

STATE WATER PROGRAM



W.W.I.R.P.P. SERIES - NO. 3

CHAMBERS-CLOVER BASIN INSTREAM RESOURCES PROTECTION PROGRAM INCLUDING PROPOSED ADMINISTRATIVE RULES

(WATER RESOURCE INVENTORY AREA 12)

**STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY**

NOVEMBER 1979

CHAMBERS-CLOVER BASIN
INSTREAM RESOURCES PROTECTION PROGRAM
INCLUDING
PROPOSED ADMINISTRATIVE RULES
(WATER RESOURCE INVENTORY AREA 12)

Prepared by
Water Resources Policy Development Section
Washington State Department of Ecology

FINAL
November 19, 1979

Washington State Department of Printing
Olympia, Washington
November 1979

TABLE OF CONTENTS

	<u>Page</u>
I. PREFACE	1
II. SUMMARY	4
III BASIN DESCRIPTION	6
IV WATER RESOURCES	8
V. WATER USE	15
VI WATER QUALITY	18
VII. CURRENT ADMINISTRATIVE STATUS	21
VII PROPOSED ADMINISTRATIVE STATUS	21
IX. BIBLIOGRAPHY	23
X. DISTRIBUTION LIST	25
XI APPENDICES	
APPENDIX A - PROPOSED RULES	
APPENDIX B - BACKGROUND: WESTERN WASHINGTON INSTREAM RESOURCES PROTECTION PROGRAM	
APPENDIX C - . PUBLIC HEARING COMMENTS LETTERS OF COMMENTS	
APPENDIX D - RESPONSES TO COMMENTS	

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1 Streams and Lakes in Hie Chambers-Clover Creeks Basin (WRIA 12)	3
2. Chambers-Clover Creeks Basin Map Indicating Locations of Special Water Districts, Water Companies, Wells, Reservoirs, and Water Quality Monitoring Stations	7
3. Schematic of a Typical Water-Bearing Unit Stratification in the Chambers-Clover Basin (WRIA 12)	13
4. Water Table Contours and Selected Observation Wells in the Tacoma Area	14

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1 Current Administrative Status and Proposed Status of Streams and Lakes in the Chambers-Clover Creeks Basin (WRIA 12)	5
2. Water Source Data	16
3. Water Quality in the Chambers-Clover Creeks Drainages	20

PREFACE

The Western Washington Instream Resources Protection Program (WWIRPP) is designed to develop and adopt instream flow regulations for most Water Resource Inventory Areas (WRIA) in western Washington pursuant to Chapter 90.54 RCW (Water Resources Act of 1971), Chapter 90.22 RCW (Minimum Water Flows and Levels), and Chapter 173-500 WAC (Water Resources Management Program). See Appendix B for complete background information.

Prior to 1969, the primary statutory authority relating to the protection of instream flows was provided by the State Fisheries Code (chapter 75.20 RCW). The Western Washington Instream Resources Protection Program confirms surface water limitations established previously by the Department of Ecology. The program will further set forth additional streams and lakes to be closed to future appropriations and will establish instream flows for streams that still have water available for consumptive appropriation.

The administrative rules proposed for the Chambers-Clover Basin Instream Resources Protection Program will:

1. Help to maintain water quality in streams and lakes.
2. Help protect habitat for spawning and rearing of resident and anadromous fishes, and for wildlife.
3. Maintain adequate lake water levels and stream flows for recreation, and aesthetic purposes.

THE INSTREAM RESOURCES PROTECTION PROGRAM DOES NOT AFFECT ANY EXISTING WATER RIGHTS.

ENVIRONMENTAL IMPACT STATEMENT

No adverse environmental impacts are foreseen to result from the Chambers-Clover Creeks Basin Instream Resources Protection Program.

Environmental impact statement requirements have been met in the overall Western Washington Instream Resources Protection Program Final Environmental Impact Statement (distributed June 1979). A basin specific supplemental environmental impact statement, therefore, is not required.

PUBLIC INVOLVEMENT

Distribution of a draft of this basin document initiated public involvement in the Instream Resources Protection Program for the Chambers-Clover Basin (WRIA 12). Public comments were accepted during a public hearing held in Pierce County on October 10, 1979. Written comments were accepted until October 31, 1979. Written comments and oral testimony were fully considered in preparation of the final program document and proposed rules. A summary of oral testimony and written comments are contained in Appendix C.

The Instream Resources Protection Program Rules for the Chambers-Clover Basin (WRIA 12) as proposed in this document were adopted December 12, 1979, in a public adoption proceeding at the Department of Ecology, Lacey, Washington.

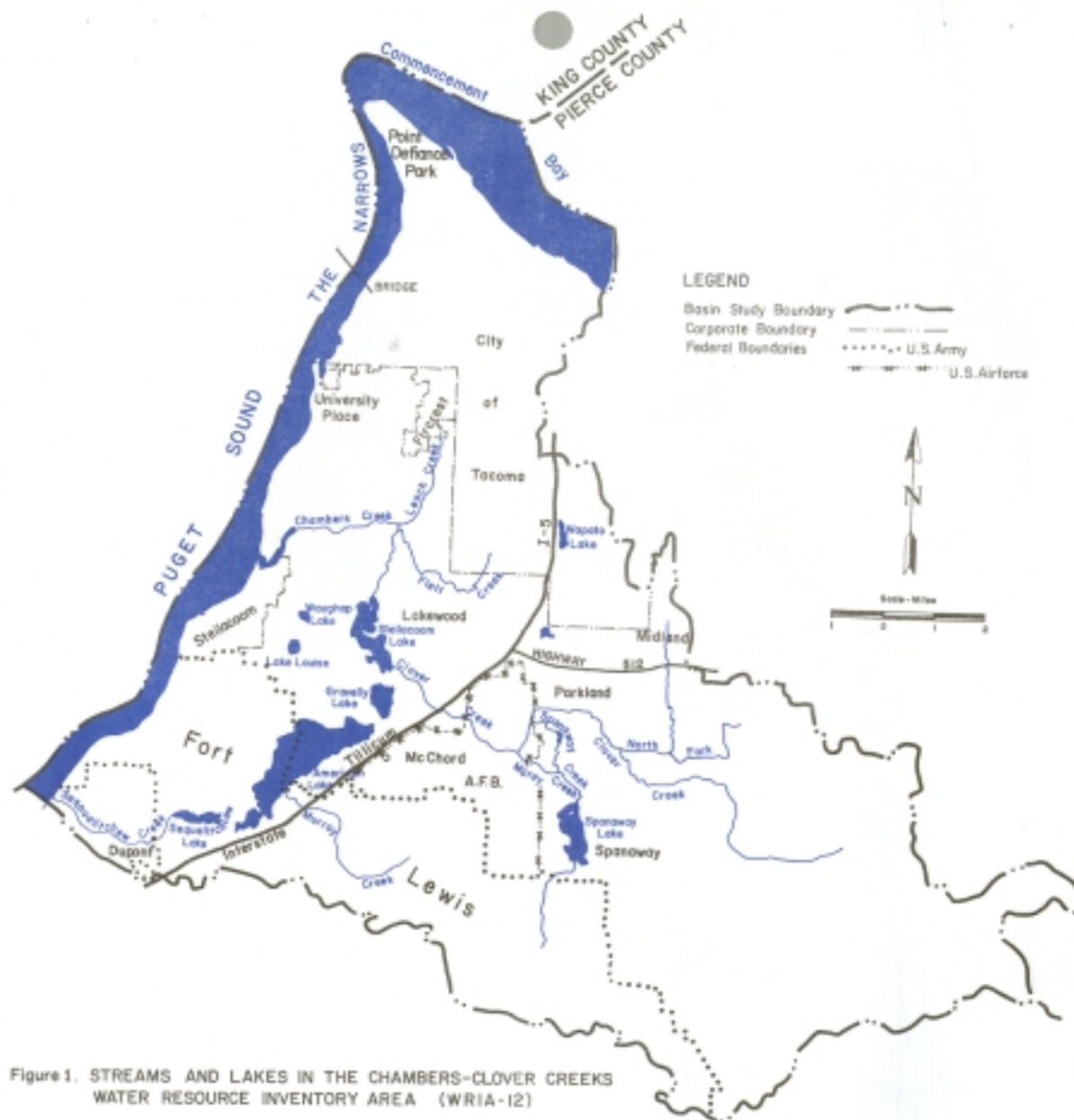


Figure 1. STREAMS AND LAKES IN THE CHAMBERS-CLOVER CREEKS WATER RESOURCE INVENTORY AREA (WRIA-12)

SUMMARY

At the present time, the entire Chambers-Clover drainage system is administratively closed to consumptive appropriations. The Sequelitchew Creek drainage system, including Sequelitchew Lake and American Lake, are currently not under any surface water limitations.

The Department of Fisheries operates a salmon hatchery at Garrison Springs, a small tributary of Chambers Bay, and a natural rearing habitat in Sequelitchew Lake. Projected juvenile releases for 1979 include nearly 1,000,000 chum salmon and more than 1,000,000 pink salmon into Chambers Creek and over 2,500,000 coho into Sequelitchew Creek.

The Department of Game operates two hatcheries on Chambers Creek, just below Steilacoom Lake which constitute the single most important game fish hatchery in the state. These two hatcheries combined produce approximately 13,000,000 rainbow and steelhead trout, and other game fish annually.

None of the streams or lakes in the Chambers-Clover Basin are used for public water supply. In addition to the water transported from the Green River Basin, the City of Tacoma utilizes a significant amount of ground water from this basin.

WRIA 12 is underlain by strata of water-bearing and non-water-bearing units. The shallow aquifers provide much of the water to the surface water systems and are highly sensitive to ground water withdrawals. The deeper aquifers appear to contain large quantities of water and do not readily affect surface waters.

The surface waters of the Chambers-Clover Creeks Basin have reached, and in some cases exceeded an ability to absorb and disperse wastes. Upper reaches of the Clover Creek system regularly dry up in the summer months. Presently septic tanks are recharging the shallow aquifers above glacial till layers. New sewage facilities are currently being constructed to collect and transport an estimated 18,000 acre-feet per year of effluent out of the basin. This is estimated to lower the underlying water table six to eight inches below its present level. Although the exact effects of a lowered water table on the surface water system is not known, lower lake levels and decreased stream flows are anticipated with completion of the sewage system.

To mitigate cumulative effects of water pollution and to preserve as much of the current instream flow as possible for fish and wildlife habitat, recreation, and aesthetic purposes, the Department of Ecology is proposing, under authority of Chapter 90.54 RCW, Chapter 90.22 RCW, and Chapter 173-500 WAC to close all streams in the Chambers-Clover Creeks Basin (WRIA 12), and all lakes in direct surface continuity with those streams to future out-of-stream consumptive uses, except where exempted by Section 173-512-060 of the proposed rules (Appendix A). Table 1 lists the streams and adjacent lakes proposed for closure and indicates the current status and proposed status for each. Groundwaters will be left open to future appropriations with the provision that case-by-case investigations determine that the proposed withdrawal will not significantly impact the surface water system.

Table 1. Current Administrative Status and Proposed Status of Streams and Lakes in the Chambers-Clover Creek Basin - WRIA 12.

