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A DESCRIPTIVE AND HISTORICAL ACCOUNT OF THE PLATTE RIVER,
ITS SURROUNDING AREA, AND ITS SALMONID FISHES ↓

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ABSTRACT

Michigan's Platte River is located in the northwestern part of the Lower Peninsula. Only about half of the main stream is suited for salmonid fishes the year round because the rest of it becomes too warm for them in summer. The three principal tributaries are cold-water streams. The surrounding land consists mostly of sand; much of it is forested, mainly with hardwoods, but there are extensive plantations of Christmas trees and forest-type conifers.

Settlement of this region commenced little more than 100 years ago. Lumbering and farming were the first industries, each of which receded after a brief flourish. Great expansion of sport fishing and of other leisure-time activities within recent years has made recreational services a significant industry in this area.

The grayling, which inhabited Platte River when settlement of this region began, became extinct here before 1895. The grayling was replaced by the brook trout, which was abundant into the 1930's. The rainbow trout appeared around 1920. It was numerous during the 1930's and 1940's, but greatly decreased in the 1950's and early 1960's from predation by sea lampreys in Lake Michigan. It became plentiful again by the mid-1960's, however, after lampreys had been drastically reduced. The brown trout was introduced in 1921. Some evidence suggests that its establishment progressed slowly.

Presently Platte River harbors considerable numbers of rainbow and brown trout, but has few brook trout. Large runs of coho salmon have entered this stream since it was first stocked with this species in 1966. Coho have reproduced naturally to some extent. Chinook salmon were planted here in 1971 and 1972.

¹✓ A contribution from Dingell-Johnson Project F-31-R, Michigan.

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Thomas M. Stauffer, Doris S. Greenleaf, and Gerald P. Cooper edited the report.

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INTRODUCTION

Fisheries research biologists periodically collected samples and data from the Platte River in Benzie County from April 1967 through September 1972 for a study of competition between trout and coho salmon. The information from these collections, which is now being examined and organized, will be dealt with in forthcoming reports. This report was prepared to consolidate basic information on the drainage system and on the surrounding land. Although some information obtained during the field investigation appears herein, much more came from other sources. Such a compendium was thought quite desirable as a base of orientation for evaluating relationships between trout and salmon. Aside from this purpose, it will also serve as a general reference on the river and its tributaries.

Besides describing biological and physical aspects of the river and its drainage basin, the report presents some economic and social history of Benzie County. This plan of coverage was adopted because of several reasons, one being that we cannot eventually decipher the causes of significant changes in fish populations here within the last 100 years without looking into mankind's activities in this locality during that same time. Another reason for such an approach is to assist comprehension of the river's value as a recreational and esthetic asset at the present time. This, then, is why mills, railroads, farms, park attendance figures, and several other seemingly intrusive subjects have found their way into the story.

PART I. THE RIVER AND THE SURROUNDING LAND

The name

Probably many people have wondered about this river's name --its meaning and origin. It seems fitting that something be said about it here.

The names for this stream that appear on old maps, and generally in this sequence, are Assiette, Plate, and Platte. ↓
The first two are French words, and the third is an alteration of the second. Meanings of "assiette" include "plate" and "platter"; meanings of "plat" (feminine form, "plate") include "flat," "level," "even." A dictionary of place names (59) explains the name of the Platte River in the Great Plains region:

Plate. French "flat." In place names the feminine appears as Platte. The river NB [Nebraska] is a translation of the Omaha [Indian] name elsewhere transliterated as Nebraska, meaning a stream not running between high banks, but widely spread out.

It would appear that Michigan's Platte River was named by a Frenchman (fur trader, voyageur, or missionary?), perhaps

↓
Examples of maps on which these names appear: (1) Assiette: map of Michigan, Illinois, and Indiana, of unknown origin and date; (2) Assiette: "The Lower Peninsula of the Northwest Territory," John Cary, 1805; (3) Plate: "Geographical, Statistical, and Historical Map of Michigan Territory," J. Finlayson, engraved by Young and Dellecker, 1822; (4) Plate: "North America Sheet V, The Northwest and Michigan Territories," J. & C. Walker Sculp, 1833; (5) Platte: "Map of Michigan," T. G. Bradford, engraved by G. W. Boynton, 1838; (6) Platte: "Tourists Pocket Map of Michigan," J. H. Young, 1839. These and other old maps of the region concerned are on file in the Graduate Library of The University of Michigan.

directly, but possibly from a name given to it by Indians, which had a meaning similar to that of the French root word.²

Why was this name chosen? The reason will probably never be definitely known, but it likely was because of some flat (plate-like) feature associated with the stream. As the river has low banks along much of its course, and especially within the stretch near the mouth, one could suppose that this feature influenced the choice. This characteristic is not unique, however, among tributaries of Lake Michigan. Therefore what could more likely have caused the choice is the character of the terrain near the mouth and its marked contrast with the terrain on either side of the valley. Beginning near Honor, the river courses through a broad, delta-shaped plain. On each side of this plain, extending to Lake Michigan, is much higher ground. The situation is well illustrated on relief maps.³ One can imagine that the contrast in elevations could have emphasized the flatness of the broad valley for a person on a high point of land or in a boat on Lake Michigan, which could have suggested the name chosen. This possibility of origin is strengthened when it is considered that the usual English equivalents of "assiette," which evidently was the first name the white man used for this river, are "plate" or "platter."⁴

² Nearby Betsie River (previously Betsy or Betsey) is named R. au Bec Scies on old maps of the Michigan territory. Jenks (26) has this to say about it: "The word 'Betsy' however is itself a corruption of the French name of the river, Riviere Aux Bec Scies, which means the 'river of the saw bill' or 'Merganser duck,' and the translation of the early French travelers of the Indian name of the stream, Unzig-o-ze-bee, which has the same meaning." Bruce Catton (10) tells an interesting story, whether factual or apocryphal, about the origin of the present name of this stream.

³ Appropriate references on this point are Helen Martin's map (30) and a detailed map of this area in Calver's paper (9).

⁴ Information from Professor J. D. Robertson, Department of Romance Languages and Literature, the University of Michigan.

Two lakes, a township, and a community in Benzie County, are also named Platte, quite certainly as a result of their close association with the river.

Location and length of the main stream,
and area of the drainage basin

Some of the headwaters of Platte River are located in Grand Traverse County, but Benzie County contains all of the main stream and its major tributaries. The outlet of Lake Ann forms the main stream, which from Lake Ann to Lake Michigan is about 25 miles long, including entry-to-exit distances across Bronson, Big Platte, and Loon lakes. The principal tributaries are the North Branch, Carter Creek, and Brundage Creek. Brown (7) records 30 miles of tributaries for the entire stream system.

Several areas have been given for the area of the drainage basin; these disagreements apparently have been due to differences of opinion on the location of the basin's periphery. At least three measurements of total area have been recorded; these are, in square miles, 150 (69), 171 (63), and 187 (7). Figure 1 shows the drainage system. The area of 150 square miles was determined from the latter map (69). Of the total area, approximately 128 square miles (81,920 acres) are in Benzie County. Hence this portion comprises about 37% of the total expanse (218,880 acres of land surface plus inland water area) of Benzie County.

Widths, depths, and flow

The main stream is from 20 to 90 feet wide. Unlike the typical situation of streams gradually broadening toward their lower end, Platte River is about as wide in some places near Lake Ann as it is near its mouth. The average width for the main stream is

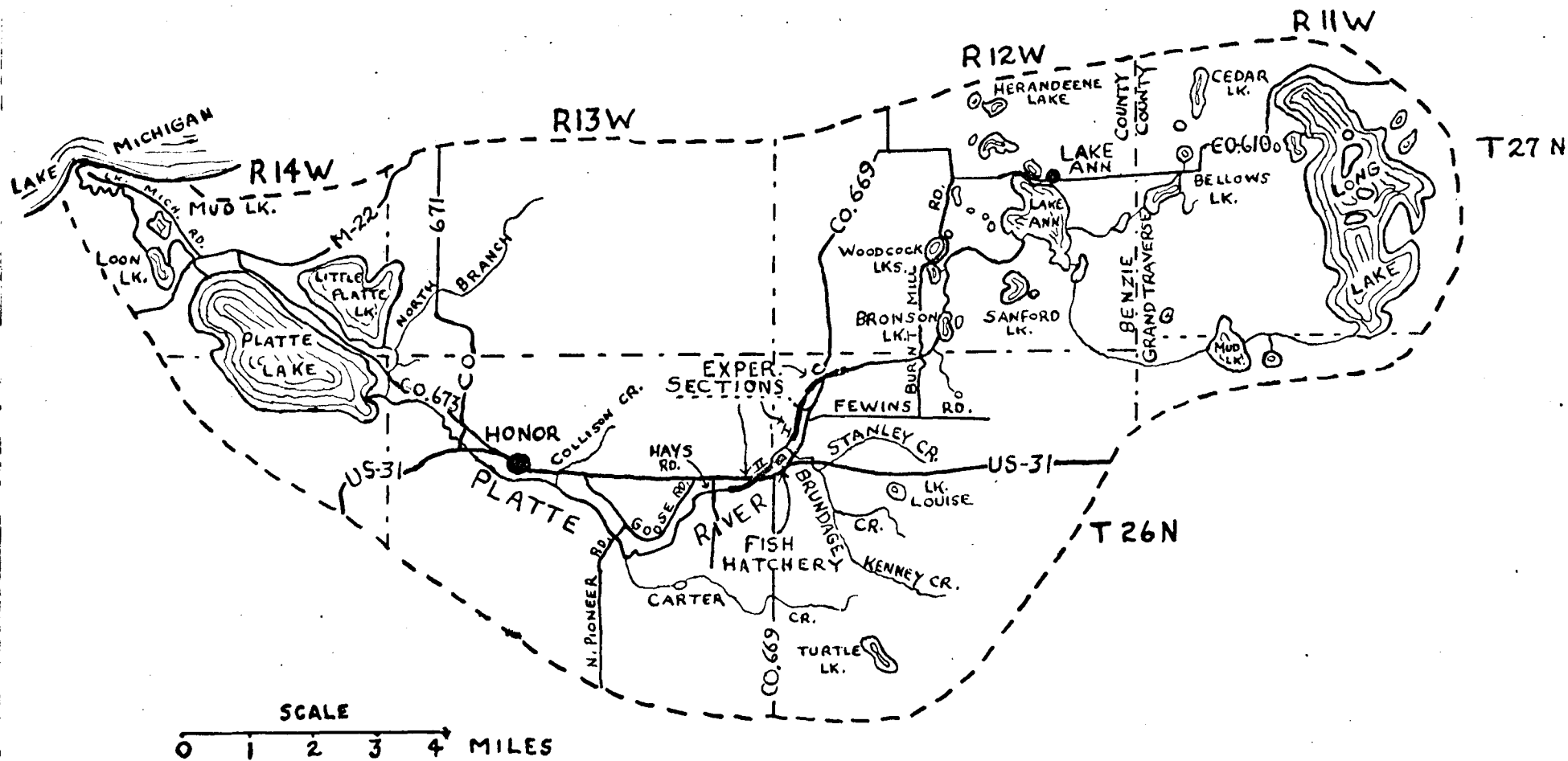


Figure 1. --The Platte River Watershed, in Benzie and Grand Traverse counties.

Copied, and modified, from "Platte River Watershed Reconnaissance Survey Report," by R. G. Wicklund and B. C. Dean, 1957.

probably between 45 and 50 feet. The mean widths in feet of the 1-mile experimental sections in which the investigation of 1967-1972 was carried out are as follows: Control Section, 51 feet; Section I, 44 feet; and Section II, 44 feet. ⁵ Acres of water surface in the experimental sections at the time of normal summer flow are: Control Section, 5.8; Section I, 5.3; Section II, 5.3. Approximate average widths of the North Branch and Carter and Brundage creeks are 15, 12, and 10 feet, respectively.

Water depths in Platte River are generally shallow, especially in the stretch from Lake Ann to about a mile above Platte Lake. Most of the stream here is less than a foot deep; few of the pools are as much as 5 feet deep. Mean depths of the experimental sections during normal summer flow were found to be 10 inches in the Control Section, 12 inches in Section I, and 15 inches in Section II.

The volume of flow is quite stable, and extreme flooding rarely happens. Among 44 measurements made by the U.S. Geological Survey at the US-31 bridge east of Honor between January 1961 and November 1968, the range of discharge was 56-98 cubic feet per second (63). Average discharge by season was: winter (December, January, February--10 samples), 75 cfs; spring (March, April, May--12 samples), 81 cfs; summer (June, July, August--11 samples), 68 cfs; fall (September, October, November--11 samples), 71 cfs. A large flash flood reportedly occurred in the summer of 1956 (69). During the various occasions we worked on the river in 1967-72, the greatest observed rise in level from rainfall was 0.8 foot (from observations on the staff gage at the US-31 bridge east of Honor).

Records on flow volumes at various points in the river and in the three larger tributaries appear in Table 1.

⁵ These figures for widths and depths, as well as those for bottom soils and mean depths, were determined from detailed maps of the test sections. The test sections (I, II, and Control), located above and below the fish hatchery, are indicated in Figure 1.

Table 1.--Discharge measurements of Platte River and tributaries,
October 7, 1957*

Stream	Location	Drain- age area (sq. mi.)	Dis- charge (cfs)	cfs per square mile
Platte R.	SE 1/4 Sec. 27, T. 27N., R. 13W., 1/2 mile down- stream from Lake Ann	47.6	16.9	0.35
Platte R.	SE 1/4 Sec. 6, T. 27N., R. 13W. at Allyn (Maple City Rd. crossing)	71.6	36.6	0.51
Brundage Cr.	SW 1/4 Sec. 7, T. 26N., R. 13W. 500 ft. upstream from Platte R.	12.7	13.5	1.10
Platte R.	SE 1/4 Sec. 12, T. 26N., R. 14W. at U.S. Highway 31	91.9	66.0	0.72
Carter Cr.	NE 1/4 Sec. 22, T. 26N., R. 14W. 1/2 mile upstream from mouth	10.9	4.83	0.44
Platte R.	SE 1/4 Sec. 15, T. 26N., R. 14W. At Case Bridge, 1/2 mile downstream from Carter Cr.	109.0	81.6	0.75
Platte R.	NE 1/4 Sec. 16, T. 26N., R. 14W. at south edge of Honor	117.0	94.2	0.80
North Branch Platte R.	NE 1/4 Sec. 1, T. 26N., R. 15W. on County Road 673	31.1	17.1	0.55
Platte R.	NE 1/4 Sec. 28, T. 27N., R. 15W. 200 ft. downstream from M-22	166.0	115.0	0.69
Platte R.	NW 1/4 Sec. 20, T. 27N., R. 15W. 1/4 mile upstream from Lake Michigan	171.0	118.0	0.69

* This table adapted from Surface Water Supply of the United States, 1958. Part 4. St. Lawrence River Basin. U.S. Geological Survey Water-Supply Paper 1557 (1960), U.S. Geol. Surv., Washington, D.C. 394 pp.

