



LIBRARIES

UNIVERSITY OF WISCONSIN-MADISON

Results and trout management implications of a 9-month creel census on Timber Coulee Creek in 1984. Report 135 [1985]

Hunt, Robert L. (Robert Leroy), 1933-
Madison, Wisconsin: Dept. of Natural Resources, [1985]

<https://digital.library.wisc.edu/1711.dl/4ZALVKLFUTRNX8K>

<http://rightsstatements.org/vocab/InC/1.0/>

For information on re-use see:

<http://digital.library.wisc.edu/1711.dl/Copyright>

The libraries provide public access to a wide range of material, including online exhibits, digitized collections, archival finding aids, our catalog, online articles, and a growing range of materials in many media.

When possible, we provide rights information in catalog records, finding aids, and other metadata that accompanies collections or items. However, it is always the user's obligation to evaluate copyright and rights issues in light of their own use.

John Mason
DNR, Area Office
3911 Fish Hatchery Rd.
Fitchburg WI 53711

57

RESULTS AND TROUT MANAGEMENT
IMPLICATIONS OF A 9-MONTH CREEL
CENSUS ON TIMBER COULEE CREEK
IN 1984

DEPARTMENT OF NATURAL RESOURCES

RESEARCH

By
Robert L. Hunt
Bureau of Research, Waupaca

REPORT 135

OCT 1985

ADMINISTRATIVE SUMMARY

The sport fishery for brown trout at Timber Coulee Creek during 1984 was characterized by very heavy angler use, primarily by local residents, a very impressive harvest by number and weight, and excellent angling quality in terms of average size and catch rates.

However, if the high rate of exploitation by anglers in 1984 is typical, it is a serious biological problem deserving prompt management attention to prevent recurrence.

More restrictive angling regulations should be implemented soon to preserve or enhance the excellent trout fishery this productive stream has the potential to provide.

CONTENTS

INTRODUCTION	2
FISHERY MANAGEMENT HIGHLIGHTS AND IMPLICATIONS	3
RESULTS FROM THE CREEL CENSUS.	5
Season-long Review.	5
Early Season vs. Regular Season	7
EXPLOITATION AND POPULATION DYNAMICS	9
APPENDIX	10
Description of Study Streams.	10
Methods Employed.	11
LITERATURE CITED	23

INTRODUCTION

This report summarizes results of season-long creel census covering 1.6 miles of Timber Coulee Creek in Vernon County (Append. Fig. 1). The census was conducted throughout the 9-month (January through September) trout fishing season in 1984. It covered two fishing zones established as part of a proposed long-term research project to evaluate impacts of an experimental slot size limit on a brown trout fishery. A 1-mile zone is designated as the Treatment Zone in which the experimental regulation would be imposed. An adjacent upstream segment, measuring 0.6 mile, is designated as the Reference Zone where normal regulations for trout streams in Vernon County would apply during the long-term study.

During the 1984 trout fishing season there was a minimum size limit of 6 inches in effect all season. The bag limit was 2/day during the January 1 -May 4 period and 5/day for the remainder of the season.

Because of the present concern among DNR fish managers in southern Wisconsin to evolve a new set of more effective trout fishing regulations for that region, and because of the scarcity of creel census studies from counties where the trout fishing season is 9 months long, I decided to publish the results of the 1984 creel census on Timber Coulee for their inherent management value now rather than postponing publication until the long-term research project is completed. In the report that follows, information from both study zones is combined and treated as if it came from one zone only--simply a 1.6-mile reach of Timber Coulee Creek.

This report departs from the traditional format of a technical publication, i.e., introduction, description of study area, methods, results, discussion. Technology transfer is the up-front focus of this report. Highlights of the 1984 findings and their fishery management implications are stressed. Supporting tables, figures, and methodology are relegated to Appendix sections.

FISHERY MANAGEMENT HIGHLIGHTS AND IMPLICATIONS

During the 9-month trout fishing season, angling pressure in the study zone was estimated to be 1,063 hours/acre. This is the highest intensity of use observed on a Wisconsin trout stream measured by this index. It exceeded by 124% the amount of use recorded on a 2.5-mile portion of Rowan Creek in Columbia County during a 9-month season in 1979 (Larson 1982).

Greater intensity of angler use on a "per mile" basis was recorded on a 1-mile portion of the Race Branch of the Willow River in St. Croix County during the 1976-79 fishing seasons (Hunt 1981) than was observed on Timber Coulee in 1984. However, on a "per acre" basis, the Race Branch fishery now stands in second place on the list of trout waters where angler use has been documented in Wisconsin.

The Race Branch received 1,845 trips/mile vs. 1,683 trips/mile on Timber Coulee, but highest recorded use on a per acre basis for the Race Branch was 1,015 hours in 1977 (5% less than Timber Coulee value) and the 4-year average for 1976-79 was 856 hours/acre. Fishing seasons on the Race Branch during 1976-79 were 5 months long (May-September).

Angler harvest of the brown trout (Salmo trutta) population in the study zone on Timber Coulee exceeded replacement potential via natural recruitment. Minimum exploitation was estimated to be 50% of the preseason population and 70% of that portion of the preseason population with lengths that were 6 inches or larger.

Long-term exploitation rates exceeding 40% of the legal-sized component of brown trout populations should be considered excessive, as they now are for brook trout (Salvelinus fontinalis) populations, until more thorough studies of the dynamics of exploited populations of brown trout are completed.

Angler use and harvest were proportionately less during the 4-month "early season" (January through April) than during the 5-month "regular season" (May through September), but in combination the results of a season length of 9 months were overexploitation of the population as a whole and severe reduction of trout over 14 inches. Exploitation of the latter portion of the standing stock was proportionately greater during the early season than during the regular season.

Harvest was equivalent to 1,162 trout/mile or 196 pounds/acre. These values are 3-4 times greater than comparable values for brown trout fisheries on 4 central Wisconsin streams (Avery and Hunt 1981) and 12-15 times greater than comparable values for brown trout fisheries censused on 2 northern Wisconsin streams (Avery 1983).

Average length of the trout creel at Timber Coulee in 1984 was 10.6 inches, a very high value for Wisconsin. Approximately 13% of the trout harvested were 12 inches or larger. A minimum size limit of 9 inches would have theoretically reduced harvest by only 8%. A 10-inch size limit would have resulted in a 30% reduction.

