PUYALLUP BASIN

Water Resource Inventory Area 10

The Puyallup River system is comprised of a single mainstem river with numerous tributaries, the largest being the Carbon and White (Stuck) rivers. The two independent basin drainages are Hylebos and Wapato creeks that enter Commencement Bay. There are 728 identified rivers and streams in the Puyallup basin providing over 1,287 linear miles of drainage. Each of the drainages offers suitable habitat for both anadromous and resident fish species.

The Puyallup River originates in the Klapatche Ridge area on the southwest slopes of Mount Rainier. Principal sources are the Puyallup and Tahoma glaciers. The river moves northwest 6.5 miles through a narrow steep-walled valley, located in heavily forested, mountain terrain, before receiving its first large tributary, the Mowich River. The Mowich enters from the east and is also of glacial origin. It exhibits mostly mountain type characteristics with relatively steep gradient, numerous cascades, and few pool-riffle sections. A short distance below the confluence with the Mowich, near river mile 41, is Puget Sound Power and Light Company's dam where water is diverted for use at the Electron Power Station 11 miles downriver. For the first five miles below the diversion, the stream and stream bank character remains the same as above; however, the next six miles flow through a very narrow, steep-walled canyon where the river passes through numerous cascades and considerable deep pool sections. Below river mile 30, at Electron, the valley floor begins to broaden slightly, but mountain type stream characteristics prevail for some distance downstream. Although considerable pool-riffle area does exist, the majority of this section has moderately steep gradient, containing mostly large rock and bottom material. This condition continues downstream for approximately 13 miles to the confluence with the Carbon River near McMillan. Between Electron and the Carbon the main accessible tributaries are Fox, Kapowsin, and Fiske creeks.

PHOTO 10-1. Puyallup River mouth entering Commencement Bay and industrialization of adjacent lowlands.

The Carbon River, like the Puyallup, originates on the rugged slopes of Mount Rainier, principally in the Carbon Glacier located on the mountain's north face. Except for occasional sections having a relatively broad valley floor with moderate stream gradient, the majority of Carbon River drainage presents a mountain type character with steep gradient, large rock, and numerous cascade sections. The river courses more than 30 miles northwest to its confluence with the Puyallup, much of this passing through steep sloped and heavily forested terrain. One stretch, between Carbonado and Fairfax, cuts through an extremely narrow, steep walled canyon containing numerous cascades and extensive deep pools. Only in the lower 8 miles does the stream flow over a relatively broad valley floor. This area offers considerably more spawning and rearing potential than above. Principal tributaries to the Carbon River are South Prairie and Voight creeks.

Below the confluence of the Carbon, the Puyallup River meanders generally north about 7 miles to Sumner where the White (Stuck) River enters. Between the Carbon and White rivers the Puyallup contains numerous pool-riffle areas highly suitable for fish spawning and rearing. The heavily forested stream bank sections, existing over the upper watershed, now give way to more open farm land development. Two important spawning tributaries, Canyonfalls and Fennel creeks, enter in this section.

The White River also originates high on Mt. Rainier. From Emmons Glacier, on the mountain's northeastern face, the river flows generally north more than 25 miles to Greenwater. This stretch is highly mountainous in character with the streambed containing considerable large rock and bottom material in the extensive steep gradient sections. Below Greenwater, the river flows generally west for nearly 22 miles to Buckley. This stretch is in an intermittently broad and narrow valley with relatively steep, densely forested slopes. Occasional pool-riffle sections do exist throughout this section, even though most of the streambed maintains its mountain-like character. Mud Mountain Dam, a barrier to migratory fish, is located at river mile 29.6 about 6.5 miles above Buckley. Five miles below this dam is Puget Sound Power and Light's diversion which shunts water to Lake Tapps and hence back to the White River at mile 21.2.

Below Buckley, the river meanders across a relatively broad valley floor to Auburn and contains increasing amounts of high quality spawning and rearing area. From Auburn, the river turns generally south toward Sumner where it joins the Puyallup. This lower section provides considerable pool-riffle area suitable for anadromous and resident fish use. The surrounding terrain for much of the lower 8 miles is predominantly open farm land, with occasional small communities and some industrialization.

Principal White River tributaries are Silver and Huckleberry creeks, the West Fork White, Greenwater, and Clearwater rivers, all located above Mud Mountain Dam, and Boise Creek entering below Buckley. Anadromous fish utilizing the upper river are trapped at the Buckley diversion and are hauled to a point near Greenwater where they are returned to the river to continue upstream migration and natural spawning.

PHOTO 10-2. Extensive sections of the Puyallup River are channelized.

Below its confluence with the White River, the mainstem Puyallup courses west-northwest approximately ten miles to Puget Sound at Commencement Bay. Much of this section is extensively channelized with the river generally confined by large flood control dikes. Despite this the channel offers areas of suitable pool-riffle character conducive to anadromous and resident fish production. The surrounding terrain consists of open farm land, moderately populated areas, and intense industrialization in its lower three miles. Clark and Clear creeks are two important tributaries entering along this lower stretch of river.

Each of the two independent basin drainages provide areas suitable for production of anadromous and resident fish. Hylebos and Wapato creeks encounter heavy industrialization near their mouths which severely limit their potential. It is estimated that the total accessible area provided by these independent drainages amount to approximately 14 linear miles. The flows from each of these are important to the specific ecological make-up of the estuarine and marine environment in the vicinity of their confluence with the salt water.

Fish Inventory and Distribution

Four Pacific salmon species populate the Puyallup basin. These include chinook, coho, pink, and chum salmon. Some sockeye are indigenous to the basin; however, their numbers are considered insignificant at this time.

Chinook Salmon — Chinook salmon populating the Puyallup basin are generally separated into two groups or races, springs and falls, with the falls considerably more abundant.

Adult spring chinook utilize principally the high mountain streams of the upper White River system. These include Huckleberry Creek and the West Fork White, Greenwater, and Clearwater rivers. Also, limited numbers of spring chinook probably use the upper reaches of the mainstem Puyallup and the upper Carbon rivers. It is estimated that within the entire Puyallup system approximately 22 linear miles of stream are utilized by spawning spring chinook.

Rearing occurs in each of the streams populated by spawning adults, as well as in the mainstem rivers and in the highly critical estuarine waters of Commencement Bay.

Adult spring chinook enter the Puyallup beginning in mid to late March with the run continuing through July (Table 10-1). Spawning begins in some areas as early as late July; however, the major portion occurs in late August and early September and is usually completed in all areas by the end of September. Following emergence from the gravel, the juveniles characteristically remain in the system for more than a year, migrating seaward early in their second year of fresh-water life. This movement generally occurs between early March and late August, with peak migration in April and May coinciding with the river's natural spring run-off pattern.

Based on trap counts and spawning ground surveys, it is estimated that the spring chinook spawning escapement to the Puyallup has ranged from 800 to 1,500 fish from 1965 to 1971, averaging about 1,100 annually.

Fall chinook spawning occurs throughout the Puyallup River system with heaviest concentrations noted in the mainstem Puyallup and the lower White and Carbon rivers. Principal tributaries utilized by this species include Kapowsin, South Prairie, and Voight creeks. There are approximately 71 miles of spawning area in the Puyallup River and tributaries utilized by fall chinook. Important rearing waters for the juvenile fall chinook are approximately the same as those of the spring chinook.

PHOTO 10-3. Typical fall chinook spawning area in the lower White River.

Adult fall chinook enter the Puyallup as early as mid-July with spawning commencing in early September in some areas. Spawning is usually completed throughout the system by mid-November. Following incubation and subsequent emergence, the juveniles generally rear in the system about three months prior to seaward migration with this occurring mainly from late February through early August. However, some chinook emigrate throughout the year.

Based principally on spawning ground information, it is estimated that natural fall chinook escapements to this subregion have ranged from 2,500 to 4,000 fish for the period 1966 to 1971 averaging about 3,400 fish annually.

Coho Salmon — Virtually all accessible streams and tributaries draining the Puyallup basin are utilized by spawning coho salmon. Spawning also occurs in the mainstem Puyallup, Carbon, and White rivers, particularly in areas where divided channels create water courses more suitable for use by this species. Some of the more important tributary streams containing coho include Kapowsin, Canyonfalls, Fennel, and Fiske creeks on the Puyallup; Boise, Slippery, and Huckleberry creeks, plus West Fork, Greenwater, and Clearwater rivers on the White; and South Prairie and Voight creeks on the Carbon River. Each of the two independent basin drainages also receives spawning coho; however, the total production from these streams is considerably less than that of the Puyallup River. Within the entire drainage area it is estimated that 112 linear miles of stream are utilized by spawning coho.

Juvenile coho rear in all streams used by spawning adults and throughout the mainstem Puyallup, Carbon, and White rivers. Areas of particular importance for these young fish include a lower mainstem Puyallup River and the estuary waters of Commencement Bay.

Adult coho begin entering the Puyallup River in late July and continue well into December. Spawning commences about mid-October and continues in some areas until mid-January. Following emergence from the gravel, the juvenile coho characteristically remain in the system more than a year, migrating to sea early in their second year of fresh-water life. The bulk of this migration occurs between early March and early August. These general timing patterns are probably the same in adjacent independent drainages.

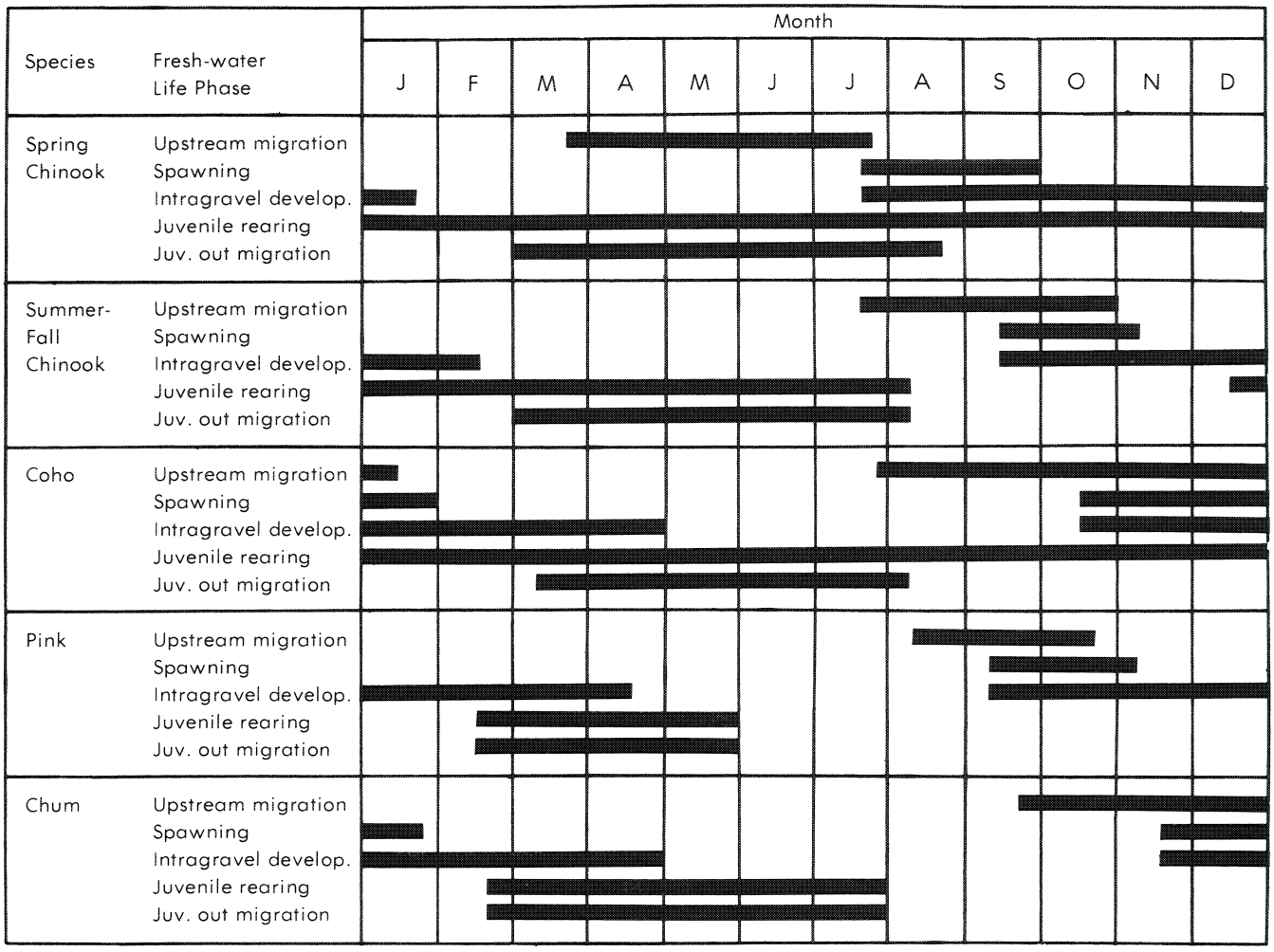
Based on spawning ground information it is estimated that natural coho salmon escapements to the Puyallup system have ranged from about 42,000 to 70,000 fish for the period 1966 to 1971 averaging about 50,000 per year.

Pink Salmon — Within the Puyallup basin odd numbered year pink salmon spawning occurs almost exclusively in sections of the mainstem Puyallup, the lower Carbon, and the lower White rivers. Principal tributaries known to receive spawners include Fennel Creek on the main Puyallup and South Prairie and Voight creeks on the Carbon River. Pink salmon runs have not been established in the independent drainages of the basin.

The very frail condition of the newly emerged pinks makes their survival extremely dependent on the environment. Their susceptability to unnatural water conditions can spell success or failure to an entire year class. Especially critical areas exist at the mouth of the Puyallup and in the estuarine waters of Commencement Bay.

Adult pink salmon have been recorded in the Puyallup in mid-July with the run continuing into October. Spawning commences in mid to late September and is usually completed by early November. Soon after the fry emerge from

Timing of salmon fresh-water life phases in Puyallup Basin WRIA 10



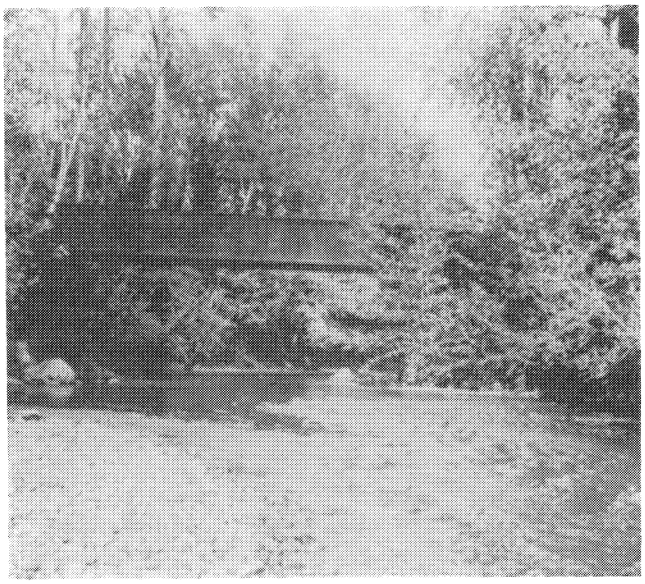


PHOTO 10-4. South Prairie Creek supports the major portion of the Puyallup pink spawning population.

the gravel their seaward migration begins with this movement usually completed by the end of June.

Based on extensive tagging and recovery programs and on routine stream survey information, it is estimated that pink salmon escapements to the Puyallup system have ranged from 16,000 to 40,000 fish from 1966 to 1971, averaging nearly 26,000 per odd year escapement.

Chum Salmon — Chum salmon spawning within the Puyallup basin is confined primarily to portions of the mainstem Puyallup, the lower Carbon, and the lower White rivers, plus each of the independent basin drainages. Principal Puyallup tributaries known to receive chum include Canyonfalls, Fennel and Clark creeks on the main Puyallup and South Prairie Creek on the Carbon River. The independent drainages also receive good numbers of chum salmon.

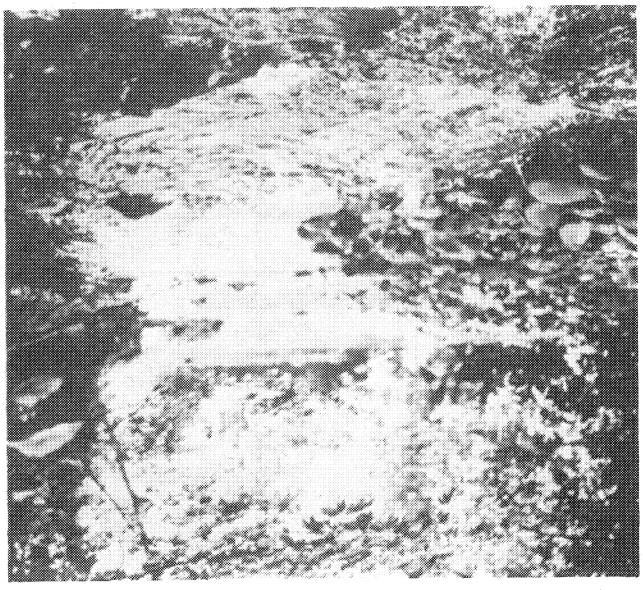


PHOTO 10-5. Small tributaries of the Puyallup River are used extensively by chum salmon (Fennel Creek).

Since the very frail juvenile chum begin seaward migration soon after emerging from the gravel, the mainstem of the lower Puyallup is exceedingly important to early freshwater rearing and to successful introduction into salt water. As with pink salmon juveniles, extremely critical areas exist at the mouth of the Puyallup and in Commencement Bay's estuary waters.

Adult chum salmon begin entering the Puyallup in late September with spawning commencing in mid-November and continuing in some areas until mid-January. Soon after emerging from the gravel the young chum move seaward with this migration usually completed by mid-July. The timing of spawning and migration in the basin's independent drainages is approximately the same as that for the mainstem Puyallup.

Based on limited spawning ground information it is estimated that chum salmon escapements to the Puyallup basin have ranged from about 10,000 to 25,000 for the period 1966 to 1971, averaging about 17,000 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 naturally and artifically produced fish, as well as escapement and harvest figures.

The natural production from the native stocks of salmon in the Puyallup basin provides over 237,000 salmon annually to various sport and commercial fisheries in Washington. In an average year approximately 63,000 adult salmon return to spawn naturally (Table 10-2).

TABLE 10-2. Salmon Escapement Level for the Puyallup River Basin WRIA 10.

	1966-1971 Escapements [1]	
Species	*Range*	*Average*
Chinook	1,900— 6,500	3,500
Coho	12,800—31,100	21,100
Pink	16,000—40,000	26,000
Chum	7,600—25,000	12,600

	Natural Escapement Potential
Chinook	8,000
Coho	15,000
Pink	40,000
Chum	35,000

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

The Washington Department of Fisheries maintains and operates the Puyallup Salmon Hatchery on Voight Creek near Orting. The hatching capacity is approximately 1,-500,000 salmon fry with the present rearing capacity about 700,000 yearling and 1,300,000 fingerlings. New ponds and water supply will be completed by 1976 to increase production to 93,000 lbs. [1]

For the period 1966 to 1971, chinook returns to the Voight Creek hatchery rack ranged from 241 to 1,519 adults averaging 685 annually. Coho rack counts ranged from 8,554 to 14,333 averaging 11,989 spawners annually. Fall chinook and coho are the principal salmon produced here.

Occasionally some juvenile salmon are transplanted into the Puyallup from facilities located in other basins; however, total plantings of this type have been relatively small to date.

For the period 1966 to 1971, a total of 10,178,000 chinook and 8,978,000 coho were planted in the basin's waters. Average annual plants in this watershed for this period are 1,696,000 chinook and 1,496,000 coho. Plants in 1971 included 1,769,000 juvenile chinook (12,600 lbs.) and 2,-468,000 juvenile coho (37,600 lbs.) into Puyallup and Nisqually watersheds.

Information from commercial and sport catch statistics indicate the present planting program in the basin contributes approximately 14,800 chinook and 56,500 coho to these fisheries annually.

Harvest

Salmon produced or reared in Puyallup Basin waters contribute to Puget Sound, U.S., and Canadian ocean-sport and commercial fisheries, as well as to a sport fishery existing on the Puyallup River. Estimated total contribution, both natural and artificial (all species), to these fisheries has ranged from 150,000 to 260,000 salmon during the base years.

The marine waters of this basin support a relatively light commercial fishery with Commencement Bay designated as closed waters. A few gill net and purse seine vessels fish the area in the vicinity of Dumas Bay and Dash Point. Net fisheries are also managed in the adjacent waters of Colvos Passage and East Passage off Bainbridge Island, where they intercept runs to the Puyallup River. Principal landing areas are in Seattle and Tacoma.

The Puyallup River Indian gill net fishery, which had commercially harvested up to 75,000 salmon from the lower Puyallup River in a season, was curtailed in 1965. The Muckleshoot Indian fishery, existing mainly on the lower White River, has increased its harvest somewhat since 1965.

The question of Indian fishing rights has been contested for many years and adjudication now in progress may cause significant alterations in both fishing patterns and distribution of catch.

The entire marine area is semi-protected from heavy winds providing generally good conditions for an intense year-round sport fishery. More than 110,000 angler trips were recorded for marine waters in this area in 1971. Popular sport angling areas include Dash Point, Commencement Bay, Point Defiance, and the Tacoma Narrows. Also, many sportsmen travel from local basin waters to favorite fishing areas to the south and to the north.

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

The lower 16 miles of Puyallup River are open to sport angling for salmon. Only jack salmon may be possessed in these waters. [2] Catches from the Puyallup River have increased steadily in recent years with the reported 1966 through 1971 harvest averaging 2,398 fish per year. These consisted of jack coho and chinook with some pink salmon included in the odd year catches.

Limiting Factors

Limiting factors refer to conditions that lead to a complete loss or reduction of the environment's fish producing potential, excluding harvest or exploitation. They include only those conditions presently considered alterable. Within the Puyallup basin the major limiting factors include seasonal flooding, low summer flows, unstable streambeds, physical barriers in the streams and rivers, poor water quality, and extensive tideland industrialization in the estuary and marine areas.

Stream flow — Nearly all of the smaller streams in the basin suffer from summer low flows. In the mainstem Puyallup River above the confluence of the Carbon and in the mainstem White River between the Buckley diversion dam and a point just above the town of Sumner, low flow conditions are aggravated by diversion of water from the river for the purpose of electric power production.

Seasonal flooding is common in all of the major drainages of the basin. Since each of these drainages originate from glaciers, run-off occurs rapidly in the face of heavy rainfall, particularly when such rains are combined with warmer temperatures. Accentuating the sudden and often violent run-off patterns is the fact that the mountain regions are very steep and are, for the most part, extensively logged off. Some of the smaller drainages within the basin also experience flooding. This too is generally associated with heavily logged off areas. South Prairie Creek, a tributary to the Carbon River, is one such example.

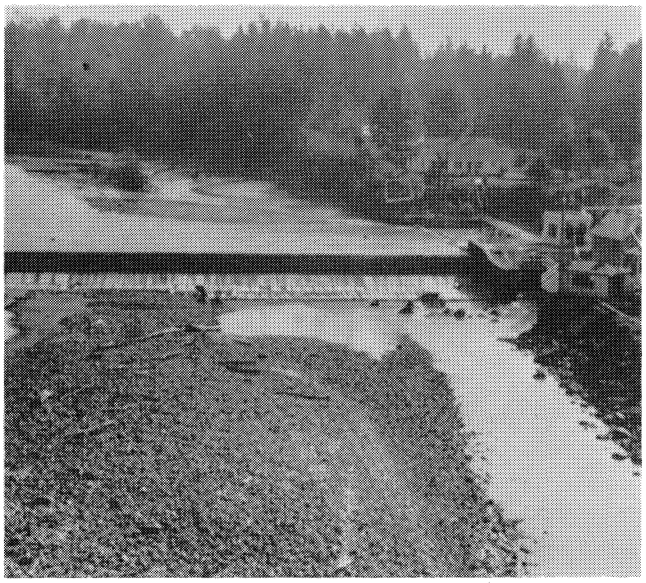


PHOTO 10-6. White River flows are reduced by a diversion near Buckley.

