

## CHEHALIS BASIN

### Water Resource Inventory Areas 22 & 23

The Chehalis basin is comprised largely of the Chehalis River watershed with two major and a number of minor, independent drainages. The Humptulips and Hoquiam rivers plus several smaller systems enter Grays Harbor from the north; the Chehalis River from the east; and the Johns and Elks rivers along with a number of smaller drainages from the south.

The Chehalis River forms on the higher slopes of southwestern Washington near the town of Pe Ell. The river flows generally northerly through a gradually broadening valley where a number of larger tributaries enter the river along its route. These include the South Fork Chehalis, Newaukum, Skookumchuck, Black, Satsop, Wynoochee, and Wishkah rivers. Of these, only the Wynoochee and Satsop river watersheds contain steep mountainous terrain in their headwaters. The lower reaches and most of the remainder of the Chehalis River watershed is composed of moderately sloped hills and broad valleys.

The Humptulips River is formed by its East and West forks which originate in the southeastern slopes of the Olympic Mountains. Its two major forks flow south through narrow valleys to their confluence from which the mainstem courses southerly through a gradually broadening valley to its entrance into Grays Harbor.

The Hoquiam River and its tributaries head in low, gentle hills north of Grays Harbor. Its stream courses are generally confined to moderately sloped valleys and the other tributaries to the north side of Grays Harbor and all the south side tributaries originate in low hills, meandering through broad valleys in their middle and lower reaches. There are 1,391 rivers and streams containing 3,353 linear stream miles within this basin.

Grays Harbor is an important marine area providing an essential fresh-salt water conversion zone and feeding ground for juvenile salmonids produced in the basin. Salmon from this and other basins enter Grays Harbor periodically to feed on the abundance of smaller marine fishes which occasionally school in the western portion of the harbor.

### Fish Inventory and Distribution

Grays Harbor tributaries are inhabited by chinook, chum, and coho salmon while pink and sockeye salmon are rarely encountered in these streams. Anadromous trout, steelhead, and cutthroat are also common. Salmon migrate, spawn, and rear in over 1,688 miles of tributary streams.

**Chinook Salmon** — Both spring and fall chinook are present in the Chehalis basin. Spring chinook enter the river in March through June destined for the upper reaches of the Wynoochee, Skookumchuck, Newaukum, South Fork Chehalis, and Chehalis rivers. These runs are presently at a low level of abundance.

Fall chinook are present in all of the larger tributaries and many of the smaller streams. Available chinook spawning area in the Humptulips and Hoquiam rivers and the Chehalis River tributaries downstream from Oakville is more heavily utilized at present than the spawning grounds of the Chehalis watershed upstream from Oakville.



PHOTO 22-1. Removal of Fisk Falls (R.M. 113.5) opened the upper Chehalis River to chinook and coho production.

Chinook spawners are generally abundant on riffles of the West Fork Humptulips and upper mainstem Humptulips River. The East Fork Humptulips River supports these fish at least as far upstream as the falls near Flatbottom Creek. Donkey Creek, below the falls, and the lower half of Stevens Creek are also heavily spawned.

The West Fork Hoquiam from tidewater to above the diversion dam, the lower reaches of the Middle Fork, and the central portion of the East Fork are excellent chinook spawning areas. The Wishkah River upstream from the mouth of the West Fork to the falls below Parker Creek and the lower reaches of the West and East forks also provide suitable chinook spawning riffles.

The Wynoochee River contains spawning riffles suitable for chinook salmon from the mouth of Black Creek upstream to Wynoochee Canyon above Save Creek with the riffles upstream from Carter Creek to near Save Creek appearing to be the most heavily spawned. Significant runs of chinook are known to inhabit the lower miles of Carter and Schafer creeks with some spawning in the lower extremities of several other tributaries.

The Satsop River tributaries provide many miles of chinook spawning area. While some spawning occurs in the main river, the bulk of the activity takes place in the East Fork between its mouth and Bingham Creek, the lower half of the West Fork, the Middle Fork, and Decker Creek. If stream flows are sufficient during the spawning run, Dry Run and Bingham creeks are also occupied.

Several smaller tributaries to the Chehalis River, including Cloquallum, Porter, and Cedar creeks, contain suitable chinook spawning riffles. Significant runs annually enter Cloquallum and Porter creeks.

Certain reaches of the Chehalis River contain quantities of chinook spawning gravel, but are presently used far below their potential. These reaches include the mainstem between Porter and Scatter creeks and upstream from Adna. Other



PHOTO 22-2. Chinook inhabit all the larger tributaries and many of the smaller streams in the Chehalis River basin (riffle on Canyon River).

suitable areas in the upper Chehalis watershed, presently underseeded, include: portions of the Black River, Skookumchuck Dam, Newaukum River, North Fork Newaukum upstream to Mitchell Creek, South Fork Newaukum upstream to the falls above Bernier Creek, the lower and upper reaches of the South Fork Chehalis River and the lower half of Stillman Creek and Elk Creek from the falls to the mouth. The Chehalis River above Fisk Falls, about five miles south of Pe Ell, was not accessible to salmon prior to 1970 when the configuration of the falls was modified.

Adult spring chinook enter the river during March through July (Table 22-1). These fish commence spawning in late August and continue through September. Fry emerge from the gravel late the following winter or early spring and juvenile spring chinook generally remain in the river for more than a year with seaward migration taking place the second spring following hatching.

In late July adult fall chinook begin entering the streams of the Chehalis basin where most of the earliest fish are destined for the Satsop River. The run peaks in September and tapers off rapidly through mid-November. Some of the earliest fish begin spawning in late August with the peak of spawning generally occurring during late October and early November. Fall chinook fry remain in fresh water for 3 to 5 months following emergence from the gravel and the major seaward migration occurs in mid-April through June.

Based on spawning ground inspections and fishery observations, it is estimated that the total combined spring and fall chinook natural spawning escapements to the Chehalis basin ranged from 10,000 to 30,000 chinook annually in the period of 1966 through 1971 with the average annual escapement being approximately 22,400.

In addition to the natural production of chinook in the Chehalis basin, the Department of Fisheries produces this species at Simpson Salmon Hatchery on the Satsop River. Only limited numbers of chinook reach the hatchery racks annually where an average of less than 40 fish per year were enumerated.

**Coho Salmon** — Coho salmon spawn in virtually all accessible streams containing satisfactory streambed material. These fish characteristically seek out smaller tributary streams, although some spawning does occur in large stream channels, such as the West Fork Humptulips and upper Wynoochee rivers. Coho runs in the Humptulips and Hoquiam watersheds and in the Chehalis River watershed downstream from Adna are generally good. Present populations in the Chehalis watershed upstream from Adna are in relatively poor condition.

