

FRESHWATER FISHERIES ADVISORY SERVICE

MARINE DEPARTMENT

INVESTIGATION REPORT

JOB NO. 30

ACCLIMATISATION SOCIETY DISTRICT: Ashburton

TITLE OF JOB: An Investigation of Taylors and Bowyers Streams.

OBJECTIVES: To determine the cause for the reported decline of the trout fishery, and to evaluate the present state of the trout fishery in these waters.

FINDINGS: This investigation was carried out over an extended period with three separate visits to the two streams being made. The first visit was made in August 1960 and consisted of only an inspection of a short section of Bowyers Stream augmented by electric fishing. The second visit in November 1960 consisted of an extensive survey of both streams and sampling of the bottom fauna, while the third visit in May 1961 was a more exhaustive sampling of the fish population by means of the 'pack-set' electric fishing machine.

A. PHYSICAL FEATURES

Taylors Stream

This stream rises in the Winterslow Mountains and follows a winding course through the hills for approximately five miles before entering the plains below the Alford Forest. This upper area, because of its inaccessibility and lack of relative importance to the fishery was not examined. Below the Alford Forest the stream flows rapidly for some ten miles across the plains before joining the Bowyers Stream. The combined streams then flow but a short distance before entering the Ashburton River (see Fig. 1). As the stream comes from the hills it is fairly well confined although the banks are unstable, but immediately upon entering the plains there are rather extensive flood plains and the stream is often divided into two or more channels. Bank vegetation consists of a mixture of scrub, native and exotic trees and pasture grass. In the lower reaches of this stream the flood bed becomes a little more confined although still subject to periodic flooding while the bank vegetation is limited to thick stands of broom and willow.

Water flow in Taylors Stream alternates between rapid and swift ripples for the most part, but the ripples become more moderate in the lower two miles. The stream bed is composed generally of boulders and large stones in the upper half of the inspected portion and of large stones, gravel and some sand in the lower half. Weed growth of any sort was not observed and algal growth was of a scattered nature and undoubtedly subject to fluctuations with changes in the river volume.

The stream as a whole is unstable with a great deal of movement of the bottom material and therefore strongly affected by flooding.

Bowyers Stream

This stream rises in the hills south of Mount Winterslow and flows through open hills before entering the densely clad Alford Forest. Emerging from the forest it flows parallel to and then gradually converging with Taylors Stream (See Fig. 1.).

The stream was examined from approximately three-quarters of a mile into the forest (Sharplin Falls) down to the confluence with the Taylors Stream. For the purpose of this investigation the stream was divided into three stations: the upper ("A") from Sharplin Falls to Stavely, the middle ("B") from Stavely to the abandoned Railroad Bridge below the School House Road Bridge and the lower ("C") from the Railroad Bridge down to the Confluence.

Section A - Within the forest the stream is typical of a mountain stream, that is, dropping quickly over large boulders with isolated deep pools. From the forest down to Stavely the stream continues to fall rapidly over a bed of large boulders and stones with a flood bed up to 100 yds wide although well grown with weeds. The banks, very unstable for the most part, are well growth with pasture grass and native trees, both of which give way entirely to broom near Stavely.

Section B - From Stavely down to the abandoned railway bridge the stream slows up considerably although still lacking in adequate holding water except for an occasional fast pool. The stream bed is composed of stones and small gravel and the banks are predominantly willow backed by large areas of broom.

Section C - For about one mile below the old railway bridge the stream stabilises considerably. Pools and flats alternate with mild ripples where there is excellent spawning gravel and thick willow cover. The banks in this area are completely stable and no flood bed is present. From this area down to the confluence the stream quickens again with alternating rapids

and fast ripples and very little holding water. The willow fringed flood bed also reappears.

The combined rivers down to the confluence with the south branch of the Ashburton River have wide unstable flood bed and offer almost no cover. The gravel is somewhat finer in this section and offers spawning facilities in a few places.

