

ROYAL RIVER DRAINAGE

Fish Management

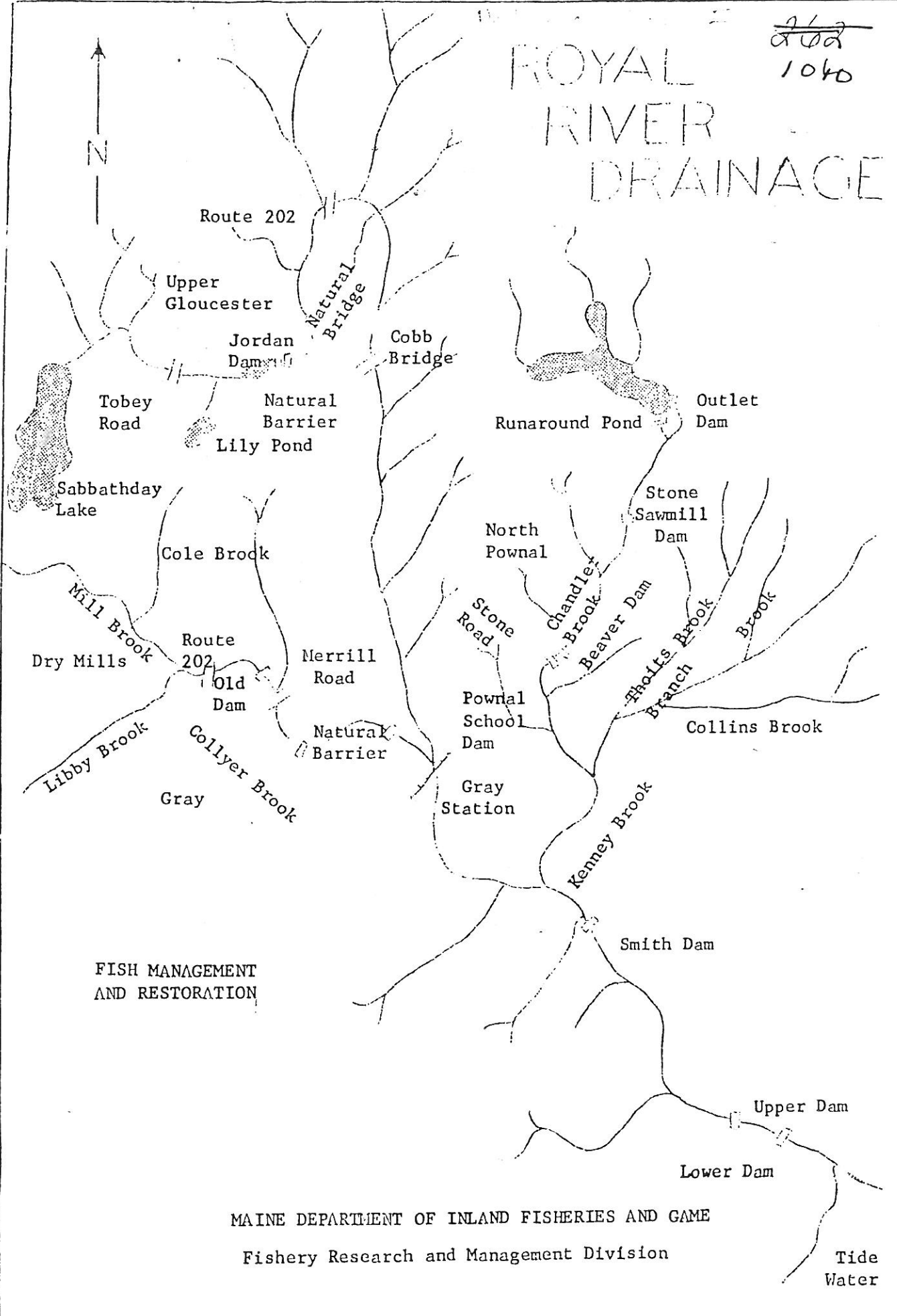
by

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Roland H. Cobb, Commissioner
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ROYAL RIVER DRAINAGE



FISH MANAGEMENT
AND RESTORATION

MAINE DEPARTMENT OF INLAND FISHERIES AND GAME
Fishery Research and Management Division

Tide
Water

FOREWORD

River management studies are in progress throughout the State. Their purpose is to maintain and restore the fisheries of our inland waters. As these studies are completed they will be presented to the citizens of our State.