The Grays Harbor coho run enters fresh water in September through February. This run consists of two distinct segments — early and late spawners. The early run commences in September and continues through November with spawning spread over the period from October through December. These fish are found throughout Chehalis basin. The late-run coho enter the streams in mid-November through February with spawning activities taking place in late December through March. Late-run coho are not found in significant numbers in the Chehalis River watershed upstream from Delezene Creek near Elma, but excellent runs are present in the Satsop, Wynoochee, Hoquiam, Wishkah, and Humptulips rivers with lesser runs in other tributaries to Grays Harbor and the Chehalis River below Delezene Creek.

Juvenile coho generally remain in fresh water over one year before beginning their seaward migration. They mainly migrate as yearlings during April, May, and June of their second year; however, some fry and fingerlings migrate during flooding and heavy run-off periods in their first year. Estimates of annual coho spawning escapements are based on spawning ground surveys and fishery observations. During 1966 through 1971 the average coho escapement was nearly 120,000 fish and ranged from 50,000 to 200,000. These figures include the average return of 8,200 coho annually to Simpson Hatchery whose escapement ranged from 5,200 to 10,212 coho.



PHOTO 22-3. Many small Chehalis River tributaries provide good habitat for coho spawning and rearing (Andrews Creek).

**Table 22 & 23-1. Timing of salmon fresh-water life phases in Chehalis Basin WRIA 22 & 23**

Species	Fresh-water Life Phase	Month											
		J	F	M	A	M	J	J	A	S	O	N	D
Spring Chinook	Upstream migration			■	■	■	■	■	■	■	■		
	Spawning									■	■		
	Intragravel develop.	■											
	Juvenile rearing	■	■	■	■	■	■	■	■	■	■	■	■
	Juv. out migration			■	■	■	■	■					
Summer-Fall Chinook	Upstream migration												
	Spawning									■	■	■	■
	Intragravel develop.	■	■	■	■								
	Juvenile rearing		■	■	■	■	■	■	■	■	■	■	■
	Juv. out migration			■	■	■	■	■					
Coho	Upstream migration	■											
	Spawning	■											
	Intragravel develop.	■	■	■	■								
	Juvenile rearing	■	■	■	■	■	■	■	■	■	■	■	■
	Juv. out migration		■	■	■	■	■						
Pink	Upstream migration								■	■			
	Spawning												
	Intragravel develop.	■	■	■	■								
	Juvenile rearing		■	■	■	■	■	■	■	■	■	■	■
	Juv. out migration			■	■	■	■						
Chum	Upstream migration	■											
	Spawning	■											
	Intragravel develop.	■	■	■	■								
	Juvenile rearing		■	■	■	■	■	■	■	■	■	■	■
	Juv. out migration			■	■	■	■						
Sockeye	Upstream migration			■	■	■	■	■	■	■	■	■	■
	Spawning	■	■	■	■								
	Intragravel develop.	■	■	■	■								
	Juvenile rearing	■	■	■	■	■	■	■	■	■	■	■	■
	Juv. out migration			■	■	■	■						

**Chum Salmon** — Major chum spawning areas are found in all the larger tributaries to the north side of Grays Harbor and in the larger streams entering the north side (right bank) of the Chehalis River downstream from Cloquallum Creek. Large numbers of chum frequently spawn in small, spring fed streams.

The Humptulips River and its tributaries, particularly Stevens Creek and the West Fork Humptulips, support significant chum runs. The Hoquiam and Wishkah rivers also are important chum spawning areas. Extensive chum utilization in the Wynoochee extends from approximately two miles above its mouth upstream to the lower end of Wynoochee Canyon near Save Creek. Schafer Creek is probably the most important chum spawning tributary; however, spawning takes place in the lower reaches of most tributaries containing suitable spawning gravel.

The Satsop River and its tributaries annually contain large numbers of chum salmon. Major runs occur in the East Fork, the lower ten miles of the West and Middle forks, and

the lower reaches of their tributaries. Decker Creek, several of its tributaries, and the East Fork Satsop are heavily spawned.

Cloquallum Creek is the uppermost tributary to the Chehalis which presently supports an important chum run. Chum salmon runs in areas further upstream have suffered a drastic decline with the majority of production upstream in the Chehalis from Cloquallum Creek now being confined to the area between Porter Creek and Scatter Creek near Rochester.

Chum salmon enter the Grays Harbor tributaries in early October through mid-December and spawning peaks in mid-November. Chum fry begin their seaward migration shortly after emerging from the spawning bed during February, March, and April after a short period of stream residence. An average of 16,000 chum escaped the fisheries to spawn in streams of the Chehalis basin in 1966 through 1971 while the spawning escapement ranged from 12,000 to 35,000 fish. Virtually all of this production is the result of natural



PHOTO 22-4. An excellent chum spawning riffle in lower Cloquallum Creek.

spawning. Average return to Simpson Hatchery was 444 chum and ranged from 25 to 1,158. Success of the eyed-egg incubation channel on the East Fork Satsop River has not been fully documented.

**Pink and Sockeye Salmon** — These two species have been seen in several streams of the Chehalis basin, but in insignificant numbers. They are assumed to be strays from elsewhere and are not indigenous to this basin.

### Salmon Production

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

Natural spawning in the Chehalis basin sustains an average annual catch of over 130,000 salmon to the various sport and commercial fisheries in Washington. An additional 65,000 salmon are harvested by fisheries of Alaska, Canada, Oregon, and California. In an average year approximately 160,000 adult salmon return to spawn in the Grays Harbor drainage of which over 150,000 spawn naturally and nearly 10,000 return from artificial production.

The Washington Department of Fisheries maintains the Simpson State Salmon Hatchery on the East Fork Satsop River. Bingham Creek and the East Fork Satsop provide water for the 44 standard pond equivalent station which has a hatching capacity of 9.0 million fry and a rearing capacity of approximately 2.0 million coho yearling and 4.5 million chinook fingerling salmon. This station handles principally fall chinook and coho. Virtually all juvenile coho are planted in the Grays Harbor drainage while much of the chinook production is transported to Capitol Lake in lower Puget Sound for further rearing.

Additional plantings of chinook and coho fry are often planted in this drainage from stations in the Willapa Harbor area. For the period 1966 to 1971, annual salmon plants in the basin have averaged 1.5 million chinook, 800,000 coho yearlings, and 800,000 coho fry.

Table 22-2. Salmon Spawning Escapement Levels for the Chehalis Basin WRIA 22 & 23.

