KITSAP BASIN
Water Resource Inventory Area 15

The many rivers and streams located within the boundary of the Kitsap Peninsula can best be defined and discussed by locality if the Peninsula is divided down the middle from north to south. This division then separates the streams flowing generally eastward draining into Puget Sound and southern Puget Sound from those flowing westward and southerly into Hood Canal. By this method it is also easier to geographically define the commercial and sport fisheries which harvest the salmon production from these streams. Within this basin there are 521 identified streams providing over 665 linear miles of drainage.

The streams draining into Puget Sound from the east half of the Kitsap Peninsula are rather small in comparison to those of the west half and represent typical lowland type streams with generally moderate gradients. Considerable deciduous growth, interspersed by stands of conifers, farm land, and suburban developments is common on all streams. Many of these streams originate from lakes, ground water run-off, or swamp-like basins. Stream profile characteristics are, for the most part, pool riffle in nature with water quality and aquatic insect production highly conducive to anadromous fish habitation.

PHOTO 15-1. Most streams of this basin originate from spring fed swamps (Headwaters Tahuya River).

Moving from south to north the major streams of the East Kitsap segment include Coulter, Rocky, Lackey, Minter, Burley, Purdy, Crescent, Ollala, Gurley, Blackjack, and Gorst creeks. Virtually every one of these streams is inhabited by anadromous fish including at least two species of salmon. Several smaller independent streams are also located in the east Kitsap drainage and support impressive numbers of salmon spawners for their size.

The marine waters along the shorelines and borders of the east Kitsap basin and southern Puget Sound through the Tacoma Narrows into Carr Inlet contain a highly diversified salt water environment. These waters are vital to the marine fish and shellfish resources by providing mixing and transition zones from the cool, dense saline ocean waters to the warmer, less saline water layers of the shallow shelfs, bays, and channels of the peninsula.

Within these prominent protected waters, including Dye and Sinclair inlets, Liberty Bay, Port Madison, Port Orchard, Gig Harbor, Quartermaster Harbor, and Carr Inlet, are rich feeding areas for anadromous fish. The strongly mixed currents within Colvos Passage and the Tacoma Narrows also create prime feeding areas by collecting a great diversity of marine organisms within the tide rips.

The streams and rivers draining the west side of the Kitsap Peninsula are larger than those of the east side, but originate in adjacent and similar headwater terrain. Moving from north to south the major streams of the West Kitsap segment flowing into Hood Canal include Big Beef Creek, Dewatto River, Anderson Creek, Tahuya River, Stimson, Little Mission, and Big Mission creeks, and the Union River. These systems support impressive populations of anadromous fish with at least two salmon species utilizing each stream.

The marine waters of Hood Canal are unique due to the slow exchange and mixing of waters in the extensive length of the canal. Depths generally exceed 50 fathoms with large areas in the 70-fathom and deeper range. There are also shallow shelfs and bays that provide warmer waters rich in nutrients.

The relatively large volume of fresh water draining into the canal forms a layer over the salt water or sometimes stratifies at different depths depending upon the temperature differences between the drainage run-off and the salt water. Thus the environmental changes here play an important role in triggering algae and zooplanktonic blooms which produce heavy seasonal food supplies.

The many independent rivers and streams provide a total of over 665 linear miles of stream length to the Kitsap basin, most of which is accessible.

PHOTO 15-2. Limited estuaries are typical of streams in this basin (mouth of Coulter Creek).

Fish Inventory and Distribution

Four species of Pacific salmon, chinook, coho, chum, and pink, currently utilize Kitsap basin drainages. No established populations of sockeye have been observed in any of the Kitsap streams. These salmon species migrate, spawn, and rear in approximately 600 linear miles of independent streams and their tributaries.

Chinook Salmon — In this basin chinook salmon utilize the larger drainages in addition to some of the smaller creeks. Coulter, Rocky, Minter, Burley, Gorst, Chico, and Dogfish creeks in the east Kitsap drainages and the Dewatto, Tahuya, and Union rivers in the west Kitsap drainages all contain established fall chinook populations. Chinook utilize the lower stream sections where larger quantities of gravel and greater flows are found. Use of the smaller independent basin drainages by this species is minimal since these streams exhibit very low flows during the normal chinook migration and spawning periods.

Upstream migrations of fall chinook in these lowland streams extend over two months (mid-September to mid-November), depending on the stream flows and temperatures (Table 15-1). Early runs of chum salmon also overlap the chinook spawning in many of these streams during the same period. These two species also utilize the same spawning reaches in most cases. The essential difference between them is the preference of chinook for the larger gravel and heavier flows than the chum. The peak spawning occurs between mid-October and mid-November and is usually completed in all small streams by the end of November. Following incubation and subsequent fry emergence, the majority of chinook fry rear in these lowland systems for 3 or 4 months and enter the estuaries around May or early June depending on the spring run-off flows. Juvenile migrants tend to remain longer in the lower Tahuya and Union rivers where deep holes and tidal influences provide ideal conditions for the conversion from fresh to salt water rearing.

The annual escapement of fall chinook adults in the East Kitsap streams from 1966 to 1971 has ranged from 530 to 2,350, averaging 1,470 per year. The three larger rivers comprising the West Kitsap drainage into Hood Canal have had annual escapements ranging from 160 to 800 chinook from 1966 to 1971 and averaging 550 fish (Table 15-2).

Coho Salmon — All of the accessible independent lowland streams of the Kitsap Peninsula are utilized by coho salmon. Spawning occurs in every independent stream and tributary where suitable conditions exist, particularly in the upper headwaters. Since coho are well adapted to the typical lowland-type streams found in this basin, they inhabit the most remote and extreme rivulets, as well as the springs, swamps, and marshes forming the upper headwaters and high water overflow areas on many of these drainages. Coho juveniles rear throughout the accessible lengths of these streams and in the associated estuaries and marine habitats.

Adult coho begin entering the larger rivers and streams of this basin in early to mid-September and the smaller streams about the end of October. These runs continue well into late December. Spawning commences in mid to late October and is generally completed by late December. Following incubation and emergence from the gravel, the juveniles normally remain in the stream for more than a year, migrating seaward early in their second year of fresh-water life. In many of the smaller streams that generally suffer reduced summer flows in this basin, the coho juveniles are forced to migrate out as fry within the first six months of residency. Resident fry reluctant to move downstream during receding summer low flows suffer heavy mortalities due to stranding, desiccation, extreme water temperatures, or predation. The out-migration extends through the period of late February to mid-July with the peak usually occurring in mid-April.

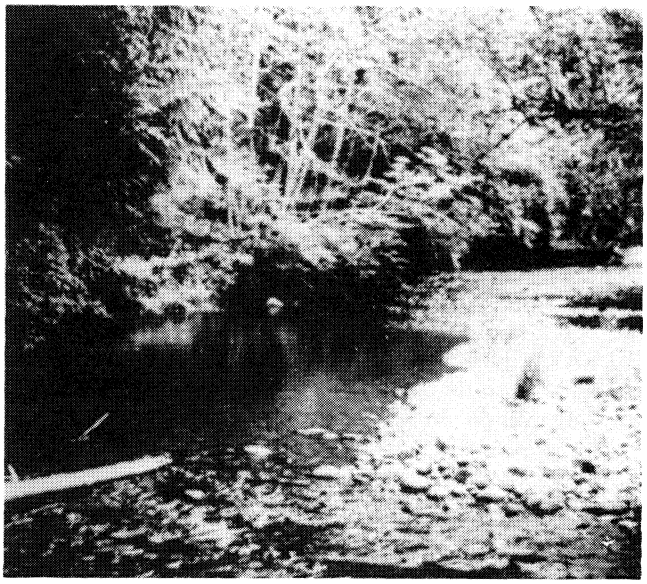


PHOTO 15-3. Upper Dewatto Creek offers superior coho habitat.

Estimates of adult coho spawning escapements to the West Kitsap streams for the period 1960 to 1970 have ranged from 9,100 to 30,100, averaging 19,000 annually. Those to the East Kitsap rivers and streams ranged from 6,650 to 27,800, averaging 16,650 annually.

Chum Salmon — Impressive runs of chum salmon occur in most of the Kitsap streams and a few are found in nearly every accessible stream. Principal chum streams include Coulter, Rocky, Lackey, Burley, Purdy, Crescent, Gurley, Blackjack, Dogfish, Chico, Gorst, Big Beef, Anderson, Big Mission, Little Mission and Rendsland creeks, as well as the Dewatto, Tahuya, and Union rivers. Many of these streams maintain only a single race or run of chum salmon while several others have two distinct runs (early and late). Those containing early and late runs are Coulter, Rocky, Big Beef, and Anderson creeks and the Union River. The three chum runs entering both the Dewatto and Tahuya rivers overlap to such an extent that they can hardly be separated. These adults start arriving in mid-September with spawning waves continuing on into January.

The early chum runs enter the basin's independent streams beginning September 15th with spawning concluded by October 20th. The intermediate runs occur within the period October 15th to November 25th, while late runs are comprised of spawners utilizing the late fall-early winter period between November 20th and January 5th.

PHOTO 15-4. Chum salmon utilize the lower sections of most Kitsap streams (Union River).

The distribution of chum spawners varies widely between streams due to the size and nature of the watersheds. Spawning normally starts immediately above the tidal influence and extends upstream as far as good spawning gravels are accessible. Following incubation and subsequent fry emergence, the juveniles migrate seaward. This migration starts in mid to late February and is completed by mid-May.

Based on spawning ground information, it is estimated that the East Kitsap streams had annual chum escapements ranging from 27,200 to 85,700 for the period 1966 to 1971, averaging about 46,850 annually. In the West Kitsap rivers and streams chum salmon escapements were estimated to range from 20,250 to 47,950, during this same period, averaging 29,550 annually.

Pink Salmon — The typical lowland type streams of the Kitsap Peninsula are not normally inhabited by pink salmon as they seem to prefer drainages that are of glacial origin. The Nisqually River in Southern Puget Sound and Skokomish River in Hood Canal are the southern extremities of the range of pink salmon. Minter Creek is the only Kitsap Peninsula stream to record a meager return of pink salmon each odd year. The largest run to return to the rack occurred in 1963 when 1,794 were counted. A few stray adult pinks wander into the Dewatto, Tahuya, and Union rivers each cycle from the heavy runs that inhabit the larger west side Hood Canal rivers.

Salmon Production

Minter Creek Salmon Hatchery is the only artificial production facility within the Kitsap Peninsula basin. This station originated in 1937 as the Minter Creek Biological Station to assess the natural escapements in this system through rack counts and controlled releases. Since 1955 this facility has operated as a production hatchery with expansion of the egg incubation and rearing facilities to accommodate 12,-500,000 coho and chinook out-migrants. These fingerlings are essentially planted within the basin drainages, but many are on occasion also released outside the basin to bolster depleted runs in Puget Sound waters. In addition, chum and pink salmon are also propagated from this hatchery. For the period 1966 to 1971, chinook returns to the Minter Creek Hatchery rack ranged from 1,589 to 10,913 adults, averaging 4,904 annually. Coho rack counts ranged from 5,580 to 47,582, averaging 17,704 spawners annually. Chum salmon returns ranged from 61 to 920, averaging 432 with none spawned artificially.

Between 1966 and 1971 a total 20,006,000 chinook and 10,171,000 coho were released in the Kitsap basin with an average annual plant of 3,343,000 chinook and 1,695,000 coho. Plants in 1971 included 2,269,300 juvenile chinook (114,000 lbs.) into the Kitsap watersheds and 3,543,100

Timing of salmon fresh-water life phases in the Kitsap Basin WRIA 15

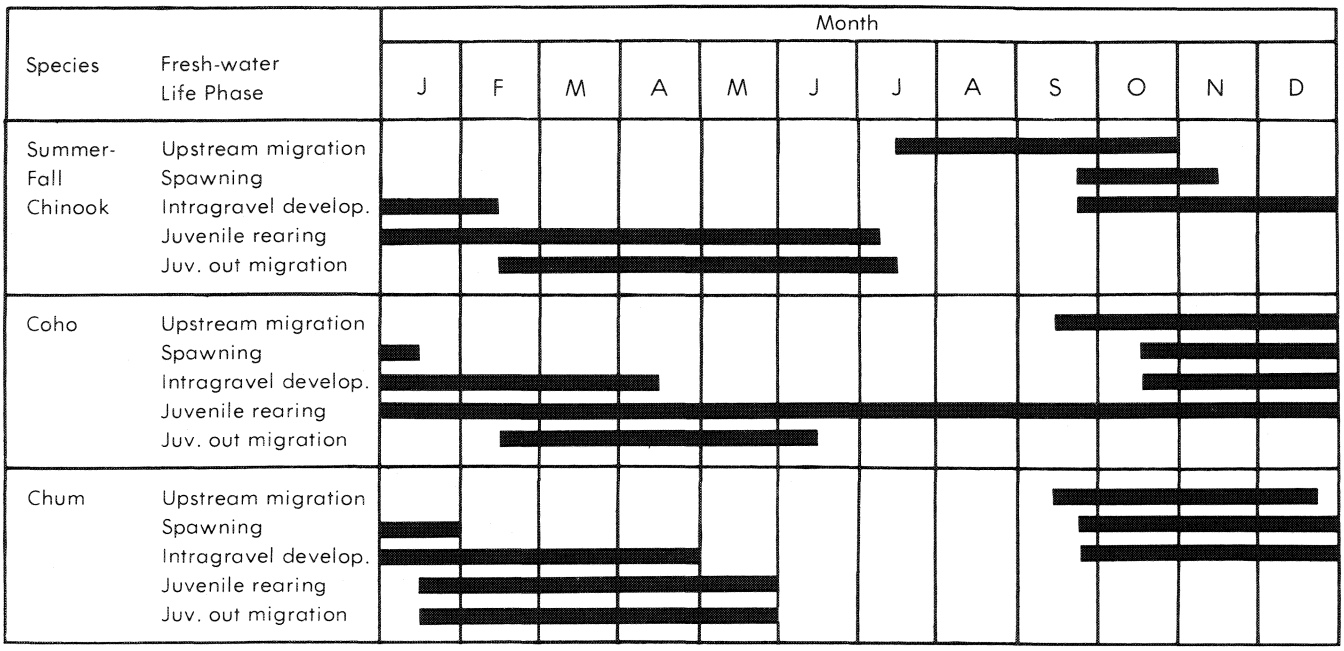


TABLE 15-2. Salmon Escapement Level for the Kitsap Basin WRIA 15.

Species	1966-1971 Escapements [1] Range	Average
Chinook	5,600— 8,000	6,900
Coho	33,500— 75,600	53,300
Chum	47,400—133,700	76,400

Natural Escapement Potential	
Chinook	8,000
Coho	70,000
Chum	90,000
Pink	< 71,000

[1] *Includes natural plus artificial combined escapements.*

juvenile coho (23,400 lbs.) released into the Shelton, Deschutes, and Kitsap watersheds. [1]

Preliminary information from marking programs and commercial and sport catch statistics indicates that the present salmon planting program from this basin contributes approximately 36,350 chinook and 95,900 coho to these fisheries annually. The tremendous sea survivals in 1970-71 plus the heavy increases in artificial plants indicate that production from these lowland streams should double the contribution to these fisheries in the next cycle.

Harvest

Salmon produced and reared in the Kitsap basin contribute to the U.S. and Canadian, Pacific Ocean sport and commercial fisheries and to all the fisheries existing through the Strait of Juan de Fuca and throughout Puget Sound and Hood Canal. The estimated total contributions (all species) to these various fisheries has for the years 1966-1971 ranged from 200,200 to 462,100 salmon.

A commercial fishery was authorized in Carr Inlet off the mouth of Minter Creek north of a line true west from Green Point on October 23, 1970. One night of gill net fishing by 100 vessels followed by some 40 purse seiners the next day harvested 14,578 coho and 140 chinook in a 24-hour period. The exceptional sea survival of all stocks from this year class had resulted in a tremendous coho escapement to all Washington streams. Minter Creek, below the hatchery rack, was clogged with spawners to the extent that the oxygen in the creek was depleted below tolerance levels and fish were dying. The total harvest plus escapement accounted for 11,055 chinook and 62,600 coho. A commercial fishery was again allowed in this area in 1971 to harvest the surplus fish returning to Minter Creek.

[1] *The average weight of juvenile salmon from hatchery releases is 20 coho/lb. and 125 chinook/lb.*

In past years Indian fishing in this areahas been nearly non-existent, but adjudication of Indian fishing rights now in progress may cause significant alterations in both fishing patterns and catch.

Sport angling for salmon is growing in popularity in the marine waters of the Kitsap Peninsula with fishermen concentrating their efforts along the drop-off shelf around Glen Cove, Minter Creek, Wauna, the mouth of Burley Lagoon at Purdy, and Raft Island and Cutts Island waters. Winter blackmouth fishing is particularly attractive in these waters as large numbers of immature feeder salmon utilize the marine waters of the Kitsap Peninsula the year around. Since many of the bays and inlets are semi-protected from prevailing winds and rough water and have good access at boat launching ramps and resort areas, sport fishermen are attracted to these waters. The most concentrated sport fisheries are found in the areas of heavy currents, tide rips, and back eddys where food organisms are abundant and salmon congregate, such as Point No Point, Point Jefferson, Agate Pass, Orchard Point-Manchester, West Passage, the Tacoma Narrows, and Fox Island Channel.

The marine salmon sport catch for the waters surrounding the Kitsap Peninsula cannot be accurately depicted because there are three salmon punch card areas involved. These are Area 9, Admiralty Inlet-Possession Sound; Area 10, Seattle-Bremerton; and Area 11, South Puget Sound. The fisheries in these three areas catch the salmon originating from many other watersheds both within Puget Sound and Canada.

Limiting Factors

Limiting factors refer to conditions that lead to a complete loss or reduction of the environment's fish production potential, excluding harvest or exploitation. They include only those conditions presently considered alterable. Within the Kitsap basin major limiting factors include seasonal flooding, low summer flows, intermittent debris or beaver dams, and water quality problems in the areas of concentrated land developments and major marine activities of the metropolitan centers.

