LYRE-HOKO BASIN
Water Resource Inventory Area 19

The Lyre-Hoko basin consists of a number of small to medium-sized streams that empty into the western Strait of Juan de Fuca. These streams provide suitable habitat for spawning and rearing of anadromous fishes. The larger streams in this basin include the Lyre, Pysht, Clallam, Hoko, and Sekiu rivers.

Most of the streams in this area originate in a moderately high range of hills paralleling the Strait of Juan de Fuca, while the other drainages are separated from the olympic Mountain range by the Quillayute and Elwha river systems. All of these drainages have asteep gradient near their headwaters, but contain many miles of moderate gradient stream channel in their lower reaches. Several of the larger streams have a tidal influence extending upstream for several miles creating atypical estuarial zones. The Hoko, Sekiu, Clallam, and Pysht rivers have this characteristic. The other streams of this basin generally flow directly into the Strait of Juan de Fuca with little estuarial area. All streams that are accessible to anadromous fishes contain areas of good to excellent quality pool-riffle streambed dispersed between occasional rapid sections. Land use in this basin varies from timber to agricultural production area with agricultural areas being generally limited to the eastern half of the basin around Salt Creek, lower Pysht, lower Clallam, and lower Hoko rivers. The town of Clallam Bay is located at the mouth of the Clallam River on a protected bay, as are other towns and communities on the straits, for protection of the fishing fleets harbored there. There are 244 rivers and streams providing 495 linear stream miles in this drainage.

Fish Inventory and Distribution

The Lyre-Hoko basin supports four species of Pacific salmon; these are chinook, coho, chum, and a small number of pink salmon. These fish utilize approximately 174.5 linear miles of streams in the basin.

Chinook Salmon — The Pysht River is a primary chinook production stream in the Lyre-Hoko basin. Only the fall race of this species is known to utilize the Pysht River and its tributaries where spawning occurs from near the head of tidewater upstream to near river mile 12.0. Chinook spawning has also been noted in the lower reaches of its tributaries, Green Creek, and the South Fork Pysht River.

Most of the spring chinook spawning in this basin occurs in the ten miles of river upstream from Hoko Falls on the Hoko River. The bulk of the fall chinook spawning in this river occurs below Hoko Falls. Little Hoko River may be utilized by fall chinook upstream to near the falls at river mile 3.0.

The Sekiu River contains significant amounts of fall chinook spawning area downstream from the confluence of its North and South forks to near tidewater, with an additional production area existing in the lower three miles of the North Fork. The existing runs are presently in an extremely depressed condition.

Several other small streams on the Strait of Juan de Fuca provide suitable spawning habitat for fall chinook. These streams include: Deep Creek, and East Twin, West Twin, Lyre, and Clallam rivers. Only small chinook runs are found in these streams, since stream flows during adult migration and spawning are frequently quite low. Juvenile chinook rearing occurs in all of the chinook spawning areas and in the stream reaches downstream from the upper limit of spawning. Estuaries, where present, are valuable rearing areas for the species.

The spring chinook adult migration in the Hoko River commences in March and continues through mid-August (Table 19-1). Spawning commences in late August and continues through September. Following incubation of eggs in the gravel, chinook fry emerge in late January and February. Juvenile spring chinook remain in the Hoko River for over 14 months and commence migration to the ocean in March of the second year with this migration extending into July.

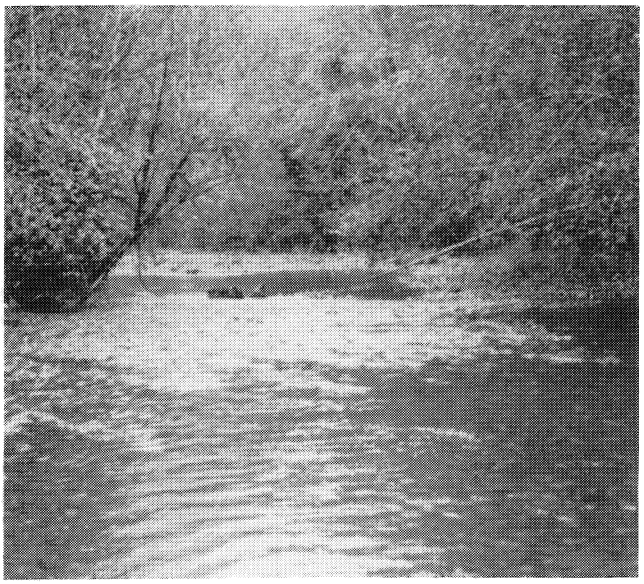
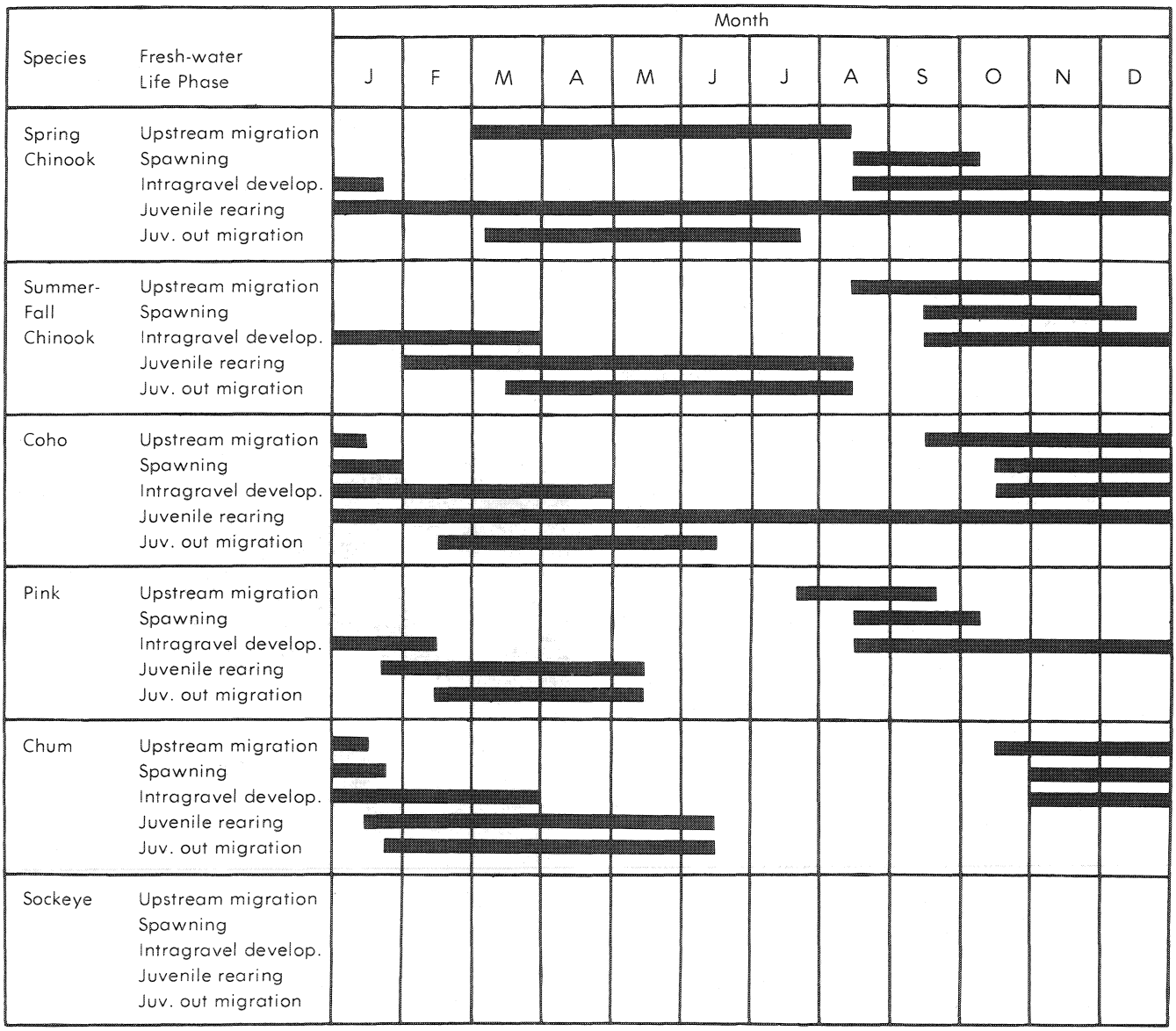


PHOTO 19-1. The Pysht River offers many sections of excellent chinook spawning riffles.

The entrance of adult fall chinook into the streams of the Lyre-Hoko basin is highly dependent upon late summer and early fall rainfall since these streams are typically quite low during the late summer run-off period. Fish begin an active upstream migration following the first freshets after early September. Spawning commences in mid-September and extends through mid-December with peak activity in early November. Following incubation of the eggs within the gravel, emergence of fry occurs in February and March. The majority of the young fall chinook fry rear in the system for approximately three months prior to migrating to the Strait of Juan de Fuca. Some fall chinook juveniles remain in the streams for an extended period of time and may be found as late as August.

It is estimated that the total combined escapement of spring and fall chinook in the Lyre-Hoko basin ranged from 300 to 3,000 fish during the period of 1966 through 1971. The average annual escapement in these years is an estimated 1,000 chinook. Virtually all of these fish are the result of natural production.

Table 19-1. Timing of salmon fresh-water life phases in Lyre-Hoko Basin WRIA 19



Coho Salmon — Virtually all accessible stream tributaries in the Lyre-Hoko basin are utilized by coho salmon. Spawning occurs in almost every stream where suitable gravel is found. Major coho production watersheds include: Salt Creek, Lyre River, East and West Twin rivers, Deep Creek, Pysht River, Clallam River, Hoko River, and Sekiu River. Most of the other smaller tributaries to the Strait of Juan de Fuca also support coho salmon.

The Hoko River furnishes approximately one-third of the coho production water in the Lyre-Hoko basin and is accessible nearly to its source. Many miles of tributary streams are also available for coho spawning and rearing.

Excellent coho production waters are also found in the Pysht and Clallam river watersheds. These rivers and many of their tributaries are accessible to near their headwaters. Sekiu River formerly supported significant coho runs, but watershed damage in recent years has seriously reduced these runs.

Salt Creek has a good run of coho which spawn and rear throughout much of its length and its tributaries also support these fish. Coho production in the Lyre River is confined to the mainstem below Lyre Falls and the lower extremities of several tributaries.

Several other tributaries, including Deep Creek and East and West Twin rivers, collectively are important coho producers. Spawning occurs in the upper reaches of their accessible lengths as well as in several tributary streams. Several smaller watersheds, including Whiskey, Murdock, Field, Joe and Falls creeks, have barriers limiting coho usage to their lower reaches or restricting them completely.

Adult coho begin entering the streams in this basin in late September as their upstream migration is also highly keyed to fall precipitation. Spawning commences in mid-October and extends through January. Intra-gravel development extends from mid-October through late April and juvenile coho salmon, following an emergence from the gravel, remain in the stream for over one year. The out-migration of juvenile coho commences in mid-February of their second

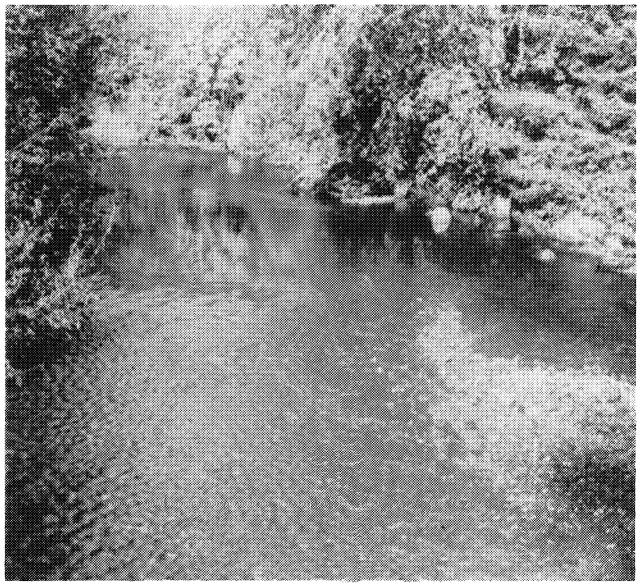


PHOTO 19-2. The small tributaries along the straits contain prime coho rearing habitat (lower Clallam River).

year and extends through mid-June.

During the 1966-1971 period, estimated coho escapements in the Lyre-Hoko basin ranged from 5,000 to 30,000 fish and averaged approximately 15,000, with the majority of these runs resulting from natural production.