Species	1966-1971 Escapements	
	Range	Average
Chinook	10,000— 30,000	22,000
Coho	50,000—200,000	119,000
Chum	12,000— 35,000	16,000

During the 1966-1971 period a total 9,152,000 chinook fry and fingerling, 6,283,000 coho fry and fingerling, 9,652,000 yearling coho, and 528,000 chum fry were planted in the Chehalis basin. Some of these fish, particularly chinook and coho fry, were planted out of hatcheries in the Willapa basin. Many of the chinook fry and most of the coho fry and fingerling were planted after only short-term rearing into barren and depleted areas within the Chehalis basin. Actual production of the fisheries and returns to the basin from such plants are unknown.

An experimental egg incubation channel is operated on a spring-fed tributary to the East Fork Satsop River. This facility is 240 feet long by 12 feet wide and has an estimated capacity of 2,000,000 eggs. Eggs are buried in the gravel and allowed to incubate, emerge, and migrate from the channel naturally. Both chum and coho eggs have been planted; however, emphasis has been placed on the production of chum fry. An average of 500,000 chum eggs have been planted annually since its construction.

### Harvest

Salmon produced or reared in the Chehalis basin waters are harvested by sport and commercial fisheries of the United States and Canada. These fish are known to be present from northern California to southeastern Alaska, but Washington coastal fisheries and those in the western end of the Strait of Juan de Fuca capture the majority of the total production. The estimated total contribution (all species) to these fisheries ranged from 139,000 to 370,000 salmon for the period 1966-1971.

Grays Harbor supports an intensive gill net fishery which harvests an estimated 35 percent of the chinook, 50 percent of the chum, and 23 percent of the coho entering the bay. An Indian gill net fishery operates on the Chehalis River in the vicinity of Oakville. This fishery has captured an average of 4,050 salmon annually in recent years.

A large sport fishing fleet operates out of Westport and Ocean Shores near the entrance to Grays Harbor. Most of the fleet's effort is expended on the ocean waters between Copalis and Willapa Harbor. The bar at the entrance of Grays Harbor is also a popular sport fishing site.

Freshwater salmon angling is permitted in several of the larger tributaries in the Chehalis basin. The more popular fishing areas include the Humptulips, Wynoochee, Chehalis, and Satsop rivers. The average freshwater catch of salmon in the basin based on sport catch punch card returns is 6,150 annually and has ranged from 2,030 to 8,330. Chinook and coho comprise the bulk of the catch; however, some chum salmon are taken. No data are available to determine species composition or the number of jacks and adults.



PHOTO 22-5. A scene repeated thousands of times each year on Westport charter boats.

### Limiting Factors

Limiting factors refer to conditions that lead to a complete loss or a reduction of an environment's fish producing potential, excluding harvest.

**Stream flow** — Seasonal flooding occurs in some of the drainage areas. This flooding does not normally result in excessive damage to the fisheries resources of this basin, but it may result in unstable streambeds.

Seasonal low flows occur in virtually all of the streams, but are most detrimental to fish life in the smaller tributaries by limiting the amount of rearing areas available. These low flows generally occur from natural causes, since stream diversions for other water uses are presently limited to a small number of courses. Some smaller streams go dry during extensive rainless periods in the summer.



PHOTO 22-6. Intermittent flows create serious mortalities of juvenile coho (Dry Bed Creek).

**Physical barriers** — A number of streams in this basin have physical barriers which inhibit or delay salmon migration to potential spawning and rearing areas. Most of these barriers are natural features consisting of falls, cascades, and beaver dams. Log jams, composed of both natural and logging debris, are problems in many streams.

Some barriers have resulted from construction activities and include two dams that have been constructed with both of them having fish passage facilities. A number of small tributary streams are blocked by improper culverts on county, state, and private roads. Culverts not properly installed create outfall drops and velocities sufficient to prevent upstream passage of adults.

Natural barriers blocking fish passage to stream reaches with significant salmon production potential are found on the East and West forks Humptulips, East Fork Hoquiam, Wishkah, Wynoochee, Middle and West forks Satsop, Skookumchuck, South Fork Newaukum, and West Fork Chehalis rivers, and Porter Creek. A number of lesser, but important, potential production areas are inaccessible on the smaller streams.

**Water Quality** — Degraded water quality areas exist in the lower five miles of the Newaukum River. Many of the small drainages and most estuarine areas of Grays Harbor suffer from degraded water quality. Grays Harbor has suffered from water pollution problems since 1937 and has had many studies conducted on the problems in the past years.

Principal causes of inferior water quality result from domestic and agricultural pollutants in the streams, and domestic and industrial effluents in the estuarine and marine water.

Excessive streambank erosion exists upstream of Pe Ell on the mainstem Chehalis River and has created heavy siltation downstream.

Water temperature problems exist, particularly in the Chehalis River below Newaukum River.

Operation of food processing plants in the Centralia area during the summer months overloads existing treatment facilities and raw sewage enters the Chehalis River below the confluence of the Newaukum River. Water samples collected by the Washington Water Pollution Control Commission in 1967 and by the Federal Water Pollution Control Administration in 1966 show low dissolved oxygen, a high 5-day BOD, and high coliform counts. This pollution problem may have serious effects on salmon and shad.

**Limited spawning and rearing** — Virtually all of the streams in this basin had sufficient spawning area in their pristine condition. Siltation from logging and road construction has resulted in compaction of the spawning gravel and decreased intragravel flow in many tributaries. This seriously limits the success of natural spawning and rearing.

Streams experiencing very low summer flows have limited rearing area for juvenile coho which is also lost through physical changes in stream length, streambed composition, and pool-riffle characteristics.

Steeper gradient streams do not have a proper balance of pools and riffles, consequently the rearing potential is restricted. Bottom materials in these steeper streams are often too large for successful spawning with only an occasional patch of smaller spawning gravel.

Watershed developments—Development of river-front property for summer and permanent homes has not been extensive, but can be expected in the future. This will result in demands for diking and channel changes which are not compatible with fish production.

Physical alterations of the stream courses for road construction are found on many streams which results in increased gradient and loss of spawning and rearing area. Logging road construction has resulted in numerous such losses and public roads also have created a number of damaging channel changes.

Gravel removal from the natural streambeds reduces the amount of available spawning area and may result in a reduction in streambed stability. Gravel removal projects on the Satsop, South Fork Chehalis, Humptulips, and Wynoochee rivers have probably reduced the available chinook spawning areas.

Gravel removal operations, particularly adjacent to stream in the Newaukum watershed, have probably contributed greatly to the decline of the chinook and chum runs. These operations have affected, and continue to affect, virtually every spawning reach of the South Fork below the town of Onalaska, the Newaukum River, and the North Fork below the stream gage. Full restoration of the chinook runs is not possible until this situation is corrected.



PHOTO 22-7. Improper gravel removal operations impair salmon production (Newaukum River).