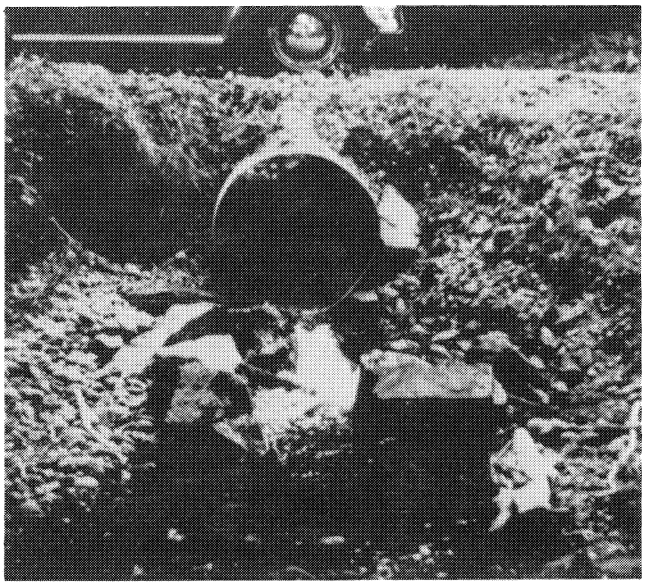


PHOTO 15-5. Improperly placed culverts block migrations to many miles of upstream area (Dewatto Creek tributary).

Stream flow — The seventeen major independent rivers and streams of the Kitsap Peninsula all originate in lower elevation foothills with no supporting glaciers or snow packs to provide continuous melt in warm summer months. Since the streams draining this area are entirely dependent on rainfall, seasonal flooding occurs infrequently in each of the basin's drainages and the effects of flooding in the smaller streams is usually minimal. In the rivers, however, the flow intensity has the capacity to destroy the salmon spawn and alter the quality of the spawning and rearing habitat. Extensive logging and land developments around the many lakes within the upper watersheds intensifies the intermittent run-off, increasing the magnitude of short duration floods.

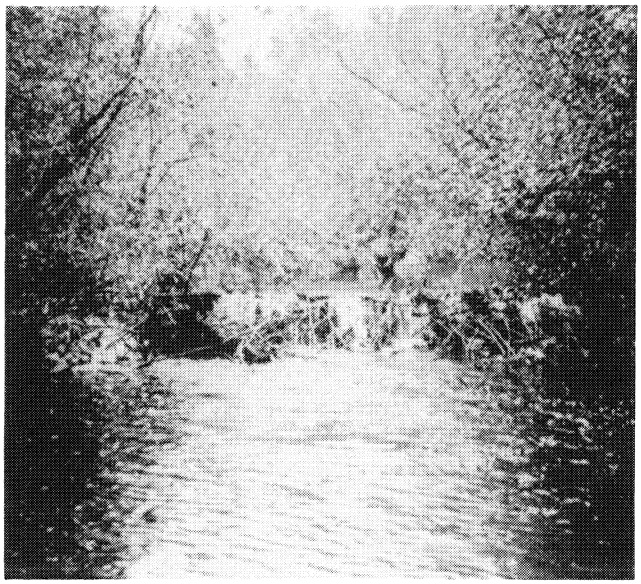


PHOTO 15-6. Beaver dams are a common and recurring problem in the Kitsap basin (Goldsborough Creek).

The seasonal low flows are a serious limiting factor in virtually every basin stream, but are extremely critical where extensive land clearing has occurred. Except for the natural lakes and swamps there is little opportunity for flow augmentation. The accelerated population expansion within this basin is resulting in the deterioration of stream environments and salmon production in many areas. Increased demands for municipal and industrial water supplies are already being expressed.

Physical barriers — Most of the streams in the basin contain moderate gradients throughout their lengths which salmon are able to utilize. Only four drainages in this basin contain blocks of which three are man-made and only one is natural. Two of the man-made barriers have fishways. These are the dam on Lake Symington on Big Beef Creek at RM 5.2 and the dam on Tahuya Lake at the headwaters of the Tahuya River. The pumping station and fish rack on Gorst Creek is a total block to the upper watershed which is the City of Bremerton's water supply. McKenna Falls is the only natural barrier to fish migration and is located at RM 6.5 on the Union River. Above the falls the City of Bremerton maintains a storage dam and reservoir.

Intermittent barriers created by debris accumulation or by beaver activity occur periodically on all of the basin's streams.

Water quality — Since much of the peninsula is cutover land that has grown back to second growth fir and deciduous trees and brush, poor water quality is not a particular problem at this time. High water temperatures above those tolerable by salmonids occur in the summer and fall months in Big Beef Creek from the impounded waters of Lake Symington. In the Union River severe low flows and high temperatures occur annually due to reservoir impoundment. Localized effluent problems are noticeable in the marine waters of the Bremerton-Port Orchard area largely due to industrial wastes and the lack of secondary sewage treatment plants. Recreational developments are rapidly expanding in the upper watersheds of this basin and pose a potential pollution problem in the near future.

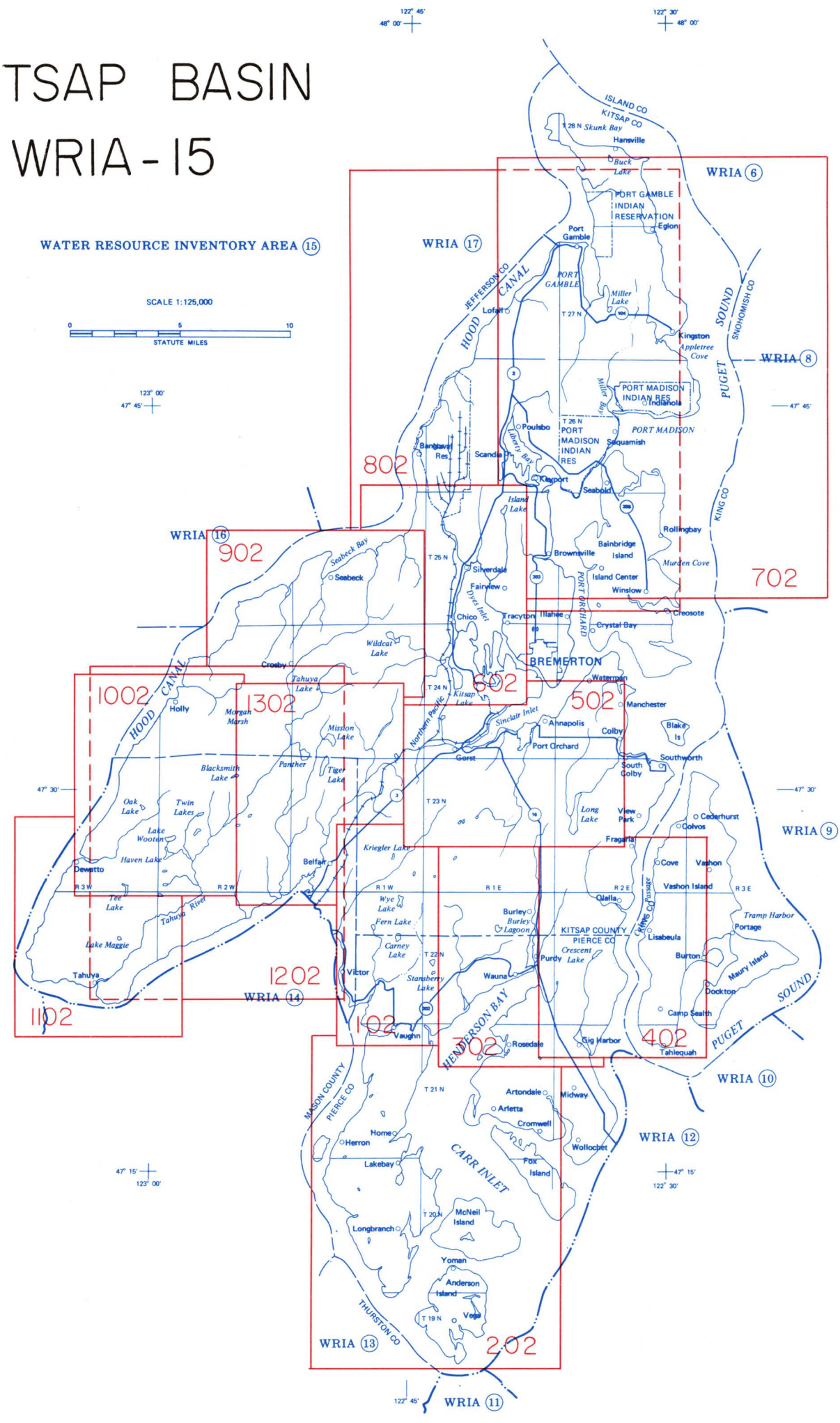
Limited spawning and rearing area — Low flows in the fall and early winter preclude adult spawners from entering many of the small lowland-type streams that are prevalent here. Likewise, reduced rearing habitat during these periods is a serious threat to the coho stocks in these streams. On naturally dry years these smaller streams cannot sustain fish life due to extremely low flows. Anderson Creek and Big Beef Creek have undergone serious gravel bed scouring and have become silted in their upper sections due to land development activities.

Watershed development — Much of the upper watersheds are used for growing Christmas trees. This continual cutting of the land cover creates intensified run-offs. The creation of recreational developments and construction of summer homes around lakes and ponds is accelerating. Heavy pressures to dam streams in the basin in order to create home and recreational land developments are increasing. Future expansion of U.S. Naval facilities and programs within this basin can also be anticipated. Since no further sources of municipal and industrial water supplies are available from the small streams on the peninsula, all future demands and requirements will have to be satisfied from rivers outside of this basin, logically from the Olympic Peninsula rivers.

PHOTO 15-7. Damming of streams to enhance property values causes significant habitat losses (unnamed tributary to Tahuya River).

KITSAP BASIN WRIA 15
Index to Key Map

KITSAP BASIN
WRIA-15



COULTER-ROCKY CREEKS

Coulter Creek, Rocky Creek, and five unnamed drainages flow into three bays that form the northernmost portion of Case Inlet. Interestingly, the relatively small watershed area lies within the boundaries of three counties; Kitsap, Pierce, and Mason. Total stream length is 43.2 miles, with the two major creeks sharing most of this total.

Stream Description

One description of physical watershed characteristics applies to all the streams within this sub-basin. The headwaters of the several streams lie in sparsely developed lowland hills of the southern Kitsap Peninsula. Streams flow in a southerly direction through moderately sloped valleys covered with second growth timber. Land development is very limited except for a rural development belt along the marine shorelines.

Existing land use is predominantly for second growth timber, with a few Christmas tree farming areas. Second growth logging is now under way and has been relatively intensive in portions of Coulter Creek. Coulter and Rocky creeks are similar in drainage area and size, although Coulter Creek has significantly greater flows (there are no known published stream flow data available on these streams). Both streams, however, afford excellent salmon habitat and rank high in productivity.

Coulter Creek enters southern Puget Sound at the tip of North Bay, the northernmost extension of Case Inlet. Stream gradient is moderate to shallow throughout much of its accessible length. It is very stable, has dense stream bank cover, and has many areas of excellent quality spawning gravel. Several very old log jams are present in the channel; however, these have seemingly served to stabilize the existing stream habitat over a period of many years, and they do not presently limit production. There are occasional areas with shallow gradient and semi-swampy habitat that provide superb rearing conditions throughout the year.

Rocky Creek enters Rocky Bay to the south. Stream gradient may be slightly steeper than Coulter Creek, with fewer quiet water areas, but spawning and rearing habitat is still exceptional. Stream bank cover in both these important drainages remains dense, even though there has been recent logging of adjacent lands.

A major left bank tributary enters Rocky Creek at mile 0.4. While this stream has an apparent larger drainage area, and half again the mainstem length of Rocky Creek, its value for salmon production is apparently minimal. Coho spawn and rear in its lower reaches, but much of the upper watershed is unproductive and has only seasonal flows.

Salmon Utilization

Virtually all areas of Coulter and Rocky creeks with year round flow are utilized by salmon for spawning and rearing. Coho ascend Coulter for more than five miles, and Rocky Creek is accessible to Fern Lake at mile 3.4. The major Rocky Creek tributary is also utilized by coho, but the upper limit of production is unknown. Large runs of chum salmon enter both streams, and the lower three miles of Coulter Creek and 1.5 miles of Rocky Creek are heavily utilized for spawning. Both early (October) and late (December-January) stocks return to the streams.

The unnamed independent drainages have unknown production, but it is believed to be minor. Tributary No. 0023, entering the head of Vaughn Bay, appears to have excellent coho production habitat.

Limiting Factors

Existing productivity of the stream remains favorable, in spite of past and present logging activity. Severe poaching during recent years, particularly on Rocky Creek's chinook and early chum salmon stocks, has been severe. Intense patrol of problem areas during recent years has reduced this problem; however, stocks have not yet responded to this protection.

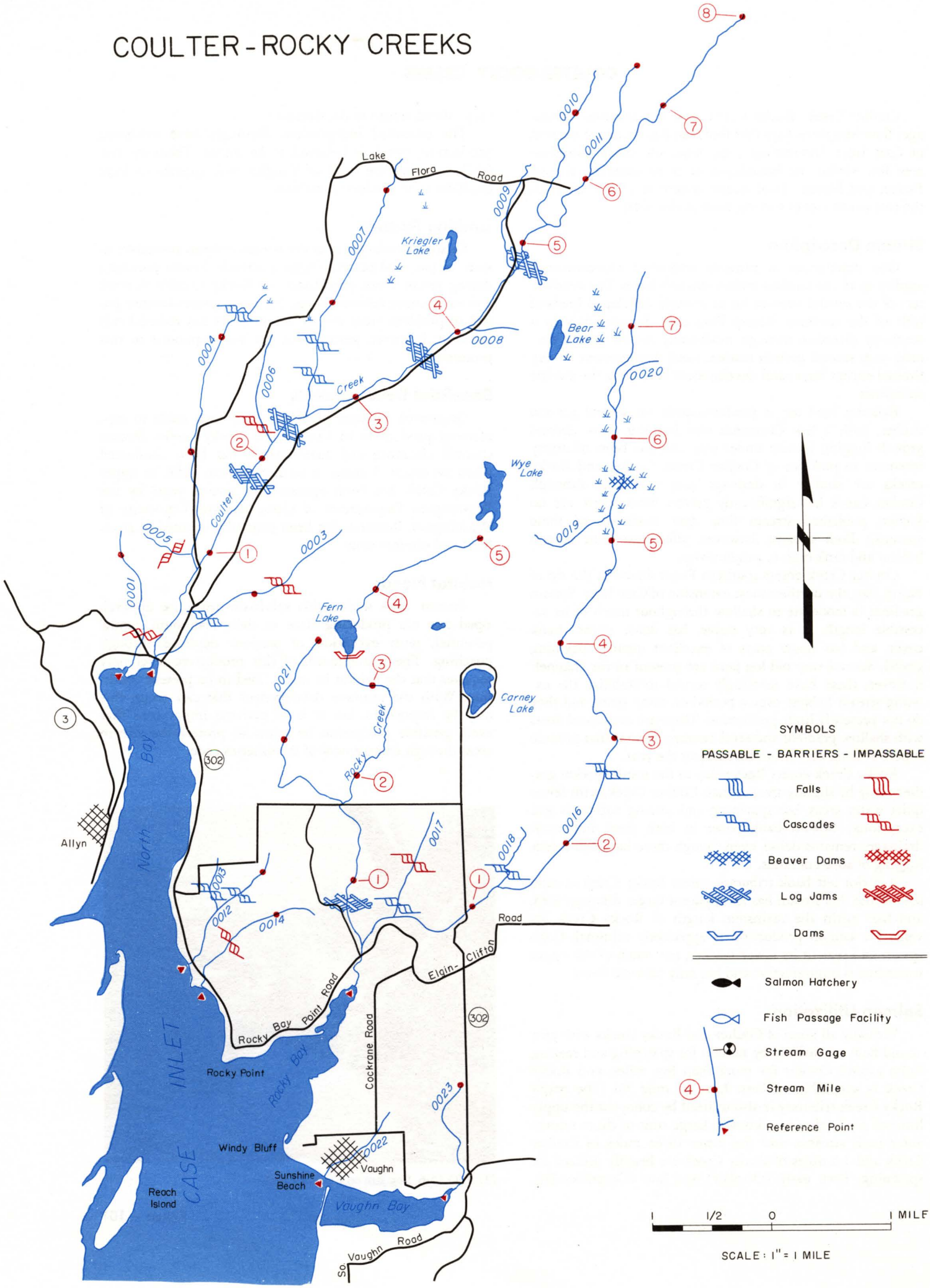
Beneficial Developments

Occasional hatchery plantings have been made to supplement production in Coulter and Rocky creeks. Stream channel clearance and maintenance has been conducted when necessary. A research facility on Fern Lake, in upper Rocky Creek, has been operated for several years by the Washington Department of Game and the University of Washington. Research has been primarily devoted to steelhead and resident trout.

Habitat Needs

Stream areas within this sub-basin are quite undeveloped and are producing close to their maximum natural potential, with exception of sections depleted through poaching. The maintenance of this productive level only requires that the habitat be maintained in its present condition. With the ultimate development that can occur, this may be impossible, but it is of extreme importance that every possible precaution be taken to protect the stream areas through enforcement of the fisheries code.

PHOTO 15-6. Log jam on Coulter Creek.


