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GROWTH, HARVEST AND SURVIVAL OF HATCHERY-REARED AND NATIVE BROOK TROUT (SALVELINUS FONTINALIS) IN THE DUNK RIVER SYSTEM, PRINCE EDWARD ISLAND

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Brook trout *(Salvelinus fontinalis)* were studied over 4 years in the coastal Lower Dunk River, the freshwater Scales Pond, and the small, inland Upper Dunk River in Prince Edward Island. Length and weight increments for hatchery brook trout in the Lower and Upper Dunk River areas during the first 120 days after release were significantly greater than those of tagged native trout in the same areas. In the Lower Dunk River, annual growth increments were greater for hatchery trout than for tagged or untagged native trout, but did not differ in the 2 kinds of trout in the Upper Dunk River, where hatchery trout grew significantly more slowly than they did downstream. Better growth of both kinds of brook trout in the Lower Dunk River than in the Upper Dunk River was related to food and trout densities. Summer harvests of hatchery trout were similar in the Lower Dunk River and Scales Pond, ranging from 9.1-30% of those released. Summer harvests of tagged native brook trout in the Lower Dunk River were never greater than 10%. Harvests of hatchery trout in the Upper Dunk River were usually lower than in the other areas. It was estimated that 32% of the hatchery trout were still present in the Lower Dunk River by July but only 8% by mid-August. Only 0.2-1% of the hatchery trout released were recovered the next year and none more than 1.5 yr after release, whereas 1-2.1% of the tagged native brook trout were recovered the next year. Larger trout at tagging were captured more frequently immediately following release and less frequently later in the season. Trout captured after more than 100 d after release were generally the smaller trout at tagging. The effects of food, trout densities, predation movement, and weather on growth and harvest of hatchery trout together with their effect on the Dunk River sport fishery are discussed.

Introduction

Hatchery-reared brook trout Salvelinus fontinalis have been released annually to Prince Edward Island streams and ponds as supplements to wild populations. Such releases are assumed to improve trout production and to enhance sport fishing, but there is little documented evidence to support this assumption. Only Smith (1957), Saunders and Smith (1964), Smith and Saunders (1968), and White (1927; 1930) have reported on the fate of hatchery brook trout in waters of Prince Edward Island. The present 4-year study (1972 to 1975) was undertaken (a) to describe the growth, harvest and survival of a domesticated strain of hatchery-reared brook trout released as yearlings to different regions of the Dunk River system; (b) to compare these data where possible with those from native brook trout cohabiting the same regions of the system and finally (c) to consider the management implications of these findings.

Description of the Dunk River System

The Dunk River system (Fig 1), 46°21'N, 63°36'W, is one of Prince Edward Island's larger river systems situated in the midst of a highly developed agricultural region. It is easily accessible by many roads and paths, and is only a short distance from either Summerside or Charlottetown. As a result, it is among the most heavily fished systems on Prince Edward Island.

Along the river system, a riparian growth of alder *(Alnus rugosa)*, white spruce *(Picea glauca)*, balsam fir *(Abies balsamea)*, trembling aspen *(Populus tremuloides)*,

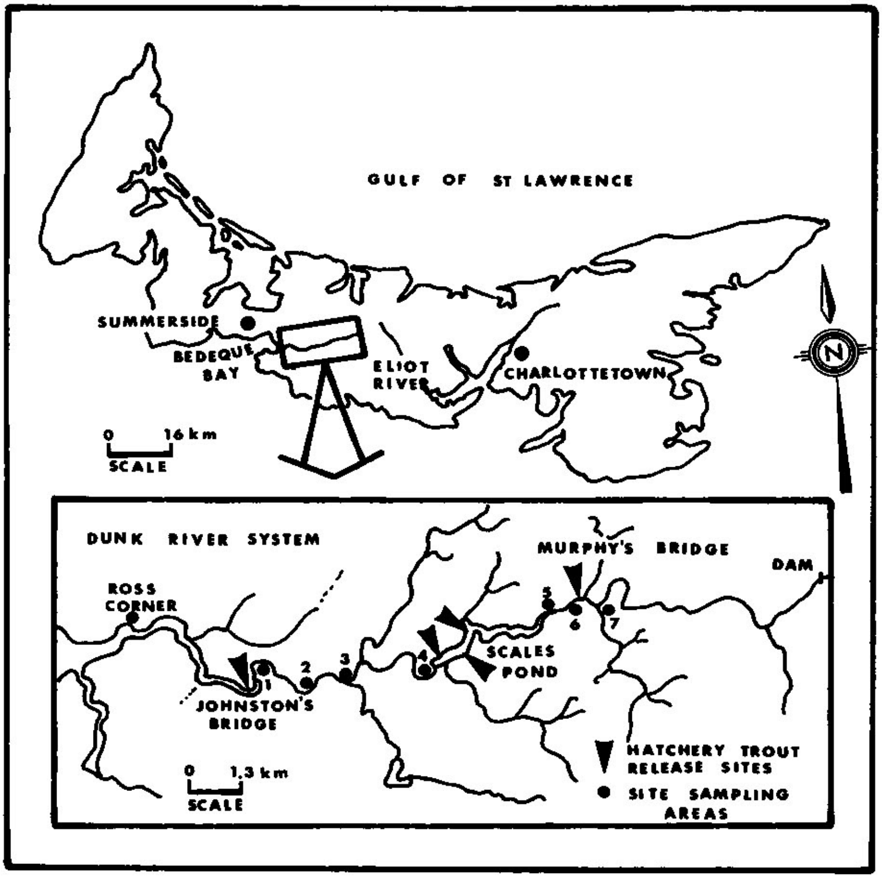

Fig 1. The Dunk River system on Prince Edward Island.

eastern hemlock *(Tsuga canadensis),* white birch *(Betula papyrifera),* beech *(Fagus grandifolia)* and sugar maple *(Acer saccharum)* is frequently broken by cultivated fields or pasture land. Fertilizers applied to the fields frequently wash into the river during heavy rains, making it highly productive (Stewart & Himelman 1974). The water chemistry of this system has been described already by Johnston and McKenna (1976).

The study of hatchery and native brook trout was carried out in three different regions. The Lower Dunk River extends from the bridge at Ross Corner, 13 km inland, to the dam at Scales Pond which is an impassable barrier to the upriver movement of trout and other fish species. Below the dam, the river is 8.0 to 17.0 m wide and 0.1 to 1.3 m deep, and has a surface area of 10.4 ha during summer. Shallow pools (<0.6 m) form 30% of the water area while runs (0.6-1.0 m), deep pools (>0.6 m) and riffles (<0.3 m) constituted 26%, 24%, and 20% respectively. A slight rise and fall of water during tidal cycles was observed 0.5 km above Johnston's Bridge.

Fish species observed in the Lower Dunk River include brook trout *Salvelinus fontinalis),* rainbow trout *(Salmo gairdneri),* Atlantic salmon *(Salmo salar),* American eel *(Anguilla rostrata),* and 3-spine stickleback *(Gasterosteus aculeatus).* Smelts *(Osmerus mordax)* and gaspereau *(Alosa pseudoharengus)* are seasonal migrants, spawning in the river each year between April and July.

The second region, Scales Pond, is a body of fresh water with a surface area of 23.5 ha and a length of 3.0 km. Most of the pond is shallow with a mean summer depth of 2.0 m and a maximum depth of 4.4 m. In summer, the surface water varies between 15°C and 25°C, and in some areas the bottom is 3 to 6°C cooler because of springs and ground water seepage. The only fish in the pond are brook trout, rainbow trout and 3-spine stickleback.

The third region, a section of the Upper Dunk River, runs 7 km from the head of Scales Pond to a second impassable dam at Breadalbane. This section is narrow, shallow, and shaded by overhanging alder and other shade trees. Brook trout, rainbow trout, and 3-spine stickleback are the only fish species present.

