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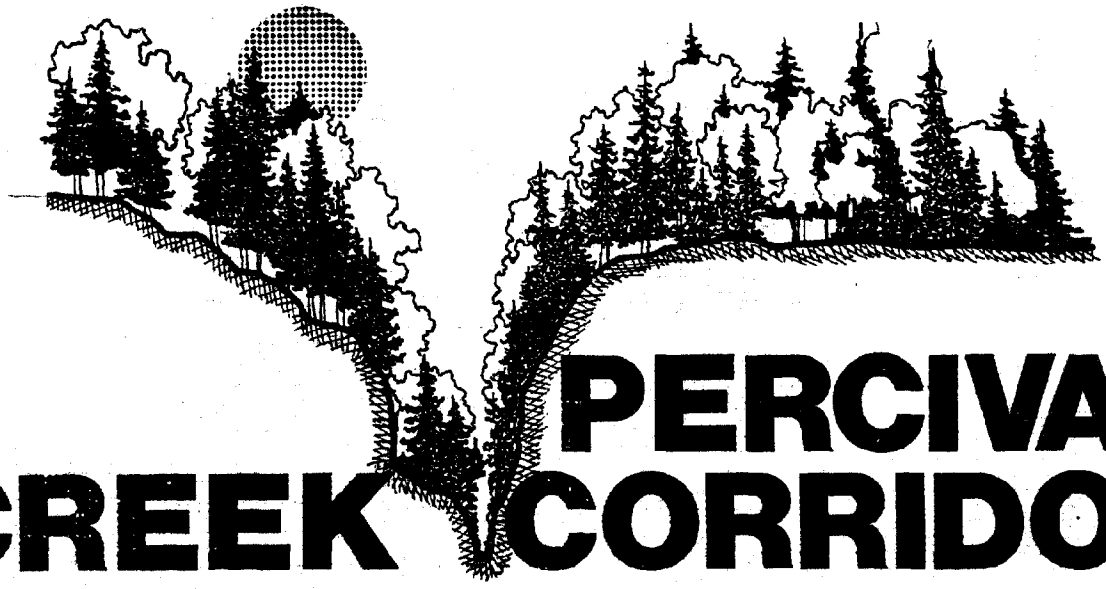

PERCIVAL CREEK CORRIDOR PLAN

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Volume 2: Upper Reach

Washington State Department of Ecology

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Thurston Regional Planning Council

February 1986

THURSTON REGIONAL PLANNING COUNCIL is a 15-member intergovernmental board made up of local governmental jurisdictions within Thurston County, plus the Washington State Capitol Committee and The Evergreen State College. The Council was established in 1967 under RCW 36.70.060 which authorizes creation of regional planning councils.

Thurston Regional Planning Council undertakes largely land use related research and planning programs of interest to all of the member jurisdictions. Each member jurisdiction funds the Council's operations based on a per capita formula. The Council is governed by representatives from the member jurisdictions. They determine the budget and work program annually for Council projects and operations.

As a separate function, Thurston Regional Planning Council by intergovernmental agreement also provides the Planning staff for the Planning Departments of Thurston County and the cities of Olympia and Lacey. In this function, the contracting governments are the sole determinants of the work programs and funding levels for the local planning department work.

This report was prepared as part of the Thurston Regional Planning Council's 1986 regional work program.

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PERCIVAL CREEK CORRIDOR PLAN

VOLUME 2

UPPER REACH

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BACKGROUND

Located within the shadow of the Capitol Dome, Percival Creek and the Black Lake Drainage Ditch flows 3.3 miles from Black Lake through Thurston County, the cities of Tumwater and Olympia to enter Capitol Lake at Percival Cove. The creek corridor is rich in natural resources and recreational opportunities, and within this short distance are three distinct creek reaches. Each reach contains a unique mix of water, wetlands, and riparian vegetation which supports a diverse wildlife population.

The Lower Reach is characterized by a 110-acre canyon with heavily wooded hillside extending 1.5 miles upstream of the mouth. If offers city dwellers uncommon natural beauty within their own backyard. By comparison, the Middle Reach flows through open fields which provide broad vistas of pastoral views. Waters within the Upper Reach lazily flow down the manmade drainage ditch which bisects a 160-acre wetland associated with Black Lake.

These resources and amenities survive in the midst of an urban area experiencing rapid population growth and accompanying development. Due to these pressures, conflicts have arisen between upland activities and the future maintenance of the creek's natural integrity.

Begun in 1984, the Thurston Regional Planning Council has worked in cooperation with the three jurisdictions and an advisory committee to draft the Percival Creek Corridor Plan. The advisory committee consisted of departmental representatives from the jurisdictions, affected state agencies, an Indian Tribe, property owners and community groups with both "business and "environmental" viewpoints.

The Percival Creek Corridor Plan is designed as a management tool to guide future land use decisions along the creek. The primary goal is to strike a balance between the long-term protection of the creek ecosystem, while providing for economic growth and vitality. Providing predictability within the corridor is also of common interest to all parties.

The Corridor Plan seeks to resolve existing conflicts between shoreline and zoning through the use of a combined regulator approach called a "Management Unit." A Canyon, Middle and Upper Reach Management Unit is proposed within the Canyon Reach divided by the respective jurisdiction (Olympia and Tumwater). The "Management Unit" would replace the current shoreline "Environments" in the Shoreline Master Program. For those areas within the corridor beyond the shoreline jurisdiction, compatible regulations would be necessary within the local zoning code.

For those "Management Unit" regulations within the shoreline jurisdiction review and adoption by Olympia, Tumwater and Thurston County, as a local amendment to the Shoreline Master Program would be necessary. This local action would subsequently be sent to Washington Department of Ecology for their review and approval.

FINDINGS

1. The Percival Creek Corridor is approximately 3.3 miles long and contains three reaches representing the following distances.

a.	Canyon Reach	8,000 lineal feet (1.5 miles)
	(1) Olympia	6,000 lineal feet
	(2) Tumwater	2,000 lineal feet
b.	Middle Reach	2,400 lineal feet (0.5 mile)
c.	Upper Reach	6,800 lineal feet (1.3 miles)
	(1) Tumwater	5,100 lineal feet
	(2) Thurston County	1,700 lineal feet

2. The corridor planning area contains approximately 808 acres of which only 195 acres (20 percent) were developed in 1983.

Canyon and Middle	316 acres, 72% undeveloped
Upper	307 acres, 82% undeveloped

3. The Percival Creek drainage included approximately 6,350 acres of which approximately 1.5 miles of the creek and drainage ditch shorelines were designed for either commercial or industrial uses.

4. The Upper Reach contains a 160-acre associated wetland of Black Lake. It was identified as high quality wetland with a unique mix of four wetland classes providing desirable wildlife habitat instream fisheries resource, and a natural greenway paralleling the creek.