[2] *Not less than 10 inches nor more than 20 inches in length.*

Physical barriers — The Electron power canal diversion, located at river mile 41.8, blocks some ten additional miles of upper Puyallup River watershed suitable for use by anadromous fishes. Wide ranging flow fluctuations and often near drying conditions corresponding to power operations occur in the eight-mile stretch below the diversion dam downstream to the powerhouse. River profile changes generally associated with stream channelizing projects in the Carbon, White and mainstem Puyallup rivers create "thin water" stretches during low flow periods. This condition is particularly bad on the White River between the diversion dam and the re-entrance of river water to the channel some seventeen miles downstream.

The diversion dam located on the White River is equipped with a ladder-trap and fish hauling facilities to enable adult migrating fish to be transferred to upstream spawning areas. Often, however, reduced flow conditions through the ladder and lack of sufficient transportation water downstream from the dam creates serious delays in the natural migration pattern of the adult salmon. In conjunction with this diversion operation is an extensive fish screen installation located some three miles downstream from the flume intake. Tests have shown that these screens do not effectively pass all downstream migrating juvenile salmonids from the canal back to the river. Many of the young fish arriving at the screens are delayed in their natural downstream movement and cannot locate the portals through which they can be guided from the channel back to the main river. Predation on these confined juveniles is high as they become exhausted in fighting the currents and hang back along the rotating screens. These fish tend to be carried over the screens and into Lake Tapps, where their only egress is via the power intake penstocks and the turbines below. Mortalities here are extreme.

PHOTO 10-7. Puyallup River diversion dam blocks fish migration in upper reaches.

On the Carbon River, cascades and small falls located deep in a narrow canyon below the town of Fairfax may cause a hinderance to upstream migrating fish, particularly during extreme low or high water conditions.

PHOTO 10-8. Fish screening facilities in the White River diversion canal are not entirely effective.

Water quality — The glacial-flour characteristic of the main Puyallup, Carbon, and White rivers might be considered somewhat limiting with regard to basic fish food production. However, the timing of highest turbidity is generally in the early spring and again in the fall months. Deposits of glacial silt cover much of the stream gravel and river beds inhibiting aquatic plant and insect development.

The intermittent flushing of the Electron power canal flume on the Puyallup River and the annual controlled flushing in September of Mud Mountain Reservoir on the White River creates unusually high silt loading over their respective downstream reaches. Such conditions can be extremely damaging depending upon the time of the year they occur.

Numerous domestic, agricultural, and industrial effluents enter the Puyallup drainages, particularly near various population centers. Cities and towns adjacent to the system include Tacoma, Puyallup, Sumner, Auburn, Buckley, Enumclaw, and Orting. Effluents from each of these areas tend to alter the stream's natural water chemistry, particularly at low river flows. Although no direct toxic pollution may occur within the river system from any one specific source, the combined effect from all areas can be quite damaging to fish populations in the lower stream reaches.

Pulp mill wastes are dumped directly into the Puyallup River at its confluence with Commencement Bay. Studies have shown that these effluents can be particularly damaging to juvenile salmonids, especially during slack tides or low river flow conditions. In addition to pulp mill waste the estuary and marine waters of Commencement Bay are influenced by the introduction of wastes from wood treating plants, chemical refining industries, domestic sewage, smelter slag dumps, and log booms. The marine waters of Commencement Bay are also affected by occasional oil spills, disposal dumping of dredged spoils, and occasional barge washing, each of these associated with the heavy shipping traffic in the area.

Only limited temperature information is available for most of the Puyallup basin streams. It is felt, however, that only the smaller low land drainages experience temperatures extreme enough to limit anadromous fish production. These are streams located downstream from the City of Puyallup including Clarke, Wapato, and Hylebos creeks. Cold temperatures in the upper watersheds near the streams' origin may tend to limit fish populations, principally on the upper Puyallup, Carbon and White rivers.

A potential water quality problem exists in the mountainous forest lands of the upper Puyallup watershed. Here new techniques of pest and foliage control associated with forestry may involve use of aerial chemical spraying, a method extremely difficult to effectively regulate. In these upper mountain areas the steep slopes combined with a normally rapid run-off will tend to speed up and concentrate the leaching of toxic chemicals into the associated stream areas, where they may severely damage or even completely destroy existing fish populations.

Limited spawning and rearing — Associated with flooding of the natural streams within the Puyallup watershed is the loss of gravel that makes up the spawning material for the adult salmon. Also lost are the natural pool-riffle conditions necessary to achieve a proper balance of fish spawning and rearing area. Magnifying this condition are channelizing projects associated with flood control and with land reclamation. Dikes are, for the most part, quite narrow and straight, allowing flood waters to scour the streambed and damage the natural fish producing river profile.

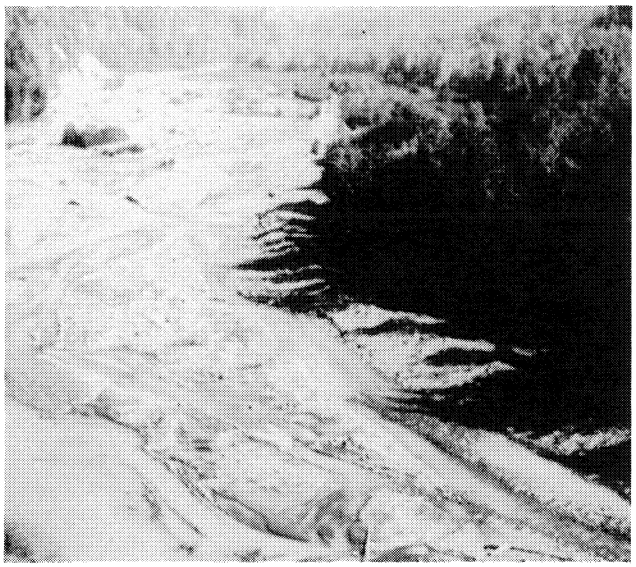


PHOTO 10-9. A typical glacial stream section showing channel shifting (lower Carbon River).

The glacial-flour type of siltation, plus muddy water conditions created by glacier scouring, are usually quite extensive during the late spring and early fall seasons, particularly during periods of heavy rainfall. Such conditions are deleterious to the natural insect production and consequently to the fish that utilize these insects as basic food.

Watershed development — Logging is, and will probably continue to be, the most significant development factor in the upper watersheds of the basin. Extensive programs of clear cutting and clear cut section logging occur over the upper watersheds of the White, Carbon and mainstem Puyallup rivers as well as over drainage areas of some of the smaller streams including Kapowsin and South Prairie creeks.

PHOTO 10-10. Improper logging practices can have a tremendous impact on fish production.

In the lower stream areas of the basin, particularly in the tributary streams, urbanization and industrial expansion are the principal development factors. Much of the summer home development and outer urban area building is occurring directly on stream flood plains. This creates a need for flood protection for the land owner which involves dikes, channelizing, or stream straightening. Such activities are generally not commensurate with fish needs.

Within the estuary and marine waters of Commencement Bay, water oriented industries such as ore smelters, log treating and storage, and pulp and chemical plants directly influence the fish production capacity of the entire bay. Boat moorage and marinas are expanding in Commencement Bay.

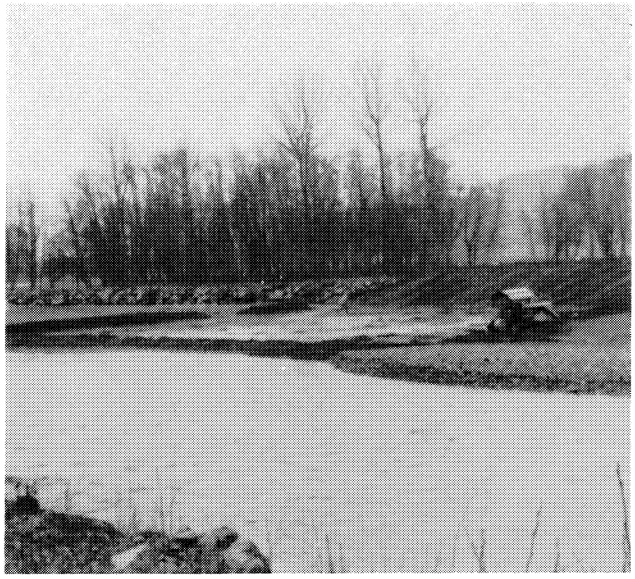


PHOTO 10-11. Removal of gravel bars is a flood control practice damaging to the natural habitat.

Presently flood control projects are very extensive throughout the mainstem Puyallup River and in each of the major contributing tributaries, as well as on some of the smaller basin streams. Major emphasis is on channelizing, straightening, and narrowing the natural stream channel, creating conditions nearly impossible for sustaining normal fish populations.

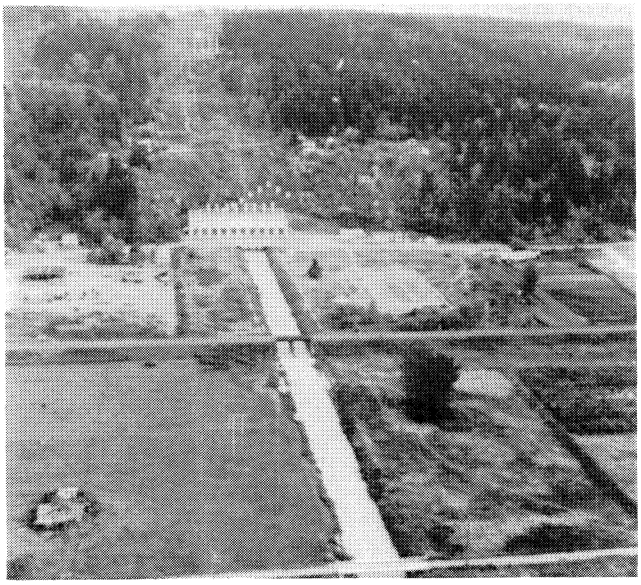


PHOTO 10-12. The Derringer power plant returns White River flows to the main river.

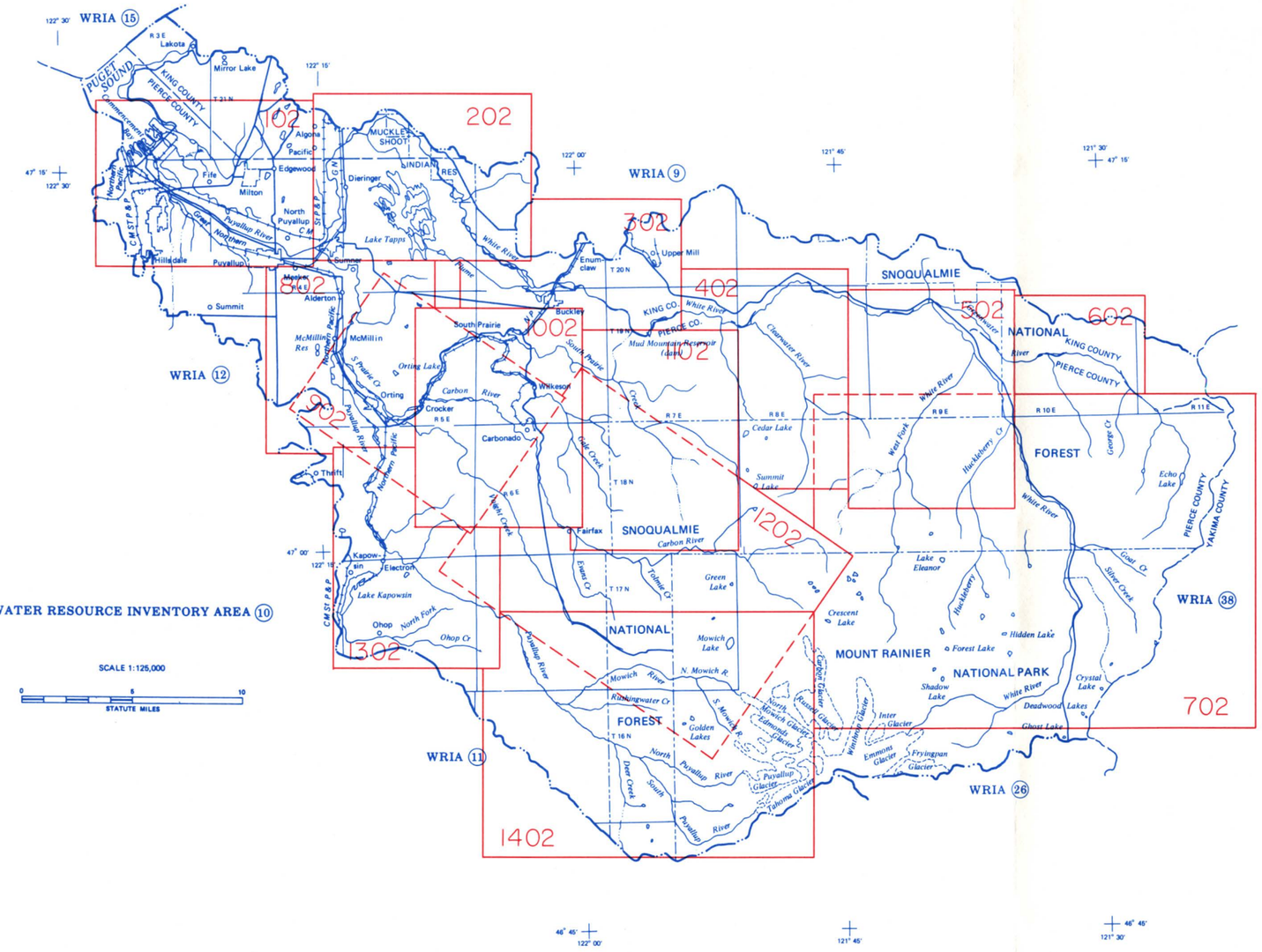
Hydroelectric power developments on the mainstem Puyallup River and on the White River are considered quite detrimental to natural fish production. Also, the operation of the Mud Mountain storage reservoir on the upper White River is often not coordinated with fish needs.

PUYALLUP BASIN WRIA 10
Index to Key Map

Map Title	Stream Numbers	Page
LOWER PUYALLUP RIVER	(10.0001—10.0030)	Puyallup— 102
WHITE RIVER (Auburn Area)	(10.0031—10.0055)	Puyallup— 202
WHITE RIVER (Buckley Area)	(10.0056—10.0072)	Puyallup— 302
WHITE RIVER (Clearwater Area)	(10.0073—10.0111)	Puyallup— 402
WHITE RIVER (West Fork Area)	(10.0112—10.0121) (10.0185—10.0197) (10.0250—10.0252)	Puyallup— 502
GREENWATER RIVER DRAINAGE	(10.0122—10.0184)	Puyallup— 602
WHITE RIVER (Mt. Rainier—Headwaters)	(10.0198—10.0249) (10.0253—10.0397)	Puyallup— 702
PUYALLUP RIVER (Orting Area)	(10.0398—10.0412) (10.0589—10.0593)	Puyallup— 802
LOWER CARBON RIVER (Orting Area)	(10.0413—10.0420) (10.0477—10.0478)	Puyallup— 902
LOWER SOUTH PRAIRIE CREEK	(10.0429—10.0459)	Puyallup—1002
UPPER SOUTH PRAIRIE CREEK	(10.0460—10.0476)	Puyallup—1102
UPPER CARBON RIVER	(10.0421—10.0428) (10.0479—10.0588)	Puyallup—1202
PUYALLUP RIVER (Electron Area)	(10.0594—10.0619)	Puyallup—1302
UPPER PUYALLUP RIVER (Headwaters)	(10.0620—10.0728)	Puyallup—1402

PUYALLUP RIVER BASIN

WRIA-10



LOWER PUYALLUP RIVER

This lower Puyallup River section includes 10.4 river miles plus over 17 miles of major side tributaries. Also included are two independent tributaries providing an additional 40 miles of stream length. The watershed in this area is situated to the east of Commencement Bay and Puyallup Waterway near Fife, Milton, and Puyallup, in Pierce County and part of King County.

Stream Description

The lower Puyallup River is located below the confluence of the White River near Puyallup. It flows generally northwesterly through the Puyallup Valley and the Tacoma industrial waterfront before entering Commencement Bay. The I-5 freeway crosses the Puyallup River about 2.4 miles above the mouth. From I-5 upstream Highway 410 parallels the river on the south side of the town of Puyallup. The mainstem river is generally contained in formal channelized banks and extensive levees, the width varying from 300 to 400 feet. Here there is little or no bank cover nor overhanging vegetation. Tidal influence extends about seven miles upstream, with the bottom being composed largely of gravel and rubble mixed with deposits of sand and fine materials. The upper half of this section contains fine gravel mixed with rubble and sand deposits along the shoreline. Two major tributaries, Clear Creek and Clarks Creek, enter from the south bank. Clear Creek is 3.85 miles long and contains two tributaries, Swan Creek and Squally Creek, plus a short unnamed tributary. Small dams are located near R.M. 2.0 on Clear Creek and R.M. 0.3 on Swan Creek. A stream gage is located on Swan Creek at R.M. 3.14. Clarks Creek is 3.7 miles long and enters the Puyallup at R.M. 5.8. This creek originates from the Maple Wood Spring near the base of the hill and has two small unnamed tributaries. Clear Creek, however, originates in the vicinity of Midland from drainage and groundwater runoff at about the 400-foot elevation.

The two independent streams in the basin are Hylebos Creek and Wapato Creek. Hylebos Creek originates from Lake Geneva and Lake Killarney about four miles north and east of the community of Milton. A second tributary originates about five miles north of Milton and follows the I-5 freeway southerly to where it joins Hylebos Creek at R.M. 5.1. From here the main creek turns northwest and flows into the Hylebos waterway. Wapato Creek originates nearly north of the town of Puyallup. It meanders 13.85 miles through agricultural valley lands and then into the industrial and heavy commercial area below I-5 before joining the industrial waterway in Commencement Bay.

Salmon Utilization

The lower six miles of the Puyallup River provides transportation and/or rearing for chinook, pink, chum, and coho. No spawning occurs below R.M. 6.0 near the mouth of Clarks Creek. Chinook and chum spawn within the section above R.M. 6.0 and the confluence of the White River above the town of Puyallup. A critical juvenile acclimatization zone extends upstream approximately three miles. Each of the accessible tributaries and independent streams offer fair to good coho and chum spawning and/or rearing habitats. In the Wapato system historically there were both chum and coho; however, salmon production is now limited. Hylebos Creek contains both coho and chum salmon and provides fair to good spawning habitat within the drainage, while Clear Creek and Clarks Creek contain coho only.

Limiting Factors

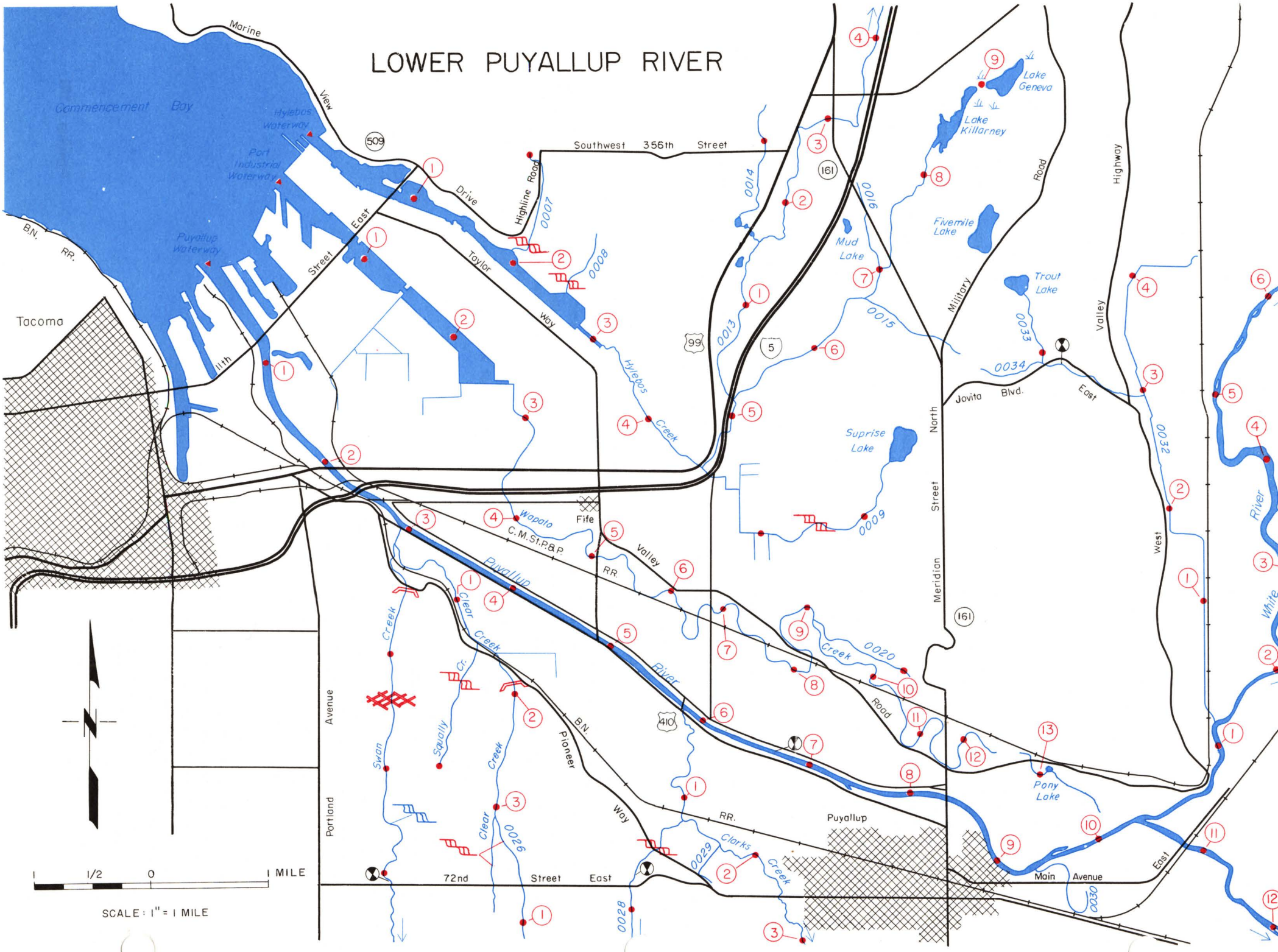
Conditions which limit salmon production in this basin include occasional low summer flows and warm water temperatures, water quality in the lower estuary areas, and heavy streambed siltation resulting from residential developments on the adjacent hillsides. Water quality within Commencement Bay, the Puyallup waterway, and Hylebos waterway are the most threatening limiting factor effecting salmon production. Heavy industrial effluents from this area have long been a serious problem. Also, potentially limiting are the activities of agricultural spraying and storm drainage problems associated with road construction. Dams located on Clear Creek and Swan Creek have created total blocks to fish passage at certain water stages.

Beneficial Developments

Heavy industries along the Tacoma waterways have done much in recent years to comply with environmental cleanup laws. The State Game Department maintains a large trout hatchery on Clarks Creek near Maple Wood Springs. The Stream Improvement Division has corrected blockages to migration in the Clear Creek and Clarks Creek drainages.

Habitat Needs

Maintaining fish production potential in this river section and independent stream drainages includes preserving and improving stream bank cover and restricting dredging operations in the lower river and waterways and also, removal of log rafts in the Hylebos waterway area would benefit juvenile rearing. The problem of water quality continues to be the major limiting factor requiring attention within this basin.