Methods

Stocking Program for Hatchery Brook Trout

Hatchery brook trout used in the study were reared from eggs of domesticated hatchery stock cultured at the Cardigan Fish Culture Station in eastern Prince Edward Island. Yearlings were weighed, measured for fork length, and jaw-tagged during May. In late May or early June of each year, approximately 1000 hatchery trout were released at Johnston's Bridge in the Lower Dunk River, 1500 in Scales Pond, and 1000 at Murphy's Bridge in the Upper Dunk River (Fig 1). Growth and recovery information for each group was obtained through river sampling and creel census programs.

Tagging of Native Brook Trout

In early June of each year, native brook trout similar in size to the introduced hatchery trout were captured in 4 selected sites of the Lower Dunk River and in 3 sites of the Upper Dunk River (Fig 1), by electrofishing and seining. They were weighed, measured for fork length, jaw-tagged, and released.

Scale Analysis

Native brook trout were sampled for scales throughout the study period, and age and length determinations were made from scale readings and measurements. Lengths were calculated by using the following equation:

$$\text{Log}\,L = 5.81 + 0.947 \log S \; (r = 0.87)$$

where L represents fork length (mm) to be calculated and S anterior scale measurement (mm).

River Sampling

Data on the growth of hatchery and native brook trout following release were obtained by recapturing trout at 4 sites on the Lower Dunk River and at 3 sites on the Upper Dunk River at approximately 20-day intervals between June and September. Recaptured trout were measured for fork length, weighed, and then released.

Angling Returns

Information about tagged trout was obtained from fishermen through a voluntary tag-return program. A tag-draw incentive was used in 1972 and 1973, but in 1974 and 1975 was replaced with a cash settlement of 25¢ per tag.

Creel Census

Information on the growth and harvest of tagged hatchery and native brook trout was also obtained through a creel survey of fishermen angling on the Lower Dunk River and Scales Pond. The survey was conducted each year between May 7 and

Sept. 3, 1973-75, which includes the period of greatest fishing pressure. While angling pressure is usually great on opening day (Apr. 15) and on the first few weekends after opening day, most of the fishing pressure occurs during May, June and July. Therefore, angling data in the first 22 days or the last 27 days (Sept. 3-30) of the fishing season were obtained from voluntary returns.

The creel census was stratified into 30-day strata, into weekdays and weekend days, and into a.m. and p.m. periods. The interval for each a.m. was from 0700 to 1300 and for each p.m. from 1300 until darkness. For every 5 weekdays, 3 a.m. and 3 p.m. periods were sampled and for every 2 weekend days, 1 a.m. and 1 p.m. period were sampled. The periods to be sampled each week were randomly selected and all holidays were considered as weekdays.

Two creel census clerks interviewed all fishermen encountered in the Lower Dunk River and Scales Pond areas. At least 2 or 3 complete surveys of each area per a.m. or p.m. period were made, depending on day length. Incomplete and complete fishing trips were used in the harvest estimate calculations.

The total harvest by fishermen for the period from May 7 to Sept. 3, was calculated from the estimated harvests for weekdays a.m., weekdays p.m., weekend days a.m. and weekend days p.m. for each 30-day stratum. The estimated harvest for each was calculated from the estimated hours fished and the mean catch per hour. Stratum totals were then summed to provide the harvest total for each census year.

Population Estimates

During 1973 and 1974, several population assessments were made by electrofishing the Lower Dunk River to determine the number of tagged hatchery and native trout alive. Approximately 13-15% of each water type (i.e., run, riffle, shallow and deep pool) in the Lower Dunk River was sampled. The estimated number of hatchery and native trout in each area sampled was determined using the Zippin (1958) method with a minimum of 3 complete fishings per area. An estimate for the total area was then made.

Results and Discussion

Growth

To demonstrate that a comparison of growth increments for recaptured hatchery and native brook trout was valid, the sizes at tagging of the recaptured trout (Table I) were compared statistically by an analysis of covariance. No significant differences between hatchery and native brook trout stocks could be demonstrated that would invalidate the comparisons.

The changes in mean fork length and weight of tagged hatchery trout between June and the end of September in the Lower Dunk River were 6 to 7 cm (Fig 2) and 60 to 80 g (Fig 3), respectively. In comparison, growth of tagged native brook trout of a similar size as hatchery trout at release was 4 to 5 cm and 20 to 40 g. When the length increments for 0 to 120 days for the two groups were compared statistically using a *t*-test, growth of hatchery trout was significantly greater ($P<0.01$) than that of native trout. Weight increments of hatchery trout were also significantly greater ($P<0.01$). Only 4 hatchery trout were caught 367 to 416 days after tagging; they grew an average of 10.5 cm and 158.7 g. Eighteen tagged native brook trout were caught 340 to 420 days after tagging and they grew an average of 7.3 cm and 108.1 g.

Annual growth increments in length for 127 untagged native brook trout as calculated from scale readings were 5.7 cm for trout aged 1 to 2 yr and 7.8 for trout aged 2 to 3 yr (Fig 4). Although the size of native brook trout in the 2 age groups was within the range of lengths for hatchery trout, their average annual length increment

Table I. Summary of fork lengths (cm), fresh weights (g), and coefficients of condition at tagging for hatchery and native brook trout used in the growth comparisons.

	Lower Dunk River		Scales Pond	Upper Dunk River	
	Hatchery brook trout	Native brook trout	Hatchery brook trout	Hatchery brook trout	Native brook trout
Number of trout tagged	360	978	435	207	1071
Range of fork lengths at tagging	10.1-20.9	8.6-21.8	10.1-21.3	10.8-19.2	8.5-18.2
Mean fork length	14.8	14.2	14.6	15.2	11.5
Range of fresh weights at tagging	12.1-126.4	8.3-147.3	8.0-123.6	13.4-110.0	3.8-78.2
Mean fresh weight	48.1	42.9	43.5	53.6	17.5
Range of coefficient of condition at tagging	0.88-2.30	0.90-2.37	0.64-2.13	1.03-2.06	0.33-2.22
Mean coefficient of condition	1.39	1.37	1.36	1.46	1.09

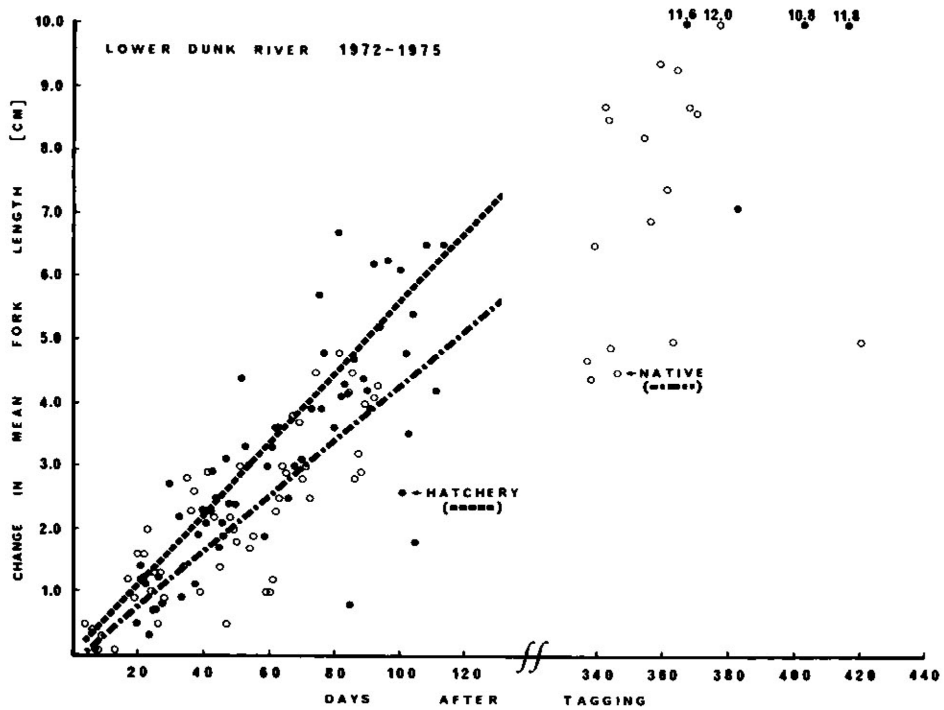

Fig 2. Changes in length of brook trout following tagging in the Lower Dunk River.