This report summarizes findings of the river management study of the Royal River by the Fishery Research and Management Division of the Maine Department of Inland Fisheries and Game.

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Sebago Lake Region

March, 1958

Royal River Drainage

Fish Management Survey

INTRODUCTION

The Royal River is a small coastal stream which originates in Sabbathday Lake and flows into the sea at Yarmouth. Growing interest in the Royal River fishery has been stimulated by the catching of an occasional sea-run brown trout (often falsely identified as Atlantic salmon) below the dam in Yarmouth.

A biological survey of the drainage has been conducted to locate and evaluate the amounts of suitable habitat present in the river for anadromous salmon or trout. Studies during the survey included:

1. Location of obstructions to fish migrations.
2. Extent and evaluation of suitable spawning and nursery areas for anadromous fish in the main river and its tributaries.
3. Evaluation of pollution and its effects upon fish-life.
4. An appraisal of existing fish populations.

General Description of the Drainage

The Royal River originates in Sabbathday Lake, New Gloucester, in Cumberland County and flows in a southerly and easterly direction through the townships of New Gloucester, Auburn, Gray, Pownal, North Yarmouth, and Yarmouth in Androscoggin and Cumberland Counties. The river is approximately 25.5 miles long, has a fall of 293 feet, and a drainage area of 97 square miles. It may commonly be referred to as Westcustogo River although names like Royalls River, Royels River, Yarmouth River, Westcustogo River and Pungustuck River are not uncommon.¹

1. Attwood, Stanley D. 1946 Length and Breadth of Maine, 231 pp.

Sabbathday Lake is the only lake of three in the drainage that has suitable habitat to support trout. Lily Pond and Runaround Pond are best suited for warmwater species of game fish even though an occasional trout may be caught in them.

Fishes in the drainage include:

Landlock Salmon	Minnows
Brook trout (squaretail)	Fallfish
Brown trout	Creek chub
Smallmouth bass	Common shiner
Chain pickerel	Golden shiner
Hornpout (bullhead)	Redbelly dace
Smelt	Blacknose dace
Alewife	Pearl dace
Eel	Pumpkinseed sunfish
White sucker	

OBSTRUCTIONS

Fish passage in the Royal River Drainage is prevented by 7 man-made dams, 3 impassable natural barriers, and one fish screen. A stone road-bed and one beaver dam on Chandler Brook are considered minor obstructions. No fishways are provided in any of the obstructions. A few comments concerning each obstruction may acquaint the reader with the general situation.

Main River

Yarmouth Dam (Lower) - This dam is not being used at the present time other than for sanitary usage at the Yarmouth Mill. Water is taken into the mill through an 8-foot penstock constructed in the head-gate of the dam.

Upstream migrating fish are blocked at this obstruction by a 7-foot vertical, concrete spillway.

Yarmouth Dam (Upper) - The upper dam, a combination man-made dam and natural barrier, blocks all upstream fish migrations. From the east shore of the river to mid-stream a natural barrier of ledge with a cement cap having facilities for splash boards, blocks fish passage. Mid-stream to the west shore is obstructed by a 10-foot vertical spillway constructed of stone slabs.

This obstruction currently furnishes water to a chicken processing plant

through a man-made canal located several hundred feet upstream. Here water is backed up and passed through the canal to the mill. A small water control dam is located on the canal but does not interfere with fish management in the main river.