Chum Salmon — Chum salmon production in the Lyre -Hoko basin is generally limited to the lower reaches of suitable spawning streams. Spawning in these areas is generally confined to the lower gradient stream sections, since this species is not as proficient in overcoming stream obstacles as chinook and coho, and seldom migrate as far upstream. Important chum production areas include: Deep Creek, East Twin, West Twin, Lyre, Pysht, and Hoko rivers and their lower tributaries. Small to moderate runs are also found in some of the smaller independent drainages.

In mid-October, chum salmon begin entering the spawning streams and the upstream migration continues through mid-January. Spawning commences in early November and extends through late January. By the end of March most of the fry have emerged from the gravel and are rearing in the streams. Chum salmon fry spend little time in fresh water and their migration to the salt water commences soon after emergence from the gravel. By early June, most juvenile chum salmon have left fresh water.

Estimated escapement of chum salmon during the 1966 through 1971 period ranged from 500 to 5,000 and averaged approximately 2,000 fish. All of this production is the result of natural propagation.

Pink Salmon — Pink salmon are not commonly found in the streams in the Lyre-Hoko basin, but occasional pink salmon catches have been recorded in the Sekiu and Hoko rivers and they have occasionally been seen in the Lyre River. Odd-year runs of pink salmon may infrequently enter other tributaries in the basin with the total basin spawning escapements believed to be in the range of 10 to 100 annually.

Salmon Production

A six-year base period, 1966 through 1971, has been selected for the presentation of all salmon production figures. This span of years is used for both natural and artificially produced fish, as well as escapement and harvest figures.

Natural production of salmon in the Lyre-Hoko watersheds provides 65,000 salmon annually to the various sport and commercial fisheries. In an average year, an estimated 18,000 chinook, chum, and coho return to spawn in the streams and rivers of the Lyre-Hoko basin. While plants of coho and chinook have augmented returns, the majority of this return has been the result of natural spawning.

The Department of Fisheries does not maintain artificial production facilities in the Lyre-Hoko basin. Juvenile salmon may be brought into the basin from hatcheries located outside — primarily the Dungeness and Soleduck hatcheries — for release within the streams. In 1966 through 1971 the Department of Fisheries planted 4,-308,000 chinook fry and fingerling (most of which received only short-term rearing prior to being planted), 720,000 coho fry, 1,115,000 coho yearling, and 189,000 chum fry.

PHOTO 19-3. A fishway created with existing stream materials provides access to good coho production area (Salt Creek).

Harvest

Salmon produced or reared in the Lyre-Hoko basin contribute to U.S. and Canadian ocean sport and commercial fisheries and the Strait of Juan de Fuca sport and commercial fisheries. The estimated total contribution (all species) to these various fisheries has in recent years ranged from 25,000 to 125,000 salmon. Specific tagging studies have not been conducted for streams in this area, therefore estimates of catch distribution are based on studies conducted with Puget Sound rivers. Adult salmon, particularly coho from the Lyre-Hoko area and tributaries of Puget Sound, are subjected to an intensive gill net and purse seine fishery in Canadian waters near the entrance to the Strait of Juan de Fuca. These fish also enter the Washington gill net and purse seine fisheries of the Strait south of the International border in the vicinity of Neah Bay. Commercial catches in this area have fluctuated over the years due to

PHOTO 19-4. Many ocean troll vessels operate out of Neah Bay.

regulation changes and have ranged from 36,663 to 267,159.

Sport fishermen land an average of 125,309 salmon annually from marine waters of the Lyre-Hoko basin. This includes landings at Sekiu, Pillar Point, and Neah Bay (Salmon Punch Card Areas 4 and 5). An average of 153,528 angler trips are made annually in pursuit of these fish, with large numbers of other desirable marine fishes also being harvested. Most of these fish are captured incidentally while fishing specifically for salmon. An unknown portion of those fish landed at Neah Bay are harvested from ocean waters outside the Strait of Juan de Fuca and south of Cape Flattery in marine waters of the Soleduck-Hoh area.

Fresh water salmon angling in the Lyre-Hoko area is permitted in Deep Creek, Clallam, East Twin, Hoko, Lyre, Pysht, and Sekiu rivers. Regulations allow the harvest of salmon between the lengths of 10 and 24 inches. This permits the harvest of "jack" salmon and precludes the taking of the larger adult spawners. The average annual catch of these smaller salmon in this area is 74 fish with virtually the entire catch being made in the Pysht River.

Within the Lyre-Hoko basin Indians claim fishing rights on streams within the Indian Reservation boundaries and on several non-reservation streams. Salmon are harvested with gill nets which are either drifted with the current or staked out in quieter pools or eddies. Dip nets, drag seines, and traps are also used. Most fishing occurs in the limited estuaries in the river mouths, but these fisheries are subject to tribal regulation only on reservation lands and to State regulation off-reservation for conservation purposes.

Indian fisheries are conducted annually on the Hoko and Sail rivers and intermittently on the Sekiu River. An average of 778 salmon are taken annually from these rivers, but catches were formerly much higher, particularly from the Hoko River.

TABLE 19.2 Salmon Escapement Level for the Lyre-Hoko Basin WRIA 19.

Species	1966-1971 Escapements Range	Average
Chinook	300— 3,000	1,000
Coho	5,000—30,000	15,000
Pink	10— 100	20
Chum	500— 5,000	2,000

Limiting Factors

Limiting factors refer to conditions that lead to a complete loss or reduction of the environment's fish production potential. They include only those conditions presently considered alterable. Major limiting factors include stream flow, physical barriers, water quality, limited spawning and rearing areas, and watershed development.

Stream flow — Seasonal flooding occurs frequently in each of the basin's drainages. Heavy rains from coastal ocean

storms are common in the Olympic mountain range, creating flash run-off conditions. Streambed scouring and sedimentation problems are the major limiting factors resulting from flooding in the Pysht, Hoko, and Sekiu rivers. Seasonal low flow conditions curtail salmon production by limiting the amount of rearing area available. This is particularly noticeable in the eastern segment of the Lyre-Hoko basin. The smaller tributaries and independent streams suffer the most serious fish losses since they dry up more quickly. Stream flow during late summer and fall affects the upstream migration of spawning salmon.

Physical barriers — Natural barriers blocking fish passage to upper stream reaches containing significant salmon production habitat are found on the Lyre River, East and West Twin rivers, and Deep Creek. Many natural cascades, minor falls, log jams, and beaver dams also occasionally inhibit or delay salmon migrations in the Lyre-Hoko basin. Logging debris clogging the water course has been a serious problem throughout the western portion of these Straits drainages and is particularly serious in the Sekiu and Hoko watersheds.

PHOTO 19-5. A log jam typical of those on the Sekiu and Hoko drainages.

Water quality — Water quality is generally good in the rivers draining to the Strait of Juan de Fuca. Excessive siltation is the major water quality deterrent in watersheds associated with extensive clear-cut logging and road construction.

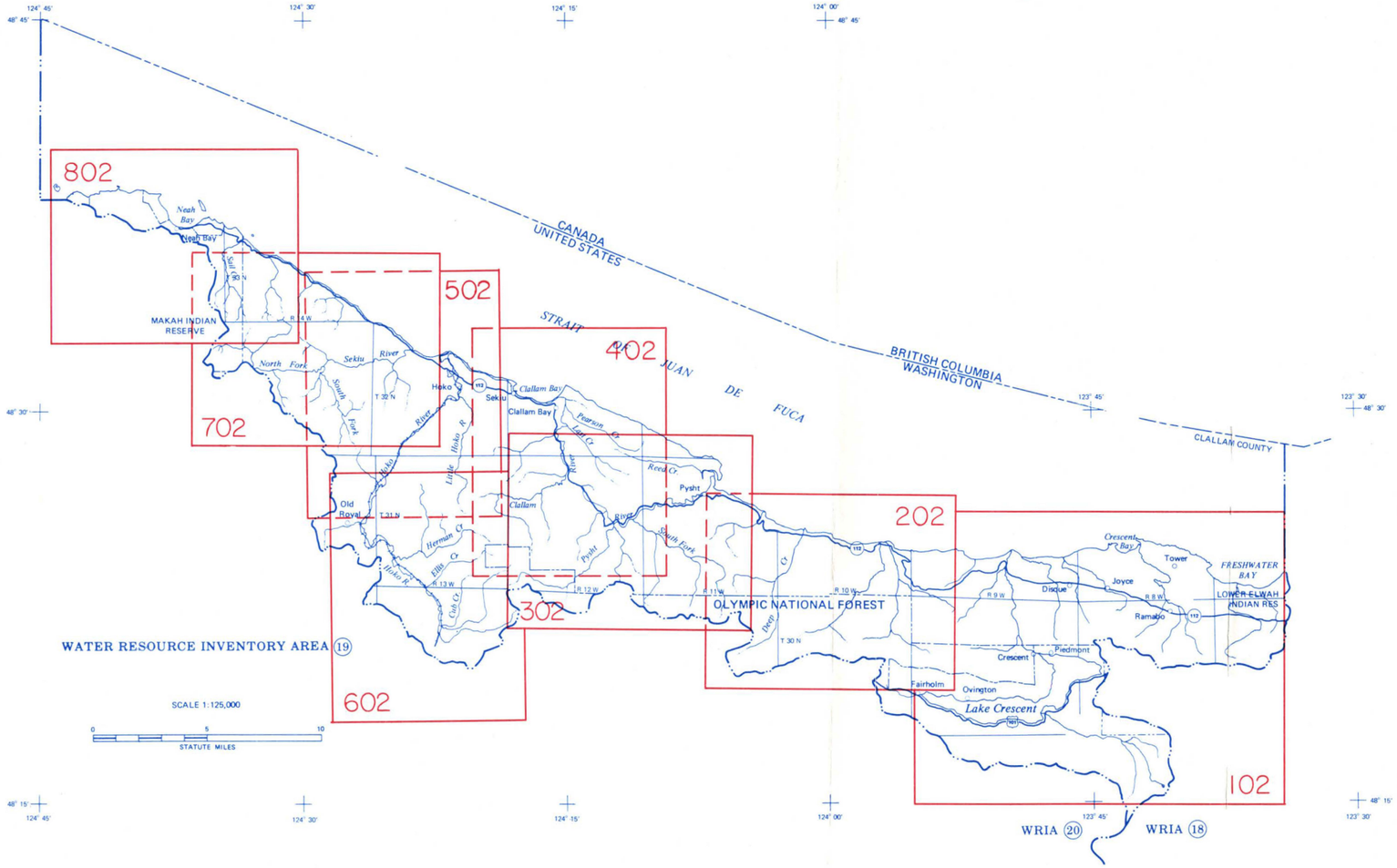
Limited spawning and rearing — Virtually all of the rivers and streams of the basin contained sufficient spawning and rearing area in their pristine condition. Logging activities and road construction have reduced much of the available fish production habitat through siltation, gravel compaction, and denuding stream banks, which eliminates shade and protection. The balance of pools and riffles is reduced or destroyed due to increased gradients and large boulders replacing good streambed gravels in the upper watersheds. At the mouths of rivers that enter directly into the Straits, the restrictive estuarial areas limit the rearing area used for conversion and feeding by juveniles moving seaward and likewise used by adults returning from marine waters to fresh water.

Watershed development — Development of riverfront property for summer and permanent homes has not been extensive due to the remoteness of this area. However, the recreational use of this basin's coastline and expansion of sport fishery centers such as Crescent and Agate beaches, Pillar Point, Sekiu, and Neah Bay will bring about greater demands for municipal water supplies and create water quality problems. Expanded highways into this area already are encroaching on the rivers and streams through channel changes, culverts, bridges, and gravel removals associated with these projects. Much of the watersheds have been extensively logged and new logging operations are continually being initiated. All these developments have some adverse effects on fish habitat and production.

LYRE-HOKO BASIN WRIA 19
Index to Key Maps

LYRE-HOKO BASIN

WRIA - 19



LYRE RIVER

This section describes a number of small- to medium-sized tributaries to the Strait of Juan de Fuca between Freshwater Bay and East Twin River. Major independent streams in this area are: Colville, Salt, Whiskey, Field, and Murdock creeks and Lyre River. The 11 streams in this section have a total length of 144.8 miles.

Stream Description

Salt Creek and the Lyre River are the principal drainages and flow in a northerly direction from the foothills of the Olympic Mountains through gradually broadening valleys to their confluence with the Strait of Juan de Fuca. They descend through mixed timber land with scattered rural and farm residences in the lower valleys. The headwaters of the Lyre River above mile 5.2, which is formed by Lake Crescent, lie completely within the Olympic National Park.

These two streams have low to moderate gradients below the fish barriers. Good bank cover is present in the mixed timber areas with fair cover in the farming areas. Salt Creek has a predominantly gravel bottom and averages four yards in width. The Lyre River averages 15 yards in width with a predominantly rubble and gravel stream bottom below the falls at mile 2.7. These streams have an excellent pool-riffle ratio providing a good salmon producing area. Above the falls to Lake Crescent the stream gradient is low and the stream offers excellent spawning and rearing potential. Lake Crescent is 624 feet deep with a surface area of 5,127 acres. The lake has a very precipitous shoreline except at both ends. Cascades or falls prevail on many of the tributaries of the lake in the vicinity of their mouths.