**CHEHALIS BASIN WRIA 22**  
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HUMPTULIPS RIVER (Big Creek Area)	(22.0041—22.0079) . . . . .	Chehalis— 202
EAST FORK HUMPTULIPS RIVER	(22.0080—22.0101) . . . . .	Chehalis— 302
WEST FORK HUMPTULIPS RIVER (Lower Mainstem)	(22.0102—22.0115) . . . . .	Chehalis— 402
WEST FORK HUMPTULIPS RIVER	(22.0116—22.0130) . . . . .	Chehalis— 502
HOQUIAM RIVER	(22.0137—22.0189) . . . . .	Chehalis— 602
CHEHALIS RIVER (Lower Mainstem)	(22.0190) . . . . . (22.0236—22.0259) (22.0345—22.0359)	Chehalis— 702
WISHKAH RIVER	(22.0191—22.0235) . . . . .	Chehalis— 802
WYNOOCHEE RIVER (Lower Mainstem)	(22.0260—22.0290) . . . . .	Chehalis— 902
WYNOOCHEE RIVER (Carter Creek Area)	(22.0291—22.0301) . . . . .	Chehalis—1002
WYNOOCHEE RIVER (Headwaters)	(22.0302—22.0344) . . . . .	Chehalis—1102
SATSOP RIVER	(22.0360—22.0363) . . . . . (22.0407—22.0413) (22.0444) (22.0457—22.0464)	Chehalis—1202
WEST FORK SATSOP RIVER (Lower Mainstem)	(22.0364—22.0376) . . . . .	Chehalis—1302
WEST FORK SATSOP RIVER (Headwaters)	(22.0377—22.0406) . . . . .	Chehalis—1402
MIDDLE FORK SATSOP RIVER AND DECKER CREEK	(22.0414—22.0443) . . . . . (22.0445—22.0456)	Chehalis—1502
EAST FORK SATSOP RIVER (Headwaters)	(22.0465—22.0476) . . . . .	Chehalis—1602
WORKMAN-DELEZENE CREEKS	(22.0488-22.0500) . . . . . (22.0520-22.0532) (22.0540—22.0541)	Chehalis—1702
NEWMAN-CLOQUALLUM CREEKS	(22.0477-22.0487) . . . . . (22.0501—22.0519) (22.0533—22.0539) (22.0542)	Chehalis—1802

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**CHEHALIS BASIN WRIA 23**  
**Index to Key Maps**

Map Title	Stream Numbers	Page
PORTER CREEK	(23.0543 23.0562)	Chehalis—1902
GIBSON-CEDAR CREEK	(23.0565 23.0602) (23.0619) (23.0623 23.0626)	Chehalis—2002
ROCK-GARRARD CREEK	(23.0563 23.0564) (23.0603 23.0618) (23.0620 23.0622) (23.0627 23.0648)	Chehalis—2102
BLACK RIVER	(23.0649 23.0695)	Chehalis—2202
CHEHALIS RIVER (Scatter Creek Area)	(23.0716 23.0724) (23.0729 23.0731)	Chehalis—2302
INDEPENDENCE-LINCOLN CREEK	(23.0696 23.0715) (23.0725 23.0728) (23.0732 23.0756)	Chehalis—2402
SKOOKUMCHUCK RIVER (Lower Mainstem)	(23.0761 23.0834)	Chehalis—2502
SKOOKUMCHUCK RIVER (Upper Mainstem)	(23.0835 23.0869)	Chehalis—2602
CHEHALIS RIVER (Centralia Area)	(23.0870 23.0875) (23.0880 23.0881)	Chehalis—2702
NEWAUKUM RIVER	(23.0882 23.0886)	Chehalis—2802
NORTH FORK NEWAUKUM RIVER	(23.0887 23.0912)	Chehalis—2902
SOUTH FORK NEWAUKUM RIVER (Lower Mainstem)	(23.0913 23.0914)	Chehalis—3002
SOUTH FORK NEWAUKUM RIVER (Upper Mainstem)	(23.0915 23.0929)	Chehalis—3102
CHEHALIS RIVER-MILL-BUNKER CREEKS	(23.0757 23.0760) (23.0876 23.0879) (23.0930 23.0933) (23.0947) (23.0952 23.0976) (23.1079) (23.1083 23.1084) (23.1091 23.1093) (23.1095 23.1097) (23.1100 23.1105)	Chehalis—3202
STEARNS-HOPE CREEKS	(23.0934 23.0946) (23.0948 23.0951) (23.1080 23.1082) (23.1085 23.1090) (23.1094)	Chehalis—3302
SOUTH FORK CHEHALIS RIVER (Lower Mainstem)	(23.0977 23.1000) (23.1038 23.1050)	Chehalis—3402
STILLMAN CREEK	(23.1001 23.1037)	Chehalis—3502
SOUTH FORK CHEHALIS RIVER (Upper Mainstem)	(23.1051 23.1078)	Chehalis—3602
CHEHALIS RIVER-CRIM-ROCK CREEK	(23.1098 23.1099) (23.1144 23.1180)	Chehalis—3702
ELK CREEK	(23.1106 23.1143)	Chehalis—3802
UPPER CHEHALIS RIVER (Headwaters)	(23.1181 23.1214)	Chehalis—3902
CHARLEY-NEWSKAH CREEK	(22.1215 22.1269)	Chehalis—4002
JOHNS RIVER	(22.1270 22.1316)	Chehalis—4102
ELK RIVER	(22.1317 22.1391)	Chehalis—4020



## WEST FORK HUMPTULIPS RIVER

### Headwaters

This section describes the West Fork Humptulips River from the mouth of Chester Creek at mile 54.9 upstream to the headwaters and all tributary streams to this reach. The area contains 14.9 miles of mainstem West Fork and 10 tributaries with 27.1 linear miles of stream drainage.

#### Stream Description

The West Fork heads in the steep foothills of the Olympic Mountains and flows southwest between steep hills in a gradually broadening river valley. Chester Creek is the only major West Fork tributary. The remainder of its tributaries are quite short and steep.

Virtually all of this section is forested with conifer timber. Old-growth timber is common throughout. Logging is presently underway. There are no areas of farmland or residential development. The upper several miles of the West Fork are quite steep, with the remainder of the river having a moderate gradient. An adequate stream bank cover of deciduous vegetation exists along the West Fork. The tributary streams are quite steep except in their lower reaches where they enter the main river valleys. Most of these tributaries are in recently logged land or old-growth timberland. Their bank cover consists of conifer timber in their steeper sections and deciduous growth in the bottomland.