The water of Platte River is remarkably clear, and it is not very turbid during spring run-off or after heavy rains. Despite its high clarity, however, drift nets showed that the stream carries a surprising amount of suspended silt and organic debris.

The average current velocities in the experimental sections during May 1967 were 1.3 feet per second in both the Control Section and Section I, and 1.7 feet per second in Section II (22).

Water temperatures and chemistry

The 13 miles of main stream between Burnt Mill Road and Platte Lake is the better trout water of the river because of temperature conditions. Other parts of the main stream become excessively warm in summer. This warming is strongly influenced by the outflow from lakes connected with the river. Approximately 12 miles of the main stream are either marginal or generally unsuited for salmonids in the summer because of intolerable temperatures (70), although trout may be found in small, isolated areas where there is spring inflow. On the other hand, trout and salmon (mainly seasonal migrants from Lake Michigan) use these portions of the river extensively at other times.

Temperatures even in the more favorable 13-mile portion can either approach or reach the upper limits of tolerance for salmonids during unusually warm weather. These periods, however, are infrequent and usually brief. Salmonids at such times may congregate in areas with spring inflow. Water temperatures were taken when air temperatures were warmer than usual for that region (Table 2). The water temperatures recorded on July 9, 1967 were only a degree or two higher than those which prevail on a normal summer day (air temperature in the mid-70's), as judged from numerous readings obtained in the experimental sections.

Table 2. --Warm-weather water temperatures of Platte River and three of its tributaries, Benzie County, July 1967*

Station locations	July 9		July 22	
	Hour	Temp	Hour	Temp
	(p.m.)	(°F)	(p.m.)	(°F)
Old railroad crossing, about 200 ft. up from Burnt Mill Rd. (Sec. 4, T.26N., R.13W.)	4:45	70	2:00	71
Burnt Mill Road crossing (Sec. 4)	4:50	72	2:15	71
Old railroad crossing, about 2,000 ft. below Burnt Mill Rd. (Sec. 4)			3:15	70
County Road 669 crossing (Sec. 6)	5:15	69	4:30	72
About 3,000 ft. below Co. Rd. 669 crossing (Sec. 6)	5:20	68	4:35	72
Fewins Rd. crossing (Clark Bridge, Sec. 7)	5:25	69		
Road bridge on fish hatchery grounds (Sec. 7)	5:30	69	4:40	72
<u>Brundage Cr.</u> , Co. Rd. 669 crossing (Sec. 7)	5:45	54	4:50	56
US-31 crossing, E. of Honor (Sec. 13, 26N., 14W.)	6:45	64	5:00	69
Haze (Hays) Rd. crossing (Sec. 13)	7:00	66		
State Forest campground, near picnic area (Sec. 22)	7:15	67	5:15	70
N. Pioneer Rd. crossing (Case Br.) (Sec. 15)	7:30	64	5:30	69
<u>Carter Cr.</u> , Brownell Rd. crossing (Sec. 22)			5:45	60
South St. Br. (at Honor, Sec. 16)	7:45	64	6:00	68
US-31 crossing, W. of Honor (Sec. 8)	7:55	65		
Indian Hill Rd. crossing (Sec. 8)	8:00	64		
<u>North Branch</u> , Indian Hill Rd. crossing (Sec. 30, 27N., 14W.)	8:15	52		
<u>North Branch</u> , Deadstream Rd. crossing (Sec. 1, 26N., 15W.)	8:30	68		
M-22 crossing (Sec. 28, 27N., 15W.)	8:45	70		

* Air temperatures taken at sites where water temperatures were recorded: July 9--4:45 p.m., 82; 6:00, 82; 7:00, 78; 8:00, 77; 8:45, 74; July 22--2:00 p.m., 84; 4:30, 86; 5:00, 84; 6:00, 82.

Some information has been obtained on the chemical and physical properties of Platte River water. Electrical conductivity in the experimental sections (recorded under both high-water and normal conditions) has ranged between 290 and 340 μ mhos (standardized to 25 C). The range of methyl orange alkalinity was 110-150 ppm. Tables 3 and 4 show values for various minerals and gases.

Bottom soils

The bottom soils of Platte River are mainly gravel, sand, silt, and mixtures of these types. Small patches of clay are exposed in scattered locations, and there also are small areas of rubble. In the experimental sections, the percentages of the three prevalent types of exposed bottom soil were as follows:

<u>Section</u>	<u>Gravel</u>	<u>Sand</u>	<u>Silt-sand</u>
Control	71	8	21
I	58	25	17
II	57	31	12

These percentages were determined from soil designations that had been recorded together with depths when the sections were mapped.

In many places where sand or silt are the exposed soils, gravel composes the underlying substrate, beginning usually less than a foot below the cover soil.

Aquatic vegetation

Close observations on vegetation were made only in the experimental sections, but casual observations indicated that the plant life was similar in the other trout-water portions of Platte River. Plants

Table 3. --Analyses for some minerals and gases and several other chemical and physical properties of water in the Platte River*

Station 1 was at Burnt Mill Road; Station 2 at mouth of the river

Material or property	Amount in ppm or mg/l	
	Station 1	Station 2
Aluminum	0.0	0.0
Calcium (CaCO ₃)	116	108
Phenolph. hardness (CaCO ₃)	trace	0.0
Methyl purple hardness (CaCO ₃)	141	143
Total hardness	198	196
Chloride	3.5	3.0
Copper	0.22	0.25
Iron	0.7	0.6
Nitrate nitrogen	0.197	0.197
Nitrite nitrogen	0.003	0.003
Dissolved oxygen	9.8	8.3
Total phosphate	0.22	0.30
Ortho phosphate	0.02	0.10
Meta (poly) phosphate	0.20	0.20
Silica	7.0	8.2
Sulphate	14.0	18.0
Tanin and lignin	0.4	0.4
<hr/>		
pH value	8.3	8.3
Conductivity value	290 μ mhos	310 μ mhos
Water temperature (°F)	72 (10 a.m.)	72 (9:15 a.m.)

* Samples were collected and analyzed by personnel of the U.S. Bureau of Sport Fisheries and Wildlife, July 17, 1970.

Table 4. --Average value and range for some minerals and gases and for several other chemical and physical properties of water in the Platte River*

Material or property	Number of analyses	Amounts in ppm or mg/l	
		Average	Range
Alkalinity	10	158	150-175
Ammonia (NH ₃)	11	0.0	0
Nitrate nitrogen (NO ₃)	11	0.31	0.25-0.40
Nitrite nitrogen (NO ₂)	9	0.003	0.0-0.01
Dissolved oxygen	12	9.7	9.0-11.2
Total phosphate	11	0.04	0.0-0.15
Ortho phosphate	10	0.0	0
pH	11	8.1	7.6-8.3
BOD	10	2.1	1.2-3.2
Air temperature °F	12	56	28-84
Water temperature °F	12	52	36-66

*Samples were collected and analyzed by members of the technical staff, Michigan Water Resources Commission, Bureau of Water Management, November 1967 to October 1968 (17).
Samples collected in Section 13, T. 26 N., R. 14 W.

occur mostly in the shallower areas where the current is slow, and on silt bars. They have wide variety, but most kinds are sparse. The more prevalent aquatics are waterweed (Elodea), buttercup (Ranunculus), watercress (Nasturtium), and a narrow-leaf pondweed, Potamogeton vaginatus.⁶ Typically, all of these plants are either entirely or mostly submerged, but here watercress grows out of water on silt bars in many places. Watercress provides good cover for fish where the beds are submerged.

The pondweed may possibly have the greatest importance for fish of any plant in the river. Its stems and leaves harbor numerous insect larvae, and it affords good cover. Trout hide, and perhaps also feed, in the dense beds. When fish were being collected, trout were often found here. Most kinds of vegetation in streams thrive only where the current is slow, but this plant apparently prefers locations in brisk current.

Fish foods

Judging again mainly from studies and observations made in the experimental sections, fish-food organisms are plentiful in Platte River. Insects compose the bulk of the food. The more common groups are caddis flies (Trichoptera), mayflies (Ephemeroptera), and true flies (Diptera) (22, 23). Grayfish are moderately abundant and are important in the diet of the larger trout. Hildebrand's publication (23) lists the kinds of bottom-dwelling organisms found in the test sections, and indicates their abundance.

⁶ Identification verified by Professor Edward G. Voss, Curator, of Vascular Plants, Herbarium, The University of Michigan.

The fishes

Brown trout (Salmo trutta) and rainbow trout (Salmo gairdneri) are the principal sport fishes of Platte River. The brook trout (Salvelinus fontinalis) is extremely scarce now, but it formerly was abundant, and for some years was this stream's only salmonid fish after the grayling (Thymallus arcticus) disappeared. Coho salmon (Oncorhynchus kisutch) have inhabited this stream since 1966. The young coho live in the river from the time they hatch until they migrate to Lake Michigan about a year later, but adults are present only from late September into early winter. Chinook salmon (Oncorhynchus tshawytscha) were planted here in 1971 and 1972. The river provides some angling for salmon during the spawning runs.

Any species of fish that inhabits the connected inland lakes may sometimes be found in Platte River, and several species that primarily are residents of Lake Michigan occasionally are seen here also. A weir that was in use in the lower part of the river during 1941-43 captured 16 species of fish (54). Collecting with electrical gear in the experimental sections during 1967-1972 accounted for at least 17 additional species, including minnows and other small fishes that ordinarily would not be taken in a weir not designed for them (Table 5). All but a few species of the small and warmwater fishes, however, occur rarely in Platte River. The fishes other than salmonids that are more frequently encountered in the experimental sections are the white sucker (Catostomus commersoni), blacknose dace (Rhinichthys atratulus), creek chub (Semotilus atromaculatus), and mottled sculpin (Cottus bairdi). Their abundance varies widely among locations in the 3 miles of stream that have comprised the experimental sections, which obviously is influenced by differences in habitat.

Table 5. --Fishes captured in the Platte River in 1941-43 and 1967-72, with general assessments of abundance*

Species**	1941- 1943	1967- 1972	Species	1941- 1943	1967- 1972
Brown trout		N	White sucker	F to N	F to C
Rainbow trout	N	N	Bullhead spp.	F	R
Brook trout		F	Burbot	F	
Coho salmon		N	Brook stickleback		R
Chinook salmon		F			
Chestnut lamprey	X	X	Smallmouth bass	F	F
Sea lamprey	X	X	Largemouth bass		R
Bowfin	X		Pumpkinseed		R
Cisco	F to C	R	Bluegill		R
Rainbow smelt	F	R	Rock bass	C	F
Central mudminnow		F			
Northern pike	F	R	Walleye	F	
Carp	F to N	R	Yellow perch	C	F
Creek chub		F to C	Logperch		F to C
Blacknose dace		C to N			
Hornyhead chub		F	Mottled sculpin		C to N
Emerald shiner	N				
Rosyface shiner		F			
Common shiner		F to C			
Bluntnose minnow		F			

* Collections of 1941-43 taken in a weir near the mouth of the river, in Sec. 20, T. 27 N., R. 15 W. Collections of 1967-72 taken with electro-fishing gear in three 1-mile sections of the river, located in Sec. 13, T. 26 N., R. 14 W., Sec. 12, T. 27 N., R. 14 W., and Secs. 7, 6, 5, T. 26 N., R. 13 W.

** Names are those given in A List of Common and Scientific Names of Fishes from the United States and Canada (3rd ed. 1970) By Reeve M. Bailey et al., American Fisheries Society Special Bull. No. 6.

Two or three species of minnows collected in 1967-72 were not identified to species and therefore are not listed.

Key to symbols for abundance: N = numerous; C = common; F = few; R = rare (1-3 captures altogether); X = abundance not evaluated.

Variation of abundance indicated for some species in 1967-72 was associated oftener with stream location than with time.

An angler's description of the stream

E. W. Wait, who fished Platte River a long time ago and about whom more will be said later, on May 26, 1903 wrote this comment (66a) in his fishing diary:

The Platte is one of the most beautiful rivers, if not the most beautiful, of any in this part of the state. For ten miles from Allyn to Honor the river runs through a virgin forest, in no place does a farm come down to the banks. So similar is the river in all its parts, that a view of one part is a view of all, the river having a uniform and but little widening width the whole distance, being from forty to fifty feet wide. The wading is fine and also quite uniform. Although of course the stream is somewhat deeper in the lower course, being except in the holes from one to two feet deep. The bottom is always sandy and gravelly, and the water ripples along swiftly over the fine bottom. There is absolutely no brush in the river, although here and there a stranded log or large boulder stands above the water with the river rippling around it. The holes which are nowhere near as deep as on the Boardman are invariably under one or both banks and are so similar as to need no separate description being all overhung by bushes. Once in a while but not frequently a "sweeper" of cedar or maple falls out half way across the creek. It is a beautiful spot [near Hays Bridge] and on the day we were fishing seemed to be alive with speckled beauties of every size.

With the deletion of a few words (especially "virgin forest," in the second sentence), the stream as it appears today between Maple City Road and Honor could still be generally described with that passage.

Geology and soils

As a river is strongly influenced by the character of its drainage basin and man's use of the area, the surrounding land should also be considered in a descriptive account of the stream. Beginning with this



Figure 2. --Platte River at Hays (Haze) Bridge. Photograph taken probably in 1904.



Figure 3. --Upstream view of Platte River from Hays Bridge, April 20, 1972. The pine stumps in the stream were placed there in 1958 for fish cover.

topic, the rest of Part I of the report will deal mostly with the surroundings.

The basic geological features of the Platte River watershed consist of (1) outwash and glacial channels, (2) rolling and high moraines, and (3) lakes and old lake beds, which occur mainly around the lower third of the stream's course (30). The first feature has the greatest area; the smaller areas occupied by the other two features apparently are similar in extent.