5. The Department of Fisheries fish cultural facility in Percival Cove started in 1971 and contributed upward of $3.9 million to the sport and commercial fisheries in 1984.

6. Approximately 80 percent of the flow feeding Percival Cove originated from the Black Lake Drainage Ditch.

7. Future stormwater impacts (both quantity and quality) were identified as the most significant threat to Percival Creek and Percival Cove.

8. Water quality samples taken at the mouth indicated almost no water quality violations between March to August of 1983.

9. Fecal coliform sampling from 1983 and 1984 indicated violations of water quality standards at the mouth and along Percival Creek between Trosper and Mottman Roads.

10. In the Upper Reach three potential corridor crossings were identified by priority: 35th Avenue, 29th Avenue, 25th Avenue, respectively. The 25th Avenue corridor lies between the Upper and Middle Reaches.

RECOMMENDATIONS

I. UPPER REACH MANAGEMENT UNIT

A. Shoreline Master Program

Redesignate the "Natural" associated wetlands and 6,800 lineal feet of the drainage ditch yet to be classified to a consistent shoreline designation. The proposed regulations of the "Upper Reach Management Unit" represents a hybrid of shoreline "Environments." Uses and activities within the Black Lake Drainage Ditch, its buffer, associated wetlands and its buffer are severely restricted; whereas the remainder of the shoreline jurisdiction is compatible to the underlying zoning district.

B. Zoning

1. Tumwater. Adopt comparable regulations for wetland buffers not within shoreline jurisdiction.

2. Thurston County. Implement the Corridor Plan through the current Environmentally Sensitive Area regulations. Adopt comparable regulations for wetland buffers not within shoreline jurisdiction.

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PERCIVAL CREEK CORRIDOR PLAN

Vicinity

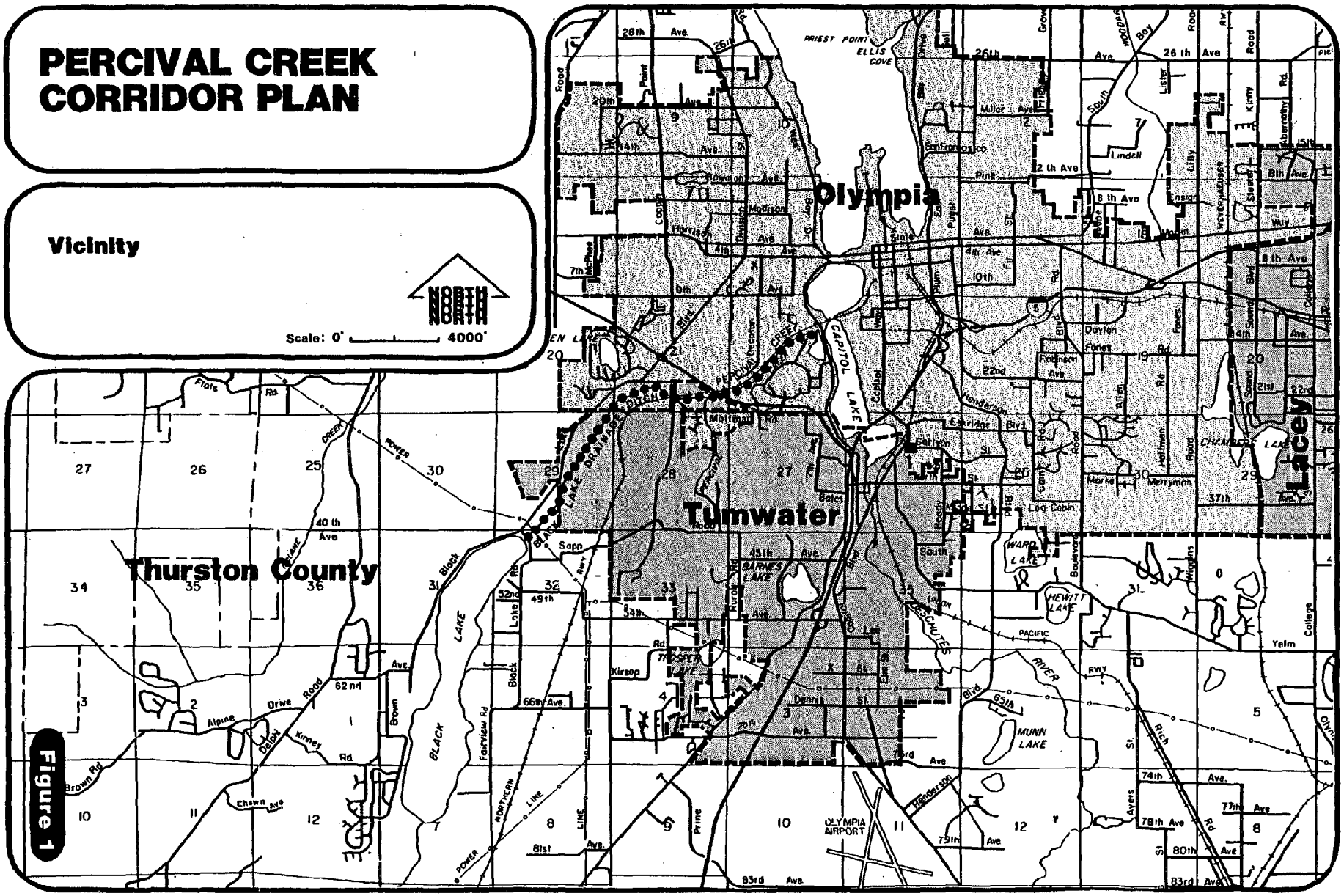


Figure 1

A. Background

Percival Creek flows north from Black Lake through Thurston County and the cities of Tumwater and Olympia, then enters Capitol Lake. The stream is rich in natural resources and recreational opportunities, containing native runs of salmon, steelhead, and cutthroat trout. In addition, its mix of water, wetlands and riparian vegetation provides a diversity of wildlife populations including deer, fur bearers, and a wide variety of birds (refer to Figure 1).

Within the short distance between lakes exists three distinct environments or reaches. The lower reach is characterized by a canyon with heavily wooded hillsides. This offers city dwellers uncommon natural beauty in their own backyard. In contrast, the middle reach provides broad vistas of pastoral view. In the upper reach the manmade Black Lake Drainage Ditch flows lazily, bisecting an extensive wetland associated with Black Lake. This 160-acre wetland contains several wetland types which provides a desirable habitat mix that supports a diverse wildlife population. The Percival Creek/Black Lake Drainage Ditch corridor offers a unique mix of water, wetlands and natural resources.

However, these resources and amenities survive in the midst of an urban area experiencing rapid population growth and accompanying development. Due to these pressures, conflicts have arisen between upland activities and the maintenance of the creek's natural integrity.