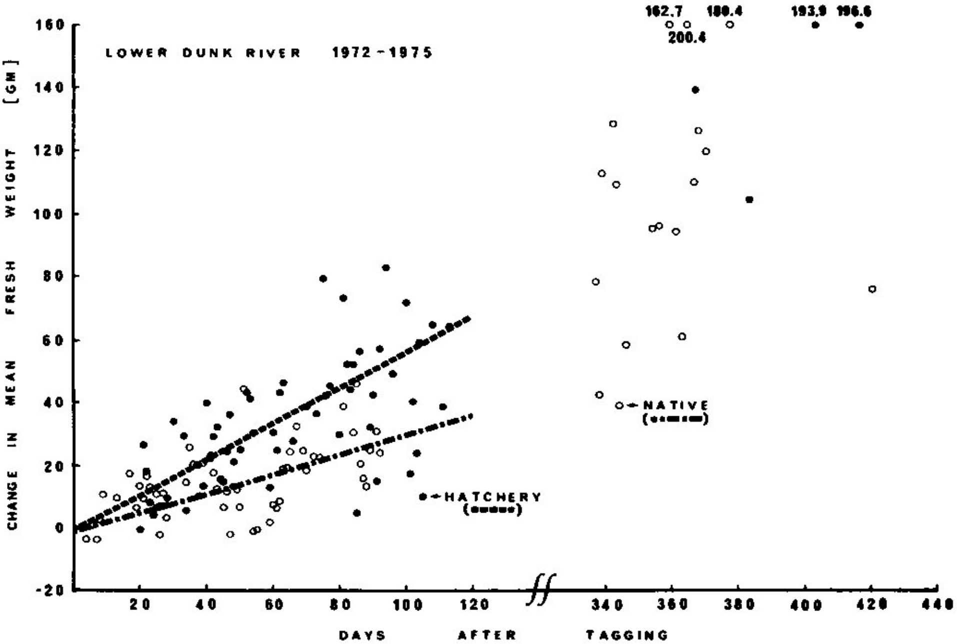

Fig 3. Changes in weight of brook trout following tagging in the Lower Dunk River.

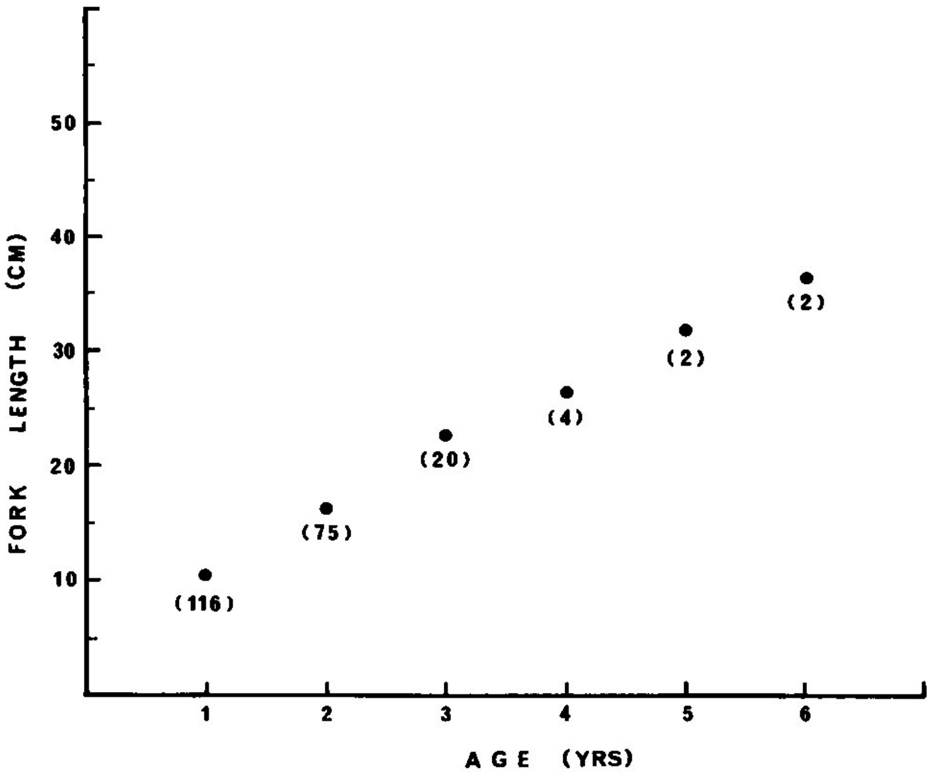

Fig 4. Size of untagged native brook trout at different ages in the Lower Dunk River as determined by scale analysis. Each point represents a mean value; the sample size for each point is in parentheses.

(6.7 cm) was markedly lower than that for tagged hatchery trout (10.5 cm), but similar to that for tagged native trout (7.3 cm).

Both hatchery and wild brook trout experienced some decline in condition after release. Data indicate that nearly 50% of the hatchery trout sampled in the first 100 days in the Lower Dunk River showed a loss in condition (Fig 5). The extent of condition decline was generally greater for tagged native brook trout than for tagged hatchery trout. While losses in condition were common for both groups during the first summer following release, some improvement in condition occurred by the next spring.

In Scales Pond, 5961 hatchery trout were released and 435 were later recaptured and used in the growth study. Attempts to capture large numbers of native brook trout similar in size to the hatchery trout in Scales Pond failed. Of those tagged, only 2 were recaptured later in the season. As a result, no comparative information is presented for native brook trout in this area.

Changes in mean length and weight of hatchery trout in Scales Pond during the summer were 5 to 6 cm (Fig 6) and 50 to 60 g (Fig 7). Weight and length increases were compared by *t*-test with weight and length increments for hatchery trout in the Lower Dunk River and were not significantly different. Only one hatchery trout in Scales Pond was reported surviving more than 1 year after release, and this trout grew 3.6 cm and 30.4 g.

Losses in condition factor were also evident for hatchery trout from Scales Pond (Fig 8). Such losses in condition were similar in extent but more frequent than those experienced by hatchery trout in the Lower Dunk River.

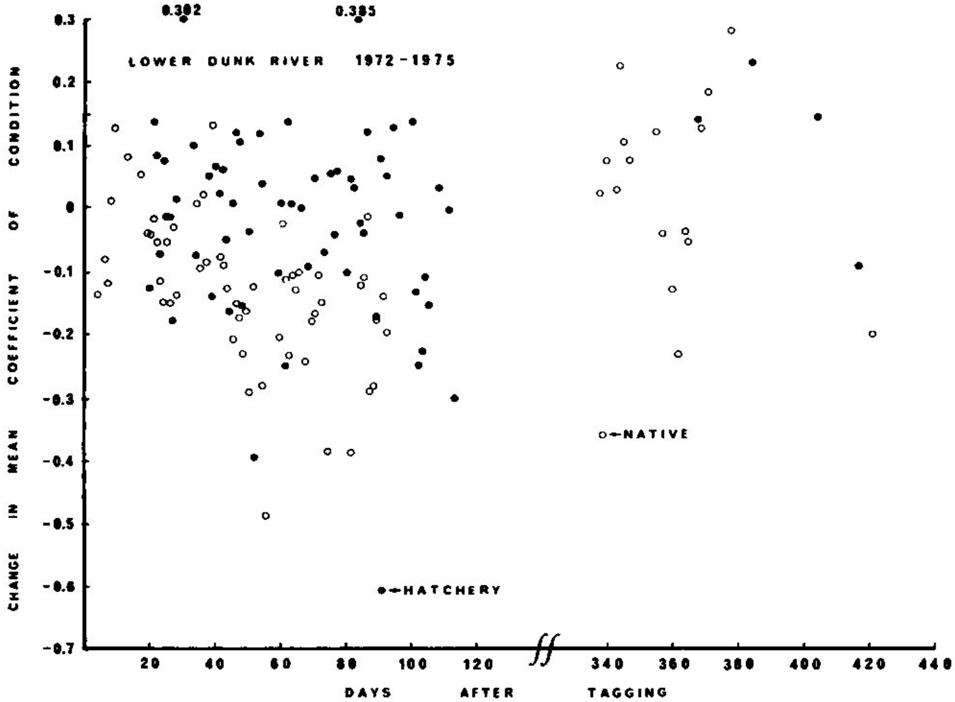

Fig 5. Changes in condition of brook trout following tagging in the Lower Dunk River.