The drainage basin and adjacent areas have a highly interesting geological history. Their physiography is so distinctive that it is one of the prime attractions for drawing visitors to this region. The Pointe Betsie and Empire moraines, which border the lower portion of the Platte River valley, are examples of outstanding formations. Another distinctive feature is nearby Sleeping Bear Dune. The postglacial lakes that at various times occupied the basin of Lake Michigan, and which influenced shoreline formations in numerous ways, created a highly interesting chapter in local geological history. For anyone interested in details of the geology of this area, Calver's paper (9) and Dorr and Eschman's book (15) are recommended. Helen Martin's map (30) affords a general view of the geology and topography.

The drainage basin's surface soils are dominated by sand, almost to the exclusion of other soils. Veach (64) designates its various grades of sand as Class II and Class III soils, which are poor to medium for agriculture. Deposits of gravel occur some distance below the surface. As mentioned previously, gravel is prevalent in the channel of the river.

Forest cover

Trees and shrubs line the banks of the river and tributaries along most of their courses. In some places the river valley is

completely forested, and there are adjoining upland woodlands as well. These situations, of course, benefit the fishes of the streams by retarding runoff and preventing soil erosion, and shading helps to prevent excessive warming of the water.

As noted from personal observations and supplemented with information provided by area foresters Ted M. Reuschel and Clark Oliver (cc), these are the predominant trees and shrubs on the floor of the Platte River valley: (1) from Lake Ann to Honor--aspen mainly; also white cedar, hemlock, yellow birch, maple, elm, willow, and tag alder (the Dutch elm disease has begun destruction of elm stands); (2) from Indian Hill Road to Platte Lake--primarily tamarack, but also white cedar, hemlock, and tag alder; (3) from highway M-22 to the mouth--tamarack, white pine, and red pine, with cedar, hemlock, and tag alder bordering the banks.

Game and fur-bearing animals

From an economic standpoint, the whitetail deer may well be Benzie County's most important game animal, although its population here is not large. Two other significant species are the ruffed grouse and the snowshoe hare. There are a few cottontail rabbits. Squirrels consistently provide good hunting, fox squirrels outnumbering the gray species (bb). Wild turkeys were introduced into Benzie County about 7 years ago, but it is doubtful whether any presently survive (bb). The woodcock is an important game bird of this area, and there are some snipe. Ducks and geese are not abundant in the Platte River drainage basin, but they provide some hunting. Ducks frequent the lakes associated with the river more than the river itself.

The muskrat doubtless is the most abundant furbearer of this area. Judging from signs along the river, raccoons are plentiful; as is to be expected, mink are much less common, and otters are

rare. Numerous old cuttings indicate that beavers were fairly common along Platte River within recent time, but only one colony is known to be in its drainage basin now (bb). Conservation Officer George Peters also reported, however, that within the county in general there has been a considerable increase of beavers after 3 years of complete protection (bb). Other common furbearers of the area are the striped skunk, red fox, and weasels. There are a few coyotes and badgers. It is questionable whether any bobcats are present (bb).

The black bear is not known to occur in Benzie County now (bb), although it was formerly present. Other game and fur animals that previously inhabited parts of the Lower Peninsula, and quite possibly the Grand Traverse region also, were the moose, caribou, timber wolf, lynx, fisher, and marten (8).

Fayette Clark (11) has said that passenger pigeons nested by the thousands in the Platte River valley; he has mentioned also that pigeon hunters from New York boarded at his parents' home in Inland Township, and that they shipped out barrels of the pigeons. The Potawatomi Indian chieftain, Simon Pokagon, wrote a magazine article (50) in which he described the passenger pigeon, its habits, abundance, and methods used by market hunters to capture it. He also mentioned in this item a nesting site with these words:

In May 1880, I visited the last known nesting place east of the Great Lakes. It was on Platt [sic] River in Benzie County, Michigan. There were on these grounds many large birch trees filled with nests. These trees have manifold bark, which when old hangs in shreds like rags or flowing moss, along the trunks and limbs.

Immediately after this passage, Pokagon told of a method used here for capturing the birds, which because of its cruel aspects, was a discredit to the pigeon market hunters. ⁷√

Early settlement

An account of this kind should tell something of man's influence on the river and on the land it drains. Such coverage requires the inclusion of some social and economic history. Benzie County in its entirety will usually be involved in the discussion of the next several topics, rather than only Platte River's drainage area. A demanding reason for this procedure is that statistics used for reference were compiled on a county basis. But for other reasons also it is well to take a broader view, even to including other counties, mainly to place local conditions in perspective.

The white people who first settled near Platte River quite surely fished in it and trapped and hunted along its banks. The first white man who settled in the area now within the boundaries of Benzie County is said to have been Joseph Oliver. He was a trapper and trader who built a log hut near the mouth of Betsie River sometime

⁷√ Some comment on Simon Pokagon seems to be in order here. He was a son of Leopold Pokagon, also a Potawatomi chieftain, who in the early 1800's had settled in Silver Creek Township, Cass County. A village that eventually developed here was named Pokagon. Simon attended the University of Notre Dame, travelled widely, gave lectures, lived at various locations in southwestern Michigan, and gained a reputation as a writer. Although he apparently was a talented man, evidence also indicates that he received much assistance in writing the items credited only to him; a brilliant woman he knew is reputed to have had much to do with the quality of his published output. The Potawatomi Indians associated with the Ottawas in the northern part of the Lower Peninsula; Simon Pokagon wrote that he had been a fur trader in that region. Born in the 1830's, he died in Allegan County in 1899. All of this information has been provided by Everett Claspy in his histories which deal with the Potawatomi tribe in Michigan (12, 13).

within 1846-1854 (18, 29, 48). By 1858, three families were living in the area where Frankfort is now located (29). In 1857 and 1858, explorations were made in the Grand Traverse region to find a site for establishing a Christian colony and college, the idea of which the Reverend Charles E. Bailey of Ohio had conceived. The first location that the Reverend Bailey, his brother John, and several compatriots chose for the colony was approximately a mile south and 2 miles east of where Benzonia presently stands. However, when settlement began late in 1858 it took place at the latter location, because they found it more desirable.⁸ James Walker Case (1862-1946), son of Lucious W. Case, was the first white child born in the Benzonia area.⁹

The years that settlement began in other localities, identified by present townships of Benzie County, are reported to have been as follows: Almira and Homestead, 1862; Inland and Joyfield, 1863; Platte, 1864 (18). The first roads built in this region were one between Benzonia and Manistee in 1862, and another between Benzonia and Traverse City in 1863 (29).

Settlement in the area now within Grand Traverse County began earlier and progressed faster than in the Benzie area. Grand Traverse County was organized in 1851 (34). A post office was established in

⁸ Dorothy B. Hensel, a Bailey descendant who resides in Frankfort, has provided the information on the establishment of Benzonia, based largely on an account of it in the book, The Grand Traverse Region, published in 1884 by H. R. Page and Company of Chicago. Miss Hensel has also noted that although land claims had been made around Betsie Lake as early as 1851, it was not until 1859 that true settlement began at the location of Frankfort, and that this community did not show evidence of becoming a stable village until 1867-69.

⁹ Shelton M. Case, the present curator of the Benzie Area Historical Museum, contributed the information on his father, James Walker Case.

1853 in the village that was to become Traverse City (29). To illustrate how much faster southern Michigan had become populated than the northern part by the middle of the last century, Grand Traverse County was reported to have contained 911 people in 1854, when Washtenaw County had 28,836 (27). Grand Traverse Bay provided good access to the Grand Traverse area. Desirable stands of timber nearby also encouraged settlement here sooner than in some other parts of the north country. A lumber mill existed here already in the 1840's, and after the Hannah, Lay Company of Chicago bought the Boardman Mill in 1851, lumbering appreciably increased (29). By 1870 the population of Grand Traverse County was 4,443, while that of Benzie County (organized in its present form in 1869) was 2,184 (27).

Lumbering

Extensive commercial lumbering began later in Benzie County than in Grand Traverse County and in some other northern localities. Reasons for the delay apparently include the scarcity here of large stands of pine, much lower demand for hardwood while pine was still plentiful, and lack of good means in this area for transporting logs and wood products. Sizable stands of pine in this vicinity are reported to have been confined to one between Platte Lake and Lake Michigan, and another that extended between Lake Ann and Bendon (a, g, 31). There were, however, patches of high quality pine among the hardwoods (*L*, 48). Someone around 1901 described in the following account (48) the location of one of these smaller areas, and also mentioned pines that were scattered along the banks of Platte River and tributary streams:

In the central portion [of Inland Township], and for a short distance south of that, was a valuable tract of pine, while in the southern part was a strip of hardwood, with better soil than that in the center. The

northern portion is well watered by the Platte River, a clean pebbly bottomed stream, and a fine system of tributary creeks, whose banks are covered with a dense growth of hemlock and cedar, interspersed with birch, ash and grand old pines, some of which towered like giants above the surrounding forest one hundred and fifty feet high.

One of the early lumber mills was situated on Platte River a short distance below Bronson Lake. This mill was powered by the flow of the river, and it produced lumber for homes and barns of pioneer settlers (g, l, z). The road that led to it was Mill Road. After fire destroyed the structure, this winding, trail-like highway was renamed Burnt Mill Road.

The history of other mills and of logging activities in the Platte River basin is obscure; yet many of the details could surely be recovered by someone with the desire and opportunity. Although the aim has been to make this commentary on lumbering as accurate as possible, it is but a general survey. Installations and activities will be described mostly in the order of their location from Lake Ann to the mouth of Platte River.

Like the Boardman and Au Sable rivers (14, 45) and other northern streams (31, 46) used for transporting logs, Platte River (11) was clogged with fallen trees when the early settlers arrived. These obstructions had to be removed before logs could be floated down the stream's course. Someone described the Platte in print as "a shallow stream so choked with timber and brush that it was not possible for a person to walk down its bed" (48). On shallow streams used for log driving, barriers known as freshet dams were built to provide sufficient depth (31). Some evidence indicates that such dams were used on Platte River in the early days (g, z). Deadheads are still plainly evident in the stream; it is not known whether they date mostly from the first logging period, or from the one of 1895-1915, but both periods probably are represented.

Two lumber mills are said to have operated on Lake Ann (g, k, z), one of which was the Habler Mill (g). A steam-powered mill was located at Allyn, a hamlet that once existed where Maple City Road (also known as County Road 669) crosses Platte River, in Section 6 of Inland Township. This mill required a crew of 11 men for operation at full capacity (11). It was functioning when the Bates family moved onto a farm nearby in 1878 (g). William T. Shutt was the proprietor (d, 11). Near this mill was a store owned by John Richardson, which sometime later was bought by Shutt (n). The store building was eventually converted into a residence; the original building, together with an addition, still stands in good condition on what is now the Volpe property on the west side of Maple City Road and south of the river (m). The Manistee and Northeastern Railroad passed through Allyn, and it had a siding here (n, 66a).

Orson Clark (Fayette Clark's father) and another man built a water-powered mill around 1880 about a 100 yards upstream from where Fewins Road crosses the river. After fire destroyed it, Orson Clark rebuilt the dam and constructed another lumber mill here in about 1910 which he owned alone. In succeeding years he added machinery for grinding flour and livestock feed, and expanded facilities for making shingles, lath, and a greater variety of lumber. Eventually he added a mill, on the opposite bank, which shelled corn and ground flour and stock feeds for local customers (11,ℓ). Fayette Clark, who still lives at the mill site, took over the business in 1923, and later owned it. He completely remodeled the sawmill. Later on, increased adoption of electricity made water-powered mills obsolete. Operation of the Clark Mills ended in 1946 (11,ℓ).

D. C. Brundage and sons of his built a shingle mill on the headwaters of Brundage Creek early in the 1880's (a, 48). A logging camp, operated by the State Lumber Company, was located near the mouth of Brundage Creek and on land now occupied by the Platte



Figure 4. --The Clark Mills, about 1935.

River Anadromous Fish Hatchery (a, ℓ). The Manistee and North-eastern Railroad maintained a siding here (11, 66a). Lloyd Bates (born in 1879) worked out from this camp one winter (g).

Wesley Amidon, the father of Ralph Amidon,¹⁰ operated a steam-powered mill near Hays Bridge, ¹¹ beginning in 1905. Its products included lumber, shingles, lath, and parts for wagons and sleighs (a).

Charcoal kilns are said to have existed in early days in the vicinity of the present junction of Valley Road with US-31 (m, 66d). A shingle mill, located along the river a short distance upstream from present Henry Street in Honor, is reported as having operated in the early 1800's (a, t).

D. C. and S. K. Carter had a sawmill on Carter Creek in early days that furnished lumber for settlers in Homestead Township (48). This may have been the same mill in Section 22 that was run in later years by Burt Osburn. Ralph Amidon says (a) that this mill was equipped with an "up-and-down" saw, also known as the pit or whip saw (31).

Expansion of a wood-products industry resulted in the founding of Honor. The Guelph Patent Cask Company, which had a mill at

¹⁰ Ralph "Happy" Amidon, born in 1892, has resided in the Honor area all his life. He worked at his father's mill, and then for the Seymour and Peck Company from about 1910 to 1915, where he rode the log carriage. Mr. Amidon helped build the fish weir near the mouth of Platte River which the State operated in 1941-43 (a).

¹¹ The name of the road this bridge is located on has undergone transformation within recent years. It was first known as either Hays or Hayes, but road markers and maps presently show it as Haze. Quite certainly this road was named after one S. Hays who, according to Benzie County Plat Book No. 1, acquired either by purchase or through a homestead grant the northwest quarter of Section 13, Homestead Township, on September 8, 1866.

Wolverine, established another plant in Homestead Township in 1895 (48, 51). The firm had but a small portable sawmill here at the start, but soon expanded considerably. Although a low-head dam on Platte River was associated with the mill, steam was used for power; the main product was veneer, but this plant also produced lumber (a, t). As the plant's original name implies, the veneer was used for casks. The town born from the establishment of this industry was named in compliment to Honor Gifford, baby daughter of J. A. Gifford, general manager of the company (a, t, 48). Business places established here by the summer of 1896 were two general stores, one bazaar store, a hardware store, barber shop, three boarding houses, and a blacksmith shop (47). Frank Conklin came here the year the village was established and soon became its blacksmith (o). Later, he and a brother operated a hardware store; after his brother's death, he ran the business alone, which now is carried on by his son, Verrol. The veneer-lumber mill of Seymour and Peck stood on the north bank of the river and opposite the location where the Honor Motel is now situated.