COULTER - ROCKY CREEKS
Lake
Flora
Road
Kriegler Lake
Bear Lake
Wye Lake
Fern Lake
Carney Lake
Creek
Coulter
Rocky
Creek
0001
0003
0004
0005
0006
0007
0008
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0012
0013
0014
0016
0017
0018
0019
0020
0021
0022
0023
Allyn
North Bay
INLET
CASE
Rocky Point
Rocky Bay
Windy Bluff
Reach Island
Sunshine Beach
Vaughn
Vaughn Bay
So Vaughn Road
Rocky Bay Point Road
Cockrane Road
Elgin-Clifton Road
302
SYMBOLS
PASSABLE - BARRIERS - IMPASSABLE
Falls
Cascades
Beaver Dams
Log Jams
Dams
Salmon Hatchery
Fish Passage Facility
Stream Gage
Stream Mile
Reference Point
1/2
0
1 MILE
SCALE: 1" = 1 MILE

COULTER-ROCKY CREEKS
Kitsap Basin — WRIA 15

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0001	Unnamed	Sec8,T22N,R1W	1.2	—	Coho, (Chum)
0002	Coulter Creek	Sec9,T22N,R1W	8.0	—	Chin., Coho, Chum
0003	Unnamed	LB-0.05	1.9	—	Coho, Chum
0004	Unnamed	RB-0.85	2.6	—	Coho, Chum
0007	Unnamed	RB-2.5	2.3	—	Coho, (Chum)
0010	Unnamed	RB-5.3	1.5	—	Unknown
0011	Unnamed	RB-6.05	1.0	—	Unknown
0012	Unnamed	Sec28,T22N,R1W	1.15	—	Unknown
0014	Unnamed	Sec28,T22N,R1W	1.3	—	Unknown
0015	Rocky Creek	Sec27,T22N,R1W	5.0	—	Chin., Coho, Chum
0016	Unnamed	LB-0.4	7.5	—	Coho, (Chum)
0021	Unnamed	RB-1.7	2.0	—	Unknown
	Fern Lake	Outlet-3.4	—	—	
0023	Unnamed	Sec2,T21N,R1W	1.0	—	Unknown

CARR INLET
Independent Drainages

Numerous small streams drain the small watersheds of the Longbranch Peninsula, McNeil Island, Anderson Island, and the southeasternmost portion of the Kitsap Peninsula. Of the 33 independent streams in this group, the largest is Artondale Creek, tributary of Wollochet Bay. Its mainstem length is 2.2 miles; however, most of the independent streams are one mile or less in length. Combined stream mileage of all streams, including tributaries, is only 38.0 miles.

Stream Description

Terrain throughout this portion of southern Puget Sound is predominantly low hills that frequently extend to the shoreline area. Valleys are small, like the streams they sustain, and typically have moderate or steep slopes. Vegetation is mixed deciduous and coniferous second growth timber, and is rather dense in undeveloped valleys and along streams.

Watershed use, other than second growth timber, is almost totally rural home development and a few small farms. Settlement is most dense along the low or moderate bank waterfront shoreline areas. Streams are mostly stable and have excellent cover, but due to their size and occasionally steepness of terrain their accessibility and value for anadromous fish is limited. Several of the streams have intermittent flow, which also limits productivity. Type of bottom material varies, of course, from stream to stream according to its size and gradient. In most of the creeks, however, gravel is the predominant substrate.

Salmon Utilization

Artondale Creek, the largest stream, has moderate runs of coho and chum, but totally the salmon production in this group of streams is minor when compared to most other areas of southern Puget Sound. Six of the other 32 streams are known to contain coho, and one small chum population has been observed in a stream near Longbranch. Coho and chum are believed to be reproduced in a few other streams, but this has not been verified.

Limiting Factors

The natural limiting factor of streams in this area is their small size and restricted accessibility. Some habitat damage has occurred in areas where home development has been intense.

Beneficial Developments

There have been no facilities, projects, or programs designed to benefit or increase salmon production in any of these streams.

Habitat Needs

Better identification of existing or potential areas of salmon production are needed. This should be followed by efforts to maintain the habitat of those streams that are of productive value for salmon, through implementation of the fisheries code and close scrutiny of any proposed water diversion. Small scale enhancement projects also deserve future consideration.

CARR INLET
Independent Drainages

CARR INLET — INDEPENDENT DRAINAGES
Kitsap Basin — WRIA 15

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
	SOUTHERN LONG BRANCH PENINSULA				
0026	Dutcher Creek	Sec15,T21N,R1W	1.8	—	Coho, (Chum)
0028	Unnamed	Sec22,T21N,R1W	1.2	—	None
0029	Unnamed	Sec28,T21N,R1W	1.7	—	Unknown
0036	Unnamed	Sec24,T20N,R1W	1.3	—	Coho, (Chum)
	RAFT ISLAND TO POINT FOSDICK				
0072	Warren Creek	Sec25,T21N,R1E	1.1	—	Unknown
0075	Artondale Creek	Sec24,T21N,R1E	2.2	—	Coho, (Chum)
0076	East Branch	LB-0.65	1.1	—	Coho, (Chum)
0078	Unnamed	RB-1.2	1.4	—	Unknown
0080	Unnamed	Sec24,T21N,R1E	1.4	—	Coho, (Chum)
0081	Unnamed	RB-0.25	1.7	—	Coho, (Chum)
0083	Unnamed	RB-0.5	1.3	—	(Coho)
0086	Unnamed	RB-1.0	1.35	—	(Coho)
	Unnamed Lake	Outlet-1.4	—	—	
0087	Sullivan Gulch Creek	Sec29,T21N,R2E	1.2	—	Unknown

HENDERSON BAY DRAINAGES

Henderson Bay lies at the uppermost portion of Carr Inlet. Several important salmon streams enter the area including, by decreasing size, Minter, Burley, Purdy, Lackey, and McCormick creeks. There are also unnamed minor drainages. Total mileage of the ten independent streams and their tributaries is 40.6.

Stream Description

Quality of the stream habitat is dependent upon the intensity of development. Rural homes and farms are the predominant settlement, with the highest population density around the communities of Purdy, Burley, and Key Center. The Burley Creek valley contains several farms and is the most heavily developed watershed of this stream group.

The terrain surrounding these streams is characterized by low hills of moderate slope, with heavy mixed second growth vegetation in all uncleared areas. In spite of moderately heavy settlement, stream bank cover is mostly dense and brushy, except in a few areas where home sites border the stream. Portions of Burley Creek have farm and pasture-land extending to the stream margin.

Stream conditions include mostly moderate gradients and favorable production habitat. Stream channels are stable, and flows are infrequently extreme. As a result of the predominantly moderate gradient, the substrate is mostly gravel of sizes suitable for salmon spawning. Enough stream bank cover remains to provide favorable rearing conditions in all streams.

Salmon Utilization

Coho production in this sub-basin has been dominated by artificial propagation at the Minter Creek Hatchery for many years. In addition to contributions to ocean and Puget Sound sport and commercial fisheries, intensive terminal commercial fisheries in Carr Inlet have been employed in recent years to harvest available surpluses of coho salmon. Minter Creek Hatchery is also an important chinook salmon station, with fishery contribution of statewide importance for many years. Natural production in Minter Creek totals approximately 600 spawners annually, plus a small population of wild chum salmon.

Natural production of coho, chum, and chinook salmon is also important in this group of streams. Burley Creek has returns of coho and chum salmon, and the only wild stock of chinook salmon in the sub-basin. Both early (October) and late (December) chum salmon runs return to this stream. Purdy Creek, also located near the head of Henderson Bay, supports coho and chum salmon, with returns in recent years appearing to be below their potential.

Lackey Creek is one of the smaller streams; however, its present chum salmon production is the most important. Several hundred fish return to the limited available spawning area each year, after contribution to Puget Sound's commercial chum fishery.

McCormick Creek supports a minor run of coho, and is believed to have some chum salmon spawning. Of the unnamed streams, only the creek entering near Raft Island is believed to contain salmon.

Limiting Factors

There are few natural causes that limit productivity for salmon in these streams. Lackey Creek is an exception, where greater production could be realized with more available spawning area. There are apparent limitations in production related to development of the watersheds, however. Gravel quality and egg survival in Burley Creek is poor. From the times of earliest logging through present farm use, sediment in the form of silt and fine sandy materials has contaminated the streambed.

Coho and chinook artificial propagation at the Minter Creek Hatchery has enjoyed extreme success over many years, but this has been accomplished at the apparent expense of an important chum run that once returned to the stream. Yearling coho predation on emerging chum fry has been charged as the cause of this depletion. Present programs, however, are designed to restore this production through later timing of hatchery coho releases as well as artificial propagation of chum salmon.

Beneficial Developments

The Minter Creek Salmon Hatchery is the dominant production facility in this district, and provides annual releases of chinook and coho fingerlings to many of the streams of the Kitsap Peninsula and other Puget Sound river systems. Programs to benefit salmon production include stream habitat maintenance, and a spawning gravel improvement project to increase the usable area of Lackey Creek.

Habitat Needs

Restoration of spawning habitat in Burley Creek would be most beneficial, and plans have been formulated for implementation in the future. Hydraulic projects and water diversion proposals for these streams must be carefully reviewed for potential impact on stream productivity.

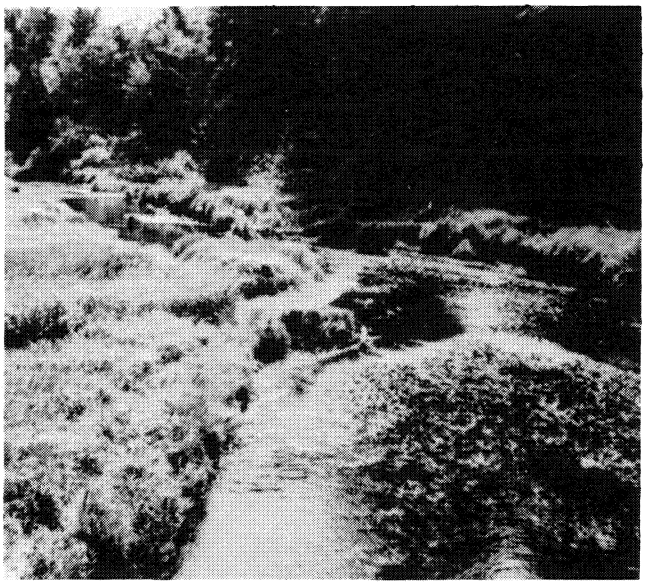
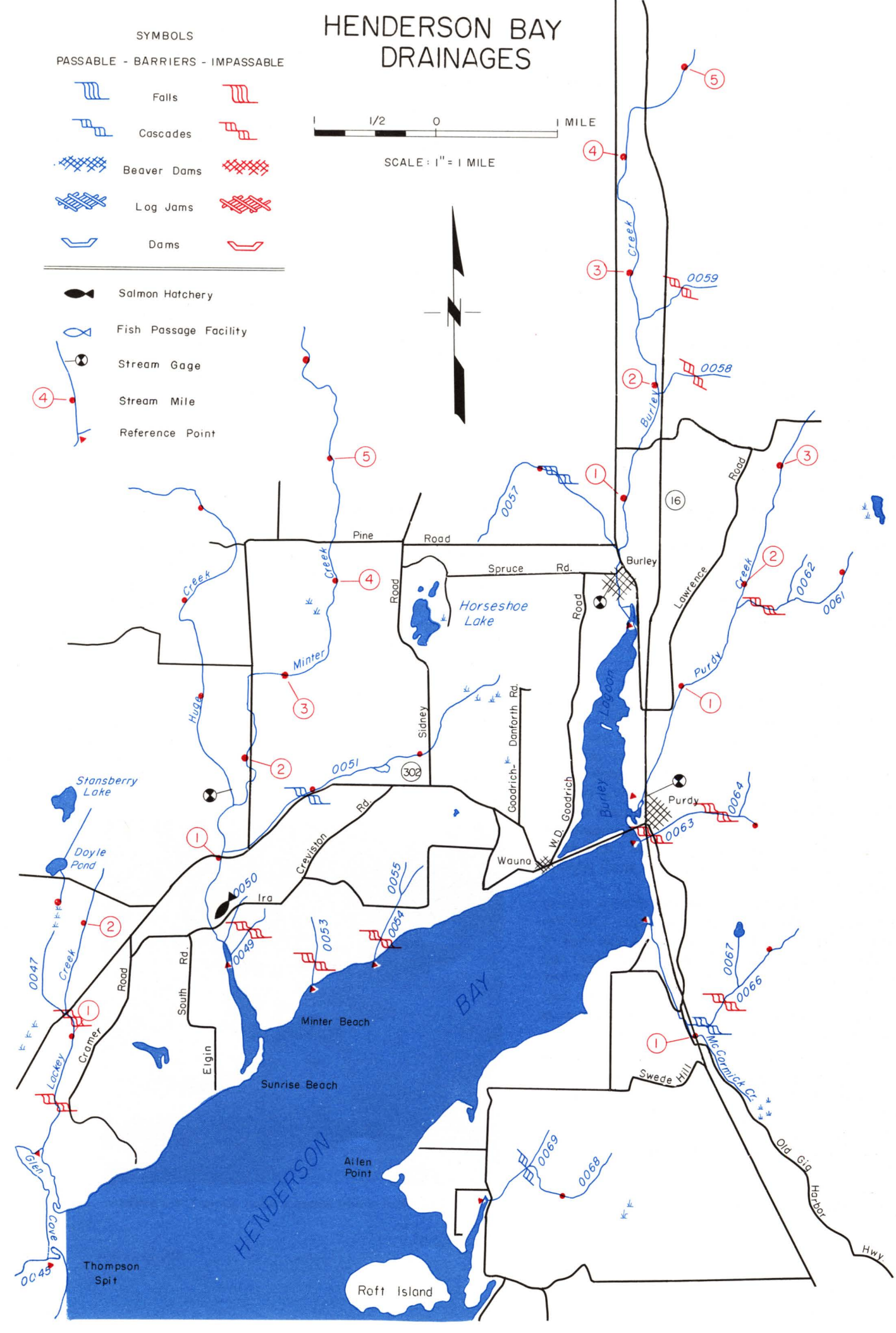


PHOTO 15-7. Head of tidal influence below Minter Creek hatchery.


HENDERSON BAY DRAINAGES
SYMBOLS
PASSABLE - BARRIERS - IMPASSABLE
Falls
Cascades
Beaver Dams
Log Jams
Dams
Salmon Hatchery
Fish Passage Facility
Stream Gage
Stream Mile
Reference Point
1/2
0
1 MILE
SCALE: 1" = 1 MILE
HENDERSON BAY
Thompson Spit
Allen Point
Raft Island
Sunrise Beach
Minter Beach
Horseshoe Lake
Stansberry Lake
Doyle Pond
Burley
Purdy
Wauna
Ira
Swede Hill
Pine Road
Spruce Rd.
Lawrence Road
Goodrich-Danforth Rd.
W.D. Goodrich Road
Creviston Rd.
South Elgin Rd.
Cramer Road
Old Gig Harbor Hwy
Burley Lagoon
Minter Creek
Hugs Creek
Sidney
Lockey
Glen Cove
McCormick Cr.
0045
0047
0049
0050
0051
0053
0054
0055
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0059
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0062
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0069
16
302

HENDERSON BAY DRAINAGES
Kitsap Basin — WRIA 15

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0046	Lackey Creek	Sec6,T21N,R1E	2.5	—	(Coho), Chum
0047	Unnamed	RB-1.25	1.9	—	None
	Doyle Pond	Outlet-1.3	—	—	
0048	Minter Creek	Sec29,T22N,R1E	6.3	—	Chin., Coho, Chum
0051	Unnamed	LB-1.05	2.95	—	Coho, Chum
0052	Huge Creek	RB-1.5	3.7	—	Coho, Chum
0056	Burley Creek	Sec12,T22N,R1E	5.2	—	Chin., Coho, Chum
0057	Unnamed	RB-0.55	1.9	—	Coho, (Chum)
0060	Purdy Creek	Sec24,T22N,R1E	3.55	—	Coho, Chum
0061	Unnamed	LB-1.75	1.2	—	(Coho)
0063	Unnamed	Sec24,T22N,R1E	1.0	—	Unknown
0065	McCormick Creek	Sec25,T22N,R1E	1.6	—	Coho, (Chum)
0066	Unnamed	RB-0.85	1.3	—	Unknown
0068	Unnamed	Sec2,T21N,R1E	1.5	—	(Coho),(Chum)

COLVOS PASSAGE
Independent Drainages

Streams within this region may be grouped into three areas: those draining the Kitsap Peninsula to Colvos Pass from northern Pierce and southern Kitsap counties, all tributaries of Vashon Island, and all drainages on Maury Island. There are only three streams of moderate size, plus numerous small drainages of which few are named. The 49 independent streams and their tributaries contain a total of 59.35 stream miles. Ten are located on the Kitsap Peninsula, 28 on Vashon Island, and 11 drain Maury Island.

Stream Description

Topography, extent of land development, watershed cover, and stream characteristics are similar throughout this sub-basin. The short streams cut narrow valleys through hilly land, most of which lies below 400-foot elevation. Only the three larger drainages of Crescent, Olalla, and Judd creeks contain broad valleys and level terrain. Watershed cover and habitat is dependent upon the extent of development, and is varied. Dense valley and stream cover of second growth vegetation occurs in virtually all areas that remain unsettled. Proximity to Seattle and Tacoma has led to increasingly heavy rural development. Gig Harbor is the largest population center and is the home port for an important segment of the Puget Sound commercial salmon fleet. Other communities include Olalla, Vashon Heights, Vashon, and Burton. Vashon Island is accessible only by ferry and this has limited the rate of development. Numerous small farms are located throughout the drainages.

Crescent Creek flows south from its headwaters at Crescent Lake and enters the bay at Gig Harbor. It has moderate or shallow gradient throughout its length, and substrate is predominantly gravel with sandy sections. Stream conditions in the lower 2.0 miles are particularly favorable for salmon production.

Olalla Creek is the largest stream. Gradient is shallow in the upper and middle sections, with slow moving water and sandy substrate interspersed with riffle sections. Gradient increases in the lower mile, and here the stream channel contains much suitable spawning gravel. Portions of the upper watershed bordering farmland has limited cover; however, downstream areas offer vegetation and brush to provide favorable rearing areas.

Judd Creek on Vashon Island contains 2.9 miles of mainstem and has numerous tributaries. Gradient is moderate to shallow, and the stream contains suitable spawning and rearing habitatnfor salmon.