LOWER PUYALLUP RIVER
Commencement Bay
Hylebos Waterway
Port Industrial Waterway
Puyallup Waterway
Marine View Drive
509
Southwest 356th Street
Highline Road
Taylor Way
East 11th Street
B.N. RR.
Tacoma
99
5
161
Hylebos Creek
0007
0008
0013
0014
0015
0016
Lake Geneva
Lake Killarney
Fivemile Lake
Mud Lake
Trout Lake
0033
0034
Military Road
Valley Highway
Jovita Blvd. East
North Meridian Street
Suprise Lake
0009
0032
Wapato Creek
C.M.St.P.&P. RR.
Fife
Valley
Puyallup River
Clear Creek
Swan Creek
Squally Cr.
Clear Creek
0026
Portland Avenue
B.N. Pioneer Way
410
RR.
Puyallup
Clarks Creek
0029
0028
0020
Road
Pony Lake
0030
Main Avenue East
72nd Street East
West
White River
1/2
0
1 MILE
SCALE: 1" = 1 MILE

LOWER PUYALLUP RIVER
Puyallup Basin — WRIA 10

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0001	Joes Creek [1]	Sec11,T21N,R3E	1.4	—	Coho, (Chum)
0003	Unnamed	Sec10,T21N,R3E	1.1	—	Coho, (Chum)
0006	Hylebos Creek	Sec27,T21N,R3E	9.0	—	Coho, (Chum)
0007	Unnamed	RB-1.95	1.0	—	Unknown
0009	Unnamed	LB-4.5	2.6	—	(Coho)
	Surprise Lake	Outlet-2.6	—	—	
0013	Unnamed	RB-5.15	4.85	—	Coho, (Chum)
0014	Unnamed	RB-1.5	1.4	—	Unknown
	Lake Killarney	Outlet-8.31	—	—	
	Lake Geneva	Outlet-9.0	—	—	
0017	Wapato Creek	Sec27,T21N,R3E	13.85	—	Coho, (Chum)
0018	Drainage Ditch	LB-1.45	~ 2.5	—	None
0020	Unnamed	RB-9.15	1.1	—	(Coho)
	Pony Lake	Outlet-13.1	—	—	
0021	Puyallup River	Sec33,T21N,R3E	54.4	—	Chin., Coho, Pink, Chum
0022	Clear Creek	LB-2.9	3.85	12.1	Coho, (Chum)
0023	Swan Creek	LB-0.2	6.05	—	Coho, (Chum)
0024	Squally Creek	LB-1.4	1.0	—	Coho, (Chum)
0026	Unnamed	RB-3.05	1.1	—	None
0027	Clarks Creek	LB-5.8	3.7	—	Coho, Chum
0028	Unnamed	LB-1.2	1.65	—	Coho
0031	White (Stuck) River	RB-10.4	76.7	—	Chin., Coho, Pink, Chum
	(See Puyallup 202)				
	(Cont. Puyallup 803)				

[1] *For map showing Joes Creek, see Duwamish 102.*

WHITE RIVER
Auburn Area

The lower White River contains approximately 21 miles of mainstem and 14 tributaries that contribute over 32 miles of stream plus several miles of drainage ditches. Only about one-third are accessible to anadromous species. The Muckleshoot Indian Reservation encompasses the mainstem from R.M. 8.9 to 15.5. State Highway 167 parallels the lower White River and State Highway 164 parallels the upper section.

Stream Description

The White River meanders downstream from R.M. 20 in a northwest direction through a fairly confined valley to R.M. 8.0. Here the valley and river curve south to the confluence with the Puyallup River near Sumner. Historically, this section was called the Stuck River, and flowed around the southeast edge of Auburn into the Green River. In 1906, flood waters cut through the river bank at R.M. 8.0 and the flow turned south to the Puyallup. In 1915, a King County-Pierce County flood control project diked off the Stuck channel at R.M. 8.0 and permanently directed the river into the Puyallup system.

In this lower section only three tributaries afford good anadromous fish production. These include 4.65 miles of an unnamed tributary with its 1.5 miles of tributary Jovita Creek; 1.8 miles of Strawberry Creek; and 3.6 miles of Bowman Creek.

Lake Tapps is an artificial lake created in 1911 by the Puget Sound Power and Light Company to provide storage water for the Dieringer Powerhouse. This lake lies at elevation 540, contains 2,296 surface acres with 46,665 acre feet of storage. Water from the White River is bypassed into Lake Tapps through the Buckley flume. Discharge from the Dieringer Powerhouse returns to the White River at R.M. 3.5.

White River has a valley averaging one mile in width, with steep hillsides rising abruptly to the 400-foot elevation. It is a glacial stream which has been highly channelized and diked for flood control. Considerable channel splitting occurs each year. The river transports heavy silt loads from annual flushing operations at Mud Mountain Dam and the diversion bypass canal.

Land usesis confined primarily to agriculture with some hillside logging. Indian fishing for both commercial and personal use occurs cn the Indian reservation.

Salmon Utilization

Utilization below R.M. 20 is principally for transportation and rearing. However, summer and fall chinook, chum, and pink salmon spawn in the mainstem above the Dieringer Powerhouse upstream to the Buckley fish trap and haul facilities. Spring chinook and coho normally are hauled above Mud Mountain Dam for spawning. Coho and chum spawn and rear in lower Jovita, Strawberry, and Bowman creeks.

Limiting Factors

Salmon production is limited by floods; silt and debris flushed from Mud Mountain Dam and Buckley flume; low summer blows; and flood control projects in the lower river. Also, operation of the Lake Tapps-Dieringer Plant Complex has had a major impact on the fish runs due to losses of juveniles through the fish screens in the bypass channel and reduction of stream flows for adult transportation and spawning.

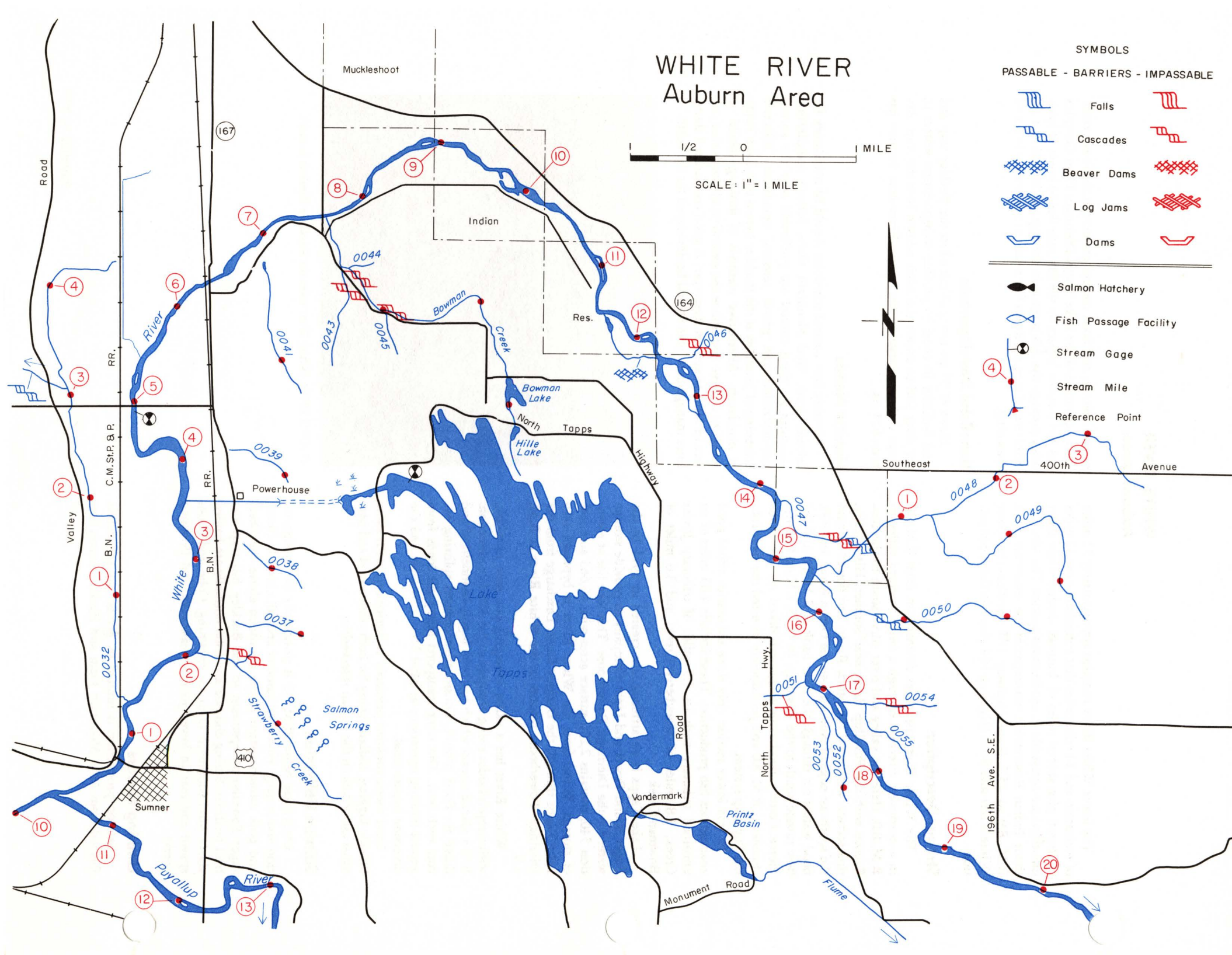
Beneficial Developments

Flows of 35 cfs are maintained in the Buckley trap and haul facilities in order to provide transportation waters in the river and to attract the adult salmon into the trap. Average daily discharge for the White River near Sumner has been 623 cfs.

Habitat Needs

Monthly flow control schedules should be mandatory for releases from Mud Mountain Dam. Stream stabilization measures for flood control are preferable over the annual channelization and gravel removal operations. Effective screening of juveniles at the Buckley bypass into Lake Tapps is mandatory. Alternative methods of flushing should be found to remove and utilize the extensive silt loads that collect in Mud Mountain Reservoir. A good coordinated shorelines management plan should be developed for the basin.

PHOTO 10-12. White River joins the Puyallup River at Sumner.


WHITE RIVER
Auburn Area
SCALE: 1" = 1 MILE
1/2
0
1 MILE
SYMBOLS
PASSABLE - BARRIERS - IMPASSABLE
Falls
Cascades
Beaver Dams
Log Jams
Dams
Salmon Hatchery
Fish Passage Facility
Stream Gage
Stream Mile
Reference Point
Muckleshoot
Indian
Res.
Bowman Creek
Bowman Lake
North Hille Lake
Tapps Lake
Tapps Highway
Powerhouse
Southeast 400th Avenue
Valley Road
C.M.St.P. & P. RR.
B.N. RR.
White River
Strawberry Creek
Salmon Springs
Sumner
Puyallup River
Vandermark Road
North Tapps Hwy.
Printz Basin
Flume
Monument Road
196th Ave. S.E.
0032
0037
0038
0039
0041
0043
0044
0045
0046
0047
0048
0049
0050
0051
0052
0053
0054
0055
167
164
410

WHITE RIVER — AUBURN AREA
Puyallup Basin — WRIA 10

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0021	Puyallup River			—	Chin., Coho, Pink, Chum
0031	White (Stuck) R.	RB-10.4	76.7	—	Chin., Coho, Pink, Chum
0032	Unnamed	RB-1.3	4.65	—	Coho, Chum
0033	Unnamed (Jovita Cr.)	RB-3.01	1.5	—	Coho, (Chum)
	Trout Lake	Outlet-1.5	—	—	
0035	Strawberry Cr.	LB-2.1	1.8	—	Coho,(Pink),Chum
0037	Unnamed	LB-2.35	1.05	—	Unknown
0038	Unnamed	LB-3.35	1.35	—	Unknown
0039	Unnamed	LB-4.05	1.05	—	Unknown
0040	Drainage Ditch	RB-5.3	~ 1.8	—	Unknown
0041	Unnamed	LB-6.9	1.35	—	Unknown
0042	Bowman Creek	LB-7.65	3.6	—	Coho, (Chum)
	Bowman Lake	Outlet-2.71	—	—	
	Hille Lake	Outlet-3.15	—	—	
0048	Unnamed	RB-15.45	3.8	—	Coho, (Chum)
0059	Unnamed	LB-1.3	2.35	—	Unknown
0050	Unnamed	RB-15.5	2.2	—	Coho, (Chum)
0052	Unnamed	LB-16.9	1.1	—	(Coho)
	(Cont. Puyallup 303)				

WHITE RIVER
Buckley Area

This section includes 11 miles of White River below Mud Mountain Dam near the towns of Buckley and Enumclaw. Boise Creek plus five smaller unnamed tributaries add 34.4 linear stream miles. U.S. Highway 410 and Burlington Northern Railroad bisect the White River near R.M. 23.1.

Stream Description

From R.M. 31.0 in the Mud Mountain Reservoir, the White River flows west by northwest to R.M. 20.0 below the Buckley-Lake Tapps Canal bypass return channel. The river is confined in a narrow steep-sided canyon from the dam to Red Creek, then broadens to about 0.5 mile in width. The valley widens below and walls are set back and rise sharply for 100 feet above the alley floor. Heavy growths of deciduous trees and brush fill the flat valley bottom. Deciduous trees dominate the side valley terrain and upper slopes. The principal tributaries include Boise Creek, Red Creek, and 3 small, unnamed tributaries. Old Pond Creek flows into the Mud Mountain Reservoir at R.M. 31.0. The White River is a fast-flowing glacial stream comprised principally of boulder and rubble with some gravel and considerable silt and fines. Intermittent gravel riffles are located among the channel splits where shifting has occurred and along the shorelines.

The towns of Enumclaw and Buckley are the principal nearby communities. Land use is agricultural with some logging and recreational activities. Mud Mountain Dam is a flood control structure located at R.M. 29.6, forming a long, narrow reservoir with a surface area of 1,200 acres and storage of 106,000 acre-feet. The dam is 425 feet high and 700 feet long, constructed of earth core and rock fill. Two 2,000-foot tunnels, one 9 feet and one 23 feet in diameter, pass the normal river flow. A concrete-lined spillway on the right bank passes floodwaters.

The Puget Sound Power and Light Company diversion dam forms a barrier at R.M. 24.25. Water is diverted through silt-settling ponds in Dingle Basin and into Lake Tapps, which provides storage water for the Dieringer Powerhouse. The diversion has a maximum capacity of 1,900 to 2,000 cfs.

Boise Creek is the principal tributary and flows from the Weyerhaeuser mill pond through pasturelands for 5.5 miles to the White River. Boise Creek courses within a well-defined stream channel cut deeply in the agricultural plateau. It contains good gravel and pool-riffle composition as well as stream-side cover.

Salmon Utilization

The Buckley diversion dam is a complete barrier to fish passage at R.M. 24.25; however, good transportation, spawning and rearing water are found below this point. The dam contains a fish trap and haul facility where salmon are collected and transported 12 miles upstream to above Mud Mountain Dam. The average return for the last 10-year period has been 1,915 coho and 508 chinook. Peak return of coho was 12,510 adults in 1950. Coho utilize all accessible areas of Boise Creek and chum spawn in the lower mile.

Limiting Factors

Factors that limit salmon production include flooding conditions, flushing of silt and debris from Mud Mountain Dam and Buckley flume, low summer flows, reservoir level fluctuations, and ineffective screening in the Buckley diversion channel. When Mud Mountain Reservoir levels exceed 90 feet above the 9-foot tunnel, downstream migration is impaired because juveniles will not sound to that depth in seeking the outlet. Migration is also delayed at the diversion and at the bypass fish screens, and many pass over the screens into Lake Tapps. The large rotary screens are only 50% effective and mortalities of 73% for chinook and 34% for coho have been measured. The heavy silt loads and flushing operations create excessive sediment in spawning areas which limits natural survival of eggs and fry. Low flows during the upstream migration period also cause serious delays in adult trapping. The Weyerhaeuser mill pond for log storage creates oxygen problems and heavy slime growth within the gravel bottom of Boise Creek.

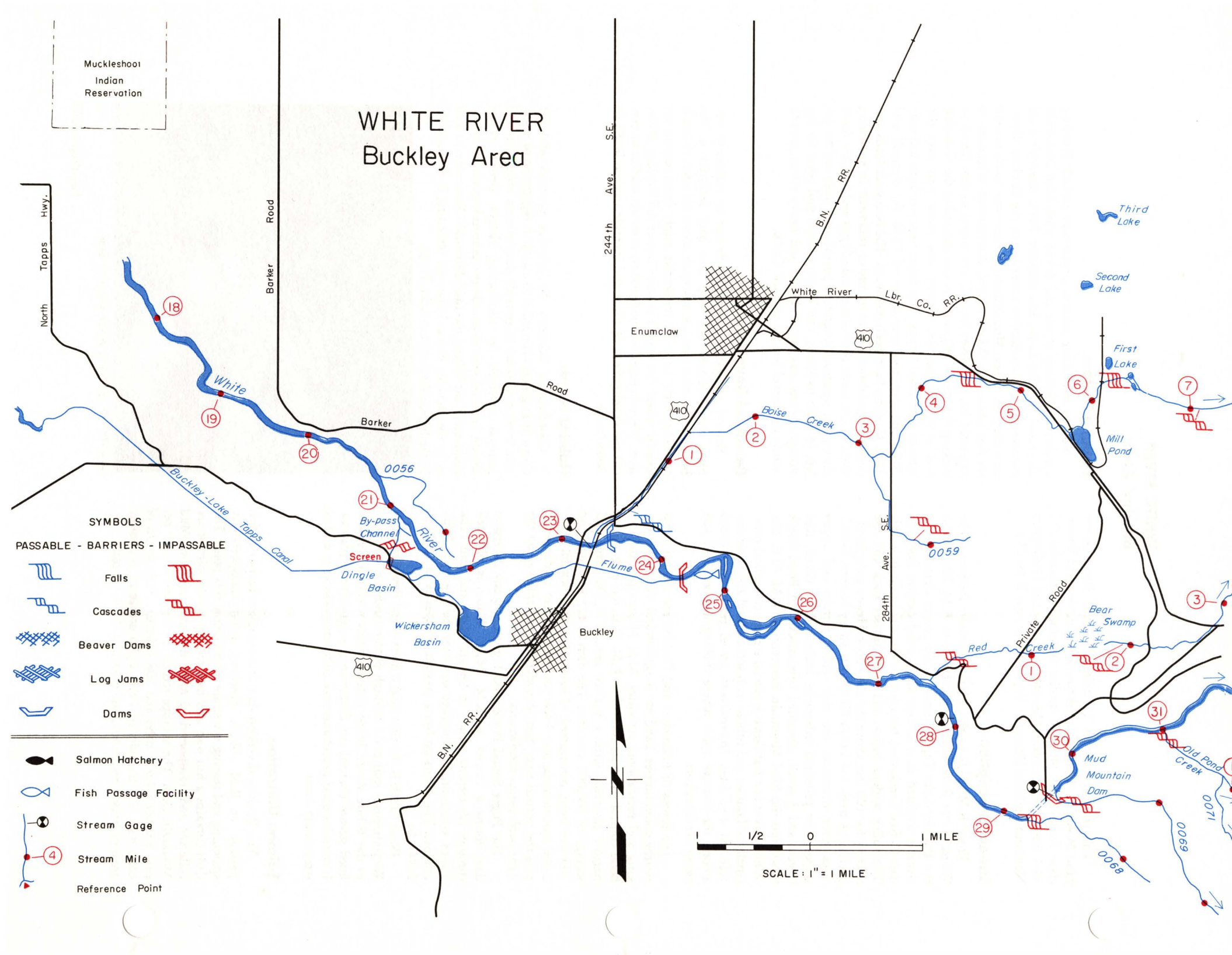
Beneficial Developments

Several mitigative measures attempt to minimize impacts noted above. The trap and haul facilities at the Buckley diversion provide upstream access for adult chinook and coho. Eight large but ineffective rotary drum screens are located where the bypass channel leaves the Buckley diversion. Weyerhaeuser has undertaken research studies to curtail the development of slime and increase oxygen levels in Boise Creek.

Habitat Needs

Coordination between the fisheries agencies and the Corps of Engineers is needed to establish regulation of reservoir levels and flows to provide downstream migration and increase survivals by eliminating delays. Better means should be developed to handle the tremendous silt loads and build-up of silt behind the Mud Mountain Reservoir, as well as in the Buckley flume. Improved screening is also needed in the bypass diversion to Lake Tapps.

PHOTO 10-13. White River diversion dam.


Muckleshoot Indian Reservation
WHITE RIVER
Buckley Area
North Tapps Hwy.
Barker Road
244th Ave. S.E.
B.N. RR.
White River Lbr. Co. RR.
Third Lake
Second Lake
First Lake
Mill Pond
Enumclaw
410
Barker Road
White River
Boise Creek
0056
Buckley-Lake Tapps Canal
By-pass Channel
Screen
Dingle Basin
Wickersham Basin
Buckley
Flume
284th Ave. S.E.
0059
Private Road
Red Creek
Bear Swamp
Mud Mountain Dam
Old Pond Creek
0071
0069
0068
SYMBOLS
PASSABLE - BARRIERS - IMPASSABLE
Falls
Cascades
Beaver Dams
Log Jams
Dams
Salmon Hatchery
Fish Passage Facility
Stream Gage
Stream Mile
Reference Point
1 1/2 0 1 MILE
SCALE: 1" = 1 MILE

WHITE RIVER — BUCKLEY AREA
Puyallup Basin — WRIA 10

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0021	Puyallup River				Chin., Coho, Pink, Chum
0031	White River				Chin., Coho, Pink, Chum
0056	Unnamed	RB-20.7	1.2	—	Coho
0057	Boise Creek	RB-23.25	11.8	15.4	Coho, (Chum)
0059	Unnamed	LB-3.2	1.4	—	Coho
	Millpond	Outlet-5.61	—	—	
0061	Unnamed	RB-8.6	1.05	—	None
0066	Red Creek	RB-27.5	5.3	5.59	(Coho)
0067	Drainage Ditch	LB-4.7	~ 1.25	—	None
0068	Unnamed	LB-29.2	1.4	—	None
0069	Unnamed	LB-29.65	2.6	—	None
0070	Old Pond Creek [1]	LB-31.0	4.8	—	None
0071	Unnamed	LB-0.85	1.2	—	None
0072	Unnamed	LB-1.2	1.9	—	None
	(Cont. Puyallup 403)				

[1] *For map of upper Old Pond Creek see Puyallup 420.*

WHITE RIVER
Clearwater Area

This section of the White River includes 10 miles of mainstem plus the entire Clearwater drainage and six tributaries to the White River, for a total of 84.35 stream miles. Access along this stretch of river is via the Chinook Pass Highway 410 which parallels the mainstem, and by private logging roads. This entire section of drainage all lies within King County.

Stream Description

The mainstem White River from R.M. 31 to 35 is inundated by the Mud Mountain Dam Reservoir which backs up to approximately R.M. 35.5 above the confluence of the Clearwater River. The stream above this point meanders to R.M. 42.0. There are six tributary streams draining into the White River plus 10.5 miles of Clearwater with some 14 moderate to small tributaries totalling more than 40.45 stream miles. The White River is a glacial stream and shows mountainous characteristics including heavy boulders, rubble, and large gravel, meandering with many channel splits and deep-cut banks. The Clearwater River originates from springs and natural runoff on Bear Head Mountain, and flows northerly 10.5 miles to the confluence with the White River at R.M. 35.3. Approximately a mile and a half downstream is Canyon Creek which originates from small lakes and groundwater runoff from the Three Sisters Mountain Range. It flows northerly 5.8 miles to its confluence with the White River at R.M. 33.8. The other tributary streams include Clay Creek, Cyclone Creek, West Twin, and East Twin creeks. These originate from the slopes of Grass Mountain north of the White River. They all contain steep cascade sections approximately 0.5 mile above their mouths.

The White River has a gradient of approximately 50 feet per mile and contains fast-moving flows. The main river and tributary creeks in the upper portion of this section all show the effects of heavy flood flows and runoffs. The hillside area between Clay Creek and East Twin Creek has been heavily logged in past years. Mostly deciduous trees and brush are found along the river banks and side slopes of the valley with some mixed conifer. Slash burns from logging have left the area barren.

The Clearwater River descends through a narrow, steep, heavily forested valley above R.M. 4.0. The lower valley gradually broadens and the gradient becomes moderate. Heavy rubble predominates in this section with considerable angular rock and gravel in the lower portions of the tributaries. Access is by a private logging road and jeep trail.