There were logging facilities on Platte Lake and on Platte Bay of Lake Michigan that are thought to have preceded the establishment of Honor. Logs were floated on Platte Lake, and there was a mill at Edgewater, off the northwest shore of this lake; a narrow-gauge railroad transported lumber from here to a dock on Platte Bay. There were two lumber docks on Platte Bay--the Debridge and the East Bay docks (a).

Extension of lines into Benzie County and Honor by the Chicago and West Michigan Railway and the Manistee and Northeastern Railroad must have greatly invigorated the economy of the area. The Chicago and West Michigan¹² branch was built in 1895 (42). Laying of the

¹²The Chicago and West Michigan Railway was reorganized into the Pere Marquette Railroad in 1900 (24), so henceforth it will be referred to by this name or simply "the P.M." as it was commonly known in the localities it served. In 1951 this company was absorbed into the Chesapeake and Ohio Railroad System (16).

tracks of the M. & N.E. Railroad's Platte River Branch commenced in 1898 (60), and was completed by December 21, 1898 (42). Between its connection near Lake Ann with the main (Manistee-Traverse City) line and Honor, this road closely followed the course of the river, and crossed it five times. The other terminus of the 17-mile branch was at Empire Junction. The latter point was also the southern terminus of the Empire and Southeastern Railroad, a short logging road, whose other end was at Empire (60). Establishment of the M. & N. E.'s roads was specifically based on transport of logs and timber products (60), as was development of the Pere Marquette system in the northern part of the State (24).

The Guelph Patent Cask Company, which later became known as the Seymour and Peck (or Honor) Company, could not have functioned without railroad service, nor could several other local industries. The Honor plant was serviced by the P. M.'s Clary-Honor branch, as were the Desmond Charcoal and Chemical Company's interests ¹³ on Carter Creek. Among the M. & N.E.'s sidings were a log-loading station that was located a short distance below the point where Pioneer Road crosses Platte River, and another located below the US-31 crossing east of Honor (a, 66a).

By 1913 the thriving lumber town of Honor had a population of 550. It was the county's seat of government, which had been moved here from Frankford in 1908. Some of the business establishments and services were: three general stores, two meat markets, two produce stores, hardware, drug store, two physicians, post office, railroad express, telegraph service, three telephone companies, three hotels, a bank, a Congregational Church, and a newspaper (51).

¹³ These holdings were a plant at which various chemicals were extracted from wood and charcoal was made, and a general store, all located in Section 24 of Homestead Township. The store fronted on what is now County Road 669, on the east border of Section 24, and stood a little north of the creek; the industry was situated about a quarter mile west of here (x). Ruins of the charcoal kilns still remain.

Nothing was mentioned in the business directory about the several saloons which the town also had. Honor was incorporated as a home rule village on November 30, 1914, and its charter was adopted on January 30, 1915 (34).

It has been said that there were as many as 15 lumber camps operating at one time within a 5-mile radius of Honor (t). The timber of Benzie County in those days consisted mainly of maple and beech; other kinds were hemlock, cedar, tamarack, yellow birch, ash, basswood, elm, and black cherry (g, ee). The bark was harvested from hemlock trees, which was used by tannaries (c, ee). Common procedure was to cut these trees in winter, strip their bark (beginning in the spring and continuing into summer), and then cut them into saw logs (c). Beech trees were sometimes used for falling maples into them to prevent the latter from splitting (ee). Beech was used for veneer and wooden dishes; the Oval Dish Company at Traverse City was a market for this wood (29, ee). Maple was also used for veneer, and it was important for flooring and furniture. Waldo Hobson, who was employed by the Seymour and Peck Company 11 years, says (t) that about 95% of the logs the mill received were maple and beech; the remainder were from various kinds of trees. He says that the average diameter of the saw logs was about 30 inches.

Honor evidently attained its zenith around 1915, whereas local lumbering, which essentially nourished the town and its people, had previously reached its peak. Various events indicate the virtual finish of the industry throughout this corner of the State around 1915, although cutting continued for some years beyond that time. The Traverse City Lumber Company, successor to the Hannah, Lay Company, closed its mill in 1915 (14). Wesley Amidon sold his mill on Platte River in 1910 or 1911, and a year or so later the new owner dismantled it and moved it elsewhere (a). Seymour and Peck closed its Honor plant in 1915 (a, t). The M. & N.E. Railroad was plainly in financial trouble by 1917 (60). The Pere Marquette Company was in serious financial straits several

times before this year (24). The P. M. 's Clary-Honor branch ceased servicing Honor in either 1915 or 1916, but continued service as far as the location of the Desmond Charcoal and Chemical Company's holdings on Carter Creek until this firm abandoned operations in 1920 (x). The M. & N. E. took up the tracks of its Platte River branch line about 1923 (11, p).

Forest fires (which perhaps more properly should be called brush fires) broke out often on Benzie County's cut-over lands in the early 1900's (a, g), as they did in other parts of northern Michigan. Charred pine stumps still serve as reminders of such burns in the vicinity of Platte River. The town of Lake Ann is said to have experienced three extensive fires during its early days, one of which was caused by wind-driven sparks, from a steam tug on the lake, that reached the grounds of a sawmill (g). The destruction of young trees and forest duff from fires surely amounted to significant losses, and one may wonder about the effects of the fires on streams and fish. Fayette Clark describes a bad fire of 1908 which destroyed a logging camp and spread to his father's farm (11).

Agriculture

As in other parts of northern Michigan, lumbering and agriculture developed together in the Benzie County area. The second industry expanded as the first shrank. Because cleared land was scarce and nearby markets and good means of transportation were lacking, farming in its beginnings here scarcely provided as much as subsistence. Fayette Clark tells of an experience of his family that may sound almost fictional at the present time of monetary inflation and reputed affluence, but which is not only true but evidently was far from uncommon in the 1800's. The first year that Mr. Clark's father worked his 120-acre homestead in Inland Township, income from marketed produce was \$6, of which \$2 went for taxes (11).

Lumbering made vast areas available for farming. The railroad companies, which promoted further settlement by advertising, also offered land for sale (which they had received free in government grants) and provided transportation for produce (16). ¹⁴ The Secretary of State's reports on farming activities contain information that affords a view of agriculture of that time in Benzie County (43). Statistics from two of these reports appear below, with Grand Traverse County records included for comparison:

	<u>Acres of land in farms</u>			<u>Num- ber of farms</u>	<u>Aver- age acre- age</u>
	<u>Improved</u>	<u>Unim- proved</u>	<u>Total</u>		
<u>1881</u>					
Benzie	8,586	28,649	37,235	351	106
Grand Traverse	25,016	49,771	74,787	721	104
<u>1903</u>					
Benzie	24,921	25,695	50,616	659	77
Grand Traverse	75,045	45,465	120,510	1,420	85

As the above tabulation shows, the acreage of improved land in these two counties trebled within 22 years, while the numbers of farms approximately doubled. The reports for these years reveal that on an acreage basis the main crops in Benzie County were hay and corn. Next in importance (about 1,000 acres of each) were potatoes, wheat, oats, and apples. The lumber companies bought produce from farmers (such as

¹⁴The railroad companies also promoted recreation in the northlands, as is illustrated by the following quotation from a brochure titled Fishing and Hunting in Michigan issued by the Pere Marquette Railroad from its Detroit office in 1912. This comment appeared under the Benzie County directory: "Lake Ann--On M. & N.E.R.R. Reached through Traverse City. Fine fishing and hunting. Summer hotel, the Douglas; rates \$1.00 per day; \$5.00 to \$7.00 per week. Power and rowboats furnished; also bait, tackle, etc. Write J. G. Turk, Lake Ann."

beef and pork) to supply their camps (a, g). In later years potatoes, wheat, and hay continued to be important, and buckwheat was a significant crop besides (a, d, g). Potatoes were marketed in Traverse City in the early days; later on a potato warehouse was built at Cedar, and still later, another was built at Lake Ann (g).

Judging from figures on amounts of farm produce carried by the M. & N.E. Railroad, agriculture underwent appreciable and steady expansion in the Grand Traverse region between 1889 and 1912, remained quite stable during 1912-1916, and declined between 1916 and 1919. The tonnage of farm produce carried by this railroad in various years was as follows: 1889--605; 1895--6,923; 1903--17,156; 1912--42,955; 1916--42,849; 1919--27,560 (41, 60). One should keep in mind that these figures cover all of the M. & N.E.'s lines, which ran across or into seven counties, of which Leelanau, Grand Traverse, Benzie, and Manistee probably were the more important agriculturally. The P.M. lines also carried much farm freight in this area (41).

Population figures afford another insight into the economic situation at various times. Between 1870 and 1920, lumbering and agriculture were the main industries in the north country. These were the populations of Benzie County during this 50-year span according to the U.S. Census:

1870--2,184	1900-- 9,685
1880--3,433	1910--10,638
1890--5,237	1920-- 6,947

Much of the area was poor for farming, and a number of especially poor choices evidently were made for farm sites. Some people reacted to the shortcomings of the soil by "pulling stakes" soon after the agricultural boom commenced; more of them gave up during the economic recession that followed World War I. This is what happened also in many other localities throughout the northern half of the Lower Peninsula.¹⁵

¹⁵A good historical reference on the lands of Michigan with regard to the claims made for them, their public disposal, and their reversion to State ownership because of abandonment or tax delinquency, is D. B. Reynold's series of stories in Michigan Conservation (53).

A transitional era

The years from 1930-1945 comprised a relatively static period in the economic history of Benzie County, and for much of northern Michigan for that matter. Lumbering was of minor significance then, while agriculture--with some exceptional aspects--continued on a downhill road. The situation might have been much different without the influence of two strong social forces of that period--the economic depression of the 1930's and World War II. As viewed in retrospect, outdoor recreation activities and tourism showed signs in the 1930's of their eventual importance to that region, but the weak economy of those years deferred their development. The automobile had become a reliable machine for distant travel, and good roads led into this part of the State where a few years before they had been lacking. Then as the Nation was beginning to emerge from the stifling depression, it became deeply involved in war. Now military obligations, scarcity of time for recreation, and restrictions on travel through rationing of gasoline and sharply reduced sale of automobiles further delayed development of the recreation industry. Manufacturing that supported the military effort was almost entirely confined to the lower part of the State where all but a small amount of the peacetime products had been made before the war.

The economy in recent time

Lumbering and farming, major industries in Benzie County in past years, are now practiced here on far smaller scales and in much different ways than formerly. What was once the lumbering industry perhaps should now be referred to as the forest products industry, which includes production of pulpwood and Christmas trees. The following assessment of production reflects the importance that these two commodities have attained within recent time.

Timber cutting in Benzie County has been fairly active in recent years. Aspen and other trees used for pulp are being harvested near the allowable level (700-1,000 acres per year estimated), but hardwoods used for lumber apparently are undercut (cc). This county ranks high in Christmas tree production; in 1972 the cut amounted to 100,000 trees, mainly Scotch pine, with white spruce probably second. Around 3,000 acres are in Christmas tree plantations (cc).

The potential of lumber and pulpwood production in the future is good. The composition of this county's timber stands by percentage is approximately as follows, according to the records (cc):

Northern hardwoods (mostly sugar maple, also, beech, etc.)	30
Aspen	30
Lowland hardwoods (mostly red maple, also ash, elm, etc.)	12
Oak	12 or less
Pine (mostly red pine)	8
Swamp conifers (mostly cedar)	7

Reforestation of State lands in Benzie County has declined in the last 10 years, mainly because most of the plantable areas have been planted. Interest continues in planting trees on private lands, but the extent of this activity presently is small. Both the State and private land owners mostly set out pine (cc).

Aside from their direct value of wood production, forest lands have of course other values that are highly important in their bearing on recreation and other public use. These assets include benefits that streams derive from trees (prevention of erosion, stabilization of flow, etc.), provision of habitat and food for game animals and song birds, and accommodations for hunting and other kinds of recreation.

Although agriculture still is a significant contributor to the economy of Benzie County, it has continued to decline. However, since about 1945, land has been removed from crop production all over the State and in the Nation as a whole; apparently the recent recession of agriculture in northern Michigan largely stems from the same causes that are responsible for the national trend.¹⁶ Table 6 indicates the extent that farming activity changed between 1950 and 1969 in Benzie County and in the three bordering counties. Accompanying the recession were changes in crop plantings, that are indicated below by approximate acreages of principal crops in Benzie County in 1950 and 1969 (62):

	Orchards (apples and cherries mainly)	Hay	Corn	Small grains
	_____	_____	_____	_____
Year 1950:	4,600	3,000	2,700	1,700
Year 1969:	5,000	1,900	900	400

Still greater changes in planting patterns developed before 1950, according to long-time local residents. Production of potatoes formerly was important (d, g), but in recent years it has been virtually nil on a commercial basis (62). Similarly, small grains (wheat, oats, rye, buckwheat) were grown more extensively in former years (a, d, g, n). At one time at least three threshers operated in Benzie County. Lloyd Bates, who was one of the custom threshers, says that he and a son spent about 2 months of each year at this work (g). The raising of small grains is said to have begun to decline around 1940 (n). Presently the chief crops of Benzie County are, in this order of importance, fruit, beef, feeder and dairy cattle, and dairy products (i).

¹⁶One should not infer from this situation that national agricultural production has decreased also; production has in fact been rising through improved farming practices, which have been aided by new and better kinds of machinery and fertilizers, scientifically selected seeds, etc.

Table 6. --Number and acreage of farms in four Michigan counties,
1950 and 1969*

County and year	Number of farms	Land acreage of county	Percent- age in farms	Land in farms	Average size of farms
Benzie		202, 240			
1950	541		34.5	69, 872	129.2
1969	231		19.2	38, 771	167.8
Grand Traverse		296, 960			
1950	1, 200		48.1	142, 969	119.1
1969	633		28.3	83, 712	132.2
Leelanau		223, 360			
1950	884		54.4	121, 484	137.4
1969	511		35.3	77, 745	152.1
Manistee		357, 120			
1950	971		34.6	123, 771	127.5
1969	376		19.3	68, 336	181.7

* Data from U.S. Census of Agriculture, 1954 and 1969 (62).

Tables 7 and 8 carry other information for depicting recent changes in agriculture in this region. These data show also the rising importance of other industries. Some comment on the data is desirable to round out this survey.

The increasing importance of manufacturing for people of Benzie County is especially significant. Although only a little manufacturing is done in this county, apparently a sizable number of the residents travel to places (probably Traverse City and Manistee mainly) where it is prevalent. This industry has expanded greatly since 1945 in a number of northern communities of the Lower Peninsula.