The Percival Creek Corridor Plan was designed as a management tool to guide future decisions related to the use of the creek, striking a balance between the need to conserve and protect the long-term productive capacity of the creek ecosystem, while considering the human use and urban infrastructure improvements needed to meet the region's social and economic needs. One of the Corridor Plan's major goals was to provide predictability to both development and environmental interests regarding new land uses within the corridor.

B. Corridor Planning Area (Refer to Figure 2)

1. Upper Reach. With the Canyon and Middle Reaches of the Corridor Plan contained in Volume I, the only remaining portion of the corridor is the Upper Reach. It lies south of the City of Olympia boundary and extends upstream to Black Lake. The Upper Reach lies within the jurisdictions of Tumwater and Thurston County.

   In November of 1983, the Department of Ecology responded to Thurston Regional Planning Council's inquiry regarding establishing an accurate flow rate for the Black Lake Drainage Ditch. At that time the Department of Ecology analysis indicated that a mean annual flow for the ditch was approximately 46 cubic feet per second (cfs) which was later re-calculated at 32.5 cfs, both

PERCIVAL CREEK CORRIDOR PLAN

Upper Reach

Creek Reaches

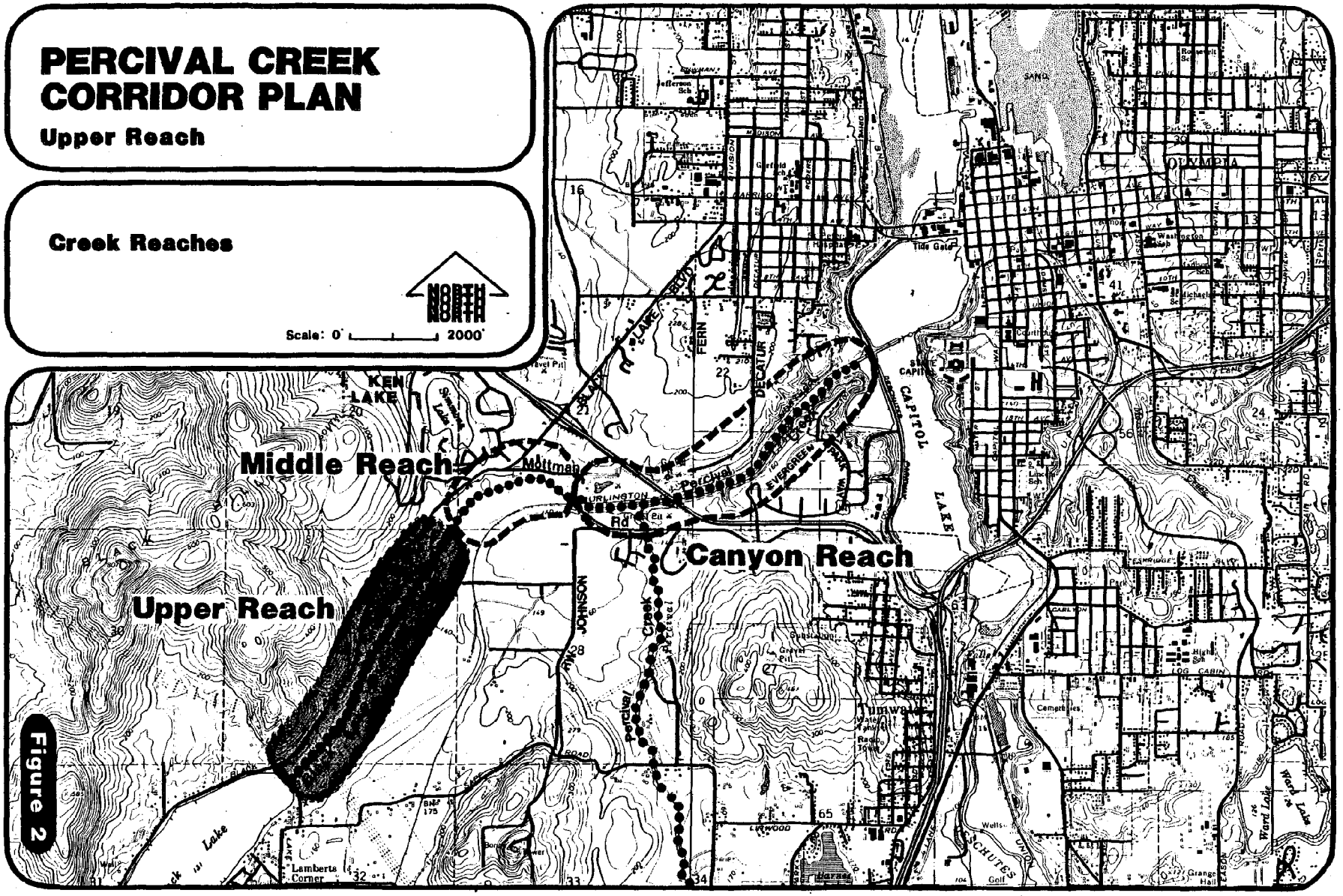


Figure 2

sufficient flow to constitute a "shoreline of the state" and thereby be included in the local Shoreline Master Program. The Black Lake Drainage Ditch was added to the list of streams meeting the Shoreline Management Act criteria by the Department of Ecology in 1985.

Although the Upper Reach contains extensive wetlands, some upland areas lie immediately adjacent to the drainage ditch. With the newly-adopted shoreline flow criteria, many of these areas would now fall within shoreline jurisdiction. The Department of Ecology suggested that the local Shoreline Master Programs be amended for both these reaches to include all the Black Lake Drainage Ditch and establish appropriate environmental designations for those new shorelines.

2. Grant. Originally initiated in May of 1984 as a Coastal Zone Management grant, the Washington Department of Ecology (WDOE) has largely funded this planning effort. In September 1984 and July 1985, WDOE authorized $10,400 and $10,190 grants, respectively for the completion of the corridor planning process. Volume II was to provide an inventory, analysis and management plan for the Upper Reach, thereby completing a Corridor Plan from Capitol Lake to Black Lake.

   The specific requirements of these grants and the DOE standards for a shoreline inventory are contained in Appendices A, B and C.

C. Corridor Plan Approach

The Upper Reach is only one of three shoreline segments of Percival Creek. It accounts for 40 percent of the 3.4-mile corridor from lake to lake, it was evaluated consistent with planning process for the Canyon and Middle Reaches. Further, due to the presence of multiple jurisdictions (i.e., Olympia, Tumwater and Thurston County) and their common Shoreline Master Program, all aspects of this Corridor Plan including the inventory analysis, plan text, and management regulations were designed so that the analysis of the Upper Reach in Volume II would interface with the previous text on the Canyon and Middle Reaches. This consistent process provided the opportunity to analyze the corridor based upon homogeneous features rather than jurisdictional boundaries or rigid grant requirements. Finally in keeping the process simple, straightforward, and the same for all, it reduces textual and graphic repetition.