Land use is logging and recreation, with minimal development due to the precipitous terrain. Most of the land is owned by Weyerhaeuser Timber Company or other private logging interests. Gravel mining for road construction is also prevalent.

Salmon Utilization

Although salmon are transported and released 10 miles above the dam near Greenwater, the adult chinook and coho still manage to move downstream and into the Clearwater system. Both chinook and coho adults ascend Clearwater River beyond R.M. 5.0. Coho are also known to inhabit the lower 1.5 miles of Canyon Creek. Minimal spawning and rearing area is available within the main White River above the reservoir in this section. Coho can also utilize the lower tributary sections of streams entering the Clearwater River. Juvenile spring chinook and coho rear within the tributaries of this section of river the year around.

Limiting Factors

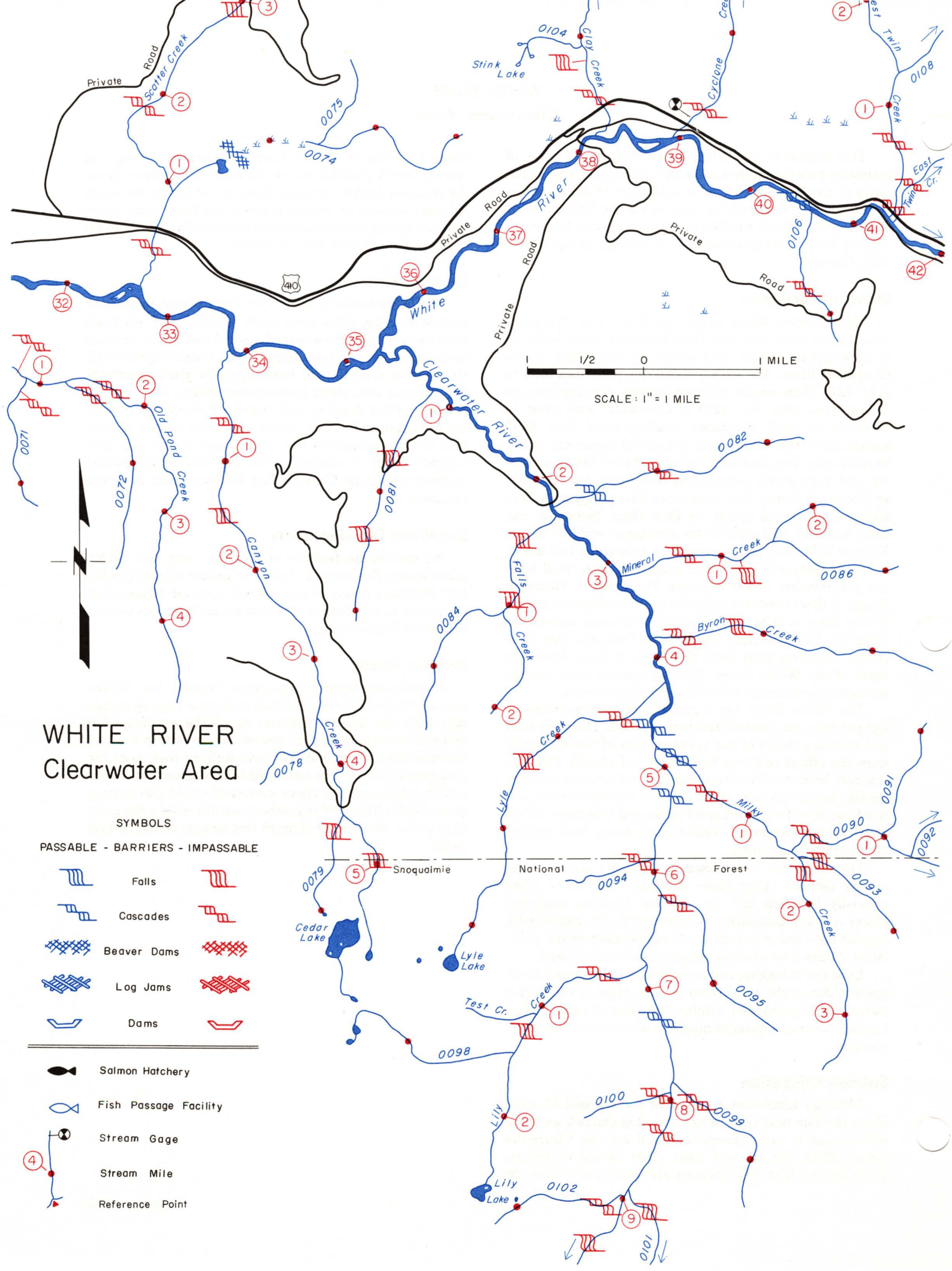
The major limiting factors curtailing salmon production include flooding from snow melt runoff, heavy silt loads from logging operations, large boulders and rubble material throughout the area, low summer flows restricting the available rearing area, limited food supply in glacial atersheds, and extreme cold water temperatures within the river and reservoir. Flash flooding and channel shifting are perhaps the most serious limiting factors impacting salmon production. Road construction and logging within the area have stripped much of nutrients from the land. Flood control measures along the Chinook Pass Highway have also been extensive.

Beneficial Developments

No specific fish facilities or programs have been undertaken within this section of river to benefit salmon production. Hatchery plants of chinook and coho are released into the system to supplement runs that are depleted due to environmental degradation.

Habitat Needs

Coordinated logging agreements between the Weyerhaeuser Timber Company and other private logging companies with the fisheries agencies should be encouraged in order to protect the natural stream habitat within the area. Rehabilitation of streams that have suffered from poor logging practices should be addressed in this agreement. Barren area fry plants into the upper watershed would also be beneficial. Establishment of streambed controls within the mainstem of the White river through this section should be evaluated.


WHITE RIVER
Clearwater Area
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
White River
Clearwater River
Private Road
410
Snoqualmie
National
Forest
Scatter Creek
Clay Creek
Cyclone Creek
West Twin Creek
East Twin Cr.
Stink Lake
Old Pond Creek
Canyon Creek
Falls Creek
Mineral Creek
Byron Creek
Lyle Creek
Milky Creek
Test Cr.
Lily Creek
Cedar Lake
Lyle Lake
Lily Lake
0071
0072
0074
0075
0078
0079
0081
0082
0084
0086
0090
0091
0092
0093
0094
0095
0098
0099
0100
0101
0102
0104
0106
0108
32
33
34
35
36
37
38
39
40
41
42

WHITE RIVER — CLEARWATER AREA
Puyallup Basin — WRIA 10

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0021	Puyallup River				Chin., Coho, Pink, Chum
0031	White River				Chin., Coho, Pink, Chum
0073	Scatter Creek	RB-32.7	5.1	—	Coho
0074	Unnamed	LB-0.9	3.05	—	None
	Unnamed Lake	Outlet-0.5	—	—	
0076	Unnamed	LB-3.85	1.5	—	None
0077	Canyon Creek	LB-33.85	5.8	6.05	Coho
0079	Unnamed	LB-4.45	1.0	—	None
	Unnamed Lake	Outlet-5.8	—	—	
0080	Clearwater River	LB-35.3	10.5	37.8	Chin., Coho
0081	Unnamed	LB-0.75	2.1	—	Coho
0082	Unnamed	RB-2.31	2.35	—	(Coho)
0083	Falls Creek	LB-2.4	2.05	—	(Coho)
0084	Unnamed	LB-1.1	1.5	—	None
0085	Mineral Creek	RB-3.15	2.7	—	(Coho)
0086	Unnamed	LB-1.5	1.15	—	None
0087	Byron Creek	RB-3.8	2.5	—	(Coho)
0088	Lyle Creek	LB-4.2	3.35	—	(Coho)
0089	Milky Creek	RB-4.8	3.55	6.99	(Chin.), (Coho)
0090	Unnamed	RB-1.5	2.8	—	None
0091	Unnamed	RB-0.85	1.1	—	None
0092	Unnamed	RB-1.2	1.1	—	None
0093	Unnamed	RB-1.6	1.1	—	None
0095	Unnamed	RB-6.2	1.7	—	Unknown
0096	Lily Creek	LB-6.8	2.7	—	(Coho)
0098	Unnamed	LB-1.5	1.6	—	None
	Lily Lake	Outlet-2.7	—	—	
0099	Unnamed	RB-7.85	1.5	—	Unknown
0101	Unnamed	RB-8.9	2.2	—	None
0102	Unnamed	LB-8.95	1.2	—	None
0103	Clay Creek	RB-38.2	1.7	—	None
0105	Cyclone Creek	RB-38.95	2.1	—	None
0106	Unnamed	LB-40.6	1.2	—	None
0107	W. Twin Creek	RB-41.4	2.7	—	None
0108	Unnamed	LB-1.3	1.8	—	None
0109	E. Twin Creek	RB-41.5	2.65	—	None

WHITE RIVER — CLEARWATER AREA
Puyallup Basin — WRIA 10

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0110	Unnamed	LB-1.0	1.3	—	None
0111	Unnamed	LB-1.9	1.0	—	None
	(Cont. Puyallup 503)				

WHITE RIVER
West Fork Area

This covers the White River from just above Twin Creeks (R.M. 41.5) upstream to Huckleberry Creek (R.M. 53.1), approximately 11 miles. Seven small tributaries enter along this stretch, adding nearly 19 miles. Also included is the lower 9-10 miles of West Fork White which, with its 30 total tributaries add about 70 stream miles. Two larger tributaries enter in this section, the Greenwater River (Puyallup 600) and Huckleberry Creek (Puyallup 700). The area is located approximately 16 miles east of Enumclaw, in southeast King County, with access via Highway 410. Approximately the upper mile of White River, plus the West Fork and its tributaries above R.M. 4 are within Snoqualmie National Forest.

Stream Description

From Huckleberry Creek the White River flows northwest more than 7 miles to the Clearwater vicinity, then generally west 4 miles to Twin Creeks. Principal tributaries are Huckleberry Creek, the West Fork White and Greenwater River.

The White River valley floor is relatively narrow throughout this section, but slightly broader near the community of Greenwater. Generally it slopes moderately upward away from the river, meeting sharply rising mountainside slopes of nearly 5,000 feet in some areas. Scattered stands of mixed deciduous and coniferous growth exists over most of the bottomland. The steeper mountain slopes contain thick coniferous forests except where extensive clear-cut logging has occurred. Some bottom and mountain slope sections are in various stages of reforestation. On the West Fork White River generally the same type of valley, mountain slope, and cover conditions prevail. Little development exists along this White River section, with the community of Greenwater being the only populated area. Logging is the chief activity, with extensive clear-cut areas evident. Considerable recreation use also occurs here.

The glacier-fed White River exhibits moderately steep gradient characteristics throughout this section. Except for a few short, relatively confined stretches, the channel appears somewhat unstable, presenting numerous splits and braiding. Swift-flowing riffles predominate, with few pools, some rapids, and a few cascade stretches. Stream widths range from 11 to 14 yards above the confluence of the West Fork, and 14 to 20 yards below. The bottom is predominantly boulder and rubble with limited patch gravel and a few small gravel riffles. Stream banks are principally natural earth or rock cuts, or relatively broad boulder-rubble side beaches. Some limited bank protection work has taken place generally near bridges or at points where logging roads abut the streams.

The West Fork falls over a gradient exhibiting profile, bottom, and stream bank conditions similar to that described for the mainstem. This lower section of the West Fork ranges from 6 to 12 yards in width.

Stream-side cover along the White River and its large tributaries is generally sparse, consisting of intermittent thickets or small stands of deciduous and low coniferous trees and underbrush. The smaller tributaries of the White River and West Fork present steep swift-flowing mountain-type characteristics. Access is limited to the relatively short stretches where they flow over the narrow valley floors. These streams have narrow confined channels, with gravel-rubble bottoms over their lowermost reaches and rubble and boulder above. Most are provided with dense cover except where clear-cut logging has occurred.

Salmon Utilization

Spring chinook and coho spawn and rear within this section; however, only in relatively small numbers. The riffle and patch gravel areas in the White River and the West Fork provide spawning habitat for chinook, while coho tend to use the smaller tributaries. Juveniles of both species rear within these waters year around.

Limiting Factors

Cold, glacial mountain stream characters in most of these waters naturally limit production. Extensive clear-cut logging and certain road building practices have impacted production capabilities in some sections by removal of natural cover and allowing debris and silt to enter streams.

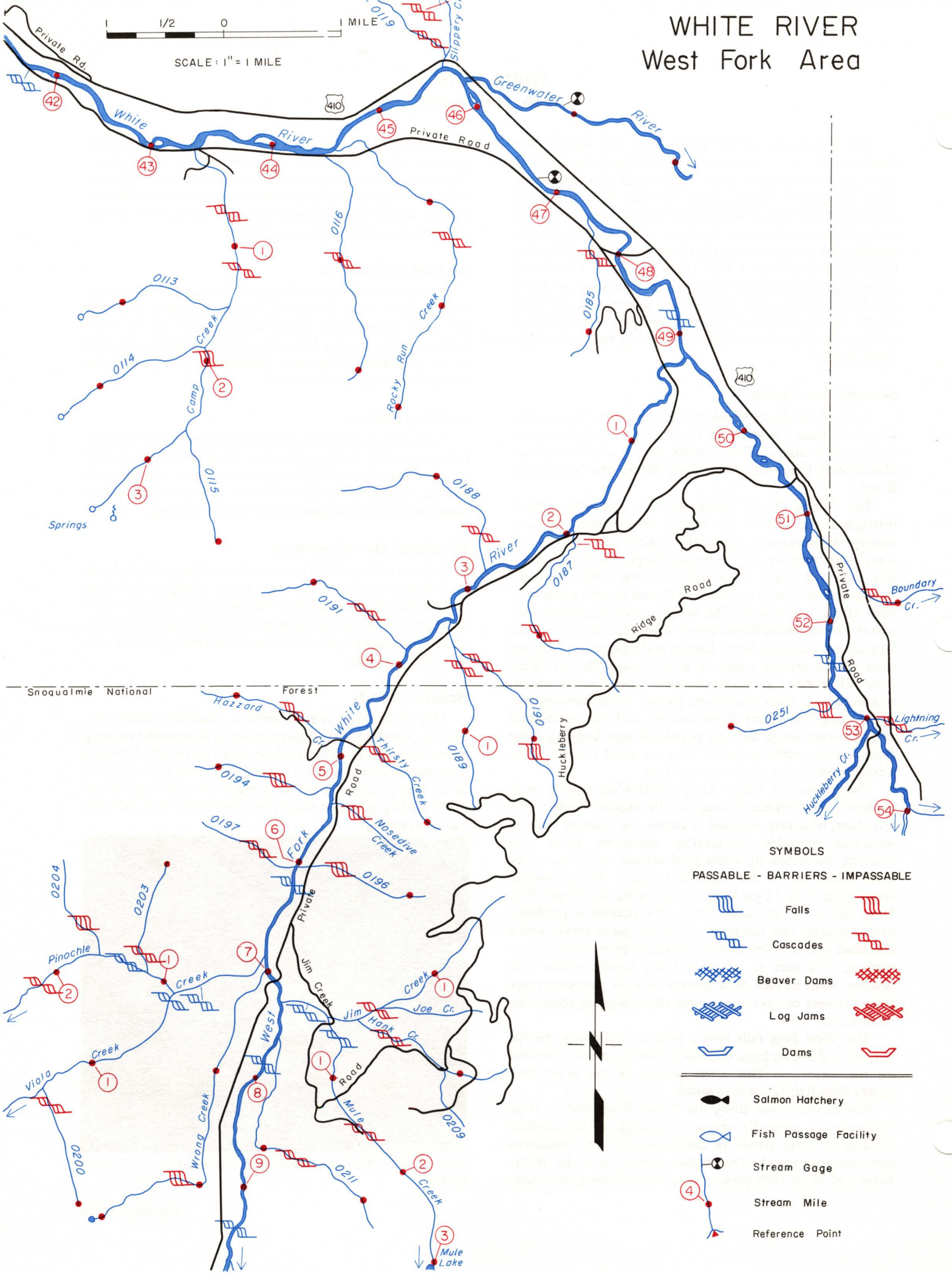
Beneficial Developments

Salmon utilizing this section of river have already benefited from a truck-and-haul operation, transporting adults around Mud Mountain Dam, releasing them into the upper drainage just below the community of Greenwater. Also, artifically propagated juveniles are occasionally planted into the upper drainage.

Habitat Needs

One of the main requirements to maintain natural production potential within this section is to preserve existing stream-side cover, and to replace cover previously removed. Also, stream and streambed conditions should be maintained in as near a natural state as possible. Future logging and road building practices should be coordinated with fish habitat requirements.

PHOTO 10-14. West Fork White River is confined by steep forested slopes.


WHITE RIVER
West Fork Area
1/2 0 1 MILE
SCALE: 1" = 1 MILE
Private Rd.
White River
Greenwater River
Private Road
Slippery Cr.
Rocky Run Creek
Camp Creek
Springs
Ridge Road
Private Road
Boundary Cr.
Lightning Cr.
Huckleberry Cr.
Huckleberry
Hazzard Cr.
Thirsty Creek
Nosedive Creek
Fork
Jim Creek
Joe Cr.
Hank Cr.
Mule Creek
Mule Lake
Pinochle Creek
Viola Creek
Wrong Creek
West
Snoqualmie National Forest
SYMBOLS
PASSABLE - BARRIERS - IMPASSABLE
Falls
Cascades
Beaver Dams
Log Jams
Dams
Salmon Hatchery
Fish Passage Facility
Stream Gage
Stream Mile
Reference Point

WHITE RIVER — WEST FORK AREA
Puyallup Basin — WRIA 10

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0021	Puyallup River				Chin., Coho, Pink, Chum
0031	White River				Chin., Coho, Pink, Chum
0112	Camp Creek	LB-43.3	3.6	—	(Chin.), Coho
0113	Unnamed	LB-1.5	1.4	—	None
0114	Unnamed	LB-1.9	1.4	—	None
0115	Unnamed	RB-2.6	1.0	—	None
0116	Unnamed	LB-44.4	2.1	—	(Coho)
0117	Rocky Run Creek	LB-44.5	3.1	—	Coho
0118	Slippery Creek	RB-45.6	2.9	—	Coho
0119	Unnamed	RB-0.1	1.2	—	Unknown
0120	Unnamed	LB-0.7	1.7	—	None
0121	Unnamed	LB-1.95	1.4	—	None
0122	Greenwater R.	RB-45.8	21.2	—	Chin., Coho
	(See Puyallup 603)				
0185	Unnamed	LB-47.35	1.25	—	Unknown
0186	W. Fk. White R.	LB-49.2	20.2	—	Chin., Coho
0187	Unnamed	RB-1.9	1.95	—	(Coho)
0188	Unnamed	LB-2.8	1.9	—	Unknown
0189	Unnamed	RB-3.35	1.7	—	(Coho)
0190	Unnamed	RB-0.2	1.9	—	Unknown
0191	Unnamed	LB-3.8	1.4	—	Unknown
0192	Thirsty Creek	RB-4.6	1.1	—	(Coho)
0193	Hazard Creek	LB-4.85	1.3	—	Unknown
0194	Unnamed	LB-5.3	1.2	—	(Coho)
0196	Unnamed	RB-6.0	1.1	—	Unknown
0198	Pinochle Creek	LB-6.85	4.3	—	Chin., Coho
	(Cont. Puyallup 703)				
0250	Boundary Creek	RB-51.1	2.1	—	(Coho)
0251	Unnamed	LB-52.7	1.0	—	Unknown
0252	Lightning Creek	RB-53.0	1.7	—	Unknown
0253	Huckleberry Creek	LB-53.1	12.4	—	Chin., Coho
	(Cont. Puyallup 703)				

GREENWATER RIVER DRAINAGE

This segment covers the entire Greenwater River drainage. Along its 21-mile length there are more than 30 tributaries adding 88 linear miles. This section is located 16 miles east of Enumclaw, Washington, in southeast King County. Access is via Highway 410, Forest Service and private logging roads. The river and all tributaries above mile 4.5 are within Snoqualmie National Forest.

Stream Description

From headwaters on Castle Mountain, the Greenwater flows generally northwest for 21 miles, meeting the White River at the town of Greenwater. Principal tributaries include Maggie, Lost, Pyramid and Twenty-eight Mile creeks.

Over the upper 12 or so miles the river is contained in a relatively narrow, steep-sloped valley with most slopes holding dense coniferous forest. Below Burns Creek (R.M. 8.2) the valley floor alternately broadens and narrows for nearly 4 miles, with the side hills remaining very steep and thickly forested. Over its lower 4 miles the river courses over a relatively broad, flat valley with steeper slopes along the north bank. Forest cover over the valley and side slopes along the lower 5 miles ranges from clear-cut areas to dense coniferous and mixed deciduous timber. Little development has occurred in this drainage, with the community of Greenwater the only populated area. Logging is the principal activity, being extensive in some sections. The area receives fairly heavy recreation use, with a number of formal campsites developed in the upper reaches.

The Greenwater heads in a high mountain valley containing at least two small lakes. The stream drops rapidly for the first 10 miles to the vicinity of Pyramid Creek (R.M. 10.5). Through this precipitous stretch the confined channel ranges from 2 to 5 yards in width and reveals numerous cascades, small falls, and a predominately bedrock and boulder stream bottom. Stream-side cover is dense. Below Pyramid Creek the gradient remains moderately steep to steep, with numerous cascades separated by occasional pool-riffle stretches, and the bottom consists of boulder and rubble with relatively few gravel areas. Stream widths range from 4 to 8 yards. Banks are mostly sharp rock cuts with dense overgrowth. These conditions generally depict the stream character for the next 2 to 3 miles below Pyramid Creek, to the vicinity of Burns Creek. Below Burns Creek the gradient decreases to moderate and the channel takes on a more winding stream course toward Greenwater. The channel remains relatively confined, with a few stretches having numerous channel splits. A relatively good pool-riffle balance exists through most of the river's lower eight miles. Stream banks are relatively stable, consisting of natural earth or rock cuts, or rubble-gravel side beaches. Stream-side cover ranges from sparse to dense. Where clear-cut section logging has not taken place, cover consists primarily of coniferous timber with some mixed deciduous trees and underbrush.

Salmon Utilization

Small to moderate numbers of spring chinook and coho populate the Greenwater. This river serves as one of the principal spawning areas for spring chinook. Adult salmon are known to ascend as far as Burns Creek (R.M. 8.2), and may proceed a short distance beyond. Most spawning occurs in the mainstem; however, accessible tributaries provide suitable spawning habitat. Juvenile chinook and coho rear within these waters year-round.

Limiting Factors

The steep gradients and increasing cascades above Burns Creek are believed to form a natural limitation within this system. Also, the steep side valley terrain prevents fish use of tributaries. Extensive clear-cut logging, removal of natural stream cover, and logging road construction not coordinated with fish production requirements, have jointly reduced the quality of the available fish production habitat. Considerable siltation occurs over some streambed areas, and logging debris has caused a few jams in lower stream reaches. Encroachment of summer home developments on the river banks have reduced fish use habitat, particularly in the lower 2 to 3 miles.

Beneficial Developments

No facilities or special projects have been undertaken to benefit salmon production within this section. Juvenile salmon plants have been made into this watershed. Rehabilitation of spring chinook within this system could be highly beneficial.

Habitat Needs

The major requirements to maintain fish production potential involve preserving existing stream-side cover and maintaining the natural existing stream and streambed conditions. A program to develop profuse growing stream-side cover should also be undertaken.