Stream or Lake	Tributary To	Status	Proposed Action
Chambers-Clover Creek	Puget Sound	Administratively Closed*	Closure
Leach Creek	Chambers Creek	Administratively Closed*	Closure
Flett Creek	Chambers Creek	Administratively Closed*	Closure
North Fork Clover Creek	Clover Creek	Administratively Closed*	Closure
Spanaway Creek	Clover Creek	Administratively Closed*	Closure
Morey Creek	Clover Creek	Administratively Closed*	Closure
Spanaway Creek	Clover Creek	Indirectly regulated by Clover Creek closure	Closure
Tule Lake	Spanaway Creek	Indirectly regulated by Clover Creek closure	Closure
Steilacoom Lake	Chambers Creek	Surface level regulated	Closure
Unnamed Stream (Crystal Springs Creek)	Puget Sound	Low Flow Limitation	Closure

Stream or Lake	Tributary To	Status	Proposed Action
Ponce De Leon Creek	Steilacoom Lake	Open	Closure
Sequalitchew Creek	Puget Sound	Open	Closure
Sequalitchew Lake	Sequalitchew Creek	Open	Closure
American Lake	Indirectly to Sequalitchew Lake	Open	Closure
Murray Creek	American Lake	Open	Closure

*Administratively closed by Department of Ecology at request from Department of Fisheries or Game under authority of Chapter 75.20 RCW.

BASIN DESCRIPTION

The Chambers-Clover Creeks Basin, Water Resources Inventory Area 12 is a triangular shaped area located entirely within Pierce County. It covers a 210 square mile area bounded by Puget Sound on the west, the Puyallup River Basin on the east and the Nisqually River Basin on the south. The Basin includes approximately the western half of the city of Tacoma and all of the towns of Steilacoom, Dupont, Fircrest, and Ruston. It also includes the unincorporated communities of Lakewood, Parkland, Spanaway, University Place, Elk Plain, Frederickson, and Midland. A large portion of the central and southern part of the basin is occupied by McChord Air Force Base and part of Fort Lewis, which together comprise the largest active military installation in the northwest.

Land use activities that affect water resources in the Chambers-Clover Basin are mainly residential and the commercial activities that support the resident community, wood products industries, and military development. Water Resource Inventory Area 12 is heavily urbanized, particularly in the northern portion. The population of the basin is forecast to be 570,000 in the year 2020, more than double the 1975 population of 225,900.

Various types of industrial activities are scattered throughout WRIA 12: a large copper smelter is located at Ruston (American Smelting and Refining Company), an explosive factory is located in the Frederickson area (Olin Company) and a former explosives plant site is now planned for a log export facility at Dupont (Weyerhaeuser Company). Gravel mining is being conducted in University Place, Lakewood, Parkland, and upper Clover Creek area. Transportation related industries include a Burlington Northern Railyard in Tacoma, the military airports at McChord Air Force Base and Fort Lewis as well as five small private airports. The former naval supply depot in Lakewood is now an industrial park with several light manufacturing and warehousing industries. Other major industries include metal smelting and fabrication, chemicals, construction components, boat building, food processing, and shipping. Recreational services include seven major golf courses, three saltwater marinas which serve the entire county, and numerous private recreational services.

Although agriculture is diminishing in the Chambers-Clover area, one large dairy farm remains in the urban part of the Basin, on Flett Creek in Lakewood. Small farms in the southeast portion of the basin raise livestock, poultry and berries.

A number of special water districts and water companies are located in the Chambers-Clover Basin including Lakewood Water District, Southeast Tacoma Mutual Water Company, Curran Mutual Water, Parkland Light and Water Company, Spanaway Water Company, City of Tacoma, Vickery Road Mutual Water Company, Summit Water and Power Company, South Summit Water Supply Company, Firgrove Mutual, Inc., and Midland Mutual Water Company (see Figure 2).



FIGURE 2. Chambers-Clover Creeks Basin (WRIA-12). Map indicates locations of special water districts, water companies, wells, reservoirs, and water quality monitoring stations. (Modified from Kennedy Engineers, Inc., 1974)

WATER RESOURCES

STREAMS

The Chambers-Clover Basin is characterized by one major stream system, Chambers Creek and its tributaries, integrated with eight lakes and a number of other lakes that have no surface stream inlet or outlet. An independent stream, Sequalitchew Creek, serves as the outlet for Sequalitchew Lake, which is indirectly connected with American Lake.

Clover Creek forms the headwaters of Chambers Creek, originating in the South Hill, Puyallup/Midland residential districts from the north side of the drainage basin and in the Elk Plain/ Spanaway district from the south side of the drainage basin.

In the Parkland area, east of Pacific Avenue, Clover Creek streamflow tends to disappear from its channel into the ground in several locations during low flow periods. Further downstream, the channel has been relocated and now consists of a concrete lined ditch.

Tributary to Clover Creek are Spanaway and Morey Creeks, which are in turn supplied by Spanaway Lake and a large marsh to the south and upstream from the lake. This collective system flows beneath McChord Air Force Base in a manmade tunnel and becomes the major inflow to Steilacoom Lake, Ponce De Leon Creek, which functions as a storm drain in its upper reaches, contributes water to Steilacoom Lake partly supplied by storm waters from Gravelly Lake Drive and areas east of Gravelly Lake Drive. The outflow from the northern point of Steilacoom Lake is Chambers Creek.

Approximately one mile north of Steilacoom Lake two tributaries meet Chambers Creek. Leach Creek flows southerly from Fircrest to its confluence with Chambers Creek through lightly developed residential areas. Leach Creek drains a 6.56 square mile area and has an average discharge of 9.8 cfs. Flett Creek extends westerly from the west edge of the City of Tacoma, draining 7.33 square miles, with an average discharge of 8.5 cfs. The major source of water in Flett Creek is Flett Springs. From the confluence of these tributaries to the mouth, Chambers Creek drains a canyon area north of the town of Steilacoom and then enters Puget Sound approximately one mile north of Steilacoom.

Sequalitchew Creek, a small stream independent from the Chambers-Clover system, is formed from the outflow of Sequalitchew Lake. In addition, the Sequalitchew Creek drainage includes American Lake, which normally does not drain at the surface. It is thought that American Lake is the water source for Sequalitchew springs near Sequalitchew Lake. Only in high water periods does American Lake spill into a ditch tributary to Sequalitchew Lake. Sequalitchew Creek flows for approximately 3 miles on the Fort Lewis Military Reservation, through two large marsh areas, and discharges into Puget Sound near the Dupont wharf.

LAKES

A description of the major lakes in the Chambers-Clover Basin follows:

American Lake – drains an area of 25.4 sq. mi., has a surface area of 1,100 acres, a mean depth of 53 feet, and contains a volume of 60,000 acre-feet. The southern half of the lake is controlled by Fort Lewis, and on the east shore 8 of the lake on army property is the main inflow, Murray Creek. The lake has no surface drain, but in 1956 the army constructed a deep entrance box culvert with a revolving mesh screen to feed a fish rearing pond on the south end of the lake. The pond overflow is routed to Sequalichew Lake. The maximum surface water elevation is generally maintained at 233 ft. above m.s.l. by Fort Lewis Water Engineers, but this level has not been set by a court order.

Sequalitchew Lake – drains an area of 34.2 sq. mi., has a surface area of 91 acres, a mean depth of five feet, and contains a volume of 470 acre-feet. The lake is on Fort Lewis property, west of American Lake. Sequalitchew Lake drains to Puget Sound via Sequalitchew Creek.

Gravelly Lake – drains an area of 0.66 sq. mi., has a surface area of 160 acres, a mean depth of 38 feet, and contains a volume of 6,000 acre-feet. Gravelly, American, and Steilacoom Lakes are recharged from aquifers to the east. Gravelly Lake has no surface outlet; it loses water by evaporation and seepage to aquifers to the west. The lake is an indicator of the water table balance, as shown in 1970 when the lake level fluctuated five feet between wet and dry seasons.

Steilacoom Lake – drains 89.4 sq. mi., has a surface area of 320 acres, a mean depth of 11 feet, and contains a volume of 3,500 acre-feet. Main surface inflow is Clover Creek, augmented by Ponce de Leon Creek and eastern aquifers. Outflow is to Chambers Creek on the north side of the lake. Maximum surface water levels of Steilacoom Lake have been established by a Pierce County Superior Court Order. The Summer level is fixed at 205.84 feet above sea level. The winter elevation is set at the level which will result by permitting a free flow of water over the bottom of the west culvert, 202.09 feet above sea level. The lake level is allowed to be lowered once a year for weed control treatment.

Spanaway Lake – drains 17.0 sq. mi. has a surface area of 280 acres, a mean depth of 16 feet, and a volume of 4,600 acre-feet. The lake is fed by a 1.5 mile long marsh to the south via Coffee Creek. The Fort Lewis Fisheries Division has a reclamation project underway on Coffee Creek to raise the water level of the marsh to a depth of 3.5 feet to create habitat for waterfowl and fish, using a five foot high earth dam. The outflow is to Clover Creek to the north, through Spanaway and Morey Creeks.

Lake Louise – is a water table lake with no surface outflow channel. It has a drainage area of 0.34 sq. mi., a surface area of 39 acres, mean depth of 22 feet, and contains a volume of 860 acre-feet.

Wapato Lake – is a groundwater lake with no surface outflow channel. It drains an area of 1.98 sq. mi., has a surface area of 28.2 acres, mean depth of five feet, and a volume of 150 acre-feet.

Wauhop Lake – A groundwater lake with no surface outflow channel. The lake drains an area of 0.34 sq. mi. It has a surface area of 33 acres, a mean depth of 7 feet, and contains a volume of 220 ac-ft. The lake is located in Fort Steilacoom County Park, just east of the town of Steilacoom.

NATURAL STORAGE BASINS

Numerous marshes, ponds, and storm water collection basins are located throughout Water Resource Inventory Area 15. These natural and man-made basins are significant to surface water bodies for their ability to store and release storm water runoff to ground waters that supplement water table lakes and streams via gravelly substrata adjacent to stream and lake beds

Much of the Clover Creek drainage east of McChord Air Force Base is supplemented by this type of drainage. The major contributors are listed below:

Milburn Lake

A shallow, marshy lake draining underground to Clover Creek; located about 2/3 mile southeast of Ponders, on McChord Air Force Base. Its elevation is approximately 280 feet above mean sea level, and it covers a surface area of approximately 7.1 acres.

Unnamed Lake

A series of small ponds located approximately 3/4 miles northeast of Ponders, adjacent to the east side of Bridgeport Way and to the Clover Creek main channel. Elevation is approximately 280 feet above mean sea level; surface area, approximately 1.3 acres; and, drainage is directly to Clover Creek.

Brendon Marsh

A peat bog, originally about five acres, located approximately one mile west of Parkland. Drainage is to tributaries of the lower reaches of Clover Creek.

Smith Lake

Situated at the confluence of Clover Creek, and Spanaway Creek, just east of McChord Air Force Base and south of Brendon Marsh. Smith Lake no longer exists as a lake, but is a proposed new impoundment site.

Tule Lake

Located approximately 1-1/2 miles north of Spanaway Lake, just east of Spanaway Loop Road. The lake has a marshy shoreline and covers an area of about 8 acres. Inflow is from Spanaway

Creek and outflow is to Spanaway Creek. Elevation is approximately 290 feet above sea level. Maximum depth is about 10 feet.

Stony Lake

A swampy area covering approximately 7 acres, located about 3 miles southeast from the south end of Spanaway Lake and 1/2 mile west of Frederickson. Elevation is about 380 feet above mean sea level. Drainage is underground to Clover Creek.

Constance Lake

A shallow, swampy, private pond covering 4 acres approximately 1/2 mile southeast of Frederickson. Drainage is underground toward Stony Lake and Clover Creek.