Salmon Utilization

Olalla, Crescent, and Judd creeks support returns of coho salmon in most of their accessible stream area. Olalla Creek, due to its larger size, is the most productive. Coho are known to return to a few of the small independent streams, and possible productivity in others has not been verified.

Important chum salmon runs return to Crescent and Olalla creeks. These stocks arrive later than the bulk of Puget Sound production, spawning in late December and early January. The lower mile of both streams offer excellent spawning area, and are heavily utilized each year. Judd Creek is also believed to support chum salmon; however, the run size has not been assessed. A few of the minor tributaries have potential for chum salmon; however, production is unknown.

Limiting Factors

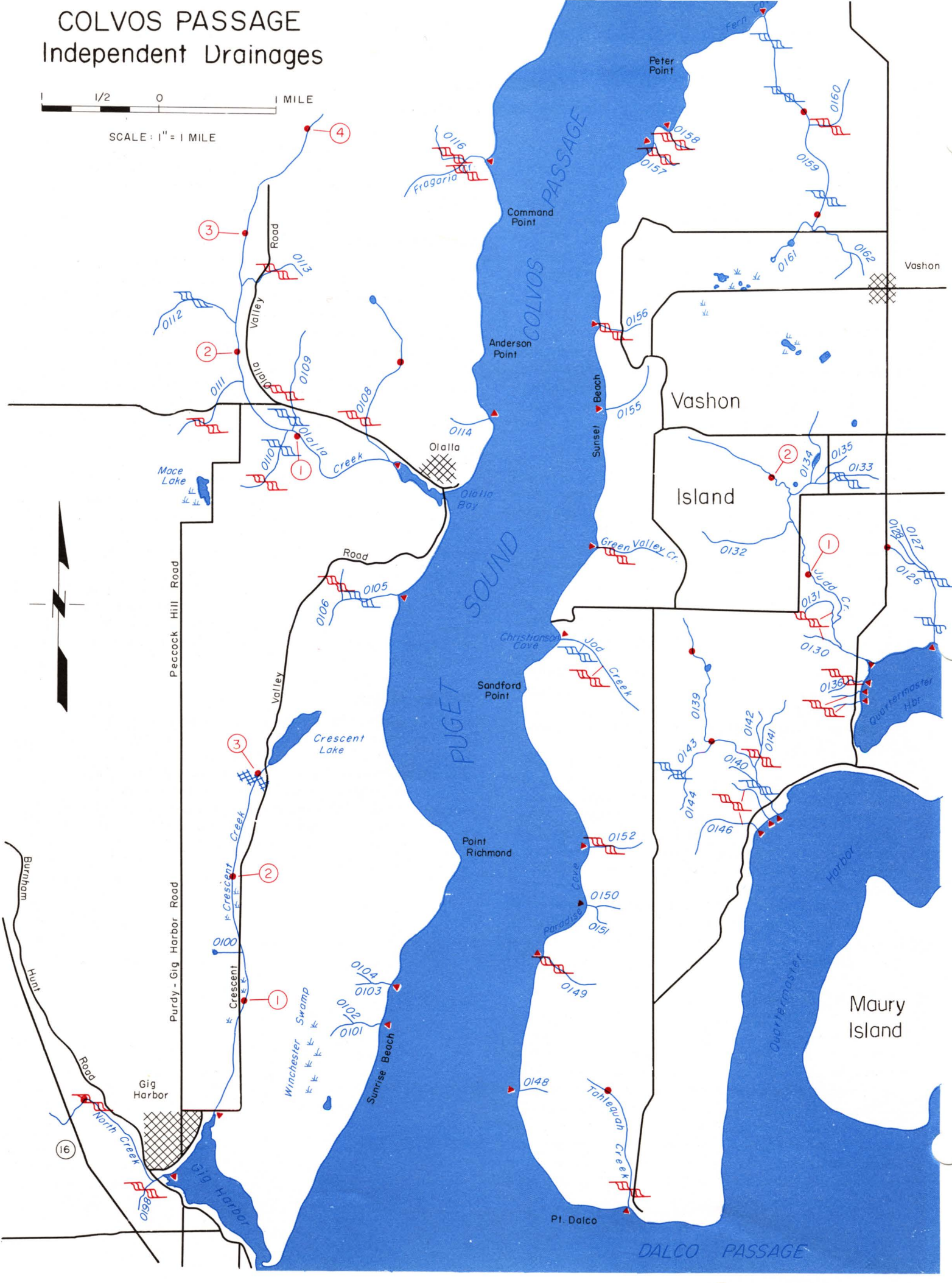
The major observed deterrent to maximum production in the two most important streams, Crescent and Olalla creeks, is habitat deterioration that has occurred during early years of logging and from subsequent farming practices. Stream substrate in portions of both creeks is unsuitable for salmon spawning due to the accumulation of sandy sediment. Other limiting factors include lack of stream bank cover in localized areas, low or intermittent summer flows in many of the smaller tributaries, and local problems of poaching.

Beneficial Developments

Crescent and Olalla creeks have received coho plants from Minter Creek Hatchery; however, production in all streams has been predominantly natural. A recent Department of Fisheries cooperative project with the Gig Harbor Commercial Fishermen's Civic Club has incubated and released chum salmon from North Creek (known locally as Donkey Creek). Chum salmon eggs have been placed in stream-side gravel incubation boxes that receive controlled water flow. This project has been continuing since 1971, with encouraging fry production. Adult returns have yet to be evaluated.

Habitat Needs

Due to the small size of the streams in the area, all future water diversions should be carefully examined prior to approval. Stream habitats also deserve careful protection since portions are already in a degraded state. Future stream habitat restoration and enhancement projects should be considered by this Department. Determination of habitat quality and salmon production is badly needed in those small streams were information is lacking.


COLVOS PASSAGE
Independent Drainages
1 1/2 0 1 MILE
SCALE: 1" = 1 MILE
PUGET SOUND
COLVOS PASSAGE
DALCO PASSAGE
Vashon
Island
Maury Island
Peter Point
Command Point
Anderson Point
Sunset Beach
Olalla
Olalla Bay
Olalla Valley Road
Olalla Creek
Mace Lake
Peacock Hill Road
Valley Road
Crescent Lake
Crescent Creek
Purdy - Gig Harbor Road
Crescent
Sandford Point
Christianson Cove
Jod Creek
Point Richmond
Paradise Cove
Sunrise Beach
Winchester Swamp
Gig Harbor
North Creek
Burnham
Hunt Road
16
Pt. Dalco
Tahlequah Creek
Quartermaster Harbor
Quartermaster Hbr
Green Valley Cr.
Judd Cr.
Fragaria
Fern Cr.
0100
0101
0102
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COLVOS PASSAGE — INDEPENDENT DRAINAGE
Kitsap Basin — WRIA 15

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0097	North Creek	Sec6,T21N,R2E	1.4	—	Coho, Chum
0099	Crescent Creek	Sec5,T21N,R2E	3.1	—	Coho, Chum
	Crescent Lake	Outlet-3.1	—	—	
0107	Olalla Creek	Sec4,T22N,R2E	4.2	—	Coho, Chum
0108	Unnamed	LB-0.01	1.6	—	Coho, (Chum)
	VASHON ISLAND [1]				
0121	Unnamed	Sec29,T23N,R3E	1.2	—	Unknown
0123	Unnamed	Sec5,T22N,R3E	1.7	—	Unknown
0126	Unnamed	Sec17,T22N,R3E	1.0	—	Unknown
0129	Judd Creek	Sec18,T22N,R3E	2.9	—	(Coho), (Chum)
0139	Unnamed	Sec19,T22N,R3E	2.3	—	Unknown
0147	Tahlequah Creek	Sec2,T21N,R2E	1.2	—	(Chum)
0159	Unnamed	Sec13,T22N,R2E	2.8	—	Unknown
	MAURY ISLAND [1]				
0173	Unnamed	Sec21,T22N,R3E	1.1	—	Unknown
0174	Unnamed	LB-0.05	1.0	—	Unknown

[1] *Tributaries listed from northernmost point in clockwise order around islands.*

SINCLAIR INLET
Independent Drainages

Streams within this area include the tributaries of Sinclair Inlet, the southern portion of Port Orchard, Yukon Harbor, and one tributary in northern Colvos Passage. There are 22 streams, mostly small, and all lie in east-central Kitsap County. Total miles of stream, including mainstem and tributaries, is 66.2.

Stream Description

Of the 22 small streams, only three could be classified as being of moderate size: Curley Creek, Blackjack Creek, and Gorst Creek. These drainages comprise 39.05 miles, or 59% of the sub-basin total. Watersheds are moderately settled, with rural residences and occasional small farms, although areas near Bremerton and Port Orchard are heavily developed. There are numerous small communities including Gorst, Annapolis, Manchester, South Colby, Southworth, Long Lake, and Bethel.

Curley Creek has 5.3 miles of mainstem and 8.2 of tributaries. It drains Long Lake (314 acres) and enters Yukon Harbor at the community of South Colby. Salmonberry Creek, the inlet to Long Lake, flows in a southerly direction to Long Lake while Curley Creek flows northerly to salt water, with the streams roughly paralleling each other but flowing in opposite directions. Gradient is moderate or shallow in nearly the entire watershed, while substrate is either sand or gravel with only occasional coarse material in the lower few miles of stream. The heaviest settlement is a rural community and several farms near the north end of Long Lake.

Blackjack Creek is 6.9 miles long, with 6.05 miles of tributary. It flows in a northerly direction with its mouth at the City of Port Orchard. Much of the upper portion of Blackjack Creek lies in a broad valley where gradient is shallow. Below this the lower 2.5 miles of stream has moderate gradient as it flows through a deep valley dividing the City of Port Orchard. Gradient is moderate and substrate is predominantly gravel. The stream bank cover and immediate terrain is dense, even though the section lies within the city limits. Stream gaging records are available for the years 1947 through 1950, at river mile 0.4. The range of flows indicate Blackjack Creek is a very stable stream, with minimum of 6.7 and maximum of 285 cfs during this period. Annual mean flows were 20 to 26 cfs.

Gorst Creek has a beautiful watershed that is virtually undisturbed above its lower mile. It is part of the City of Bremerton's water supply and has restricted entry and development. The stream habitat is also excellent, but unfortunately it is totally inaccessible to salmon, at a barrier at mile 0.6. Below this there is moderate gradient and excellent gravel substrate. It flows through a densely populated area, however, and cover is intermittent.

Other streams are quite small; however, some are salmon producers. Most have moderate gradient and contain some spawnable material. Development within the watersheds is varied.

Salmon Utilization

Streams within this area are extremely important for chum and coho salmon. Early stocks of chum salmon, that enter and spawn during October, utilize the lower two miles of Blackjack Creek and the lower 1.25 mile of Curley Creek. Late-run chum salmon use all of the accessible areas of Gorst Creek. Total chum spawners within the sub-basin are 3,400 annually. Curley Creek and Salmonberry Creek, above and below Lost Lake, are important coho areas. Much favorable rearing habitat is available, and it is probable that the lake provides additional rearing capacity. Blackjack Creek also has a good run of coho, while production in Gorst Creek is limited by the accessible area available. Coho escapements total about 1,100 spawners to all these streams.

Limiting Factors

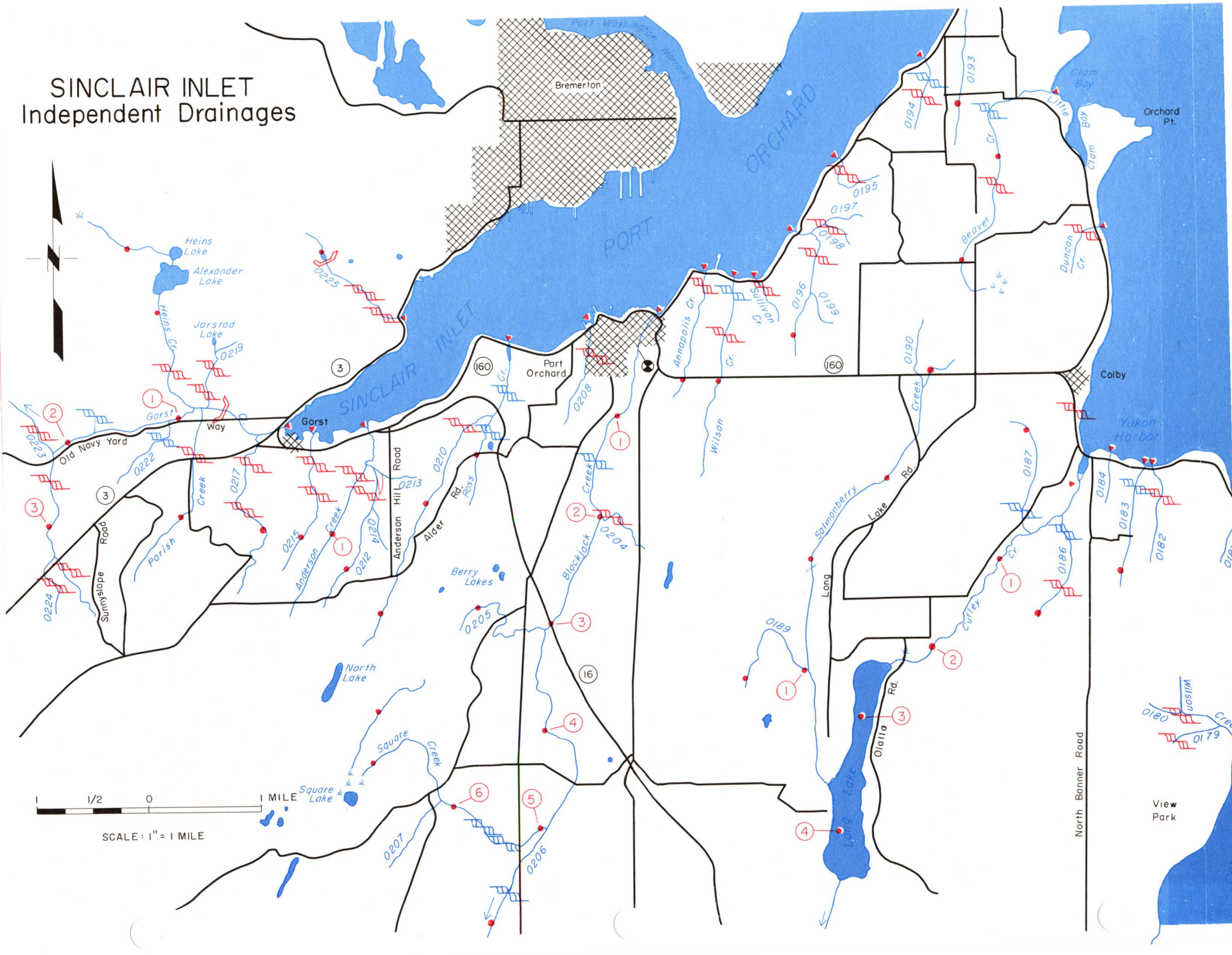
Limiting factors include the blockage of Gorst Creek to upstream access, minor natural factors of stream gradient and gravel availability, and impact of watershed developments in certain areas.

Beneficial Developments

Occasional plants of coho have been made into Curley and Blackjack creeks. Chinook were also released into Gorst Creek. During the early 1960's, Heins and Alexander lakes, on a tributary of Gorst Creek, were utilized as fish farms. Success was limited and they were discontinued after short operation. Coho have been reared in Clam Bay, an enclosed salt water lagoon near Manchester, and chum salmon in a pond on nearby Beaver Creek. A private marine aquaculture facility is operated near Beaver Creek. A private marine aquaculture facility is operated near Manchester, and has contributed some accidental "plants" when fish have escaped or been inadvertently released.

Habitat Needs

Close regulation of hydraulic projects, within the streams, is needed to maintain the present habitat and production level. It would be desirable to open the upper watershed of Gorst Creek; however, the City of Bremerton is not receptive to this. A watershed management plan should be developed by the City of Port Orchard and associated communities through the Shorelines Management Act to curtail development on these streams.


SINCLAIR INLET
Independent Drainages
Bremerton
Port Washington Narrows
ORCHARD
PORT
SINCLAIR INLET
Heins Lake
Alexander Lake
Heins Cr.
Jarstad Lake
0225
0219
0223
0222
0217
0215
0214
0213
0212
0210
0208
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0207
0206
0224
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0195
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0193
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0186
0184
0183
0182
0180
0179
Gorst
Way
Old Navy Yard
Port Orchard
Anderson Hill Road
Alder Rd.
Ross
Parish Creek
Sunnyslope Road
Berry Lakes
North Lake
Square Creek
Square Lake
Blackjack Creek
Annapolis Cr.
Sullivan Cr.
Wilson Creek
Salmonberry Lake
Long Lake
Olalla Rd.
Curley Cr.
Beaver Cr.
Duncan Cr.
Little Clam Bay
Clam Bay
Orchard Pt.
Colby
Yukon Harbor
North Banner Road
View Park
160
16
1/2
0
1 MILE
SCALE: 1" = 1 MILE

SINCLAIR INLET — INDEPENDENT DRAINAGE
Kitsap Basin — WRIA 15

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0183	Unnamed	Sec34,T23N,R2E	1.1	—	Unknown
0185	Curley Creek	Sec4,T23N,R2E	5.3	—	(Chin.), Coho Chum
0186	Unnamed	RB-0.35	1.1	—	(Coho)
0187	Unnamed	LB-0.65	1.2	—	(Coho)
	Long Lake	Outlet-2.45	—	—	
0188	Salmonberry Creek	LB-3.6	4.2	—	Coho
0189	Unnamed	RB-1.0	1.1	—	(Coho)
0192	Beaver Creek	Sec16,T24N,R2E	2.4	—	(Coho), (Chum)
0193	Unnamed	Sec8,T24N,R2E	1.4	—	Unknown
0196	Unnamed	Sec19,T24N,R2E	1.2	—	Unknown
0201	Wilson Creek	Sec25,T24N,R1E	1.8	—	Unknown
0202	Annapolis Creek	Sec25,T24N,R1E	1.2	—	Unknown
0203	Blackjack Creek	Sec25,T24N,R1E	6.9	—	Coho, Chum
0205	Unnamed	LB-3.05	1.3	—	Unknown
0206	Unnamed	RB-4.95	1.75	—	(Coho)
0207	Square Creek	LB-6.15	2.5	—	Unknown
0209	Ross Creek	Sec27,T24N,R1E	1.4	—	Unknown
0210	Unnamed	LB-0.65	2.3	—	Unknown
0211	Anderson Creek	Sec33,T24N,R1E	1.8	—	(Coho),(Chum)
0212	Unnamed	RB-0.35	1.4	—	Unknown
0215	Unnamed	Sec33,T24N,R1E	1.3	—	Unknown
0216	Gorst Creek	Sec32,T24N,R1E	3.9	—	Chin., Coho, Chum
0217	Unnamed	RB-0.3	1.6	—	Coho, (Chum)
0220	Parish Creek	RB-0.8	1.7	—	None
0221	Heins Creek	LB-0.85	2.4	—	None
	Alexander Lake	Outlet-1.2	—	—	
	Heins Lake	Outlet-1.55	—	—	
0225	Unnamed	Sec28,T24N,R1E	1.2	—	None

DYES INLET DRAINAGES

Dyes Inlet and its tributaries lie in Kitsap County north of Bremerton. There are 17 individual streams entering this inlet containing 49.25 creek miles. Chico Creek is the largest and most important of the streams in this drainage area.