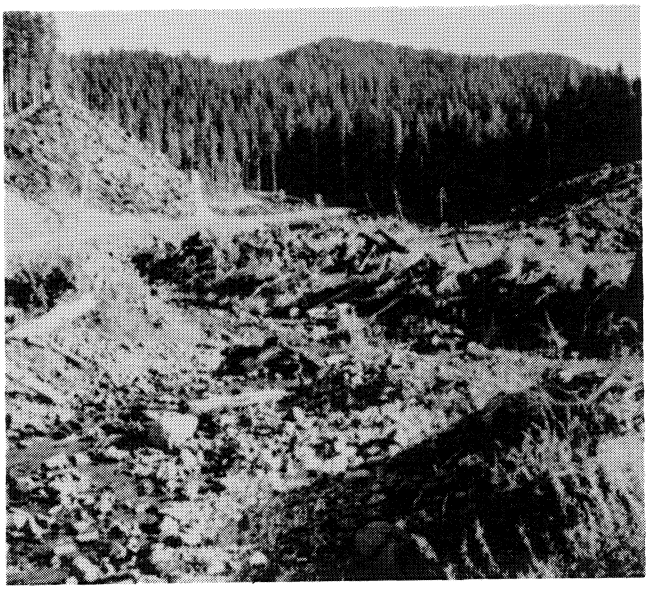
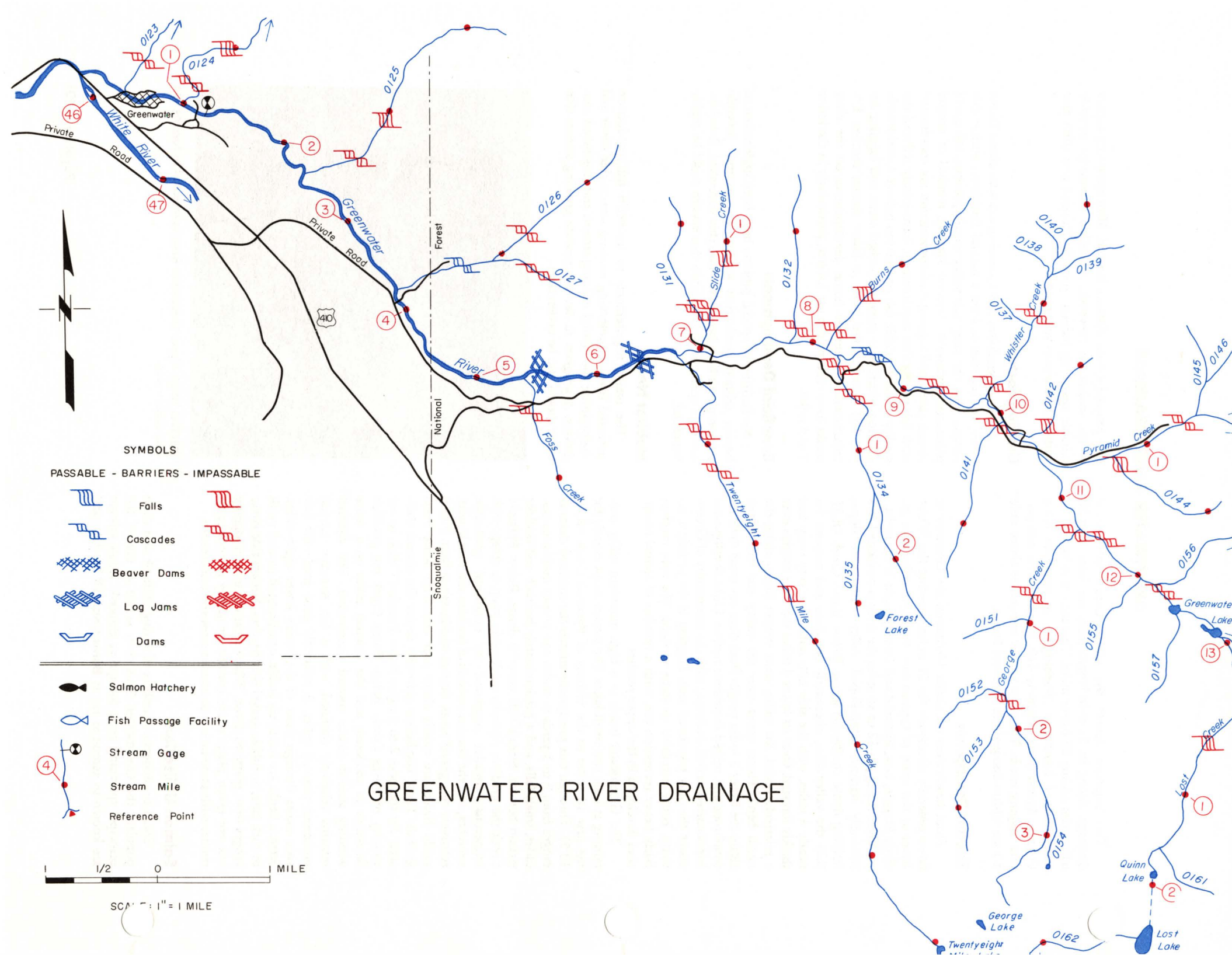


PHOTO 10-15. Upper Greenwater River is impacted by logging and road construction.


0123
0124
0125
0126
0127
0131
0132
0135
0134
0141
0142
0145
0146
0140
0138
0139
0137
0144
0156
0155
0157
0151
0152
0153
0154
0161
0162
1
2
3
4
5
6
7
8
9
10
11
12
13
46
47
Greenwater
White River
Private Road
Greenwater River
Private Road
Forest
National
Snoqualmie
410
Foss Creek
River
Slide Creek
Burns Creek
Whistler Creek
Pyramid Creek
Twentyeight Mile Creek
Forest Lake
Greenwater Lake
George Lake
Lost Creek
Quinn Lake
Lost Lake
SYMBOLS
PASSABLE - BARRIERS - IMPASSABLE
Falls
Cascades
Beaver Dams
Log Jams
Dams
Salmon Hatchery
Fish Passage Facility
Stream Gage
Stream Mile
Reference Point
1 1/2 0 1 MILE
SCALE: 1" = 1 MILE
GREENWATER RIVER DRAINAGE

GREENWATER RIVER DRAINAGE
Puyallup Basin — WRIA 10

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0021	Puyallup River				Chin., Coho, Pink, Chum
0031	White River				Chin., Coho, Pink, Chum
0122	Greenwater River	RB-45.8	21.2	76.4	Chin., Coho
0123	Unnamed	RB-0.45	1.9	—	Coho
0124	Unnamed	RB-1.0	2.2	—	Coho
0125	Unnamed	RB-2.4	2.35	—	Coho
0126	Unnamed	RB-3.8	2.4	—	Coho
0128	Foss Creek	LB-5.35	1.3	—	(Coho)
0129	Twenty-Eight Mile Creek	LB-6.8	6.0	—	Coho
	Twenty-Eight Mile Lake	Outlet-6.0	—	—	
0130	Slide Creek	RB-7.0	1.8	—	Coho
0131	Unnamed	RB-0.2	1.3	—	Unknown
0132	Unnamed	RB-7.8	1.5	—	Unknown
0133	Burns Creek	RB-8.15	1.9	—	Unknown
0134	Unnamed	LB-8.25	2.65	—	Unknown
0135	Unnamed	LB-1.4	1.1	—	None
0136	Whistler Creek	RB-9.8	2.1	—	None
0141	Unnamed	LB-10.1	1.5	—	None
0142	Unnamed	RB-10.2	1.1	—	None
0143	Pyramid Creek	RB-10.55	3.8	—	None
0144	Unnamed	LB-0.7	1.2	—	None
0147	Unnamed	RB-1.85	1.2	—	None
0150	George Creek	LB-11.3	3.9	—	None
0153	Unnamed	LB-1.8	1.4	—	None
0156	Unnamed	RB-12.2	2.3	—	None
	Greenwater Lks. (Lower Lk.)	Outlet-12.4	—	—	
	Greenwater Lks. (Upper Lk.)	Outlet-12.85	—	—	
0158	Meadow Creek	RB-12.95	3.15	—	None
0160	Lost Lake	LB-13.6	3.8	—	None
	Quinn Lake	Outlet-1.85	—	—	
	Lost Lake	Outlet-2.3	—	—	
0162	Unnamed	LB-2.5	1.9	—	None
0163	Maggie Creek	RB-14.25	3.4	—	None
0168	Unnamed	RB-15.46	2.15	—	None

GREENWATER RIVER DRAINAGE
Puyallup Basin — WRIA 10

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0169	Unnamed	LB-0.2	1.3	—	None
	Echo Lake	Outlet-16.5	—		
0172	Unnamed	RB-16.75	1.8	—	None
0175	Unnamed	LB-18.0	1.4	—	None
0176	Unnamed	RB-18.55	1.3	—	None
0178	Unnamed	RB-18.85	2.0	—	None
	Hidden Lake	Outlet-19.2	—	—	
0181	Unnamed	LB-19.25	1.5	—	None

WHITE RIVER
Mount Rainier-Headwaters

This segment covers nearly 24 stream miles of the upper White River from the vicinity of Huckleberry Creek to its Mount Rainier headwaters. More than 20 tributaries along this stretch add about 184 linear stream miles. Also included are the upper 16 miles of West Fork White River (see Puyallup 501). This area is located about 25 miles east of Enumclaw with access via Highway 410. The river's upper 16 miles lie within the Mount Rainier National Park, while the majority of the area below is the Snoqualmie National Forest. Likewise, upper Huckleberry Creek and upper West Fork are in the park and their lower reaches in forest land.

Stream Description

From Emmons and Fryingpan glaciers the White River travels east, then generally north 18 miles to Ranger Creek, then northwest 6 miles to Huckleberry Creek. Principal tributaries are Fryingpan, Sunrise, Silver, and Huckleberry creeks.

The valley floor is quite narrow through this section with extremely steep mountain slopes, often rising sharply from the river's edge to well over 6,000 feet. The bottom contains mixed dense conifer and deciduous timber, while the side slopes have dense conifer forest. Above Fryingpan Creek the timber thins out, giving way to low scattered conifers, then to bare rock slopes, perennial snowfields and glaciers. Similar terrain and cover exist on the upper West Fork and to some degree on Huckleberry Creek. Development is extremely limited and is oriented mostly to park management or recreation. Some logging occurs outside the park boundaries.

The White River's upper 10-11 miles present very steep, and sometimes precipitous gradient. Much of the channel is unstable with considerable splitting and braiding, and a number of falls and many cascades and rapids. The bottom is mostly boulder and bedrock with some rubble-patch gravel stretches. Over the lower 13-14 miles of this section the channel remains quite steep and has only a few moderate gradient stretches, mainly in the lower 2-3 miles. The channel remains somewhat unstable, exhibiting considerable braiding and major channel splitting. There are many cascades and rapids, some fast riffles, and few pools. Stream widths range from about 6 to nearly 15 yards in some areas. Bottom material is mostly boulder and rubble, with a few rubble-gravel riffles over the lower stretches. Banks are either rock or earth cuts, or moderately sloping boulder-rubble side beaches. Stream-side cover consists of moderate to dense stands of coniferous timber.

The West Fork White's upper 4-5 miles present extremely steep gradient, with numerous falls, cascades and rapids, and boulder and rubble substrate. Below Lodi Creek the gradient decreases with the stream offering mostly fast riffles, and a few rapids and scattered cascades. Stream widths range from 4 to 9 yards. The bottom is largely rubble-boulder with a few patch gravel and short gravel riffle stretches.

Huckleberry Creek contains steep gradient over its upper 9 or so miles, with numerous cascades and small falls. The bottom is mainly boulders and rubble. Gradient decreases over the lower 3 miles with the partially confined channel consisting mainly of fast riffles, some rapids, and a few pools. Here the bottom is essentially rubble with a few small gravel riffles and scattered boulder-strewn areas. Stream widths range from 4 to 10 yards. Banks are generally stable earth or rock cuts covered with dense conifers.

The small tributaries have steep mountain physical features over most of their stream length. Within their narrowly confined channels they contain numerous falls, cascades, and rapids and predominantly boulder-rubble bottoms. Dense forest cover extends throughout their lengths.

Salmon Utilization

This section of the drainage is utilized by spring chinook and coho salmon. Both species spawn in the shallow, slower moving riffle areas of the mainstem, or in accessible tributaries. Juveniles are present all year within these waters. Huckleberry Creek has in the past supported good numbers of spring chinook.

Limiting Factors

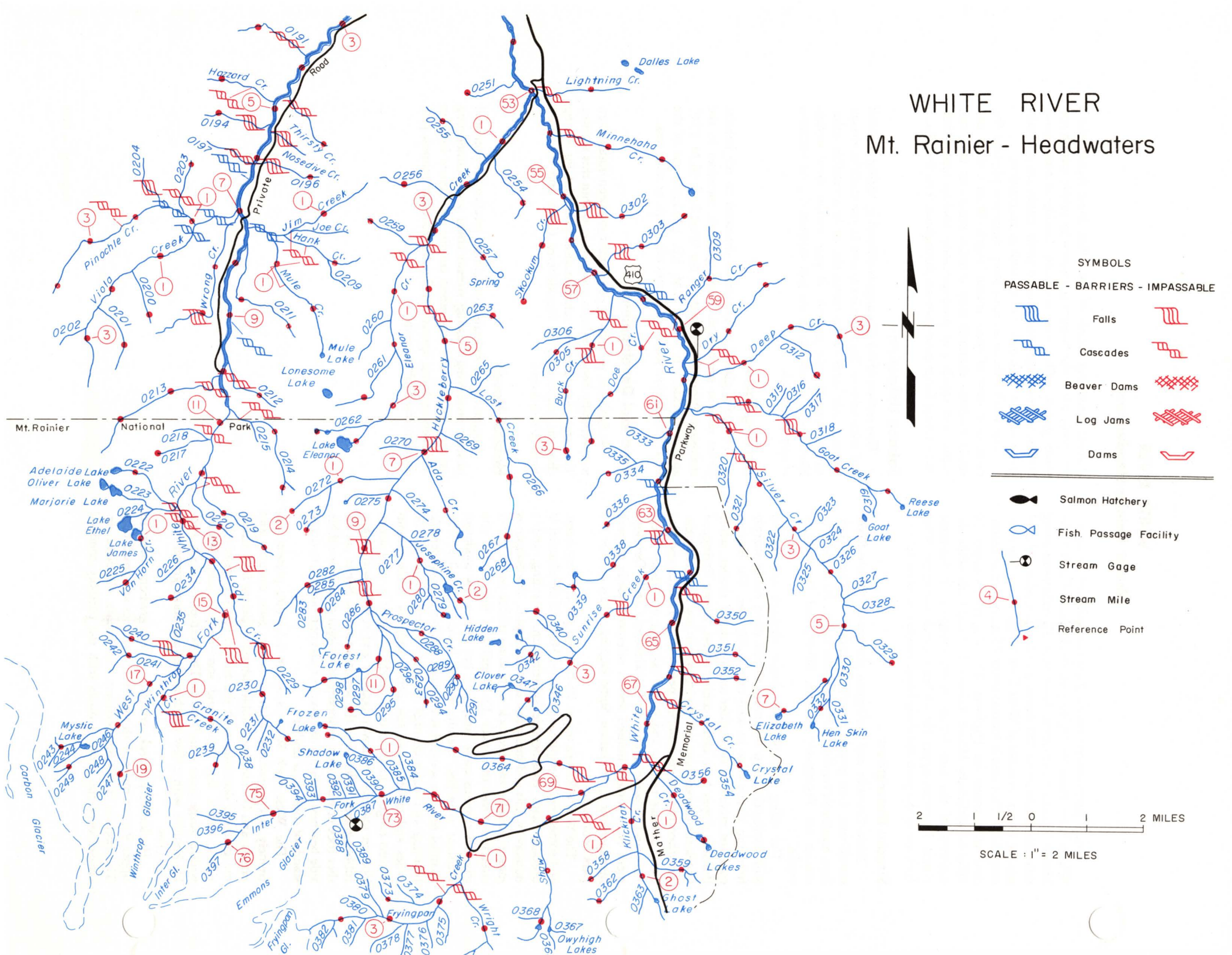
The cold, glacial mountainous character of the habitat limits salmon production. Steep gradient increases in the mainstem White (R.M. 68.0), in the West Fork (R.M. 15.0) and in Huckleberry Creek R.M. 3.0) precludes use of the areas above. Most small tributaries offer little or no access.

Beneficial Developments

No facilities, projects or programs have been undertaken to specifically benefit salmon production within this section. The area does provide rehabilitation potential for spring chinook, particularly in Huckleberry Creek and the West Fork White River.

Habitat Needs

Requirements to maintain salmon production potential include preserving existing stream cover and maintaining existing stream and streambed conditions. Future logging and road building operations should recognize salmon production and habitat needs.


WHITE RIVER
Mt. Rainier - Headwaters
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
Mt. Rainier National Park
Private Road
Hazzard Cr.
Thirsty Cr.
Nosedive Cr.
Jim Joe Cr.
Hank Cr.
Mule Cr.
Pinochle Cr.
Viola Creek
Wrong Cr.
Mule Lake
Lonesome Lake
Lake Eleanor
Eleanor Creek
Huckleberry Creek
Spring Creek
Lightning Cr.
Dalles Lake
Minnehaha Cr.
Skookum Cr.
Ranger Cr.
Dry Cr.
Deep Cr.
Buck Cr.
Doe Cr.
Parkway
Goat Creek
Reese Lake
Goat Lake
Silver Cr.
Adelaide Lake
Oliver Lake
Marjorie Lake
Lake Ethel
Lake James
Van Horn Cr.
White River
Lodi Fork Cr.
Josephine Cr.
Ada Cr.
Prospector Cr.
Hidden Lake
Forest Lake
Clover Lake
Sunrise Creek
Frozen Lake
Shadow Lake
Granite Creek
West Winthrop Cr.
Mystic Lake
Carbon Glacier
Winthrop Glacier
Inter Glacier
Emmons Glacier
Fryingpan Gl.
Fryingpan Creek
Wright Cr.
Owyhigh Lakes
Ghost Lake
Deadwood Lakes
Deadwood Cr.
Klickitat Cr.
Crystal Cr.
Crystal Lake
Elizabeth Lake
Hen Skin Lake
Shaw Cr.
Mather Memorial Parkway
White River
Inter Fork
410

WHITE RIVER — MOUNT RAINIER — HEADWATERS
Puyallup Basin — WRIA 10

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0021	Puyallup River				Chin., Coho, Pink, Chum
0031	White River				Chin., Coho, Pink, Chum
0086	W. Fk. White R.	LB-49.2	20.2	—	Chin., Coho
	(Cont. from Puyallup 503)				
0198	Pinochle Creek	LB-6.85	4.1	—	Chin., Coho
0199	Viola Creek	RB-0.85	3.9	—	Coho
0200	Unnamed	RB-1.45	1.1	—	None
0201	Unnamed	RB-2.4	1.35	—	None
0203	Unnamed	LB-1.1	1.0	—	Unknown
0205	Wrong Creek	LB-7.0	2.9	—	(Coho)
0206	Mule Creek	RB-7.3	2.9	—	Unknown
0207	Jim Creek	RB-0.4	1.9	—	Unknown
0208	Hank Creek	LB-0.25	1.4	—	Unknown
	Mule Lake	Outlet-2.9	—	—	
0211	Unnamed	RB-7.6	2.2	—	Unknown
0212	Unnamed	RB-9.8	1.4	—	Unknown
0213	Unnamed	LB-10.1	2.5	—	Unknown
0214	Unnamed	RB-10.7	2.1	—	None
0217	Unnamed	LB-11.3	1.05	—	None
0219	Unnamed	RB-11.8	2.2	—	None
0220	Unnamed	RB-12.15	1.3	—	None
0221	Van Horn Creek	LB-12.65	2.2	—	None
0222	Unnamed	LB-0.01	1.25	—	None
	Lake James	Outlet-0.95	—	—	
	Unnamed Lake	Outlet-2.2	—	—	
0227	Lodi Creek	RB-13.7	4.05	—	None
0234	Unnamed	LB-13.8	1.5	—	None
0236	Winthrop Creek	RB-15.95	1.5	—	None
0237	Granite Creek	RB-1.1	2.2	—	None
0240	Unnamed	LB-16.2	1.4	—	None
0241	Unnamed	LB-16.3	1.4	—	None
0243	Unnamed	LB-18.1	1.4	—	None
0246	Unnamed	LB-18.15	1.3	—	None
	(White R. cont. from Puyallup 503)				
0253	Huckleberry Creek	LB-53.1	12.4	—	Chin., Coho

WHITE RIVER — MOUNT RAINIER — HEADWATERS
Puyallup Basin — WRIA 10

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0254	Unnamed	RB-1.2	1.3	—	(Coho)
0255	Unnamed	LB-1.4	1.4	—	Unknown
0256	Unnamed	LB-2.3	1.4	—	(Coho)
0257	Unnamed	RB-2.7	1.4	—	Coho
0258	Eleanor Creek	LB-3.2	4.1	—	None
0259	Unnamed	LB-0.1	1.05	—	None
0261	Unnamed	LB-2.05	1.5	—	None
0262	Unnamed	LB-3.6	1.0	—	None
	Lake Eleanor	Outlet-4.1	—	—	
0263	Unnamed	RB-4.7	1.3	—	None
0264	Lost Creek	RB-5.75	3.9	—	None
	Unnamed Lake	Outlet-3.9	—	—	
0271	Ada Creek	RB-7.05	1.95	—	None
	Unnamed Lake	Outlet-1.45	—	—	
	Unnamed Lake	Outlet-1.95	—	—	
0272	Unnamed	LB-7.65	2.05	—	None
0273	Unnamed	RB-1.25	1.0	—	None
0276	Josephine Creek	RB-8.4	2.4	—	None
0279	Unnamed	LB-1.2	1.0	—	None
	Unnamed Lk.	Outlet-1.0	—	—	
	Unnamed Lake	Outlet-1.65	—	—	
0282	Unnamed	LB-9.4	1.85	—	None
0284	Unnamed	LB-9.6	1.9	—	None
0286	Unnamed	LB-10.05	1.0	—	None
0287	Prospector Cr.	RB-10.15	2.6	—	None
0293	Unnamed	RB-10.3	2.1	—	None
0295	Unnamed	RB-10.5	2.1	—	None
	Forest Lake	Outlet-11.4	—	—	
0030	Minnehaha Creek	RB-54.0	2.8	—	Unknown
0301	Skookum Creek	LB-55.2	2.0	—	Unknown
0302	Unnamed	RB-55.5	1.5	—	Unknown
0303	Unnamed	RB-57.05	2.1	—	Unknown
0304	Buck Creek	LB-57.5	3.1	—	Unknown
0305	Unnamed	LB-0.7	1.4	—	None
	Unnamed Lake	Outlet-3.1	—	—	
0307	Doe Creek	LB-57.6	3.35	—	Unknown
0308	Ranger Creek	RB-58.7	2.1	—	None
0310	Dry Creek	RB-59.7	2.3	—	Unknown

WHITE RIVER — MOUNT RAINIER — HEADWATERS
Puyallup Basin — WRIA 10

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0311	Deep Creek	RB-59.9	3.5	—	Unknown
0312	Unnamed	LB-0.8	1.0	—	None
0313	Silver Creek	RB-60.5	7.2	15.9	(Coho)
0314	Goat Creek	RB-0.2	4.4	—	Unknown
	Reese Lake	Outlet-4.4	—	—	
0321	Unnamed	LB-1.7	1.35	—	None
0329	Unnamed	RB-5.05	1.05	—	None
0330	Elizabeth Creek	RB-5.55	1.6	—	None
	Henskin Lake	Outlet-1.3	—	—	
	Elizabeth Lake	Outlet-7.0	—	—	
0334	Unnamed	LB-61.7	1.6	—	Unknown
0336	Unnamed	LB-62.3	1.1	—	None
0337	Sunrise Creek	LB-63.0	4.5	—	Unknown
0338	Unnamed	LB-0.2	2.35	—	None
	Unnamed Lake	Outlet-1.7	—	—	
0340	Unnamed	LB-2.8	1.2	—	None
0342	Unnamed	LB-2.9	1.45	—	None
	Unnamed Lake	Outlet-4.5	—	—	
0350	Unnamed	RB-64.1	1.6	—	None
0351	Unnamed	RB-65.6	1.5	—	None
0352	Unnamed	RB-65.9	1.2	—	None
0353	Crystal Creek	RB-66.3	2.2	—	None
	Crystal Lake	Outlet-2.2	—	—	
0355	Deadwood Creek	RB-67.5	2.1	—	Unknown
0356	Unnamed	RB-0.3	1.0	—	None
	Deadwood Lakes (Lower Lake)	Outlet-1.9	—	—	
	Deadwood Lake (Upper Lake)	Outlet-2.1	—	—	
0357	Klickitat Creek	RB-67.9	2.9	—	Unknown
0358	Unnamed	LB-1.55	1.1	—	None
0359	Unnamed	RB-1.56	1.4	—	None
0362	Unnamed	LB-1.9	1.2	—	None
	Ghost Lake	Outlet-2.5	—	—	
	White R. cont. as Inter Fk. White R.	@ mi. 67.91	—	—	
0364	Unnamed	LB-68.4	3.4	—	None
0365	Shaw Creek	RB-68.8	3.55	—	None
	Owyhigh Lakes	Outlet-3.0	—	—	

WHITE RIVER — MOUNT RAINIER — HEADWATERS
Puyallup Basin — WRIA 10

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0369	Fryingpan Creek	RB-70.5	4.65	—	None
0370	Wright Creek	RB-1.5	1.7	—	None
0373	Unnamed	LB-1.8	1.4	—	None
0385	Unnamed	LB-72.6	2.0	—	None
0386	Unnamed	LB-0.8	1.0	—	None
	Frozen Lake	Outlet-2.0	—	—	

PUYALLUP RIVER
Orting Area

This portion of the Puyallup River drainage lies between the towns of Orting and Sumner at the confluence of the White River. Ten small to moderate tributaries occur in this stretch, adding 30.0 linear stream miles. A major tributary, the Carbon River, enters the right bank at R.M. 17.9 and contributes another 32.1 miles of stream (see Puyallup 9 and 12). Access to this section is via State Highway 162, south of Sumner.