Charlton Lake (Flett Creek Basin)

Shallow, marshy area covering approximately 14 acres about 1-1/4 miles south of Wapato Lake. Elevation is about 300 feet above mean sea level. Drainage is underground to Flett Creek and Chambers Creek.

Crawford Marsh (Steilacoom Lake)

Located about 1 mile east of Steilacoom Lake near Lakewood Center. Drains underground to Steilacoom Lake.

Edmond Marsh (Sequalitchew Creek Basin)

Located northeast of Dupont; drains underground into Sequalitchew Creek.

Hamer Marsh (Sequalitchew Lake)

Located southeast of Sequalitchew Lake. Drains into Sequalitchew Lake.

Unnamed Marsh (Spanaway Lake)

Located south of Spanaway Lake. Drains underground into Spanaway Lake.

GROUNDWATER

Most of the Chambers-Clover Basin is underlain, below sea level, by extensive and thick deposits of fine-grained material containing relatively thin beds of gravel and sand, which yield large quantities of water at some locations. Water-bearing zones as deep as 1,090 feet below sea level have been tapped revealing substantial yield. Figure 3 illustrates a typical water-bearing unit stratification underlying the Chambers-Clover Basin. Ground waters play a major part in the transport of waters for many codependent lakes, including American Lake, Gravelly Lake, and Waughop Lake. Groundwater levels within the basin range from more than 250 feet below land surface to within a few feet of the surface. Beneath most of the basin area water levels are less than 60 feet below the land surface. The groundwater flow pattern is from the southeast to the northwest. The southern and eastern extremities of the basin contain areas where the

drainage pattern is indistinct and therefore not all surface drainage is directly tributary to Clover Creek.

The underground waters can be divided into two parts. The shallow water-table aquifer has a flow in the northwesterly direction and water elevations as shown in Figure 4. There are also several deeper aquifers under the Chambers-Clover Creek Basin which appear to have large volumes of high quality water available to serve the needs of the area residents. Preliminary investigations of these aquifers indicate that there is limited continuity between the deeper aquifers and the surface water. Each future ground water development project will be evaluated to assure that the surface waters are not significantly affected by the proposed withdrawal of ground waters.

Natural discharge of ground water occurs through springs, many of which are along the margin of the upland, adjacent to Puget Sound. Originally, the major inflow to most of the basin streams was from springs of high quality water. This inflow has been greatly altered over time by land development.

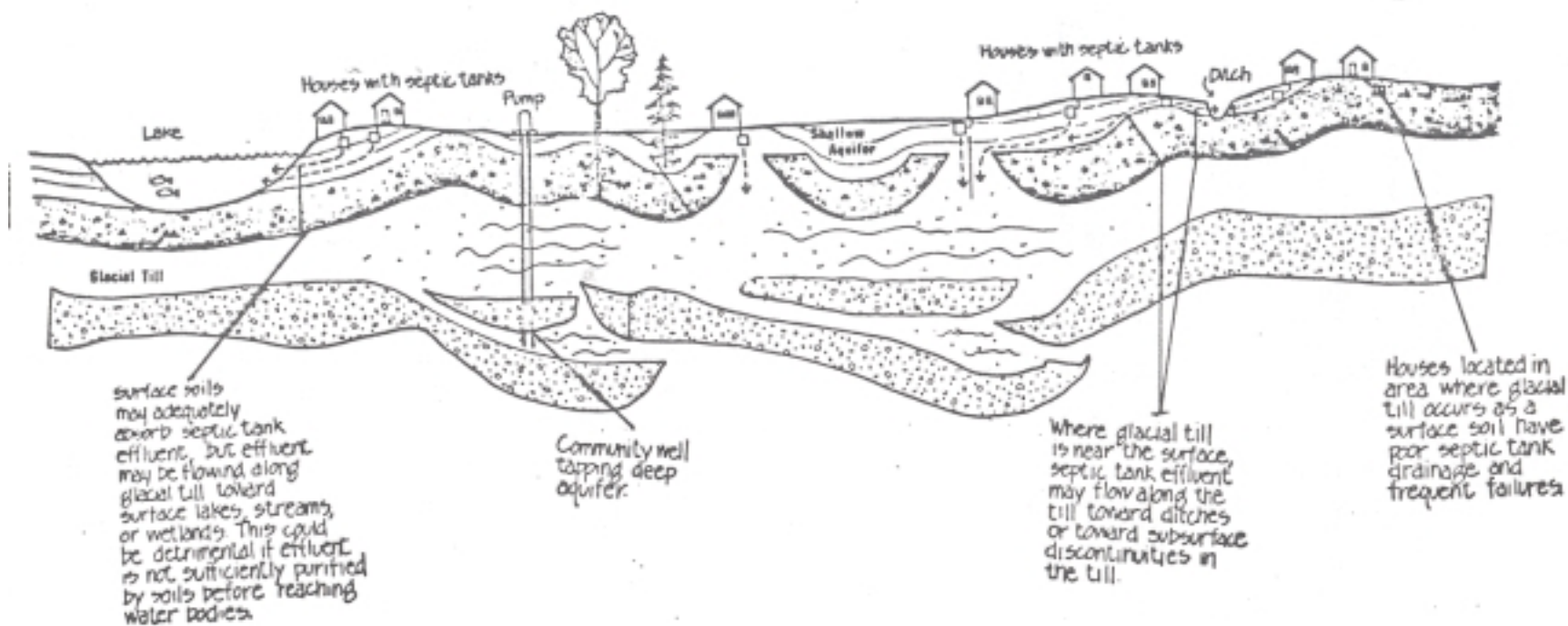


FIGURE 3. Schematic of a typical water-bearing unit stratification in the Chambers-Clover Basin (WRIA 12)

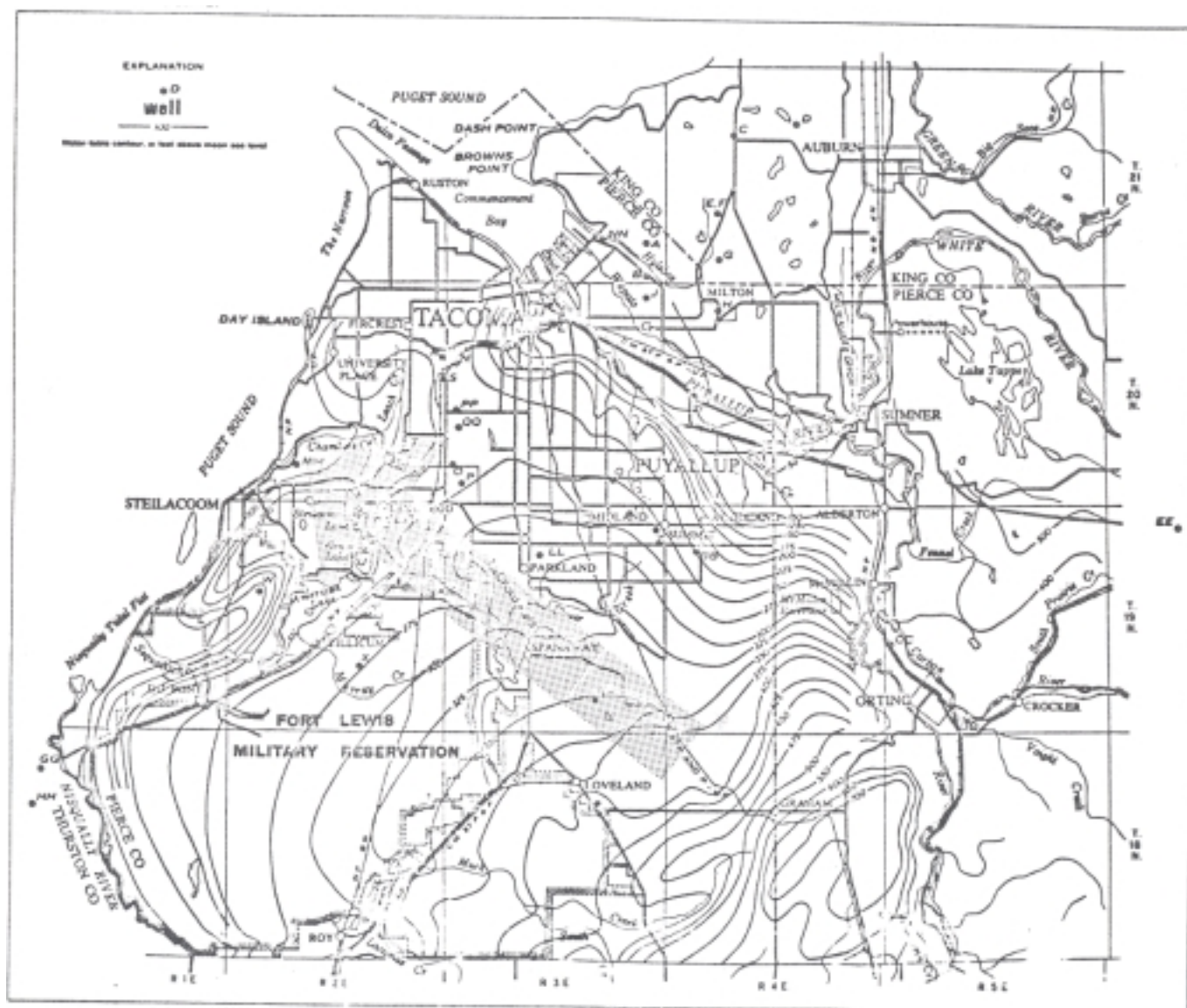


Figure 4 Water-Table Contours in the Tacoma Area

WATER USE

Instream Uses

Fisheries

All accessible reaches of the Chambers-Clover drainages are utilized by coho salmon. Chum salmon use is mostly below river mile 3 in Chambers Creek, and in the lower reaches of Leach and Flett Creek.

The Department of Fisheries has recently expanded hatchery production at two sites within the Basin: Garrison Springs (a small independent tributary entering Chambers Bay) and Sequalitchew Lake.

The projected juvenile releases for this year (1979) includes nearly 1,000,000 chum salmon and more than 1,000,000 pink salmon into Chambers Creek, and over 2,500,000 coho into Sequalitchew Creek.

The Department of Came operates two hatcheries on Chambers Creek, just below Steilacoom Lake which constitute the single most important game fish hatchery complex in the state. These two hatcheries combined produce approximately 13 million rainbow and steelhead trout, and other game fish annually.

The Department of Fisheries has identified major limiting factors to fish production in the Chambers-Clover Basin as: (1) low summer flows, (2) barriers due to gradients (or poor flow conditions), (3) concentrated watershed development and encroachment, and (4) poor water quality.

Recreation

All significant lakes in the Chambers-Clover Basin provide opportunities for swimming, and in most cases, fishing and small boating. Steilacoom, American, and Spanaway Lakes further provide for water-skiing and sailing. Recreation on the streams is more limited, although fishing is popular on the lower reaches of Chambers Creek.

Out-of-Stream Uses

Municipal and Industrial

None of the streams or lakes in the Chambers-Clover Basin (WRIA 12) are used for municipal water supply. The City of Tacoma imports water for municipal and industrial (M & I) supply from the Green River (WRIA 9), and provides backup to the surface water supply system from wells located in the Chambers-Clover area. A number of independent suppliers (many with less than 100 customers) receive their water supply either from the City of Tacoma or from wells within the WRIA 12 area (see Table 2 and Figure 2).