Higher than normal catch rates also typified the Timber Coulee fishery: 0.4 trout/hour creeled and 1.1 trout/hour released.

Approximately 3 trout were released for every trout kept. The statewide average is about 1:1.

Most of the brown trout released were probably legal sized. Anglers kept few trout less than 8 inches. Release of legal-sized trout, particularly by fly-fishers during the May-September period, helped to reduce the impact of harvest on the standing stock.

Anglers using natural baits were less common on Timber Coulee and anglers using flies were more common than is typical for stream trout fisheries in Wisconsin.

About half of the fishing pressure and harvest and one-fourth of the trout released were accounted for by anglers using natural baits exclusively.

About one-fourth of the trips and harvest and half of the trout released were accounted for by fly-fishers.

The proportion of angling trips on which no trout are caught commonly exceeds 50%, even on streams noted to provide good fishing (in Wisconsin and elsewhere). At Timber Coulee only 40% of the angling trips were "unsuccessful" by this criterion in 1984, an indication that fishing skill is above average among anglers participating in this fishery.

Anglers residing within 25 miles of Timber Coulee accounted for 87% and 90% respectively of the fishing trips made during the early season and regular season. Despite the excellent fishing quality this stream provides, it attracts few nonlocal anglers.

Results of this one-season creel census on Timber Coulee lead to the preliminary conclusion that changes are needed in the present fishing regulations to reduce the rate of harvest. Five kinds of changes should be considered to reduce the level of exploitation by at least 20% to enhance or at least maintain the excellent fishing quality this productive stream can continue to provide in the future as angling use of trout waters in this region of the state continues to intensify:

1. Shorten the season length at one end or the other, or both.
2. Increase the minimum size limit to at least 9 inches.
3. Reduce the present daily bag limit of 5 during May-September.
4. Encourage more anglers to practice voluntary "recycling" by releasing legal-sized trout they catch.
5. Apply some variety of special regulations that require "catch and release" of most of the trout caught.

RESULTS FROM THE CREEL CENSUS

Season-long Review

Angling Pressure During the 274-day trout fishing season, angling effort on the 1.6 mile reach of Timber Coulee in the study zone was equivalent to 1,683 trips/mile, an average of 6 trips/mile/day. Anglers spent 4,679 hours fishing in the study zone, an amount equivalent to 2,924 hours/mile or 1,063 hours/acre (Append. Table 1). Monthly fishing effort was least in January (36 hours/acre) and greatest in May (217 hours/acre).

The average fishing trip lasted 1.7 hours.

Approximately 50% of the fishing pressure occurred on weekends and holidays that comprised about 30% of the total days in the season (Append. Table 2).

Catch Harvest of brown trout was equivalent to 1,162/mile or 423/acre. Weight of this harvest was 539 pounds/mile or 196 pounds/acre (Append. Table 3). Monthly harvest, like fishing effort, was least in January (31 trout/mile) and greatest in May (336 trout/mile).

Average length of the trout kept was 10.6 inches (Append. Fig. 2).

Trout less than 7 inches comprised only 1% of the harvest; those less than 8 inches comprised 5% of the harvest. Trout 12 inches or larger accounted for 13% of the harvest.

Anglers reported releasing 3,203 trout/mile or 1,165/acre. An average of 2.8 trout were released for every trout kept (Append. Table 1).

Catch rates for all anglers combined, independent of the type of bait used, were 0.4 trout/hour creeled and 1.1 trout/hour released.

Baits Anglers using natural baits accounted for 51% of all hours fished, 55% of the trout creeled and 26% of the trout released. Fly-fishers accounted for 24% of the total hours, 21% of the trout kept, and 51% of the trout released. The remainders were accounted for by anglers using spinning gear and a combination of lures (Append. Table 4).

Catch rates by anglers using natural baits were 0.42 trout/hour creeled and 0.58 trout/hour released. Fly-fishers averaged 0.36 trout/hour creeled and 2.37 trout/hour released.

Angler Success No trout were caught on 42% of the angling trips. One or more trout were caught but none were kept on 26% of the angling trips. One or more trout were kept on 32% of the angling trips (Append. Table 5).

Anglers who kept 1 or 2 trout/trip accounted for 48% of all trout harvested.

On 6% of the trips 10 or more trout were released. Approximately 38% of all the trout released but only 3% of the trout harvested were taken on these few trips.

On 13% of the trips 1 or more trout were caught and kept and none were released. These anglers accounted for 36% of the total harvest.

Residence Approximately 90% of the fishing trips, 87% of the hours fished, and 92% of the trout creel were recorded by anglers residing within 25 miles of the stream (Append. Table 6).

More than 90% of the anglers interviewed in the study zones were residents of Wisconsin (Append. Table 7).

Party Size Anglers fishing alone accounted for 34% of the total trips; parties of 2 anglers accounted for 49% of all trips. Average party size was 1.9 anglers (Append. Table 8).

Length of Fishing Trip Length of the "fishing day" increased from month to month during the January-May period, held steady during May-July, and then gradually declined during July-September (Append. Fig. 3).

During January, anglers fished from about 9:00 a.m. to 5:00 p.m. with peak effort expended during the 11:00 a.m.-noon period and 3:00 p.m.-4:00 p.m. period.

During February anglers were observed in the study zone from 7:00 a.m. to 6:00 p.m. Peak use was during midday.

Midday and early afternoon hours were the preferred time to fish in March and April.

"Fishing days" spanned a 15-hour period during May-July, from about 5:00 a.m. to 8:00 p.m.

Anglers started fishing later in the day during August and still later in September. Quitting time remained about the same (8:00 p.m.) as that during May-July.

Early Season vs. Regular Season

Creel census data obtained during 1984 were separated into an "early season" covering the months of January through April and a "regular season" period covering the months of May through September. Technically, the "regular season" did not begin until May 5th, the first Saturday in May, but for convenience in processing, analyzing, and presenting the results of the 1984 creel census, the first 4 days of May were arbitrarily assigned to the regular season period. The early season, therefore, was 121 days long and the regular season was 153 days long, a 44%/56% split of the entire 9-month season.

Angler effort and catch (both trout kept and trout released) were proportionately greater during the regular season than during the early season in relation to the relative length of each "season" (Append. Fig. 4).