B. BOTTOM FAUNA

Bottom fauna samples were taken from both streams with a Surber square foot sampler. Both streams were running higher than normal and had been in flood some two or three weeks previously.

Taylor's Stream

Sixteen samples were taken from various parts of the river and yielded an average of only 119 animals per sample, extremely low for adequate trout food. The most numerous group were the Mayflies (Ephemeroptera) comprising 78% of the total, the predominate species being Deleatidium. The other groups Caddis Flies (Trichoptera), True Flies (Diptera), Beetles (Coleoptera), were also apparent in much smaller numbers (See Table 1).

Bowyer's Stream

Twenty samples were taken at intervals from the bush edge down to the junction of the two streams and yielded an average of 232 animals per square foot. The number of animals varied from section to section, generally declining in numbers toward the forest (See Table 2). Again the predominant group were the Mayflies, the Caddis Flies being the only other group present in any numbers.

C. NATIVE FISH

Bullies were present in both streams in all size groups. No attempt was made to count these species but they were caught throughout both stream systems with the electric fishing gear. Galaxiids were also present in both streams, in fact very numerous in the upper areas. Taylor's Stream especially had a large population in the upper section.

Eels were relatively uncommon in both waters but this can be expected in open shingle streams. The stomach of one 52" eel was opened and contained a 6" trout, 59 olinga, 2 stenoperla, 1 hydropsycha, a quantity of paper, 9 willow leaves, a twig, 3 stones, and some unidentifiable matter - all suggesting their worthy use for keeping the streambed clean.

D. TROUT STOCK

Taylor's Stream

On both occasions this stream was visited in the course of the investigation, the water was dirty and higher than usual making observations difficult.

At point A (Fig. 1) electric fishing was carried out for a considerable distance and although the amount of water flowing made catching the fish an almost impossible task, useful observations could be made. Fish of the year were plentiful wherever cover was available and in the shallow water bordering the main flow. Larger fish are scarce however, and only four fish of catchable size were seen in approximately $\frac{1}{4}$ mile of stream. One of these fish, a brown trout male, was caught, and measured $23\frac{1}{4}$ inches; no other fish approaching this size were seen.

At Point B where the stream is a bit more stable, the same picture was evident, i.e. small fish but no large ones. Here, in 200 yards of stream, 51 fish were seen and 33 caught. Of those that got away only two were around catchable size and the largest one obtained measured $9\frac{1}{2}$ inches. The 33 fish caught averaged 5.3 inches and were of this year's hatch although five of them (8.6" average) may have been one year old.

Bowyers Stream

Conditions for electric fishing were better here than in Taylor's Stream and four separate spots were fished over the stream's length (Fig. 1). In all 275 fish were caught, 85% brown trout and 15% quinnat salmon.

In Section A one area was fished, two spots in Section B, and one in Section C.

The results are given below.

Point Fished map ref.	Section	Lgth of stream fished yds	Trout		Salmon	
			No. Caught	Av. Lgth ins	No. caught	Av. Lgth ins
1	A	40	15	6.8	-	-
2	B	300	117	4.5	10	3.8
3	B	800	61	5.1	31	4.9
4	C	200	40	4.4	1	3.5
TOTALS			233	4.6	42	4.6

In addition to the above 125 fish were seen but not caught at point 2 and average 3.7 lb, the largest being 22.5" long and weighing 4.75 lb.

At point A, a natural rocky area, one large fish was seen and the small, fish of the year, were plentiful and somewhat larger than lower down the river. The stream within Alford Forest itself is good trout water and on two trips 1 fish around 1½ lbs; 3 of about 4 to 5 lbs and numerous small fish were seen. A lower falls shortly below the Sharplin Falls appears to be the upstream limit for trout, electric fishing could stir nothing up above this point.

Point B was fished far more extensively than the other sections, being refished a few days after the initial work. This area was marked off in two sections and the fish caught in each given a distinct fin clip and liberated in the section where caught. Upon refishing the upper section a larger number of fish were caught than at first and included only 16% recaptured fish. 40% of these were fish originally caught and only released in the lower section.