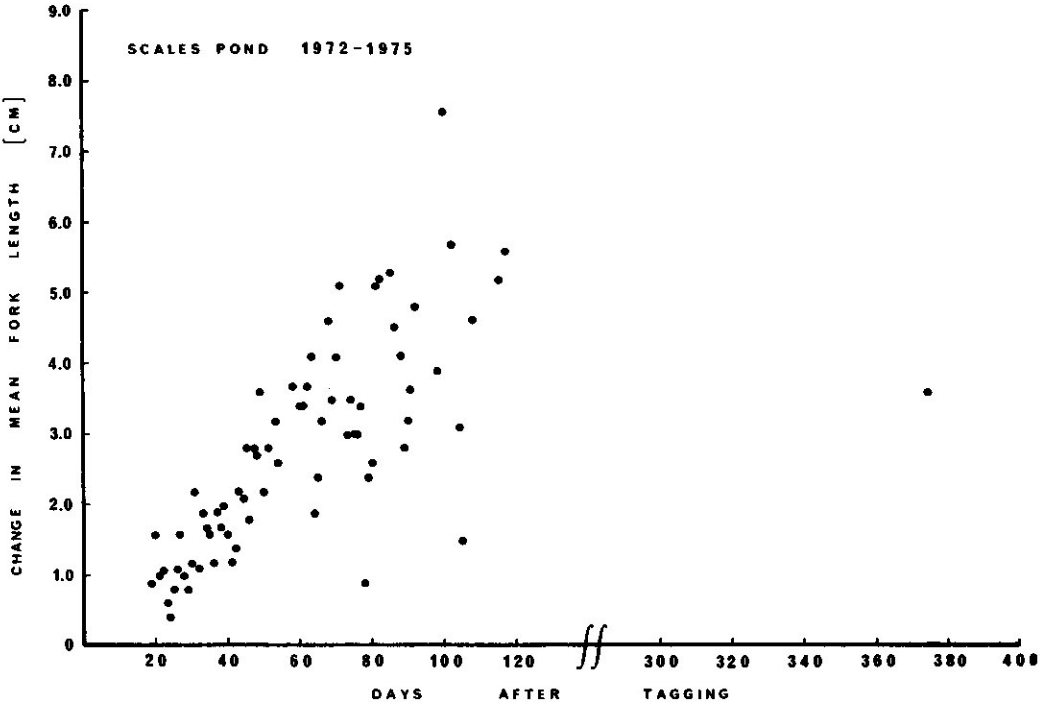

Fig 6. Changes in length of hatchery trout following tagging in Scales Pond.

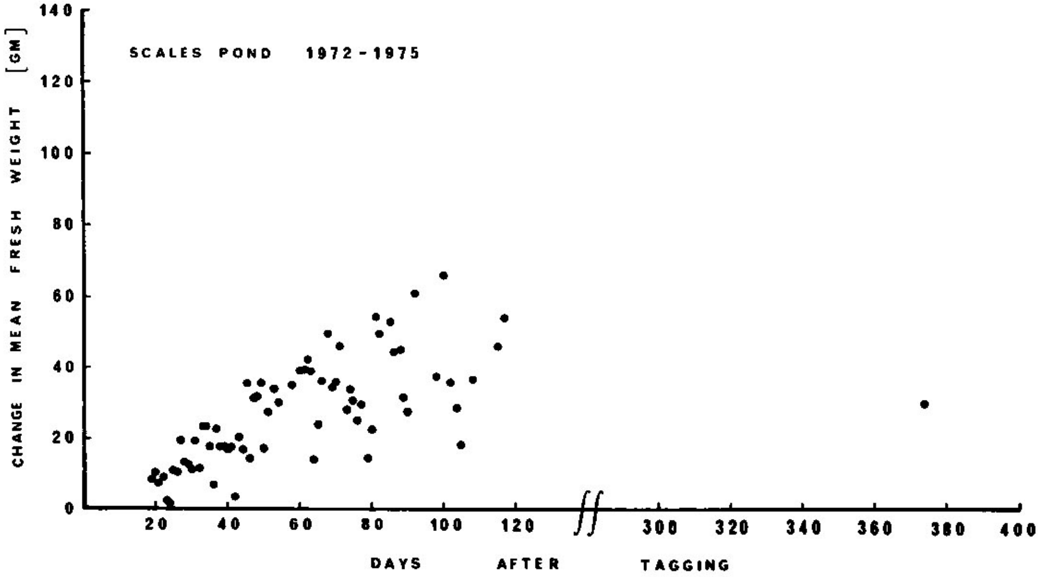

Fig 7. Changes in weight of hatchery trout following tagging in Scales Pond.

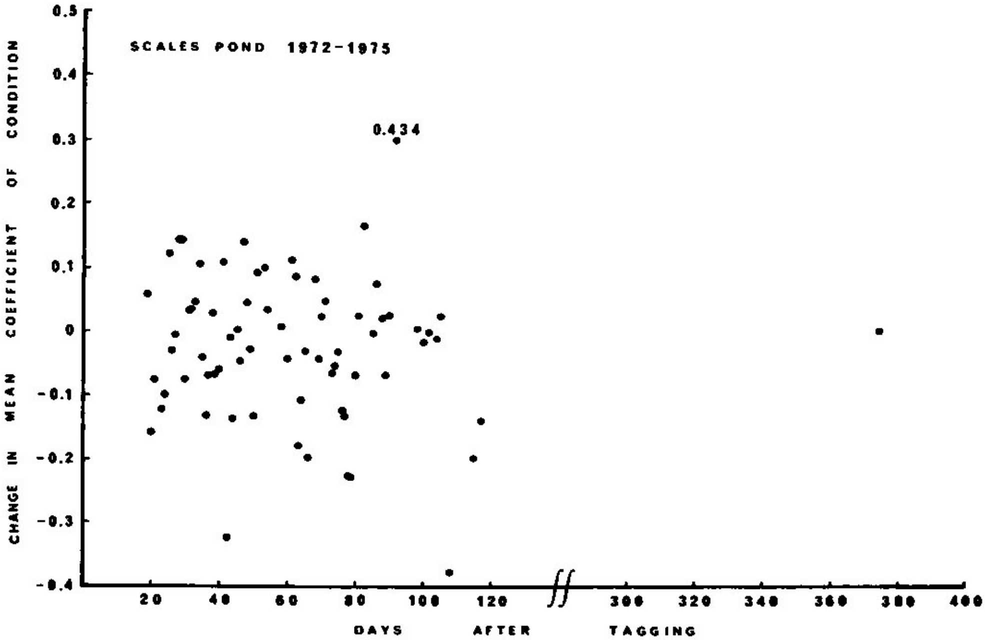

Fig 8. Changes in condition of hatchery trout following tagging in Scales Pond.