Although income rose during 1950-1967 in seven of the eight sources listed in Table 7, substantial portions of the rise can be ascribed to raises in wages and prices of goods. Therefore, to obtain a more accurate comprehension of the economic situation of this period, distribution of the labor force among the various industries should be considered also (Table 8). Among the impressions conveyed by these sources of information and others are: (1) some sources of income that formerly had small significance have become quite significant within recent years; and (2) the recreation industry (a conglomerate whose income comes from several sources, especially retail trade and services) now has important rank. One of the various indications of the importance of recreation in the north country is that private land owners year by year put more land that formerly was in farms into recreational use (j).

It seems appropriate to mention Honor again here to further illustrate the change that Benzie County has undergone with the passage of time. This village presently has little over half the number of inhabitants (1970 population, 282) that it had in 1913. Still, it experienced a much better fate than a number of other early towns which disappeared after the county's first lumber

Table 7. --Distribution of total income* among eight major sources in four Michigan counties, 1950, 1959, and 1967 **

County	Farm			Government *** (Federal, State, local)		
	1950	1959	1967	1950	1959	1967
Benzie	1,648	907	1,190	871	1,659	3,141
	24	9	8	12	17	21
Grand	9,101	6,996	3,340	4,870	9,073	17,360
Traverse	26	13	4	14	17	19
Leelanau	3,706	1,448	1,654	930	2,698	4,218
	55	19	14	14	36	36
Manistee	1,761	1,514	1,473	1,574	2,901	5,664
	12	6	4	11	12	14

County	Manufacturing			Contract construction		
	1950	1959	1967	1950	1959	1967
Benzie	1,035	1,833	2,897	665	701	1,007
	15	19	20	9	7	7
Grand	7,746	10,368	20,870	1,686	4,083	8,327
Traverse	22	19	23	5	8	9
Leelanau	347	676	972	369	603	1,022
	5	9	8	6	8	9
Manistee	5,253	9,535	17,881	554	1,169	2,505
	36	39	43	4	5	6

* Total income in thousands of dollars; lower figure, percentage of the total for eight sources.

** Source of data: 1972 Michigan Economic and Population Statistics, Office of Economic Expansion, Michigan Department of Commerce (34).

*** Government income includes that from military service.

(Concluded, next page)

Table 7. --concluded

County	Transportation, communications, public utilities			Wholesale and retail trade		
	1950	1959	1967	1950	1959	1967
Benzie	579 8	1,950 20	2,273 15	1,233 18	1,368 14	2,132 14
Grand Traverse	1,244 4	4,534 8	5,478 6	6,085 17	9,926 18	18,817 20
Leelanau	88 1	136 2	195 2	685 10	1,007 13	1,696 14
Manistee	862 6	1,489 6	2,214 5	2,858 20	4,267 18	5,778 14

County	Finance, insurance, real estate			Services		
	1950	1959	1967	1950	1959	1967
Benzie	96 1	136 1	252 2	878 13	1,259 13	1,944 13
Grand Traverse	739 2	1,935 4	3,148 3	3,670 10	6,764 13	14,865 16
Leelanau	40 1	91 1	309 2	538 7	887 12	1,767 15
Manistee	219 1	559 2	988 2	1,519 10	2,926 12	4,752 12

County	Total		
	1950	1959	1967
Benzie	7,005	9,813	14,836
Grand Traverse	35,141	53,679	92,205
Leelanau	6,703	7,546	11,833
Manistee	14,600	24,360	41,255

Table 8. --Percentage breakdown of employed labor force by industry for Benzie and Leelanau counties and Michigan as a whole, 1940, 1950, 1960*

Industry	Benzie County			Leelanau County			Statewide		
	1940	1950	1960	1940	1950	1960	1940	1950	1960
Agriculture	36.1	19.8	9.5	57.8	40.0	18.1	11.8	6.7	3.4
Forestry and fisheries	1.9	0.7	0.9	1.8	0.9	0.8	0.1	0.1	0.1
Construction	8.8	8.3	6.4	6.9	8.8	8.8	4.1	4.9	4.6
Manufacturing	4.6	14.2	20.3	3.7	9.7	17.2	38.6	41.0	38.0
Transportation, communication, and utilities	12.0	20.0	15.9	2.9	3.6	3.4	5.4	6.4	5.8
Wholesale and retail trade	13.2	13.7	17.0	7.9	13.6	19.9	16.1	17.5	17.7
Finance, insurance and real estate	1.1	2.0	1.8	0.5	0.8	2.0	2.6	2.7	3.3
Services	21.2	19.9	26.5	17.7	20.1	28.4	19.0	18.6	23.3
Unreported and minor categories	1.2	1.4	1.8	0.7	3.7	1.2	2.3	1.9	3.9

* Data adapted from The Proposed Sleeping Bear Dunes National Seashore (1).

industry died. The businesses and services of this progressive village now are as follows: two grocery-meat stores, two restaurants, four motels, four gasoline-auto service stations, two sporting goods stores, two hardware-building supply stores, a clothing-variety store, variety store, antique store, tavern, two beauty shops, barber shop, an insurance agency, two real estate agencies, a bank, an apple storage plant, county highway garage, Congregational Church, a school, and post office.

A subject definitely pertinent to this discussion is the economic worth of Platte River from the recreational standpoint. Although no determination of it has ever been made, estimates for other waters may give some idea on the value of just the fishery of this stream. When drawing an evaluation from the two following evaluations, one should keep in mind that the Au Sable River system is much larger than the Platte River system, and that the Grand Traverse Bay fishery is of a different type. Nevertheless, the monetary values that these examples have shown are applicable to some extent for judging the dollar value of Platte River angling.

It has been estimated that the economic value to Michigan of the fishing done by Michigan residents on the Au Sable River in 1970 was \$535,640. This estimate was partially based on an individual person's average expenditure of \$2.18 for each daily trip on the stream. The total value estimated for the 1971 fishing season was \$836,290 (49).

From a survey that was conducted on fishing in Grand Traverse Bay of Lake Michigan from May 1971 to May 1972, the estimated gross expenditure within the vicinity of the bay by anglers from Michigan areas outside this vicinity amounted to \$419,000; from this figure, net community income was estimated to have been \$204,000 (28).

Fishing on Platte River is particularly heavy in early spring when large rainbow trout from Lake Michigan are present in the stream for spawning. Regional Fisheries Biologist John MacGregor

took a census of fishermen here from a plane on the opening day of the early trout season in 1967 (Saturday, April 6), covering the stretch of river between the mouth and the US-31 bridge east of Honor. It was estimated that from 9 a. m. until noon 780 fishermen were present on these 13 1/2 miles of stream (y). Fishing pressure on Platte River is, however, much lighter than this during most of the trout season.

Even though the total economic value of Platte River apparently amounts to a high figure, the stream's immeasurable social value probably exceeds it in importance. Such assessment may apply as well to other unspoiled scenic streams.

Public lands and facilities
and their use

Benzie County is richly endowed with public land, most of which is administered by State agencies. Much of the frontage on Platte River is in public ownership. State land comprises about 28% of the total area of this county. The following tabulation shows its distribution by designation (w.):

<u>Designation</u>	<u>Acres</u>	<u>Platted lots</u>
State forest	58, 836.13 and	6, 363
State park	2, 295.02	
State game area	697.23 and	1
Public fishing sites and public water access	245.35 and	3
Undedicated	63.38	
Total	<u>62, 137.11</u>	<u>6, 367</u>

The public forest land of Benzie County is included in the Betsie River State Forest. It is distributed over various parts of the county, but most of it is in the eastern half. The Forestry Division of the Department of Natural Resources manages these timber lands, including campgrounds on Grass Lake, Lake Ann, and two on Platte River, which provide water access.

Benzie State Park, which has frontage on both Platte River and Platte Bay of Lake Michigan, was established in 1923 (2). In 1957 it contained 180 acres, whereas presently it covers about 13 times that area. This facility has played an important role in the Fisheries Division's salmon program; it affords camping accommodations and a boat launching site for salmon fishermen who congregate here in large numbers each fall.

The Betsie River State Game area, administered by the Wildlife Division, extends upstream from Betsie Lake along both banks of the river for about 2 1/2 miles. Grass Lake, a headwater of Betsie River, is a wildlife flooding area.

In Benzie County, the State maintains 12 water access sites on lakes, 3 on Platte River, and 1 on Betsie River. The city of Frankfort operates a fee-charge launching area for boats used on Lake Michigan. Besides these designated points, free access is available for some miles along the Platte and Betsie rivers by way of State-owned frontage.

Parks sponsored by other governmental units also offer free accommodations for sportsmen and tourists. Lake Township Park (area, about 3 1/2 acres) fronts on Platte River near its mouth; salmon and trout fishermen use this development intensively for access to Lake Michigan. Small, village-supported parks are located in Beulah, Honor, Lake Ann, and Thompsonville.

Two facilities of the Department of Natural Resources are credits to the entire State as well as to Benzie County. One of them is the \$6.5 million Platte River Anadromous Fish Hatchery.

Construction of this plant began in 1967, and fish production commenced in 1969. The hatchery is situated on the grounds formerly occupied by the Platte River Trout Rearing Station, that operated from 1928 (36) until its functions were absorbed by the hatchery.

The other of these facilities is the 200-mile Michigan riding and hiking trail for horseback riders and hikers. A portion of the original trail, which extends between Tawas and Empire, courses through the northeast corner of Benzie County, and all of the branch trail that leads to Elberta is confined to this county (38).

Because the relationship is so obvious, it almost need not be said that the public lands of this region and developments on them are invaluable assets to the recreation industry. They also provide numerous free benefits for local people as well as visitors.

Some figures on usage assist comprehension of the importance of the resources. Below are Benzie State Park's attendance and camp permit records of several recent years (dd). The attendance figures cover campers as well as day users:

<u>Year</u>	<u>Atten- dance</u>	<u>Camp per- mits issued</u>
1956	36,068	754
1966	64,766	3,350
1967	110,469	5,506
1972	130,311	6,549

Much of the increased use of Benzie State Park in 1967 over that in 1966 is attributable to the interest aroused in 1967 by the first presence of full-term mature (3-year-old) coho salmon in Lake Michigan and Platte River.

Additional land in this county is coming into public ownership through the Sleeping Bear Dunes National Lakeshore. This park, located in the western portions of Benzie and Leelanau counties, is expected to eventually cover about 60,000 acres (1). Since

establishment of this park was officially approved in October 1970, it has acquired approximately 3,500 acres of land through purchase (19). Plans call for including the Benzie and D. H. Day state parks in the National Lakeshore area.

Private use of Platte River
and associated lakes

Except as recreational enterprises (canoe liveries, bait and tackle shops, etc.) benefit from Platte River and its tributaries, these streams serve no industrial use today. Neither agriculture nor grazing are presently practiced on their borders. Homes and cottages are situated on the banks of the river in several areas. Such development is not extensive now, but it likely will soon increase greatly on privately owned frontage. Since 1968 a real estate development has been underway on Bronson Lake, which until then had no buildings on its shores. Numerous dwellings are located on Lake Ann and Platte Lake, where much boating, water skiing, and fishing are done.

PART II. HISTORY OF THE SALMONID FISHES

A look into the history of the salmonid fishes that have inhabited Platte River during the last 100 years can be useful in several ways. It can afford guidance for their future management, as well as provide background information for aiding assessment of competition between trout and salmon. Further, it may also suggest causes for two fish population catastrophes that have plagued this stream and a number of other Michigan streams--extinction of the grayling and extreme decline of the brook trout. No attempt is made in this report to determine the causes.

Unfortunately, information on Platte River from the years when this region was first being settled is extremely scarce. There are few published early records on the stream. Twenty years ago one might have still obtained from pioneer residents direct word-of-mouth information on the grayling. All of such people are now gone, but several of their descendants gave helpful assistance in this regard. It was hoped that records on the grayling and on fishing conditions in Platte River when this fish occurred here could be found in old letters, diaries, or photographs. But many inquiries, as well as extensive search in libraries, failed to turn up anything of use.

Scarcity of such material is nearly this extreme also for information on fish and fishing in Platte River in the early 1900's. A set of diaries of fishing experiences is a very fortunate exception. E. W. Wait, an ardent angler who lived in Traverse City, kept these diaries, which date from 1903 to 1907 (66). He fished in several streams near home (mainly the Boardman River and Mitchell Creek), and in a few streams more distant. One of the latter is Platte River, which he reached by the Manistee and Northeastern Railroad.

It apparently was not until the 1930's that Platte River became well known beyond the immediate region for its fishing. It was then that rainbow trout from this stream began to win prizes in national contests. Publicity from the contests, together with improved roads and the increasing range of the automobile, did much to acquaint people of distant places with this river. Its fame increased further following introduction of coho salmon in the late 1960's and with a resurgence of rainbow trout fishing at the same time.

Grayling

Although no published record was found on the grayling of Platte River, descendants of early settlers recall stories about them.

Fayette Clark, born in 1900, whose father was one of the early residents of Inland Township, has reported that Indians gave the settlers grayling that were caught in a fish trap set in Platte River near where Maple City Road now crosses the stream (11).

Mrs. Paul Bare (nee O'Brien) heard her mother and father tell about the grayling of Platte River (e). The O'Briens resided south of the river, near Burnt Mill Road, and Mrs. Bare's father, David O'Brien, took part in early log drives on this stream. Her maternal grandparents, the Thomas Luthers, homesteaded near the location of the O'Brien home (48).

Frank Conklin, born in 1873, also provided word that grayling once thrived in Platte River (o). He grew up near Bear Lake in Manistee County. He recalled that his father caught grayling from Bear Creek. Conklin came to Honor in 1895, the year of its beginning. The grayling had disappeared from Platte River by that time, but he remembered local people recollecting their former presence.¹⁷

¹⁷ Frank Conklin was a remarkable man. This fine citizen was still physically active and mentally alert close to the time he died in May 1973 at the age of 99. In September 1972 he was parade marshal in Honor's annual National Coho Festival.

Lloyd Bates also remembers hearing old-time residents tell stories concerning grayling in Platte River (g).

The occurrence of grayling is documented for neighboring streams, including Bear Creek, the Manistee, Betsie, Boardman, and Boyne rivers. Vincent ¹⁸ lists these streams and others (65). Presence of this fish in these waters supports the evidence already mentioned for the grayling's presence in Platte River. There is no apparent reason why this essentially cold-water stream among all the others should have been devoid of it.