Most of the tributary streams to the Lyre River below Lake Crescent and in Salt Creek have steep gradients in the headwaters and moderate gradients in the lower areas. They also contain pool and riffle areas suited for salmonid production with excellent bank cover of mixed timber and excellent gravel stream bottoms. These streams average from one to five yards in width.

The other independent tributaries; Colville, Whiskey, and Murdock creeks, and some unnamed streams have blocks in the vicinity of their mouths which prevent anadromous fish passage upstream. These streams are of limited value for salmon production.

Salmon Utilization

The Lyre River supports runs of coho, chum, and a limited number of chinook and pink salmon. Major chum spawning areas exist below State Highway 112 and the lower reaches of Susie Creek. Coho spawn in the accessible areas of the tributaries and above Highway 112 while chinook and pink utilize the entire mainstem below the falls.

Salt Creek and its tributaries support an excellent run of coho throughout much of the watershed and a limited run of chinook and chum below mile 0.35. Major coho spawning areas are found in Salt Creek between mile 3.5 and 6.4 and in the lower reaches of the tributaries. Of the approximately 145 miles of streams in this section, only 17.0 miles are presently in salmon production.

Limiting Factors

The principal limiting factors include low summer flows, siltation of spawning areas, falls on Field Creek and Lyre River, and a dam on Salt Creek.

The steep stream gradient found in Colville, Whiskey, Murdock, and several other small unnamed tributaries limits access for adult migration to a short reach above their confluence with the Straits.

Beneficial Developments

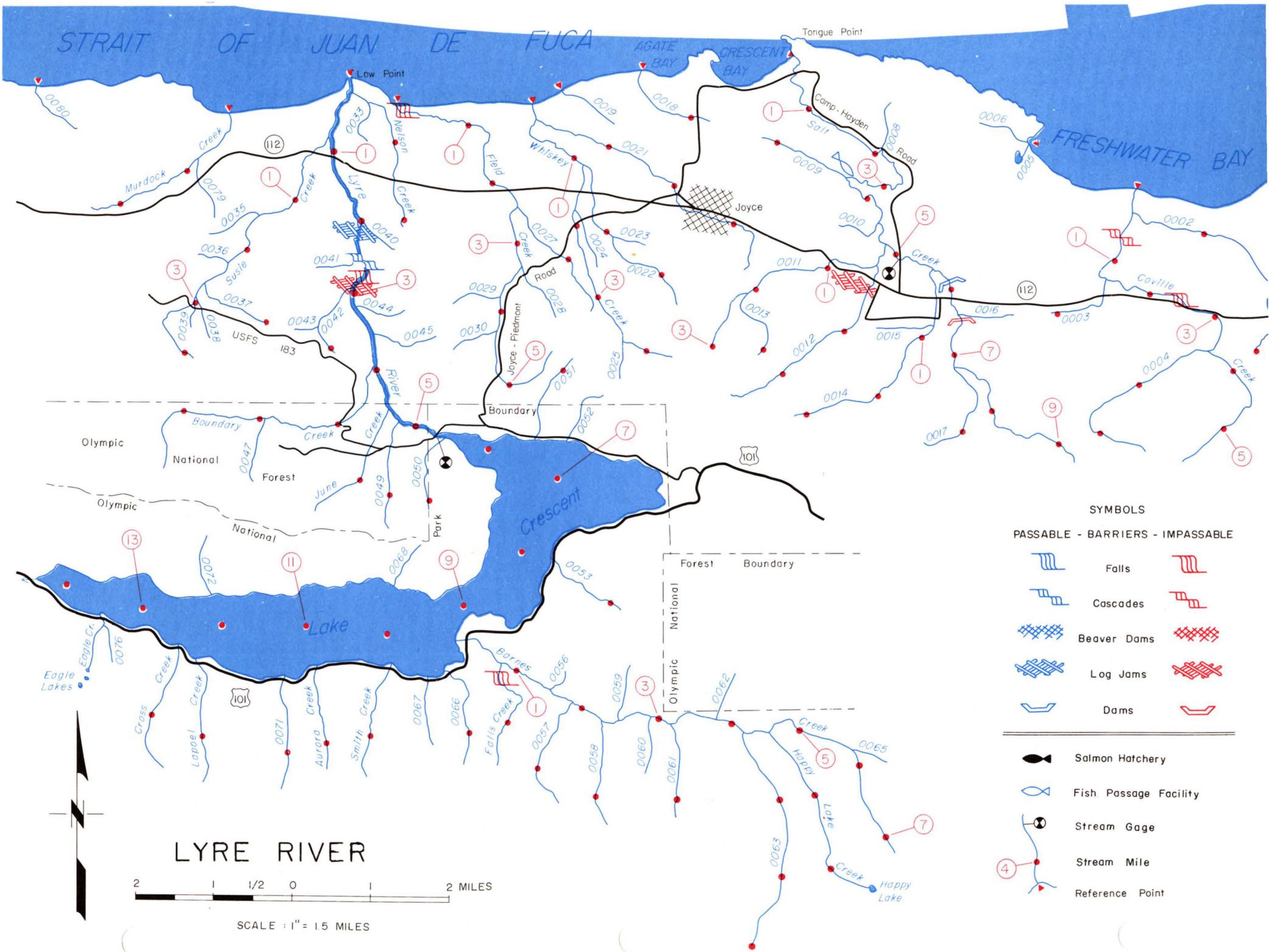
Log and debris jams have been removed throughout the drainage system to assist salmon migration. To provide passage for coho salmon to the headwaters, a fish ladder was constructed in 1963 on Salt Creek at mile 3.5. A baffled culvert on a Salt Creek tributary assures access to upper spawning areas.

Habitat Needs

Major requirements for maintaining the fish production in this drainage system includes preserving the existing stream bank cover, preventing additional gravel removal projects, and the incorporation of improved logging methods to control siltation and erosion from road construction.

The fish ladder on Salt Creek should be redesigned to establish better passage conditions at all flow levels.Channel clearance should be undertaken on some streams to provide access to all potential spawning areas.

PHOTO 19-6. Mouth of Lyre River on Strait of Juan de Fuca.


STRAIT OF JUAN DE FUCA
Tongue Point
AGATE BAY
CRESCENT BAY
FRESHWATER BAY
Low Point
Camp - Hayden Road
Joyce
Joyce - Piedmont Road
USFS 183
Boundary
Olympic National Forest
Olympic National Park
Forest Boundary
Olympic National Forest
Crescent Lake
Eagle Lakes
Happy Lake
Murdock Creek
Susie Creek
Lyre River
Nelson Creek
Field Creek
Whiskey Creek
Salt Creek
Coville Creek
June Creek
Barnes Creek
Cross Creek
Lapael Creek
Aurora Creek
Smith Creek
Falls Creek
Happy Lake Creek
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SYMBOLS
PASSABLE - BARRIERS - IMPASSABLE
Falls
Cascades
Beaver Dams
Log Jams
Dams
Salmon Hatchery
Fish Passage Facility
Stream Gage
Stream Mile
Reference Point
LYRE RIVER
2 1 1/2 0 1 2 MILES
SCALE : 1" = 1.5 MILES

LYRE RIVER
Lyre-Hoko Basin — WRIA 19

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0001	Coville Creek	NW¼,Sec32, T31N,R7W	5.8	9.94	None
0002	Unnamed	RB-0.3	3.0	—	None
0003	Unnamed	LB-1.4	1.1	—	None
0004	Unnamed	LB-3.6	2.6	—	None
0007	Salt Creek	E½,Sec21, T31N,R8W	9.3	—	Coho, Chinook, Chum
0009	Unnamed	LB-3.6	1.2	—	Coho
0011	Unnamed	LB-4.85	3.0	—	Coho
0012	Unnamed	RB-0.3	2.8	—	Coho
0013	Unnamed	RB-2.1	1.1	—	Unknown
0014	Unnamed	LB-5.6	3.1	—	Coho
0017	Unnamed	LB-7.2	1.6	—	None
0018	Unnamed	SW¼,Sec19, T31N,R8W	1.3	—	Unknown
0020	Whiskey Creek	NW¼,Sec25, T31N,R9W	4.3	6.65	Coho
0021	Unnamed	RB-0.2	3.8	—	Coho
0022	Unnamed	RB-1.2	2.4	—	Unknown
0026	Field Creek	NW¼,NE¼,Sec27, T31N,R9W	5.8	4.67	Coho
0027	Unnamed	RB-2.5	1.8	—	None
0031	Lyre River	SW¼,Sec22, T31N,R9W	16.8	66.1	Coho, Chin., Chum,Pink
0032	Nelson Creek	RB-0.2	2.2	—	Coho, Chum
0034	Susie Creek	LB-0.8	4.2	3.59	Coho, Chum
0037	Unnamed	RB-2.7	1.0	—	Unknown
0042	Unnamed	LB-2.9	1.1	—	Unknown
0046	Boundary Creek	LB-4.0	3.8	—	None
0048	June Creek	LB-4.6	1.7	—	None
0049	Unnamed	LB-4.8	1.4	—	None
	Lake Cresent	Outlet-5.3			None
0050	Unnamed	LB-5.4	1.1	—	None
0051	Unnamed	RB-6.5	1.2	—	None
0053	Unnamed	RB-7.9	1.2	—	None
0054	Barnes Creek	RB-9.3	7.2	15.7	None
0055	Falls Creek	LB-0.8	1.7	—	None

LYRE RIVER
Lyre-Hoko Basin — WRIA 19

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0057	Unnamed	LB-1.85	1.6	—	None
0058	Unnamed	LB-2.3	1.4	—	None
0061	Unnamed	LB-3.2	1.2	—	None
0063	Unnamed	LB-4.2	3.0	—	None
0064	Happy Lake Creek	LB-4.5	2.6	—	None
0066	Unnamed	RB-9.4	1.4	—	None
0069	Smith Creek	RB-9.9	1.6	—	None
0070	Aurora Creek	RB-10.8	1.3	—	None
0071	Unnamed	RB-11.1	1.5	—	None
0073	Lapoel Creek	RB-12.3	1.6	—	None
0074	Cross Creek	RB-12.5	1.8	—	None
0078	Murdock Creek	N½,Sec29, T31N,R9W	2.4	2.83	None

TWIN RIVERS

This section covers a number of small tributaries to the Strait of Juan de Fuca between Murdock Creek and Pysht River. These 7 independent streams contain a total of 64.8 stream miles.

Stream Discussion

The major fish production streams to be discussed in this drainage area include East Twin, West Twin rivers, and Deep Creek. The three streams are very similar in both physical characteristics and local land use. They originate in the foothills of the Olympic Mountains and flow in a northerly direction from the Olympic National Forest to the Straits through private timber farms composed of mixed timber, deciduous brush, and clear-cut areas. Gradients are moderate to steep throughout and stream widths generally average between 3 to 9 yards. Stream bank cover is adequate throughout the watershed except in recently clear-cut areas.

Streambed composition is predominantly gravel and rubble with an occasional outcropping of bedrock. Siltation of gravel is minimal.

Fair spawning area is found in all three streams for coho and chum. Pool-riffle balance is fair to good with numerous riffles, good clean gravel, and some rapids.

Tributaries to Deep Creek and East and West Twin rivers, and drainages of Joe and Jim creeks are very similar with good stream bank cover, moderate to steep gradient, fair pool-riffle balance, and predominantly gravel and sand streambeds. The streams average one to three yards in width with ample spawning area for coho and chum. Land use is primarily mixed timber and deciduous brush owned by private timber companies or by the state.

Salmon Utilization

East and West Twin rivers, and Joe and Jim creeks all support important runs of coho and a small run of chum. Deep Creek has significant runs of chum and coho. Coho production occurs in virtually all the accessible streams of the watershed. The major coho spawning areas are located on the West and East Twin rivers below mile 4.2 and 3.4, respectively, and in Deep Creek. The major chum spawning area is confined to the lower one mile of Deep Creek. Of the approximate 65 linear miles of streams in this section, over 22 miles are available for anadromous fish use.

Limiting Factors

The principal factors limiting salmon production in the section include falls on East and West Twin rivers which block all salmon passage and the occurrence of low summer flows. Flooding in the lower reaches of Deep Creek and East Twin River, bank erosion, clear-cut logging and associated road building further limit salmon production. Numerous log jams and steep gradient condition in the tributaries restrict salmon production throughout the watersheds.