Sequalitchew Springs near Lake Sequalitchew, located on U.S. Military Reservation property, provides domestic and emergency water supply for the Fort Lewis installation year round. Ten wells scattered around the reservation provide back-up domestic and emergency water.

TABLE 2

WATER SOURCE DATA

Supplier	Source		No. Wells	Well Capacity (MGD)	Demand (MGD)	
	(1) City Wells				Average	Peak
Curran Rd. Mutual Water Co.	Yes	No	—	—	N/A	N/A
Fircrest, Town of	No	Yes	6	5.6	1.3	3.5
Firgrove Mutual, Inc.	Yes	Yes	4	0.4	0.3	0.6
Lakewood Water District	No	Yes	27	21.3	7.0	20.0
Mile B Water & Power Co.	Yes	No	—	—	0.08	0.12
Parkland Light & Water Co.	No	Yes	9	4.3	1.6	3.0
Southeast Tacoma Water Mutual	No	Yes	9	5.2	0.8	2.1
So. Summit Water Supply Co.	Yes	No	—	—	N/A	N/A
Spanaway Water Co.	No	Yes	7	1.6	0.8	2.4
Steilacoom, Town of	No	Yes	3	4.3	0.3	1.4
Summit Water & Power Co.	No	Yes	6	4.0	0.44	1.35
Tacoma, City of	(1)	(1)	12	66.0	73.3 (2)	114.8
University Place Water Co.	No	Yes	10	N/A	1.2	3.6
Vickery Road Mutual Water Co.	Yes	No	—	—	N/A	N/A
Waller Road Consumers Water Co.	Yes	No	—	—	N/A	N/A
Fort Lewis	No	Yes	(3) 10	20.0	6.0	N/A
McChord AFB	No	Yes	8	N/A	1.25	N/A

Note: Most information based on Jan. 1973 data provided to State Health Department by water suppliers. Demands are often based on estimates.

- (1) Wells used to supplement surface supply
- (2) Includes entire service area in and out of City.
- (3) Includes springs

N/A Data Not Available

(Table modified from "Chambers Creek Basin Water Quality Management Plan, Pierce County, Washington (1974).)

Independent Industrial

Most commercial and small industrial firms in the basin acquire water from municipal supplies or from marine waters that do not affect surface levels in streams and lakes. Several larger companies do require significant amounts of water from streams and wells. The Boise Cascade Company operates a pulp and paper mill at the mouth of the Chambers Creek and diverts approximately 6 cfs (4 MGD) from Chambers Creek for processing purposes. A second significant user of Chambers Creek water is the Kaiser Sand and Gravel Company, which diverts over 6 cfs (4 MGD) near the mouth of the creek for gravel washing.

The Pioneer Sand and Gravel Company uses approximately 14 cfs (9 MGD) from wells near Chambers Creek; and the Flett Dairy withdraws 1 cfs (0.7 MGD) for processing and cooling from wells near Flett Creek.

Agricultural

Agriculture in Water Resource Inventory Area 12 is fast giving way to urbanization. Moreover most soils are sandy-gravelly glacial deposits that are not especially productive for agricultural use. One large dairy farm remains in the urban part of the basin. This is located on Flett Creek in Lakewood. Small farms in the southeast portion of the basin raise livestock, poultry, and berries.

Domestic

Because of poor water quality in Chambers-Clover Creeks and other streams in the Chambers-Clover Basin, in-house domestic use is not usually made of the waters.

Lake waters are used by riparian property owners for lawn watering and other irrigation.

Aesthetic Uses

A major loss of stream waters may be caused by diversions for ponds by aesthetic uses. These uses are normally considered to be nonconsumptive. However, whenever such ponds are not properly sealed, a major loss of stream water to the underlying gravels can result.

WATER QUALITY

Although several industries within WRIA 12 use stream waters for cooling, processing, and cleaning purposes, only one, the Lakewood Industrial Center discharges effluent directly to a stream (Flett Creek). Industrial waste discharges into Puget Sound for municipal treatment systems are regulated by a waste discharge permit system administered by the Department of Ecology. Direct discharges require tertiary treatment.

Indirect discharges are:

Franklin-Pierce School Complex	Lagoon
Pacific Lutheran University	Lagoon
Flett Dairy	Lagoon
Pacific Rendering	Via Peat Bog
South Tacoma Hatchery Creek	Steilacoom
Chambers Creek Steelhead Hatchery	Chambers
Fircrest	Lagoon to
Leach Creek	

The primary sources of contaminants in the basin's streams are urban and agricultural runoff.

The following four parameters are used to depict the state's general water quality. These were selected as they relate to a water's ability to support aquatic life, its sanitary quality, and its clarity:

Temperature – unnatural temperature increases can be caused by diverting large quantities of stream water. The reduced stream quantity and velocity allow greater climatic heating than if more water were present. Diverted water used for irrigation may also contribute to stream temperature problems as well as to sedimentation and chemical contamination when it is returned to the stream.

Dissolved Oxygen – it takes only a small quantity of household chemicals, organic matter, etc., to reduce oxygen concentrations to relatively low levels in small systems.

Inordinately high oxygen levels may indicate the presence of large numbers of algae and aquatic weeds probably resulting from large quantities of nutrients - derived from the discharges of fertilizers from agricultural activities, sewage treatment plants, and industrial operations.

Total Coliform Bacteria – Some of the highest coliform bacteria densities are found in small streams near urban areas or in streams near dairies and other agricultural operations dealing with animals.

Turbidity – created from urban and agricultural runoff, natural erosion, dredging, channelization, and industrial washing.

Problem Areas in WRIA 12

The Department of Ecology's 1975 Water Quality Assessment Report, Volume 1, identified the Chambers-Clover as a specific problem area for coliform bacteria related to septic tanks in urban areas with unsuitable soils, and urban runoff. Since Clover Creek discharges into Lake Steilacoom, water quality in the lake is often negatively impacted by high nutrient levels in Clover Creek.

A comparison of water quality data from the U.S. Geological Survey Water Resource Data - 1976 and the Department of Ecology water quality data -1973, indicates that fecal and coliform problems still exist, especially on Flett, Leach, and Chambers Creeks. Flett Creek also exhibited low dissolved oxygen (DO).

Although measurements near the mouth of Chambers Creek indicated a decrease in ammonia nitrogen and total phosphorous, nutrient problems remained essentially the same for that stream reach.

In Clover Creek, nitrates increased, but phosphorous decreased; Flett Creek experienced a decrease in dissolved oxygen, but ammonia nitrate increased. A decrease in phosphates was exhibited by Leach Creek (see Table 2).

The Department of Ecology's "Five-Year Water Quality Strategy," completed in September, 1978, indicated that dissolved oxygen (DO), associated with urban runoff and septic tank drainage, has become a primary water quality concern in the Chambers-Clover Creeks system.

High water quality in the Pacific Northwest is due, in large part, to the high capacity of flowing waters to accept and disperse pollutants. Closure of the streams and adjacent lakes to further consumptive appropriation in the highly urbanized Chambers-Clover Basin is expected to help mitigate stream contamination by maintaining surface flow levels.

The surface water system has reached, and in some cases exceeded, its ability to absorb and treat wastes. The result is high coliform and nutrient levels in Chambers Creek, which eventually impacts the stream habitat. One reason for the poor water quality is the amount of septic tank effluent that has been discharged to the shallow water system. The sewage collection and treatment facilities currently under construction should improve the water quality situation considerably. Current Pierce County policy for storm water runoff control in urbanizing areas is based upon the use of "best management practices," i.e., excess runoff from post-development areas must be controlled so as to not exceed predevelopment conditions. This is usually accomplished by either surface detention systems or subsurface infiltration systems as engineered for residential plats or commercial developments. This should mitigate stream pollution and siltation resulting from direct storm water runoff. However, urban development and runoff will continue to cause degradation of the surface water quality.

TABLE 3. Water Quality in the Chambers-Clover Creeks Drainages. Encircled figures indicate water quality parameters currently being exceeded.

(Data from USGS Water Resource Data for Washington - Water Year 1976. Volume 1.)

Parameter	Clover Creek above Steilacoom near Tacoma WA	Chambers Creek below Steilacoom Lake near Steilacoom WA	Flett Creek at Custer at Tacoma WA at mouth	Leach Creek near Steilacoom WA at mouth	Chambers Creek near Steilacoom WA at mouth	DOE std. class A waters	EPA suggested criteria <u>1/</u>
pH	7.4	7.99	6.84	7.5	7.4	6.5 - 8.5	–
Temp, °C	11.0	12.6	10.6	9.6	11.1	18.0	–
Turbidity, JTUs	4.5	4.7	5.5	5.3	5.1	shall not exceed 5 NTU <u>2/</u> over background	–
Dissolved oxygen, mg/l	10.6	12.6	5.9	11.0	10.2	8.0	–
Fecal coliform, per 100 ml	230	12	166	286	108	100	–
Total nitrite plus nitrate (N) mg/l	0.96	0.51	1.59	1.19	1.17	–	0.32
Total ammonia nitrogen (N), mg/l	0.10	0.11	0.19	0.10	0.12	–	0.2
Total phosphorus (P) mg/l	0.05	0.05	0.13	0.07	0.06	–	0.05
Dissolved ortho phosphate (P) mg/l	0.009	0.002	0.06	0.03	0.02	–	0.01

1/ U.S.E.P.E. "Water Quality Criteria 1972." (March 1973).

2/ Turbidity shall not exceed 5 NTU over background turbidity when the background turbidity is 50 NTU or less, or have more than a 10 percent increase in turbidity when the background turbidity is more than 50 NTU.

The upper reaches of the Clover Creek drainage system regularly dry up in the summer months. Presently, septic tanks are recharging the shallow aquifers above the glacial till layers (see Figure 3). With the new sewage facilities being constructed, it is estimated that 18,000 acre-feet per year of effluent will be collected and transported out of the basin. It is estimated this will lower the water table six to eight inches below its present level. The exact effect of a lowered water table on the stream system is not known. However, lower lake levels and decreased stream flows are anticipated with the completion of the sewage system.

On the two major residentially populated lakes, Steilacoom and American, there are 48 issued surface water rights. Of that number, 58 percent have been issued in the past 10 years. The basin is served by a well-developed domestic water system.

Ground water is currently being used for water supply by the City of Tacoma and the water districts in the basin. Future expansion of the use of ground water for municipal water supply is anticipated. Preliminary investigations indicate that sufficient volumes of water are available in the deeper aquifers to serve this need.

CURRENT ADMINISTRATIVE STATUS

All streams and tributaries in the major drainage system of Water Resource Inventory Area 12, i.e., Chambers-Clover Creeks, are currently closed to additional appropriations. Lakes adjacent to, or in continuity with the stream system are indirectly regulated by the surface water source limitations on the stream system. Maximum surface water levels of Steilacoom Lake, a tributary to Chambers Creek, have been established by Pierce County Superior Court, Cause No. B 1365, ordered March 28, 1941.

An independent stream (Crystal Springs Creek) discharging into Puget Sound is regulated by a low flow limitation.

A second independent stream, Sequelitchew Creek, the outflow for Sequelitchew Lake, is, at the present time, open to appropriation. Two associated lakes, Sequelitchew and American Lakes; are also open for appropriations, as is Murray Creek, tributary to American Lake (see Tables 1 and 2). Private appropriations are limited on this stream system since all of Sequelitchew Lake and portions of Sequelitchew Creek, American Lake, and Murray Creek are located on U. S. Military land (.Fort Lewis Military Reservation and Camp Murray National Guard).