Smith Dam (Hayes Dam) - This obstruction has recently changed ownership and is being used to generate electricity for Mr. Smith's summer cottage. Fish can pass through the sluice-gate on the east shore at most water levels; however removal of debris and alteration to the mid-spillway submerged orifice would assure fish passage at all water levels.

Natural Barriers No. 1 & No. 2 - The first set of natural ledge falls is located in the town of New Gloucester several hundred yards below the Jordan Dam. These falls offer a 6 to 8-foot drop to migrating fish and are considered sufficient to block all upstream migrations of fish at all water levels.

The second set of natural falls is located only 100 feet below the Jordan Dam in Upper Gloucester. These falls, a complete fish barrier, have a sheer drop of 9 feet over ledge and boulders.

Jordan Dam - Although the remains of the old mill are hardly visible, the stone-work of the dam is still in place. The two sluice gates have been repaired for the installation of splash boards which presently hold a head of 8 feet that creates a ponded area in the main river above, where warm-water species of game fish are present.

Sabbathday Lake Fish Screen - The fish screen at Sabbathday Lake has been removed by high water since the survey; however plans are currently being made to re-locate the screen at the Tobey Road crossing, a distance of nearly 2 miles from the lake. With the screen located at this site spawning fish from Sabbathday Lake will be able to utilize the fair spawning area between the lake and the screen.

Tributaries

Collyer Brook

Pownal School Dam - This dam is located about 3/4 of a mile upstream from the confluence with the Royal River. The dam is of concrete and steel construction and holds a 7-foot head of water which is used as a water supply for Pownal School.

Natural Barrier - A barrier of ledge and rock is located about one-half way upstream between Merrill Road and "Old" Dam. No suitable spawning or nursery areas of consequence for anadromous fish are present above this barrier.

"Old" Dam - This dam is located about 200 feet above the Brandy Brook juncture. The mill has long-since fallen down and the dam is nearly non-existent except for the stone-slab sluiceway which still remains. The dam holds no head but fish passage in this stream section may be blocked by debris piling up in the face of the old stone sluiceway opening.

Chandler Brook

Stone Roadbed Barrier - This barrier to fish passage is located directly under the high tension power lines in the town of Pownal. It consists of large boulders placed in the stream to suffice as a jeep or wagon crossing. During summer flows all fish passage is stopped at this point.

Beaver Dam - An impassable beaver dam is present in Chandler Brook approximately 3/4 of a mile upstream from the Stone Roadbed barrier. Beaver dams are usually only temporary barriers and during periods of high water are not considered much of a problem. This dam should be removed however to allow normal migrations of fish during low water periods.

Sawmill Dam - This stone dam is located in an old, abandoned, fallen-down sawmill in North Pownal. No present use is being made of the mill or dam and both are beyond repair.

Runaround Pond Dam - The dam at the outlet of Runaround Pond is made of concrete and wood and is maintained in good repair to control the water level in the pond above which provides good pickerel fishing.

POLLUTION

Pollution in the Royal River is not considered extensive enough to be harmful to existing fish life. Other than being offensive to humans and decreasing the aesthetic and recreational value of the lower Royal River Drainage, pollution is not considered a serious fish management problem.

Pollution in the form of sewage enters the river in several places from Gray to Yarmouth; however its greatest influx is from the Pownal State School in Pownal. Here raw sewage is allowed to flow directly into the river above Gray Station.

Pollution in the form of chicken blood, viscera, and feathers enters the river in Yarmouth at the (Upper) dam. No direct effects to fish-life could be determined from this source of pollution at the time of survey. It should be mentioned here that the owners of the chicken plant have shown their desire to cooperate in any move designed to "clean up" the Royal River.

A more technical statement of pollution in the Royal River is not available at the time of this report. The Water Improvement Commission is currently conducting a pollution survey of the watershed and as soon as the survey is completed a report of this work along with recommended classification for the Royal River will be forthcoming.*

* Information obtained through personal correspondence (March, 1958).