This work showed two things, first that there are more fish present than can be seen or caught, even by electric fishing and second, that there is considerable short distance movement by small fish in high water conditions. In this same section only a minute fraction of the number of fish caught could be seen by careful observation while walking the banks.

Point 3 was fished carefully but the nature of the stream here offers little cover for small or large fish and no catchable fish were seen at all.

At Point 4 the river was quite unsuitable for any numbers of trout and little were seen. There is a lack of holding water here except for a few bush heaps deposited by flooding; 16 fish were seen but not caught, all small, and two large eels were killed.

If a length frequency plot of the fish is made, Fig. 2, another fact becomes obvious, that is, growth rate is quite slow. All the fish from seven inches and perhaps six inches upward are at least one year old in all probability which is very small for wild fish of this age. The fish of the year have an average length of a bit over four inches in May, much too small for a healthy population. Thus even with stream conditions favouring the small fish they have not attained adequate size, indicative of a large population than the stream can support.

The tributary streams to Bowyers Stream are for the most part unfishable, being too narrow and heavily overgrown with bush.

E. TROUT SPAWNING CONDITIONS

Taylor's Stream

Spawning potential on Taylor's Stream is very poor. There is little gravel of a stable nature and, as far as could be ascertained, wherever there is a slackening of the water flow and suitable gravel accumulates, there are also deposits of sand and silt so as to make the gravel unusable by fish.

Bowyers Stream

This stream possesses much good spawning gravel over most of its length. There are large areas of smooth round gravel of an ideal size for spawning with a good flow of clean water and negligible silting. The spawning grounds reach, roughly, from the confluence to Stavely, although there are some areas quite unsuitable.

F. DISCUSSION

Both these streams lack holding water and are generally very fast flowing with unstable banks. The degree of instability is difficult to assess owing to the way in which the broom scrub quickly hides scars and old flood bed. Verbal accounts of the pools available in years gone by indicate that the streams have deteriorated in this respect and one farmer estimated the loss of 80 yards of paddock in 10 years on the Bowyers Stream.

On the first visit of this investigation the area near Stavely was inspected and special attention paid to the same spot on the last visit. In the short period of only 9 months a great deal of change was evident in the streams make up, the flood bed was much more extensive, the size of rock was smaller and all weed growth on the banks was lacking. The general affect was a change from a mountainous stream to an open, flat one. Catchment Board activity also is playing a major part in the destruction of the streams as a trout habitat due to their efforts to control flooding.

The composition of the bottom fauna types was very much alike in both streams but with far fewer organisms to be found in the rather more unstable Taylor's Stream, as could be expected.

The Mayfly Deleatidium which is the predominant animal present is excellent trout food but is available only to small or young fish due to its living habits. Thus, what food is present favours only the young fish and further limits the chance of the trout attaining a large size.

There are a few large fish to be found in both rivers, some were observed while electric fishing and few are caught by anglers. Some local fishermen report large fish taken but only when time is no object and a good knowledge of the river is held.

Quinnat salmon are present in fair numbers in both streams as indicated by the young salmon caught. Adults were also taken occasionally while electric fishing; the small fish would offer severe competition to the trout for food in the Taylors Stream.

CONCLUSIONS AND RECOMMENDATIONS

1. Both the Taylors and Bowyers Streams are unstable and are experiencing a continued physical deterioration.
2. The cause of the instability of these streams is due to:
 - (a) natural erosion caused by land use
 - (b) Catchment Board activity.
3. The lack of stability of these streams results in a reduction of quiet water, cover and the density of bottom dwelling organisms. These points in turn limit the number of trout that can exist.
4. Spawning conditions, poor in Taylors Stream and good in Bowyers Stream, are adequate for the existing trout population in the respective streams.
5. The two streams are now supporting the maximum number of trout possible under present water conditions.

FIG. 1