Stream Description

From R.M. 25.0, three miles south of the town of Orting, the Puyallup River flows generally north and west to its confluence with the White River at R.M. 10.4. Besides the Carbon River, only two named tributaries occur along this stretch. Canyon Falls Creek is 3.0 miles in length, and only the lower 0.5 mile is accessible. Fennel Creek is 7.9 miles in length, with only the lower two miles accessible. Fennel Creek originates in the foothills immediately south of Lake Tapps and drains westward. A second tributary from the Bonnie Lake area drains south and west through a valley approximately 0.5 mile in width until it reaches R.M. 2.0, where Victor Falls creates an impassable block to fish passage. From here it flows westerly to its confluence with the Puyallup at R.M. 15.6. Canyon Falls Creek originates in the foothills east of the community of McMillan. It flows westerly until a series of cascades near R.M. 0.75 restricts fish passage. Then it turns and flows north where it intercepts the Puyallup River at R.M. 16.2.

The valley floor is about two miles wide in the vicinity of Orting, narrowing to one mile at the mouth of the Carbon near McMillan, then flares out over two miles wide at Sumner. Steep hillsides rise steeply on both sides 400 to 500 feet in less than one-fourth mile.

The Puyallup River is a glacial stream and is subject to intensive flooding through the lower valley where diking, channelization, and gravel removal are conducted annually. Set-back levees occur between R.M. 18.0 and R.M. 16.0 at the mouth of the Carbon River, and upstream between R.M. 24.5 and 20.3 near the town of Orting. The river meanders within the confined area and contains medium to large gravel and pool-riffle-glide areas. Land use is predominately agricultural throughout the valley with a little logging along the slopes of the adjacent hills. River width varies from 100 to 200 feet. There is little stream cover due to the broad flood plain gravel bars.

All the unnamed tributaries located along the valley floor contain very little gradient and are comprised essentially of drainage and groundwater seepage. Where these flow through farmlands they contain limited quantities of shade and protection. Most of the unnamed tributaries provide little access for spawning and rearing due to the low summer flows.

Salmon Utilization

This section of the Puyallup River provides transportation, spawning, and rearing chinook, pink, chum, and coho. Chinook, pink, and chum spawn in the mainstem, particularly in the split channels. Large pool and backwaters with gentle gradients provide excellent holding and resting areas for the adult salmon and exceptional rearing habitat for juveniles. Coho and chum utilize the unnamed tributary streams and particularly Fennell Creek and Canyon Falls Creek.

Limiting Factors

Major limiting factors here include heavy siltation on streambeds and severe gravel scouring and shifting. Silt is produced from the upper basin logging projects and from glacial flour. Untimely cleaning operations of the Puget Sound Power and Light's electron powerhouse flume and reservoir also adds silt. The annual flood control projects cause considerable bedload shifting. The natural low summer flows restrict salmon production. Temperature problems exist in small tributaries lacking shade and cover.

Beneficial Developments

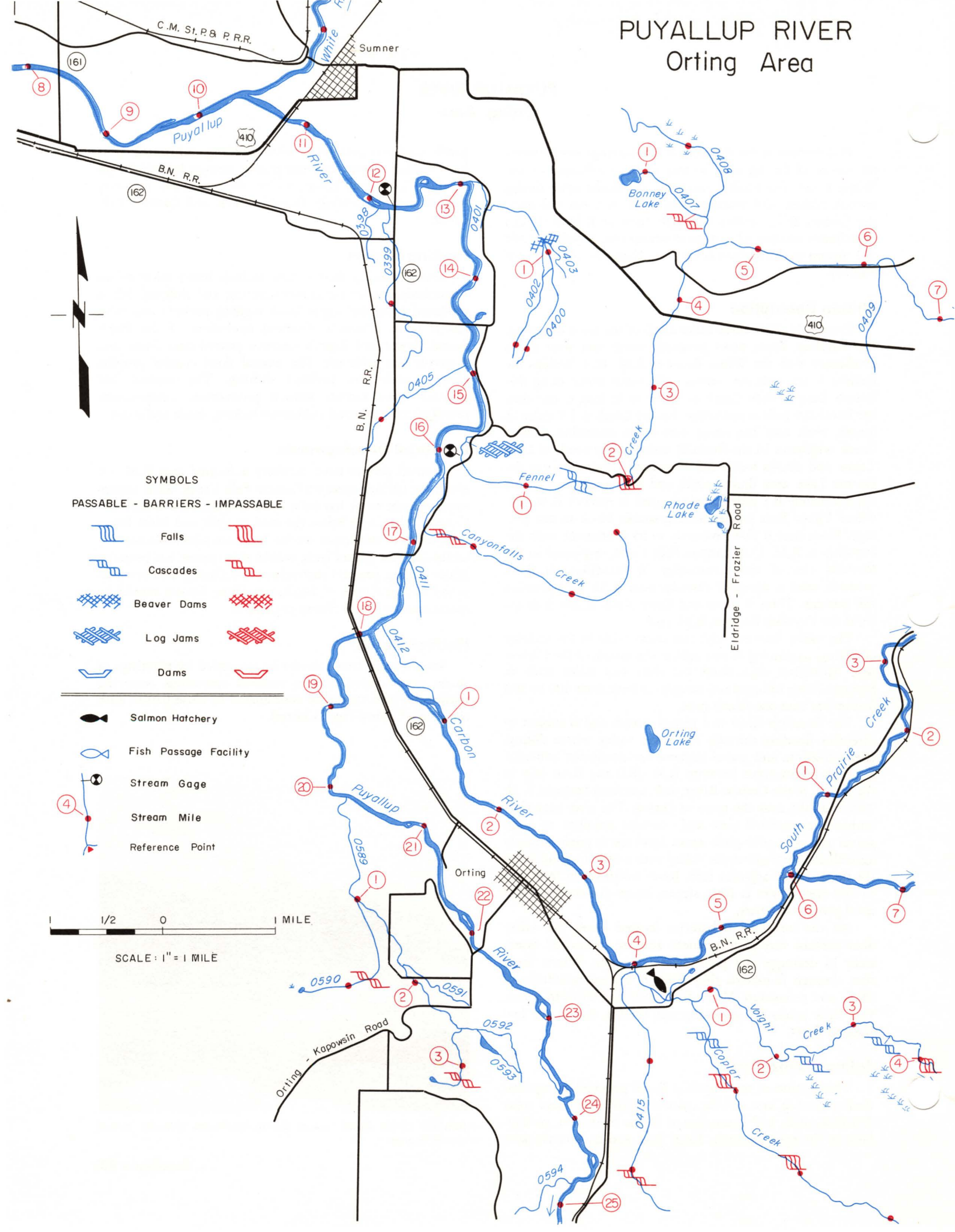
A small private trout hatchery is located near R.M. 1.0 above the cascade areas on Canyon Falls Creek. Some stream improvement work has been done and gravel was added to Canyon Falls Creek below the road in 1968 and 1969. However, much of this lower section has been silted in since. Establishing new gravel beds, within this system, has promise. Major diking projects throughout the Orting area are proposed by the Corps of Engineers. Close liaison should be maintained to insure fishery protection.

Habitat Needs

Stream bank cover should be improved by plantings of shade trees. Annual gravel removal operations occurring within this area should be coordinated by close liaison with the Pierce County Flood Control.

PHOTO 10-16. Flood control diking operations alter the natural stream habitat.

PUYALLUP RIVER
Orting Area



PUYALLUP RIVER — ORTING AREA
Puyallup Basin — WRIA 10

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0021	Puyallup River				Chin., Coho, Pink, Chum
0399	Unnamed	LB-12.2	1.8	—	(Coho)
0400	Unnamed	RB-13.1	2.15	—	(Coho), (Chum)
0402	Unnamed	LB-0.95	1.1	—	Unknown
0405	Unnamed	LB-14.9	1.35	—	Unknown
0406	Fennel Cr. (Kelly Cr.)	RB-15.5	7.95	6.58	Coho, Chum
0407	Unnamed	RB-4.55	1.0	—	None
0408	Unnamed	LB-0.15	1.9	—	None
	Bonney Lake	Outlet-1.0	—	—	
0410	Canyonfalls Creek	RB-16.2	3.0	1.71	Coho, Chum
0413	Carbon River	RB-17.9	32.1	—	Chin., Coho, Pink, Chum
	(See Puyallup 903)				
0589	Unnamed	LB-20.2	3.3	—	Coho, (Chum)
0590	Unnamed	LB-1.0	1.4	—	Coho, (Chum)
	Unnamed Lake	Outlet-3.3	—	—	
	(Cont. Puyallup 1303)				

LOWER CARBON RIVER
Orting Area

This portion of the lower Carbon River includes the lower 13 miles immediately above the town of Carbonado to the confluence with the Puyallup River east of Orting at R.M. 17.9. Two major tributaries, totalling over 41 linear miles, enter the Carbon in this stretch. These are Voights Creek, with its four small tributaries, and South Prairie Creek (Puyallup 1001 and 1101).

Stream Description

The Carbon River originates from Carbon Glacier on the north base of Mt. Rainier, over 32.0 miles away. Above R.M. 11.0, in the vicinity of the town of Carbonado, the river is contained within steep canyon walls upstream to the community of Fairfax. A cascade area occurs at R.M. 10.8 at Carbonado. Below this point to R.M. 6.0, at its confluence with South Prairie Creek, the river channel widens and narrows intermittently with channel splitting and deep pools. The river descends from the 600-foot elevation at Carbonado to less than 200-foot elevation at Orting. From R.M. 13.0 near the community of Carbonado down to R.M. 8.0 the river is confined within a deep and narrow ravine. Below this point the valley broadens enough to allow channel splitting and the formation of large gravel bars. Below South Prairie Creek the 6 miles of river forms a continuous series of long channel split sections down to its confluence with the Puyallup River. Here the valley abruptly fans out to about 2 miles wide. In this lower part the river follows the base of the east valley hillside and is comparable in size to the main Puyallup River. Excellent pool-riffle conditions exist with a moderate gradient. Channel widths vary from 50 to 200 feet. The numerous riffles are composed mainly of good spawning gravel with mixed rubble. Some sand and silt deposits exist along the edges of quiet pools and back eddies. Boulders and large rubble are numerous along some areas. Mixed deciduous and conifer thickets grow on the hillsides and in long strip sections within the flood plain.

Extensive levees along the southwest side of the lower Carbon River from R.M. 3.8 downstream to the mouth provide flood control protection for the town of Orting.

The lower 9 miles of Voights Creek lies in this section above its confluence at R.M. 4.0 with the Carbon River. Falls occur at both R.M. 5.6 and 6.8. The stream here varies from 2 to 12 yards in width and is about 50 percent spawnable. Tributaries to Voights Creek include Coplar, Waterhole, Bear, and Frame creeks. These tributaries offer good salmon production potential throughout their lengths.

Land use above R.M. 6 on the Carbon River is principally logging and mining, with some agriculture in the lower valley and flatland areas. The lower 6 miles of river valley within the vicinity of Orting is strictly farmland.

Salmon Utilization

This section of the Carbon River provides transportation, spawning, and rearing for chinook, pink, chum, and coho. Deep pools located in the lower river offer excellent holding and resting areas for adult salmon and provide exceptional rearing environment. The smaller accessible tributaries also provide spawning and rearing habitat for coho.

Limiting Factors

A major factor limiting salmon production is glacial silt deposition, with the heavier concentrations out in the slow moving portion of the lower river. Flood waters and fast runoffs have caused heavy gravel movements from the upper Carbon River watershed. Natural low summer flows within the main channel and in some of the smaller feeder streams restrict salmon production. Certain gravel removal operations have been detrimental to salmon production.

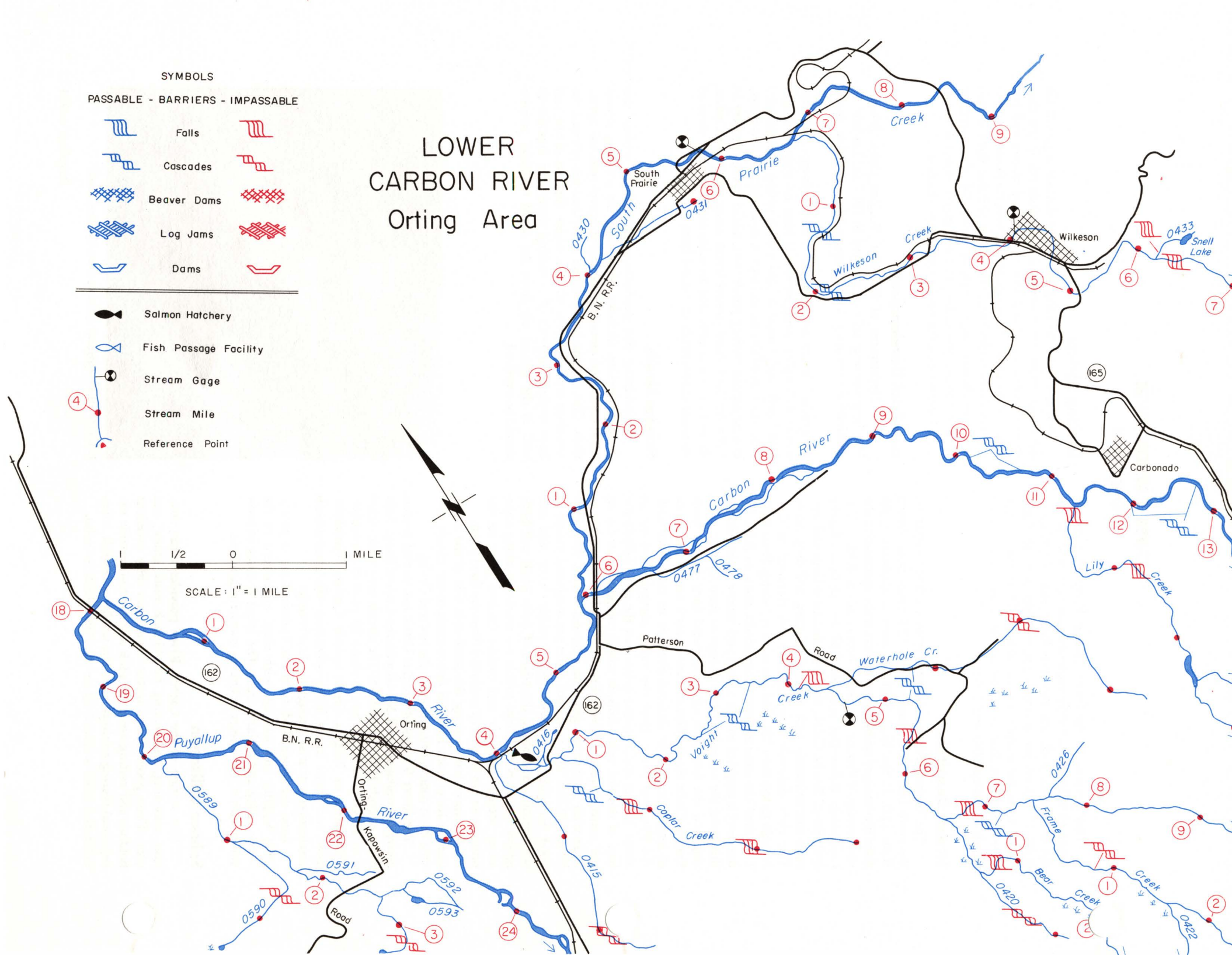
Beneficial Developments

The Department of Fisheries' Voights Creek Salmon Hatchery was originally constructed in 1917 and has been in continuous operation. Three sources of gravity flow water are available at the hatchery. One source is from a rock dam intake on Voights Creek, another is from an intake on Copeland Creek, and a third is from a small spring line obtained from the City of Orting in 1942. A new rack and two quarter-acre asphalt rearing ponds were added to the hatchery in 1971. Set-back flood control levees along the lower Carbon River have been beneficial in allowing the lower river to meander somewhat in its natural state.

Habitat Needs

Maintaining fish production capabilities within this drainage section includes preserving the existing stream bank cover and curtailing extensive gravel removal operations. Coal mining in the upper watershed has released the washings into the lower streams where deposits of fine coal have settled. Methods of removing these coal deposits as well as the glacial silt from the small tributary streams should be explored.

PHOTO 10-17. Channel splits in lower Carbon River.


SYMBOLS
PASSABLE - BARRIERS - IMPASSABLE
Falls
Cascades
Beaver Dams
Log Jams
Dams
Salmon Hatchery
Fish Passage Facility
Stream Gage
Stream Mile
Reference Point
LOWER
CARBON RIVER
Orting Area
1 1/2 0 1 MILE
SCALE: 1" = 1 MILE
Carbon River
South Prairie Creek
Wilkeson Creek
Snell Lake
Carbonado
Lily Creek
Waterhole Cr.
Voight Creek
Poplar Creek
Frame Creek
Bear Creek
Puyallup River
Orting River
Kapowsin
Patterson Road
Road
B.N. R.R.
South Prairie
Wilkeson
Orting
Carbonado
0430
0431
0433
0477
0478
0416
0415
0426
0420
0422
0589
0590
0591
0592
0593
162
165

LOWER CARBON RIVER — ORTING AREA
Puyallup Basin — WRIA 10

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0021	Puyallup River				Chin., Coho, Pink, Chum
0413	Carbon River	RB-17.9	32.1	230.0	Chin., Coho, Pink, Chum
0414	Voight Creek	LB-4.0	19.8	—	Chin., Coho, Pink, Chum
0415	Unnamed	LB-0.01	2.5	—	Coho, (Chum)
0417	Coplar Creek	LB-0.75	3.0	—	Coho, (Chum)
0418	Waterhole Creek	RB-4.45	3.4	—	None
0419	Bear Creek	LB-6.6	3.05	—	None
0420	Unnamed	LB-0.6	1.1	—	None
0421	Frame Creek	LB-7.5	4.45	5.23	None
	(See Puyallup 1303)				
	(Cont. Puyallup 1203)				
0429	S. Prairie Creek	RB-5.9	21.65	—	None
	(See Puyallup 1003)				
	(Cont. Puyallup 1203)				

LOWER SOUTH PRAIRIE CREEK

This section includes the lower 12 miles of South Prairie Creek above its confluence with the Carbon River on the right bank at R.M. 5.9 immediately below the State Highway 162 bridge. Wilkeson Creek is a major tributary along with eight smaller tributaries having a total of 41.9 linear stream miles. The watershed is located near the communities of Wilkeson, Burnett, and South Prairie in Pierce County. Access to this area is by State Highway 162 and by the Spiketon-Wilkeson Road.

Stream Description

From R.M. 12.0 South Prairie Creek generally zigzags for 7 miles to the town of South Prairie where it then turns and flows southwest to its confluence with the Carbon River at R.M. 5.9. Within the upper 4 miles of this section the creek cuts through steep ravine-type terrain, with a confined stream channel. At R.M. 8.0 near the community of Burnett, the hillsides give way to more gently sloping terrain and widening valley floor. From this point downstream the creek flows through well defined channels. The valley floor intermittently broadens and narrows downstream to the mouth. This lower section contains increasing amounts of open farmlands separated by intermittent stands or strips of deciduous trees and brush. Land use is agricultural in the lower valley and logging and mining in the upper watershed.

South Prairie Creek exhibits a moderate gradient throughout the valley floor. The stream contains good shade and cover with overhanging banks and has an average discharge of 250 cfs at the gage at South Prairie. Stream widths vary from 10 to 70 yards. The valley hillsides rise from 500 to 700-foot elevation and are covered with mixed deciduous and coniferous forests. Most of these 12 miles contain good pool-riffle proportions and excellent stream substrate.

Wilkeson Creek is the major tributary within this section and contains 12.3 miles of stream plus 5 smaller tributaries providing an additional 21.3 linear miles. The upper headwaters are formed from the South Fork Gail Creek and from West Fork Gail Creek which originate in the Gleason Hills. This drainage flows northerly through the town of Wilkeson to its confluence with South Prairie Creek at R.M. 6.7. The upper watershed originates in a rather pristine area of mountainous terrain with steep gradient, numerous cascades, and is heavily forested. A steep cascade at R.M. 6.8 is a total barrier to fish passage. The lower stream contains excellent pool-riffle balance and much good gravel substrate. The moderately steep gradient shallows in the lower 3 miles. This stream is well covered with deciduous trees and brush along the banks throughout the entire length.

Salmon Utilization

The lower 8 miles of South Prairie Creek provides the major spawning habitat within the system and this drainage is utilized by chinook, pink, chum, and coho. The lower 6.8 stream miles of Wilkeson Creek provide excellent spawning and rearing habitat, with heaviest usage by coho. Each of the accessible unnamed tributaries receives annual runs of coho and a few are utilized by chum in the lower reaches.

Limiting Factors

The major limiting factor within this drainage section is the natural occurrence of low summer flows that reduce the available rearing area throughout the stream. Flood control measures have been undertaken in the lower stream section including gravel removal, bank erosion controls, and channel changes. Heavy silting and gravel compaction have resulted from these types of operations. Coal waste from former mining operations in the upper Wilkeson watershed has settled in the lower stream. Poaching has always been a serious problem in this lower South Prairie Creek area.

Beneficial Developments

No facility developments or programs have been undertaken within this section to benefit salmon production.

Habitat Needs

A major requirement for maintaining salmon production potential within this drainage section is to preserve existing stream cover and the natural pool-riffle balance. Future mining operations in the upper watershed, particularly for coal, should be monitored closely to preserve the water quality of the area. A good watershed management plan should be developed under the Shorelines Management Act by the local communities to preserve this watershed in its natural state.

