.2		21.5-23.0	---
Statewide Mean Length	6.4	9.0	11.5	15.1	18.8	21.3

Brook Trout (no fin clips)

Length at Age

	I+	II+	III+
No. Fish	3	5	1
Mean Length	6.7	9.3	13.2
Length Range	4.7-8.4	8.0-10.4	---
Statewide Mean Length	5.7	8.2	10.4

level control dam with 5 foot head operated by the Indian Lake Association and Thompson Township under a 1945 court order located in Section 2, T41N, R18W. The other is a City of Manistique owned and operated water supply dam in Section 1, T41N, R18W constructed in 1917 with a 4 foot head. Both dams are equipped with concrete chutes and stop log type fish ladders. Most fish found in the lower river (with exception of suckers) could not negotiate either ladder and ascend the upper river. The Papermill Dam, constructed in 1902, in Manistique blocks Great Lakes anadromous species from ascending the lower Manistique River and hence the Indian River. Two important migratory species (sturgeon and Great Lakes muskellunge), found in the lower Indian River and lake, were trapped in the Indian River system when the above mentioned dams were constructed and have been able to reproduce here.