Stream Descriptions

Dyes Inlet is an extremely confined arm of central Puget Sound that is joined to Port Orchard via Port Washington Narrows. Streams drain the low land and foothills surrounding the inlet, entering from all sides. Chico Creek, the largest drainage, has 6.0 mainstem miles and contains 14.55 miles of tributaries. Other important independent streams are Clear and Barker creeks, while the remaining 14 tributaries are all small.

Chico Creek drains the timbered regions west of Bremerton and enters Dyes Inlet at Chico Bay at the community of Chico. Four major branches comprise the watershed; Kitsap, Dickerson, Lost, and Wildcat creeks. There are 2 major lakes in this stream system; Kitsap Lake has 250 surface acres, and Wildcat Lake has 113.

The upper watershed, within Lost, Wildcat, and Dickerson creeks, has moderately rugged and heavily timbered slopes. These tributaries, and a portion of the mainstem, flow through sections of deep valley of restricted development. The lower 1.7 miles mainstem has a much broader valley, with moderately heavy residential and small business development. The shores of Kitsap and Wildcat lakes are also heavily settled. Stream gradient through all but the uppermost reaches is moderate, and substrate is predominantly medium sized gravel. Mean discharge of Chico Creek near its mouth has been 34.4 cfs over 15 years of record; however, late summer and early fall flows are very low.

Clear Creek flows south through a broad shallow valley and enters Dyes Inlet at its northernmost tip, near the town of Silverdale. Portions of this watershed are heavily developed, mainly residences and small farms. Watershed and stream bank is mixed conifer and deciduous timber. Upper portions of the stream along with the lower 0.25 mile have moderate gradients, while the other portions have shallow gradients and sandy substrate. Stream discharge records were kept on only one year, from July to October, 1947, and show a range in flow from 1.5 to 9.0 cfs.

Barker Creek originates in Island Lake, 43 acres in size, and flows south to enter the east shore of Dyes Inlet. This watershed is also moderately developed with rural homes. Vegetative cover along the stream banks is varied. The stream gradient is moderate throughout and has predominantly gravel substrate.

The remaining drainages entering Dyes Inlet are all short and small. Some are accessible near their mouths, but most are steeper than the larger creeks in this drainage area. Development within these smaller watersheds is moderately heavy near the shores of Dyes Inlet.

Salmon Utilization

In spite of the small total stream length available within this drainage sub-basin, salmon production is outstanding. Chico, Clear, and Barker creeks all have important runs of chum and coho. There is also believed to be coho production in some of the minor streams. The chum salmon run in Chico Creek is by far the largest population. They spawn throughout the entire mainstem and lower portions of all tributaries. Chum salmon also utilize the lower reaches of Clear and Barker creeks. Coho are found throughout all accessible areas of Chico, Clear and Barker creeks, including tributaries. Chum salmon returns to the area total approximately 10,000 annually while coho average 1,500 adults.

Limiting Factors

Low summer and fall stream flows have affected production of coho and chum salmon in this drainage. Portions of some of the streams or their tributaries have intermittent flow, while discharge from all streams is minimal. During certain years the low flow conditions have extended into late October and November, and have interfered with the upstream migration of the early portion of the major chum run to Chico Creek. The area is relatively heavily developed and populated, and the usual problems associated with water quality, construction adjacent to the stream, numerous road and highway crossings, and poaching are common.

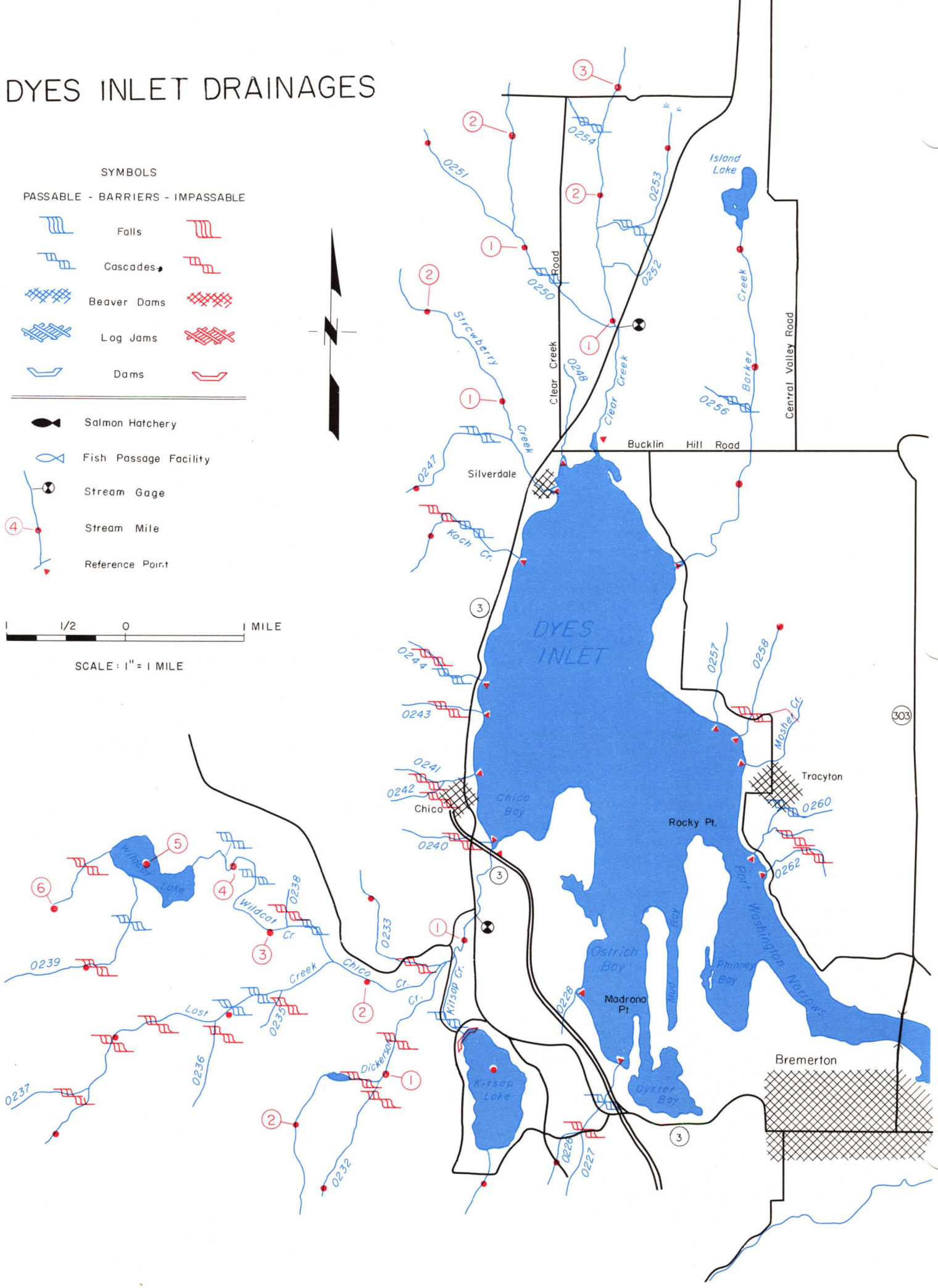
Beneficial Developments

There have been no facilities developed for enhancement or production of salmon stocks in this area. Occasional hatchery plants of coho have been made in past years.

Habitat Needs

To maintain existing stream habitats, future developments must be controlled through the state hydraulics code, within the watershed. Diversion of additional water from the streams during low flow periods would be particularly detrimental. There may be a potential for creating additional spawning area artificially, particularly in Clear Creek.

DYES INLET DRAINAGES



DYES INLET DRAINAGES
Kitsap Basin — WRIA 15

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0226	Unnamed	Sec16,T24N,R1E	1.2	—	Unknown
0229	Chico Creek	Sec5,T24N,R1E	6.0	—	Coho, Chum
0230	Kitsap Creek	RB-1.2	2.3	—	Coho, (Chum)
	Kitsap Lake	Outlet-0.6	—	—	
0231	Dickerson Creek	RB-1.3	2.8	—	(Coho), (Chum)
0232	Unnamed	RB-1.15	1.1	—	Unknown
	Unnamed Lake	Outlet-1.4	—	—	
0233	Unnamed	LB-1.35	1.2	—	(Coho), (Chum)
0234	Lost Creek	RB-2.3	3.1	—	Coho, (Chum)
	Chico Creek cont. as Wildcat Creek	@ mi. 2.31	—	—	
	Wildcat Lake	Outlet-4.45	—	—	
0239	Unnamed	RB-4.95	1.8	—	None
0245	Koch Creek	Sec20,T24N,R1E	1.35	—	Unknown
0246	Strawberry Creek	Sec20,T25N,R1E	2.5	—	(Coho), (Chum)
0247	Unnamed	RB-0.65	1.1	—	Unknown
0249	Clear Creek	Sec16,T25N,R1E	3.2	—	Coho, Chum
0250	Unnamed	RB-0.91	2.35	—	Coho, Chum
0251	Unnamed	RB-1.2	1.1	—	None
0253	Unnamed	LB-1.75	1.4	—	Unknown
0255	Barker Creek	Sec21,T25N,R1E	3.15	—	Coho, Chum
	Island Lake	Outlet-3.15	—	—	
0258	Unnamed	Sec34,T25N,R1E	1.0	—	Unknown

NORTH KITSAP PENINSULA
Independent Drainages

The North Kitsap Peninsula drainage area includes many independent streams, all small, that enter the northern portion of Port Orchard, Liberty Bay, Port Madison, and Admiralty Inlet. Included also are all tributaries draining Bainbridge Island. There are a total of 58 streams, including 20 on Bainbridge Island, when combined total only 88.0 stream miles. Streams draining the North Kitsap Peninsula to Hood Canal are described under Kitsap 802.

Stream Description

Terrain of this peninsula is predominantly low rolling hills separated by numerous small valleys. The region has been moderately heavily settled, particularly near Poulsbo on Liberty Bay, and Winslow on Bainbridge Island. There are numerous smaller communities including Hansville, Kingston, Suquamish, Keyport, Brownsville, and Illahee, plus rural home and farm development throughout the region.

Watershed cover is intermittent, due to the extent of development. Vegetated areas, where they exist along the streams, are mostly dense underbrush. Stream gradients, as well as type of substrate, vary among the many tributaries. Most of the smallest streams tend to have steeper gradient. Predominant stream substrate throughout the region is gravel and sand. Stream flow records are available from only one watershed, Dogfish Creek, where the mean flow for 24 years was 8.94 cfs. This small stream is also very stable, with annual low flows seldom below 1 cfs and often 2 cfs or more. This stable condition has been noted in other streams within the area, particularly those with shallower gradients that lie in the lower elevation valleys.

Four streams are worthy of individual mention, including Illahee, Steele, Dogfish, and Grovers creeks. Illahee Creek has moderate gradient,nstable stream flow, and excellent stream bank cover. Gravel quality, however, contains much sand and fine material. This is at least in part due to the construction of a large golf course within the upper watershed where the denuded area was open to winter rains. Sediment from earth slides and heavy erosion was deposited throughout the stream.

Steele Creek, entering Port Orchard at Brownsville, has moderate gradient and excellent gravel throughout much of its length. The south branch is inaccessible in all but its lower 0.1 mile due to a highway fill and culvert blockage. The north branch and its tributary have excellent cover and provide high quality habitat. Dogfish Creek has a moderately shallow gradient, with some substrate sections of sand and fine material and others containing favorable spawning gravel.

Grovers Creek is the longest stream in this basin subarea with 5.1 miles of mainstem. The stream has much suitable cover; however, gradient is shallow in many areas and quality of the substrate is limited.

Salmon Utilization

Due to their stable nature, many of the small drainages have year-round flow and produce salmon. Coho and chum salmon are the predominant species, yet surprisingly chinook also return to Dogfish Creek. The heaviest coho production is in Steele, Dogfish and Grovers creeks, while the best chum salmon streams are Steele and Dogfish creeks. Chum and/or coho production has been reported in several of the smaller independent drainages. Total coho production for this area is approximately 800 spawners, while chum production is near 1,000. Chinook returns in Dogfish Creek have ranged from 20 to 100 fish per year.

Limiting Factors

Natural limiting factors within the area are the small size of the streams and restricted accessibility. Shallow gradient sections also affect gravel quality. In addition to the man-caused sediment deposition in Illahee Creek, the removal of stream bank cover and acceleration of erosion has caused gravel contamination in some areas.

Beneficial Developments

A gravel improvement project has been completed on Dogfish Creek, replacing sediment contaminated gravel with high quality material. During the late 1950's and early 1960's two brackish water impoundments were utilized as natural rearing facilities, located in lagoons near Keyport and Kingston; however, benefit/cost ratios were not favorable. Hatchery plants have been made occasionally in streams within this area.

Habitat Needs

Some streams may have potential for spawning gravel improvement, where gradient is suitable. The serious problem of gravel quality in Illahee Creek needs repair; however, this would undoubtedly require a costly project that would bring back only moderate return.

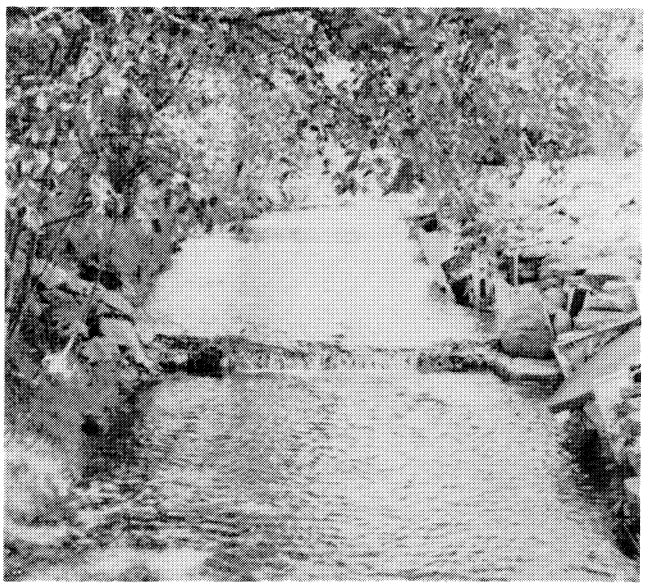
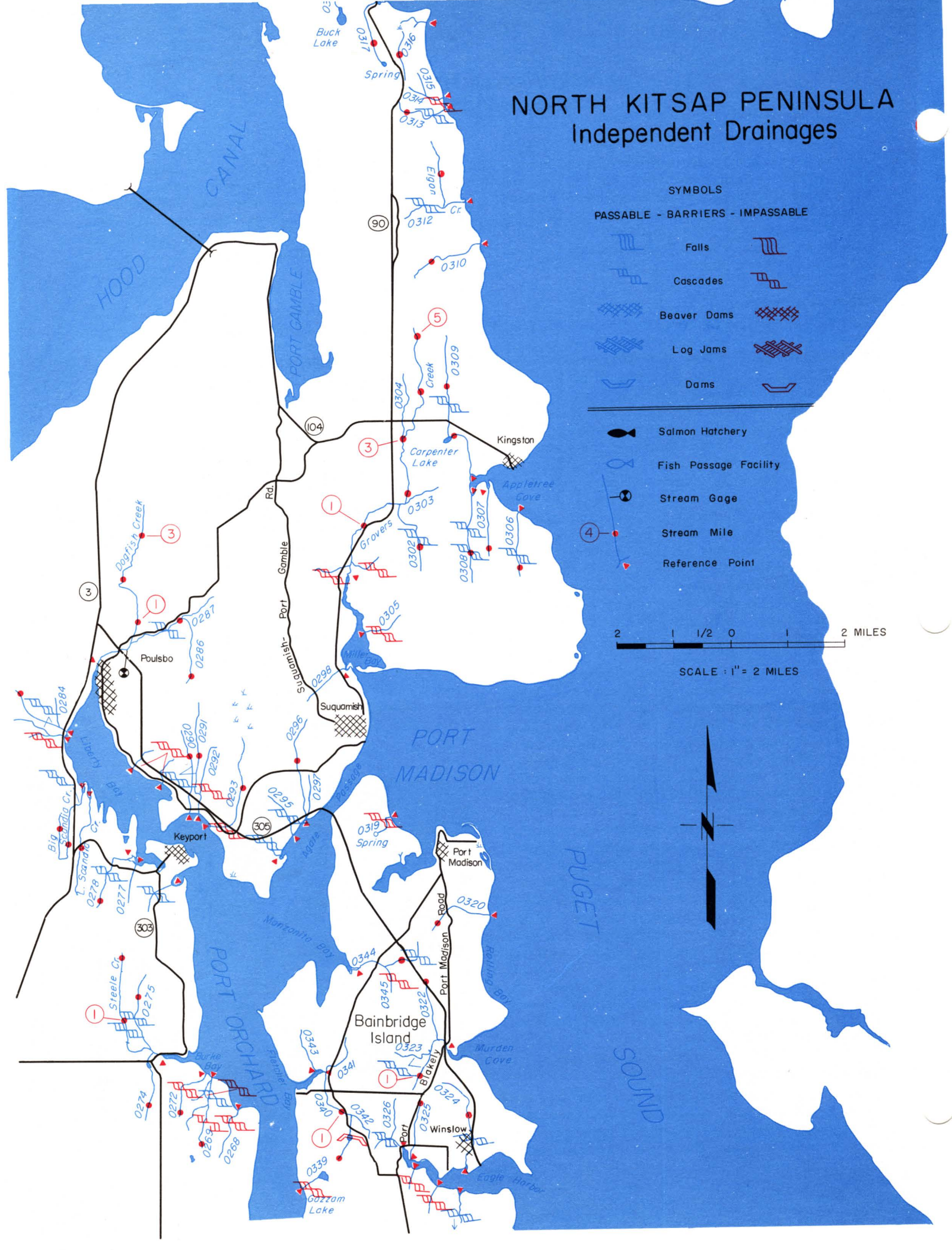


PHOTO 15-8. Streambed cleaning and stabilization on Dogfish Creek.