Why, then, could I not find any published record of grayling in Platte River? As mentioned earlier, settlement of this area began late and progressed slowly. Roads between this region and more populated parts of the State were poor and few for a long while after settlement began. Persons who might have written for publication about the grayling here evidently did not visit this stream. It seems that each of these circumstances contributes something toward an answer to the question above, as perhaps does the probability that the grayling disappeared from the Platte River sooner than it did from several other streams where its presence became well publicized.

Although a few grayling survived in the Manistee, Black, and Au Sable river systems into the early 1900's (66d, 32, 45), this species disappeared before the turn of the present century from most of the Lower Peninsula streams in which it had existed. Whitaker (68) reported in 1885 that the Boardman, Boyne, and Jordan rivers contained only an occasional straggler. Vincent (65) traces the decline from abundance to absence in these same streams. Northrup (46) said the Jordan ceased to be a grayling stream by 1879. On the other hand, grayling are said to have been still present in Bear Creek,

¹⁸ Quite surely, Robert E. Vincent made the most thorough study of the Michigan grayling that has ever been undertaken. Therefore, anyone who sets out to study in detail the grayling's occurrence in this State ought to examine his thesis, which contains an extensive bibliography.

Manistee County, by 1902 (65d, x). Mershon (32) commented on the catch from Bear Creek shown in Figure 5 which he said had been taken in August 1896. ¹⁹

In any attempt to find the immediate cause or causes of the grayling's disappearance from Platte River, a close approximation of the time it happened would be highly desirable, but this apparently cannot be determined. All we know about it is that it occurred between 1867 and 1895, as shown by previously mentioned information from Conklin (o) and Clark (11).

Brook trout

We do not know whether the brook trout occurred in Platte River naturally with the grayling, or if it became established through stocking alone. This question applies as well to other grayling streams of the Lower Peninsula. Some persons have thought that only grayling inhabited these streams until the grayling sharply declined, that natural populations of brook trout were confined to the Upper Peninsula, and that man-made introductions alone were responsible for the establishment of this trout in the rest of the State. Other people have believed that brook trout existed naturally also in the northern part of the Lower Peninsula when the white man first came here.

Records exist which show brook trout were present in grayling streams at least as early as the 1850's. Metcalf (33) cites a reputable angler who reported that his catches in the Boyne and Boardman rivers around 1855 consisted about half and half of grayling and brook trout. Metcalf himself caught a brook trout in the Hersey River in 1872 when grayling were still plentiful there (33). The State of Michigan began

¹⁹ Figure 5 has been the most publicized of the few published photographs of the Michigan grayling. Mershon (32) has given a brief history of the picture and of the catch. James W. Good of Bellaire 21 years later gave a fuller account of these events which in some details differs from Mershon's account. Good's story (20) is on file at the Institute for Fisheries Research in Ann Arbor.



Figure 5. --Michigan grayling, caught in Bear Creek,
Manistee County, in or about 1896.

planting brook trout in 1879 (44). Vincent (65) presents details on the early presence of brook trout in the Jordan River, as well as in the Boardman and Boyne rivers. Whitaker (68) expressed an interesting theory in the following comment:

It would seem unaccountable that this state of things once existed, that in late years the grayling should have so rapidly disappeared from these streams; yet the fact remains that many of the streams that once knew them now know them no more. This is notably true of such noble streams as the Jordan, the Boyne, and the Boardman. From those streams that flow to and discharge their waters on the extreme northern coast of the Lower Peninsula the grayling have entirely disappeared, although now and then an occasional straggler may be found. The cause of this depletion is, however, directly traceable to the lumberman and the trout. It is a fact that within the last thirty or forty years, brook trout were unknown in the northern streams of Michigan, while the streams of the Upper Peninsula, discharging their waters into Lake Michigan, are stocked almost exclusively with the trout. The theory advanced and generally accepted by those familiar with the facts, is that a migration of the trout has taken place from the streams emptying their waters into Lakes Michigan and Huron to those grayling streams.

In support for this theory, Whitaker (68) tells that the Maple River, which flows into Burt Lake, contained numerous grayling at the time he wrote (1885), whereas neighboring streams that directly enter either Lake Huron or Lake Michigan had been greatly depleted of them.

Vincent (65) comments on independent introductions:

The first documented introduction of brook trout in Michigan (Mershon, 1923) was in the spring of 1870 in the south branch of the Tobacco River (Clare County). However, in 1866 Mr. [Nelson] Clark of Clarkston (Oakland County) had a private pond that contained this species. No record is available whether he distributed fish to other

areas. Early private plantings were made along the Flint and Pere Marquette Railroad in the Hersey, Pere Marquette, Tobacco, and upper Muskegon rivers (Lake, Osceola, and Clare counties) (Mershon, 1923). In Oceana County the first brook trout came from private stock that was planted in 1878 (E. R. D., 1885).

By 1879 many brook trout had escaped or been planted from private ponds (Mich. Fish. Comm., 1881) Before 1880 the only watersheds containing grayling that had been stocked with brook trout were the Pere Marquette and Muskegon rivers. There is no record of brook trout being planted in the northern part of the Lower Peninsula until 1882 when streams in Cheboygan and Charlevoix counties were stocked (Mich. Fish. Comm., 1883).

The matter of private ponds certainly confuses the issue of whether brook trout populations in various drainage systems were of natural or introductory origin. One of the early private trout ponds in Michigan (if not the very first one) was established by Nelson W. Clark of Clarkston in the winter of 1866-67 (5). It was a slow-going venture in the beginning; in time a son, Frank N. Clark, joined his father in the business, and with persistence they made it a successful undertaking. Evidently, they produced mainly brook trout. In 1874 they transferred their operation to Northville; the elder Clark died two years later, but the son continued the business until 1880 (5). In this year the U.S. Fish Commission took over the Northville Hatchery (67).

As Vincent (65) has stated, there is no evidence available as to whether the Clarks distributed brook trout outside their immediate area, but they could have done so. On the other hand, there are the records of the 1850's and early 1860's noting the presence of brook trout in northern Lower Peninsula streams. In view of this evidence, and of the well known ability of fishes to extend their range rapidly, and also of the absence of railroads and the scarcity of highways in the

region at that time, my guess is that brook trout occurred naturally in Platte River before they were first planted here by the State in 1892. This planting was made in the Traverse County portion of the drainage system; the main stream was stocked for the first time in 1896 (44). It seems very likely that newly constructed railroad connections made these introductions possible. The Manistee and Northeastern Railroad reached Lake Ann in 1890 (60); in this same year the Chicago and West Michigan Railway Company completed extension of its line from Baldwin to Traverse City (24).

E. W. Wait recounted in his fishing diaries (66) experiences of fishing for brook trout in Platte River. Winther (72) summarized catch data from these journals. A conception of the quality of the fishing in 1903-05 can be derived from Winther's summarizations, which are reworded in the following paragraph.

Wait and companions spent 8 angler days on four trips to Platte River during 1903-05, and caught 253 brook trout at a rate of 2.94 fish per hour; their average length was 8.7 inches. Wait's share of the total catch amounted to 157 trout, and his rate of catch was 3.65 per hour. Among the four streams (Boardman and Platte rivers, Mitchell and Acme creeks) for which he recorded trips oftener than for seven other streams, Platte River fishing provided the best rate of catch and the largest trout. Brook trout around 8 inches long composed 65% of Wait's total catch from Platte River, and 10-inch trout composed 28% of it. The largest brook trout he caught here was one of 14 inches (72). Occasionally, however, 2-pound trout were caught in the Platte, at least in the 1890's, according to the Benzie Banner.²⁰

The quotation below is from Wait's diary entry (66d) titled "A Dozen from One Hole":

²⁰The Benzie Banner was a weekly newspaper published in Benzonia from July 19, 1888 through January 7, 1910.

Nink Paige and I left the Honor train at the State Road crossing on the morning of August 30th 1905 and got into the stream at the bridge as soon as we could limber up. As we were due back on the evening train we had but three hours to fish.

It was a bright warm day but the trout bit fairly well nevertheless. We fished from the State Road to the old loader and there took the train, I with twenty one fish over size [over 7 inches] Nink with thirteen. One feature of the trip however was worth remembering.

A quarter mile below the State Road at the Coal Kilns and the little village that has grown up around them the river changes from its westward course and turns abruptly to the north. At the turning point the stream is divided by a low sandy island the main stream passing to the left. In front of the smaller or right hand stream, a long log bridges the surface from point to island. The river here is nowhere deep and at this season was filled with grass. In front of the log and at a little distance, however, was a sandy depression in the bed of the stream which was singularly free from grass; the hole if such it might be called being perhaps five feet long, two wide and two deep.

As I walked down a few yards distant from this hole, trout scampered from it--of all sizes and in all directions. I threw into the hole but the fish were not there. It was very bright and the trout had seen me and taken the alarm. I had waded some distance past, when I determined to go back and get fish from that hole. So back I went as far away as possible and stooping low to avoid detection I could see the fish laying in the hole idly sunning themselves and headed lazily up stream. There were as many as two dozen ranging from eight inches up to twelve--a beautiful sight.

I made a careful cast into the head of the hole and let my bait run easily down. A fish took it and after a brief battle I netted a nine inch trout. After things had quieted down I repeated this cast and was rewarded with an eight inch one. This was repeated at least fifteen times I each time drawing fluttering across the waters a fish from eight to ten inches long. Most of these I landed but some of course I lost. In twenty minutes I had basketed a dozen fine speckled beauties from one hole.

Julius fishing down a little later caught three or four from the same depression.

And the following extract (66d) is from an account of fishing that Wait and a companion did on the Platte on May 22, 1907, from Hayes Bridge to Old State Road:

. . . . the fish bit well and I caught some fifty-six over size [over 7 inches] including many nice ones from ten to twelve inches long. Our best luck was in the stretch from Haye's Bridge down to the Goose Pasture.

One can only guess the extent that planting influenced fishing success for brook trout in Platte River, either directly or indirectly. However, it seems that once this species became well established, natural reproduction quite certainly was the main source of new stock. This belief is based on the facts that for a long while the releases consisted of fry (the survival rate of which is very apt to be low), and that the numbers planted were not large. Planting continued fairly regularly year after year (3,000 to 84,000 fry annually) from 1896 to at least through 1914 (44), and also during 1921-26 (37). Records on fish plantings from 1915 through 1920 by location could not be found, so there is a 6-year lapse of information on stocking.

Planting of larger trout commenced in 1927 with the release of fingerlings into the North Branch and Carter and Brundage creeks. Yearlings and younger fingerlings were planted in the main stream in 1930; adults (750) were deposited here in 1931. The last large planting was made in 1941 with the release of 13,400 fish that consisted of yearlings and 5- and 8-month fingerlings. Beginning in 1946, the only brook trout planted were fish designated in the planting reports as legal-size fish (7-inch minimum), but possibly included some trout not quite this big. This policy continued until stocking of the main stream and tributaries with brook trout ended in 1954. During 1946-54, the annual allotments ranged from 300 to 1,800 fish. In 1964, Loon (Round)

Lake was stocked with 6,000 legal-size brook trout, and Platte Lake received 15,000 of this category in 1965 (37). Perhaps some of these trout entered the river.

Other information on brook trout in the Platte River system was obtained from local residents. Fayette Clark, who has lived beside the river all his life, recalls when brook trout were plentiful. He tells (11) of a memorable occasion in or around 1913 when wagons and buggies of 13 families filled his father's mill yard on the evening before the trout season opened. These people fished in the mill pond on the opening day and caught over 700 brook trout. ²¹✓

Robert Bailey, who is of Ottawa descent, came to live in the Honor area around 1905. He was born near Hart in 1886. He and his brothers speared suckers and angled for brook trout in Platte River. He relates (c) that the trout were plentiful in the main stream and tributaries. ²²✓

Arthur Marks, born in 1905, fished Platte River extensively in his younger years. ²³✓ He says that brook trout were plentiful in Brundage Creek and other feeder streams, as well as in the main stream. There were fewer of them between Lake Ann and Bronson Lake, but the fish here were chunkier than those below Bronson Lake, he reports. Marks remembers the ease with which he caught brook trout; occasionally he could take many from a single spring hole (z).

²¹✓ The trout fishing season in 1913 extended from May 1 to September 15. The minimum size limit was 7 inches, and the daily catch limit was 35 (58).

²²✓ Mr. Bailey has other remembrances. When a boy, he came to the Honor area with his parents in summers to dig ginseng. They camped across from land along Valley Road that eventually became his farm, where he presently resides. His main employment for some time after he came to live in Benzie County was that of stripping hemlock bark.

²³✓ Some years ago, Mr. Marks maintained minnow ponds close to the river and adjacent to the M. and N.E. grade along the south bank, nearly a mile above the Maple City Road crossing. The pond basins and remains of a drain box still exist.

Paul Bare began to fish Platte River in 1910. Asked when the brook trout here began to decline, he thought it was in the early 1920's (e). Arthur Marks said they were "the fish" of the river until around 1930 (z).

The best available records for information on brook trout abundance in Platte River since 1928 are those from the general creel census. This census of fishing was taken on lakes and streams throughout the State from 1927 through 1965. Conservation officers obtained the data while performing law enforcement duties. They sent the records to a central office where the statistics were compiled and summarized. Although this censusing program had shortcomings, it also possessed several values. One of its good features was that if a body of water was sampled sufficiently over a number of years it could reflect significant changes in fish populations if extraordinary changes occurred. Such use of the census seems applicable to the brook trout of Platte River.

The general creel census records indicate a fairly distinct point of time when brook trout in Platte River began to decrease noticeably. Although it seems likely that they had passed the peak of abundance here before 1928, the records indicate that they sharply declined after 1928. This was in or near 1937. The decline is generally shown by the data of selected years listed in Table 9.

Table 9. -- Trout fishing records compiled on Platte River by the general creel census

Year	Hours fished by checked anglers	Trout caught					
		Brook		Rainbow		Brown	
		Legal	Sub-legal	Legal	Sub-legal	Legal	Sub-legal
1928	151	101	277	86	125	2	1
1931	747	261	1,596	248	1,090	3	1
1934	319	41	306	59	190	8	3
1935	348	106	584	110	507	6	1
1937	466	48	--	156	--	3	-
1940	604	22	--	133	--	9	-

Comparing catch ratios determined from all of the general creel census records available on Platte River affords a more revealing picture of the decline. During 1928-1930, the catch ratio of legal-size rainbow trout to legal-size brook trout was approximately 2:3; during 1931-35 the ratio was around 1:1, and for 1937-41 (no census records available for 1936) it was 4:1. The evidence further shows that the change in ratio was due to decrease of brook trout in the catch, not to increased catch of rainbow trout. Extremely few captures of brook trout were recorded by the general creel census after 1951.