PROPOSED ADMINISTRATIVE STATUS

The Department of Ecology proposes under authority of Chapter 90.54 RCW, Chapter 90.22 RCW, and Chapter 173-500 WAC, to close all streams in the Chambers-Clover Creeks Basin (Water Resource Inventory Area 12) to future out-of-stream consumptive uses, except where exempted by Section 173-512-060 WAC. The department further proposes to close to future consumptive appropriation all lakes in direct surface continuity with the Chambers-Clover Creeks system, except where exempted by Section 173-512-060 WAC. Table 1 lists these streams and adjacent lakes in WRIA 12 and indicates the current status and proposed status for each.

Although it is not proposed to close the streams and lakes to appropriation for non-consumptive uses, each application for permit to authorize such uses will have to be carefully evaluated to assure that the use is, in fact, nonconsumptive and not in any manner detrimental to the instream resources.

Ground waters will be left open to future appropriation provided that case-by-case investigations determine that the proposed withdrawal will not significantly impact the surface water system.

BIBLIOGRAPHY

Revised Code of Washington

Chapter 75.20

Chapter 90.22

Chapter 90.54

Washington Administrative Code

Chapter 173-500

Department of Ecology. 1976. Reconnaissance Data on Lakes in Washington Volume 3. Kitsap, Mason and Pierce Counties. Water Supply Bulletin 43, Volume 3. Washington.

Department of Ecology. 1977. Washington State Water Quality Standards. State of Washington.

Department of Ecology. 1975. Water Quality Assessment Report. Volumes I and II. Olympia, Washington.

Kennedy Engineers. 1974. Chambers Creek Basin Water Quality Management Plan. Study conducted for Pierce County, Washington.

U.S. Department of Agriculture. 1968. Washington Climate for King, Kitsap, Mason, Pierce Counties. E.M. 2734. Washington.

U.S. Geological Survey. 1968. Ground Water Occurrence and Stratigraphy of Unconsolidated Deposits, Central Pierce County, Washington. Water Supply Bulletin, No. 22. Washington.

U.S. Geological Survey. 1976. Water Resources Data for Washington, Water Year 1976, Water Data Report WA-76-1, Vol. 1, Western Washington.

Washington Department of Fisheries. 1975. A Catalog of Washington Streams and Salmon Utilization. Vol. 1, Puget Sound, Washington.

Wilsey & Ham, Inc. 1975. Final F.I.S. for Chambers Creek Sewerage System (ULID-73-1) Project No. C-530565-01, E.P.A. Region X, Pierce County, Washington.

BIBLIOGRAPHY -- (continued)

Clover Creek Basin Drainage Plan, by Consoer, Townsend and Associates, 1976, Study conducted for Pierce County, WA.

Parkland/Spanaway Comprehensive Land Use Plan, 1979.

Effects of Surface and Shallow Subsurface Contaminants on the Ground Water Quality in Central Pierce County, by R. M. Schaff at the University of Washington, 1978. (See Foppe DeWalle, Environmental Health, School of Public Health).

DISTRIBUTION LIST

Federal Agencies

Heritage Conservation and Recreation Service
U.S. Army Corps of Engineers
National Marine Fisheries Service
U.S. Fish and Wildlife Service
U.S. Environmental Protection Agency
U.S. Geological Survey
Bonneville Power Administration
Pacific Northwest River Basins Commission
Soil Conservation Service
McChord Airforce Base
Fort Lewis, Washington

State Agencies

Department of Game
Department of Fisheries
Energy Facility Site Evaluation Council
Office of Financial Management
Department of Agriculture
Department of Natural Resources
Department of Social and Health Services
Planning and Community Affairs Agency
Utilities and Transportation Commission
Interagency Committee for Outdoor Recreation
Washington National Heritage Program
Office of Environmental Mediation, University of Washington
College of Fisheries, University of Washington
Department of Transportation
House Energy and Utilities Commission
Department of Commerce and Economic Development

Pierce County

Pierce County Planning Department
Department of Public Utilities
Pierce County Health Department, Division of Environmental Health
Mr. Clay Huntington, Pierce County Commissioner
Mr. Patrick J. Gallagher, Pierce County Commissioner
Mr. Joe Stortini, Pierce County Commission
Pierce County Engineer
Pierce County Parks and Recreation
Pierce/Tacoma Health Department

Fisheries Interest Groups

Puget Sound Gillnetters Association
Purse Seine Vessel Owners Association

Northwest Steelhead and Salmon Council
National Federation of Fishermen
Steelhead Trout Club of Washington
Washington State Sportsmen's Council
Washington Kayak Club

Indian Tribes

Nisqually Indian Tribe Puyallup Tribe of Indians
Elected Officials - Federal, State and City
Honorable Warren G. Magnuson, United States Senator
Honorable Henry M. Jackson, United States Senator
Honorable Lowell Peterson, Washington State Senator
Honorable A1 Williams, Washington State Senator
Honorable Georgette Valle, Washington State Representative
Honorable Jeff Douthwaite, Washington State Representative
Honorable Lyle Dunkin, Mayor of Steilacoom
Honorable John G. Iafrati, Mayor of DuPont
Honorable Owen Gallagher, Mayor of Ruston
Honorable Wallace Z. Ramsdell, Mayor of Fircrest
Honorable Mike Parker, Mayor of Tacoma

Cities

Town Planner, Steilacoom, Washington
Tacoma City Planning Department

Water Districts and Associations

Lakewood Water District
Southeast Tacoma Mutual Water Company
Curran Road Mutual Water Association
Parkland Light and Water Company,
Spanaway Water Company
City of Tacoma Water Department
Summit Water and Supply Company

Washington State Ecological Commission

Arpad L. Masley, M.D., Chairman
Richard C. Snyder, Ph.D.
Mr. Michael T. Waske
Ms. Sally Schaefer
Mr. C. Stewart Sargent
Mr. A. Richard Juris
Mr. Harold W. Heacock, Vice Chairman

Public Libraries

Pierce County Library
Tacoma Public Library
Parkland Library
Steilacoom Library
Tillicum Library
University Place Library, Tacoma

Environmental Groups

Washington Environmental Council
League of Women Voters, Tacoma
Friends of the Earth
League of Women Voters of Washington
Black Hills Audubon Society
Seattle Audubon Society

Other Agencies, Companies and Individuals

Weyerhaeuser Company
Pacific Power and Light Company
Puget Sound Council of Governments
Pacific Northwest Waterways Association
Association of Washington Cities
Washington State Association of Counties
Northwest Resource Information Center, Inc.
Washington State Farm Bureau
Puget Sound Power and Light Company
Washington PUD Association
R. W. Beck and Associates
Instream Use Unit, Statewide Planning Branch, Sacramento
Robinson and Noble, Inc.
Mr. W. L. Trowbridge
Mr. William F. Royce
Mr. Larry Alan Meyer
Fisheries Research Institute, University of Washington

APPENDIX A

PROPOSED ADMINISTRATIVE RULES

FORM OF ORDER AND TRANSMITTAL BY AGENCY HAVING SINGLE HEAD

State of Washington

DEPARTMENT OF ECOLOGY

(agency name)

Administrative Order No. DE 79-23

(1) I, Elmer C. Vogel, deputy director of
the Department of Ecology
do promulgate and adopt as the Department of Ecology, Lacey, Washington,
(place)
the annexed rules relating to:

Adopting chapter 173-512 WAC--Instream Resources Protection Program--
Chambers-Clover Creeks Basin, Water Resource Inventory Area (WRIA) 12

(1) ALTERNATIVE A. Use only for Adoption of Permanent Rules.

This action is taken pursuant to Notice No. WSR 79-09-133 filed with the code reviser
on September 5, 1979. Such rules shall take effect:

- ☒ pursuant to RCW 34.04.040(2)
☐ at a later date, such date being _____

(2) ALTERNATIVE B. Use only for Adoption of Emergency Rules.

I, _____, find that
an emergency exists and that the foregoing order is necessary for the preservation of the public health, safety, or
general welfare and that observance of the requirements of notice and opportunity to present views on the
proposed action would be contrary to public interest. A statement of the facts constituting such emergency is:

Such rules are therefore adopted as emergency rules to take effect upon filing with the code reviser

(3) Pursuant to the requirements of RCW 34.04 (1977 c 19 § 2)¹ that "every agency shall incorporate the
most specific, but in no case more than all, of the following language alternatives when adopting or amending rules: (a), (b), or (c) as appropriate)

☒ (a) This rule is promulgated pursuant to ~~RCW~~ chapters 90.54 and 90.22 RCW
and is intended to administratively implement that statute

☐ (b) This rule is promulgated pursuant to RCW _____
which directs that the

(agency)

has authority to implement the provisions of

(name of act or RCW citation)

☐ (c) This rule is promulgated under the general rule-making authority of the

(agency)

is authorized in RCW _____

(4) The undersigned hereby declares that he has complied with the provisions of the Open Public Meetings Act
(chapter 42.00 RCW), the Administrative Procedure Act (chapter 34.04 RCW) or the Higher Education
Administrative Procedure Act (chapter 28B.19 RCW), as appropriate, and the State Register Act (chapter 34.08
RCW)

(5) This order after being first recorded in the order register of this agency is herewith transmitted to the Code
Reviser for filing pursuant to chapter 34.04 RCW and chapter 1.12 WAC

APPROVED AND ADOPTED December 12, 1979
STATE OF WASHINGTON
FILED

DEC 12 1979

CODE REVISER'S OFFICE
WSR 79-09-133

By Elmer C. Vogel
Elmer C. Vogel
Deputy Director

Title

[Form CR-7: Effective 12/1/77]

Chapter 173-512 WAC

INSTREAM RESOURCES PROTECTION PROGRAM– –CHAMBERS-CLOVER CREEKS BASIN WATER RESOURCE INVENTORY AREA (WRIA) 12

NEW SECTION

WAC 173-512-010 AUTHORITY. This chapter is promulgated pursuant to chapter 90.54 RCW (Water Resources Act of 1971), chapter 90.22 RCW (Minimum Water Flow and Levels), and in accordance with chapter 173-500 WAC (Water Resources Management Program).

NEW SECTION

WAC 173-512-020 PURPOSE. The purpose of this chapter is to retain perennial rivers, streams, and lakes in the Chambers-Clover Creeks drainage basin with instream flows and levels necessary to provide for preservation and protection of wildlife, fish, scenic, aesthetic and other environmental values, recreational and navigational values, and to preserve water quality.

NEW SECTION

WAC 173-512-030 SURFACE WATER CLOSURES. The department of ecology, having determined that further consumptive appropriations would harmfully impact instream values closes the following streams and lakes in Water Resource Inventory Area 12 to further consumptive appropriations:

SURFACE WATER CLOSURES

<u>Stream or Lake</u>	<u>Tributary To</u>
Chambers Creek and all tributaries, including among others: Leach Creek Flett Creek Steilacoom Lake Ponce De Leon Creek	Puget Sound Chambers Creek Chambers Creek Chambers Creek Steilacoom Lake
Clover Creek and all tributaries, including among others: North Fork Clover Creek Spanaway Creek Morey Creek Spanaway Lake Tule Lake	Clover Creek Clover Creek Clover Creek Spanaway Creek Spanaway Creek
Unnamed Stream (Crystal Springs Creek) including tributaries	Puget Sound

Stream or Lake

Tributary To

Sequalitchew Creek
and all tributaries, including among others:
 Sequalitchew Lake
 American Lake
 Murray Creek (and tributaries)

Puget Sound

Sequalitchew Creek
Sequalitchew Lake
American Lake

NEW SECTION

WAC 173-512-040 GROUND WATER. In future permitting actions relating to ground water withdrawals, the natural interrelationship of surface and ground waters shall be fully considered in water allocation decisions to assure compliance with the intent of this chapter.