Angling Pressure

During the early season, angling effort amounted to 478 trips/mile or 336 hours/acre. During the regular season comparable values were 1,205 trips/mile and 728 hours/acre. Fishing intensity during the regular season was, therefore, 152% greater in terms of trips/mile and 117% greater based on hours/acre. There were approximately 4 trips/mile/day during the early season and 8 trips/mile/day during the regular season.

During the early season 75% of the angling hours were recorded on weekends and holidays. This percentage declined to 38% during the regular season (Append. Table 2).

The average fishing trip lasted 1.9 hours during the early season vs. 1.7 hours during the regular season.

Harvest

Harvest was equivalent to 189 trout/mile (69/acre) during the early season vs. 973/mile (365/acre) during the regular season. Harvest computed on a daily average amounted to 1.6 trout/mile/day for the early season and 6.4 trout/mile/day for the regular season.

Anglers removed 102 pounds/mile (37 pounds/acre) during the early season. Removal increased to 437 pounds/mile (159 pounds/acre) during the regular season (Append. Table 13).

Length

Average length of the trout creel was also greater for the early season than for the regular season, 10.9 inches vs. 10.5 inches.

The estimated harvest of trout that were 14 inches or larger from the study zone was 45 (28/mile); 60% of these were taken during the early season.

Rates	Catch rates averaged 0.20 trout/hour creeled and 0.75 trout/hour released during the early season vs. 0.49 trout/hour creeled and 1.25 trout/hour released during the regular season.
Baits	<p>Anglers using natural baits exclusively during the early season accounted for 50% of the total hours, 52% of the harvest, and 35% of the number of trout released (Append. Table 4).</p> <p>Anglers using flies exclusively accounted for 17% of the early season hours, 16% of the harvest then, and 34% of the total released.</p> <p>During the regular season bait-fishers contributed 52% of the total hours, took 55% of the trout creeled, and released 25% of the trout. Fly-fishers put in 27% of the hours fished, creeled 22% of the harvest, and released 56% of the trout returned to the stream.</p>
Trout Caught/ Released	<p>No trout were caught on 50% of the trips made during the early season vs. 38% of the trips made during the regular season. One or more trout were kept on 26% of the trips during the early season and on 34% of the trips made during the regular season (Append. Table 5).</p> <p>The ratio of trout released to trout kept was higher for the early season period than for the regular season period, 3.7:1 vs. 2.6:1.</p> <p>All trout caught were released on 24% of the early season trips and on 27% of the regular season trips.</p> <p>Anglers released 10 or more trout/trip on 1% of the early season trips compared to 8% of the regular season trips.</p>
Bag Limit	The maximum daily bag limit of 2 trout during January-April was reached on 13% of the trips during this 4-month period. During May-September, when the daily bag limit increased to 5, only 2% of the anglers caught and kept a limit. These limit catches, however, made up 13% of the total number of trout harvested during the regular season.
Residence	Anglers living within 25 miles of Timber Coulee accounted for 87% of the early season trips and 90% of the regular season trips. They logged 85% and 87% of the hours and during both periods they creeled 92% of the total take-home catch (Append. Table 6).

EXPLOITATION AND POPULATION DYNAMICS

On 3 October 1983 the study zone held approximately 3,744 brown trout of which 2,672 were 6 inches or larger based on a mark/recapture electrofishing inventory of the entire study zone. This inventory included the age 0, 1983 year class (Append. Table 9).

If no natural mortality of trout occurred in the study zone and there was no movement of wild or domestic trout in or out of the study zone from 3 October 1983 to 1 January 1984, subsequent angler exploitation during the 1984 fishing season amounted to 50% of the "preseason" population as a whole and 70% of the preseason number of trout 6 inches or larger. Estimated harvest was 1,859 trout.

These theoretical exploitation rates for the 1984 season should be viewed cautiously until more is known about natural mortality and movement of trout in this stream. Taken at face value, however, both rates must be considered excessive, and if perpetuated, are bound to have depressing impacts on the quantity and quality of future standing stocks and the sport fisheries they support.

Angling mortality was not as great during the early season as during the regular season, in proportion to the relative length of each season.

Exploitation during the early season (again assuming a stable population from 3 October to 1 January) was 8% for the population as a whole and 11% for those 6 inches or larger. Comparable rates for the regular season were 42% and 58%.

If an upper limit of 35-40% exploitation of preseason abundance is accepted as valid for brown trout fisheries as well as brook trout fisheries (McFadden 1961), it is evident that even during the 5-month regular season the harvest approached or exceeded a level of overexploitation. Extension of the length of the fishing season simply exacerbates that biological problem, even though relative rates of exploitation are less during the early season extension.

The standing stock of brown trout present at the close of the 1984 fishing season was not as good in quality or quantity in comparison to the standing stock present a year earlier (Append. Table 10). There were 34% fewer trout of all sizes, 40% fewer trout 6 inches or larger, and 74% fewer trout 14 inches or larger. Exploitation of that component of the stock represented by trout 14 inches or larger was proportionately greater during the early season than during the regular season.

More years of observations on harvest and normal fluctuations in population abundance are necessary to accurately characterize the significance of angling mortality as a component of total annual mortality, but the decline in abundance and quality of the brown trout stock in the study zone from October 1983 to October 1984 does not contradict the probability that harvest by anglers was excessive in 1984 and that remedial management measures should be taken to prevent its repetition. Until more precise exploitation rates can be determined, it would seem prudent to err on the side of protection rather than

foster circumstances leading to excessive depletion of the wild brown trout population in the study zone.

APPENDIX

DESCRIPTION OF STUDY STREAM

Timber Coulee Creek is located in northwest Vernon County, about 20 miles southeast of the City of La Crosse in the unglaciated "Coulee region" of Wisconsin. Approximately 208 miles of streams in Vernon County are managed as trout water, including all 8.2 miles of Timber Coulee. About 60% of Timber Coulee is presently managed as Class I water, where no domestic trout are stocked, and 40% is managed as Class II water which receives an annual stocking of 5,000 age 0 brown trout in the fall and 1,000 age I brown trout in the spring.

The stream is very fertile (MOA of 225), alkaline (pH of 8.0), and has a moderately high gradient (40 ft/mile) for a trout stream in Wisconsin. Surface area of the stream is about 14 acres.