Beneficial Development

Several minor log jams have been removed from Deep Creek and East Twin River. No other projects have been undertaken within the drainage which directly benefit salmon production.

Habitat Needs

Preserving the existing stream bank cover and curtailment of gravel siltation from improper road construction are major requirements for maintaining the coho and chum runs in the drainage. Also, there is a definite need to see that all logging operations are performed in a careful manner. Existing log debris jams should be removed to provide access to all potential spawning areas. Removal of the existing falls on East and West Twin Rivers would provide access to additional spawning and rearing area. The cost of these projects has not been determined.

It may be necessary to restrict issuance of further water rights because of low flow periods in the summer months.

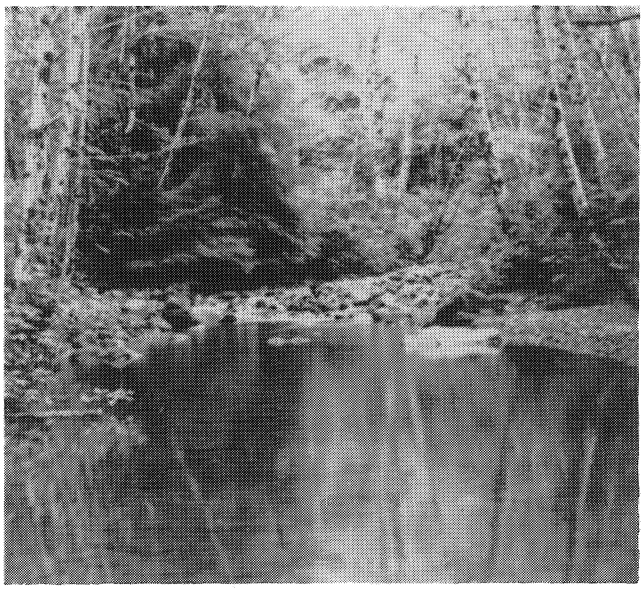
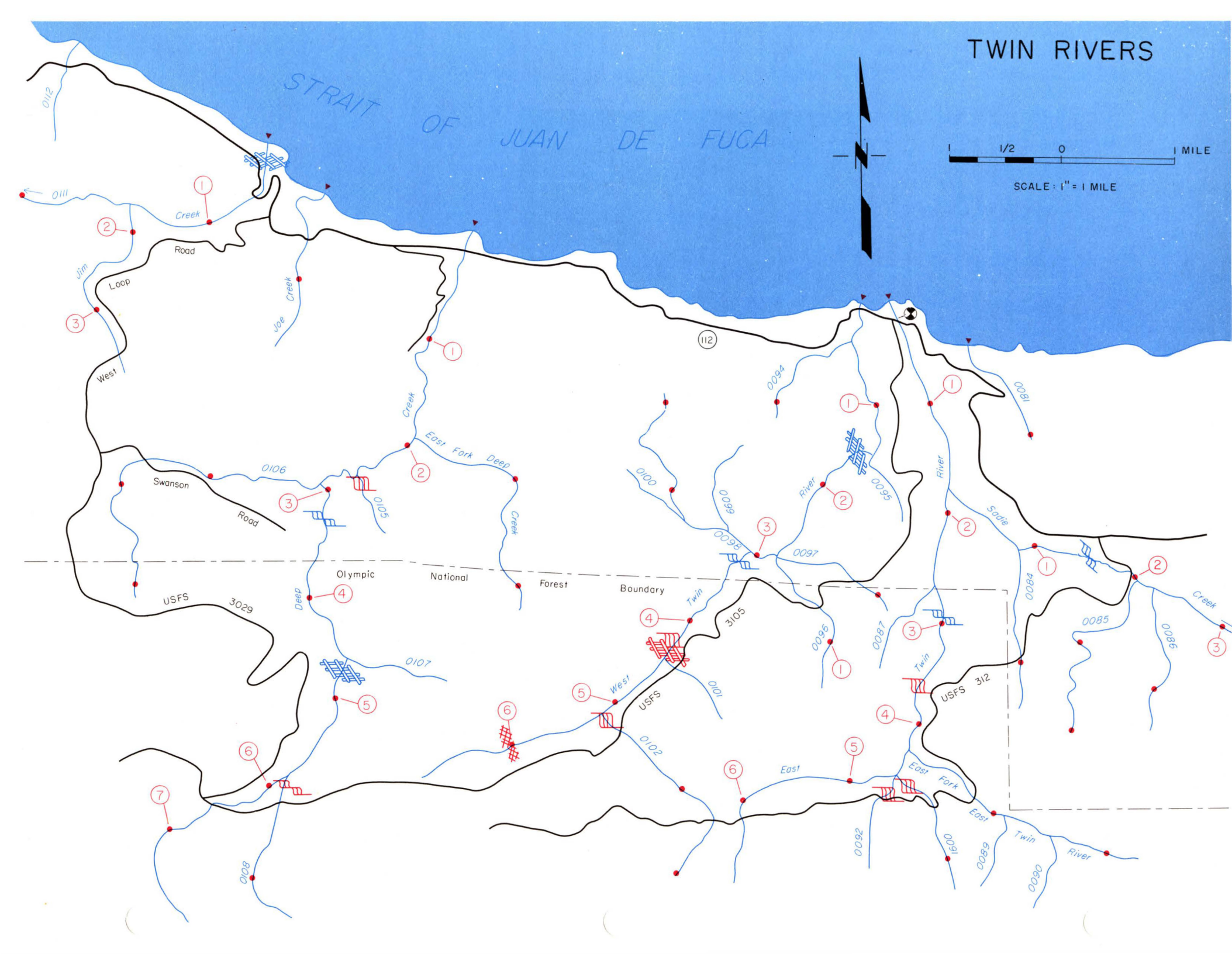


PHOTO 19-7. Quiet pool area on East Twin River.


TWIN RIVERS
STRAIT OF JUAN DE FUCA
1 1/2 0 1 MILE
SCALE: 1" = 1 MILE
0112
0111
Creek
Jim
Loop
Road
West
Joe
Creek
112
Creek
East Fork Deep
Creek
0106
Swanson
Road
0105
Deep
Olympic
National
Forest
Boundary
USFS
3029
0107
0094
0100
0099
0098
0095
River
0097
Twin
3105
0096
0087
0101
West
USFS
0102
East
East Fork
East
Twin
River
0092
0091
0089
0090
0081
River
Sodie
0084
0085
0086
Creek
Twin
USFS
312
0108

TWIN RIVERS
Lyre-Hoko Basin — WRIA 19

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0081	Unnamed	SE¼,Sec24, T31N,R10W	1.0	—	Unknown
0082	East Twin River	NE¼,SE¼,Sec23, T31N,R10W	6.7	14.0	Coho, Chum
0083	Sadie Creek	RB-1.75	3.5	—	Coho
0084	Unnamed	LB-0.85	1.4	—	Coho
0085	Unnamed	LB-2.05	2.0	—	Coho
0086	Unnamed	LB-2.2	1.5	—	Coho
0088	E. Fk. E. Twin River	RB-4.3	2.4	—	None
0091	Unnamed	RB-4.55	1.3	—	None
0093	West Twin River	NW¼,SE¼,Sec23, T31N,R10W	6.9	12.8	Coho, Chum
0094	Unnamed	LB-0.35	1.1	—	Coho
0096	Unnamed	RB-2.8	1.4	—	Unknown
0097	Unnamed	RB-0.01	1.2	—	Unknown
0098	Unnamed	LB-3.1	2.1	—	Unknown
0102	Unnamed	RB-5.2	2.0	—	None
0103	Deep Creek	NW¼,Sec20, T31N,R10W	7.9	17.3	Coho, Chum
0104	E. Fk. Deep Creek	RB-1.9	2.2	—	Coho
0106	Unnamed	LB-2.9	3.1	—	Coho
0108	Unnamed	RB-5.8	1.5	—	None
0109	Joe Creek	SE¼,Sec13, T31N,R11W	1.6	—	Coho
0110	Jim Creek	NW¼,Sec13, T31N,R11W	3.6	—	Coho
0111	Unnamed	LB-1.75	1.4	—	Unknown

PYSHT RIVER

This section includes the entire Pysht River watershed of 44.4 square miles. The Pysht River is 16.3 miles long with 8 tributaries providing nearly 35.6 miles of tributary streams.

Stream Description

The Pysht River maintains a northeasterly course, starting in the foothills of the Olympic Mountains, and flows through a gradually broadening river valley to its confluence with the Straits of Juan de Fuca. Along this course, the Pysht River picks up a few small tributary streams, such as the South Fork Pysht River, Reed, Green, and Needham creeks.

Timber production occurs throughout the region from the headwaters to mouth with a few scattered homes and farms along the lower seven miles. A private tree farm borders the larger portion of the area with the U.S. Forest Service managing the headwaters of the Pysht River.

Gravel and sand dominate the streambed in the flat valleys of the lower 11 miles of the Pysht River and the lower 7 miles of the South Fork. The steeper gradient section in the upper Pysht and South Fork contain predominantly gravel and rubble with the South Fork having a few outcroppings of bedrock. The Reed Creek streambed which lies in a low flat valley, is primarily sand and has a low gradient. The other tributary streambeds are generally composed of gravel and have a moderate gradient. The stream channels in this area are generally confined within low cut banks on either side. There is no evidence of extensive artificial channelization. The streams provide a balance of pools and riffles suited for salmon production. The lower Pysht River has an average width of 12 yards in the summer and 20 yards in the winter. Tributary streams, in their lower reaches, range from one to eight yards in width. The stream bank cover throughout Pysht watershed is primarily deciduous brush and alders. The upper Pysht River had adequate bank cover but has been clear-cut logged or will be in the near future.

Salmon Utilization

The Pysht watershed supports runs of chinook, coho, and chum. Chinook spawning is generally confined to the lower 13 miles of the Pysht and the lower six miles of the South Fork. The South Fork and Pysht contain a number of pools suited for maturation of adults and supports juvenile coho and chinook. Coho production occurs in virtually all of the accessible reaches of the watershed. The major coho spawning areas are located on the upper South Fork and Pysht Rivers. The major chum production occurs in the Pysht River between river mile 4.0 and 10.0. Salmon presently utilize some 14.5 miles of the mainstem Pysht River and at least 23 miles of tributaries.

Limiting Factors

A few limiting factors affect salmon production in the Pysht River watershed. Stream flows during the summer months are typically low. Siltation of the spawning gravel throughout this watershed is moderate at the time, but may increase with more logging and road building. The Pysht River has a number of log jams which hinder upstream migration and occasionally extensive flooding and channel shifting occurs in the lower five miles. The upper tributaries contain numerous small log jams which may hinder coho migration.

Beneficial Developments

A few log jams have been removed from the watershed. No beneficial developments have been undertaken in this watershed specifically for salmon production or enhancement.