NEW SECTION

WAC 173-512-050 FUTURE RIGHTS. No water rights for consumptive uses of waters from the streams and lakes listed in WAC 173-512-030 shall hereafter be granted. Future rights for nonconsumptive uses may be granted subject to the provisions of this chapter.

NEW SECTION

WAC 173-512-060 EXEMPTIONS. (1) Nothing in this chapter shall affect any existing water rights, riparian, appropriative, or otherwise, existing on the effective date of this chapter; nor shall it affect existing rights relating to the operation of any navigation, hydroelectric or water storage reservoir or related facilities.

(2) Stock watering use, except that related to feed lots, shall be exempt from the surface water closures established in this chapter.

NEW SECTION

WAC 173-512-070 ENFORCEMENT. In enforcement of this chapter, the department of ecology may impose such sanctions as appropriate under authorities vested in it, including but not limited to the issuance of regulatory orders under RCW 43.27A.190 and civil penalties under RCW 43.83B.335.

NEW SECTION

WAC 173-512-080 REGULATION REVIEW. The rules in this chapter shall be reviewed by the department of ecology at least once in every five year period.

APPENDIX B

BACKGROUND: WESTERN WASHINGTON INSTREAM RESOURCES PROTECTION PROGRAM

BACKGROUND: WESTERN WASHINGTON INSTREAM RESOURCES PROTECTION PROGRAM

Low Flow Restrictions and Closures:

The need to maintain flows in Washington's streams in sufficient quantity to support game and food fish populations was originally set forth as state policy in 1949 under Chapter 75.20 RCW. Section 75.20.050 RCW provides that the Supervisor of Hydraulics (now the Director of the Department of Ecology) shall notify the directors of the departments of Fisheries and Game of applications for permits to divert surface waters, and that he may refuse to issue such permits if, in the opinion of the directors of Fisheries or Game, the diversions might result in reducing the streamflow below that necessary to adequately support game and food fish.

Since the enactment of this law, the involved agencies have communicated their interests in water right applications primarily through biweekly or monthly meetings in which the specific impacts of proposed diversions on the fish resources are thoroughly discussed. As a result of such discussions, low-flow, or other restrictive permit provisions may be recommended by the departments of Fisheries and Game to protect fishery resources. These recommended limitations are normally accepted by the Department of Ecology and applied to the respective water right permits and subsequent water rights for that source. Many such low-flow provisions have been applied to individual rights over time, but because of changing personnel and a lack of data, in many cases, there is little uniformity among the low-flow values selected for different streams. In addition, major streams were generally not addressed under this procedure.

In those cases where it has been determined that sufficient water beyond that required for fish would not be available on a reasonable frequency, streams have been closed to further consumptive appropriation. Statewide, there are approximately 250 streams now protected with low-flow provisions and 250 streams closed to future appropriations.

Minimum Flows:

Recognizing the inadequacy of then existing flow preservation activities, the Legislature enacted a new law in 1969 to provide a more definitive and systematic approach. Under this law, codified as Chapter 90.22 RCW and entitled "Minimum Water Flows and Levels," the Department of Ecology, when requested by Fisheries or Game, is directed to establish minimum streamflows and lake levels by administrative rule for purposes of protecting fish, game, birds, or other wildlife resources, or recreational or aesthetic values, or to preserve water quality. The Department of Ecology may also initiate the process. Under this law, hearing procedures were established but no criteria was defined for quantifying flows which should be retained in each stream to protect instream resources and environmental values.

Only one minimum flow regulation (Chapter 173-30 WAC for the Cedar River) was promulgated under Chapter 90.22 RCW. Requests for establishment of minimum flows have been made by the departments of Fisheries and/or Game for 24 streams in Western Washington.

Base Flows:

In the Water Resources Act of 1971, the Legislature took additional action to affirm the state's interest in preserving instream values through a declaration of fundamentals for utilization and management of state waters. RCW 90.54.020(3)(a) provides that, "Perennial rivers and streams of the state shall be retained with base flows necessary to provide for preservation of wildlife, fish, scenic, aesthetic, and other environmental values and navigational values."

In a hydrologic sense, the term base flow normally refers to flow sustained in a stream during extended periods without precipitation or, that component of streamflow primarily derived from ground water effluent. In perennial streams, ground water usually contributes to streamflow to some degree throughout the year; thus it is reasonable to view base flow as a year-round phenomenon. Under natural conditions and at any given date of the year, these are flows that can be expected in the stream a relatively high percentage of the time. The department's base flow methodology is based generally on this concept.

Process:

The base flow methodology outlined in Appendix D of the Program Overview and WRIS Bulletin No. 11 provides a means of determining instream flows in a timely manner. The method described will be used to determine a "first-cut" flow regime. In the process, valuable hydrologic information is generated that can be used to associate an expected frequency of occurrence or non-occurrence of proposed instream flow levels. The base flow methodology is characterized generally as a hydrologic approach to the instream resource protection problem.

At the same time as the "first-cut" base flows are being determined, the state departments of Fisheries and Game will be using habitat-based methods to determine their flow recommendations. An important spin-off of this work is information indicating the incremental effects of alternative flow levels on fish production determinants including spawnable area and rearing area available for fish.

When all this information is prepared, representatives of the departments of Ecology, Fisheries, and Game will meet and if possible negotiate a workable, mutually supportable instream flow regime. In basins where there is a sole local user group (or groups) with significant interests in the basin, meetings will be arranged to air the main concerns of both consumptive and nonconsumptive users on a one-to-one basis. Whether the flows are fully agreed to or not, the department will propose flows for adoption as administrative rules under the Washington Administrative Code. A basin report is prepared regarding the proposed flows or restrictions and the programmatic EIS supplemented as necessary.

This program is being developed using a basin-by-basin approach. The basin documents will include, along with other information, an identification of streams which have been closed to further additional appropriation and those for which low flows have been established under Section 75.20.050 RCW.

Those documents will be distributed, and public hearings will be held in counties in which the affected waters occur. Oral and written comments will be considered in the final draft of the basin documents and the proposed administrative rules. An adoption proceeding will be held at department headquarters to hear final comments and to consider adoption of the proposed rules. Unless specifically indicated otherwise, the proposed flows or actions related thereto will be adopted under both Chapter 90.22 RCW (minimum flow) and Chapter 90.54 RCW (base flow), and will be known generically in this program as instream flows.

Periodic Review and Future Planning

Each basin regulation will include a provision requiring the department to review the administrative rules within five years of adoption and henceforth within every five years. In its review, the department will consider additional information developed in the interim and may amend the rules as appropriate.

The establishment of instream flows will provide a foundation for future planning activities and development of complete basin management programs.

APPENDICES INDEX

Following in Appendix C are the comments received on the draft Chambers-Clover Instream Resources Protection Program document and proposed rules, with the responses of the Department of Ecology to those comments in Appendix D. We sincerely thank those agencies and individuals who took the time to formally respond. All comments will be considered in the department's deliberations. For ease of reference, the comments have been numbered. The following list shows the page number in Appendix D on which the department's responses to the comments in Appendix C will be found.

<u>APPENDIX C - COMMENTS</u>	<u>APPENDIX D - RESPONSES</u>
	Page
I. PUBLIC HEARING TESTIMONY	
A. Public concerns	D-1
II. WRITTEN STATEMENT	
B. Department of Game	D-1
III. LETTERS OF COMMENTS	
C. Department of the Army, Seattle District Corps of Engineers	D-1
D. U.S. Department of the Interior Geological Survey	D-1
E. Department of Transportation	D-2
F. Department of Fisheries	D-2
G. Pierce County Planning Department	D-2
H. Pierce County Department of Public Works	D-2
I. Robinson & Noble, Incorporated	D-6
J. U.S. Department of Commerce National Oceanic and Atmospheric Administration	D-6

APPENDIX C

PUBLIC HEARING COMMENTS

LETTERS OF COMMENT

I. Public Hearing Testimony

A. Several concerns were expressed by individuals during the question and answer period which warrant mention here:

1. Diversion of stream waters for aesthetic ponds on private property:

Concerns: the amount of water that is lost by seepage through pond beds, and the increase in loss as population increases.

Question: "Does the Department of Ecology have a program to monitor the ponds to assure that the beds are sealed and the use is nonconsumptive?"

2. Ground water development projects:

Concern: whether ground water projects could be evaluated before a great deal of money is invested by the developer.

Question: "Is the Department of Ecology going to have a permit procedure for ground water development projects?"

B. A statement was made by the Department of Game. That letter follows:



STATE OF
WASHINGTON
Dixy Lee Ray
Governor

DEPARTMENT OF GAME

600 North Capitol Way, GJ-11 Olympia, Washington 98504 206/753-5700

November 14, 1979

John F. Spencer, Assistant Director
Office of Water Programs
Department of Ecology
Mail Stop PV-11
Olympia, Washington 98504

Dear Mr. Spencer:

The Department of Game endorses the Chambers-Clover Basin Instream Resources Protection Program including Proposed Administrative Rules. Closure of the basin to further consumptive appropriation is essential to protection of fish and wildlife in the basin.

The Chambers Creek drainage plays a major role in the propagation of steelhead and rainbow trout for the entire state of Washington. A run of 1,100 to 3,000 steelhead returns each year to the Department's South Tacoma and Chambers Creek Hatcheries. Approximately 13 million steelhead and rainbow trout are shipped out or released from these two hatcheries to waters of the state each year, making these two hatcheries the single most important trout hatchery complex in the state. The hatcheries, which are non-consumptive water users, depend upon water from springs and from Chambers Creek. Protection of the flow by the Instream Resources Protection Program will help keep water quality and temperature at acceptable levels for trout culture.

Waters of the Chambers-Clover Basin provide recreational fishing for resident and anadromous gamefish close to a major population center. This proximity is important as we face an energy shortage.

It is apparent that the Department of Game has a vital interest in the Chambers-Clover Basin, Therefore, the Department repeats its support of the Chambers-Clover Basin Instream Resources Protection Program.

Sincerely,

DEPARTMENT OF GAME

A handwritten signature in dark ink, appearing to read "Jon Gilstrom".

Jon Gilstrom, Program Manager II
Habitat Management Division

JG:mb

LETTERS OF
COMMENT



DEPARTMENT OF THE ARMY
SEATTLE DISTRICT, CORPS OF ENGINEERS
P.O. BOX C-3755
SEATTLE, WASHINGTON 98124

John F. Spencer, Assistant Director
Office of Water Programs
Department of Ecology
State of Washington
Olympia, Washington 98504

Dear Mr. Spencer:

1

We have reviewed the draft Chambers-Clover Creeks Basin Instream Resources Protection Program document with respect to the U.S. Army Corps of Engineers' areas of responsibility for flood control, navigation, and regulatory functions. We have no comments on the document.

Thank you for the opportunity to comment on this document.