PERCIVAL CREEK CORRIDOR PLAN

Upper Reach

Drainage Ditch Cross Sections

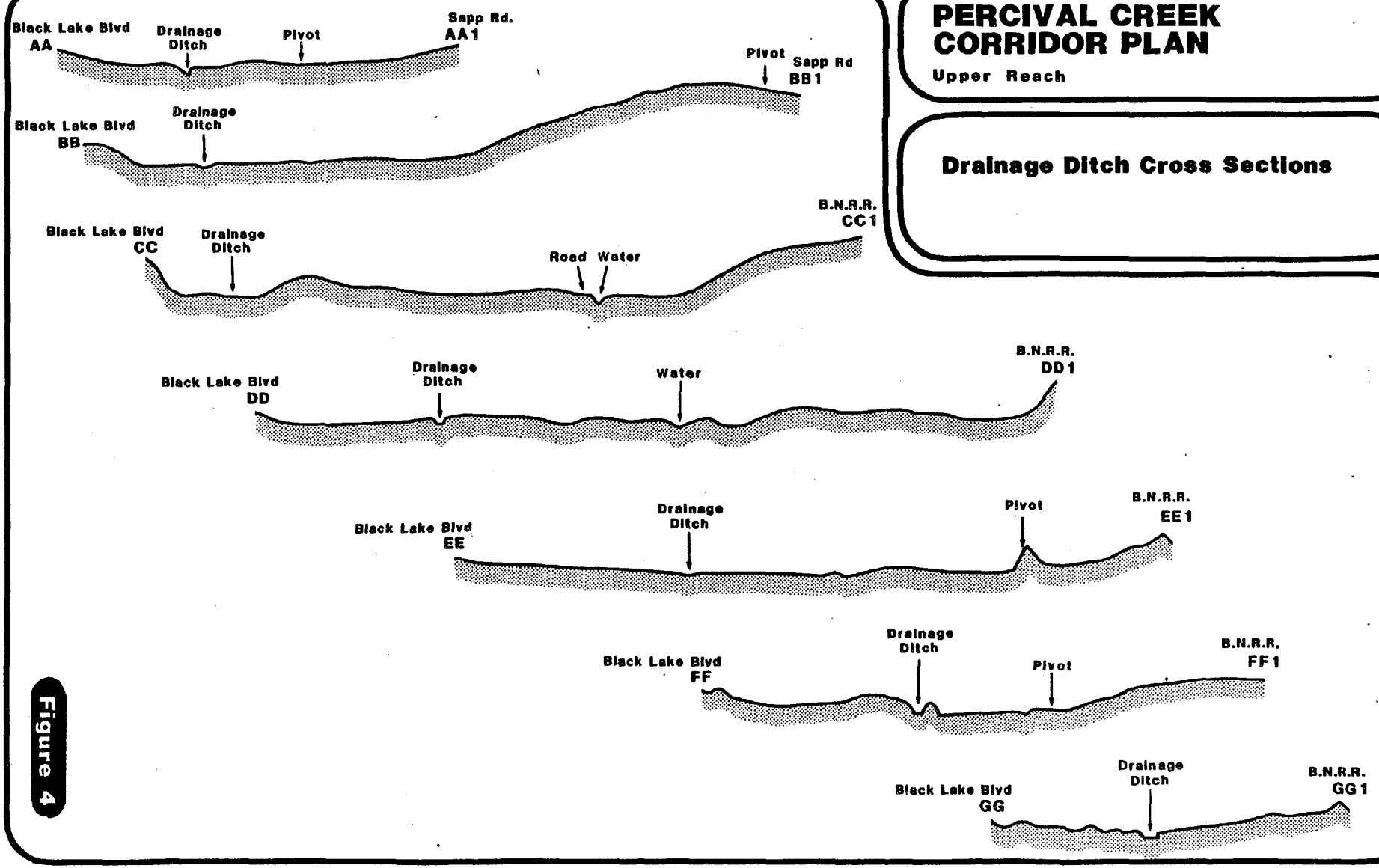


Figure 4

A. Earth

1. Topography. The Upper Reach of the Percival Creek corridor is but a small part of the topography within this drainage basin (refer to Figure 3, page M-1). The variation in elevation within this reach ranges from 150 feet above mean sea level (MSL) along Black Lake Boulevard to 170 feet in the vicinity of the Burlington Northern Railroad right-of-way. Within this narrow valley there is some isolated "islands" of high ground.

   By comparison, high points around the drainage basin range from the multiple summits of the Black Hills immediately west of the drainage ditch at 807 to 590 feet, 450 feet for both Bush Mountain and west Tumwater, and finally 260 feet on Cooper Point north of 20th Avenue N.W.

   The Percival Creek drainage originates from a number of different lakes which eventually discharge into Capitol Lake at Percival Cove. Black Lake lies at elevation of 125 feet above MSL, Ken Lake at elevation 135 feet, Trosper Lake at elevation 155 feet and Percival Cove lying at elevation of 6 feet.

2. Creek Physiography. A four-category, geo-hydraulic river zone classification system has been developed and is the recommended methodology for creek description and analysis. In this system, creeks are divided into units on the basis of a combination of interrelated factors. The main factors considered are gradient, stream course, bed material and valley section. The four classes are described as:

   Estuarine Zone I
   Pastoral Zone II
   Gravel Beach Zone III
   Boulder/Cobble Zone IV

   A detailed description of these is contained in Appendix D.

   While it would seem logical for the geo-hydraulic zones to follow in numerical order from the mouth to the headwaters, this ordered succession does not always occur. Percival Creek Corridor was analyzed by this classification system. Figure 3, page M-1 provides the base topography for the creek cross sections as detailed on Figure 4. The drainage ditch profile varies so little within this reach that a profile would be a flat line from the lake to the middle reach. Since that gradient is so flat, it has been classified as a Pastoral Zone II.

B. Soils

A generalized soil map of the planning area has been developed largely from the soil maps of the Soil Conservation Service (SCS) and their report, the Soil Survey of Thurston County, Washington (1958) (refer to Figure 3, page M-1). The mapped soil boundaries on Figure 3 have been adjusted based upon field investigation, and more detailed topography to correctly align the soil units with the slope. Additional boundary adjustments were made based upon both Peat Resources of Washington, (1958) and the more up to date State Soil Survey (1978) prepared by the Washington Department of Natural Resources (DNR).

Some of the Department of Natural Resources soils names have been updated from the SCS report. Substantively, these name changes do not effect the substrata and in generally the DNR mapping is more detailed as the original SCS data for this area.