Much of the watershed of 18 square miles is agricultural, plus some hardwood forests along the hilltops. The riparian zone is predominantly pasture land for dairy cattle. About 90% of the stream frontage is included in perpetual easements owned by the state. Public access, therefore, is excellent and fishability is generally easy.

Extensive portions of the stream have received intensive modification with trout habitat improvement structures made of large rock supported by wooden subsurface platforms to narrow and deepen the stream and increase pool area and underbank hiding cover.

The riffle:pool ratio is excellent (47%:53%). Substrate of the riffles is dominated by well-armored cobble (fist-sized stones) and gravel.

County Road P closely borders much of the stream, adding to ease of access for anglers.

Timber Coulee is one of several trout streams that collectively constitute the Coon Creek system (Append. Fig. 1).

The study area on Timber Coulee is delineated at its upper boundary by the confluence of Bergen Coulee and Timber Coulee. A road bridge, Olstad Bridge, crosses the study zone 0.6 mile below the upstream boundary. The lower boundary of the study zone is 1 mile, by stream thread, below the bridge. It is marked by a boundary fence line near a farm vehicle access trail also utilized by anglers.

Average width of the 1.6-mile study zone is 23.4 feet and surface area is 4.4 acres.

During the summer of 1984 maximum water temperatures recorded at the upper and lower boundaries of the study zone were 64 F and 65 F respectively in August.

The sport fishery is almost 100% dependent on brown trout. An occasional wild brook trout is recruited from a small tributary entering in the study zone. No domestic trout were stocked in the study zone in 1984 but trout stocked in Class II water just below the study zone and in Class II water several miles above the study zone are free to move into the zone as are wild brown trout from the Class I portion of stream above the study zone.

METHODS EMPLOYED

Trout Population Inventories

The standing stock of trout in the study zone was censused on 3 October 1983 and again on 1 October 1984. A standard DNR stream shocker unit was employed. It had a 220-volt D-C generator and 3 positive electrodes. Electrofishing proceeded upstream from the lower boundary of the study zone. Trout collected by the crew were transported in a tub of water on the electrofishing boat. Trout were transported varying distances of 100 to several hundred yards depending on the number being collected.

A second processing crew followed behind the collecting crew until sufficient trout had been collected to make it worthwhile to set up processing procedures.

Trout captured on the first or "marking" run were measured to the nearest 0.1 inch (total length) and weighed to the nearest gram. Each received a temporary mark (excision of lower lobe of caudal fin) prior to being released. After examination and marking were done, trout were transported in a perforated garbage can partially filled with water downstream to the point at which collection of that lot of trout began before they were released. Meanwhile the electrofishing crew continued collection until the processing crew could catch up or another tub of trout had been collected.

All age 0 trout collected were given a permanent year class mark to aid in establishing known-aged individuals in future electrofishing inventories and in the catch by anglers. Age 0 was clearly separated from age I by a gap between the length frequency of each age group.

On the second or "recapture" electrofishing run through the study zone the following day, trout were tallied by inch groups and permanent year class marks, if present. Age 0 trout captured for the first time were permanently marked before release.

Population estimates were made by inch group using the Bailey modification of the Petersen mark and recapture formula. Estimates were made by inch group because electrofishing efficiency of capture varies substantially in relation to size of fish being sampled. Estimates by inch group were added to obtain estimates for the population in the study zone.

Estimates of biomass were derived for each inch group from the product of average weight/inch group and estimated number/inch group. Whenever possible, average weights were based on sample sizes of 50 individual weights.

Creel Census

A partial creel census was operated in the study zone throughout the 9-month trout fishing season on Timber Coulee in 1984. The census involved periodic "instantaneous counts" of angler vehicle in the study zone and anglers present from the upper boundary to Olstad Bridge, plus interviews with anglers. Emphasis was placed on interviewing anglers who had completed their fishing trips.

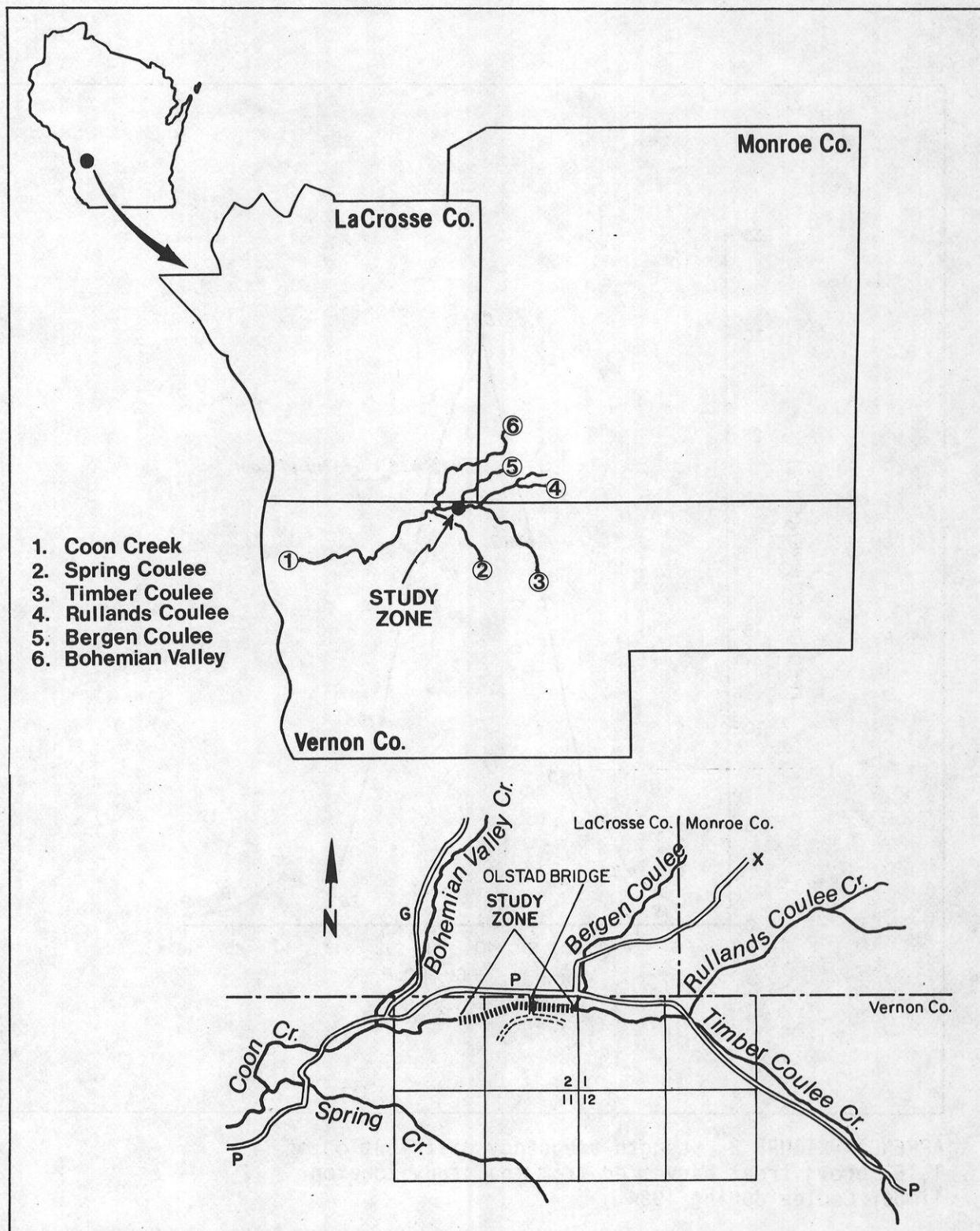
Counts of vehicles and anglers on census days were made at intervals no longer than 2 hours. Each count took only a few minutes to drive a route on County Road P that paralleled the study zone plus a count of vehicles at the Olstad Bridge. From this bridge the upper 0.6-mile portion of stream was entirely visible, so it was possible to also "instantaneously" count anglers there.