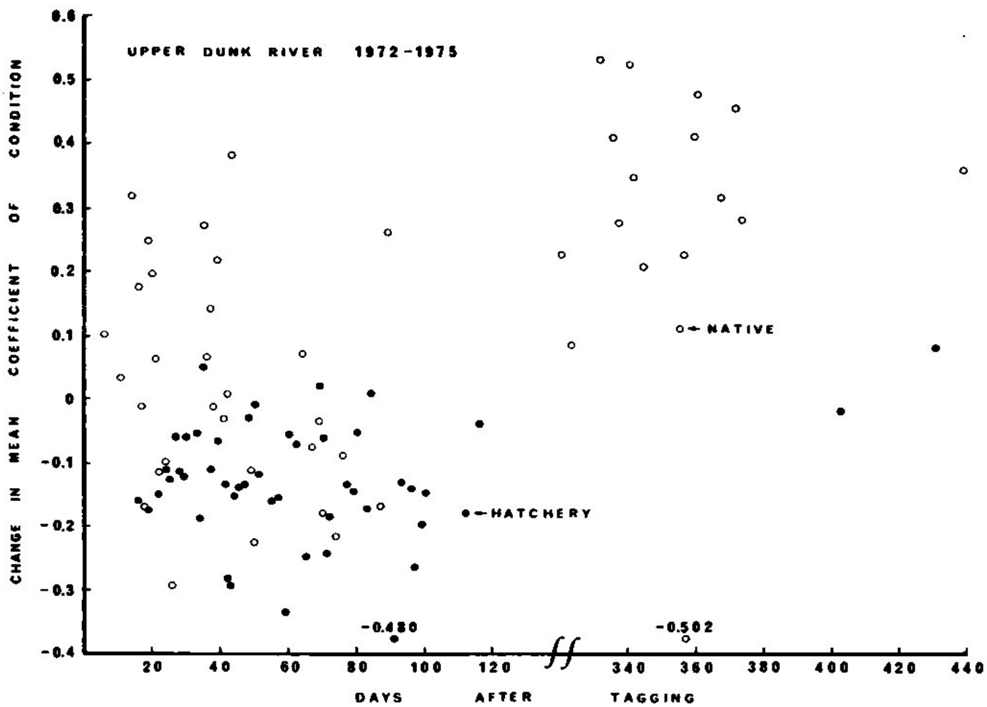

Fig 9. Changes in length of brook trout following tagging in the Upper Dunk River.

In the Upper Dunk River, 3974 tagged hatchery and 5622 tagged native brook trout were released; 207 and 1071, respectively, were later recaptured.

Changes in mean length and weight of tagged hatchery trout in the first 120 days after release were 3.5 to 4.5 cm (Fig 9) and 40 to 50 g. During the same period, tagged native brook trout gained only 2 to 3 cm and 10 to 15 g (Fig 10). Statistical treatment of the results indicated that weight and length gains for hatchery trout were significantly greater ($P<0.01$) than those for tagged native brook trout in that area.

Only 2 tagged hatchery and 18 tagged native brook trout were recaptured 320 to 440 days after release. The largest hatchery trout grew 7 cm and 118 g, while the tagged native trout grew an average of 6.8 cm and 62.6 g. These length and weight increments were not appreciably different for the two groups.

Almost all hatchery trout sampled from the Upper Dunk River declined in condition factor (Fig 11). Tagged native brook trout also showed losses in condition but the losses were not generally as great as those for hatchery trout.

In summary, weight and length increments for tagged hatchery and tagged native brook trout in the three different environments of the Dunk River system for the first 120 days after release suggest that hatchery trout grow significantly more in length and weight than native brook trout. Hatchery and native brook trout in the Lower Dunk River and Scales Pond also grew significantly better than those in the Upper Dunk River ($P<0.01$).

Better growth by hatchery and native brook trout in the Lower Dunk River during the first 120 days after tagging appears to be related in part to the food source. Hatchery and native trout in the Lower Dunk River fed extensively on eggs of smelt and gaspereau during spawning runs in May, June and July, and their stomachs were frequently distended with eggs. Other major foods included mayfly nymphs, caddisfly larvae and occasionally gastropods, adult smelts, and sticklebacks. Leeches, mayfly nymphs, dipterans, gastropods and sticklebacks formed the main food items in Scales Pond. Smelts and gaspereau were unable to pass the dam to spawn in the pond and therefore did not contribute to the food supply in that area. In the Upper Dunk River, trout fed primarily upon mayfly nymphs, caddisfly larvae, coleopterans

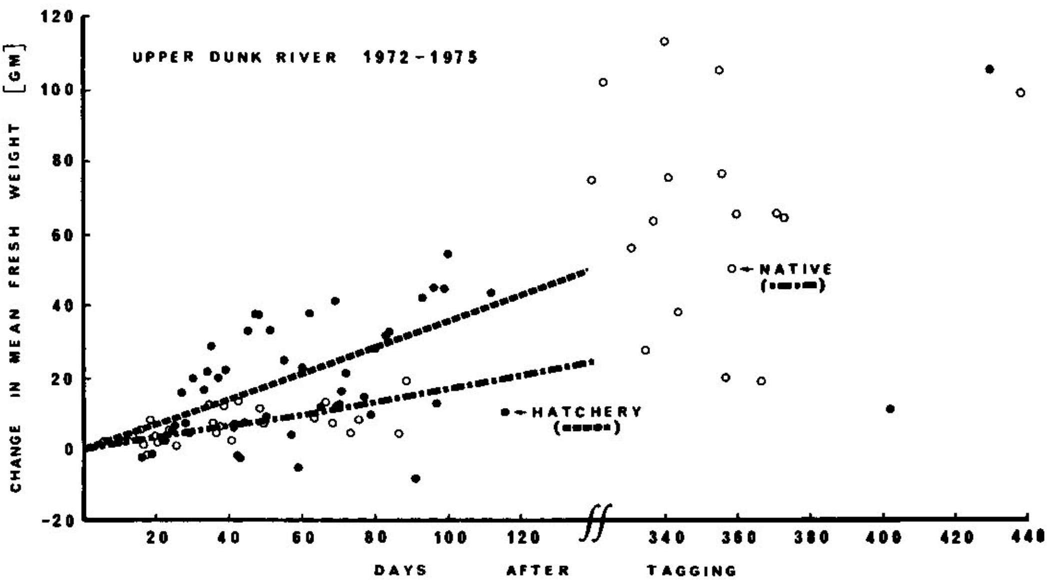

Fig 10. Changes in weight of brook trout following tagging in the Upper Dunk River.

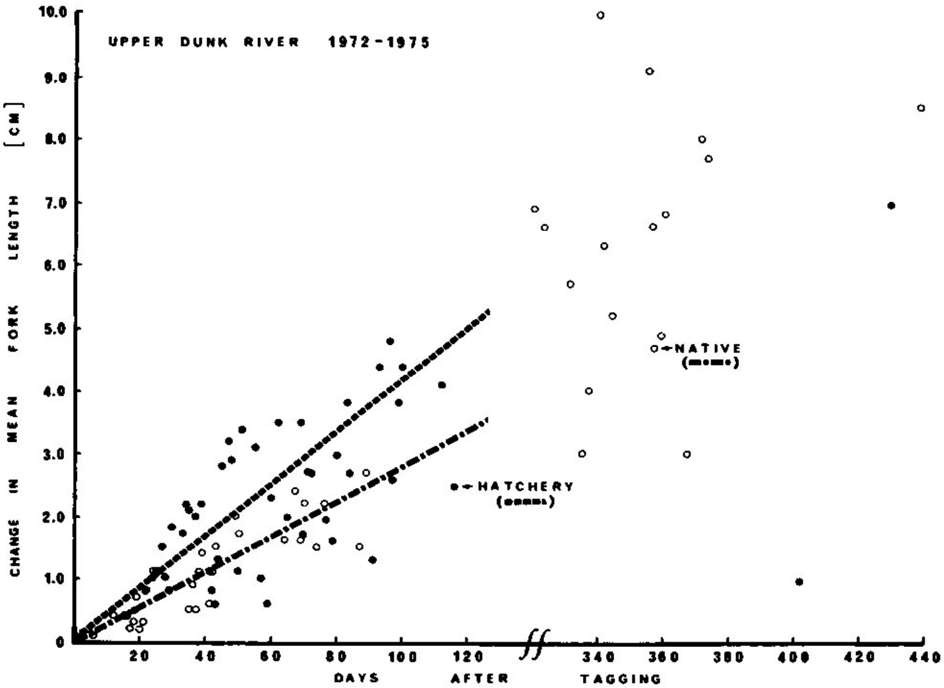

Fig 11. Changes in the condition of brook trout following tagging in the Upper Dunk River.