NORTH KITSAP PENINSULA
Independent Drainages
SYMBOLS
PASSABLE - BARRIERS - IMPASSABLE
Falls
Cascades
Beaver Dams
Log Jams
Dams
Salmon Hatchery
Fish Passage Facility
Stream Gage
Stream Mile
Reference Point
2 1 1/2 0 1 2 MILES
SCALE : 1" = 2 MILES
HOOD CANAL
PORT GAMBLE
PORT MADISON
PUGET SOUND
PORT ORCHARD
Buck Lake
Spring
Elgin Cr.
Kingston
Carpenter Lake
Appletree Cove
Grovers Creek
Dogfish Creek
Poulsbo
Suquamish-Port Gamble Rd.
Suquamish
Miller Bay
Liberty Bay
Big Scandia Cr.
Little Scandia Cr.
Keyport
Steele Cr.
Manzanita Bay
Agate Passage
Port Madison
Port Madison Road
Bainbridge Island
Blakely
Murden Cove
Bellina Bay
Winslow
Eagle Harbor
Port Orchard
Burke Bay
Fletcher Bay
Gazzam Lake
90
104
3
5
1
305
303

NORTH KITSAP PENINSULA — INDEPENDENT DRAINAGES
Kitsap Basin — WRIA 15

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0266	Illahee Creek	Sec31,T25N,R2E	1.4	—	Coho, (Chum)
0269	Unnamed	Sec24,T25N,R1E	1.1	—	Unknown
0272	Unnamed	Sec24,T25N,R1E	1.1	—	Unknown
0273	Steele Creek	Sec14,T25N,R1E	2.1	—	Coho, (Chum)
0274	Unnamed	RB-0.1	1.3	—	(Coho), (Chum)
0275	Unnamed	LB-0.2	1.5	—	(Coho), (Chum)
0278	Unnamed	Sec35,T26N,R1E	1.05	—	Unknown
0279	Little Scandia Creek	Sec27,T26N,R1E	1.8	—	(Coho), (Chum)
0280	Big Scandia Creek	Sec27,T26N,R1E	2.2	—	(Coho), Chum
0283	Unnamed	Sec22,T26N,R1E	1.05	—	Unknown
0285	Dogfish Creek	Sec15,T26N,R1E	3.5	—	Chin., Coho, Chum
0286	Unnamed	LB-0.75	2.1	—	Coho, (Chum)
0290	Unnamed	Sec25,T26N,R1E	1.5	—	Unknown
0291	Unnamed	Sec25,T26N,R1E	1.9	—	Unknown
0293	Unnamed	Sec36,T26N,R1E	1.8	—	Coho, (Chum)
0296	Unnamed	Sec29,T26N,R2E	1.7	—	Unknown
0299	Grovers Creek	Sec4,T26N,R2E	5.1	—	Coho, Chum
0302	Unnamed	LB-1.85	1.5	—	Unknown
0306	Unnamed	Sec36,T27N,R2E	1.1	—	Unknown
0307	Unnamed	Sec35,T27N,R2E	1.2	—	Unknown
0308	Unnamed	Sec35,T27N,R2E	1.45	—	Unknown
0309	Unnamed	Sec26&Sec35, T27N,R2E	2.9	—	(Coho), (Chum)
0310	Unnamed	Sec2,T27N,R2E	1.45	—	Unknown
0311	Eglon Creek	Sec2,T27N,R2E	1.6	—	(Coho), Chum)
0313	Unnamed	Sec26,T28N,R2E	1.3	—	Unknown
0316	Unnamed	Sec22,T28N,R2E	1.5	—	Unknown
0317	Unnamed	Sec16,T28N,R2E	1.4	—	Unknown
	Unnamed Lake	Outlet-0.05	—	—	
	BAINBRIDGE ISLAND [1]				
0320	Unnamed	Sec2,T25N,R2E	1.1	—	Unknown
0321	Unnamed	Sec15,T25N,R2E	1.3	—	Unknown
0322	Unnamed	LB-0.4	1.0	—	Unknown
0324	Unnamed	Sec26,T25N,R2E	1.7	—	Unknown
0325	Unnamed	Sec27,T25N,R2E	1.0	—	Unknown
0340	Unnamed	Sec20,T25N,R2E	2.0	—	Unknown

[1] *Tributaries listed from northernmost point in clockwise order around islands.*

NORTH KITSAP PENINSULA — INDEPENDENT DRAINAGES
Kitsap Basin — WRIA 15

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
	Unnamed Reservoir	Outlet-1.4	—	—	
0344	Unnamed	Sec9,T25N,R2E	1.6	—	Unknown

PORT GAMBLE-SEABECK
Independent Drainages

Streams described here drain the west side of the northern Kitsap Peninsula, and flow into Hood Canal. There are 24 independent streams; however, combined they total only 48.2 stream miles. Mouths of these streams lie between Foulweather Bluff and Big Beef Creek near the community of Seabeck in Kitsap County. (Big Beef Creek is described in sub-basin Kitsap 902.)

Stream Description

Due to the elevation and contours of the northern Kitsap Peninsula, there is less drainage to Hood Canal than to the Admiralty Inlet side. With exception of the unnamed tributary (Gamble Creek) entering the head of Port Gamble, remaining streams are very short. The watershed is comprised of low gently rolling hills, mostly less than 400-foot elevation. While the terrain is less than rugged, many areas bordering Hood Canal have rather steep side slopes.

Settlement within this portion of the peninsula is less dense than to the south and east. Residential communities are located at Port Gamble and Lofall with the remaining development being homes and farms distributed throughout the sub-basin. The shoreline bordering Hood Canal is perhaps the most heavily settled. As a result of only moderate development, the watershed and stream bank cover is generally favorable. Timbered areas are mixed coniferous and deciduous second growth, while dense underbrush is common along the streams.

Gradient in the several streams is quite varied. In general the shorter streams with smaller discharge are predominantly steep and of limited value, while the larger streams are moderate in slope and contain predominantly gravel substrate with some areas of fine gravel and sand. The creeks have stable characteristics with relatively narrow extremes of flow.

The 3 largest drainages are Gamble Creek, Little Anderson Creek near Seabeck, and an unnamed tributary entering just north of Lofall. All are accessible to anadromous fish and have favorable habitat, including excellent cover and suitable gravel riffles and pool areas. The lower one mile or more of Gamble Creek has shallow gradient and suitable gravel is less abundant.

Salmon Utilization

Gamble Creek has the greatest potential and supports the largest coho population in this area. The stream is accessible for nearly 4 miles, with suitable spawning area in the upper one-half of the stream and excellent rearing habitat throughout. Coho are also produced in Anderson Creek and the unnamed tributary near Lofall, plus minor production in a few other streams. Little Anderson Creek has excellent chum salmon production for a stream of its small size. Some chum utilize other of the small streams within the sub-basin; however, runs are minor in nature.

Limiting Factors

Most streams in this area are just too small to produce sizeable fish runs. Gradient in some of the smaller streams also limits access to returning adults. Available habitat where accessible and utilized is generally favorable.

Beneficial Developments

There have been no programs nor facilities to increase salmon production in the Port Gamble-Seabeck area.

Habitat Needs

The small physical size of most of the streams precludes any development or enhancement in most streams. There remains the possibility for spawning habitat improvement in a few areas, such as in Gamble Creek. Since streams are already small, any application for consumptive diversion of water should be carefully evaluated.

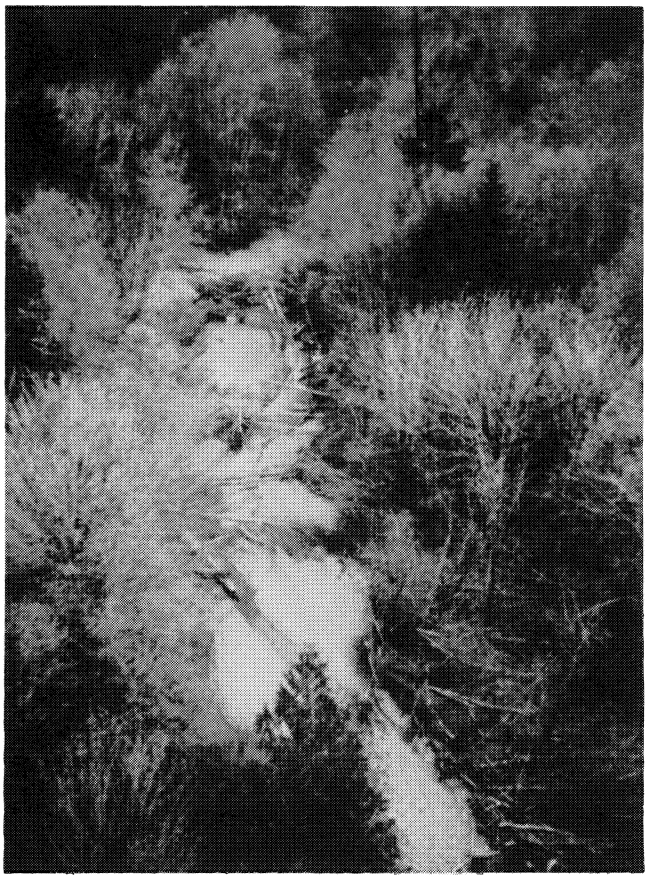
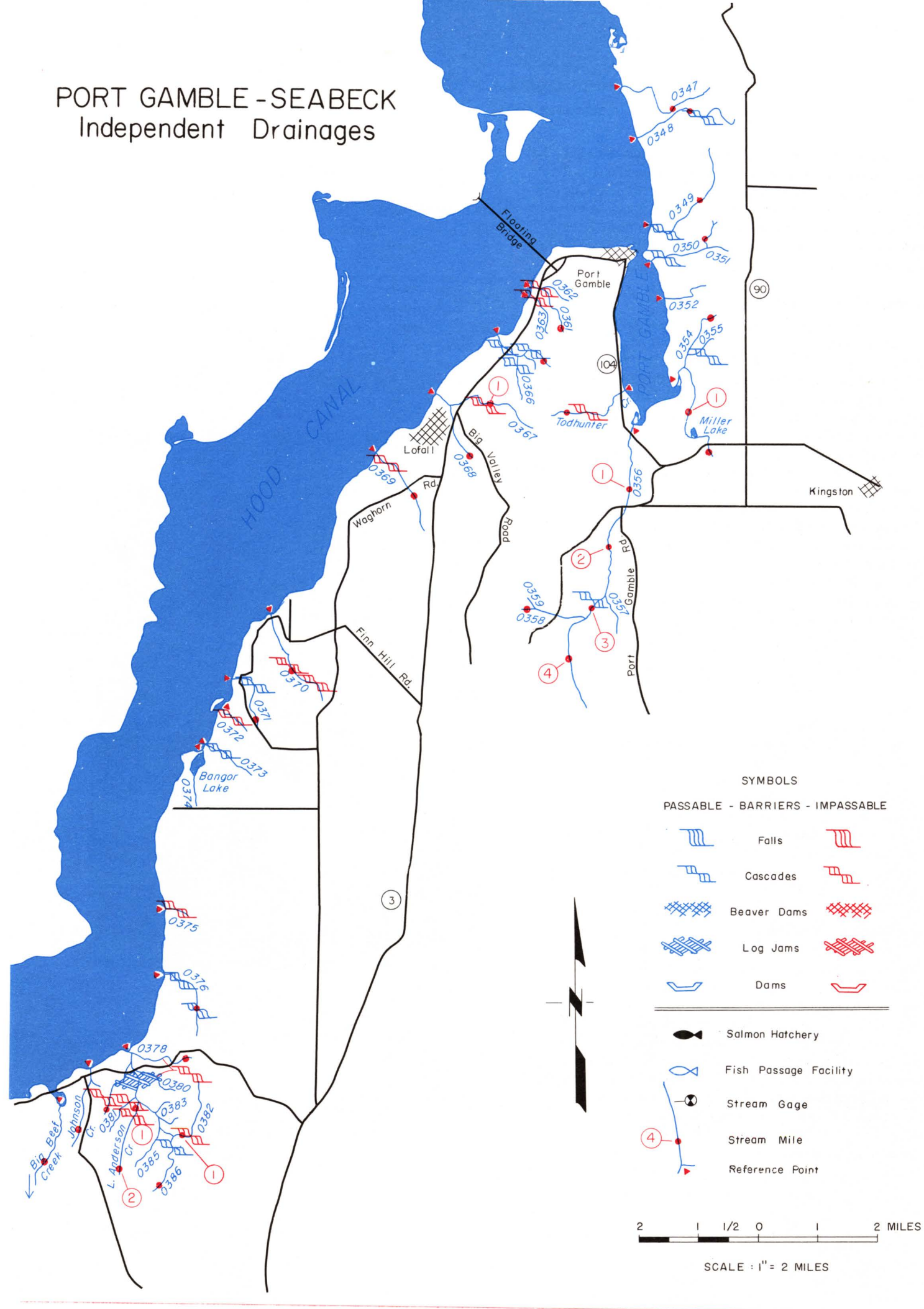


PHOTO 15-9. Big Beef Creek in undeveloped section.


PORT GAMBLE - SEABECK
Independent Drainages
HOOD CANAL
PORT GAMBLE
Floating Bridge
Port Gamble
Lofall
Big Valley Road
Waghorn Rd.
Finn Hill Rd
Port Gamble Rd
Kingston
Todhunter
Miller Lake
Bangor Lake
Big Beef Creek
Johnson Cr.
L. Anderson Cr.
90
104
3
0347
0348
0349
0350
0351
0352
0354
0355
0356
0357
0358
0359
0361
0362
0363
0366
0367
0368
0369
0370
0371
0372
0373
0374
0375
0376
0378
0380
0382
0383
0385
0386
SYMBOLS
PASSABLE - BARRIERS - IMPASSABLE
Falls
Cascades
Beaver Dams
Log Jams
Dams
Salmon Hatchery
Fish Passage Facility
Stream Gage
Stream Mile
Reference Point
2 1 1/2 0 1 2 MILES
SCALE : 1" = 2 MILES

PORT GAMBLE — SEABECK — INDEPENDENT DRAINAGES
Kitsap Basin — WRIA 15

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0347	Unnamed	Sec19,T28N,R2E	1.7	—	Unknown
0348	Unnamed	Sec29,T28N,R2E	1.9	—	Unknown
0349	Unnamed	Sec5,T27N,R2E	1.8	—	Unknown
0350	Unnamed	Sec5,T27N,R2E	1.5	—	Unknown
0353	Unnamed	Sec17,T27N,R2E	2.1	—	Unknown
0354	Unnamed	RB-0.25	1.05	—	Unknown
	Miller Lake	Outlet-1.3	—	—	
0356	Unnamed (Gamble Creek)	Sec20,T27N,R2E	4.9	—	Coho, (Chum)
0358	Unnamed	LB-3.25	1.1	—	Unknown
0360	Todhunter Creek	Sec20,T27N,R2E	1.3	—	Unknown
0361	Unnamed	Sec12,T27N,R2E	1.0	—	None
0364	Unnamed	Sec13,T27N,R2E	1.3	—	Unknown
0367	Unnamed	Sec22,T27N,R1E	1.85	—	Unknown
0368	Unnamed	LB-0.3	1.0	—	Unknown
0369	Unnamed (Jump Off Joe Cr-local name)	Sec28,T27N,R1E	1.55	—	Unknown
0370	Unnamed	Sec5,T26N,R1E	1.7	—	Unknown
0371	Unnamed	Sec7,T26N,R1E	1.25	—	Unknown
0376	Unnamed	Sec1,T25N,R1W	1.4	—	Unknown
0377	Little Anderson Creek	Sec14,T25N,R1W	2.0	—	Coho, Chum
0378	Unnamed	RB-0.05	1.05	—	Coho, (Chum)
0379	Unnamed	LB-0.25	1.1	—	Coho, Chum
0382	Unnamed	RB-0.9	1.9	—	Coho, (Chum)
0386	Unnamed	LB-0.8	1.2	—	Unknown
0387	Johnson Creek	Sec14,T25N,R1W	1.35	—	(Chum)
0389	Big Beef Creek	Sec15,T25N,R1W	10.0	—	(Chin.), Coho, Chum
	(See Kitsap 903)				

BIG BEEF CREEK DRAINAGE

Big Beef Creek is the largest of the seven independent drainages entering this area. Other streams include Stavis Creek, Seabeck Creek, Little Beef Creek, Boyce Creek, and two unnamed streams. They lie in the northwestern portion of Kitsap County and generally flow northward to enter Hood Canal. Total stream miles of all creeks is 36.85, with approximately one-half in Big Beef Creek.