A detailed description of the soil units mapped on Figure 3, page M-1 are listed in Table 1 below:

TABLE 1: SOIL--UPPER REACH

	SCS Soil Type	Slope
Ab	Alderwood gravelly sandy loam	(0-3%)
Ac	Alderwood gravelly sandy loam	(3-15%)
Ad	Alderwood gravelly sandy loam	(15-30%)
Ef	Everett gravelly sandy loam	(0-3%)
Ea	Everett gravelly sandy loam	(3-15%)
Es	Everett gravelly sandy loam	(30-50%)
Ey	Everson silt loam	(0-3%)
Ga	Giles silt loam	(3-15%)
GaC[1]	Giles silt loam	(15-30%)
Ia	Indianola loamy sand	(0-3%)
KaB[1, 2]	Kapowsin silt loam	(3-15%)
KaC[1, 2]	Kapowsin silt loam	(15-30%)
Md	McKenna gravelly silt loam	(0-3%)
Mo[1]	Mukilteo muck	(0-2%)
Gp[1]	Pits, gravel	--
RC[1]	Rifle peat	(0-2%)
ScP[1]	Schneider very gravelly loam	(20-40%)
ScE[1]	Schneider very gravelly loam	(40-65%)
Se	Semiahmoo variant, muck	(0-2%)
SkB[1]	Skipopa silt loam	(3-15%)
Te	Tisch silt loam	(0-3%)
DyD	Xerorthents, loamy	

[1]No SCS Classification.
[2]Kitsap soil name changed.

SOURCE: Soil Survey of Thurston County (1958) and State Soil Survey (1978).

Of these soil types, all but a few are suitable for urban development. Those soils that present development limitations contain either excessively steep slopes (over 40 percent) which are subject to erosion and landslides, or contain organic or wet mineral soils which are subject to differential settlement or seismic shaking (earthquakes).

Within the boundaries of the corridor, Black Lake Boulevard to the west and the Burlington Northern Railroad right-of-way to the east, the only steeply sloping area is a portion of Schneider very gravelly loam (ScE). This soil lies between Black Lake Boulevard and the drainage ditch, and the slope phase is from 40 to 65 percent slope. Although mapped as a "Naturally Stable Area" on the Slope Stability Map of Thurston County, Washington (1976), the excessively steep slope of the Schneider soil would shift these areas to an "Unstable" classification. Further, both the SCS and DNR soil survey interpretations would concur with this designation due to the potential for slope failures. These areas are mapped as "Geologic Hazard Areas" on Figure 3, page M-1.

The organic and wet mineral soils are found primarily along the drainage ditch and historic drainage channel to the east of the ditch. The Mukilteo muck (Mo), Rifle peat (RC), Semiahmoo variant, muck (Se), and Tisch silt loam (Tc) soils have been identified on the Relative Ground Settlement Hazards of Thurston County, Washington (1976) as a "Severe" area subject to ground settlement. In addition to differential settlement, these areas are also subject to seismic shaking during an earthquake but not to the degree that wet mineral soils (Tisch silt loam and McKenna gravelly silty loam) might experience. The drainage ditch has generally dewatered the substrata so that this may not be a significant constraint in all areas. The potential dewatering effect of drainage ditch on the organic, peat soils cannot be determined without detailed on-site geotechnical investigation, and without this should still be considered to be a development concern. On Figure 3, page M-1, these organic and wet mineral soils (hydric soils) are mapped as a "Severe Ground Settlement."

C. Water

1. General. The Percival Creek basin receives an estimated 55 inches of precipitation per year, which is equal to 12.42 billion gallons of water, being within the part of the Deschutes River drainage (WRIA-13). Black Lake (Drainage Ditch #0030) is the source of the major tributary and Trosper Lake headwaters (Percival Creek #0029) for the other tributaries with several smaller streams and storm drains adding to the flow. Ken Lake also discharges during the wet season and the westside sub-basin is another significant seasonal tributary. From Black Lake to the Middle Reach, the creek varies from 25 to 30 feet wide. This watershed has been subdivided into 6 sub-basins with the following acreage for each (refer to Table 2 and Figure 5).