The lower reaches of the West Fork contain a good balance of pools and riffles. It has a relatively stable streambed and averages 4 to 15 yards in width. Gravel and rubble are the predominant features of the streambeds. The tributaries contain numerous cascades, rapids, and waterfalls in their upper reaches. Only their lower extremities contain significant amounts of pool and riffle area. The majority of these streams are less than 3 yards wide in their lower reaches. The streambeds are composed primarily of gravel. Deciduous vegetation and conifer timber provide generally good stream bank cover.

#### Salmon Utilization

The cascades in the gorge on the West Fork Humptulips River below mile 46.0 are impassable barriers to salmon. The West Fork and the lower reaches of several tributaries, however, are suited for salmon production. Recently, plants of coho fry have been made.

#### Limiting Factors

The major limiting factors in this section are the numerous barriers to salmon migration. The West Fork Humptulips River has a series of cascades in the gorge at mile 45.4-45.9 which prevents salmon from migrating upstream. Chester Creek has a 15-foot waterfall at mile 0.01. Most of the tributaries are quite steep and offer little spawning potential.

#### Beneficial Development

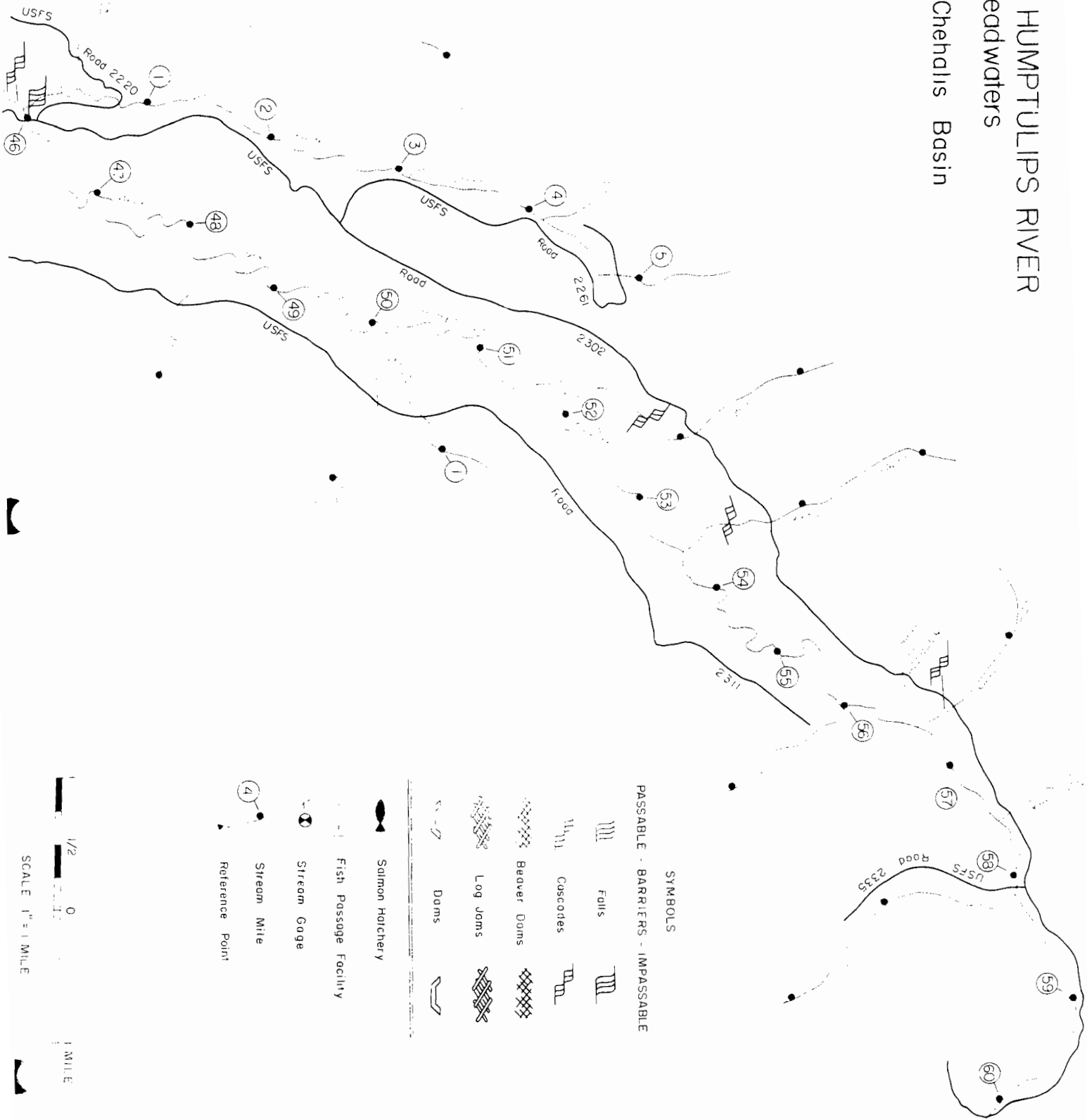
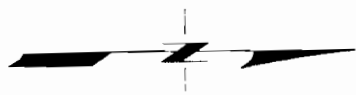
Annual coho fry plants have been made in recent years. No other beneficial developments have been undertaken.

#### Habitat Needs

Streambed and water quality in this section will be maintained if adequate protection is provided for road construction and logging. The cascades in the gorge on the West Fork Humptulips should be surveyed for possible remedial action. Fry plants should be continued.

# WEST FORK HUMPTULIPS RIVER Headwaters

Lower Chehalis Basin



### SYMBOLS

PASSABLE - BARRIERS - IMPASSABLE

- Falls
- Cascades
- Beaver Dams
- Log Jams
- Dams
- Salmon Hatchery
- Fish Passage Facility
- Stream Gage
- Stream Mile
- Reference Point



SCALE 1" = 1 MILE

**WEST FORK HUMPTULIPS RIVER — HEADWATERS**  
**Chehalis Basin — WRIA 22 & 23**

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0004	Humptulips River				Chin.,Chum,Coho
	Humptulips R. cont. as W. F. Humptulips R.	@ mi. 28.11	—	73.2	
0116	Chester Creek	RB-45.9	5.7	10.6	Unknown
0117	Phillips Creek	RB-0.3	2.4	—	None
0118	Unnamed	RB-1.6	2.1	—	None
0119	Unnamed	RB-3.1	1.2	—	None
0121	Unnamed	LB-48.3	1.0	—	None
0122	Unnamed	LB-50.1	1.6	—	None
0123	Unnamed	LB-0.2	1.3	—	None
0124	Unnamed	RB-51.8	2.3	—	None
0125	Petes Creek	RB-53.6	2.3	—	None
0126	Unnamed	LB-56.0	1.1	—	None
0128	Gibson Creek	RB-56.6	1.6	—	None
0130	Unnamed	LB-58.15	2.1	—	None

## HOQUIAM RIVER

This section discusses the entire Hoquiam River watershed of over 90 square miles. The Hoquiam River is 7.0 miles long with 14 tributaries providing an additional 124 linear miles of stream drainage.