Sincerely,

Copy Furnished:
Ms. Jeanne Holloman
Department of Ecology
State of Washington
Mail Stop PV-11
Olympia, WA 98504

SIDNEY KNUTSON, P.E.
Asst. Chief, Engineering Division



UNITED STATES
DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Water Resources Division
1201 Pacific Avenue – Suite 600
Tacoma, Washington 98402

October 4, 1979

Office of Water Programs
State of Washington
Department of Ecology
Olympia, Washington 98504

Gentlemen:

Subject: Review of draft Chambers-Clover Creeks Basin Instream Resources Protection Program

2

We have reviewed the subject document and have no comments to offer other than that proper use was made of USGS report WSB No. 22; WSB 43, Volume 3; and the 1976 annual report, Volume 1 in describing the water resources of the area.

Sincerely yours,

J. R. Williams
Inquiries Officer



STATE OF
WASHINGTON
Dixy Lee Ray
Governor

DEPARTMENT OF TRANSPORTATION
Highway Administration Bldg, Olympia, WA 98504 206/753-6005

October 9, 1979

Ms. Jeanne Holloman
Department of Ecology, PV-11
Olympia, Washington 98504

Department of Ecology
Chambers-Clover Creeks Basin
Instream Resources Protection Program
Draft Environmental Impact Statement

Dear Ms. Holloman:

3

We have reviewed the subject document and have no comments to offer regarding the proposal.

Thank you for the opportunity to review this information.

Sincerely,

ROBERT S. NIELSEN
Assistant Secretary for Public
Transportation and Planning

By: William P. Albohn
Environmental Planner

RSN:lp
WPA/WBH

cc: A. R. Morrell
R. Albert
Environmental Section



STATE OF
WASHINGTON
Dixy Lee Ray
Governor

DEPARTMENT OF FISHERIES
115 General Administration Bldg, Olympia, WA 98504 206/753-6600

September 27, 1979

Mr. John F. Spencer, Assistant Director
Office of Water Programs
Department of Ecology
Olympia, Washington 98504

Dear Mr. Spencer:

4

We have reviewed the Draft Chambers-Clover Basin Instream Resources Protection Program, including the Proposed Administration Rules, and wish to express our support for your proposed action. We concur that any further consumptive appropriation would have a harmful impact on fisheries resources, and therefore are greatly appreciative of the recommended surface water closures. This is the best possible means to help reduce the impact of anticipated decreased stream flows when new sewage facilities are completed.

5

Since the population in the Chambers-Clover Basin is projected to increase considerably in future years, close management will be required to retain the quantity and quality of water in these small streams. In addition to the surface water closures, you propose close scrutiny of future appropriations of ground waters. Your last paragraph on page 17, however, states "the exact effect of a lowered water table on the stream system is not known." How, then, will the determinations of the impact on the surface waters be made when there are proposals for withdrawal of ground waters?

We have two minor comments on your section on Fisheries (page 13):

6

1) Coho salmon utilize all accessible reaches of the drainage, as you have stated. Chum salmon use however, is mostly in the area below River Mile 3.0 in Chambers Creek, and in the lower reaches of Leach and Flett Creeks.

7

2) We have recently expanded hatchery production at two sites within the basin, Garrison Springs (a small independent tributary entering Chambers Bay) and Sequelitchew Lake. The projected juvenile releases for this year includes nearly 1,000,000 chum salmon and more than 1,000,000 pink salmon into Chambers Creek, and over 2,500,000 coho into Sequelitchew Creek.

Thank you for the opportunity to offer our comments.

Sincerely,

Gordon Sandison
Director
mr



PIERCE COUNTY PLANNING DEPARTMENT
J.N. SHENSKY, Director

October 24, 1979

Ms. Jeanne Holloman
Department of Ecology
Mail Stop PV-11
Olympia, WA 98504

Re: Draft – Chambers-Clover Basin Instream Protection Program

Dear Ms. Holloman:

8

We have reviewed the subject document and have no comments.

Sincerely,

DAN CAGLE
Environmental Health

DC:JR:scw



October 3, 1979

Department of Ecology
7272 Cleanwater Lane
Olympia, WA 98504

SUBJECT: Chambers-Clover Basin Instream Resources Protection Program,
September 19, 1979 (W.R.I. Area #12)

REF: 1) Clover Creek Basin Drainage Plan, by Consoer, Townsend and Associates, 1976, Study Conducted for Pierce County, WA.
2) Parkland/Spanaway Comprehensive Land Use Plan, 1979.
3) Effects of Surface and Shallow Subsurface Contaminants on the Groundwater Quality in Central Pierce County, by R. M. Schaff at the University of Washington, 1978. (See Foppe DeWalle, Environmental Health, School of Public Health).

Gentlemen:

The following comments are made for your review and action concerning the subject draft document:

9

1. The above referenced reports should be added to the bibliography and their respective information integrated into the body of this program document.

10

2. Table 1: Add: Ponce De Leon Creek (east side of American Lake from Villa Plaza area). This is not just a storm sewer – revise page 9 – see comment item 6.

11

3. Page 1:

12

Paragraph 5: Concerning the need for a basin specific supplemental environmental impact statement and the information provided in June 1979, E.I.S., this reviewer believes a basin specific supplement is required. There is not sufficient information to define this open-ended conclusion, especially concerning the groundwater element as described on page 19, last paragraph. Who will determine if a case warrants further investigation? By what criteria, if any, will they base their determination? By what standards of comparison (i.e., base line data)? By what guideline, if any will they be obliged to follow?

13

October 3, 1979

14

It is quite apparent that this can significantly affect further development within these areas of Pierce County and this needs to be further analyzed in detail at this time. Most plats proposed in outlying areas are served by community well systems. Will a single short plat be required to conduct expensive subsurface exploration and testing? Will large subdivision? If so, how large is "large" to be?

15

16

4. Figure 1: Needs to be enlarged to a suitable working base scale for planning and engineering applications (say 1" = 2000'). Watercourses should be correctly shown to define their flow regime (perennial, intermittent, ephemeral). Basin boundary lines should be shown to delineate sensitive and less sensitive tributary areas.

17

Ephemeral, or stormwater courses, may be deleted in favor of concentrating on perennial and intermittent channel types, i.e., Clover Creek becomes intermittent through portions of Parkland. North Fork system is intermittent through most of its reach.

The upper basin study boundary is not accurately shown (see attachment).

18

5. Page 8:

Paragraph 2: "Clover Creek forms . . . , originating in the South Hill, Puyallup/ Midland residential districts from the north side of the drainage basin and in the Elk Plain/ Spanaway districts from the south side of the drainage basin.

19

Paragraph 3: "It is believed that this occurs . . . altered by construction activities . . . " this statement is irresponsible if not verified by detailed investigations. Our information as reported in the Ref. 1 study indicates that these intermittent channels including the diked and lined portions are naturally influent watercourses during low-flow periods.

20

Paragraph 4: Mention should be made of the old Smith Lake area east of McChord A.F.B. which is proposed for an impoundment site, multi use blue-green area, by the C.C.B.D.P., Ref. 1.

21

Paragraph 4: (minor item) This diked and lined channel has an asphalt bottom and earthen banks.

6. Page 9:

22

Paragraph 3: Ponce de Leon Creek drainages waters are partly supplied by storm waters from Gravelly Lake Drive and areas east of Gravelly Lake Drive. The remainder of the watercourse (about 0.5 miles) to Steilacoom Lake is a perennial stream through a deep ravine still in a natural setting. Therefore, it is not now a stormwater sewer, open or closed conduit system notwithstanding.

October 3, 1979

23

Paragraph 4: The Ref. 1 flood control study proposes to raise the storage capacity of Spanaway Lake by 0.5 feet for 135 Ac. Ft. increased storage capacity with controlled outlet and embankment works. This would increase the low-flow augmentation effect to Spanaway and Morey Creeks.

24

Paragraph 8: Wards Lake/Seeley Lake (Crawford Marsh) areas are not discussed.

Paragraph 9: Charlton Lake is shown on Figure 1 but is not discussed.

These are all sensitive areas for both stormwater control and low flow protection.

7. Page 10:

25

Paragraph 2: See comment item 3.

26

Paragraph 3: Does this statement refer to page 16, Turbidity water quality element?

8. Page 13:

27

Paragraph 1: "All accessible reaches of the Chambers-Clover Drainages – " Mapping of "all these accessible reaches" should be provided which delineates in sufficient detail (say at a scale of 1" = 2000') the watercourses and their respective reaches which are utilized by these species for transport, spawning and rearing.

9. Page 17:

28

Paragraph 7: Add a paragraph on current Pierce County policy for stormwater runoff control in urbanizing areas based on "best management practices", i.e., excess runoff from post-development areas must be controlled so as to not exceed predevelopment conditions. This is usually accomplished by either surface detention systems or subsurface infiltration systems as engineered for residential plats or commercial developments.

29

Paragraph 8: How was the estimate of 6-8" lowered water table below present level obtained?

10. Page 18:

30

Table 3: Our information indicates all areas shown on table 3 except for Clover Creek above Steilacoom are class "A" rather than "AA" waters. Please indicate why these are all qualified as "AA" waters.

October 3, 1979

ROBINSON & NOBLE, INCORPORATED
GROUND WATER GEOLOGISTS
10318 GRAVELLY LAKE DRIVE SW
TACOMA, WASHINGTON 98499
(206) 564-4370

11. Page 19;

"Current Administrative Status" – No problem with this.

"Proposed Administrative Status" & "WAC 173-672-040", pg. 2, Appendix A.

These statements concerning groundwaters together with the inacting legislation require clarification and elaboration (or omission). See comment item 3.

Provisions need to be made for the positive enhancement of the protection program by promoting groundwater recharge measures within the defined areas (only if recharge water is of adequate quality).

Very truly yours,

WM. R. THORNTON
Director



JOHN G. COMIS
Planning Engineer

WRT:JGC:do

cc: file

M4

October 12, 1979

Department of Ecology
Office of Water Programs
Olympia, Washington 98504

Attention: John F. Spencer, Asst. Director

Regarding: Draft, Chambers-Clover Basin Instream Resources
Protection Program

Gentlemen:

I would like to offer my opinion that the proposed surface water closures are warranted and the proposed "New Sections" should be implemented. I do wish to criticize some of the hydrologic concepts offered, and do not believe that they should be presented as reasons for closure.

My comments relate to Figure 3, the drainage profile. This should be labeled "schematic" and it does adequately crystallize some of the drainage concepts. It should be further developed to better show the concept of "shallow" and "deep" aquifers.

The shallow aquifers do receive the vast majority of effluents. It is possible that local areas have insufficient purification through the soils, as noted by the diagram of the houses near the lake. There is also evidence that much of the shallow aquifer system is sufficiently purified and the water meets drinking water standards.

The "deep" aquifer, as typified by those used by the Lakewood Water District, are separated from the shallow zones by aquicludes that may be tight or leaky. Potentio-metric levels between the two tend to be separated by more than ten feet. The diagram shows water slipping off

a breach in an aquiclude shown as Vashon Till and states that unpurified effluent may reach the deep aquifer. Because a series of aquicludes exist, and because the travel path would be a minimum of several tens of feet before entering the lower zones, bacteriological pollution is an extremely remote possibility. There is no evidence to our knowledge of a pollution is an extremely remote possibility. There is no evidence to our knowledge of a polluted deep aquifer here although there may be an occasional polluted well caused by casing failure. The distinction is important.

My suggestion is to remove the statement of pollution to deep aquifers because the concept is unfounded but does have an alarmist overtone that is unwarranted.

The sketch of the cottonwood tree adds little necessary information but please let the tree draw water from the shallow aquifer only. It won't tap the deep system.