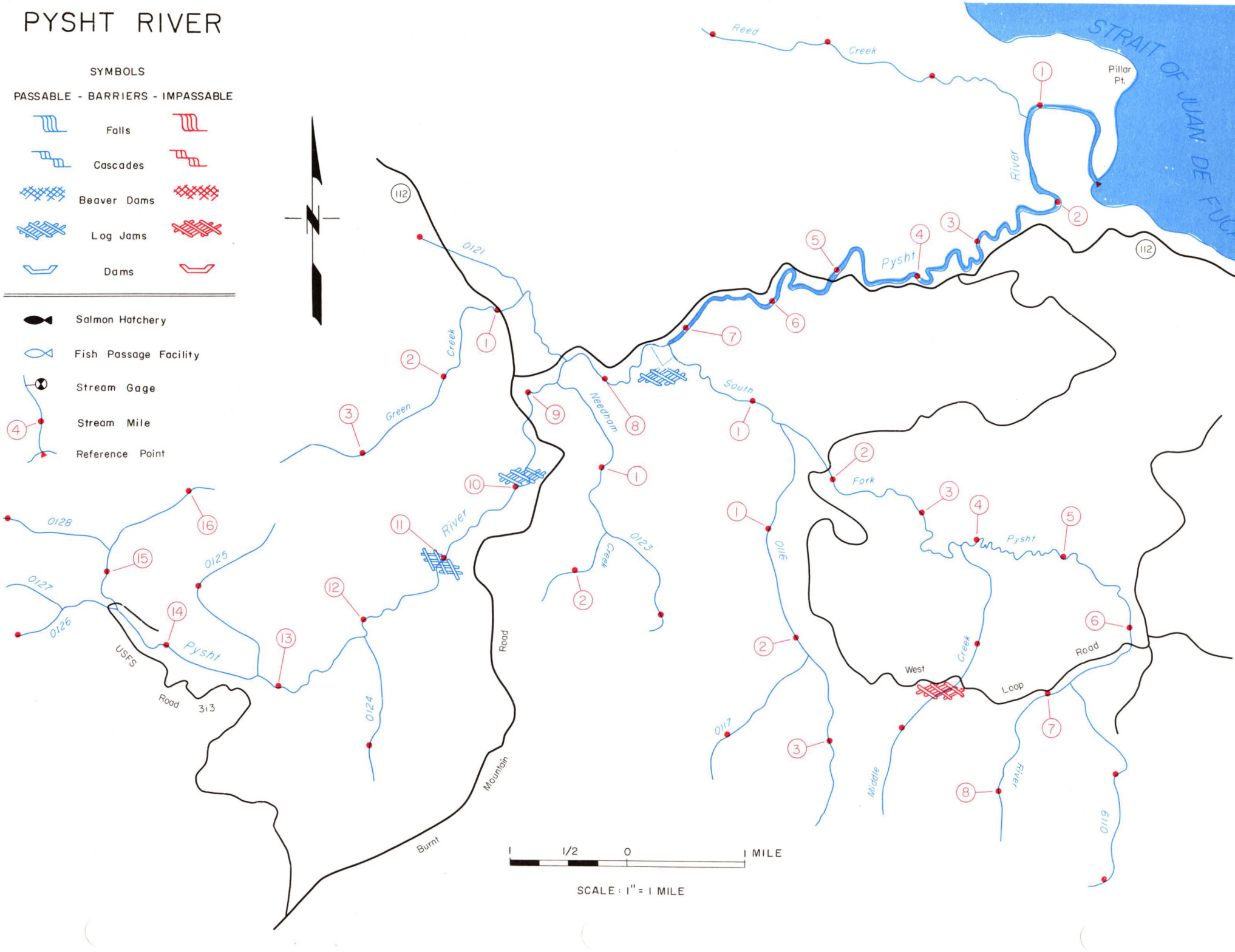
Habitat Needs

Due to low flow periods in the Pysht watershed, no further water rights should be allowed. Gravel cleaning techniques, when developed, may improve spawning gravel. Gravel removal operations should be restricted and the major log jams on the lower Pysht River should be removed.

The off-reservation Indian fishery should not be permitted on the Pysht River in order to maintain the small run of chum and chinook salmon. Further planting from hatcheries may be needed to rebuild chinook runs.

PHOTO 19-8. Extensive log jam on South Fork Pysht River.

PYSHT RIVER


SYMBOLS
PASSABLE - BARRIERS - IMPASSABLE
Falls
Cascades
Beaver Dams
Log Jams
Dams
Salmon Hatchery
Fish Passage Facility
Stream Gage
Stream Mile
Reference Point
Reed
Creek
Pillar Pt.
STRAIT OF JUAN DE FUCA
River
Pysht
112
0121
Green
Creek
Needham
South
Fork
0123
0116
0128
0125
0127
0126
USFS
Road
313
Pysht
River
Road
Burnt
Mountain
0124
0117
West
Creek
Middle
River
Loop
Road
0119
1/2
0
1 MILE
SCALE: 1" = 1 MILE

PYSHT RIVER
Lyre-Hoko Basin — WRIA 19

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0113	Pysht River	N½,NW¼,Sec10, T31N,R11W	16.3	44.4	Chin.,Coho,Chum
0114	Reed Creek	LB-1.2	3.1	—	Coho
0115	S. Fk. Pysht River	RB-7.2	8.4	15.9	Coho,Chin.,Chum
0116	Unnamed	LB-1.3	3.8	—	Coho
0117	Unnamed	LB-2.2	1.4	—	Unknown
0118	Middle Creek	LB-3.8	2.8	—	Coho
0119	Unnamed	RB-6.8	2.1	—	Unknown
0120	Green Creek	LB-8.5	3.7	—	Coho, Chum
0121	Unnamed	LB-0.8	1.0	—	Coho
0122	Needham Creek	RB-8.7	2.4	—	Coho
0123	Unnamed	RB-1.5	1.2	—	Unknown
0124	Unnamed	RB-12.1	1.3	—	Unknown
0125	Unnamed	LB-13.2	1.9	—	Unknown
0126	Unnamed	RB-14.6	1.0	—	None
0128	Unnamed	RB-15.3	1.0	—	None

CLALLAM RIVER

This section describes the Clallam River watershed and one independent stream, Falls Creek. The Clallam River is 13.4 miles in length with 9 tributaries containing nearly 30.3 linear miles in 31.6 square miles of watershed.

Stream Description

The Clallam River flows northerly from the foothills of the Olympic Mountains through coniferous timber and logged-off hills for 4.5 miles. The river then flows easterly for four miles through narrow valleys forested with mixed timber and brush and box canyons. Just below Blowder Creek the river flows north to the Strait of Juan de Fuca through a broad flat valley of pasture land and scattered farms. The community of Clallam Bay lies at the mouth.

Major tributaries along the course include Charley, Last, and Pearson creeks plus several smaller unnamed streams.

The streams in the area generally have a low gradient, except in their headwaters. Fair bank cover is found along the pasture lands and good bank cover along the mixed timber areas. The clear-cut areas of the headwaters have poor bank cover.

The Clallam River streambed has predominantly small gravel and sand below Charley Creek and averages 10 yards in width. Above Charley Creek the river ranges from 2 to 8 yards in width with gravel and rubble the predominant bottom characteristics with large amounts of bedrock and boulders in places. Charley Creek averages between 2 to 5 yards in width and the streambed is predominantly gravel and sand. Streambeds in the other tributaries are generally composed of gravel and rubble with scattered outcropping of boulders and bedrock. These streams are usually less than five yards wide and have numerous minor log jams.

The Clallam River has undergone some artificial channelization due to highway relocation. The streams in the watershed generally provide a fine balance of pools and riffles which are suited for salmon production. However, the stream is predominantly rapid in some areas.

Salmon Utilization

The Clallam River supports a run of coho and possibly a limited number of chinook and chum salmon. Chinook and chum spawning is probably confined to the lower six miles. Major coho spawning areas are in the upper reaches of the river and lower areas of accessible tributaries. The Clallam River watershed provides good rearing area for coho. Falls Creek formerly supported a chum salmon run. Salmon presently utilize over 12 miles of the mainstem Clallam River and at least 12 linear miles of tributaries.

Limiting Factors

An intermittent build-up of a sand bar at the mouth of the Clallam River frequently hinders upstream migration. Low flows in the summer months and numerous log jams throughout the watershed limit salmon production. Coho spawning area is limited by extensive bedrock areas in the headwaters. A falls on Blowder and Falls Creek limit salmon production to their extreme lower reaches.

Spawning gravel in the lower reaches of the Clallam River, Charley, Last, and Pearson creeks suffers from heavy siltation. The upper watershed may have a problem of siltation in the near future with the onslaught of road construction and clear-cut logging. Bank erosion and flooding in the lower 3.5 miles of the river occurs each year.

Beneficial Developments

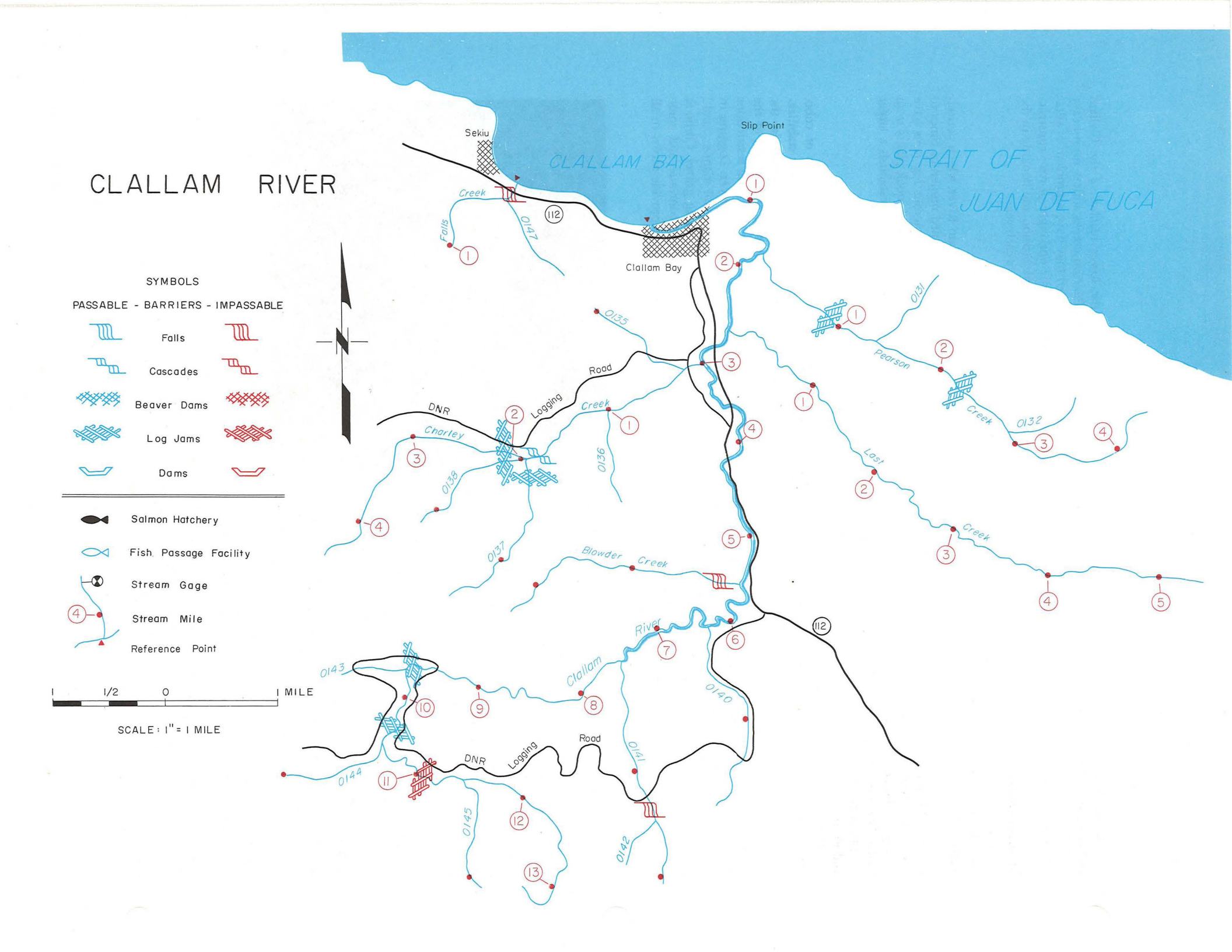
A sand bar at the mouth of Clallam River, which periodically closes the mouth, has been opened numerous times to assure upstream adult migration. Numerous log jams have been removed over the years. Coho and chinook plants from the Soleduck hatchery are being made to establish a larger salmon return.

Habitat Needs

Clallam River presently supports a fair run of coho. Maintenance of this run depends on stream bank stabilization to control erosion, sewage disposal controls in the community of Clallam Bay, stabilization and control of the sand bar build up at the mouth of the river, and restrictions on water diversion allowed on the upper river. Logging in the headwaters, if not conducted in a careful manner, could result in further siltation of the spawning gravel. Chinook and coho fry or smolt plants should continue and some channel clearance may be necessary to provide access to all of the potential spawning areas.

PHOTO 19-9. Typical section in middle reach of Clallam River.

CLALLAM RIVER



CLALLAM RIVER
Lyre-Hoko Basin — WRIA 19

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0129	Clallam River	SE¼,Sec20, T32N,R12W	13.4	31.6	Coho,Chin.,Chum
0130	Pearson Creek	RB-1.7	4.5	—	Coho
0133	Last Creek	RB-2.6	5.4	—	Coho
0134	Charley Creek	LB-3.0	4.5	—	Coho
0135	Unnamed	LB-0.2	1.0	—	Coho
0137	Unnamed	RB-2.0	1.6	—	Unknown
0138	Unnamed	RB-2.01	1.2	—	Unknown
0139	Blowder Creek	LB-5.4	2.4	—	Coho
0140	Unnamed	RB-6.3	1.9	—	Coho
0141	Unnamed	RB-7.5	2.1	—	Coho
0144	Unnamed	LB-10.5	1.0	—	Unknown
0145	Unnamed	LB-11.4	1.2	—	Unknown
0146	Falls Creek	N½,Sec19, T32N,R12W	1.0	—	Chum

LOWER HOKO RIVER

The lower Hoko River drainage consists of 10.2 miles of mainstem with 9 tributaries providing an additional 33.4 miles of tributaries. The upper reaches of the Hoko are discussed in section 600.

Stream Description

From stream mile 10.2, about 2 miles north of Hoko Camp, the Hoko River meanders northeasterly for more than 6.8 miles, to the Little Hoko River, and from there flows north to Kydaka Point on the Strait of Juan de Fuca. Seven minor tributaries and one major tributary, the Little Hoko River, enter the Hoko River in this reach.