Starting and ending times of the census shifts were adjusted as the fishing season progressed in response to weather conditions, hours of daylight, and behavior of anglers in the study zone. During January-March, work shifts began no earlier than 9:00 a.m. and terminated by 6:00 p.m. The "fishing day" was extended from 7:00 a.m. to 8:00 p.m. during May-September. When the length of time anglers were present began to exceed 8 hours, randomly assigned "a.m." or "p.m." shifts of 8 hours were censused.

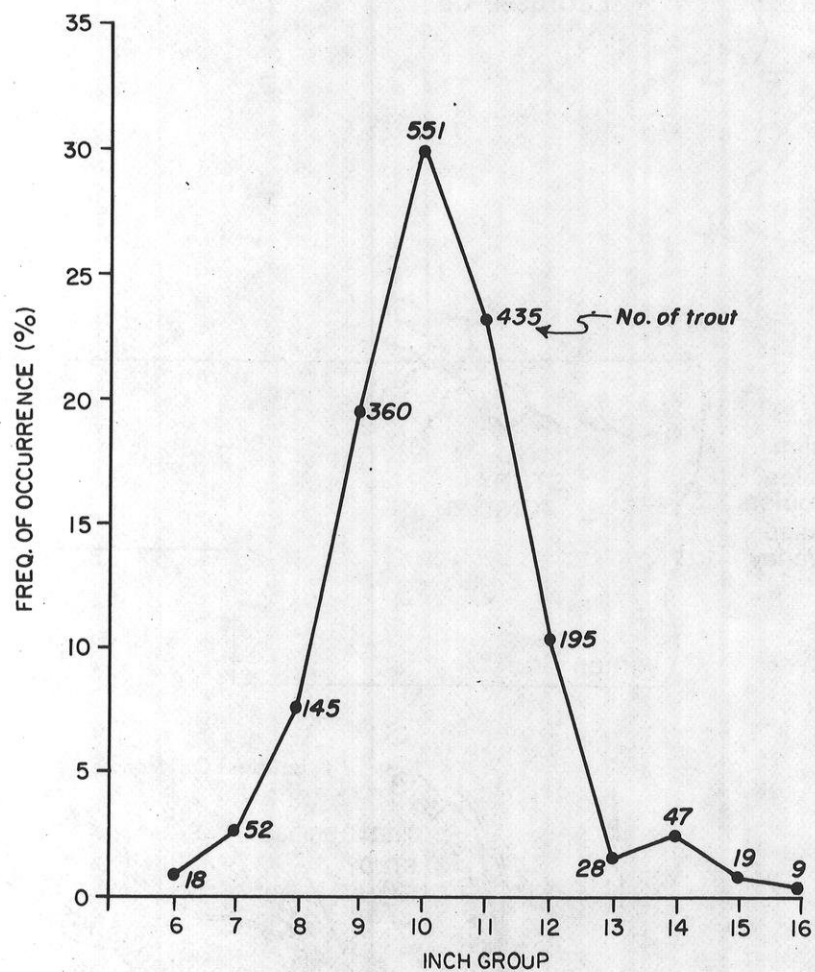
Fishing pressure, in terms of angler trips and angler hours, was calculated monthly. Separate estimates were made each month for fishing effort on week days vs weekends and holidays. Calculations followed procedures and formulas summarized by Avery (1983), Hunt (1981), and Lambou (1961).

Interview information was collected on a standard DNR form for stream trout fisheries that provided such data as anglers/party, residence and distance travelled, time spent fishing, baits employed, number of trout kept, and number released. Lengths of trout kept were recorded to the nearest 0.1 inch. Fin clips were also noted.