The general creel census sampled the tributaries of Platte River proportionately less than the main stream, but judging from the records, brook trout populations held up fairly well in Brundage and Carter creeks into the 1950's. Brown trout and a few rainbow trout were the only trout captured by electrofishing on these two streams in 1965. Leon Bailey, son of Robert Bailey, reports that brown trout now strongly outnumber brook trout in the North Branch, where the latter formerly were numerous (b). If brook trout were to have held on well anywhere in the drainage system, it seems this should have happened in the North Branch and in Brundage Creek, which have brushy banks, snag-infested channels, and water temperatures that are uniformly low throughout the year.

Berga Lindy, who worked for the Desmond Charcoal and Chemical Company from 1915 to 1920, provided an interesting item of information on Carter Creek, beside which this industry was located. He said liquid wastes that the plant discharged, which he assumed were toxic, flowed into the stream with no detoxifying treatment beforehand. Despite this situation, numerous brook trout were present in the creek a short distance below the entry point of the discharge, but these fish were small. He wondered if the wastes might have had an inhibiting effect on their growth (x). ²⁴

²⁴Mr. Lindy was a trout fisherman in his younger years. He fished the Betsie River more than the Platte, and has a special fondness for the Betsie. He says that its brook trout were beautiful fish, although white meated, whereas those of the Platte River had pink flesh.

The brook trout has become scarce in or absent from many Michigan streams where it previously was abundant. On the other hand, it continues to be fairly plentiful in some waters, most of which are brushy, snaggy creeks.

Rainbow trout

The rainbow trout became the principal game fish in Platte River after the brook trout declined, but was important also some years before that time. Brown trout were caught in the 1930's, but the general creel census shows that few were taken then.

The rainbow trout is mainly responsible for Platte River's far-reaching reputation among anglers. Even though fishing here for this trout is limited by availability to a short period in the spring and during the fall and early winter, the spectacular fight of the quarry when hooked and the chance of landing a prize specimen cause this sport to be a great attraction. Generally speaking, two sizes of rainbow trout frequent the river-- sub-legal (less than 10 inches long) and large. This is the situation also in other streams. All but a few of the rainbows produced in the river migrate to Lake Michigan before they attain legal size, where most of the survivors stay until they have grown large. In early spring they ascend this stream or another to spawn; some enter the river in the fall, where probably most of them remain over winter.

Anglers who had fished Platte River long enough to possibly know, were asked when they first saw or first heard of rainbow trout in this stream. Several of them mentioned the year, which usually was recalled by its association with another event. Not all of the given dates may be exact, but even approximations should help to determine when this fish became established here. Ralph Amidon (a) said that the first rainbow trout from Platte River he

knew of was taken in 1907. Paul Bare (e) reported that rainbows began appearing here in 1915. Arthur Marks (z) recalled having caught his first one when he was 14, which would make the year 1919. William Bryan (k) said the first rainbow he saw from this drainage system was speared through the ice on Mud Bay of Lake Ann in either 1918 or 1919.

Another question asked was when rainbow trout first became abundant in Platte River. Two persons thought this was in or close to 1920 (b, z). Fred Bates (f) said rainbows were more abundant in the 1930's and 1940's than in the 1920's. Reynolds (54) noted that local people had first observed large runs in the early 1920's.

Paul Bare (e) said that the rainbow trout was well established in Platte River by the time it was first planted here. The first introductions shown on available records were made in 1928; these were 5-month-old fingerlings, that amounted to 25,000 for the main stream and 7,500 for Carter Creek (37). The rainbow trout could have become established in Platte River by migration from Lake Michigan, and apparently this is how it happened. Several nearby streams were stocked in early years. An inlet to Crystal Lake, presumably Cold Creek, was one of them; excepting 1906, plantings were made here from 1903 through 1914 with 4,000 to 10,000 fry per year (44). It seems quite likely that in time some of these fish migrated to Lake Michigan by way of the Crystal Lake outlet and the Betsie River, and eventually came into streams (including Platte River) to spawn.

The spawning runs provided excellent catches in the 1930's and 1940's. The race of Clark's mill was one of the places which afforded people good views of the large, colorful migrants (d, e, ℓ). Local residents often reminisce about the fishing in those years. Lists of prize-winning entries in fishing contests probably are the best remaining records of large rainbow trout caught at that time. Data on rainbows from Platte River that received recognition in contests sponsored by two publications appear in Tables 10 and 11.

Table 10.--Prize-winning rainbow trout from Platte River, 1934-1948, in Field and Stream magazine's annual fishing contests (Eastern Division)

Year of contest	Place in winners' list	Weight	
		Pounds	Ounces
1934	3rd	10	4
1941	4th	11	1
1943	1st	15	8
1947	3rd	17	5
1948	4th	14	1

Table 11.--Prize-winning rainbow trout from Platte River, 1936-1948, in annual fishing contests sponsored by the Detroit Free Press (limited to fish caught in Michigan)

Year of contest	Class	Place in winners' list*	Weight	
			Pounds	Ounces
1936	Bait	1st	9	6
1937	Bait	1st	13	5
1940	Bait	1st	13	8
	Bait	2nd	12	0
	Bait	3rd	13	14
	Bait	4th	11	8
	Bait	5th	11	10
1943	Fly	1st	15	8
	Bait	1st	12	12.5
1946	Bait	3rd	9	13
1947	Bait	1st	17	5
	Bait	2nd	16	5
1948	Bait	1st	13	4
	Bait	2nd	12	0

* Position determined by length of fish.

This stream's rainbow trout population began a decline in the early 1950's. The decrease, which grew worse year by year, lasted into the 1960's. Sea lamprey depredation was responsible for the disaster. The decline of rainbow trout in Lake Michigan from abundance to scarcity is reflected by figures in Table 12 (36). Although differences in trapping intensity may have accounted for some difference in the catches in the Manistee River between years, this accounting probably gives a reasonable miniature picture of the situation in Lake Michigan.

Table 12.--Numbers of rainbow trout trapped at Tippy Dam, Manistee River, during spring spawning runs, 1947-1962

Year	Number of trout	Year	Number of trout
1947	745	1955	255
1948	818	1956	163
1949	941	1957	48*
1950	1,072	1958	71
1951	629	1959	85
1952	526	1960	129
1953	226	1961	63
1954	192	1962	19

* 24 of these 48 fish bore lamprey wounds or scars.

Planting of rainbow trout had been discontinued in Platte River after 1939, but sharply reduced abundance caused it to be resumed in 1954, when 7,850 legal-size fish were released. Annual introductions during 1955-64 of legal-size rainbows, including several plantings in Loon Lake, ranged from 4,500 to 23,700, and averaged 10,118 (37). Included in the stocking done during this period was an experimental release in 1957 of tagged rainbow trout. This was one of numerous similar plantings made during 1955-59 for a study of factors that influenced either success or failure of rainbow trout planting in the Great Lakes (21).

Another indication of the decline of rainbow trout was absence of winning entries in fishing contests. No rainbow trout from Platte River appeared among the winners in the Field and Stream competition from 1949 through 1966, and none placed in the Detroit Free Press contest from 1951 through 1966.

After sea lamprey control programs took effect, rainbow trout in Platte River gradually approached their former abundance. A sizable fall run occurred in 1966 (3). Fall and spring immigrations progressively grew larger. Fish collecting that has been done on a 1480-foot section of the stream, the upper end of which is located about a half mile down from Pioneer Road, affords a good illustration of the recovery. A run through this stretch with an electric shocker early in the autumn of 1963 produced only 19 rainbow trout of various sizes; a like amount of effort here in 1964 turned up 45 rainbows. This section was sampled again in 1971 and 1972 with effort similar to that spent in 1963 and 1964. The catch in 1971 (early September) amounted to 289 rainbow trout, and in September 1972 it was 490.

Plantings of rainbow (steelhead) trout that were made either within the drainage system or in Lake Michigan near the mouth of Platte River after 1964 and through 1972, all of which consisted of yearlings, are listed below:

<u>Year</u>	<u>Number planted</u>	<u>Location</u>
1966	50,000	Sec. 6, 26N., 13W.
1968	10,000	Sec. 20, 27N., 15W.
1969	10,500	Lake Ann
1970	8,000	Lake Ann
1971	8,000	Lake Ann
1971	10,000	Platte Bay
1972	8,000	Lake Ann

Even though Platte River now again provides excellent rainbow trout fishing, some veteran anglers have claimed there were more and larger fish in the 1930's and 1940's. When records of those years are compared

with recent records, however, such claims are not substantiated. Let us examine some of this information.

In the spring of 1942, the weir located near the mouth of the river trapped 608 rainbow trout (54). The weir presently situated near the mouth (located approximately a mile above the site of the one used in 1942) captured 888, 587, 2,746, and 715, respectively in the falls of 1968, 1969, 1970, and 1971 (55). This weir operated almost twice as long in 1970 as in 1968 and 1969, which may have accounted for much of the greater catch in 1970; however, in 1971 it operated less than the time it did in 1968 and 1969 and still captured many rainbow trout. There is good reason to believe that there are more rainbow trout in the spring migrations than in the fall migrations. Should this assumption be valid, then the catch figures of 1968-71 are all the more impressive.

Mean weights of weir-caught rainbow trout in the spring of 1942 were 5.8 pounds and 8.9 pounds for males and females respectively, and 7.2 pounds for both together (54). Mean weights with the sexes combined were 6.8 pounds in the fall of 1970, and 7.6 pounds in 1971 (weights were not taken at the lower weir in 1968 and 1969). We should remember, of course, that egg mass is usually smaller in the fall than in the spring, which accounts for some difference in weights between these seasons.

Another comparison of sizes between the rainbow trout of the earlier years and those of recent times may be made from the fishing contest records. Since 1966, merchants of Honor have annually sponsored contests for large trout. The entries must have been caught in the vicinity, and contestants are required to present their catches for verification and weighing at designated stations. Although no record has been kept of the streams from which the fish were taken, Mrs. Marvel Money of Honor, who has been closely involved in conducting the contests, has told me that she feels sure that nearly all of the award-winning rainbow trout have been caught in Platte River; one fish that she definitely knew had come from Betsie River is omitted from the listing

in Table 13. Further, if any of the fish recorded here were caught in water other than that of the Platte, it seems quite certain they were of stock similar to that which migrated into Platte River.

Table 13. --Prize-winning entries of rainbow trout in the Honor fishing contest, spring-season competition, 1966-71*

Year of contest	Place in winners' list	Weight	
		Pounds	Ounces
1966	1st	14	3
	2nd (tie, 2 fish)	13	4
1967	1st	14	12
	2nd	14	10
	3rd (tie, 2 fish)	14	7
1968	1st	18	8
	2nd	17	0
	3rd	16	3
1969	1st	16	8
	2nd	15	3
1970	1st	16	9
	2nd	16	8
1971	1st (tie, 2 fish)	18	7

* Data from the Benzie County Record, a weekly newspaper, published in Beulah, Michigan.

Mean weights were calculated from all of the rainbow trout listed for the three contests. These figures are as follows:

Field and Stream (1934-1948), 13 pounds, 10 ounces

Detroit Free Press (1936-1948), 12 pounds, 15 ounces

Honor (1966-1971), 15 pounds, 12 ounces

Brown trout

As the rainbow may be regarded as Platte River's glamour trout, the brown trout may be thought of as its bread-and-butter fish. This is because of the brown's longer availability, as all but a few of this species spend their entire lifetime in the river. The exceptional few move out into Lake Michigan at an early age, and return to the stream in late summer or in the fall when they have grown large. These individuals provide a kind of bonus fishery.

The first planting of brown trout known to have been made in Platte River was an introduction of 20,000 fingerlings in 1921 (37). But this species could have been planted here also during 1915-1920, the years for which stocking records are lacking. Excepting 1925, planting of fingerlings (12,000-50,000 per year) continued from 1922 through 1927; 100 adults were released in 1928. No plantings are recorded for the period of 1929-1940. Planting of brown trout resumed in 1941 (possibly influenced by further decrease of brook trout), and continued annually through 1953. Both fingerlings and yearlings were released in 1941-43, 2-year-olds in 1944-46, and "legals" (2,000-8,495 per year) in 1947-53. The drainage system has received one introduction since 1953. This was made in Platte Lake in 1969, and consisted of 3,000 yearlings.

Judging from the evidence available, brown trout apparently were not numerous in Platte River for a considerable span of time after planting them began. General creel census records indicate this to have been the situation. As late as 1940, when brook trout were approaching insignificance, anglers still caught more of them than brown trout. One may reason that brown trout could have actually been more common than the census indicated, as they are less readily caught than brook trout. Other evidence, however, supports the opinion that brown trout populations probably were smaller during the first 20 years of their presence in this stream than they are now. The weir that the State operated in Platte River during 1941-43 did not capture a single brown trout, whereas the

present harvest weir trapped 79 brown trout in the fall of 1970, and 22 in 1971.

Brown trout now comprise a major segment of the fish fauna in the main stream. Collection records and reports by anglers indicate that this is the dominant species in the tributaries. Brown trout of 1/2 to 3/4 pound are fairly common in the river. In the experimental sections, a few of 4-6 pounds were seen each year; larger ones were captured occasionally. The lower parts of the stream contain more of the large fish.

Coho salmon

Coho salmon were planted in Michigan streams for the first time in the spring of 1966, when the Platte River received about 264,000 yearlings.²⁵ Early maturing coho returned to the river from Lake Michigan that fall. A fish barrier, constructed of wood, spanned the stream's channel a few feet above the outlet of the lowermost pond of the trout rearing station that was in use at that time. A fish trap set in the pond's outlet captured salmon that came up the river this far.

By early February 1967, the weir had caught 1,056 coho, all of which were precocious males ("jacks") that averaged 16.2 inches and 1 1/2 pounds (3). Probably more than this number of salmon remained in the river below the weir, which could have included some mature females, although no spawning activity was seen. It was estimated that anglers caught about 400 coho from the river and from Loon and Platte lakes in the fall of 1966 (3).

²⁵ The other streams in which coho were planted in 1966 were Chinks Creek (a tributary of the Big Huron River), Baraga County, and Bear Creek (a tributary of the Manistee River), Manistee County. The only known previous planting of this species in Michigan was one of about 775 small fingerlings into Deep Lake, Oakland County, in March 1945.