(mostly families Carabidae, Elmidae and Circuleonidae) and dipterans (mostly Chironomidae and Simuliidae). Generally, these food items were much smaller than those consumed by trout in the Lower Dunk River or Scales Pond. Furthermore, stomachs from trout in the upper region were seldom distended with food, unlike those in the lower river.

Poorer growth in the Upper Dunk River may also have been caused by overabundance of small trout. Site sampling in the Upper Dunk River indicated a high density of small native brook trout and rainbow trout of underyearlings, yearlings and 2-yr-olds (Table II). Such a combination of pressures may have adversely affected growth and compounded the effects created by food type.

The growth of tagged and untagged native trout was significantly lower than that for hatchery trout in the first 120 days after tagging in the lower and upper area. These differences in growth may have been caused by bolder feeding behavior and/or a faster growth by the hatchery strain.

The marginal difference in growth of tagged and untagged native trout in the Lower Dunk River suggests that jaw tags had little effect, in agreement with Shetter and Hazzard (1940), Smith (1957) and Youngs (1958). However, Smith (1957) found that growth of tagged brook trout in Prince Edward Island ponds became significantly lower after 248 days and this might have been also true in the Dunk River if trout had survived for a longer period of time.

Harvest of Hatchery Trout

The number of hatchery trout harvested by fishermen in 1972 was determined from jaw tags returned through the voluntary tag return program. The number of

Table II. Estimated average number of brook trout and rainbow trout in four sampling sites in the Lower Dunk River and three sampling sites in the Upper Dunk River during the summer months, 1972 and 1973.

Sampling period	Estimated average number of brook trout and rainbow trout/100 m^2	
	Lower Dunk River	Upper Dunk River
June	19	34
July	26	38
August	25	30
September	32	45
	25.5	36.7

Table III. Summary of the fate of hatchery trout planted in the Dunk River system in 1972.

Release site		Number released	Number caught[a]	% harvest[b]	Mean catch/h[c]
Lower Dunk River		989	116	11.7	0.2
	Lower	497	85	17.1	
Scales Pond	Middle	499	90	18.0	
	Upper	498	57	11.4	
	Total	1494	232	15.5	0.7
Upper Dunk River		998	164	16.4	1.1

[a]From voluntary fishing returns
[b]Calculated from number harvested/ total no. released x100
[c]Represents mean catch/hour for the fishing season.

hatchery trout caught based on the voluntary tag return program represents minimum harvest levels.

More jaw tags were returned by fishermen from hatchery trout in Scales Pond and the Upper Dunk River than in the Lower Dunk River (Table III). The high harvest in the pond as compared to the Lower Dunk River was associated with a better catch in the first month following release, when fishermen caught 8.3% of the hatchery trout released in the pond and only 3.8% of those in the Lower Dunk River. Most hatchery trout in the pond were caught within 1 km of the dam, whereas they were caught throughout the 7.6-km length of the Lower Dunk River.

The harvest of hatchery brook trout between 1973 and 1975 varied considerably between years and between areas (Table IV). The harvest of hatchery trout in the Lower Dunk River in 1974 was lower than the harvest in this area for the other years.

Table IV. Summary of the fate of hatchery trout after plantings in the Dunk river System during the period of May to September 3, 1973-75.

Year	Area	Number released	Number caught[a]	Estimated number caught[b]	% summer harvest[c]
	Lower Dunk River	970	38	173	17.8
1973	Scales Pond	1473	148	268	18.1
	Upper Dunk River	981	98	-	10.1
	Lower Dunk River	998	44	91	9.1
1974	Scales Pond	1498	174	295	16.7
	Upper Dunk River	999	-	-	-
	Lower Dunk River	998	129	302	30.3
1975	Scales Pond	1498	83	454	30.1
	Upper Dunk River	996	55	-	5.5

[a]Number counted in creel census, May 7-Sept. 3, except for Upper Dunk River where number caught is from voluntary fishing returns and creel census.
[b]Computed from creel census data, May 7-Sept. 3.
[c]Calculated using: estimated no. caught x 100/number released except for Upper Dunk River where actual catch was used in place of an estimate.

This was due probably to more frequent rain, cold weather, and very turbid water conditions (Fig 12). The apparently low harvest levels in the Upper Dunk River area in 1973 and 1975 may have been due to anglers not returning information about the capture of tagged trout or to less frequent fishing trips to that area. In 1972, 33 reports were received from anglers catching hatchery trout while in 1973 and 1975 there were only 14 and 17 reports, respectively.

Only 2 hatchery trout were reported caught by fishermen in 1973, 1 in 1974 and 2 in 1975 between September 4 and 30, the last day of the fishing season, suggesting that the harvest data for hatchery trout in Table V are reasonably close to the season levels.

The percentage harvest values for hatchery trout in this investigation are similar to those reported by Smith and Saunders (1968) for the Ellerslie system in Prince Edward Island and to those reported elsewhere (Alexander & Shetter 1969; Shetter & Hazzard 1940; Smith & Smith 1945; Trembley 1945).

Harvest of Tagged Native Brook Trout in the Lower Dunk River

In 1972, of 1239 native brook trout tagged in the Lower Dunk River area, 87 were recaptured in 1972 and 12 in 1973 while in 1973, of 637 brook trout, 64 were recaptured in 1973 and 13 in 1974.

Recoveries of Tagged Hatchery and Native Brook Trout

The estimated number of spring-released hatchery trout in the Lower Dunk River declined during the summer months (Table V), with few present after one year. While none was recovered after 1 year in samples taken for population estimates in July and August, 1974, a few were recovered in the creel censuses in May and June. Nine of the 989 hatchery trout released in 1972 were caught in 1973; 2 released in