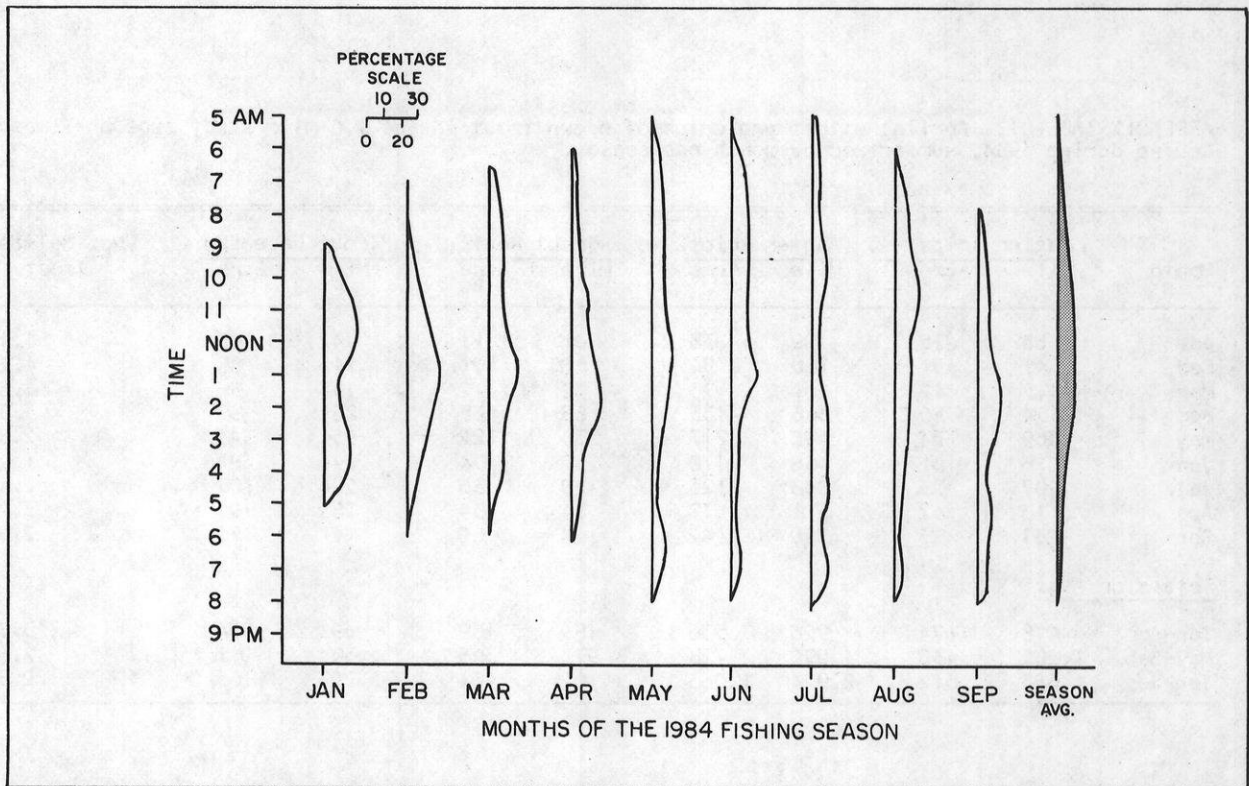
The creel census conducted in 1984 covered 67% of the weekdays of the season and 60% of the weekend days and holidays. Interviews were held with 663 anglers. Data were obtained from 214 trout kept by the anglers interviewed.



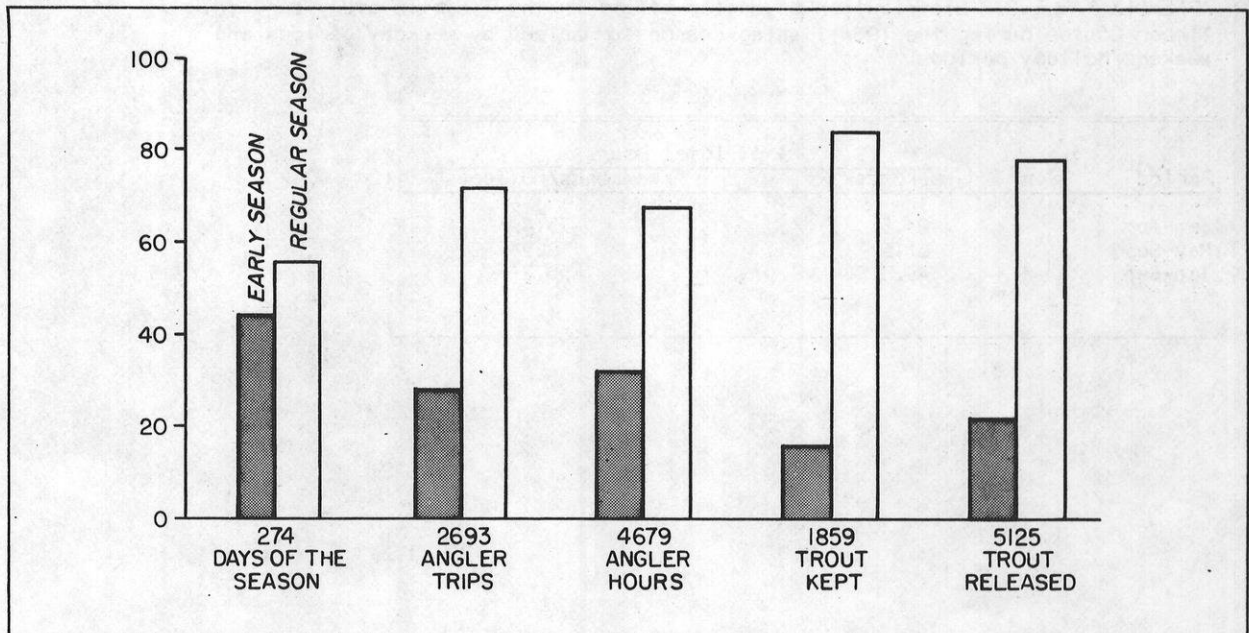
APPENDIX FIGURE 1. Site map of the 1.6-mile study zone on Timber Coulee in Vernon County. Timber Coulee is one of several trout streams comprising the Coon Creek system in La Crosse, Monroe and Vernon counties. The upper end of the study zone is at the confluence of Bergen Coulee and Timber Coulee. Much of Timber Coulee is paralleled by County Road P.



APPENDIX FIGURE 2. Length frequency distribution of 1,162 brown trout harvested from the study zone on Timber Coulee during 1984.



APPENDIX FIGURE 3. Percentage distributions of the hours of angling effort each month in the 1.6-mile study zone on Timber Coulee during the 1984 trout fishing season.



APPENDIX FIGURE 4. Proportions of total angler effort and total catch accounted for during the 4-month early season vs. the 5-month regular season on the 1.6-mile study zone of Timber Coulee.

APPENDIX TABLE 1. Angling effort and catch of brown trout in the 1.6-mile study zone on Timber Coulee during 1984, summarized by month and season.