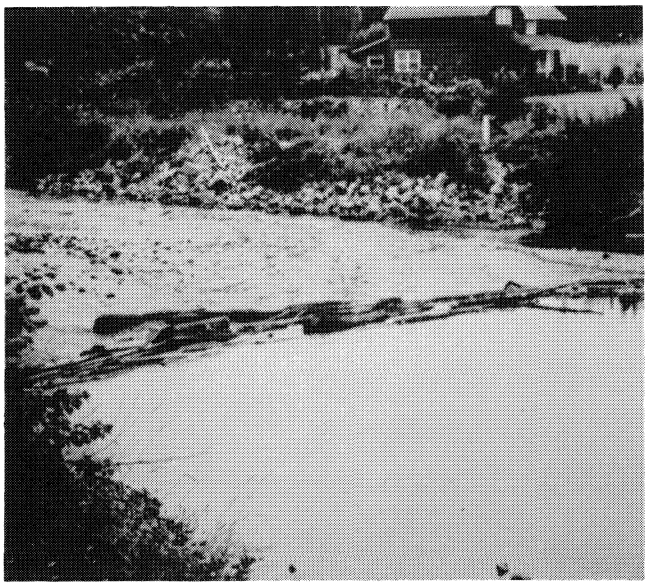
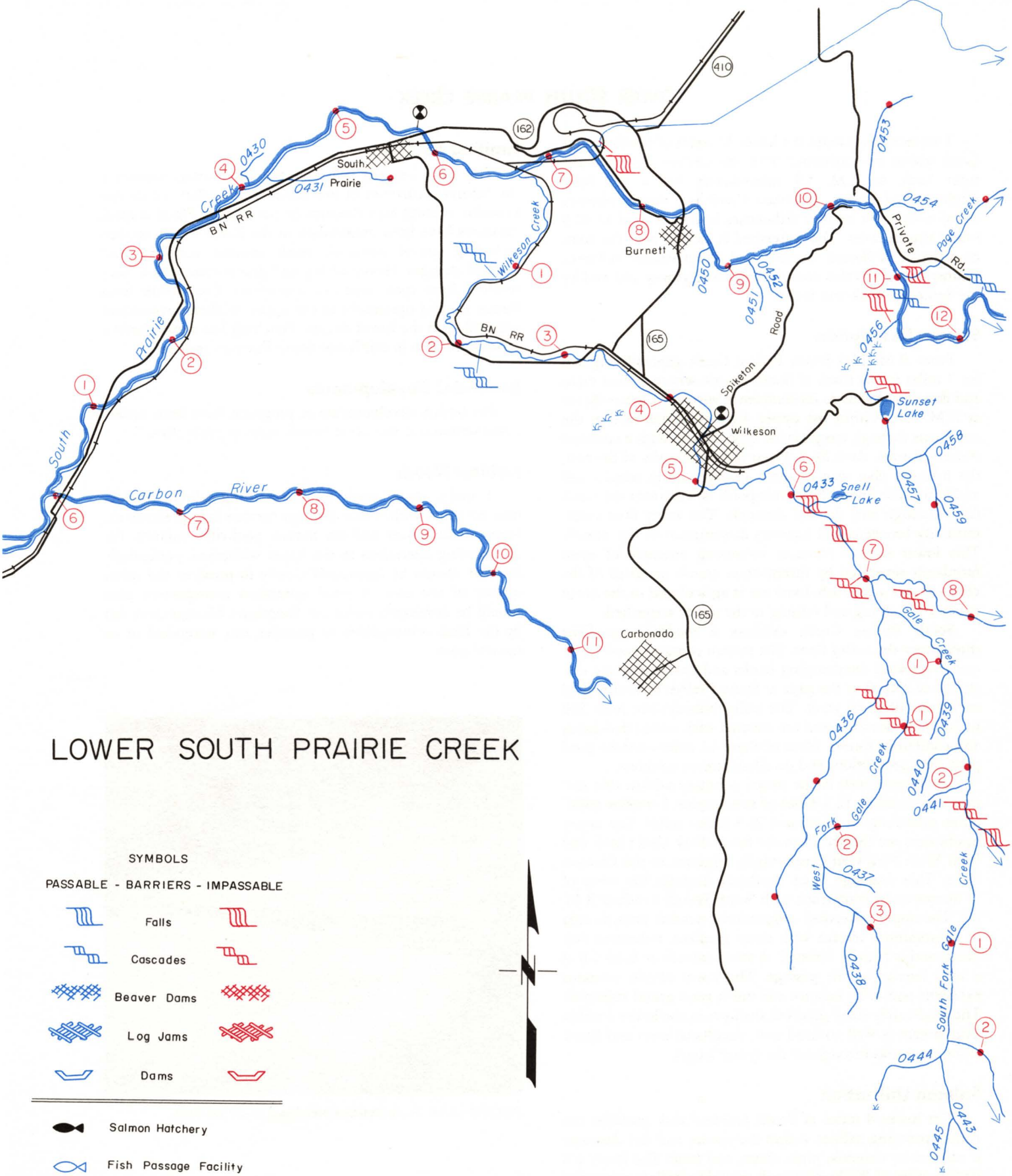


PHOTO 10-18. South Prairie Creek has a gentle gradient.


LOWER SOUTH PRAIRIE CREEK
SYMBOLS
PASSABLE - BARRIERS - IMPASSABLE
Falls
Cascades
Beaver Dams
Log Jams
Dams
Salmon Hatchery
Fish Passage Facility
Stream Gage
Stream Mile
Reference Point
South Prairie Creek
0430
0431
South Prairie
BN RR
Prairie
South
Carbon River
Wilkeson Creek
Burnett
Wilkeson
Spiketon
Road
Carbonado
0450
0451
0452
0453
0454
Private
Page Creek
Rd.
0456
Sunset Lake
0458
0457
0459
0433 Snell Lake
Gale Creek
0436
0439
0440
0441
Fork Gale
West
0437
0438
South Fork Gale Creek
0444
0443
0445
410
162
165
1/2
0
1 MILE
SCALE: 1" = 1 MILE

LOWER SOUTH PRAIRIE CREEK
Puyallup Basin — WRIA 10

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0021	Puyallup River				Chin., Coho, Pink, Chum
0413	Carbon River				Chin., Coho, Pink, Chum
0429	S. Prairie Creek	RB-5.9	21.65	—	Chin., Coho, Pink, Chum
0431	Unnamed	LB-4.2	1.0	—	(Coho), (Chum)
0432	Wilkeson Creek	LB-6.7	12.3	—	Chin., Coho, Pink, (Chum)
0434	Gale Creek	LB-7.05	7.7	—	None
0435	West Fork Gale Creek	LB-0.3	3.6	—	None
0436	Unnamed	LB-0.5	2.6	—	None
0442	South Fork	LB-2.4	3.2	—	None
	Gale Creek	LB-2.4	3.2	—	None
0446	Unnamed	LB-5.5	1.4	—	None
0447	Unnamed	RB-5.8	2.0	—	None
0448	Unnamed	RB-8.6	2.6	—	None
0449	Drainage Ditch	RB-7.4	~ 4.15	—	Coho,Pink,(Chum)
0453	Unnamed	RB-10.2	1.1	—	Coho, (Chum)
0455	Page Creek	RB-11.0	2.25	—	Unknown
0456	Unnamed	LB-11.4	2.2	—	(Coho), (Chum)
	Sunset Lake	Outlet-0.85	—	—	

(Cont. Puyallup 1103)

UPPER SOUTH PRAIRIE CREEK

This drainage section covers the upper South Prairie Creek above R.M. 12.0. The headwaters lie in the Snoqualmie National Forest near Old Baldy Mountain, Burnt Mountain, and the Three Sisters Mountain near the northwest corner of Mount Rainier National Park in Pierce County. From here the stream generally courses northwesterly towards the town of Buckley. Within this ten-mile section of upper South Prairie Creek, three major tributaries plus eight smaller tributaries provide an additional 34.65 stream miles.

Stream Description

The headwaters of the South Fork and East Fork originate near the Burnt Mountain and Old Baldy Mountain range at the 4,000-foot elevation. The upper headwaters of Beaver Creek and New Pond Creek flow from the Three Sisters Mountain range, several miles north, at the 3,200-foot elevation. They flow generally westward to their confluence with South Prairie Creek. The entire upper South Prairie Creek watershed lies in densely forested mountainous terrain above any major towns or communities. Logging is the principal activity throughout this area, with selective clear-cut sections. Much of the upper watersheds above the forks and along the creek bottoms have been extensively logged in years past. Some mining activity occurs in the mountain peak areas along the Carbon Ridge. Many small mountain lakes, which attract recreational use, also are found throughout this range.

The only access to the upper watershed is out of the town of Wilkeson by two logging roads, the Littlejohn Road and the East Prairie Road. Jeep trails branching off these roads are the only other accesses to the tributaries of the upper watershed.

Above R.M. 14.5 the upper South Prairie Creek and its tributaries course through steep-sloped high mountain terrain containing moderately steep gradients with numerous cascades and rapids and few pools or riffles. Bottom composition is primarily of boulder and rubble with some patch gravel areas. The mainstem stream banks and streambeds below New Pond Creek are quite stable with only a few natural earth-cut exposed areas. Except for the logged-off portions along the upper stream sections, there is good stream cover and shade from dense conifer timber stands.

Salmon Utilization

Salmon use within this area is restricted below R.M. 15.0 where steep cascade sections are located. A diversion dam at stream mile 15.7 provides a total block to salmon migration. Chinook, coho, and pink salmon utilize the stream below. Beaver Creek is inhabited by chinook, pink, and coho in the lower portion and coho in the upper portion, while only coho salmon utilize New Pond Creek. Juvenile chinook and coho rear in the lower three miles between R.M. 12 and 15 of this section.

Limiting Factors

The steep terrain, swift velocities, and many falls and cascades above stream mile 15.0 offer little potential for anadromous production. No fish passage facilities are associated with the diversion dam at R.M. 15.7. Heavy flood runoff waters associated with the steep mountainous terrain have scoured away much of the spawning gravel through the deep ravines and cascade sections of the upper watershed. Boulders, logs, and debris jams also limit the available areas for fish use. Logging and road construction in the upper watersheds have caused considerable silting in lower South Prairie Creek.

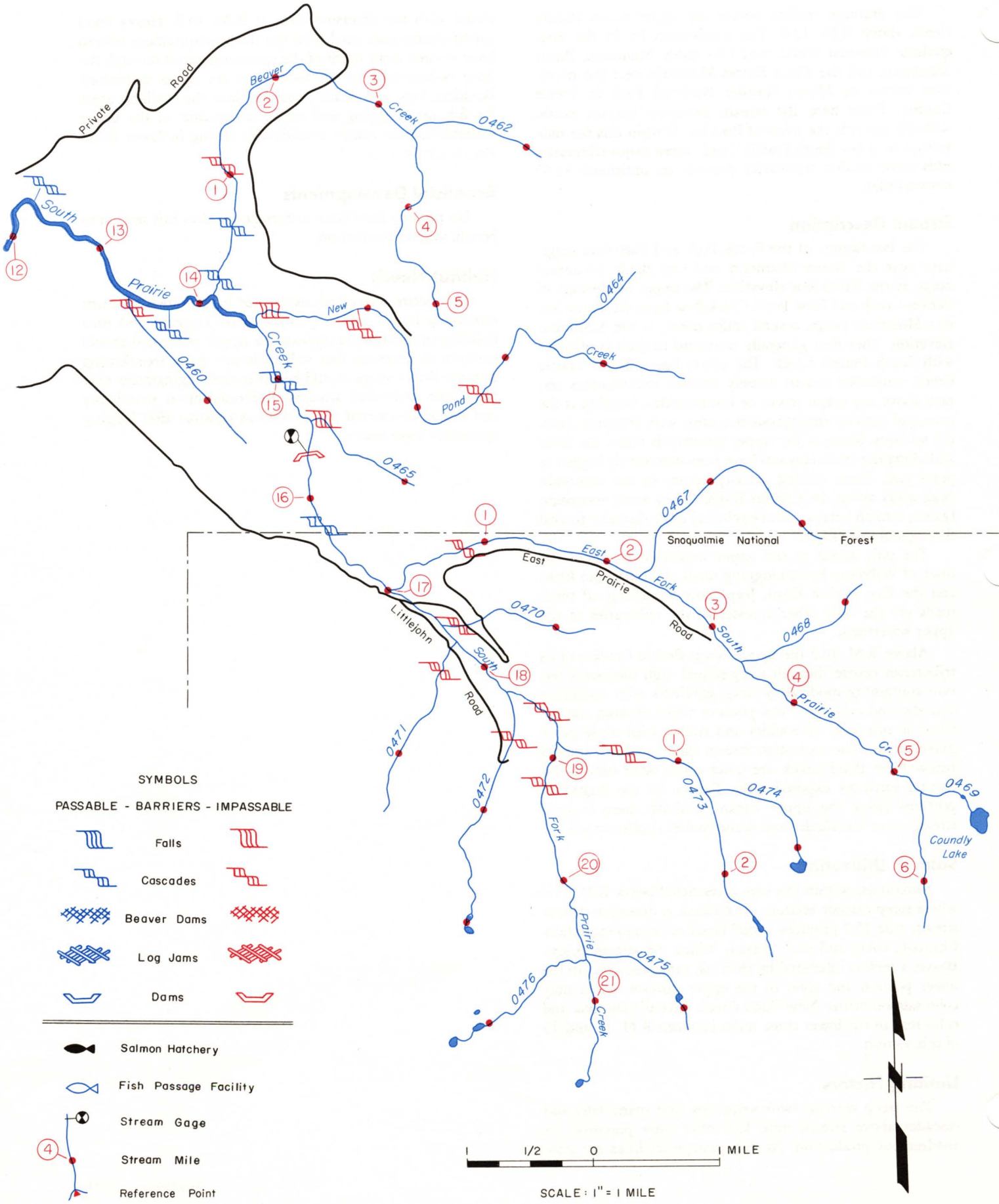
Beneficial Developments

No projects have been undertaken within this section to benefit salmon production.

Habitat Needs

This entire watershed, except for logged areas, remains essentially in its natural pristine state. Logging and road building operations throughout the upper watershed should conform to practices that will maintain clean, free-flowing streams. Buffer strips should be left in the logging areas near the upper watershed streams. Reforestation is mandatory and should be carried out as soon as possible after logging operations have ceased.

UPPER SOUTH PRAIRIE CREEK



UPPER SOUTH PRAIRIE CREEK
Puyallup Basin — WRIA 10

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0021	Puyallup River				Chin., Coho, Pink, Chum
0413	Carbon River				Chin., Coho, Pink, Chum
0429	S. Prairie Cr.				Chin., Coho, Pink, Chum
0460	Unnamed	LB-13.4	1.5	—	Unknown
0461	Beaver Creek	RB-14.1	5.25	—	(Chin.), Coho, (Chum)
0462	Unnamed	RB-3.35	1.15	—	None
0463	New Pond Creek	RB-14.55	4.65	—	(Coho)
0465	Unnamed	RB-15.4	1.05	—	Unknown
0466	East Fork S. Prairie Cr.	RB-17.0	6.4	—	None
0467	Unnamed	RB-2.3	2.2	—	None
0468	Unnamed	RB-3.4	1.2	—	None
	S. Prairie Cr. cont. as S.Fk. Prairie Cr.	@ mi. 17.01		—	
0470	Unnamed	RB-17.5	1.3	—	None
0471	Unnamed	LB-17.7	1.5	—	None
0472	Unnamed	LB-18.25	2.0	—	None
0473	Unnamed	RB-18.85	2.85	—	None
0474	Unnamed	RB-1.3	1.1	—	None
0475	Unnamed	RB-20.6	1.2	—	None
0476	Unnamed	LB-20.65	1.3	—	None

UPPER CARBON RIVER

This section covers the upper Carbon River from the vicinity of Carbonado to its glacial source, more than 20 miles. Twenty tributaries add more than 113 linear stream miles. The area is located 7 miles south of Buckley in central Pierce County, with access via Carbon Glacier Road. Above R.M. 20 the Carbon is within Snoqualmie National Forest and above R.M. 23 within Mount Rainier National Park.

Stream Description

From Carbon and Russel glaciers, the river travels northwest 5 miles, then swings generally west 10 miles to Fairfax, then northwest again about 6 miles to Carbonado. Principal tributaries include Chenuis, Evans, and Lilly creeks.

The upper 4 miles of drainage fall over steep mountain terrain, and the stream is contained in a narrow, often ravine-like valley, with side slopes rising sharply to over 5,000 feet. The valley floor broadens somewhat below Chenuis Creek (R.M. 27.2), for about 10 miles. Below Fairfax the walls constrict, forming a canyon which continues through the lower section. Where the valley floor permits, moderate to dense mixed deciduous and conifer growth exist. The steep side slopes contain dense coniferous and some patch deciduous growth. Extensive clear-cut logging has occurred over many slopes, with varying degrees of reforestation evident. Other activities are mining and recreation. Land development is scattered with older mining towns of Fairfax and Carbonado the largest communities.

A steep or precipitous gradient exists over the Carbon's upper 4 miles. Here the channel is confined with numerous cascades and a few falls. The bottom is bedrock and boulder, with only a few rubble and patch gravel stretches. Stream widths range from about 3 to 9 yards. The upper two miles cut through barren snow-field terrain while the next two miles pass through relatively dense conifer forest. Below Chenuis Creek, for the next 10 miles, the gradient ranges from moderate to moderately steep. The channel is less confined and partially unstable with considerable channel splitting and some braiding. Widths range from 7 to 14 yards. Here, it is predominantly fast riffle stream, with some rapids, few cascades and limited pools. The bottom is mainly rubble and boulder with a few relatively good gravel riffles. Banks consist of natural earth or rock cuts, and rather broad rubble-boulder side beaches. Cover is of moderate to dense stands of mixed deciduous and conifer timber with considerable underbrush thickets.

About two miles below Fairfax the river enters the canyon where gradient is quite steep with numerous rapids and some sharp cascades separated by relatively short, lesser gradient pool-riffle stretches. Stream widths range from 4 to 12 yards through the canyon. The bottom is predominantly boulder and rubble, with some bedrock and a few short gravel-rubble riffles. The slopes above the canyon support dense mixed conifer and deciduous forest while the lower slopes are often sheer rock faces.

Virtually all tributaries are steep and offer access only where they meet the valley floor. They have mostly cascade and rapid conditions except over the bottomland. Most have dense conifer cover, except where recent logging has occurred.

Salmon Utilization

This section of the Carbon River receives fall chinook and coho, with some spring chinook reported. Chinook spawn in the mainstem, while coho generally use the accessible tributary areas. Juvenile salmon, specifically coho and spring chinook, rear in these waters year-round, with fall chinook remaining just through the spring months.

Limiting Factors

Cold glacial waters, plus the typical mountain stream character, provide natural limitation on salmon production. Also, cascades in the lower 5 miles of canyon may restrict upstream migration. Occasional buildup of logs and debris in the canyon has been reported. Steepening gradient just above Chenuis Creek halt salmon migration in that vicinity. All tributaries offer relatively short access. Some past logging operations have reduced production potential for some smaller tributaries by causing debris buildup and increased siltation in lower reaches. Potential water quality problems could occur if coal mining operations resume.

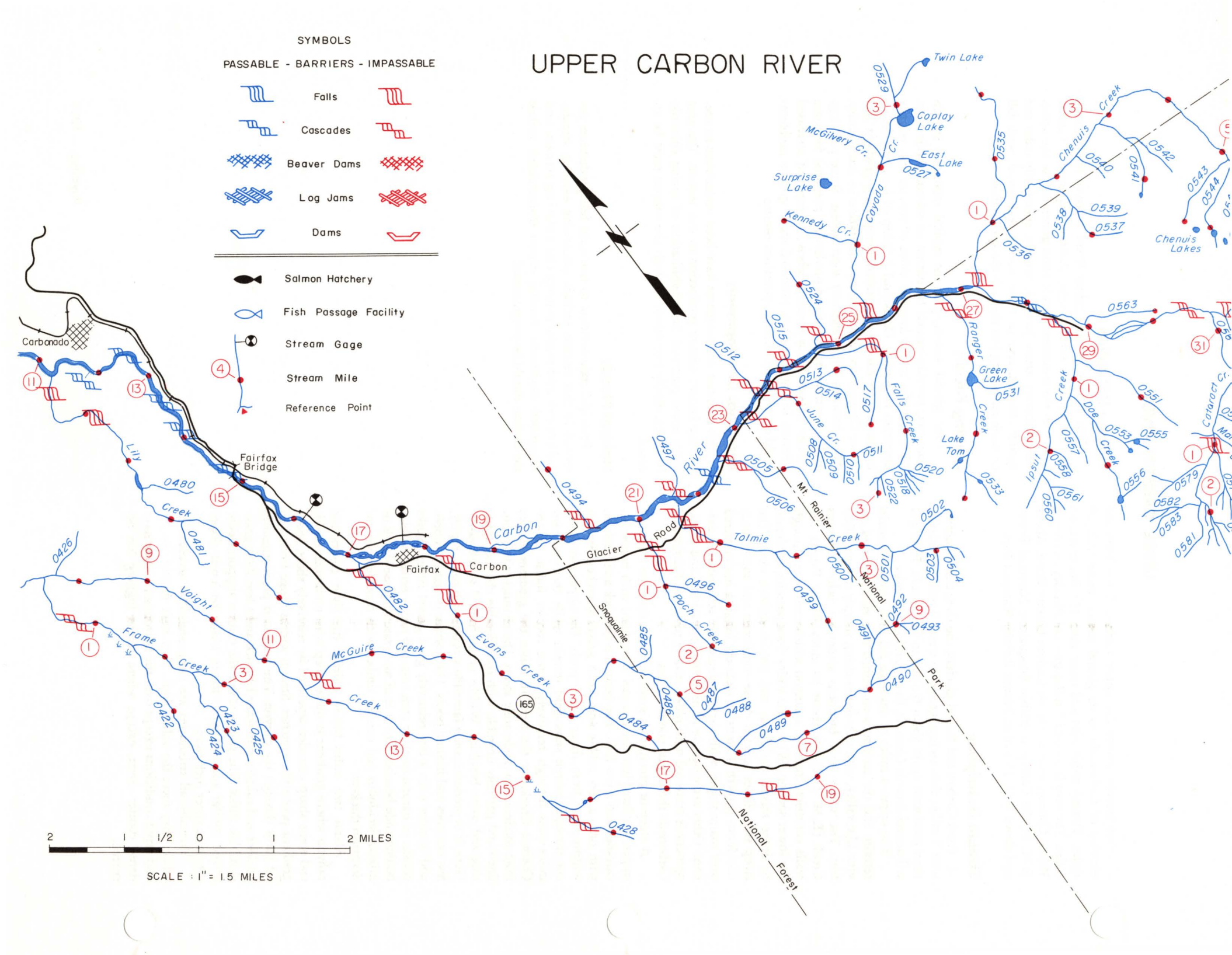
Beneficial Developments

No facilities nor programs have been undertaken to specifically benefit salmon production in this section. The area holds some potential for rehabilitation of spring chinook; however, totally free access through the canyon must be assured.

Habitat Needs

Principal requirements to maintain fish production potential in this section include preserving existing streamside cover and maintaining the existing stream and streambed conditions. Annual stream maintenance within the canyon should be programmed.