The Hoko River flows through moderately sloped terrain of coniferous timberland which is presently being logged by clear-cutting methods. Intermittent sections of adjacent land in the lower three miles have been cleared for farm houses and grazing land for cattle.

The mainstem Hoko River has a low gradient and an adequate pool and riffle balance. The streambed is primarily composed of gravel and rubble with moderate silt. The stream channel averages 20 to 30 yards in width with numerous clean gravel riffles. The immediate stream bank cover, consisting mainly of stands of deciduous and coniferous timber, is adequate. Stream banks consist primarily of broad, gently sloping gravel beaches, and low sloped earth banks. In the lower three miles stream banks are occasionally high, steep, and erosive.

The Little Hoko River has two distinctly different stream characteristics in the watershed. Above mile 3.5, the stream flows through moderate to steep hillsides, covered with coniferous timber and scattered logging projects. The gradient ranges from moderately steep to steep over a very coarse streambed. Bank cover is heavy in places and very poor in recently logged areas. From a falls at mile 3.8 upstream, the area is unaccessible to anadromous fish. In the area below mile 3.5 the river flows through moderate to gently sloping hillsides covered with mixed timber and deciduous brush. The river then breaks into a broadening flat valley of pasture land to its confluence with the Hoko River. The low gradient streambed is predominantly rubble and gravel between mile 3.5 and 1.2 and existing stream bank cover is adequate. The area below mile 1.2 has a low gradient, poor stream bank cover, and a predominantly gravel and sand streambed. The stream averages three to eight yards in width below the falls.

Other tributaries throughout the lower Hoko and Little Hoko River, below the falls, are predominantly gravel and sand streambeds with moderate gradients and fair to good stream bank cover. Most of them are utilized by salmon. The stream channels average between one and five yards in width.

Salmon Utilization

The lower Hoko River watershed supports runs of chinook, coho, and chum salmon. Fall chinook and chum utilize the mainstem Hoko River and Little Hoko River. Coho and chum utilize the lower reaches of Brownes and Ossert creeks, and unnamed tributaries to the Little Hoko and Hoko rivers. Information on chum run size is fragmentary but the total escapement is well below what we consider the optimum spawning level. Major fall chinook spawning area is located between the mouth of the Little Hoko and the falls. This area along with the upper area, discussed in Lyre-Hoko 600, provides some of the finest chinook spawning area on the north and west slopes of the Olympic Peninsula. Adult spring chinook migrate up the Hoko River to the spawning grounds primarily above Hoko Falls and juveniles may utilize the entire reach. Salmon utilize at least 18 linear miles of stream in this drainage for spawning and rearing.

Limiting Factors

Factors limiting salmon production in this section include low summer flows, both in the main channel and feeder streams, removal of streambed gravel, siltation of gravel bars, and the unrestricted Indian gill net fishery in the lower four miles of the river. Other factors include the impassable falls on Brownes Creek and Little Hoko River, flooding in the lower miles of the Little Hoko River, gradient changes in tributaries, and certain logging and road construction practices. Most of the tributaries contain numerous small log jams which may hinder coho production.

Beneficial Developments

A few log jams have been removed in this section of the watershed. No beneficial developments have been undertaken in this section of the watershed specifically for salmon production or enhancement.

Habitat Needs

Due to low flow periods on the lower Hoko watershed, issuance of future water rights should be restricted. Gravel removal operations should be prohibited and minor log jams removed from unnamed tributaries.

To maintain the runs of salmon, an unrestricted Indian fishery should not be permitted on the Hoko River. Further planting from hatcheries may be needed to enhance existing salmon runs.

The use of buffer strips in areas to be logged in the future would benefit anadromous fish.

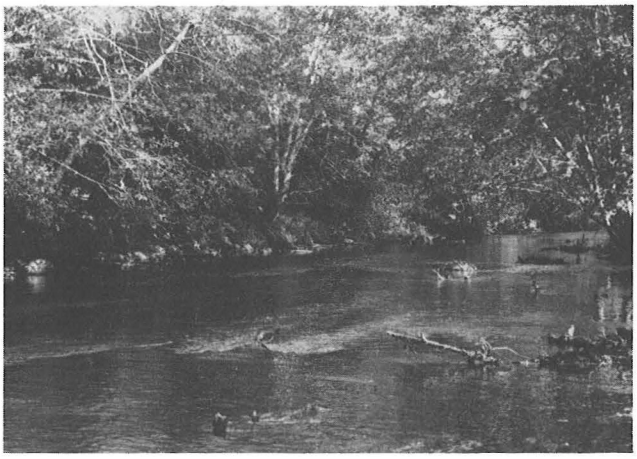
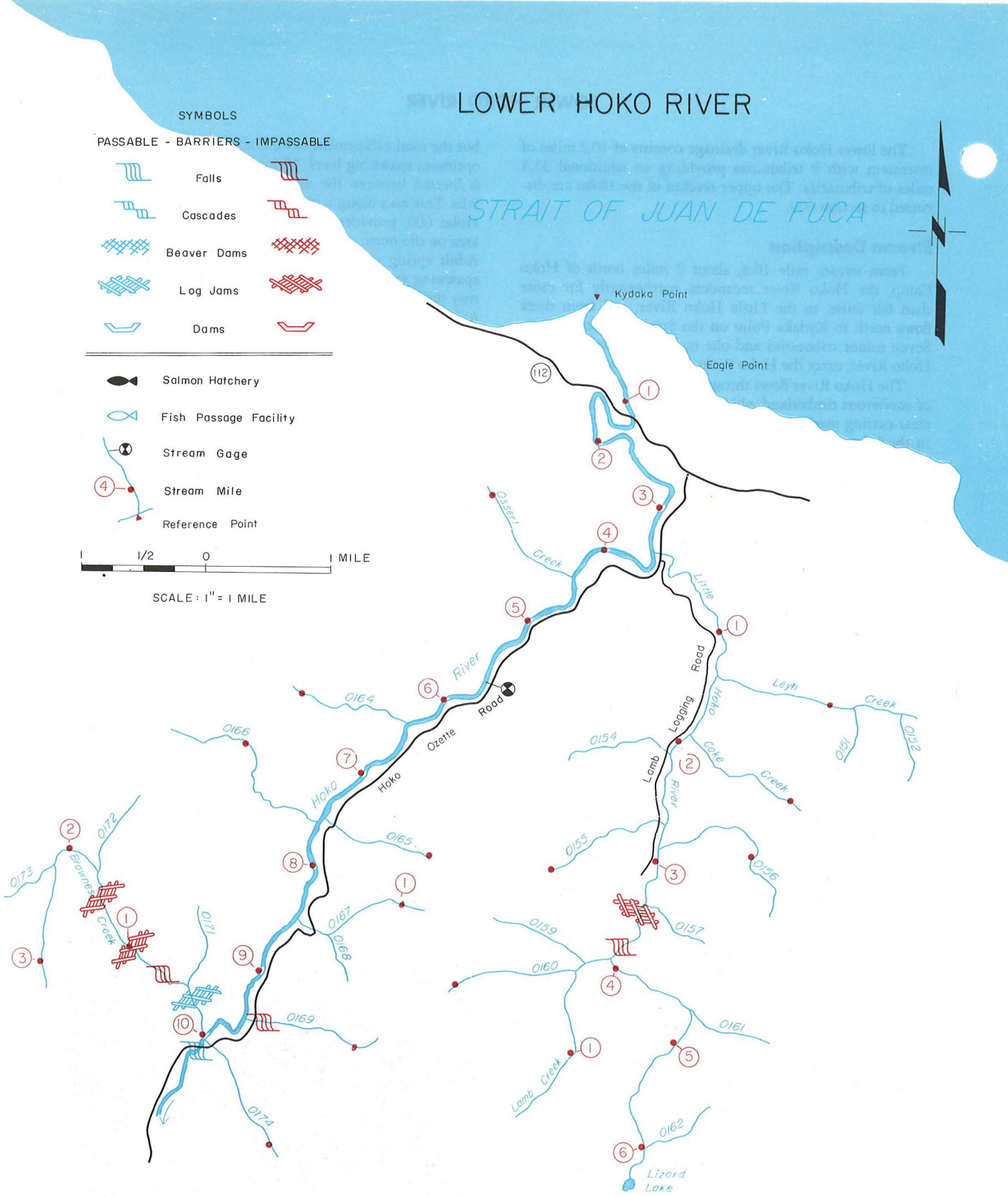


PHOTO 19-10. Immediately below falls on Hoko River on Ozette Road.


LOWER HOKO RIVER
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
STRAIT OF JUAN DE FUCA
Kydaka Point
Eagle Point
112
Ossert Creek
Hoko River
Hoko Ozette Road
Little Hoko
Logging Road
Leyh Creek
Lamb River
Coke Creek
Lamb Creek
Lizard Lake
Browns Creek
0151
0152
0154
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LOWER HOKO RIVER
Lyre-Hoko Basin — WRIA 19

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0148	Hoko River	N½,Sec10, T32N,R13W	24.9	—	Chin.,Chum,Coho
0149	Little Hoko River	RB-3.4	6.3	11.5	Chum,Coho,Chin.
0150	Leyh Creek	RB-1.4	1.7	—	Coho
0153	Coke Creek	RB-1.9	1.1	—	Coho
0155	Unnamed	LB-2.7	1.0	—	Coho
0156	Unnamed	RB-2.9	1.6	—	Unknown
0158	Lamb Creek	LB-3.9	1.7	—	None
0160	Unnamed	LB-0.3	1.1	—	None
	Lizzard Lake	Outlet-6.3	—	—	
0163	Ossert Creek	LB-4.4	1.1	—	Coho, Chum
0164	Unnamed	LB-6.4	1.1	—	Coho
0165	Unnamed	RB-7.5	1.0	—	Coho
0166	Unnamed	LB-7.6	1.7	—	Coho
0167	Unnamed	RB-8.4	1.2	—	Coho
0169	Unnamed	RB-9.4	1.2	—	Coho
0170	Brownes Creek	LB-10.0	3.2	—	Coho, Chum
0174	Unnamed	RB-10.05	1.1	—	Coho
	(Cont. Lyre-Hoko 603)				

UPPER HOKO RIVER

This section describes 14.7 miles of upper mainstem Hoko River and 16 tributaries providing an additional 46.8 linear miles of stream. This drainage area covers 40.2 square miles. The lower Hoko watershed is discussed in Section 500.

Stream Description

The Hoko River begins in the foothills of the Olympic Mountains. From the headwaters the river flows westerly through steep, mixed timberland over a very coarse streambed of rubble and boulders for 3.5 miles. Numerous cascades limit the spawning potential in this upper reach. The middle reach of the river flows northwesterly for 7.3 miles through a broad flat valley of deciduous brush and timber. From mile 14.0, about three miles southeast of Hoko Camp, the river flows northerly through broad flat valleys covered with mixed timber. At the Hoko Camp the river enters a narrow canyon with steep walls, moderate to steep gradient, and several cascade areas including Hoko Falls.

Two private companies own the majority of land bordering the Hoko River with state ownership of scattered parcels and sections.

The Hoko River averages between 5 and 15 yards and 3 to 10 yards in width in the winter and summer, respectively. The streambed is predominantly gravel and rubble with some bedrock with light to moderate amounts of silt and sand. The upper Hoko River meanders a great deal, offering a low gradient with good to excellent pool-riffle balance. Stream bank cover is adequate throughout the watershed except in clear-cut areas.

A dozen minor unnamed tributaries and four major tributaries, Johnson, Herman, Ellis, and Bear creeks, enter the mainstem in this section. The unnamed tributaries and Johnson Creek are very similar with good stream bank cover, moderate to steep gradient in the headwaters, and low gradient in the lower reaches. Good pool-riffle balance and predominantly gravel and sand streambeds provide ample spawning areas for coho with stream widths averaging one to three yards. Much of the Ellis Creek drainage has been recently logged but is otherwise similar.

Herman and Bear creeks are very similar with moderate gradient in the lower two miles and steep gradients above. Their headwaters and tributaries have recently been clear-cut logged. The lower areas still have adequate bank cover of mixed timber. In the areas accessible to anadromous fish, streambeds are predominantly gravel and sand. Herman Creek has an average width of two to seven yards and Bear Creek, two to four yards during the summer months.