Month	Angler Trips		Angler Trips		Trout Kept		Trout Released		No. Released Per Trout Kept
	Mile	Acre	Mile	Acre	Mile	Acre	Mile	Acre	
Jan	68	25	99	36	31	11	42	15	1.4
Feb	141	51	260	94	58	21	243	88	4.2
Mar	115	42	201	73	32	12	153	56	4.8
Apr	154	56	366	133	68	25	261	95	3.8
May	369	134	596	217	336	122	954	347	2.8
Jun	276	101	468	170	259	94	496	181	1.9
Jul	207	75	333	121	120	55	294	107	2.4
Aug	116	42	211	77	94	34	289	105	3.1
Sep	237	86	390	142	164	60	471	171	2.9
Totals or Avg.									
Jan-Apr	478	174	926	336	189	69	699	254	3.7
May-Sep	1,205	438	1,998	728	973	365	2,504	911	2.6
Jan-Sep	1,683	612	2,924	1,063	1,162	434	3,203	1,165	2.8

APPENDIX TABLE 2. Distribution of angler effort in the 1.6-mile study zone on Timber Coulee during the 1984 fishing season summarized by weekday periods and weekend/holiday periods.

Period	% of Total Hours	
	Weekdays	Weekends/Holidays
Jan-Apr	24.6	75.4
May-Sep	61.5	38.5
Jan-Sep	49.8	50.2

APPENDIX TABLE 3. Number and weight of brown trout harvested from the 1.6-mile study zone on Timber Coulee during 1984, summarized by inch group.

Inch Group	No. Creeled	% of Total No.	Cumulative %	Lbs. Creeled	% of Total Wt.	Cumulative %
6	18	1.0	1.0	1.6	0.2	0.2
7	52	2.8	3.8	7.1	0.8	1.0
8	145	7.8	11.6	31.3	3.6	4.6
9	360	19.4	31.0	96.5	11.2	15.8
10	551	29.6	60.6	218.6	25.4	41.2
11	435	23.4	84.0	245.5	28.5	69.7
12	195	10.5	94.5	143.6	16.7	86.4
13	28	1.5	96.0	25.2	2.9	89.3
14	47	2.5	98.5	53.6	6.2	95.5
15	19	1.0	99.5	24.0	2.8	98.3
16	9	0.5	100.0	15.0	1.7	100.0

Totals

Jan-Apr	302	163
May-Sep	1,559	699
Jan-Sep	1,859	862

Average length (inches)

Jan-Apr	10.9
May-Sep	10.5
Jan-Sep	10.6

Average wt. (lbs)

Jan-Apr	0.54
May-Sep	0.45
Jan-Sep	0.46

No. creeled/mile:

Jan-Apr	188
May-Sep	974
Jan-Sep	1,162

Lbs creeled/mile

Jan-Apr	102
May-Sep	437
Jan-Sep	539

Lbs creeled/acre

Jan-Apr	37
May-Sep	159
Jan-Sep	196

APPENDIX TABLE 4. Angler effort and catch of brown trout in the 1.6-mile study zone of Timber Coulee during the 1984 fishing season, summarized by months and types of baits used.

Months of The Season	Angler Trips					Angler Hours					Trout Kept					Trout Released				
	Natural	Spin	Fly	Comb.	All	Natural	Spin	Fly	Comb.	All	Natural	Spin	Fly	Comb.	All	Natural	Spin	Fly	Comb.	All
Jan	60	11	27	11	109	115	8	25	11	159	38	0	0	12	50	51	0	5	11	67
Feb	133	50	25	17	225	254	66	51	45	416	51	21	3	17	92	196	90	42	60	388
Mar	71	41	32	40	184	114	83	36	89	322	14	9	6	22	51	58	53	53	81	245
Apr	105	45	49	48	247	260	61	143	122	586	55	8	40	6	109	86	22	283	27	418
May	373	72	114	31	590	606	118	111	118	953	380	76	74	8	538	598	170	746	13	1,527
Jun	321	41	54	26	442	496	80	106	67	749	326	36	31	22	415	243	57	490	4	794
Jul	138	47	129	17	331	228	56	214	34	532	85	31	58	18	240	98	13	324	36	471
Aug	59	44	70	13	186	122	69	125	22	338	58	15	59	18	150	29	42	381	10	462
Sep	155	37	168	19	379	196	67	302	59	624	70	32	126	34	262	19	19	696	19	753
Monthly Totals																				
Jan-Apr	369	147	133	116	765	743	218	255	267	1,483	158	38	49	57	302	391	165	383	179	1,118
May-Sep	1,046	241	535	106	1,928	1,648	390	858	300	3,196	858	190	348	100	1,557	987	301	2,254	82	4,007
Jan-Sep	1,415	388	668	222	2,693	2,391	608	1,113	567	4,679	1,016	228	397	157	1,859	1,378	466	2,637	261	5,125

APPENDIX TABLE 5. Distribution of angling trips in the 1.6-mile study zone on Timber Coulee during the 1984 fishing season according to the number of trout kept per trip and number released per trip.

Period	Number Kept/Trip	No. of Trips According to No. Released/Trip								Total No. Trips	Total No. Released	Total No. Kept
		0	1	2	3	4	5	6-9	10+			
Jan-Apr	0	383	61	42	20	20	14	23	2	565	542	0
	1	24	33	12	12	8	4	5	0	98	182	98
	2	15	16	20	8	7	10	21	5	102	394	204
	No. trips	422	110	74	40	35	28	49	7	765	--	--
	No. released	0	110	148	120	140	140	384	76	--	1,118	--
May-Sep	No. kept	54	65	52	28	22	24	47	10	--	--	302
	0	739	130	98	56	54	28	34	125	1,264	2,635	0
	1	133	28	14	9	3	5	10	14	216	370	216
	2	98	22	21	8	20	11	8	3	191	423	382
	3	30	33	16	5	4	2	12	8	110	288	330
Jan-Sep	4	36	19	24	10	5	3	9	0	106	168	424
	5	11	7	6	4	1	1	11	0	41	123	205
	No. trips	1,047	239	179	92	87	50	84	150	1,928	--	--
	No. released	0	240	356	276	348	250	648	1,889	--	4,007	--
	No. kept	618	282	230	100	80	50	153	44	--	--	1,557
Jan-Sep	0	1,122	191	140	76	74	42	57	127	1,829	3,177	0
	1	157	61	26	21	11	9	15	14	314	552	314
	2	113	55	41	16	27	21	29	8	293	817	586
	3	30	33	16	5	4	2	12	8	110	288	330
	4	36	19	24	10	5	3	9	0	106	168	424
Jan-Sep	5	11	7	6	4	1	1	11	0	41	123	205
	No. trips	1,469	349	253	132	122	78	133	157	2,693	--	--
	No. released	0	350	504	396	488	390	1,032	1,965	--	5,125	--
	No. kept	672	347	282	128	102	74	20	54	--	--	1,859

APPENDIX TABLE 6. Distributions of angler trips, angler hours, and catch of brown trout in the 1.6-mile study zone on Timber Coulee during 1984 according to the distance anglers travelled from their residence to the stream.