PERCIVAL CREEK CORRIDOR PLAN

Drainage Basin/Sub Basins

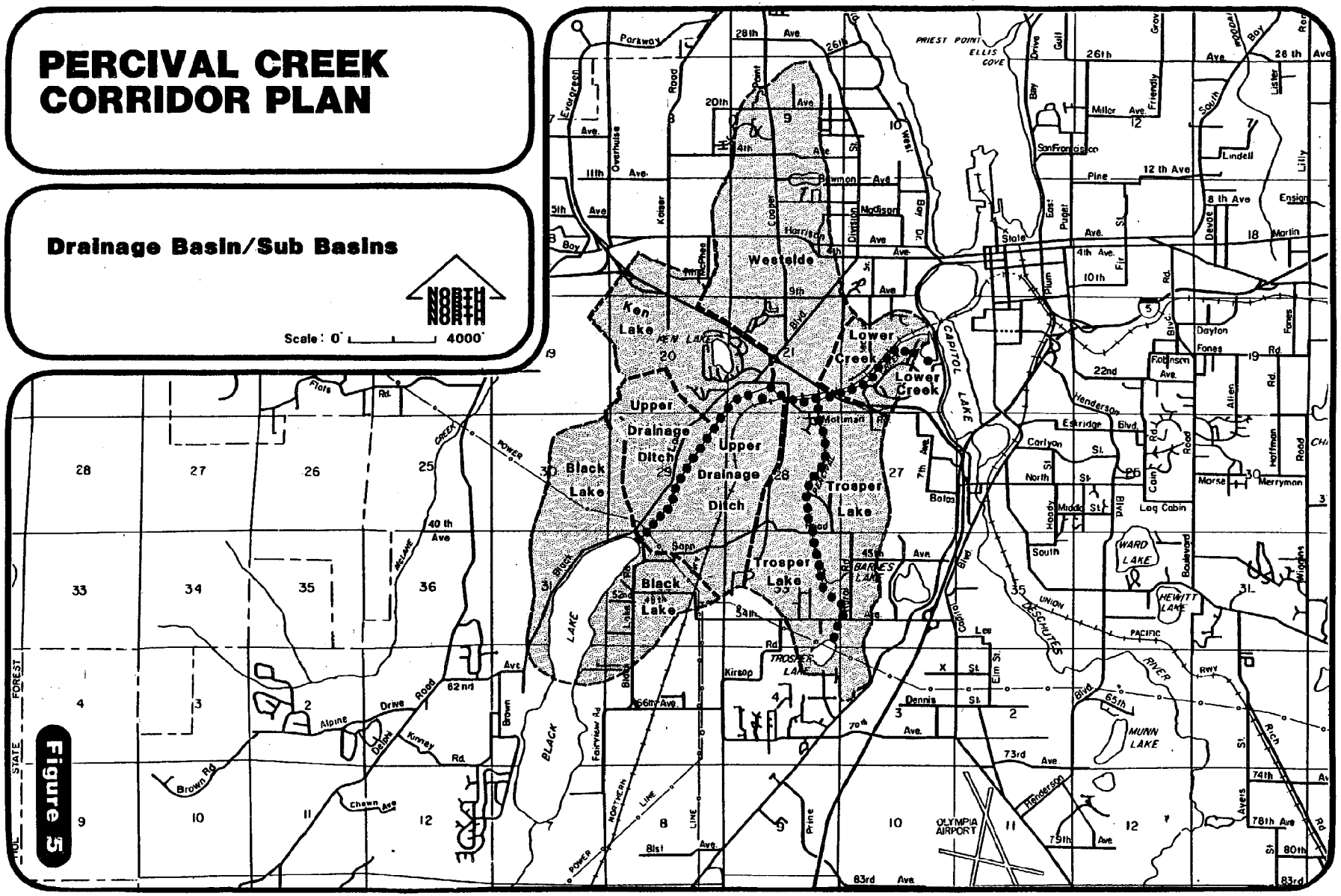


Figure 5

TABLE 2: PERCIVAL CREEK--SUB-BASINS

	Acres
Black Lake*	1,290
Upper drainage ditch west bank	1,221
Ken Lake	739
Westside	1,342
Trosper Lake	1,268
Lower Creek	462
TOTAL	6,322

*Assumes only ½ mile of Black Lake flows to drainage ditch.

SOURCE: Thurston Regional Planning Council.

2. Water Quantity. There has always been flow from the swamp at the north of Black Lake to Percival Creek even before the drainage ditch. A historical drainage channel located to the east of the ditch can be seen on all the aerial photos and generally intersected to the ditch alignment near 25th Avenue SW (extended). The Black Lake Drainage Ditch, constructed in 1922 and redredged in 1978, changed the flow of Percival Creek by more than doubling the flow of the creek. Flow data from 1963 to 1971 indicates that during that period, Black Lake contributed 80 percent of the flow of Percival Creek. Refer to the following Table 4.

TABLE 3: PERCIVAL CREEK--MISCELLANEOUS STREAM FLOWS*

Date	Drainage Ditch @ Mottman Crossing	Percival Creek @ Mottman Road)	Total
5/17/63	31.1	5.7	39.1
7/4/65	8.9	2.1	11.0
9/24/65	5.9	2.0	7.9
8/16/66	5.3	1.4	6.7
8/11/67	5.0	2.4	7.4
9/9/68	15.6	2.6	18.2
8/14/69	6.0	2.6	8.6
5/7/70	25.0	5.2	30.2
8/14/70	4.9	1.6	6.5
5/12/71	29.2	5.6	34.8
Mean	13.69	3.12	

*Flows in cubic feet/second (cfs).

SOURCE: Washington University Hydraulic and Water Quality Research--Capitol Lake, Olympia, Washington College of Engineering, 1975.

There is one recent winter snapshot of data which was collected for the Capitol Lake Restoration Analysis (1984) during the month of March 1983. Those flows are summarized in the following Table:

TABLE 4: PERCIVAL CREEK--1983 STREAM FLOW*

Station	Dates			
	3-8	3-10	3-20	Mean
Percival Creek (@ Mottman Road)	38	33	41	37
Drainage Ditch (@ Mottman Road)	118	128	106	117
Percival Creek (@ foot bridge)	142	162	157	153

*Flows in cubic feet/second (cfs)

SOURCE: Capital Lake Restoration Analysis (1984).

The hydraulic measurement taken by the University of Washington are most easily compared to the most recent samples in the following table.

TABLE 5: PERCIVAL CREEK--MEAN STREAM FLOWS

	Summer Flows 1963-71	Winter Flows 1984	1983* Yearly
Drainage Ditch @ Mottman	13.69 cfs	117 cfs	--
Percival Creek @ Mottman	3.12 cfs	37 cfs	--
Percival Creek Mouth	--	153 cfs	44.5 cfs

*Data from Table 2.

SOURCE: Data from Tables 3 and 4.

To add to this limited data, measurements were also taken for eight weeks during the "winter drought" of 1985 shown in Table 6 below.

TABLE 6: PERCIVAL CREEK--1985 STREAM FLOWS*

Station	2/22	3/1	3/8	3/15	3/22	3/29	4/5	4/12	Mean
Percival Creek @ Mouth	52.06	42.67	34.39	28.26	50.98	62.07	55.23	38.95	45.58
Percival Creek @ Mottman	3.59	7.59	5.51	4.82	8.85	7.22	6.85	5.82	6.28
Drainage Ditch @ BNRR	40.13	31.41	27.65	21.82	37.86	50.52	48.07	29.86	35.92
Drainage Ditch @ Black Lake	26.78	23.52	19.18	14.00	27.84	36.58	32.85	22.13	25.36
Percival Creek @ Trosper	2.36	2.30	1.99	2.05	3.94	2.19	2.18	1.96	2.37

*Flows in cubic feet/second.

SOURCE: Thurston County Health Department.

During 1983 and again in 1985, the Department of Ecology evaluated the mean annual flow of the Black Lake Drainage Ditch. A linear regression analysis was made comparing the flow measurements of Table 6 with those of the Deschutes River near Rainier. Based upon that hydraulic calculation, it was determined that the mean annual flow of the Black Lake Drainage Ditch is approximately 32.5 cubic feet per second. This is over the minimum stream flow required for a stream to be regulated by the Shoreline Management Act.

A "Special Flood Hazard Area" or 100-year flood plain has also been mapped for the creek since it is one of the criteria used to establish the shoreline management jurisdiction. Along the distance of both the Upper Reach, the 100-year flood plain generally falls within the traditional 200-foot boundary except for a section near the lake. (Refer to Figure 13, page M-8)

3. Water Quality. The bacteriological data in this chapter should be reviewed in the light of established water quality standards as defined by Chapter 173-201, Washington Administrative Code (WAC), Water Quality Standards for the Waters of the State of Washington. These standards are summarized in Table 7. Percival Creek is classified as a Class AA stream, with Percival Cove being a Lake Class.

The preliminary indications from the most recent 1984 fecal coliform sampling is of generally good water quality during the summer months except on Percival Creek south of the confluence. Higher counts in this area are located in a principally rural area with little development. All the homes in this area are on septic tanks and the pasturing of animals is the dominant land use. Likely contributing factors are failing septic tanks, poor animal keeping practices, or both. No rainfall was recorded during the 1984 sampling period.

In addition to fecal coliform, the state standards for dissolved oxygen, temperature, pH, and turbidity are all very critical indicators of water quality for fish habitat both in the creek and in Percival Cove. Data for these water quality indicators were collected in 1983 for the Capitol Lake Restoration Analysis and is contained in Table 9, page 17.