The first spawning run of 3-year-old coho salmon entered Platte River in the fall of 1967. A weir of concrete and steel, built in 1967 within the rearing station's grounds, captured the migrants that came up to this point. It caught 51,574 salmon (509,120 pounds), which represented 19.5% of the number released in 1966 (4). Such return was regarded as phenomenally good, and especially in view of these considerations: (1) anglers in 1967 caught about 40,000 of the salmon planted in 1966 in Platte River and Bear Creek; (2) a sizable number of the coho had returned to the Platte in the fall of 1966 as precocious males, all of which died; (3) many of the 1967 migrants did not reach the weir, and therefore were not included in the recovery figure; and (4) some of the adults strayed into other streams. Average size of the weir-caught salmon in 1967 was 28.9 inches and 10.1 pounds (55).

The Platte River harvest weir was built in the summer of 1968 and began functioning that fall. It is situated about 2 miles above the mouth of the river. Besides its use for harvesting salmon during the spawning migration, this weir has been employed to control escapement into the stretch of stream between this point and the upper weir.

Coho caught in the upper weir in 1968 were handled much like those caught in 1967--that is, spawn was obtained for hatchery use, and most of the fish taken in both weirs were marketed under contract arrangements. The two weirs captured 110,657 adults (995,913 pounds), equivalent to 22% of the yearlings planted in Platte River in 1967 (4).

The rate of return of coho to the river, as measured by the weir catches, has declined since 1968. The percentages of return for 1969, 1970, 1971, and 1972 were approximately 11, 14, 11, and 6, respectively. Increased catches by anglers quite certainly accounted for some of this reduction through 1971 (25). Fishing effort increased greatly in volume and range, and techniques for locating and catching the salmon progressively improved.

Although naturally produced salmon have also contributed to the coho fishery, their significance (at least in the Lower Peninsula) has

Table 14. --Coho salmon (yearlings) planted in Platte River, 1966-1973

Year	Average length (inches)	Number planted	Release data			Date
			T.	R.	Sec.	
1966	5.1	264,596	26N	13W	6,7	3/22
1967	5.4	502,700	26N	13W	7	4/20
1968	5.3	250,000	26N	13W	7	4/30
	5.4	58,400	26N	13W	7	5/1
1969	5.5	750,136	26N	13W	7	4/14
	5.7	181,929	26N	13W	7	4/14
	4.7	160,004	26N	13W	7	4/14
1970	5.0	777,640	26N	13W	7	4/20
1971	4.7	60,768	27N	15W	27	3/22
	4.8	179,647	27N	15W	27	3/23
	4.8	149,966	27N	15W	27	3/25
1972	5.0	406,330	26N	14W	13,14	4/10-13
1973	5.5	31,256	26N	14W	12	3/29
	4.7	886,879	26N	14W	12	4/5-26
	5.3	80,795	26N	14W	13	4/28
	5.2	136,203	26N	14W	13	4/30

probably been considerably less than that of planted stock. Table 14 provides information on plantings in Platte River.

The introduction of coho salmon into the upper Great Lakes has until now been eminently successful. Whether this fish will continue to thrive here, only time can tell.

Chinook salmon

Michigan resumed stocking chinook salmon in 1967. In this year, 836,000 fingerlings were put into the Muskegon, Little Manistee, and Huron (Baraga County) rivers. Platte River was first planted with them in 1971.

From 1873 until about 1880, around a million fry of this species (then called California or Quinnat salmon) were planted in many waters of the State, mainly in the southern counties (44). Apparently only small numbers of them reached adulthood, as extremely few captures were reported, and evidently spawning runs and successful reproduction were either meager or did not occur at all. Several less extensive attempts were made in later years to establish chinook salmon in Michigan. ²⁶

Chinook salmon were introduced into Platte River in 1971 and 1972. Below are statistics on the plantings:

1971 release: 53,500 (2.9-inch average, 6 months),
planted 6/10 at Haze Bridge (T. 26N, R. 14W,
Secs. 13, 14)

1972 release: 40,630 (95-100 fish per pound) planted
6/16 and 19 at Haze Bridge

No chinooks were planted in the Platte in 1973 (v)

²⁶ Chinook and landlocked (Atlantic) salmon were planted in the Au Sable River and other waters at least one later year, 1917. Salmon as large as 19 inches and 2 1/4 pounds, undesignated as to species, were reported caught in 1920 (40).

The State released small fingerling Pacific salmon (chinook, coho, and chum) into private Deep Lake, Oakland County, in March 1945. Approximately 2,730 of the total planting of 3,190 fish were chinook salmon, a few of which were caught within the following 2 years. Further information on this planting is available in files of the Fisheries Division.

A few chinook salmon were found in Platte River before any were planted here. One handled at the upper (hatchery) weir on November 14, 1969 was 33 inches long and weighed 15 pounds. At least one other large chinook was taken in this weir that fall. These fish quite likely were strays from the 1967 Little Manistee River planting. Anglers caught some small chinooks (of about 2 pounds) from the Platte in the fall of 1971. These salmon could have been from the release made into Platte River that spring, or from plantings made elsewhere.

In the fall of 1972, a few hundred adult and "jack" chinook salmon were caught in the lower (harvest) weir; also, some large adults (to 25 pounds) were taken by boom shocker below this weir (q). It was estimated that 250-300 chinooks, which weighed 5-15 pounds, were handled at the hatchery weir that fall (u).

PART III. HISTORY OF FISH MANAGEMENT
PROPOSALS AND PRACTICES

Records of fish management practices that have been applied to a body of water are at least of historical interest; more importantly, they may serve as guidance for continuing and improving the procedures. Except fish planting, which is summarized in Part II, practices employed on or proposed for Platte River are reviewed in this section.

Proposals and attempts to deepen
the mouth of Platte River

Some people have thought that shallow depth in the mouth of Platte River prevents the entry of migratory fish from Lake Michigan. Consequently, requests have been made from time to time for deepening the mouth. Even though various evidence has shown that deepening for this purpose is unnecessary, the history of the subject should be reviewed to clarify the issue.

A unique land formation is associated with the shallow outlet of Platte River. As the stream flows westerly in its approach to Lake Michigan, less than a mile above the mouth it begins to turn northward. In the last half mile of its course, the channel generally parallels the curved shoreline of the lake, being separated from the lake at first by a low, narrow dune. This dune eventually declines into a bar which completes the long spit which has forced the stream into a broad, right-hand curve. Where the river enters Lake Michigan it flows east, directly opposite its westward progression after heading out of Lake Ann. Waves and lake currents have formed the spit which directs the river's flow in this area. These forces also quickly fill excavations

that are made in the stream in or near the mouth. This situation has probably existed hundreds of years.

Some fishermen have thought that the shallowness of the outlet, influenced by the conditions described above, often prevents fish from entering the river out of Lake Michigan (6, 54). An outlet channel was cut through the spit, about a half mile above the present mouth, twice in the 1920's (9). A flurry of requests was directed to the State around 1940 for again excavating a channel, when the main concern was with passage of rainbow trout (6, 54). Representatives of the natural resources agency (then the Department of Conservation) were not convinced that a deeper outlet was necessary, but the Department agreed to investigate the situation to find a definite answer.

A weir was constructed in Platte River during October and November 1941 for evaluating fish immigration (54, 56). It was located about a mile above the mouth, in Section 20 of Town 27 north, Range 15 west, where Lake Michigan Road courses close to the river along the north bank, and in a bend of the stream where a knoll occurs on this bank; a public access site, on land owned by the Benzie County Road Commission, is presently situated immediately upstream from this point. ²⁷ This weir functioned from November 1, 1941 through June 20, 1943. Besides affording an evaluation of depth conditions at the mouth, the investigation provided information on the life history of rainbow trout (54, 56). The least maximum depth observed in the mouth of the river during the 20-month investigation was 17 inches. This observation indicated that fish could enter the river any time within that period, which was substantiated by the large number of rainbow trout the weir caught, and the numerous others seen immediately below the structure (54, 56).

²⁷ Rhyner Scholma, who tended the weir in 1943, showed me the specific location of the weir. Information on ownership of the land now occupied by the access site was provided by the Waterways Division, Department of Natural Resources.

The issue of channel dredging was not settled, however, by the findings of the study. It was revived again later in the 1940's, and thereafter a few anglers have occasionally to the present time advocated deepening. In 1949, a private group had an outlet channel dug some distance upstream from the natural mouth (letters: Hoard, Welch, Wilkinson). As it was dug across property without the permission of persons who claimed ownership of the land, the sponsors were sued for trespass. Litigation commenced in the Benzie County Circuit Court, but the case was dismissed there on January 24, 1952, upon request by counsel for the plaintiffs (Olds). No record is at hand to show how long this channel remained open, but presumably sand refilled it soon after excavation.

A fact not commonly recognized is that fish can and do pass through very shallow water, sometimes even where depth is less than that of their bodies.

Sea lamprey control

By the late 1940's it became plainly evident that sea lampreys would have to be severely controlled to save the sport and commercial fishes of the three upper Great Lakes. The first method tried was destruction of adult lampreys when they came into the tributary streams to reproduce. The migrants were caught in weirs installed near the mouths of the streams.

Sea lampreys have used Platte River for spawning. The U.S. Bureau of Commercial Fisheries in 1958 installed an electrical weir a short distance above the mouth for capturing lampreys (r). However, this weir was never put into operation because a chemical for killing immature lampreys came into general use after the weir was installed. This chemical is 3-trifluormethyl 4-nitrophenol (TFM).

Platte River has been treated three times with TFM. The first treatment, which began September 6, 1963, extended from the entry

point of Bell Creek (Sec. 4, T. 26 N, R. 13 W) to the mouth of the river. Additional applications, for maintaining an adequate concentration, were made at the outlets of Platte and Loon lakes (r).

The second treatment was applied during April 19-May 1, 1967, beginning at Burnt Mill Road. As the section of stream between Platte and Loon lakes was not then infested with sea lampreys, this part was not treated. Treatment resumed below Loon Lake and continued to the mouth (r).

The third application of TFM was made during July 21-29, 1970, between Burnt Mill Road and Lake Michigan, and included booster applications at the outlets of Platte and Loon lakes. In addition, granules of 5% "Bayer 73" were scattered on the alluvial fan (about 2 1/2 acres) located immediately below the entry of Platte River into Loon Lake (r).

All of these treatments, which were carried out by the U.S. Bureau of Commercial Fisheries, destroyed large numbers of sea lamprey larvae.

Stream improvement

The Lake and Stream Improvement Section of the Conservation Department's Fisheries Division during 1949 installed 202 fish habitat improvement structures between Burnt Mill Road and the US-31 crossing east of Honor. Most of the devices were single-wing sheet piling deflectors and digger logs, with some log and stump cover included. Besides this work, a stretch of stream channel was deepened, the crew planted willow cuttings in raw banks of dredged channel, and cedar trees were planted also (70, h).

The structures were repaired in 1952 and 1953, which included capping deflectors with sod.

In 1956 and 1957, the Lake and Stream Improvement Section conducted reconnaissance surveys on the Platte River watershed

(69, 70), that were followed by an intensive fish habitat improvement program in 1958 between Burnt Mill Road and Platte Lake. Provision of cover for medium-sized trout (7-12 inches) was emphasized in this program; crews built structures thought favorable for such fish, and modified the design of nearly all the devices installed in 1949 (61). Listed in Table 15 are structures and jobs completed in 1958 (61):

Table 15.--Fish habitat improvement work accomplished on Platte River in 1958

Kind of job or structure	Number
Bank stabilization (rock riprap)	5 (555 feet)
Bank stabilization (cement-sand bag)	1 (70 feet)
Double-wing deflector (sheet piling)	1
Single-wing deflector (sheet piling)	3
Single-wing deflector (rock)	1
Log sod cover	26
Log jam	244
Stump cover	84
Log cover	106
Tree top cover	47
Miscellaneous (clean up junk pile)	1
Modification of old work	200
Total	719

The Lake and Stream Improvement Section in 1959 began an experiment in Platte River to evaluate the effectiveness of fish habitat structures. The upper end of the experimental stretch was located about a half mile down from Pioneer Road (in Sec. 15, T. 26 N, R. 14 W).

Two adjoining 740-foot sections of stream were used for the tests. The upper section contained introduced cover and structures for 3 years (1959-1961), while the lower section had none; then the installations were removed from the upper section and corresponding cover and structures were provided in the lower section. The investigators conducted fish population surveys on both sections each fall for 6 years (1959-1964), and from the inventories estimated the numbers of trout present. These numbers and calculated weights of the trout were used to evaluate the effectiveness of introduced cover. Early results were reported by Wicklund and Spalding (71).

Fishing regulations

Except for extended seasons in the lower and central portions of the main stream, the regulations on trout fishing in Platte River have generally been the same as those on most other Michigan trout streams. In 1946, the fishing season for rainbow trout between the mouth and the US-31 bridge west of Honor was extended to include the months of September, October, and November. The general regulations in 1946 on streams for brook, brown, and rainbow trout were a season from the last Saturday in April to Labor Day, a minimum legal length of 7 inches, and a daily catch limit of 15 trout, but no more than 10 pounds and 1 fish. In 1951, the daily creel limit was reduced to 10 trout, or no more than 10 pounds and 1 fish.

In 1952, an early start of fishing for rainbow trout was provided for a number of Great Lakes tributary streams. The second Saturday of April was the opening day; on Platte River, this provision applied to the section in which fishing through November was permitted. In 1954, the stretch open for early spring and late fall fishing was extended up to the US-31 bridge east of Honor.

The early spring season was discontinued in 1957 after rainbow trout spawning runs had declined because of sea lamprey depredations. It was restored on Platte River in 1966.

Beginning in 1963, brown trout as well as rainbow trout could be removed wherever the long fall season applied, and this provision became effective as well for the special spring season on Platte River in 1966. In 1964, the closing day of trout fishing under the general regulations became the second Sunday in September. For streams or portions of them having the longer spring and fall seasons, the opening day was moved up in 1965 to the first Saturday in April, and in 1973 it became April 1.

Several significant changes in the statewide, general regulations on trout fishing became effective in 1969. The two more important revisions applied to brown trout and rainbow trout, and were as follows: (1) the minimum legal length was increased from 7 inches to 10 inches; (2) the daily catch limit was reduced from 10 to 5, of each species alone, or of both combined. The size and creel limits on brook trout remained at 7 inches and 10 fish. The general season on stream trout was extended to September 30.

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