Very truly yours,

ROBINSON & NOBLE, INC.
Ground Water Geologists


John B. Noble
JBN:lks



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Environmental & Technical Services Division
P. O. Box 4332, Portland, Oregon 97208

October 31, 1979

Mr. John F. Spencer
Assistant Director
Department of Ecology
Olympia, Washington 98504

RE: Chambers-Clover Basin Instream Resource Protection Program Including
Proposed Administrative Rules (Water Resources Inventory Area 12)

Dear Mr. Spencer:

35

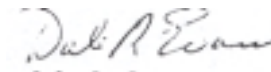
We concur with your proposal to close all streams in the Chambers-Clover Creeks Basin, and all lakes in direct surface continuity in those streams to future consumptive water appropriation in the interest of fisheries and water quality. The proposed action will help conserve valuable and important runs of anadromous fish which presently utilize habitat within the basin. The basin-by-basin approach in your Instream Resources Protection Program is a commendable method towards meeting increased demands for water resources where water in excess of fish needs is frequently insufficient.

Existing natural fish production is continually being threatened by competition for the water resource. The summer flow period is an especially critical time for coho salmon and steelhead trout. It is important to maintain adequate flows for their production in an attempt to fulfill the growing demands of Indian, sport and commercial fishermen as well as the general public.

We recommend that water conservation planning efforts be studied by all user groups within the basin in the event that less than normal flow periods create shortages. The Chambers-Clover Creeks fish runs are a highly valuable resource and we urge adoption of the proposed regulations so that they may be protected.

The National Marine Fisheries Service appreciates the opportunity to express its views on your Instream Resources Protection Program applications within the Chambers-Clover Creek Basin.

Sincerely yours,



Dale R. Evans
Division Chief

APPENDIX D

RESPONSES TO COMMENTS

APPENDIX D
RESPONSES TO COMMENTS

Responses are keyed to numbers that appear on the comment letters.

PUBLIC HEARINGS

A. Response to Public Concerns

1. Aesthetic ponds: Aesthetic ponds are normally considered to be a nonconsumptive use. In cases where the bottom sealant has been broken or is permeable, a loss of water from the ponds to the underlying strata does occur. The department does not have a program to continually monitor amounts of water lost through aesthetic pond beds. While it is not proposed in the WWIRP Program to close the streams and lakes to appropriation for nonconsumptive uses (including aesthetic ponds) each application for a permit to authorize such uses will be carefully evaluated to assure that the use is in fact nonconsumptive and not in any manner detrimental to the instream resources.
2. Ground Water Development Projects:

Prior to the issuance of a permit to drill a well, the Department of Ecology investigates the application to (a) determine what water, if any, is available for appropriation, (b) find and determine to what beneficial use or uses it can be applied, and (c) determine if any existing water rights will be violated by the new use.

If, after this investigation, the department issues a permit to drill, the well driller has an option to drill a test well to confirm the department's determinations or to drill a production well. In the case of a large development project, test wells would be drilled to generate the necessary data, prior to any large capital investments. Aground water withdrawal permitting procedure is already in effect (please refer to Chapter 90.44 RCW).

B. Response to Department of Game:

Thank you for your support in the WWIRPP Program and your participation in the public hearing.

LETTERS OF COMMENTS

C. Department of the Army, Seattle District Corps of Engineers:

1. Thank you for your review of the Chambers-Clover Instream Resource Protection Program document and proposed rules.

D. United States Department of the Interior, Geological Survey:

2. Thank you for your review and your comment.

E. Department of Transportation:

3. Thank you for your review.

F. Department of Fisheries:

4. Thank you for your support.
5. The last paragraph on page 3 is a discussion of the estimated amount (18,000 acre-feet per year) of effluent that will be collected and transported out of the basin when the new sewerage facilities are completed. The intervention of recharge from septic tank effluent will occur on a regional scale. To date, no studies have been made to determine what portions of this collected effluent currently flows into individual streams by way of the shallow aquifer, or permeates to the deeper aquifer. Consequently, data is lacking from which to calculate the effects of a lowered water table on stream systems.

The Department of Ecology evaluates impacts of proposed ground water withdrawals on surface systems on a case-by-case basis. Methods criteria are discussed and referenced in Responses 12 and 13.

6. Paragraph 1, page 13, revised accordingly.
7. Information incorporated on page 13.

G. Pierce County Planning Department:

8. Thank you for your review.

H. Pierce County Department of Public Works:

9. Your references have been considered and parts relevant to our effort incorporated into this document.
10. Ponce De Leon Creek has been incorporated in Table 1 and in Section 173-152-030 WAC, Surface Water Closures.

Paragraph 3, page 9 has been revised, and the information from your item 6 added to paragraph 4, page 8. Thank you for pointing out this oversight.
11. The department does not foresee any negative impacts to ground water occurrence or quality resulting from closure of surface water systems to additional consumptive appropriations and concludes therefore, that the overall program environmental impact statement adequately covers the Chambers–Clover Creeks Basin.

12. The statement you reference in the last paragraph, page 19 (now page 22), is based upon current ground water permitting procedures:

When application is made to DOE for appropriation of ground water, two things occur;

- (1) The applicant is required to publish notice in a general circulation newspaper published in the county or counties in which the water use is to be made, and any other newspapers that DOE might direct.

This provides a process through which the public is informed of an action, and is allowed a means of entering any objections to the proposed ground water withdrawal.

- (2) The department investigates the application to (a) determine what water, if any, is available for appropriation, (b) find and determine to what beneficial use, or uses it can be applied, (c) determine if any existing water rights will be violated by the new use, and (d) determines whether the proposed appropriation threatens to prove detrimental to the public interest.

These determinations are based upon the best information available e.g., production records of other wells in the area, on-site field investigations, discussions with other water users in the area, etc.

When all available information is compiled, the application goes through an in-house review in the DOE regional office. When that review is complete, it goes to the regional manager, and the final determination is made to either issue a permit or deny it.

If the application is for a community water system the Department of Social and Health Services is involved in the review.

The Department of Ecology may require the applicant to furnish as much "factual information as is deemed necessary to make a judgment concerning availability of ground water and impacts of withdrawals upon other wells within a specified area or any surface water bodies to which the underground water is a part or tributary to the source (90.44.030 and .080 RCW).

13. The Department of Ecology is charged with the statutory authority of regulating public ground waters by Chapter 90.44 RCW, which was enacted for the specific purpose of extending the application of surface water statutes (90.03 RCW) to the appropriation and beneficial use of ground waters within the state.

The supervisor of water resources (Department of Ecology) determines if a case warrants further investigation (90.44.070 RCW). Prior to the issuance of a water right certificate, the following factual information (provided the permittee by the well driller or other constructor of works for ground water withdrawal) must be submitted to the department (90.44.080 RCW):

- a. The location of each well or other means of withdrawal constructed under the permit, both with respect to official land surveys and in terms of distance and direction to any preexisting well or wells or works constructed under an earlier permit or approved declaration of a vested right, provided the distance to such preexisting well or works is not more than a quarter of a mile;
- b. The depth and diameter of each well or the depth and general specifications of any other works constructed under the terms of the permit;
- c. The thickness in feet and the physical character of each bed, stratum, or formation penetrated by each well;
- d. The length and position, in feet below the land surface, and the commercial specifications of all casing, also of each screen or perforated zone in the casing of each well constructed;
- e. The tested capacity of each well in gallons a minute, as determined by measuring the discharge of the pump or pumps after continuous operation for at least four hours or, in the case of a flowing well, by measuring the natural flow at the land surface;
- f. For each nonflowing well, the depth to the static ground water level as measured in feet below the land surface immediately before the well capacity test herein provided, also the drawdown of the water level, in feet, at the end of said well capacity test;
- g. For each flowing well, the shut-in pressure measured in feet above the land surface or in pounds per square inch at the land surface; and
- h. Such additional factual information as reasonably may be required by the supervisor to establish compliance with the terms of the permit and with the provisions of this chapter.

A standard operating procedure (SOP) is currently being developed by the department which will design a methodology for determining any impacts on surface water systems that might occur from ground water withdrawals, and the means for implementing corrective procedures. The computation method used is discussed in:

Theis, C. V. and Conover, C. S. 1963. Chart for determination of the percentage of pumped water being diverted from a stream or drain. In shortcuts and special problems in aquifer tests: U.S. Geol. Survey Water Supply Paper 1545-C, p. C106-C109.

14. In areas where surface water bodies are affected by ground water withdrawal, wells tapping the shallow aquifer are highly subject to restrictions under the Instream Resources Protection Program.

Withdrawals from deeper aquifers appear to have very little impact on surface water systems, and it is the deeper aquifers that will probably be tapped for future water supply.

However, the department will evaluate each future ground water development project to assure that the surface waters are not significantly affected by the proposed ground water withdrawal.
15. Withdrawals of ground waters for stock watering purposes, and watering of lawns or noncommercial gardens not exceeding one-half acre in area; or for single or group domestic, and industrial uses not exceeding 5,000 gallons per day are exempt from permit requirements (90.44.050 RCW). Applications for withdrawals over 5,000 gallons per day will be fully evaluated, but special studies and testing by the applicant are only required when needed in specific case situations. This need is determined by the potential for problems that may be caused by the proposed appropriation and does not directly relate to project size.
16. The entire Chambers-Clover Creeks drainage system including all tributaries is currently administratively closed to out-of-stream, consumptive appropriations. The Instream Resources Protection Program rules will codify those closures. The map adequately serves our purpose of illustrating the systems (except for Ponce De Leon Creek). For more complex basins, such as the Kitsap Basin (WRIA 15) a more detailed map will be developed.
17. The basin boundary is our water resource inventory area boundary. (Incidentally, you forgot to enclose the attachment).
18. Incorporated.
19. Sentence deleted.
20. Description of marshes, ponds, and stormwater collection basins from your Reference 1 incorporated, page 10.
21. Agreed.
22. See Response No. 10.

23. The department's rules for water resource management must be based upon existing conditions. A section was included in the Chambers-Clover Basin Proposed Rules (173-512-080 WAC) to allow for review at least once in every five-year period. Should new parameters develop, they will be considered in the reviews.
24. Incorporated on page 10.
25. See Responses 12, 13, and 14.
26. There was no direct relationship. The statement has been revised.
27. The accessibility of all reaches to fishes varies over time with availability of water in individual streams. Moreover, different species of fishes sometimes inhabit different reaches of the streams with overlaps of use between the species. The same species may utilize different areas of stream reaches for different phases of the life cycle. While we are not equipped to indicate this situation graphically, the text on page 13 has been revised to give a somewhat clearer understanding of the fish production potential of stream systems in the Chambers-Clover Basin.
28. Incorporated.
29. See Reference:

Pierce County Final Environmental Impact Statement for Chambers Creek sewerage system prepared by Wilsey & Ham, Inc. and EPA Region X. (ULID 73-1) Project # C-530565-01. 1975. Page 106.
30. All stream reaches indicated on Table 3 are Class A waters. The table has been revised and clarified. Thank you for your close scrutiny.
31. See Responses 12, 13, and 14.
32. This is beyond the scope of the Western Washington Instream Resources Protection Program.
- I. Robinson & Noble, Incorporated:
 33. Thank you for your support.
 34. Figure 3 has been revised to more adequately portray a typical water-bearing unit stratification in the Chambers-Clover Water Resource Inventory Area. The roots of the cottonwood tree have also been shortened. Thank you for your comments.
- J. U.S. Department of Commerce, National Oceanic and Atmospheric Administration:
 35. Thank you for your support.