Stream Descriptions

The headwaters of Big Beef Creek are in a level area of the central Tahuya Peninsula near 500-foot elevation. The Tahuya River heads in the same marshy uplands and drains to the south. It has been reported that with certain water conditions the two drainages are actually connected. Below this the gradient steepens slightly until entering Lake Symington, an artificial impoundment created for the development of property. Gradient in the upper watershed is shallow, with occasional moderate areas. Upper Big Beef Creek lies in a shallow valley that is minimally developed. Watershed cover is predominantly coniferous trees and dense underbrush along the stream providing superior quality rearing habitat. Streambed substrate contains many areas of fine material and sand, with occasional gravel riffles available. Fish passage to this upper area is possible via a ladder at the dam impounding Lake Symington.

The downstream habitat has a narrower valley covered with second growth timber to the stream edge. Gradient is moderate and excellent spawning and rearing area is provided. The streambed is predominantly gravel riffles separated by numerous pools. This portion of the watershed is also undeveloped, with excellent stream bank cover forming a canopy over most of its length. Virtually the only settlement of Big Beef Creek is the shoreline of Lake Symington. Mean stream discharge near the mouth, available for recent years from U.S.G.S., has ranged from 30 to 50 cfs per year.

Seabeck Creek is moderate in size, with 3.6 mainstem miles. Like Big Beef Creek, its watershed is sparsely developed except for an occasional homesite. It flows through a relatively narrow valley in its upper reaches and has moderate to steep gradient above mile 1.5 and moderate below this point. Gravel and some coarse material form the substrate of the upper watershed, while gravel predominates in the lower reaches.

Stavis Creek has 4.2 mainstem miles, plus one major tributary with 3.3 miles. The Stavis Creek watershed is almost totally undeveloped and provides excellent rearing and spawning habitat for anadromous fish. The upper areas of the two branches flow through narrow valleys covered with second growth timber that broaden near the mouth. Upstream sections have moderate gradient with some steep areas and cascades, while the mainstem and lower portions of the branches have moderate gradient with gravel substrate.

The remaining five streams in the watershed are small and undeveloped, but have generally steep gradient except near their mouths. Areas that are accessible to anadromous fish provide favorable habitat.

Salmon Utilization

Big Beef, Seabeck, and Stavis creeks provide exceptional spawning and rearing habitat for salmon. Big Beef Creek alone has returns of around 3,000 coho annually, and up to 3,500 chum salmon. Coho utilize the entire drainage, with the upper area above Lake Symington being the more productive. Chum spawn in the lower five miles. Stavis Creek has less accessible area; however, the available sections are heavily used. Chum use more than one mile of Seabeck Creek while coho ascend the stream for nearly two miles. Other streams have only minor production. Total returns to all streams are approximately 3,800 coho and 4,500 chum.

Limiting Factors

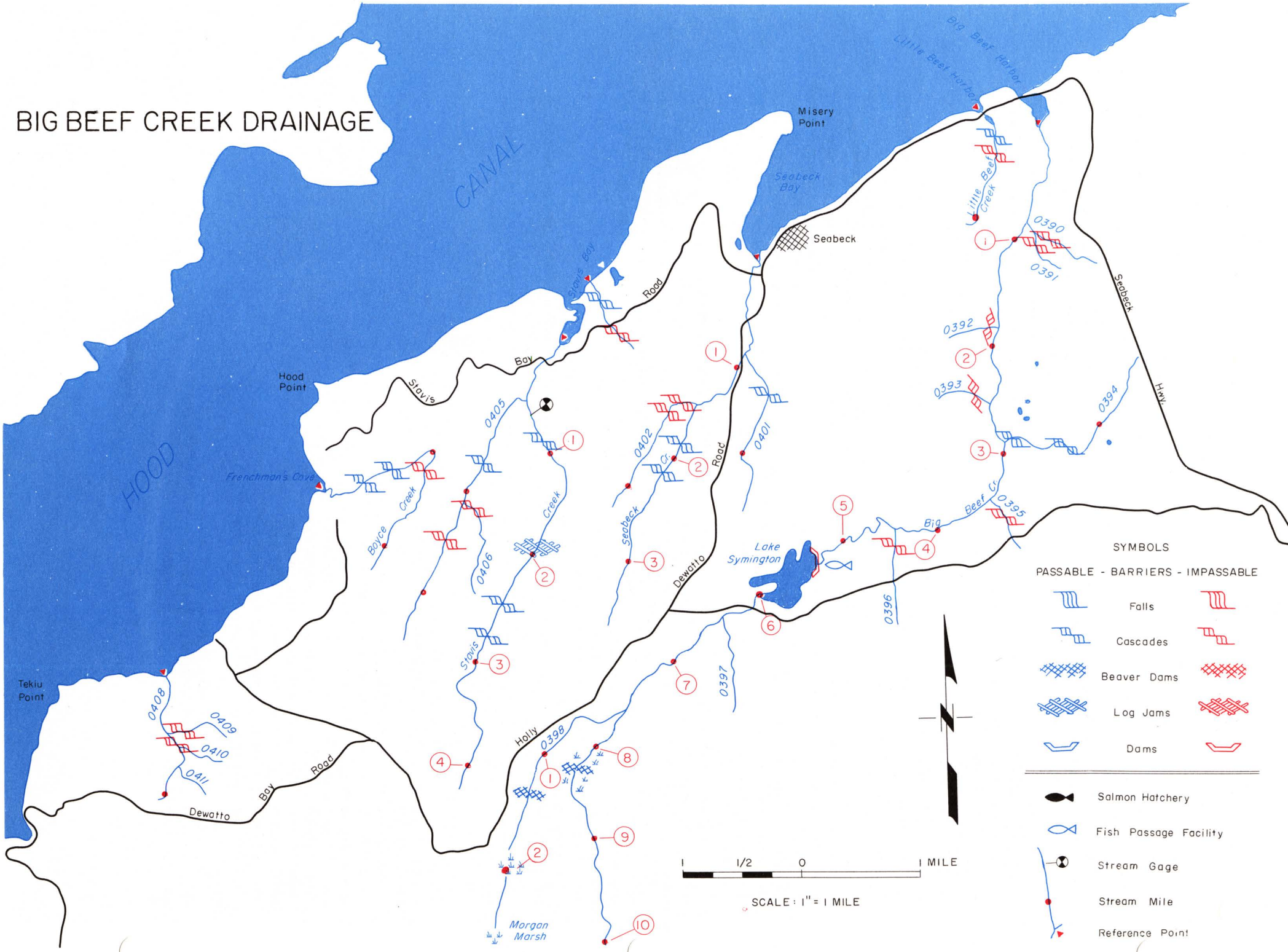
Quality of the watersheds is excellent in all areas, with exception of sections of Big Beef Creek impacted by Lake Symington. This is a large, relatively shallow impoundment where summer temperatures become too high to provide favorable rearing conditions for coho. This lake has replaced the meandering swampy area where coho reared prior to impoundment. The surface runoff from Lake Symington also has high temperatures during summer months, and downstream areas near the dam have reduced capacity for coho rearing.

Beneficial Developments

The Fisheries Research Institute of the University of Washington maintains a station near the mouth of Big Beef Creek. Their facility includes an artificial spawning channel where research work has been on salmon production and behavior.

Habitat Needs

It is important that all possible measures be taken to preserve the existing high quality stream habitat in its excellent state, primarily through enforcement of the state hydraulics code.


BIG BEEF CREEK DRAINAGE
CANAL
HOOD
Misery Point
Seabeck Bay
Little Beef Harbor
Big Beef Harbor
Seabeck
Little Beef Creek
0390
0391
0392
0393
0394
Seabeck Hwy.
Stavis Bay
Stavis Bay Road
Hood Point
Frenchman's Cove
Boyce Creek
0405
0406
Stavis Creek
0402
Seabeck Cr.
0401
Dewatto Road
Lake Symington
Big Beef Cr.
0395
0396
0397
0398
Holly
Tekiu Point
0408
0409
0410
0411
Dewatto Bay Road
Morgan Marsh
1 1/2 0 1 MILE
SCALE: 1" = 1 MILE
SYMBOLS
PASSABLE - BARRIERS - IMPASSABLE
Falls
Cascades
Beaver Dams
Log Jams
Dams
Salmon Hatchery
Fish Passage Facility
Stream Gage
Stream Mile
Reference Point

BIG BEEF CREEK DRAINAGE
Kitsap Basin — WRIA 15

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0389	Big Beef Creek	Sec15,T25N,R1W	10.0	—	(Chin.), Coho, Chum
0394	Unnamed	RB-2.9	1.7	—	Unknown
	Lake Symington	Outlet-5.3	—	—	
0398	Unnamed	LB-7.6	2.6	—	Coho
0399	Little Beef Creek	Sec15,T25N,R1W	1.15	—	(Coho), Chum
0400	Seabeck Creek	Sec29,T25N,R1W	3.6	—	Coho, Chum
0401	Unnamed	RB-0.85	1.55	—	(Coho), (Chum)
0402	Unnamed	LB-1.5	1.2	—	Unknown
0404	Stavis Creek	Sec25,T25N,R2W	4.2	—	Coho, Chum
0405	Unnamed	LB-0.5	2.5	—	Coho, (Chum)
0407	Boyce Creek	Sec34,T25N,R2W	2.2	—	(Coho), (Chum)
0408	Unnamed	Sec9,T24N,R2W	1.05	—	(Coho), (Chum)

DEWATTO-ANDERSON CREEKS

The independent drainages entering the east shore of Hood Canal in this district total 42.75 miles of stream. The Dewatto River comprised roughly three-fourth of this, with most of the remainder in Anderson Creek. Four small independent drainages complete the stream list. The northern portion of the sub-basin lies in southwest Kitsap County, while the southern half is in northeast Mason County.

Stream Description

Dewatto Creek flows in a southwesterly direction, roughly paralleling Hood Canal throughout its length. Anderson Creek flows more direct westerly. All streams in this sub-basin drain the Kitsap Peninsula.

Upper Anderson Creek is divided into two major branches above R.M. 1.6. The watershed is very sparsely developed throughout its length. Land use includes second growth timber and Christmas tree farms, with an occasional home site in the lower mile. Dense stream bank cover is excellent for fish production, and is predominantly mixed vegetation. Anderson Creek Valley has moderately steep slopes with predominantly coniferous growth. Stream gradient is moderate in the lower reaches with increasing steepness above the forks. Substrate is mostly gravel, although the lower 0.25 mile contains much fine material and the upper accessible reaches tend to have coarse gravel and rubble. The limited data on Anderson Creek flows indicate that summer low flows are about 5 cfs.

The Dewatto River provides some of the most pristine salmon habitat remaining in the state. Its 30.25 miles of stream includes 8.7 miles of mainstem plus several important tributaries. This watershed is also sparsely developed, and the second growth timber and dense stream bank cover throughout its length enhances its fisheries values. Occasional rural residences are scattered throughout the drainage, and several large parcels of land are devoted to Christmas tree farming.

Terrain of the Dewatto Valley is moderate, with gently rolling hills being the most extreme feature of the topography. The narrowest portion of the valley is nearer the river mouth, but the confinement is not extreme. Gradient is moderate throughout the entire river, although several swampy sections with shallow gradient are present. These quiet water reaches provide prime rearing area for juvenile salmon.

Stream flow data for a number of years are available from the gaging station located at R.M. 1.8. Mean stream flow over 22 years has been 69.1 cfs, while the extreme range has been from 9.0 to 2,160 cfs.

The small independent tributaries have steep gradient with little accessible area, and only the unnamed tributary located approximately one mile south of Dewatto Bay is believed to have any salmon production of importance.

Salmon Utilization

Streams in the Dewatto-Anderson drainage district are extremely productive for their size. Anderson Creek supports both coho and chum salmon, while Dewatto Creek produces very important runs of coho and chum, as well as a small chinook population. Pink salmon were introduced into the Dewatto River and returned for a few cycles; however, none have been observed in recent years.

The chum salmon populations of these drainages are interesting, particularly those of Dewatto Creek. Three completely distinct stocks of chum salmon enter Dewatto Creek at different times of the year and spawn in different sections of the stream. This is unique in Washington State among known runs, except for the Tahuya River. The earliest run enters primarily during September and spawns late in the month in the lower two miles of stream. This is a major run which may total as many as 4,000 spawners per year. A second major run, typically of equal size, enters in late November and spawn in tributaries and mainstem areas above mile 1.5. Finally, a third run enters in late December and early January and spawns intertidally and in the lowermost portion of the stream. There is little overlap in timing or spawning areas of the stocks. As a note of interest, timing of major runs in the nearby Tahuya River is similar, but intertidal timing is different.

Anderson Creek supports early and late chum runs similar in timing to the major Dewatto stocks.

Limiting Factors

Since development of the area has been minimal, the only important limiting factors are natural climatic conditions. Poaching has occasionally been a local problem.

Beneficial Developments

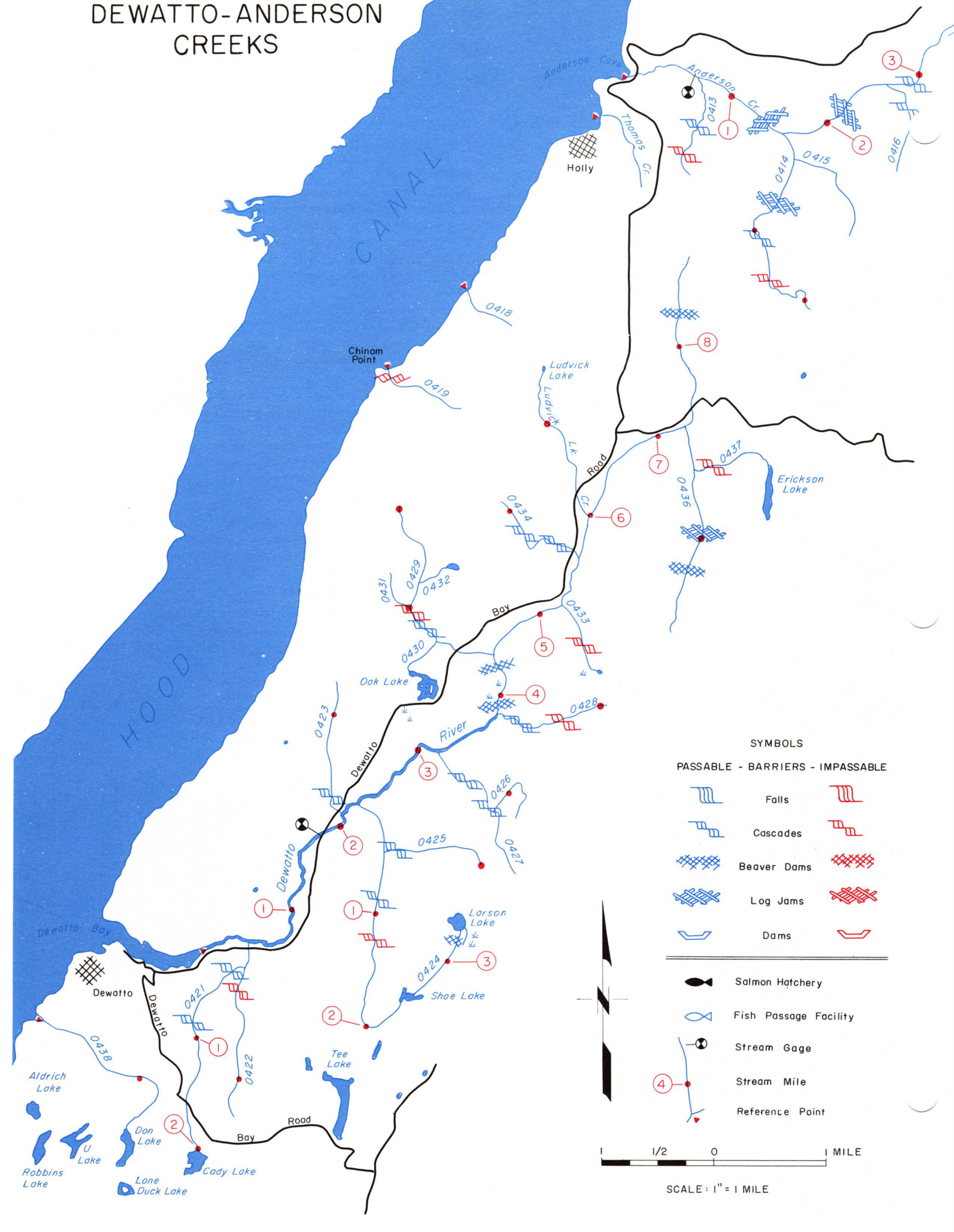
There has been occasional hatchery plantings of coho, chinook, and pink salmon in these streams. There has also been occasional removal of migratory obstructions by the Department of Fisheries stream clearance crew.

Habitat Needs

Maintenance of existing conditions in the watershed, as regards stream flow and stream character, will be required to sustain a high production level.

PHOTO 15-10. Near mouth of Dewatto Creek.