HABITAT

A fishery management program would not be complete without considering the quantity and quality of habitat present in the area under consideration. No form of life can maintain itself in nature without suitable space in which to live and reproduce. A biological survey furnishes the fishery biologist with information concerning the amounts of suitable habitat present, what species of fish would be most adaptable to these conditions, what size fish population can

be expected, and the feasibility of an expanded, often expensive, fishery management program. For instance; it would be poor fishery management, and poor business too, to recommend fishway construction in several dams in a river system at a cost of thousands of dollars, and stock many thousands of fish with the objective of establishing a population, if suitable habitat did not exist for this type of management. The biological survey then provides data which determines the most feasible fishery management program to be adopted both from a biological and economical standpoint.

The following condensed account has been prepared to present the biological data obtained during the Royal River Study.

The Main River

The main river from Sabbathday Lake to Upper Gloucester has an average mid-summer water temperature of 70°F, a depth of a few inches in riffle areas to four feet in the slow-moving sections, and a flow of 8 cfs (cubic feet per second). The total area of 3.5 miles has only 2,000 feet of fine gravel, boulders, and swiftly moving water, considered only fair spawning and nursery area for trout. No spawning or nursery areas suitable for Atlantic salmon are present in this section.

The section of main river between Upper Gloucester and Route 202 has an average temperature of 67°F throughout. Three spring-fed streams entering the section account for the lower water temperatures. Spawning and nursery areas in this section of 2.25 miles are limited to about 400 feet of fine gravel, and 900 feet of large rubble and boulders below two impassable falls. Throughout the section many barriers of debris were noted where fish passage would be difficult.

From the second tributary stream to Route 202 the river winds through farm country where alternate shallow, sandy areas and deep, mud-bottom areas make up the major portion of the river.

Only a very limited area of less than 300 feet of salmon habitat is present in this entire section.

The main river from Route 202 to Cobb's Bridge contains the best spawning and nursery area in the entire drainage. The one-mile long section of coarse gravel and boulders could supply only limited spawning and nursery facilities for Atlantic salmon. Water temperatures remain constant at 66° F as a result of several tributary streams entering the area. Recorded mid-summer stream flow in this section of the main river was 10 cfs in 1957.

The main river from Cobb's Bridge to Yarmouth is considered the most undesirable in the entire drainage. It becomes wide and deep and waters take on a clay-erosion color. A limited area of less than 300 feet of spawning gravel is present below the Smith Dam and another 100-foot area is found near the Hick's School Bridge. These two areas would provide only a limited amount of spawning area for Atlantic salmon. No nursery area is present in this section of the river to Yarmouth.

Tributaries

Twenty-three tributaries enter the Royal River which comprise over 100 miles of streams. They vary in size from brooks with flows up to 13 cfs to small, rather insignificant, spring-fed streams with flows of less than 1 cfs. To discuss each one individually would be laborious and repetitious; therefore the smaller streams will be discussed collectively while the more important ones will be discussed separately.

Some 20 streams in the drainage fall into the category of small, spring-fed brooks which do no more than provide additional flow and cooler water to the main river and supply adequate habitat for the usually small resident populations of trout contained in them. They range in temperatures of 58° to 67° F with flows not exceeding 3 cfs in mid-summer. Some may appear on the Inland Fisheries and Game Department's trout stocking list although for the most part they are too small to warrant a fishery management program. In most instances the streams are too small to provide a fishery of any kind. The highest biological

classification assigned to this type stream is "C", although a "D" classification is the more common.²

In summary, approximately 87% of the tributary streams have nothing to offer in the way of suitable habitat for spawning fish ascending the main river. Collyer Brook, formed by the junction of 4 spring-fed streams (Libby Brook, Mill Brook, Eddy Brook, and Cole Brook) in the Dry Mills area, has a mid-summer flow range of 6 to 13 cfs. Water temperatures range from 55°F near its source to 60°F at its confluence with the Royal River. The major portion of the stream above Route 202 in Gray consists of long, shallow, sand-bottom areas of swift water with an occasional short distance of deep pools. Limited spawning gravel for resident trout is present in the upper sections of the four headwater streams.