Salmon Utilization

The upper Hoko River watershed supports runs of spring chinook, chum, coho, and fall chinook. The mainstem of the Hoko above Hoko Falls provides excellent spawning and rearing habitat for spring chinook. The same area provides some of the finest fall chinook spawning area on the north and west slopes of the Olympic Peninsula. The mainstem, to mile 23.5, and the lower reaches of most tributaries provides some excellent coho spawning and rearing habitat. Major coho spawning areas include the lower reaches of Bear, Herman, and Johnson creeks and mainstem Hoko River from mile 19.0 to 22.7. Present coho production, based on abundance of juvenile fry, is less than half of the potential for the watershed. Spring and fall chinook escapement is well below what is considered the optimum spawning level. Salmon presently utilize 10 miles of the upper mainstem Hoko River and at least 14 miles of tributaries.

Limiting Factors

The principal factors limiting salmon production include low summer flows throughout the drainage system and the unrestricted Indian gill-net fishery in the lower four miles of the river. Falls on Herman Creek and its north branch stop anadromous fish movement to the headwaters, as do a series of cascades on Bear and Cub creeks. Log and debris jams, as well as poor culvert installation on numerous tributaries, hinder coho migration. Hoko Falls may impede adult migration at certain water flows.

Beneficial Developments

Log and debris jams have been removed throughout the drainage system to assist salmon migration. Hoko Falls was blasted with dynamite in 1952 and again in 1970 to aid passage of salmon into the upper watershed. Prior to 1952 the falls partially blocked upstream movement of coho and chum and may have completely blocked fall chinook passage.

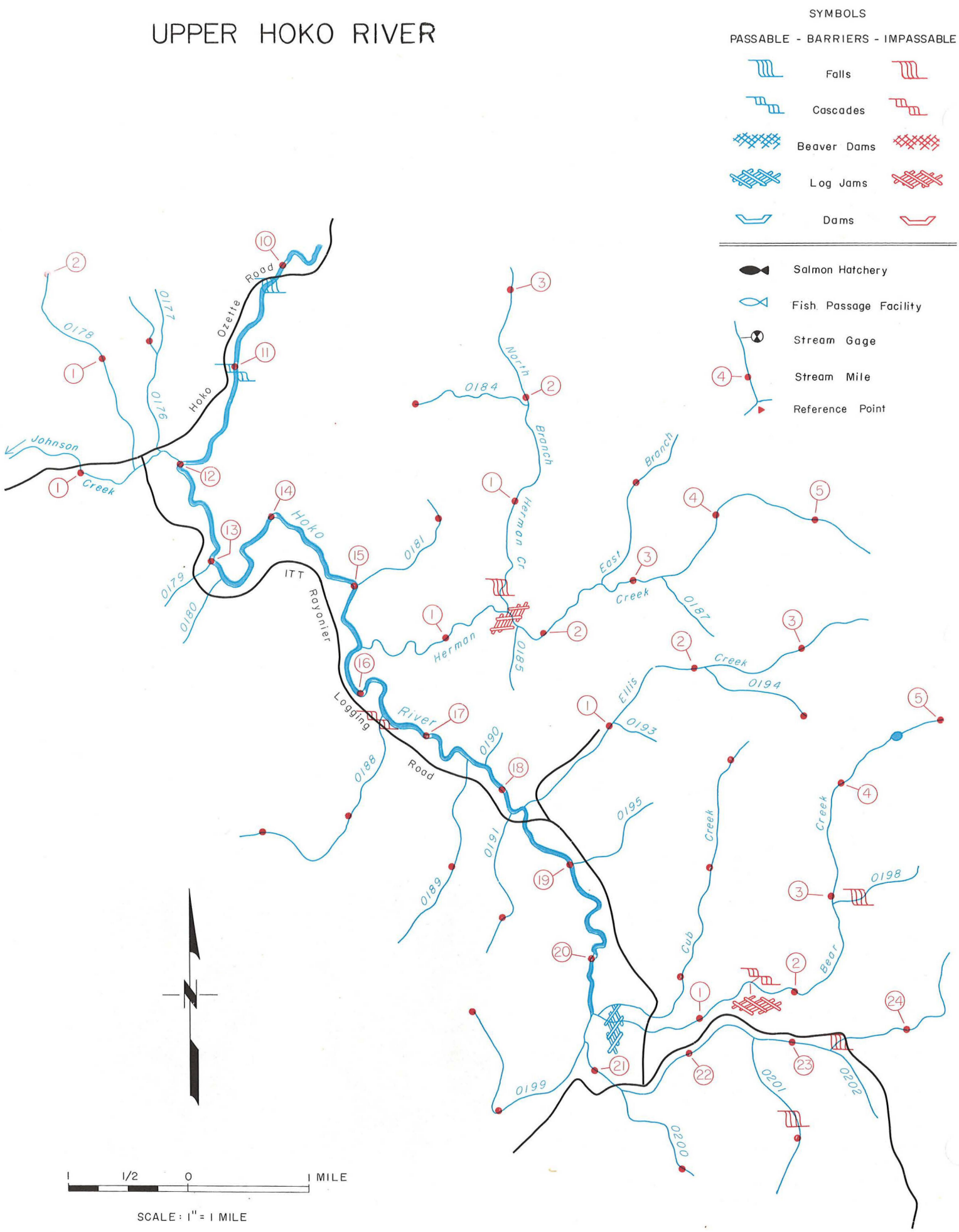
Habitat Needs

Major requirements for maintaining the fish production in this drainage system include preserving existing stream bank cover and the incorporation of improved logging methods to control siltation and erosion. Channel clearance should be undertaken on some streams to provide access to all potential spawning areas.

The unrestricted off-reservation Indian fishery should not be permitted on the Hoko River in order to maintain the runs of salmon. Further planting from hatcheries may be needed to enhance existing salmon runs and to establish fall chinook spawning runs above Hoko Falls.

PHOTO 19-11. 35-foot falls on North Branch of Herman Creek (tributary to Hoko River).

UPPER HOKO RIVER



UPPER HOKO RIVER
Lyre-Hoko Basin — WRIA 19

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0148	Hoko River				Coho, Chin.
0175	Johnson Creek	LB-12.0	3.0	—	Coho
0176	Unnamed	LB-0.2	1.4	—	Coho
0178	Unnamed	LB-0.45	2.0	—	Coho
0181	Unnamed	RB-15.0	1.2	—	None
0182	Herman Creek	RB-15.5	5.6	8.14	Coho
0183	N. Br. Herman Creek	RB-1.6	3.2	—	Coho
0184	Unnamed	RB-1.9	1.0	—	None
0186	E. Br. Herman Creek	RB-2.7	1.6	—	None
0188	Unnamed	LB-16.5	2.2	—	Coho
0189	Unnamed	LB-17.6	1.8	—	Coho
0191	Unnamed	LB-18.2	1.4	—	Coho
0192	Ellis Creek	RB-18.3	3.7	—	Coho
0194	Unnamed	LB-2.1	1.0	—	None
0196	Bear Creek	RB-20.4	5.0	—	Coho
0197	Cub Creek	RB-0.1	3.2	—	Coho
0199	Unnamed	LB-20.7	2.0	—	Coho
0200	Unnamed	LB-21.31	1.1	—	Coho
0201	Unnamed	LB-22.7	1.5	—	Coho

SEKIU RIVER

This section describes the Sekiu River and three small independent tributaries of the Strait of Juan de Fuca-Olsen, Jansen, and Rasmussan creeks. The Sekiu River is 12.5 miles in length, which includes 7.2 miles of the North Fork. A total of 36.7 miles of the 11 tributaries are included in the 33.0 square miles of watershed. Salmon presently utilize 8.8 miles of the mainstem and at least 11.5 miles of the tributaries.

Stream Description

The Sekiu River flows easterly to the Strait of Juan de Fuca through a narrow valley and gently sloped hills of mixed timber and recently logged areas. A private timber company owns most of the land which borders the river. Within the lower mainstem, the streambed is predominantly gravel and rubble with a low gradient and fair pool-riffle balance. Stream banks are low with gently sloped gravel and occasional bare earth and inadequate stream bank cover. The river averages 15 yards in width from mile 0.0-0.5 and 8 yards in width from mile 0.5-5.3 in the summer months.

Three small unnamed tributaries plus No Name and Carpenters creeks flow into the mainstem. All tributaries are similar in characteristics and land use, with adequate stream bank cover of mixed deciduous vegetation and moderate to steep gradients. Streambeds are predominantly rubble and gravel offering fair spawning area in the low reaches.

The South Fork Sekiu River flows northerly to the Sekiu River through a narrow valley of recent logged-off areas and coniferous timber. The streambed is predominantly rubble, boulders, and bedrock with scattered patches of gravel. Riffle areas are heavily silted with moderate to steep gradients. Channel widths vary from two to six yards with a fair pool-riffle balance. Stream bank cover is sparse. The South Fork tributaries contain coarse streambed material and moderate to steep gradient. They average from one to three yards in width with poor stream bank cover and a poor pool-riffle balance.

The North Fork Sekiu River flows southerly to mile 8.4 and then easterly to the Sekiu River through timber production land. The stream bank cover is adequate from the headwaters to mile 8.8 and poor to the mouth. The streambed is predominantly gravel and sand from RM 5.3 to 8.6 and mainly boulders, rubble, and bedrock throughout the remainder. Pool-riffle balance is fair with a low to moderate gradient and stream channel width of two to ten yards average. A falls forms a barrier to migration at mile 8.8. Only 1.2 miles of tributaries to the North Fork are accessible to salmon due to natural barriers. These tributaries have moderate to steep gradients, predominantly gravel streambeds, average one to three yards in width, and have poor pool-riffle balance and bank cover.

Three independent tributaries are included in this section: Olsen, Jansen, and Rasmussan creeks. These have a uniform streambed of boulders, rubble, gravel and sand; moderate to moderately-steep gradient; poor pool-riffle balance; better than adequate stream bank cover; and fair spawning areas. Stream widths average from one to five yards with the surrounding lands in timber production.

Salmon Utilization

The Sekiu River watershed supports runs of chinook, chum, and coho salmon, which utilize the mainstem Sekiu and North Fork. The major chinook spawning area occurs in reaches from No Name Creek to the forks and the lower 1.5 miles of the North Fork. A few chum utilize the lower reaches of Carpenters Creek and South Fork, while coho utilize all accessible areas in the Sekiu system. Coho and a few chum utilize the three independent watersheds. Present escapement is well below what is considered the optimum spawning level for all species. Salmon presently utilize 8.8 miles of the mainstem Sekiu River and at least 11.5 linear miles of the tributaries as well as approximately 1.5 miles of the 3 independent streams.

Limiting Factors

The principal factors limiting salmon production include high summer water temperatures associated with low summer flow and lack of bank cover. An occasional Indian gill-net fishery and numerous log and debris jams further hinder salmon production. Falls on the South and North Forks Sekiu River, Sonny Brook Creek and several unnamed streams stop anadromous fish movement to the headwaters. Many tributaries of the Sekiu River have been virtually destroyed for salmonid production by poor road construction and logging activities.