DEWATTO-ANDERSON CREEKS



DEWATTO-ANDERSON CREEKS
Kitsap Basin — WRIA 15

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0412	Anderson Creek	Sec17,T24N,R2W	3.85	—	(Chin.), Coho, Chum
0414	Unnamed	LB-1.6	2.1	—	Coho, (Chum)
0420	Dewatto River	Sec27,T23N,R3W	8.7	—	Chin., Coho, Chum
0421	Unnamed (White Cr.-local name)	LB-0.4	2.0	—	Coho, Chum
0422	Unnamed	RB-0.2	1.4	—	Unknown
	Cady Lake	Outlet-2.0	—	—	
0423	Unnamed	RB-2.1	1.3	—	Coho, (Chum)
0424	Unnamed (Shoe Cr.-local name)	LB-2.25	3.5	—	Coho, Chum
0425	Unnamed	LB-0.5	1.0	—	Unknown
	Shoe Lake	Outlet-2.4	—	—	
	Larson Lake	Outlet-3.3	—	—	
0426	Unnamed	LB-3.2	1.5	—	Coho, (Chum)
0428	Unnamed	LB-3.8	1.1	—	(Coho)
0429	Unnamed	RB-4.35	2.0	—	Coho, (Chum)
0434	Unnamed	RB-5.55	1.1	—	Unknown
0435	Ludvick Lake Creek	RB-5.9	1.5	—	Coho, (Chum)
0436	Unnamed	LB-7.3	1.8	—	Coho
0438	Unnamed	Sec32,T23N,R3W	1.75	—	(Coho), (Chum)

AYRES POINT
Independent Drainages

This portion of the Kitsap Basin is located at the most southwesterly point of the Kitsap Peninsula, in northern Mason County. There are only three independent drainages, totaling 12.4 miles of stream length. Ayres Point is more commonly known locally as Bald Point.

Stream Description

Rendsland Creek is by far the largest and most important of the three streams, with 5.3 miles of mainstem plus 4.4 miles of tributaries. It flows in a southeasterly direction and enters Hood Canal in the area of The Great Bend between Musqueti Point and Ayres Point. Its moderately deep and narrow valley flows through low lying hills and broadens gradually as it approaches the mouth. Watershed development has been very sparse except near the mouth, where rural residences border the shores of Hood Canal. Land use is second growth timber interspersed with Christmas tree farms. Valley slopes are timbered, with conifers predominating, and stream bank cover is dense.

Rendsland Creek is quite stable and provides excellent spawning conditions. Gradient is mostly moderate but becomes steeper in the upper reaches, with nearly four miles of mainstem accessible to anadromous fish. Substrate is predominantly gravel, mostly of excellent quality. Unfortunately stream flows are intermittent in the lower portion of the creek, and utilization by rearing species is limited. Portions of the watershed, however, have annual stream flow and provide rearing conditions. Rendsland Creek tributaries are small and have no known salmon usage.

The other two independent streams are small and unnamed, although the larger of the two is known locally as Caldervin Creek. The mouth of Caldervin Creek lies at the community of Tahuya near the mouth of the Tahuya River. It flows through a small narrow valley with relatively steep gradient in its upper reaches. The watershed is similar to that described for Rendsland Creek. The lower 0.5 miles of creek is characterized by a more moderate gradient, where it contains excellent spawning gravel. The stream channel is rather stable and is comprised mostly of riffle areas as it meanders among homes in the Tahuya community. Since stream banks are more heavily developed, cover is less available.

The other unnamed tributary is small and has rather steep gradient through much of its length. It has only limited value for anadromous fish production.

Salmon Utilization

Rendsland and Caldervin creeks support runs of coho and chum salmon, while the unnamed tributary is suspected to contain a minor population of coho. Coho spawn and rear in the upstream portions of Rendsland Creek, above areas of intermittent flow, while chum salmon spawn mostly in the lower mile of stream. Both chum and coho utilize the lower 0.5 mile of Caldervin Creek.

Limiting Factors

Salmon production is limited in these streams primarily by the natural habitat available. The intermittent and low summer stream flows in Rendsland Creek sharply reduce the production of coho, and on some years has affected production of chum salmon because of restricted accessibility for returning adults. The only known man-caused limiting factor is poaching, which has reportedly been severe on occasion.

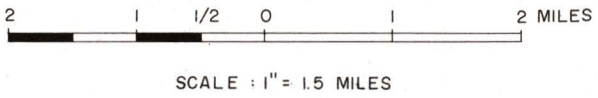
Beneficial Developments

There have been no major facilities, projects, or programs to enhance production in these streams. Infrequent and minor stream maintenance has been conducted in the past.

Habitat Needs

Preservation of existing conditions of habitat, particularly summer flows, is required to maintain existing natural production. There is the possibility that spawning area enhancement projects could be performed, but this has not been investigated.

TAHUYA RIVER DRAINAGE



SCALE : 1" = 1.5 MILES

SYMBOLS

PASSABLE - BARRIERS - IMPASSABLE

Falls

Cascades

Beaver Dams

Log Jams

Dams

Salmon Hatchery

Fish Passage Facility

Stream Gage

Stream Mile

Reference Point

AYRES POINT — INDEPENDENT DRAINAGES
Kitsap Basin — WRIA 15

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0438	Unnamed	Sec32,T23N,R3W	1.75	—	(Coho), (Chum)
0439	Rendsland Creek	Sec19,T23N,R3W	5.3	—	Coho, Chum
0440	Unnamed	LB-0.2	1.9	—	Coho, (Chum)
0441	Unnamed	RB-2.5	1.2	—	Unknown
	Unnamed Lake	Outlet-5.3	—	—	
0444	Unnamed	Sec29,T22N,R3W	1.1	—	(Chum)
0445	Unnamed (Caldervin Cr.)	Sec27,T22N,R3W	1.5	—	(Coho), (Chum)
0446	Tahuya River	Sec22,T22N,R3W	21.1	—	Chin., Coho, Chum
	(See Kitsap 1203)				
0478	Shoofly Creek	Sec18,T22N,R2W	1.5	—	(Coho), Chum
	(See Kitsap 1203)				

TAHUYA RIVER DRAINAGE

The Tahuya River is the largest stream draining the Kitsap Peninsula. Its headwaters are in Kitsap County and it flows southwesterly through northeast Mason County and enters Hood Canal at the community of Tahuya. Adjacent independent streams included in this sub-basin are Shoofly Creek, Stimson Creek, and seven unnamed tributaries. Total stream mileage of all drainages is 80.3 miles, with 64.9 in the Tahuya River.

Stream Description

Aside from the immediate shoreline of Hood Canal, where rural home development is intense, the watersheds of streams are little developed. Exceptions to this are occasional lake developments and one recreational home development on the middle portion of the Tahuya River. Land use and development of the remaining watershed is second growth timber and Christmas tree farms, with infrequent rural homes or small farms. Mixed vegetation is present, with coniferous growth being predominant.

Topography of these several independent drainages is predominantly low lying hills, with moderate valley slope. Most of the area under discussion lies below the 500-foot elevation. Watershed cover, as described above, extends to most stream areas except those few sections that are heavily settled.

Stream habitat is favorable for anadromous fish in most accessible areas. Conditions of stream bank cover, riffle-pool ratio, and spawning gravel are all favorable. Streambed stability, as well as water quality, remains excellent in all drainages.

The Tahuya River has many minor tributaries and is dependent upon these for its reputation as a major producer of coho salmon in Puget Sound. Portions of the mainstem river and its tributaries have rather shallow gradient and a number of swampy sections. Since these areas also have heavy stream bank cover, they supply extremely favorable rearing area for coho. Existing habitat conditions in the Tahuya River are responsible for its success in production of salmon resources.

Of the remaining nine independent streams entering Hood Canal, only Stimson Creek, Shoofly Creek, and two of the unnamed tributaries have any important value for salmon production. The other minor streams have either inadequate stream flow or are inaccessible due to steep gradient.

Salmon Utilization

Of the streams described, the Tahuya River is dominant in fisheries production, with very important runs of coho and chum salmon, as well as moderate chinook production. Stimson Creek supports important runs of both chum and coho, while Shoofly and the two unnamed streams have smaller runs of both species.

Most coho spawn in the Tahuya River in November and December through most of the middle and upper mainstem as well as the numerous tributary streams available. All accessible watershed areas with year-round stream flows afford excellent rearing. Chinook salmon reproduce in the lower four miles of stream, where they are confined due to stream flow conditions and accessibility during migration.

Tahuya chum salmon production, like that of the Dewatto, is unique in Puget Sound. Three distinct stocks return annually: an early run enters and spawns during September and very early October in the lower three miles of the river, and an entirely intertidal run arrives and spawns in late October and early November, while a late run appears during November and December. This last run utilizes upper river areas from miles 5 to 10, as well as lower reaches of a few tributaries.

Limiting Factors

As in all streams, low flow during summer months is a limiting factor for coho production. Several of the tributaries utilized by coho have intermittent stream flow during arid periods of late summer and early fall. Poaching is the primary man-caused limiting factor of production in these basins. During recent years this problem has been severe.

Beneficial Developments

No specific facilities, projects, nor programs have been designed to enhance salmon production in the Tahuya River. Hatchery plants have been made on several occasions, and stream maintenance has been a routine operation.

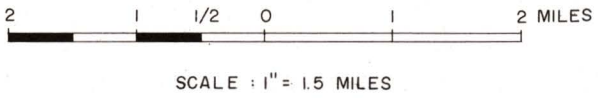
An enhancement project was conducted on one of the unnamed tributaries (known locally as "Little Shoofly Creek"). Migration was blocked at the stream mouth by an ineffective culvert, and a small fishway was constructed to provide passage for adult salmon. Previous to this the upstream areas had been stocked with surplus spawners from the Hoodsport Hatchery. Results thus far have been encouraging.

Habitat Needs

The principal requirements for maintaining the high production in these watersheds is for maintenance of the existing habitat conditions. Strict enforcement of the fisheries code, as related to hydraulic projects, will be essential.

PHOTO 15-11. Chum spawning section of Tahuya River.

TAHUYA RIVER DRAINAGE



SCALE : 1" = 1.5 MILES

SYMBOLS

PASSABLE - BARRIERS - IMPASSABLE

Falls

Cascades

Beaver Dams

Log Jams

Dams

Salmon Hatchery

Fish Passage Facility

Stream Gage

Stream Mile

Reference Point

TAHUYA RIVER DRAINAGE
Kitsap Basin — WRIA 15

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0446	Tahuya River	Sec22,T22N,R3W	21.1	—	Chin., Coho, Chum
0447	Unnamed	RB-0.01	1.9	—	Coho, Chum
0448	Unnamed	LB-0.05	1.0	—	Coho, Chum
0449	Unnamed	RB-4.1	1.6	—	Coho, (Chum)
0453	Unnamed	RB-6.25	1.0	—	(Coho), (Chum)
0454	Unnamed	LB-7.4	2.2	—	Coho, (Chum)
0458	Unnamed	RB-7.45	1.8	—	Coho
0459	Unnamed	RB-8.55	2.0	—	Coho, (Chum)
	Erdman Lake	Outlet-1.4	—	—	
0460	Unnamed	RB-8.6	2.75	—	Coho, (Chum)
0461	Unnamed	RB-0.15	2.2	—	Coho, (Chum)
	Haven Lake	Outlet-1.2	—	—	
	Lake Wooten	Outlet-2.2	—	—	
0463	Unnamed	LB-0.7	1.1	—	(Coho)
	Lower Twin Lake	Outlet-2.6	—	—	
	Upper Twin Lake	Outlet-2.75	—	—	
0465	Unnamed	RB-10.5	2.0	—	(Coho)
0466	Unnamed	RB-10.9	4.1	—	Coho
0468	Unnamed	RB-11.15	3.4	—	Coho
	Blacksmith Lake	Outlet-2.3	—	—	
0470	Unnamed	RB-14.0	1.9	—	(Coho)
0471	Unnamed	RB-15.35	1.6	—	(Coho)
0474	Gold Creek	LB-19.5	1.45	—	Coho
0475	Unnamed	LB-19.75	1.6	—	(Coho)
	Tahuya Lake	Outlet-19.95	—	—	
0476	Tin Mine Creek	LB-20.4	2.55	—	Unknown
0478	Shoofly Creek	Sec18,T22N,R2W	1.5	—	(Coho), Chum
0488	Stimson Creek	Sec11,T22N,R2W	5.3	—	Coho, Chum
	Unnamed Marsh	Outlet-2.5	—	—	
	Long Marsh	Outlet-3.0	—	—	
	Unnamed Marsh	Outlet-4.3	—	—	
	Suckell Pond	Outlet-5.3	—	—	
0492	Unnamed	Sec2,T22N,R2W	1.2	—	Unknown
0493	Little Mission Creek	Sec1,T22N,R2W	2.1	—	Coho, Chum
	(See Kitsap 1303)				
0495	Big Mission Creek	Sec1,T22N,R2W	9.85	—	Coho, Chum
	(See Kitsap 1303)				

TAHUYA RIVER DRAINAGE
Kitsap Basin — WRIA 15

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0503	Union River	Sec29,T23N,R1W	9.7	23.5	Chin., Coho, Chum
	(See Kitsap 1303)				

UNION RIVER DRAINAGES

Three important salmon streams comprise the drainages in this section of the Kitsap Basin. Little Mission Creek, Big Mission Creek, and Union River all enter Lynch Cove, the innermost portion of Hood Canal located in northeast Mason County. Total stream mileage is 53.25, with Union River contributing the most to this total.

Stream Description

All three streams flow in a southerly direction. The Union River headwaters are in the Blue Hills near 1,500-foot elevation; however, the majority lies in low rolling hills of the Kitsap Peninsula. Much of the watershed is totally undeveloped with restricted entry, since it is controlled by the City of Bremerton for its domestic water supply. Mixed second growth timber is the predominant vegetation, which comprises stream cover on side slopes and valley floor, including immediate stream bank cover. Terrain is moderate to steep. Below a high falls at R.M. 6.7 the gradient is moderate, but becomes shallower with sections of slow current velocity in the lower five miles.

The lower Union River has contrasting character, with a relatively broad valley and moderately heavy residential and farm development. Belfair is the population center for rural northwest Mason County, and is located near the mouth of the Union River.

The Big Mission Creek drainage parallels that of the Union River about four miles west. Upper stream sections are quite similar, except that the Mission Creek basin contains several lakes. Downstream areas of Big Mission Creek differ substantially in that the valley is more constricted and has less development. Rural home development is intermittent and limited to the lower two miles of stream, where the valley broadens only slightly. Belfair State Park is located at the mouth of Big Mission Creek on Hood Canal.

Little Mission Creek is small in comparison with the drainage area and stream mileage of the Union River and Big Mission Creek. Stream flow during the low flow periods, however, is surprisingly high for such a small drainage, and therein lies the value of this stream for fisheries production. Little Mission Creek flows 2.1 miles through a gently sloping valley to enter Hood Canal at Belfair State Park a few hundred feet west of Big Mission Creek. The stream is very stable with moderate gradient throughout, and has excellent bank cover in spite of residential development along its banks.

Salmon Utilization

Coho and chum salmon are produced in all three streams, and a small chinook run returns to the Union River. Surprisingly the best chum salmon production is in Little Mission Creek, the smallest drainage, although potential productivity in Big Mission and the Union River is higher. Chum salmon spawn in the lower 0.8 miles of Mission Creek, 1.5 miles of Big Mission Creek, and to the falls at mile 6.7 in Union River. Big Mission Creek and the Union River are productive coho streams, while Little Mission Creek is limited by the short stream length. The excellent rearing area afforded by these streams is responsible for the high productivity. Chinook salmon spawn in the lower two miles of the Union River. Although this stream is not typical of chinook salmon production areas, the small population appears to be well adapted to the existing habitat.

Limiting Factors

The most important limiting factor of Union River salmon production is the falls. Upstream reaches include several potentially productive stream areas. The Bremerton water supply dam and reservoir, however, is located a short distance upstream and presents an additional obstacle. The major factor controlling production in the Big Mission Creek drainage is low stream flow during summer months. Spawning areas in several upper watershed streams have excellent capacity; however, intermittent flows limit rearing area and coho productivity.

Man-caused limitations to production come from local poaching of spawning adults, and from the reductions in flow to the Union River by the diversion of water from the Union River.

Beneficial Developments

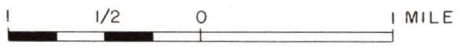
Big Mission Creek and the Union River have received occasional plants of coho salmon in past years. No specific programs have been designed to enhance production, although future efforts in this area are worthy of consideration.

Habitat Needs

Proper harvest and watershed management are the primary requirements for maintaining the existing high productions of these streams. Strict adherence to the fisheries code relative to hydraulic projects, and close evaluation of any proposals for removal of water from the streams is essential. Introduction of salmon above the reservoir does not appear feasible at this time; however, closer evaluation of this possibility could be considered for future enhancement.

PHOTO 15-12. Chum spawning riffle on Big Mission Creek.

UNION RIVER DRAINAGES



SCALE : 1" = 1 MILE

UNION RIVER DRAINAGE
Kitsap Basin — WRIA 15

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0492	Unnamed	Sec2,T22N,R2W	1.2	—	Unknown
0493	Little Mission Creek	Sec1,T22N,R2W	2.1	—	Coho, Chum
0494	Unnamed	RB-0.7	1.3	—	Unknown
0495	Big Mission Creek	Sec1,T22N,R2W	9.85	—	Coho, Chum
0496	Unnamed	LB-2.3	2.0	—	Coho, (Chum)
0497	Unnamed	RB-0.8	1.2	—	Unknown
0499	Unnamed	RB-4.1	2.5	—	Coho
0500	Unnamed	RB-0.2	1.3	—	(Coho)
	Mission Lake	Outlet-8.25	—	—	
0502	Unnamed	RB-8.3	1.25	—	Unknown
0503	Union River	Sec29,T23N,R1W	9.7	23.5	Chin., Coho, Chum
0504	Unnamed	LB-0.25	1.3	—	Coho, (Chum)
0505	Courtney Creek	RB-1.65	4.1	—	Coho, Chum
0507	Unnamed	RB-2.3	1.7	—	Coho, (Chum)
0508	Unnamed	RB-3.25	1.3	—	(Coho)
0510	Bear Creek	RB-3.85	3.5	—	Coho, (Chum)
0511	Unnamed	RB-0.5	1.3	—	None
0512	Unnamed	LB-4.1	2.8	—	Coho, (Chum)
0513	Unnamed	RB-0.9	1.0	—	Unknown
0514	E. Fk. Union R.	LB-4.85	3.0	—	Coho, (Chum)
0515	Unnamed	LB-5.4	2.8	—	Coho, (Chum)
0516	Hazel Creek	RB-5.55	2.2	—	(Coho)
0517	Unnamed	RB-6.6	1.8	—	None