Distance in Miles	Angler Trips						Angler Hours						Trout Kept						Trout Released					
	Jan-Apr		May-Sep		Both		Jan-Apr		May-Sep		Both		Jan-Apr		May-Sep		Both		Jan-Apr		May-Sep		Both	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0-24	669	87.5	2,125	90.2	2,794	89.5	1,265	85.3	3,306	87.2	4,571	86.7	279	92.4	1,702	91.7	1,981	91.8	951	85.1	4,894	94.0	5,845	92.4
25-49	16	2.1	22	0.9	38	1.2	36	2.4	20	0.5	56	1.1	0	0.0	0	0.0	0	0.0	25	2.2	0	0.0	25	0.4
50-99	58	7.6	128	5.4	186	6.0	143	9.6	317	8.4	460	8.7	20	6.6	104	5.6	124	5.7	135	12.1	216	4.1	351	5.5
100+	22	2.8	81	3.5	103	3.3	39	2.7	147	3.9	186	3.5	3	1.0	50	2.7	53	2.5	7	0.6	98	1.9	105	1.7
Total	765		2,356		3,121		1,483		3,790		5,273		302		1,856		2,158		1,118		5,208		6,326	

* % of the total number of trips, hours, or catch for each grouping of months or for the entire season (both).

APPENDIX TABLE 7. Percentages of angler effort and catch of brown trout in the 1.6-mile study zone on Timber Coulee accounted for during the 1984 fishing season by residents of Wisconsin.

Months of Season	Angler Trips	Angler Hours	Trout Kept	Trout Released
Jan-Apr	92	89	95	89
May-Sep	93	92	93	93
Jan-Sep	93	91	94	91

APPENDIX TABLE 8. Average number of anglers/car in the 1.6-mile study zone on Timber Coulee during the 1984 fishing season, summarized by month.

Month of Season	Avg. No. Anglers/Car
Jan	2.1
Feb	1.8
Mar	1.8
Apr	1.9
May	1.9
Jun	2.1
Jul	1.9
Aug	1.6
Sep	1.6
Jan-Apr avg.	1.9
May-Sep avg.	1.8
Season avg.	1.9

APPENDIX TABLE 9. Number and weight of brown trout in the 1.6-mile study zone on Timber Coulee on 3 October 1983, summarized by age group and inch group.

Inch Group	Number of Trout			Total No.	Total Wt. (lb)
	0	1	11+		
3	148			148	2.9
4	549			549	16.8
5	375			375	17.4
6	34	44		78	7.0
7		313		313	42.9
8		710		710	153.8
9		717		717	202.8
10		530		530	209.7
11		12	83	95	53.6
12			55	55	40.6
13			67	67	60.4
14			45	45	51.4
15			39	39	49.5
17			11	11	18.4
17			6	6	10.8
18			4	4	8.9
19			1	1	3.0
20					
21					
22			1	1	4.8
NUMBER SUMMARY					
Total No.	1,106	2,326	312	3,744*	
No/mile:					
Total	1,535	3,206	420	5,161	
Over 6 inches				3,674	
Over 14 inches				138	
WEIGHT SUMMARY					
Total Wt. (lb)	40.1	619.9	294.7		954.7
Lb/mile					1,300.0
Lb/acre					217.0

*The standard error for this estimate is ± 281 .

APPENDIX TABLE 10. Number and weight of brown trout in the 1.6-mile study zone on Timber Coulee on 1 October 1984, summarized by age group and inch group.

Inch Group	Number of Trout				Total No.	Total Wt. (lb)
	0	I	II+	III+		
3	45				45	0.8
4	485				485	14.5
5	318				318	14.7
6	27	2			29	2.6
7		176			176	24.7
8		408	20		428	94.1
9		183	196		379	106.1
10		32	270		302	120.8
11			193		193	108.1
12			9	63	72	53.3
13			1	14	15	13.5
14				13	13	14.8
15				10	10	12.7
16				5	5	8.3
17				5	5	9.0
18						
19				2	2	4.8
20				3	3	9.2
NUMBER SUMMARY						
Total No.	875	801	689	115	2,480*	
No/mile:						
Total	1,233	1,040	932	138	3,343	
Over 6 inches					2,153	
Over 14 inches					44	
WEIGHT SUMMARY						
Total wt. (lb)	32.4	178.6	283.0	118.0		612.0
Lb/mile						800.4
Lb/acre						139.1

*The standard error for this estimate is ± 171 .

LITERATURE CITED

- Avery, E. L.
1983. Population dynamics of wild trout and associated sport fisheries in two northern Wisconsin streams. Wis. Dep. Nat. Resour. Tech. Bull. No. 141. 31 pp.
- Avery, E. L. and R. L. Hunt
1981. Population dynamics and associated sport fisheries in four central Wisconsin streams. Wis. Dep. Nat. Resour. Tech. Bull. No. 121. 26 pp.
- Hunt R. L.
1981. A successful application of catch and release regulations on a Wisconsin trout stream. Wis. Dep. Nat. Resour. Tech. Bull. No. 119. 30 pp.
- Lambou, V. W.
1961. Determination of fishing pressure from fishermen or party counts with a discussion of sampling problems. In Proc. 15th Annu. Conf. Southeast Game Fish Comm. pp. 380-401.
- Larson, T.
1982. Characteristics of the sport fishery of Rowan Creek and the impact of fishing on the wild brown trout population. Wis. Dep. Nat. Resour. Fish Manage. Rep. 112. 15 pp.
- McFadden, J. T.
1961. A population study of the brook trout, Salvelinus fontinalis. Wildl. Mono. No. 7. 73 pp.

About the Author

Robert L. Hunt is Cold Water Group Leader for the DNR Bureau of Research, stationed at the DNR Emmons Creek headquarters near Waupaca.

Production Credits

Ruth L. Hine, Editor
Donna Mears, Copy Editor
Richard Burton, Graphic Artist