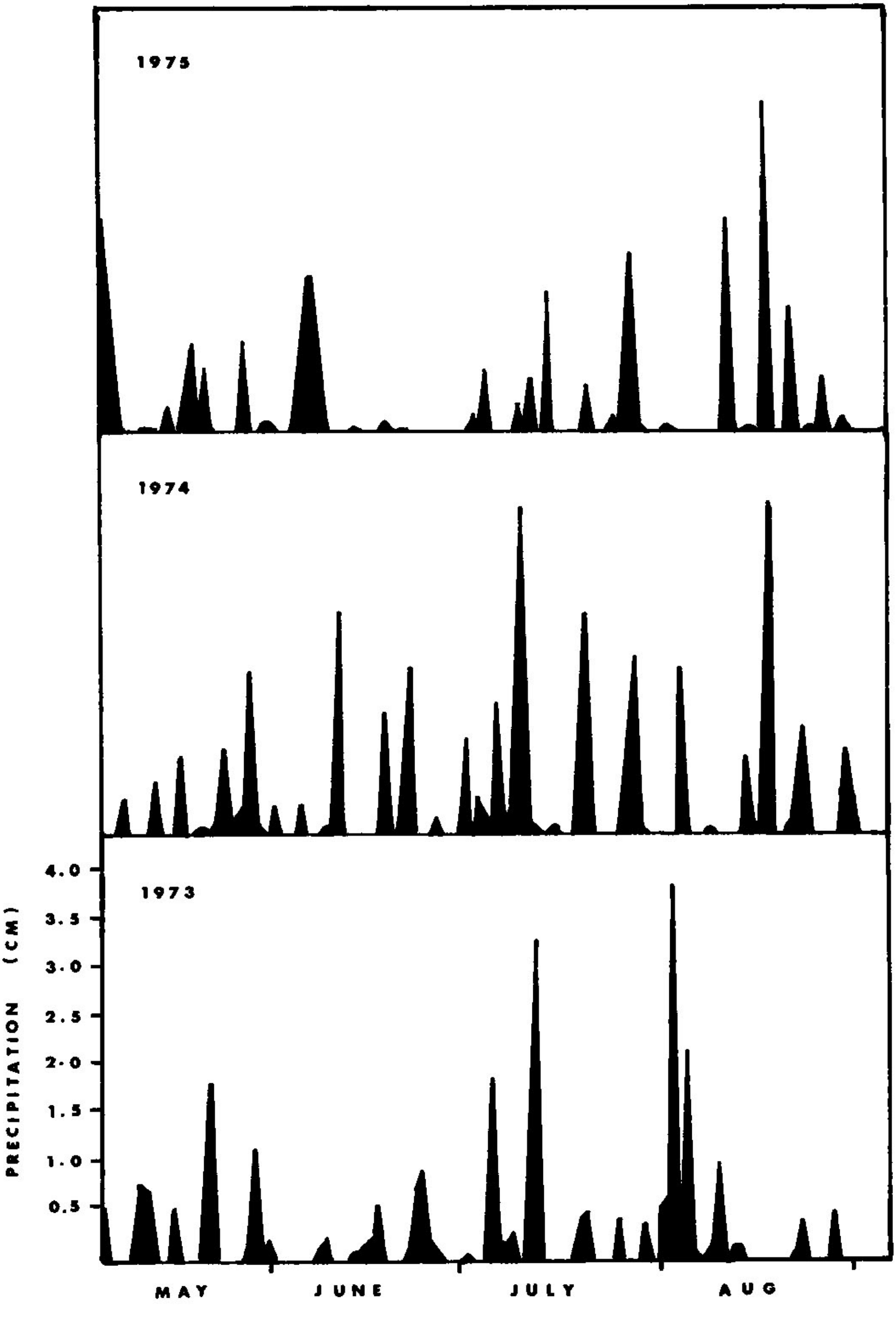

Fig 12. Summary of the daily summer precipitation levels for the Dunk River area between 1973 and 1975.

Table V. The estimated number and percent survival (parentheses) of hatchery trout released in the Lower Dunk River.

Year released	Date released	Number released	Estimated number of hatchery trout in the Lower Dunk River: Aug. 15th 1973	July 15th 1974	Aug. 15th 1974
1973	May 22	970	80(8.2)	0	0
1974	June 4	998	-	321 (32)	145 (14)

1973 were caught in 1974 and 6 released in 1974 were caught in 1975. During the entire study period, no hatchery trout was recaptured more than 1.5 years after release.

In Scales Pond, only 1 hatchery trout (released in June 1972) was recorded surviving more than 1 year (374 days).

There was a marked negative correlation between time of capture and size at release for hatchery trout in all areas (Fig 13). Larger trout at tagging were recaptured more frequently immediately following release and less frequently later in the season. Trout captured after more than 100 days were generally the smaller trout at tagging.

Based on catches of tagged native trout by anglers, an average of 1.5% of those tagged were caught in the next fishing season. This value is approximately twice that described for hatchery trout.

Poor recoveries of hatchery and native brook trout following release may have been caused by predation, competitive stress, movement, disease or excessive suspended sediment, of which the most probable are predation, competition and movement. Important predators were great blue herons *(Ardea herodias),* common mergansers *(Mergus merganser),* belted kingfishers *(Megaceryle alcyon)* and mink *(Mustela vison).* In May, June and July, as many as 10 to 15 herons/100 m of river were sighted in some areas, and following the release of hatchery trout in the Lower Dunk River, their number increased markedly (Fig 14). Also, observed throughout the summer were 4 pairs of kingfishers and 3 families of mink. During the winter, mergansers fished the open-water areas of the river and pond. Such predators may have taken hatchery trout more successfully than they did native trout. Smith (1955; 1968) found at Crecy Lake that implementing predator control improved survival and increased the percent harvest of trout. Butler (1975) reported that hatchery-reared trout use cover less, are more vulnerable to predation, and are more active and feed more than wild trout. Poor survival may be associated also with the fact that hatchery trout usually lack wildness. Stock selection by hatchery managers is usually for fast growth, resistance to disease, and adaptability to hatchery rearing. The qualities of wildness are important, for Mason et al. (1967), Flick (1971) and Flick and Webster (1976) have shown that greater longevity of hatchery-reared trout was consistently shown by wild and wild hybrid strains. Our findings support this, for survival to the next year, while low, appears to be twice as high for native trout populations.

Competitive stresses from native brook trout, rainbow trout, or Atlantic salmon may also have influenced the survival of hatchery trout during the summer. In the Lower Dunk River, populations for all 3 species combined ranged between 723 to 2660 trout per hectare. While the trout populations in Scales Pond are less certain, angler harvests indicated that native brook trout and rainbow trout together greatly