The main brook from Route 202 in Gray to the "Old" Dam has only fair spawning and nursery areas present. Electro-fishing in this section provided data that substantiates this statement in that only adult brown trout were taken. Spawning and nursery areas below this point to the Merrill Road are present in a short section above and below an impassable ledge barrier. This area is not considered extensive enough to provide anymore than sufficient facilities for the resident populations of brown trout.

2. Biological classifications are assigned to streams as follows:

- A - Sufficient numbers of trout present - no stocking necessary.
- B - Streams do not become dangerously low, or dry during the summer, have populations of trout present, and can be stocked during any month from April to August.
- C - Streams may or usually dry up after the spring run-off and should thus be stocked early in the year just prior to or during the early season.
- D - Streams which should not be stocked because of unsuitable conditions; pollution, high temperatures, dry conditions, predators present, etc.

Collyer Brook from ledge falls to Pownal School Dam consists of long, dead-water areas of deep, cool water with a clay and occasional rock bottom, heavily shaded with alder growth. Below Pownal Dam to the Royal River an extensive spawning and nursery area is present for trout. Gravel in the riffle areas of this section is not considered suitable for Atlantic salmon. Electro-fishing in a 1000-foot section below the Pownal Dam provided data to show that brown trout have widely used this area. Data in table 1 summarize the population study in this section.

Table 1. Numbers of brown trout per mile in similar habitat of Collyer Brook

Range in total length (inches)				
2.0 - 3.9	4.0 - 5.9	6.0 - 7.9	8.0 - 9.9	10.0 - 15.0
2090	29	179	36	43

A drop in numbers of 4.0-5.9 fish indicate either a poor spawning year in 1955 or adverse conditions occurred in 1955 or 1956 which caused heavy mortalities in this year class.

In summary, approximately 3,000 feet of good spawning and nursery area for brown trout is present in Collyer Brook below the Pownal School Dam to the main river. Above this barrier only limited amounts of spawning gravel exists which is not considered extensive enough to warrant fish passage facilities in the Pownal Dam or over the ledge falls.

Chandler Brook originates in Runaround Pond, Durham township, which is formed by Runaround Brook and three no-named brooks that flow through flat, marshy land and offer no habitat for salmon or trout. Runaround Pond with water temperatures of 78°F is quite well-suited for the populations of pickerel, hornpout, and minnows that are present. The low concrete dam at the pond's outlet holds a maximum head of 4 feet. A completely demolished log-type dam is located on the east outlet. This branch has good spawning gravel present; however critically high summer water temperatures preclude coldwater fishery management.

The main stream from Runaround Pond to the Sawmill Dam in North Pownal is unsuitable for salmon or trout because of high water temperatures. Chandler Brook from North Pownal to the junction of Kenny Brook, a distance of 6 miles, has a total of 2,175 feet of fair to good habitat which is mostly found in the 1,950 foot section opposite Tyron Mountain in Pownal. Approximately 90% of this section consists of nursery area. An impassable beaver dam, 1,000 yards below the Maplewood Cemetery bridge in Pownal, prevents upstream migrating fish from utilizing the above mentioned spawning and nursery area. Approximately one mile downstream from the beaver dam an impassable stone roadbed is present. Ledge falls, opposite Marston Hill in Pownal, are passable to fish and provide the remaining 225 feet of spawning and nursery area in Chandler Brook.

Kenny Brook, formed by Thoits Brook, Branch Brook, and Collins Brook, has no spawning or nursery areas present for salmon or trout other than the 450 foot section located near Pownal Center. Electro-fishing in this section where the flow was measured at 6 cfs and a temperature of 64° F was recorded produced smallmouth bass, pickerel, common shiners, blacknose dace, and redbelly dace. Crawfish were abundant in this section.