### Stream Description

Hoquiam River is formed by the confluence of West and Middle Forks. The short stream flows south through flat terrain to Grays Harbor. Major tributaries include East Fork, Little Hoquiam, Middle Fork, and West Fork.

The upper half of Hoquiam River lies in a flat, brushy valley; the lower reaches flow through the City of Hoquiam. All of the river channel is used for log storage. The channel is influenced by tidal fluctuations for its entire length and ranges from 20 to over 100 yards wide. The river bed is almost entirely mud and silt.

The Hoquiam tributaries head in low hills and have a moderate gradient most of their length. The lower extremities of the major tributaries are affected by tide variations. Stream bank cover is generally good except in scattered areas of recent logging activity. The predominant bottom material, above tidal influence, is gravel and rubble except in the Little Hoquiam watershed where silt and sand predominate.

Some farmland is found adjacent to the middle portion of the East Fork and along the upper reaches of the Little Hoquiam. The City of Hoquiam straddles the lower mainstem. There are a number of industries adjacent to the river here. Rural residences are found along the lower reaches of all the major tributaries except the Middle Fork. The non-residential uplands are in second-growth timber production.

There are three major water diversions in the watershed. Hoquiam maintains diversion dams on Davis Creek, Little North Fork Hoquiam and West Fork Hoquiam rivers. An industrial diversion was formerly operated on the East Fork.

### Salmon Utilization

The Hoquiam watershed contains runs of fall chinook, chum, and both late and early run coho. The mainstem serves as transportation and rearing area only as it contains no suitable spawning gravel. The East Fork has spawning chinook, coho, and chum at least as far upstream as the falls at mile 16.0. No spawning is expected below mile 7.0. Chum and chinook also spawn in the West Fork between the head of tidewater at mile 9.3 and mile 13.5. The Middle Fork has excellent spawning facilities for chum and chinook upstream from tidewater to mile 5.0. Lesser numbers of chum spawn in other accessible tributaries. Major coho spawning areas include the upper East, West, and Middle forks. Their tributaries also support coho as far as accessible. An estimated 68 linear miles of tributary streams are presently accessible for salmon production.

### Limiting Factors

Municipal diversions on the Hoquiam watershed have reduced the summer rearing area for juvenile coho. Dams on Davis Creek and West Fork Hoquiam, while equipped with fishways, may periodically not pass chinook, coho, or chum. The diversion dam on North Fork Little Hoquiam is a total

barrier to all species. Flushing silt from these reservoirs is not compatible with salmon spawning and rearing.

Salmon must pass through the polluted estuary and Grays Harbor on their route to, and from, the ocean. Full effect of this pollution is not known; however, fish kills do occur.

A falls on East Fork Hoquiam River is an apparent barrier to chinook and chum. Falls are also known to exist on several unnamed tributaries to the East and West forks and on Polson, Hoover, and Bernard creeks.

The Little Hoquiam River has limited spawning area as do several smaller tributaries in the system.

### Beneficial Development

The diversion dam on Davis Creek formerly was a total block to adult salmon. Recent reconstruction of this dam included provision of fish passage facilities. A fishway has also been incorporated in the dam on the West Fork. However, salmon, particularly coho, are reluctant to use it.

### Habitat Needs

Pollution abatement in Grays Harbor and Hoquiam River estuary will substantially improve runs into this system. Alternative methods of clearing the three reservoirs of silt deposits must be devised. Logging must be carefully conducted to prevent further siltation of the spawning gravel and degradation of water quality. Further water withdrawals will be detrimental to the existing fish populations. The excellent salmon habitat on the East and Middle forks must be sustained.













PHOTO 22-11. Excellent spawning area on the Middle Fork Hoquiam River.