TABLE 7: WASHINGTON WATER QUALITY STANDARDS

Parameter	PERCIVAL CREEK Class AA Streams	Class A Streams	PERCIVAL COVE Lake Class
Fecal Coliform (FC)	Geometric mean value--50 FC/ 100 ml; not more than 10% @ 100 FC/100 mL	Geometric mean value--100 FC/ 100 ml; not more than 10% @ 200 FC/100 mL	Geometric mean value--50 FC/ 100 ml; not more than 10% @ 100 FC/100 mL
Dissolved Oxygen (DO)	9.5 mg/L	8.0 mg/L	) No) measurable
Temperature	60°F or 15.6°C	65°F or 17.8°C	) change
pH (units)	6.5 to 8.5 0.2 induced variation	6.5 to 8.5 0.5 induced variation	) from) natural) conditions
Turbidity (NTU)	5 NTU over natural	5 NTU over natural	5 NTU over natural

SOURCE: WAC 173-201.

Fecal coliform organisms are aerobic, gram negative, nonspore forming, rod-shaped bacteria. Although not pathogenic in the field of environmental health, they serve as indicator bacteria for the likely presence of enteric pathogens and fecal pollution of water or food.

As in the discussion of surface water flows, there is some limited data on the water quality of Percival Creek basin relevant to the present corridor plan. Water samples were taken from various locations in the drainage.

TABLE 8: PERCIVAL CREEK--FECAL COLIFORM SAMPLING

Station	1983			1984					
	3/8	3/10	3/29	7/5	7/11	7/18	7/25	7/31	Mean
Percival Creek @ Mouth	150	75	64	106	2	0	28	18	55*
Drainage Ditch @ BNRR	23	43	150	28	34	18	34	34	46
Drainage Ditch @ Jones Bridge	--	--	--	46	16	3	--	60	31
Drainage Ditch @ Black Lake	--	--	--	22	8	2	0	6	8
Percival Creek @ Mottman	23	23	430	80	46	146	72	43	108*
Percival Creek @ Sapp Road	--	--	--	112	140	200	74	25	110*
Percival Creek @ Trosper	--	--	--	40	60	20	34	--	39

*Violation of standards.

-- = Data not available.

SOURCE: Capitol Lake Restoration Analysis (1984) and Thurston Regional Planning Council.

4. Water Quality and Stream Life

a. Effects of Pollutants. An ordinary pollutant harms a fish either indirectly or directly. Indirect damage occurs largely through destruction of the habitat. Starvation may result from the elimination of plankton and bottom organisms by chemical or physical agents. Defiling materials which settle out may cover spawning grounds and bottom foods. In addition, indirect influences may be exerted through changes in the gaseous and salt contents of the water.

Direct effects of pollution on fish life are either catastrophic or gradual, depending on the amount and kind of the undesirable effluent in relation to the quantity of the recipient water mass. Sudden discharge of a large volume of boiling water, animal waste or other chemicals may kill instantly. Some substances when absorbed are indirectly toxic to fishes, even in small quantities. Certain derivatives of crude oil and ammonium compounds are of this nature. Many commercial pollutants, however, need not be absorbed but act primarily by damaging the gill filaments. The filaments may actually be eroded (some strong acids do this) or they may become clogged by having the desecrating substance cause oversecretion of mucus (e.g., heavy metal salts). Certain other poisons need to be swallowed to damage the internal organs. Some such agents will do this at once when absorbed; whereas others, such as arsenic and selenium, are stored up by the fish until the accumulation becomes injurious. Still other things irritate the surface of the fish and bring on secondary infections of bacteria or mold.

b. Water Quality Indicators

(1) Temperature. Natural environmental temperature changes impose stresses on fish populations. Over many years various species and subspecies have adjusted to upper and lower levels, within which are optimum ranges. When natural or artificial phenomena cause shifts away from optimum ranges, the populations are stressed. Usually, under natural cyclic conditions, the stressing is not repeated in successive years.

Heat has a synergistic effect and must be considered when measuring other stresses within the environment. In general, salmonids do well within a temperature range of 45° to 65° F.

(2) Dissolved Oxygen. The accepted minimum level for dissolved oxygen (D.O.) has been stated to be 5 ppm. For the cold-water biota, it is desirable that D.O. concentrations be at or near saturation. This is especially important in spawning areas where D.O. levels must not be below 7 ppm at any time. It has been demonstrated that for the most successful incubation of salmon and trout eggs, the D.O. should be near saturation level.

(3) pH. There is no optimum pH value for fish in general; however, in waters where good fish fauna occur, the pH usually is found to be between 6.7 and 8.3. The permissible range of pH for fish depends on many factors such as temperature, dissolved oxygen, prior acclimatization, and the contents of various anions and cations. The tolerance of fish to low concentrations of dissolved oxygen varies markedly with pH.

The pH level also influences the toxicity of dissolved materials, such as cyanide and ammonia, and metallic salts, as copper sulfate, since these are less toxic in more alkaline waters.

Many species of fish can live in acid water, but it appears that under these conditions the fish may grow more slowly and fail to attain the same size as other individuals of the same species that live in alkaline streams.

Species or races of fish that are adapted to alkaline waters fail to do well and often die when transplanted to slightly acid waters. The reason for this failure to adjust to a different pH is not fully understood, but has been observed by fish culturists and investigators for many years.

(4) Phosphates and Nitrates. Excessive amounts of phosphates and nitrates may result in large blooms of offensive algae and the reduction or depletion of oxygen supplies or the creation of offensive tastes and odors.

(5) Suspended Sediment. Exposure to suspended sediment can produce a number of adverse effects on fish. The effects of chronic exposure to suspended sediment are well documented. Blood physiology indicators suggest that stress occurs in salmonid fry held in sublethal concentrations of suspended sediment. Damage to gills often results by interfering with normal respiratory processes. Feeding ability is decreased. Behavioral studies indicate a preference by coho salmon for areas of low turbidity probably used as hiding cover, but avoidance of higher turbidities due to physiological stress. The synergistic actions of the above-mentioned stresses may manifest themselves by depressing growth rates of fish in turbid water.

(6) Bedload Sediment. The smothering effect and instability of bedload sediment reduce the bottom dwelling invertebrate diversity and populations, the available living space for fish and the survival of fish.

As sediment fills the void in the spawning gravels, it interferes with aquatic life in several ways. Inter- and intragravel water flow is blocked, which reduces dissolved oxygen for incubating salmonid ova. Deposited sediment can physically prevent emergence of fry and decreases food resources for aquatic invertebrates and periphyton communities.

(7) Organic Pollutants. Organic pollution of the aquatic environment can cause deterioration of the ecological system, resulting in depletion of dissolved oxygen, an enrichment of heterotrophic fauna, a decrease in diversity, and grease and oil slicks. In addition, many organic contaminants have toxicity, so living organisms including fish, benthic invertebrates, algae and bacteria may be subject to acute or chronic effects. Even at lower concentrations, the organisms may be affected through bioaccumulation from lower trophic levels. Finally, organic contaminants can have adverse health effects on man through contaminated drinking water supplies and bioaccumulation in the food chain.