Chandler Brook and Kenny Brook will be summarized collectively since they enter the Royal River at one entry point as a single tributary. Indigenous conditions of clay-sand farmland throughout the Chandler-Kenny Brook drainage restricts the natural formation of gravel, rock, and boulder streambed that provides spawning and nursery areas. Water temperatures however remain favorable in the major portion of the drainage, ranging from 62° to 65°F. Maximum summer flows of 6 cfs in the Chandler Branch and 10 cfs in the Kenny Branch were recorded.

A total of 2625 feet of fair spawning and nursery area is present in this tributary system which consists of over 26 miles of stream. An impassable

beaver dam and a stone roadbed render 1,950 feet of this area unusable to upstream-migrating fish; however removal of both barriers can be accomplished at a minimum of effort.

Biological classification has placed Chandler Brook in Class "C" and Kenny Brook in Class "B". Both streams are listed as alternates for local streams of lower requirements in the event that the latter are unsuitable to stock when fish are delivered.

Table 2 summarizes all suitable spawning and nursery areas present in the Royal River Drainage.

Table 2. Some information obtained during the Royal River Survey, 1956-57.

River section or tributary stream	Miles	Temperature Range* °F	Flow in cfs	Spawning & Nursery in feet	Per-cent	Barriers in section
<u>Main River</u>						
Sabbathday Lake to Upper Gloucester Dam	3.5	75 - 67	4 - 8	2,000	11	1 fish screen 1 dam
Upper Gloucester Dam to Route 202	2.25	67	--	1,300	11	2 natural falls
Route 202 to Cobb's Bridge	4.25	66	10	5,280	24	None
Cobb's Bridge to Yarmouth	<u>15.0</u>	66 - 70	--	<u>400</u>	<u>0.5</u>	3 dams
Total	25.0			8,980	7%	
<u>Tributaries</u>						
Collyer Brook Headwaters to Pownal School Dam	12	55 - 60	6 - 13	1,000	1	1 natural falls 2 dams
Pownal Dam to Royal River	1	60	13	3,000	57	None
Chandler Brook & Kenny Brook	<u>26</u>	75 - 62	6 - 10	<u>2,625</u>	<u>2</u>	2 dams 2 barriers
Total	39			6,625	3%	
Grand Total of Drainage	64			15,605 (2.9 miles)	5%	

*Temperatures appear in table as readings from upstream to downstream

Species Suitability

The words, "Species Suitability" mean a great deal in the vocabulary of fishery workers, but are often times overlooked or little appreciated by enthusiastic anglers who are over-impressed by reports that a sea-run salmon or trout is occasionally caught near the mouth of a river. Often-times, before anything else is considered, a movement gets underway to build fishways in the dams along the river and stock thousands of Atlantic salmon. Certain environmental factors must be present in the river drainage which will meet the requirements of an anadromous fish in its capacity to produce sufficient numbers to provide and perpetuate a satisfactory fishery before any plans for anadromous fish restoration are undertaken. The biological survey of the river system will provide the fishery biologist with data upon which to base the future fishery management of the river.

Environmental facilities present in the Royal River Drainage with respect to species suitability are discussed for a better understanding of the recommendations of this report.

Atlantic salmon

The Royal River Drainage contains poor Atlantic salmon habitat.

Spawning and nursery areas that fulfill the requirements of the Atlantic salmon are nearly non-existent in the entire drainage. The limited spawning and nursery area along the main river is not considered adequate to produce sufficient numbers of salmon to provide and perpetuate a satisfactory fishery. The more than 100 miles of tributary streams and spring-fed brooks entering the main river contain no significant habitat for this species. Gravel, riffle areas in all the major tributaries are most suitable for brook trout or brown trout.