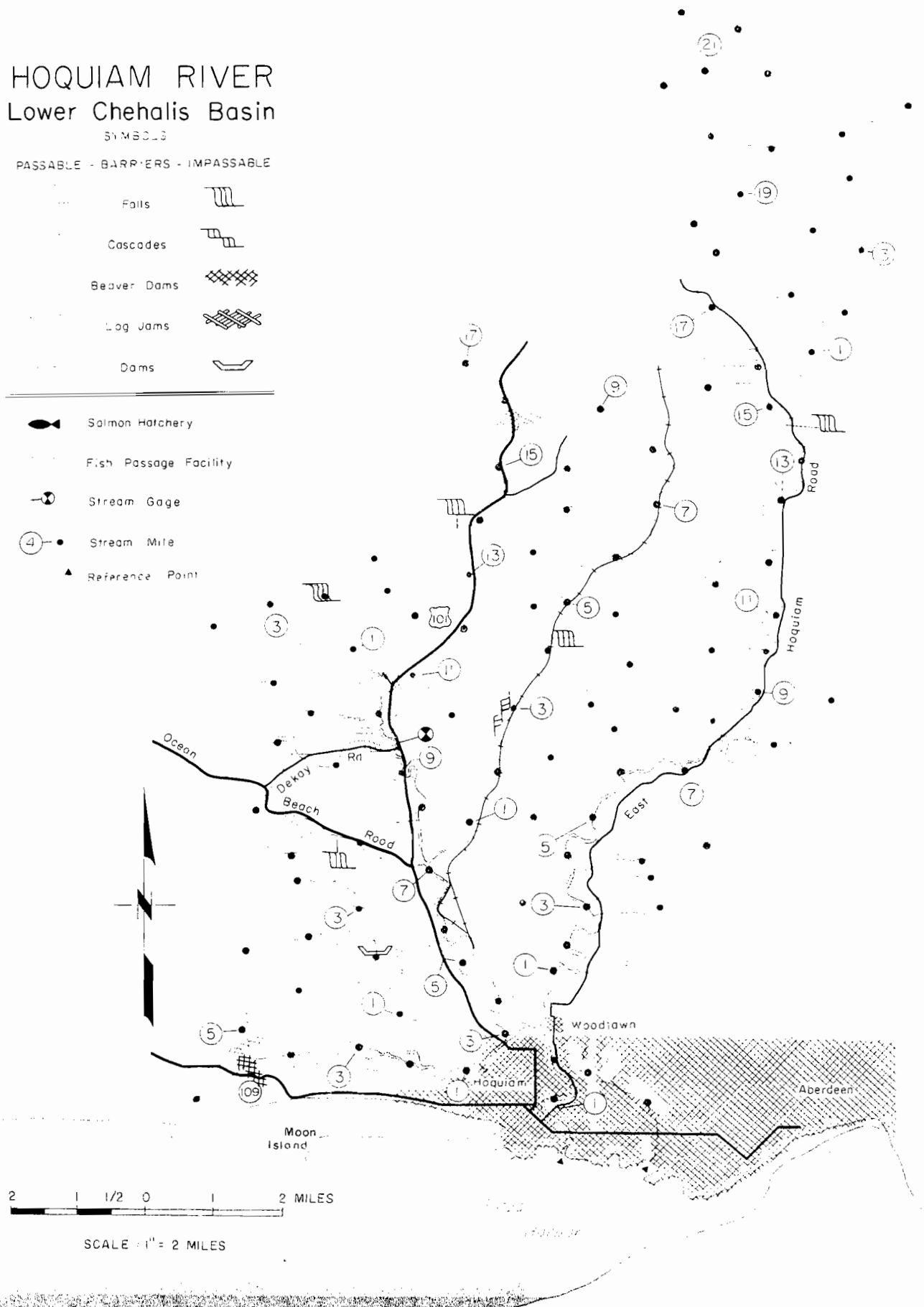
# HOQUIAM RIVER Lower Chehalis Basin

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

**HOQUIAM RIVER**  
**Chehalis Basin — WRIA 22 & 23**

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0137	Hoquiam River	Sec 12, T17N, R10W	17.4	90.2	Coho, Chum, Chin.
0138	E. Fk. Hoquiam River	LB-2.4	22.05	40.4	Chin., Coho, Chum
0140	Unnamed	LB-2.8	1.7	—	Coho, Chum
0141	Unnamed	LB-3.0	2.35	—	Coho, Chum
0142	Unnamed	LB-3.8	1.2	—	Coho, Chum
0143	Unnamed	RB-5.4	2.65	—	Coho, Chum
0144	Lytle Creek	RB-6.35	3.8	—	Coho, Chum
0145	Berryman Creek	LB-7.5	2.4	1.09	Coho, Chum
0146	Unnamed	LB-14.75	3.25	—	Chum, Coho
0148	Unnamed	LB-16.0	3.1	—	Coho
0149	Unnamed	RB-16.5	1.4	—	Coho
0150	Unnamed	RB-17.4	1.1	—	Coho
0151	Unnamed	LB-19.0	3.6	—	Coho
0152	Unnamed	RB-20.0	1.0	—	Coho
0153	Unnamed	LB-20.35	1.45	—	Coho
0154	Unnamed	LB-20.75	1.4	—	Coho
0155	Little Hoquiam River	RB-2.9	5.75	9.94	Coho, Chum
0157	N.F. Ltl. Hoquiam R.	LB-1.9	4.2	4.98	Coho, Chum
0161	Unnamed	RB-2.3	2.2	—	Coho
0162	Unnamed	LB-4.1	1.2	—	Coho
0164	Unnamed	LB-5.2	1.4	—	Unknown
0165	Middle Fk. Hoquiam R.	LB-7.1	9.65	—	Coho, Chum, Chin.
0167	Unnamed	LB-0.85	1.7	—	Coho
0168	Junction Creek	LB-1.9	2.2	—	Coho
0170	Unnamed	RB-3.7	1.4	—	Coho
0171	Unnamed	LB-4.2	1.6	—	None
	Hoquiam R. cont. as W. F. Hoquiam River	@ mi. 7.11			Coho, Chum, Chin.
0172	Bernard Creek	RB-7.15	2.2	—	Coho
0176	Polson Creek	RB-9.41	2.85	2.46	Chum, Coho
0177	Unnamed	RB-1.6	1.0	—	Coho
0178	Barnum Creek	LB-9.65	1.1	—	Chum, Coho
0179	Hoover Creek	RB-9.9	1.6	—	Chum, Coho
0180	Davis Creek	RB-10.4	4.0	—	Chum, Coho
0181	Unnamed	LB-0.3	1.7	—	Coho

**HOQUIAM RIVER**  
**Chehalis Basin — WRIA 22 & 23**

<b>Stream Number</b>	<b>Stream Name</b>	<b>Location Of Mouth</b>	<b>Length</b>	<b>Drainage Area</b>	<b>Salmon Use</b>
0182	Unnamed	LB-1.1	1.8	—	Coho
0183	Unnamed	RB-1.45	1.4	—	Coho
0184	Unnamed	LB-2.0	1.6	—	Coho
0185	Unnamed	LB-12.7	2.1	—	Coho
0187	Unnamed	LB-14.4	1.3	—	Coho
0188	Fry Creek	S½,Sec7,T17N,R9W	2.5	—	Coho

## CHEHALIS RIVER

### Lower Mainstem

This section discusses the Chehalis River from its mouth to the mouth of the Satsop River and its smaller tributaries to this reach. The Wishkah River (see Section 800) and the Wynoochee River (see Sections 900 to 1100) are excluded. The area includes 20.2 miles of mainstem Chehalis and 11 tributaries with an additional 74.7 linear miles of stream drainage.

#### Stream Description

The Chehalis River flows westerly through a broad, flat valley to Grays Harbor. The major tributaries are the Wishkah and Wynoochee Rivers, with numerous minor tributaries including Elliott, Mox Chuck, Blue, Preachers, Higgins, and Mercalf sloughs, and Mill, Stevens, and Elizabeth creeks.

The Chehalis valley and the lower reaches of several tributaries are extensively farmed. The land above the farming valleys is in timber production. Residential development is progressing rapidly in the Chehalis valley and Montesano. This development is having little direct influence on the stream habitat. Aberdeen and Cosmopolis are near the mouth of the Chehalis with Montesano located near the mouth of the Wynoochee.

This portion of the Chehalis has a low gradient and consists of the main channel and a number of sloughs and side channels. Much of this reach is influenced by tidal fluctuations and ranges from 50 to 300 yards wide. The streambed consists primarily of gravel, sand, and silt.

Streambeds in tributaries are predominantly sand, with scattered gravel riffles, gradient is low except in the headwaters of the streams, with excellent stream bank cover of deciduous vegetation. Spawning and rearing areas are fair, with a high pool to riffle balance. Stream widths average from 1 to 3 yards.

#### Salmon Utilization

The Chehalis serves as transportation water for juvenile and adult salmon including chum, coho, and both spring and fall chinook. No salmon are known to spawn in this reach. Juvenile rearing is probably limited but does occur in the river and connecting sloughs. Shad and sturgeon also are found. Coho and chum utilize approximately 12 linear miles of the smaller Chehalis tributaries for spawning and rearing.

#### Limiting Factors

The major limiting factor in the Chehalis watershed is pollution in Grays Harbor. High water temperatures and concentrations of predatory fish inhibit juvenile rearing in this reach of the Chehalis. Tributaries included in this section have limited spawning and rearing area.