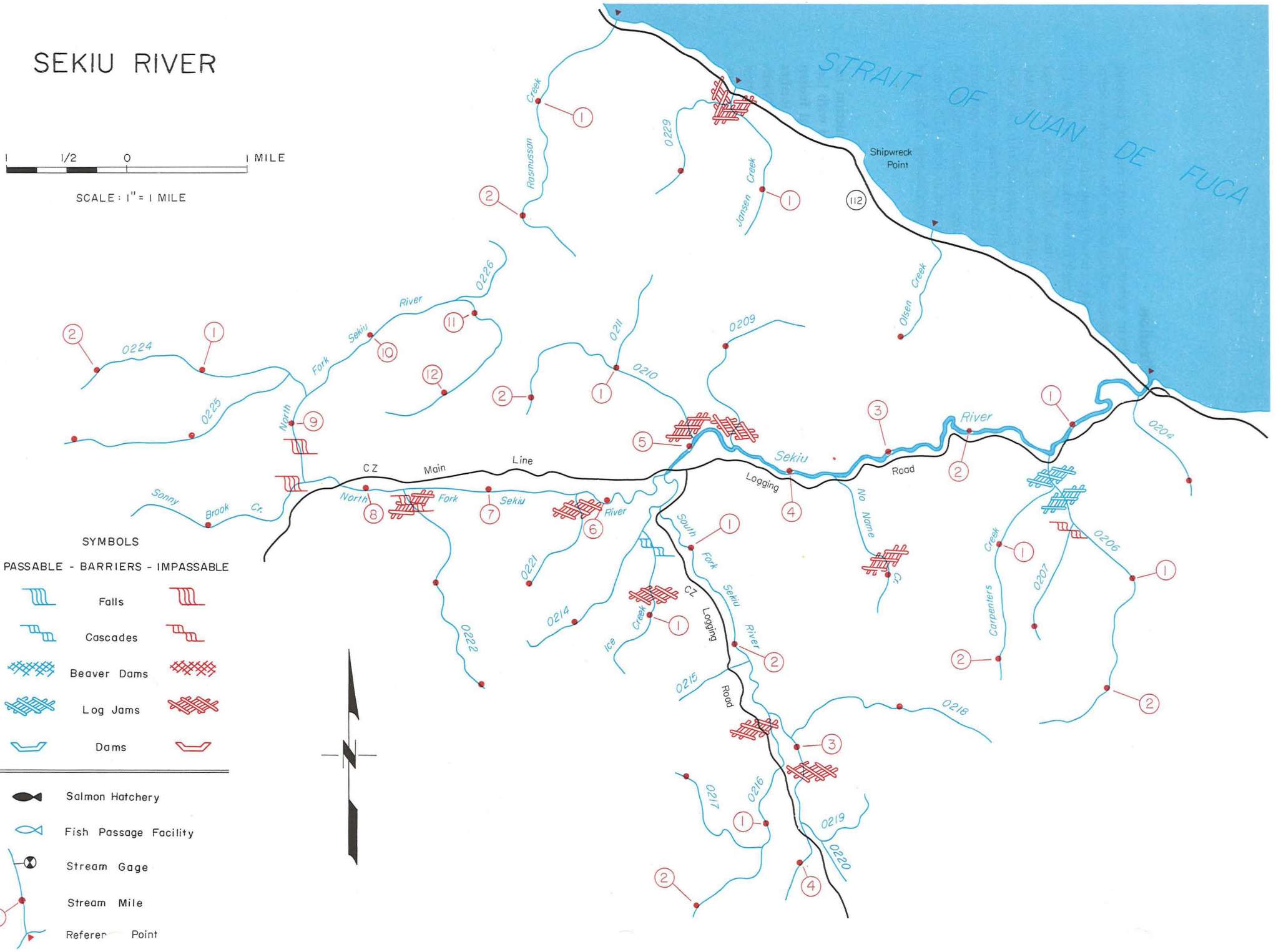
Beneficial Developments

In recent years several log jams and channel clearance projects have been undertaken by private logging companies. Coho and chinook plants from the Soleduck Hatchery are being made to establish a larger salmon return.

Habitat Needs

If salmon runs are to be maintained, an unrestricted Indian fishery cannot be permitted in the Sekiu River. Further planting from the Soleduck Hatchery will be needed to enhance existing salmon runs. In order to obtain production potential in the Sekiu drainage system, a combination of better road construction and logging practices must be undertaken. Stream clearance projects will have to continue and mechanical cleaning of spawning gravel would improve survival of salmon eggs.

SEKIU RIVER


1 1/2 0 1 MILE
SCALE : 1" = 1 MILE
STRAIT OF JUAN DE FUCA
Shipwreck Point
Rasmussan Creek
0229
Jansen Creek
Olsen Creek
0226
0224
0225
North Fork Sekiu River
0211
0209
0210
0204
CZ Main Line
Sekiu River
Logging Road
No Name Cr.
Sonny Brook Cr.
North Fork Sekiu River
0221
0222
0214
South Fork Sekiu River
CZ Logging Road
Ice Creek
0215
0218
0217
0216
0219
0220
Carpenters Creek
0207
0206
SYMBOLS
PASSABLE - BARRIERS - IMPASSABLE
Falls
Cascades
Beaver Dams
Log Jams
Dams
Salmon Hatchery
Fish Passage Facility
Stream Gage
Stream Mile
Referer Point

SEKIU RIVER
Lyre-Hoko Basin — WRIA 19

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0203	Sekiu River	NE¼,Sec8, T32N,R13W	12.5	33.0	Chum,Chin.,Coho
0204	Unnamed	RB-0.2	1.1	—	Coho
0205	Carpenters Creek	RB-1.3	2.2	—	Coho, Chum
0206	Unnamed	RB-0.3	2.7	—	Coho
0207	Unnamed	LB-0.4	1.1	—	None
0208	No Name Creek	RB-3.5	1.3	—	Coho
0209	Unnamed	LB-4.5	1.7	—	Unknown
0210	Unnamed	LB-4.9	2.1	—	Unknown
0212	S. Fk. Sekiu River	RB-5.31	4.3	—.86	Coho, Chum
0213	Ice Creek	LB-0.5	1.7	—	Coho
0214	Unnamed	LB-0.2	1.5	—	Coho
0216	Unnamed	LB-2.6	2.1	—	Coho
0217	Unnamed	LB-1.2	1.1	—	Unknown
0218	Unnamed	RB-2.9	1.8	—	Coho
	Sekiu R. cont. as N. Fk. Sekiu River	@ mi. 5.3	11.1	—	
0221	Unnamed	RB-6.3	1.0	—	Coho
0222	Unnamed	RB-7.7	2.0	—	Coho
0223	Sonny Brook Creek	RB-8.5	1.8	—	Coho
0224	Unnamed	RB-9.3	2.2	—	None
0225	Unnamed	RB-0.3	2.1	—	None
0227	Olsen Creek	NE¼,Sec1, T33N,R14W	1.0	—	Coho
0228	Jansen Creek	SE¼,Sec26, T33N,R14W	1.4	—	Coho
0229	Unnamed	LB-0.1	1.3	—	None
0230	Rasmussan Creek	NE¼,Sec27, T33N,R14W	2.5 2.5	— —	Coho

SAIL RIVER

This section describes a number of small independent tributaries of the Strait of Juan de Fuca between Cape Flattery and Bullman Creek. Most of this area lies within the Makah Indian Reservation. The 9 tributaries in this area have 23.2 miles of stream length.

Stream Description

Sail River is the only fish production stream of major significance. Other streams include Bullman Creek, Snow Creek, Agency Creek, as well as several small streams flowing out of the hilly Cape Flattery area. All streams flow in a generally northern direction to their confluence with the Strait of Juan de Fuca.

The streams east of Neah Bay flow through well defined stream valley areas. These streams have moderate gradient and range from 1 to 6 yards in width. Adequate stream bank cover is provided by deciduous vegetation. These streams have an adequate balance of pools and riffles with gravel streambeds.

The small streams west of Neah Bay originate in the steep terrain near Cape Flattery. Most of these are quite precipitous.

The town of Neah Bay is located on Neah Bay. A Coast Guard station is also maintained in this area. Resorts and campgrounds are located in Neah Bay as well as at the mouths of Snow Creek and Sail River. The remainder of the area is in timber production.

Salmon Utilization

Chum and coho utilize the tributaries east of Neah Bay. Chinook may be found in Sail River. Coho utilize all accessible reaches of Bullman and Snow creeks and Sail River. A few chum may spawn in their lower reaches. Those streams west of Neah Bay are too steep for salmon use. Sail River is the major salmon production watershed in this area. Of the 23 linear miles of independent streams in this section, an estimated 6 miles are presently utilized by salmon.

Limiting Factors

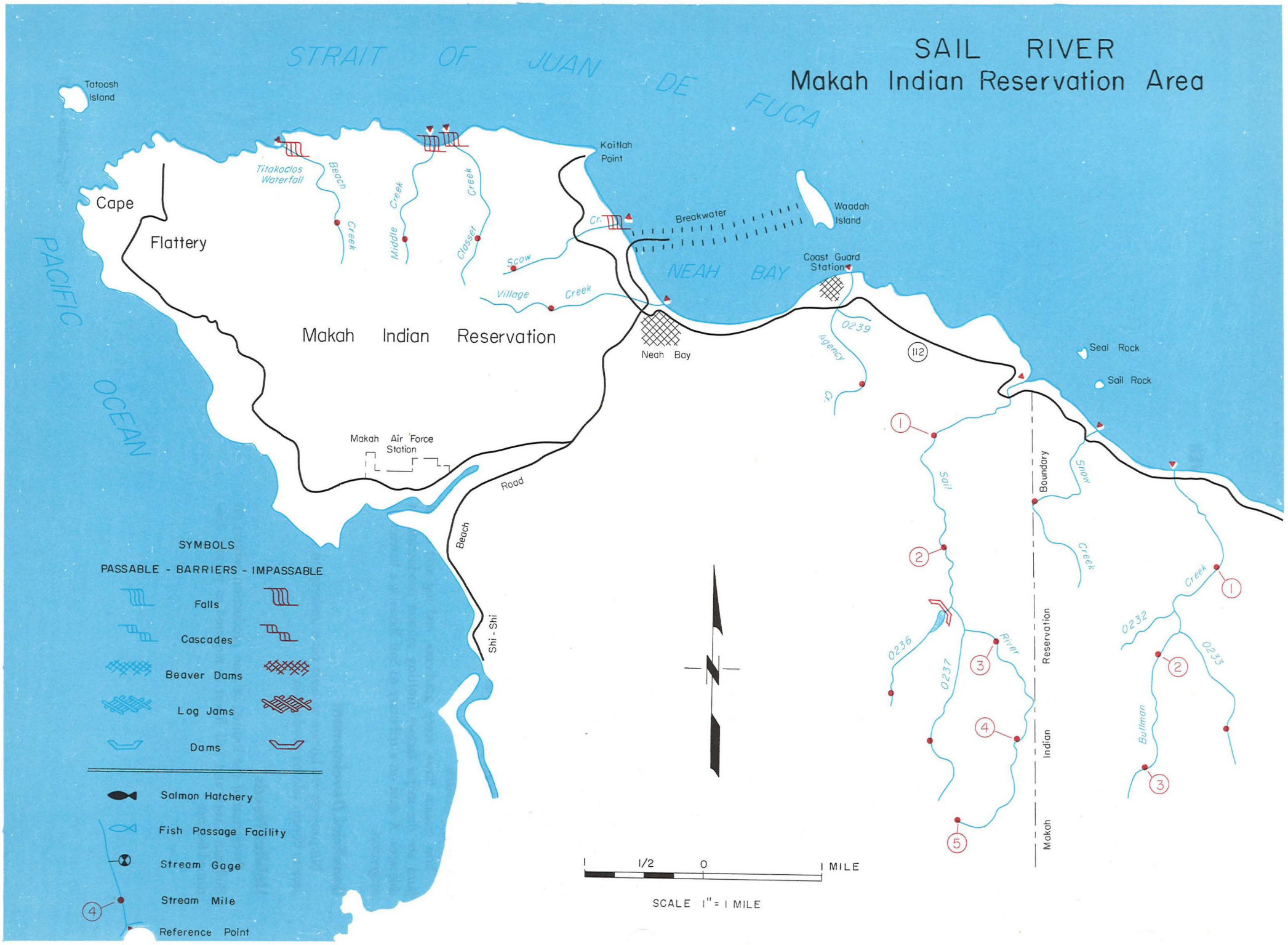
Low stream flows, steep gradients, and log and debris jams are the major factors limiting salmon production in this area. A dam on a tributary to Sail River is a barrier to migration.

Beneficial Development

No projects are known to have been undertaken in this area to benefit salmon production.

Habitat Needs

Protection of the limited salmon production habitat on Bullman Creek and Sail River is required to permit continued fish use.


SAIL RIVER
Makah Indian Reservation Area
STRAIT OF JUAN DE FUCA
PACIFIC OCEAN
Tatoosh Island
Cape Flattery
Titakoclos Waterfall
Beach Creek
Middle Creek
Classet Creek
Scow Village Creek
Koitlah Point
Cr.
Breakwater
Waadah Island
NEAH BAY
Coast Guard Station
Neah Bay
Makah Indian Reservation
Makah Air Force Station
Road
Beach
Shi - Shi
0239
Agency Cr.
112
Seal Rock
Sail Rock
Sail River
Snow Creek
Boundary
Reservation
Makah Indian
0236
0237
0232
0233
Bullman Creek
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

SAIL RIVER
Lyre-Hoko Basin — WRIA 19

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0231	Bullman Creek	NE¼,Sec20, T33N,R14W	3.3	—	Coho
0233	Unnamed	RB-1.7	1.3	—	Coho
0234	Snow Creek	SW¼,Sec17, T33N,R14W	1.9	—	Coho
0235	Sail River	NE¼,Sec18, T33N,R14W	5.0	—	Coho, Chum, Chinook
0236	Unnamed	LB-2.5	1.1	—	None
0237	Unnamed	LB-2.7	1.6	—	None
0238	Agency Creek	N½,SW¼,Sec12, T33N,R15W	1.4	—	None
0240	Village Creek	SE¼,Sec10, T33N,R15W	1.7	—	None
0241	Scow Creek	NW¼,Sec10, T33N,R15W	1.1	—	None
0242	Classet Creek	E½,NE¼,Sec5, T33N,R15W	1.4	—	None
0243	Middle Creek	W½,NE¼,Sec5, T33N,R15W	1.2	—	None
0244	Beach Creek	NW¼,Sec6, T33N,R15W	1.3	—	None