UPPER CARBON RIVER



UPPER CARBON RIVER
Puyallup Basin — WRIA 10

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0021	Puyallup River				Chin., Coho, Pink, Chum
0413	Carbon River				Chin., Coho, Pink, Chum
0414	Voight Creek				Chin., Coho, Pink, Chum
	(Continued from Puyallup 903)				
0421	Frame Creek	LB-7.5	4.45	—	None
0422	Unnamed	LB-1.6	2.45	—	None
0423	Unnamed	LB-2.55	1.5	—	None
0427	McGuire Creek	RB-11.7	2.15	—	None
0428	Unnamed	LB-15.4	1.3	—	None
	(Cont. from Puyallup 903)				
0479	Lily Creek	LB-11.3	5.25	—	Unknown
	Unnamed Lake	Outlet-2.2	—	—	
0483	Evans Creek	LB-18.4	9.3	—	(Chin.), Coho
0484	Unnamed	LB-3.2	1.2	—	None
0489	Unnamed	RB-5.9	1.2	—	None
0494	Unnamed	RB-20.4	1.2	—	Unknown
0495	Poch Creek	LB-21.0	2.6	—	(Coho)
0496	Unnamed	RB-1.0	1.0	—	None
0498	Tolmie Creek	LB-21.8	4.4	—	(Coho)
0499	Unnamed	LB-1.75	1.2	—	None
0505	Unnamed	LB-22.5	1.7	—	Unknown
0507	June Creek	LB-23.15	2.5	—	(Coho)
0513	Unnamed	LB-23.6	1.4	—	Unknown
0516	Falls Creek	LB-24.5	3.0	—	(Coho)
0517	Unnamed	LB-1.0	1.0	—	None
0524	Unnamed	RB-24.6	1.2	—	Unknown
0525	Cayada Creek	RB-25.6	3.7	—	None
0526	Kennedy Creek	RB-1.0	1.05	—	None
	Coplay Lake	Outlet-2.7	—	—	
	Twin Lake	Outlet-3.7	—	—	
0530	Ranger Creek	LB-26.8	3.0	—	Unknown
	Green Lake	Outlet-1.2	—	—	
0534	Chenuis Creek	RB-27.2	6.9	—	None
0535	Unnamed	RB-1.0	2.1	—	None

UPPER CARBON RIVER
Puyallup Basin — WRIA 10

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0537	Unnamed	LB-1.7	1.4	—	None
0541	Unnamed	LB-2.85	1.2	—	None
0543	Unnamed	LB-5.1	1.0	—	None
0544	Unnamed	LB-5.2	1.0	—	None
0546	Unnamed	LB-5.45	1.0	—	None
0550	Ipsut Creek	LB-28.3	2.8	—	None
0551	Unnamed	RB-0.8	1.6	—	None
0552	Doe Creek	RB-1.2	1.8	—	None
	Unnamed Lake	Outlet-1.5	—	—	
0563	Unnamed	RB-28.95	1.0	—	Unknown
0564	Spukwush Creek	RB-30.8	1.9	—	None
0565	Unnamed	LB-0.2	1.2	—	None
0570	Cataract Creek	LB-31.6	2.8	—	None
0571	Unnamed	RB-0.65	1.45	—	None
0572	Marmot Creek	RB-0.85	1.8	—	None
0575	Unnamed	RB-1.1	1.3	—	None

PUYALLUP RIVER
Electron Area

This segment covers 13 miles of Puyallup River from about 7 miles south of Orting upstream to about 6 miles above Electron. Six tributaries enter this stretch adding 53 linear stream miles. The area is located in central Pierce County. Access is via the Orting-Kapowsin Valley Road, and private logging roads.

Stream Description

From R.M. 37 the Puyallup flows northwest nearly 9 miles to just above Kapowsin Creek (R.M. 27.5), then generally north through the lower 4 miles. Principal tributaries include Kapowsin, Kings, Fox, and Fiske creeks.

Over the upper 1.5 miles, the Puyallup flows through a narrow, steep-sloped, densely forested valley. Just above R.M. 35 the river enters a deep, steep-walled canyon which continues for 4 miles. It emerges near Puget Sound Power and Light Company's powerhouse at Electron (R.M. 31.2). Moderately steep slopes above the canyon walls hold thick conifer and deciduous forest. Below Electron the valley broadens, alternately widening and narrowing over the next 7 miles. Here, the bottomland contains thickets or strips of deciduous trees and underbrush, and the side slopes maintaining relatively dense mixed deciduous and conifer forest. A low dam located upstream from this section (R.M. 41.7) diverts water into a flume which then parallels the Puyallup River, entering the Electron reservoir immediately above the powerhouse. Development over the upper watershed is limited. Below Electron are scattered rural and suburban residences, with 2 small communities of Electron and Kapowsin. Principal activities include power production, extensive logging, and some recreational use.

The 1.5 miles below R.M. 37.0 has a moderately steep gradient with numerous fast riffles, a few rapids and cascades. Although the channel is relatively confined, some splitting does occur. Stream widths range from 10 to 17 yards. The bottom is mostly rubble and boulder with a few small gravel riffles and patch gravel strips. Dense mixed deciduous and conifer timber cover the banks. Through the canyon, the stream is narrowly confined by either sheer rock walls or extremely steep, broken rock slopes. Here the gradient ranges from moderate to steep, with intermittent cascades separated by deep pools and short riffles. Bottom composition is large broken rock, boulders and rubble, some bedrock, and a few small gravel riffles.

Below the Canyon the river presents a moderate to moderately steep gradient over the next 7 miles. The confined channel offers mainly fast riffles, with few rapids or pools. Widths range from 12 to over 20 yards. The bottom is predominantly rubble and boulder, with a few gravel riffles and patch gravel strips. Stream banks range from steep hillsides to low earth, rock cuts or broad rubble-boulder beaches. Much of the channel below mile 29 is contained within relatively narrow, artificially contoured, heavily armored banks. Some meandering occurs; however, riffles are mostly of large rubble and boulder composition. Cover ranges from sparse to moderately dense deciduous trees and underbrush with none along the riprapped sections.

The lower reaches of Fox, Kapowsin, and Fiske creeks have moderate gradient with fairly good pool-riffle balance, and gravel and rubble substrate. Banks are fairly stable, holding moderate to dense deciduous cover. Their upper reaches exhibit mostly mountain stream character, with numerous cascades ans small falls, mainly boulder and rubble bottoms.

Salmon Utilization

This section of the Puyallup River is utilized by chinook, coho, and a few pink and chum. Fall chinook, a few spring chinook, and coho utilize the waters in the canyon, with some reported above. Chinook are principally main river spawners, while coho, pink, and chum utilize specific river sections plus the accessible tributary reaches. Only Fox, Kapowsin, and Fiske creeks are accessible to salmon.

Beneficial Developments

Other than planting of hatchery juvenile salmon, no facilities nor projects have been undertaken in this section to benefit salmon production.

Habitat Needs

Principal requirements to maintain fish production capabilities include preserving stream-side cover and maintaining natural river stretches. Bank stabilization projects should incorporate preservation of natural salmon habitat. Alternative methods of eliminating silt deposits within the flume and reservoir, rather than flushing, should be developed. Periodic checks should be made in the canyon for occurrence of migratory blocks.

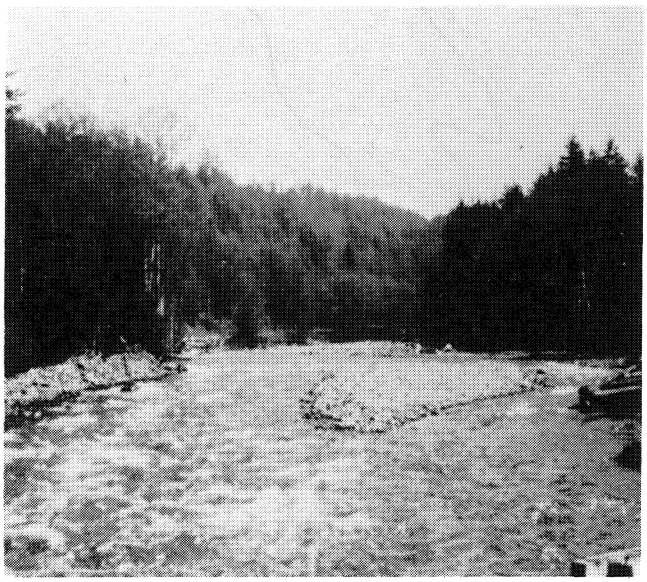
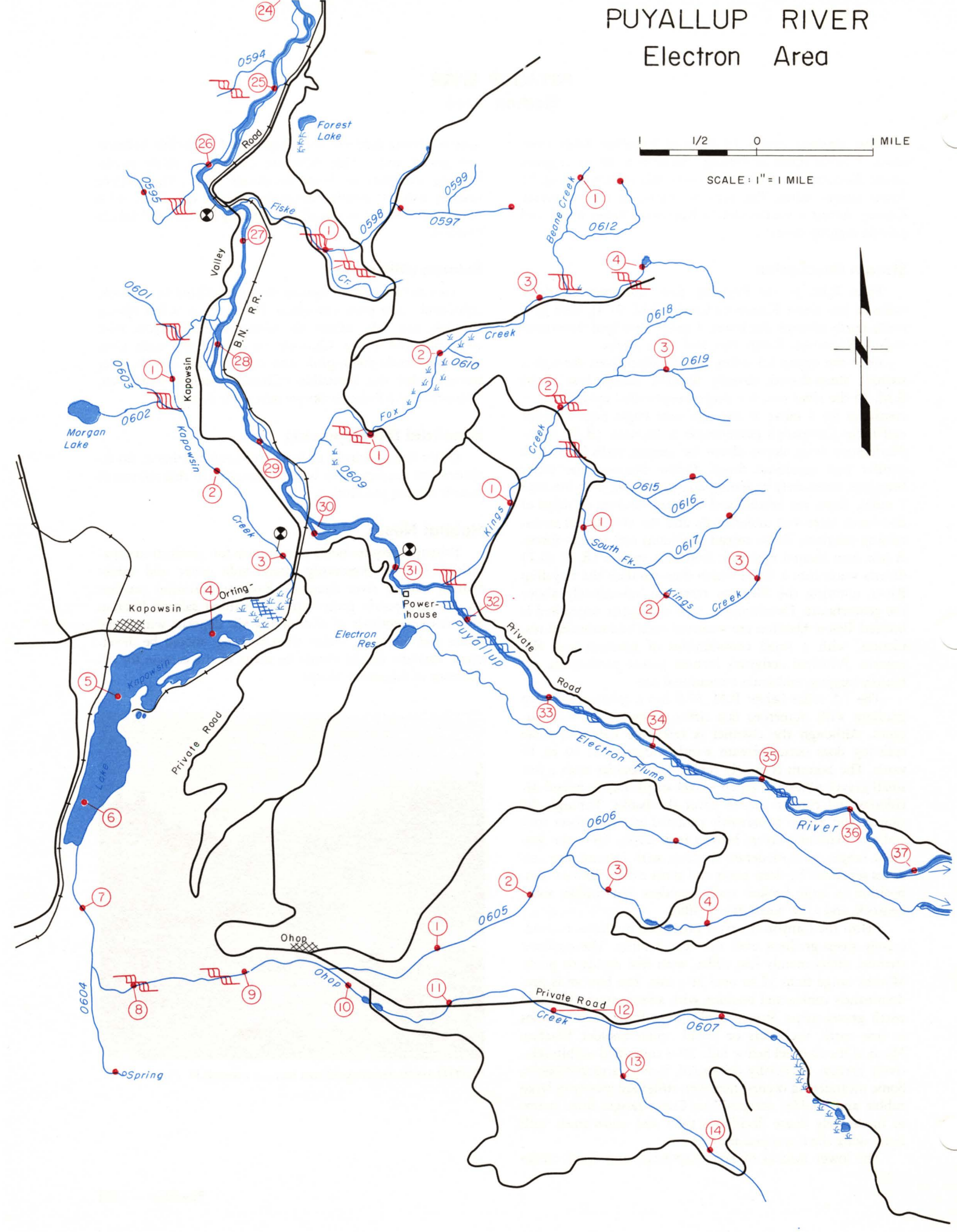


PHOTO 10-19. Stream gradients increase above R.M. 24.0.


PUYALLUP RIVER
Electron Area
1 1/2 0 1 MILE
SCALE : 1" = 1 MILE
Forest Lake
Road
Fiske
Valley
B.N. R.R.
Kapowsin
Creek
Morgan Lake
Cr.
Beane Creek
Fox
Creek
Kings
Creek
South Fk.
Kings Creek
Power-house
Electron Res.
Puyallup
River
Private Road
Electron Flume
Kapowsin
Orting
Kapowsin Lake
Private Road
Ohop
Ohop
Creek
Private Road
Spring
0594
0595
0596
0597
0598
0599
0601
0602
0603
0604
0605
0606
0607
0609
0610
0612
0615
0616
0617
0618
0619

PUYALLUP RIVER — ELECTRON AREA
Puyallup Basin — WRIA 10

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0021	Puyallup River				Chin., Coho, Pink, Chum
0595	Unnamed	LB-26.0	1.3	—	Unknown
0596	Fiske Creek	RB-26.65	1.9	—	Coho, Chum
0597	Unnamed	RB-1.0	2.0	—	None
0600	Kapowsin Creek	LB-27.5	14.6	—	Chin., Coho, Pink, Chum
	Kapowsin Lake	Outlet-3.7	—	—	
	Kapowsin Cr. cont. as Ohop Creek	@ mi. 6.41	—	—	
0604	Unnamed	LB-7.5	1.1	—	Unknown
0605	Unnamed	RB-9.8	4.9	—	None
0606	Unnamed	RB-2.5	1.4	—	None
0607	Unnamed	RB-12.5	2.3	—	None
0608	Fox Creek	RB-29.3	4.8	—	Coho, (Chum)
	Marsh	Outlet-1.3	—	—	
0611	Beane Creek	RB-3.25	1.05	—	None
0612	Unnamed	LB-0.6	1.0	—	None
	Unnamed Lake	Outlet-4.0	—	—	
0613	Kings Creek	RB-31.6	3.7	—	Coho
0614	S. Fk. Kings Creek	LB-1.5	3.5	—	None
0615	Unnamed	RB-0.45	1.4	—	None
0617	Unnamed	RB-1.7	1.4	—	None
	(Cont. Puyallup 1403)				

UPPER PUYALLUP RIVER
Headwaters

This segment encompasses the upper Puyallup River from R.M. 37, six miles above Electron, upstream more than 17 miles to glacial headwaters. Some 14 tributaries add 129 stream miles along this stretch. The area is located 15 miles southeast of Orting in south-central Pierce County, with access via private logging roads east from the Orting-Kapowsin Highway. The river above mile 45 is within Snoqualmie National Forest and above mile 50 within Mount Rainier National Park.

Stream Description

From Tahoma Glacier, the Puyallup travels southwest two miles, then turns northwest for 15 miles. Principal tributaries include North Fork Puyallup heading on Puyallup Glacier, the Mowich River heading on the North and South Mowich glaciers, plus Deer and Niesson creeks.

Except in its glacial headwaters, the upper 6-7 miles of the Puyallup cuts through a narrow, steep-sided valley of dense conifer timber, except for some clear-cut areas. Near the North Fork Puyallup (R.M. 47.0) the valley floor broadens slightly, becoming quite wide near the Mowich junction (R.M. 42.3), then narrows again over the next five miles below. Bottomland has mostly conifer with some mixed deciduous growth over the section's lower ten miles. Side slopes remain moderately steep to steep with some conifer timber, but most recently logged areas are in various stages of reforestation. The principal development is the diversion dam (R.M. 41.7) and headworks for Puget Power's Electron facility. Other activities include logging and some recreation use.

The river's upper two miles present steep, glacial stream conditions, with considerable braiding and mostly fast boulder and rubble rapids. Over the next three miles the channel offers moderately steep to steep gradient with numerous cascades and rapids, and a few pool-riffle areas. The bottom remains boulder and rubble. Over the next 12 to 13 miles to the diversion dam, the river exhibits moderate to moderately steep gradient in a rather confined channel. Widths range from 6 to 15 yards. Here, the stream is largely fast riffles, with some rapids and cascades, and only a few shallow pools. The bottom is mainly rubble with a number of boulder-strewn stretches, a few rubble-gravel riffles, and some patch gravel strips. Banks are unstable along some stretches, consisting of earth or rock cuts with some narrow rubble beaches. Cover is sparse along logged areas but otherwise is dense conifer forest.

Below the diversion, the Puyallup's gradient alternates from moderate to moderately steep. The channel remains mostly confined except for a few stretches where braiding occurs. Widths range from 12 to over 20 yards. The stream is predominantly fast riffle in character, with a few rapids and cascades. The bottom is mainly boulder-rubble, with a few pool-riffle stretches of rubble-gravel composition. Banks are stable low earth or rock cuts, or rather narrow rubble beaches. Cover is moderate to dense mixed conifer and deciduous growth.

Headwater reaches of most tributaries exhibit steep mountain stream character, with numerous cascades and rapids, and boulder-rubble bottoms. The upper North Puyallup and Mowich reveal glacial character with much braiding and fast riffle-rapid flow. Most tributaries are narrowly confined throughout their lengths. Lower reaches of most streams offer moderate to moderately steep gradients producing a few rapids and cascades, but mostly fast riffles and some shallow pools. Bottoms are mainly of rubble and gravel with a few boulder-strewn areas. Most banks are stable with moderate to dense conifer and mixed deciduous cover.

Salmon Utilization

Some chinook and coho salmon ascend to the diversion dam when passage conditions in the canyon below are favorable. Spring chinook have been reported immediately below the diversion. There is considerable potential for chinook and coho production above the diversion.

Limiting Factors

Occasional rock slides or debris buildup in the canyon below this section tend to limit salmon use. Salmon ascending this far are blocked at the diversion. Flow fluctuation or prolonged low flows below the diversion impact production capability downstream. The cold, glacial water presents some natural limitation. In certain areas, logging and associated road building have reduced stream-side cover, caused debris buildup within channels, and increased siltation of streambeds. Occasional gravel removal operations also impact production capability.

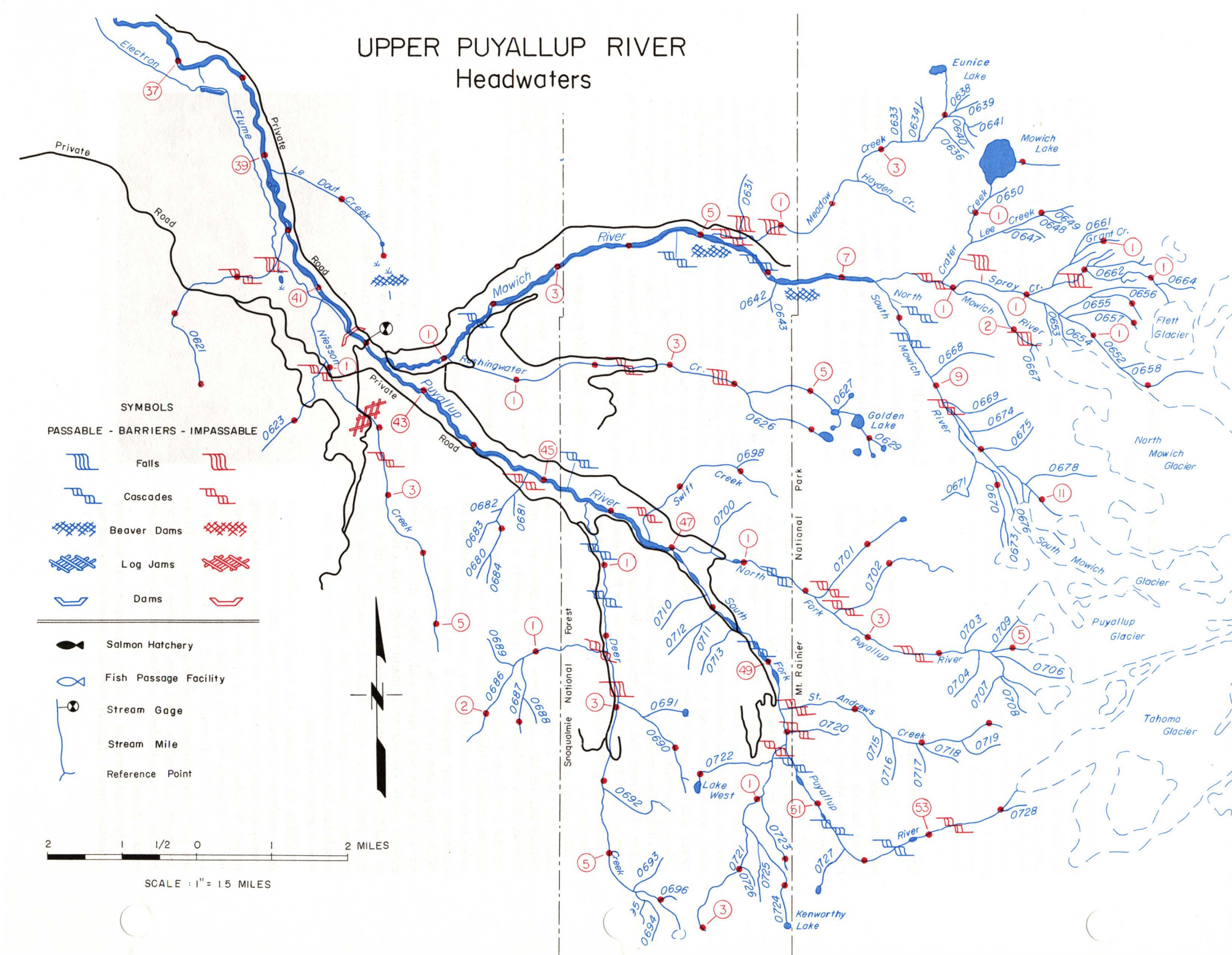
Beneficial Developments

Other than hatchery plants in tributaries below the diversion, there have been no projects to benefit salmon production in this section. Production potential above the diversion could be realized with installation of adult and juvenile passage facilities.

Habitat Needs

Principal requirements to maintain the natural production habitat include preserving the existing stream conditions and bank cover, and replacing cover where destroyed by logging. For the area below the diversion, a minimum flow for fish use should be established.

PHOTO 10-20. Upper Puyallup River headwaters.


UPPER PUYALLUP RIVER
Headwaters
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" = 1.5 MILES
Electron
Flume
Private
Road
Le Daut Creek
Mowich
River
Meadow
Creek
Hayden Cr.
Eunice Lake
Mowich Lake
Lee
Crater
Spray Cr.
Grant Cr.
North
South
Flett Glacier
Golden Lake
Reshingwater
Cr.
Niesson
Puyallup
Swift
Deer
Fork
North Mowich Glacier
South Mowich Glacier
Puyallup Glacier
Tahoma Glacier
Lake West
Kenworthy Lake
St. Andrews
Snoqualmie National Forest
Mt. Rainier National Park

UPPER PUYALLUP RIVER — HEADWATERS
Puyallup Basin — WRIA 10

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0021	Puyallup River				Chin., Coho, Pink, Chum
0620	Le Dout Creek	RB-39.2	2.6	—	(Coho)
0621	Unnamed	LB-40.0	3.0	—	Unknown
0622	Niesson Creek	LB-41.1	5.3	—	Coho
0623	Unnamed	LB-0.9	1.5	—	Unknown
0624	Mowich River	RB-42.3	11.3	—	None
0625	Rushingwater Cr.	LB-1.1	6.3	—	None
0626	Unnamed	LB-4.2	1.15	—	None
	Golden Lake (Lower Lake)	Outlet-5.4	—	—	
	Golden Lake (Upper Lake)	Outlet-5.7	—	—	
	Unnamed Lake	Outlet-6.3	—	—	
0630	Meadow Creek	RB-5.1	4.65	—	None
	Eunice Lake	Outlet-4.65	—	—	
0644	N. Mowich R.	RB-7.5	2.3	—	None
0645	Crater Creek	RB-0.9	2.4	—	None
0646	Lee Creek	LB-0.6	1.4	—	None
	Mowich Lake	Outlet-1.45	—	—	
0651	Spray Creek	RB-1.0	2.9	—	None
0652	Unnamed	LB-1.0	2.8	—	None
0655	Unnamed	RB-0.51	1.25	—	None
0657	Unnamed	RB-0.6	1.1	—	None
0659	Grant Creek	RB-1.4	1.2	—	None
0662	Unnamed	LB-2.0	1.6	—	None
	Mowich R. cont. as S. Mowich R.	@ mi. 7.51	—	—	
0670	Unnamed	LB-9.6	1.8	—	None
0680	Unnamed	LB-44.8	1.75	—	None
0685	Deer Creek	LB-45.7	6.5	—	None
0686	Unnamed	LB-2.2	2.4	—	None
0687	Unnamed	RB-1.15	1.1	—	None
0690	Unnamed	RB-2.9	1.7	—	None
0697	Swift Creek	RB-46.75	2.8	—	None
0699	N. Puyallup R.	RB-47.0	5.2	—	None
0701	Unnamed	RB-2.1	1.6	—	None
0702	Unnamed	RB-2.45	1.9	—	None

UPPER PUYALLUP RIVER — HEADWATERS
Puyallup Basin — WRIA 10

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
	Puyallup R. cont. as S. Puyallup River	@ mi. 47.01	—	—	
0714	St. Andrews Creek	RB-49.7	3.2	—	None
0721	Unnamed	LB-50.2	3.0	—	None
0722	Unnamed	LB-0.3	1.1	—	None
0723	Unnamed	RB-0.85	1.0	—	None
0724	Unnamed	RB-1.4	1.4	—	None