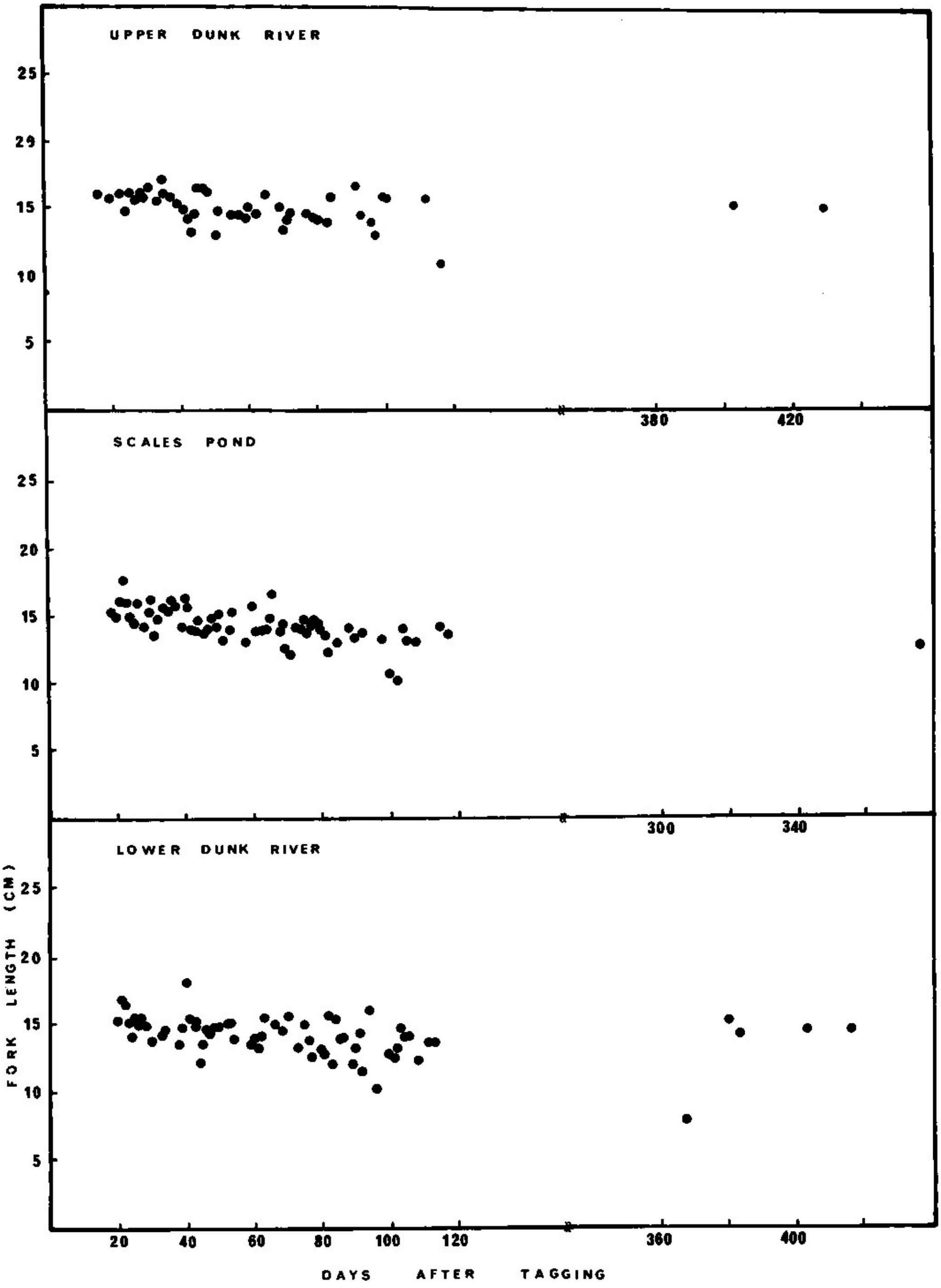

Fig 13. Summary of the mean fork lengths of hatchery trout at tagging as plotted against time of capture for the Lower Dunk River, Scales Pond, and the Upper Dunk River for the period 1972-1975.

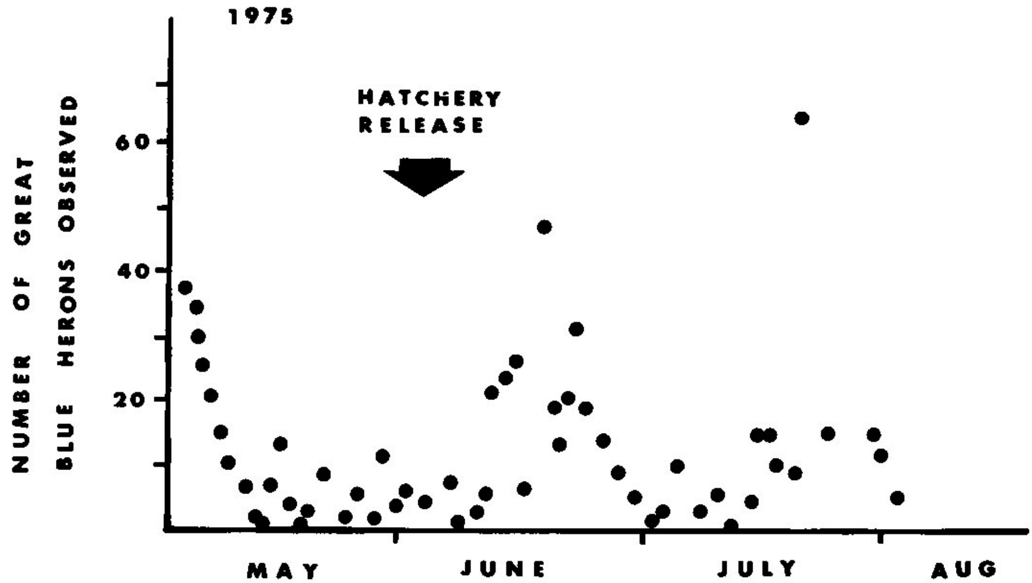

Fig 14. Summary of the number of great blue herons sighted daily in the Lower Dunk River during 1975.

exceeded 84 to 122 trout/ha. While competitive stress did not appear to affect the growth of those that survived, it may have greatly affected some of the weaker trout.

Movement of hatchery or tagged native brook trout out of the Dunk River system may have had a marked effect on recoveries. While hatchery trout planted in the Lower Dunk River moved generally upriver following release, at least 3 moved via the estuary to river systems adjacent to the Dunk systems and others were recaptured in the tributaries of the Dunk system. Of the hatchery trout planted in Scales Pond, 17% moved into the Lower Dunk River or its tributaries, and fewer than 1% moved into the Upper Dunk River. Of hatchery trout planted in the Upper Dunk River, at least 7% moved into Scales Pond or into the Lower Dunk River and its tributaries and a few moved upriver and were caught just below the impassable dam at Breadalbane. The extent to which all such movements influenced recoveries is not completely known.

Management Implications

Releasing hatchery-reared trout to the Dunk River system primarily increases angling success in the first summer after release, and mostly during the first month. The increased growth of hatchery trout did not appear to make them more capable of surviving to produce eggs and, in fact, it is unlikely they contributed in any measurable way to increasing trout production in the system.

Releasing hatchery-reared trout to the Dunk River system generally stimulated angling activity and harvest of native trout populations (Fig 15). With a long fishing season and a large daily creel limit (20 brook trout/day), overexploitation of trout populations can occur. According to fishermen, both the number and size of native brook trout in the Dunk River system have been declining in the last 10 years. Since the economic and recreational benefits of planting hatchery trout in the Dunk River system are limited, a careful review of present stocking policies should be conducted. Future plantings, if necessary, should be made with wild indigenous stocks that have sea-running characteristics. Stream enhancement programs designed to

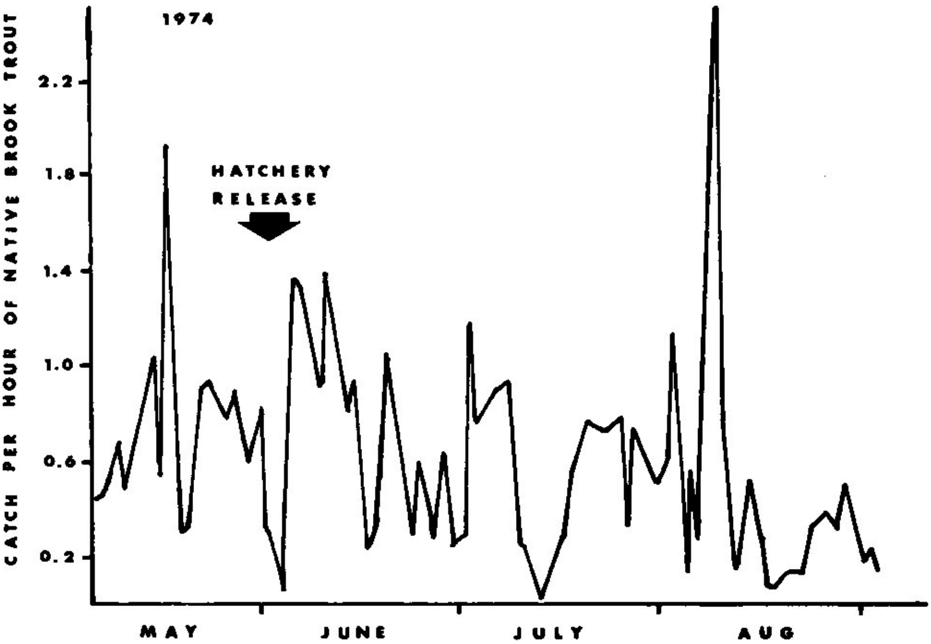

Fig 15. Summary of the daily catch per hour values for native brook trout prior to and following the release of hatchery brook trout in the Lower Dunk River in 1974.

improve food-producing rearing, and spawning habitats, combined with more protective regulations, are needed to ensure growth and development of wild trout populations.

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