Brown trout, well-established in the lower Royal River system, would play

a major role in preventing the establishment of the Atlantic salmon in the drainage as a result of compétition. This species, better adapted than the salmon, requires practically the same food and space requirements as do salmon. They are however not as particular in their utilization of spawning and nursery areas. Brown trout will satisfactorily utilize finer gravel for spawning and more inferior nursery areas than salmon. Therefore, this species is capable of becoming better established in a river system with less than ideal environmental facilities, whereas Atlantic salmon under similar conditions might never increase beyond the "occasional-fish-caught" stage.

Brown trout

The brown trout is well established in the lower 2/3 of the Royal River Drainage. Spawning and nursery areas present in the main river and in the tributary streams are utilized successfully by brown trout as evidenced from the samples of the population obtained by electro-fishing.

Maine river water temperatures and water quality is more suitable to the less critical brown trout which seem to adapt themselves well to adverse environmental conditions.

Brook trout

Although brook trout are present throughout the Royal River Drainage they were not found in significant numbers in the course of the survey. Competition from brown trout, pickerel, and trash fish in the drainage is probably the greatest single factor responsible for their scarcity.

Habitat-wise the Royal River Drainage could support brook trout since spawning and nursery areas and water temperatures for the most part are favorable for this species. Species competition however precludes the management of brook trout in the main river or its tributaries below Upper Gloucester.

Alewives

Since relatively no interest has been shown in this area for alewives they do not play an important role in this report. In view of the fact that large lake areas, necessary to provide spawning area for alewives, are lacking and the cost of providing fish passage over 4 dams and two impassable barriers seems excessive, it is not recommended that alewife restoration be considered in the Royal River Drainage.

SUMMARY AND RECOMMENDATIONS

The recommended fishery management program for the Royal River Drainage is based on the following facts:

1. Nearly 90% of all suitable spawning and nursery areas in the main river are located below the natural barriers in Upper Gloucester.
2. Over 90% of all suitable spawning and nursery areas in the tributary streams are accessible to fish moving up the main river.
3. Brown trout are well established in the Royal River below Upper Gloucester and in Collyer Brook below Pownal School Dam.
4. Debris removal and slight alterations at one dam, fishway construction in two dams, and removal of one beaver dam and one stone road-bed would allow complete fish passage in the Royal River Drainage to Upper Gloucester. (The estimated cost for two fishways, as supplied by the Department of Inland Fisheries and Game's fishway engineer, is \$3,100.00.
5. Suitable habitat for Atlantic salmon is very limited in the Royal River Drainage.

As stated previously in this report, "Certain factors must be present in a river system that will satisfy the requirements of a species before thriving populations can be produced and maintained." The Royal River survey has been conducted and the data obtained carefully analyzed. The conclusions of this study are designed to produce the best fishery that is possible with the limited amount of suitable habitat present in the Royal River Drainage.

The following recommendations are therefore made:

1. The Royal River should be managed for brown trout from Upper Gloucester to the sea in Yarmouth.

2. The main river from Sabbathday Lake to Upper Gloucester provides a brook trout fishery. This section should be managed for this species.
3. The Royal River contains only limited habitat for Atlantic salmon. No attempts to establish this species should be undertaken.
4. Fishways should be constructed in the two dams in Yarmouth (Upper and Lower) to allow free passage of sea-run brown trout.
5. Debris removal and alterations to the Smith Dam should be made to provide fish passage. However, fishway construction in this dam will become necessary if the owner decides to install splash boards in the sluice gates and increase the water height at the dam.
6. The stone roadbed and beaver dam in Pownal should be removed to allow spawning fish access to suitable facilities in Chandler Brook.
7. No increased stocking rate of brown trout is necessary in the drainage since adequate numbers of this species already exist. The continued stocking of brook trout in any stream of the Royal River Drainage below Upper Gloucester is not recommended.
8. No additional sources of pollution should be allowed to enter the Royal River Drainage.