#### Beneficial Developments

With the construction of a new section of U.S. Highway 12, a number of fishways were built to maintain access to upstream spawning areas on smaller streams.

In September 1972, an experimental project was undertaken in the lower Chehalis River to eradicate squawfish,

predators of salmonids, with the use of a chemical known as Squoxin. The results were favorable and may be done again in the near future.

Plants of juvenile salmon in the Chehalis River tributaries contribute to the important sport fishery for salmon in this section of the Chehalis River.

#### Habitat Needs

To maintain and increase the fish production potential of this drainage section, it will be mandatory to stop pollution in Grays Harbor and the Chehalis River estuary. Continued poisoning of undesirable freshwater fish, predators of salmonids and their food chain, would further help improve production potential.



# CHEHALIS RIVER

## Lower Mainstem

### Lower Chehalis Basin

#### SYMBOLS

PASSABLE - BARRIERS - IMPASSABLE

- Passable
- Barriers
- Impassable
- Folts
- Cascades
- Beaver Dams
- Log Jams
- Dams

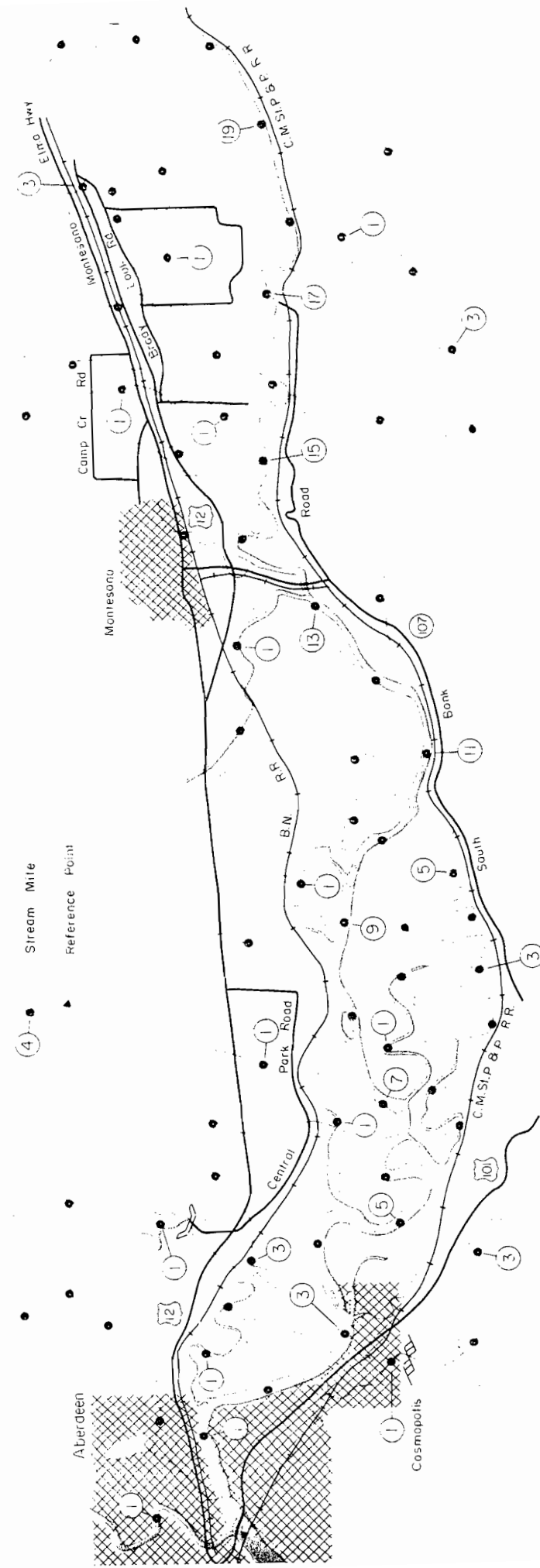
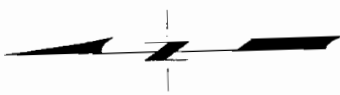
Salmon Hatchery

Fish Passage Facility

Stream Gage

Stream Mile

Reference Point



SCALE 1" = 15 MILES

**CHEHALIS RIVER — LOWER MAINSTEM**  
**Chehalis Basin — WRIA 22 & 23**

Stream Number	Stream Name	Location Of Mouth	Length	Drainage Area	Salmon Use
0190	Chehalis River	Sec9,T17N,R9W	127.2	2114.0	Chin.,Chum,Coho
0191	Wishkah River (See Chehalis 803)	RB-0.15	37.3	---	
0236	Wilson Creek	RB-0.5	1.95	—	Unknown
0238	Elliott Slough	RB-1.4	4.4	—	Chum, Coho
0240	Van Winkle Creek	RB-2.7	4.0	—	Chum, Coho
	Lake Aberdeen	Outlet-0.7	--	---	
0241	Unnamed	RB-1.0	1.1	—	None
0242	Unnamed	RB-1.1	1.35	---	None
0245	Mill Creek	LB-2.6	3.9	—	Coho
0251	Mox Chuck Slough	RB-4.5	1.9	—	Chum, Coho
0252	Unnamed	RB-0.9	1.9	—	Unknown
0253	Unnamed	RB-0.21	1.5	—	Unknown
0254	Blue Slough	LB-6.5	3.5	—	Chin.,Coho,Chum
0255	Preachers Slough	LB-6.8	5.6	—	Chin.,Chum,Coho
0256	Unnamed	RB-3.4	1.2		Unknown
0257	Higgins Slough	RB-8.7	2.7	—	Chin.,Chum,Coho
0258	Peels Slough	RB-9.4	2.5	—	Chin.,Chum,Coho
0259	Unnamed	LB-11.65	1.6	—	Unknown
0260	Wynoochee River (See Chehalis 903)	RB-13.0	63.25	—	
0345	Unnamed	RB-13.8	1.7	—	Unknown
0346	Unnamed	RB-14.0	1.9	—	Unknown
0348	Metcalf Slough	RB-14.7	2.8	—	Coho, Chum
0349	Unnamed	RB-1.35	3.9	—	Chum, Coho
0351	Camp Creek	LB-0.7	3.0	—	Coho
0352	Unnamed	LB-2.5	3.4	---	Coho
0353	Unnamed	RB-0.05	1.8	—	Unknown
0354	Unnamed	RB-0.65	1.0	—	None
0355	Unnamed	RB-1.2	1.1	—	Unknown
0356	Stevens Creek	LB-15.8	2.2	1.65	Coho, Chum
0358	Elizabeth Creek	LB-16.9	3.6	—	Coho
0359	Unnamed	RB-1.0	1.4	—	Coho
0360	Satsop River (See Chehalis 1203)	RB-20.2	28.6	---	
	(Cont. Chehalis 1703)				