Motor vehicles are the primary source of pollutants on the road surface, with minor sources including windborne particulates, debris, spills, and precipitation. Many of the pollutants in runoff waters are toxic in aquatic systems and some may be carcinogenic.

TABLE 9: PERCIVAL CREEK AND COVE--1983 WATER QUALITY SAMPLING

Station	Measurement	3/15	3/30	4/18	4/27	5/12	5/24	6/15	6/27	7/7	7/21	8/4	8/18	Mean
Percival Creek (Mouth)	DO	--	11.8	9.5	10.6	9.0	9.6	9.6	9.6	10.0	9.4	--	8.2	9.75
	Temp.-C	--	10.0	15.0	14.5	14.8	17.5	17.5	17.5	16.0	19.0*	--	18.0	16.0
	pH	7.45	7.50	7.40	7.45	--	8.00	7.70	7.70	7.40	7.50	7.55	7.50	7.56
	Turb.	3.0	4.0	2.8	4.2	3.3	3.0	4.2	3.6	4.5	3.8	2.1	1.4	3.3
	Flow (cfs)	113	120	54	48	41	30	26	25	23	23	19	12	44.5
Percival Cove	DO	--	11.2	9.0	9.8	10.8	9.8	9.3	8.6	8.1	8.4	--	9.2	9.4
	Temp.	--	10.0	13.0	13.0	13.0	17.0	18.2	17.5	17.0	19.0	--	22.0	16.0
	pH	7.50	7.10	7.50	7.30	--	8.60	7.65	8.10	8.40	7.80	8.40	8.80	7.92
	Turb.	3.0	4.0	3.5	3.4	4.0	2.8	3.8	4.2	5.4	5.2	4.3	6.4	4.2

*Violation of standards.

-- = Data not available.
FC = Fecal Coliform
DO = Dissolved Oxygen
Temp. C = Temperature
Turb = Turbidity

SOURCE: Capitol Lake Restoration Analysis (1984).

(8) Inorganic Pollutants--Metals. Although trace amounts of metals are found in various natural waters, effluents from industrialization may contain heavy ions which could cause death or inhibit the growth of necessary plant life required for stream biota. Accumulation of metals may occur in fish with lethal effects. Zinc, copper, cadmium, and nickel are known to be especially lethal to salmonids. (Jim Fraser, Department of Fisheries)

D. Wildlife Resources and Vegetative Communities

1. Fisheries Resources. Percival Creek once flowed into Budd Inlet, but since 1951 now enters Capitol Lake at Percival Cove. Historically, the creek has maintained native runs of anadromous fish including steelhead, sea-run cutthroat trout, coho and chinook salmon. Resident game fish include cutthroat and rainbow trout. Chum salmon currently do not use the stream but are believed to have used it in the past. Currently, most chinook salmon are trapped by the Department of Fisheries in Percival Cove and artificially spawned. Those chinook in excess to the fish culture programs needs are allowed to migrate up Percival Creek and spawn naturally.

The upper portions of the creek have been made accessible by a three-section vertical fish ladder near the SR-101 crossing which was initially constructed in the 1940's but improved and repaired at various times through the early 1980's. A wood, pool-step fish ladder was constructed in 1982 in the Black Lake drainage immediately downstream from the Mottman Road crossing to correct fish passage problems created by the poorly-designed dual culverts at this crossing.

The preferred spawning habitat occurs in those areas where the creek gradient creates a favorable riffle-pool balance with the presence of spawning size gravels. Such areas are located along the entire Lower Reach, south along Percival Creek to the Somerset Hill culvert, and in the drainage ditch to a point approximately 1,000 feet upstream of the Mottman Road crossing. Above that point, spawning riffles may occur sporadically with the bed of the ditch excavated through peat soils. While the remaining portions of the drainage ditch and creek are not considered good spawning areas, they are important to maintain for rearing habitat. (Jim Fraser, Department of Fisheries.)

The survival and well being of these species depends to a great part upon the maintenance of suitable water flow and spawning gravel. Salmonids dig nesting pits called "redds" in stream bottom gravel in which they lay eggs and cover them with gravel. The salmonid eggs, and young fish, called alevins, develop while buried in the gravel. Salmonids, and a great majority of other fishes, depend in some way on a gravel bed, free of silt and consistently bathed in a flow of well-oxygenated water for reproductive success. Dissolved oxygen (D.O.) is determined by water temperature, with cold water carrying more D.O. than warm. Water that lacks sufficient dissolved oxygen due to excessive water temperatures can cause suffocation of eggs and young fish. A potential for a fish kill can also occur when the gravel is covered by silt.

"The geo-hydraulic river zone classification also indicates suitability for trout rearing and growth. The progression of zones is usually from a Boulder/Cobble Zone IV to Gravel Beach Zone III to Pastoral Zone II, with the Pastoral Zone considered the lowest and Boulder/Cobble Zone the highest for instream production of trout." (Inventory of Vegetative Communities and Associated Wildlife of the Skookumchuck River Drainage, 1979)

2. Percival Cove Fish Culture Program

a. History. Capitol Lake was created by the dam in 1951. By 1954, the series of fish ladders on Tumwater Falls was completed. Most of the early fish plants and rearing efforts consisted of planting the river upstream and downstream of the falls area with chinook fry/fingerlings. These fish were not fed some years and allowed to migrate naturally.

Early plantings proved very successful; as high as 25,000 adults returned in some years. These initial efforts seemed to

be promising for increasing rearing efforts in the system. General enhancement in the lake and cove accelerated during the early 70's. It was in this period Percival Cove came into heavy use, mostly to accommodate the need for a large-volume rearing area for the successful delayed-release chinook program.

b. Current Status. The fish culture program in the cove currently includes rearing and release of two sizes of chinook salmon with different management objectives. The first program includes placing various hatchery origin chinook fry into both Capitol Lake and the cove in April and rearing them until allowing a natural outmigration of 6 to 10 million chinook of approximately 100/lb. size in late May to early June. These chinook will contribute to both ocean and Puget Sound fisheries. The second program places larger yearling-sized chinook in the cove during October, rearing them to an approximate 6/lb. size for forced release which is accomplished by drawing down the lake in April of the following year. These chinook, numbering upwards of one milion, are considered "delayed release" because they are past their normal outmigration timing. It has been shown by tagging studies that these chinook tend to remain in Puget Sound and are a major contributor to the Puget Sound Sport Fishery. The cove is not currently used between July and September 30 for fish culture. (Jim Fraser, Department of Fisheries)

c. Environmental Effects. Rearing changes in the past few years are the result of the changing environment. Yearling chinook previously brought into the cove in early September are not introduced now until early October. Extreme low flows and unsafe dissolved oxygen (D.O.) readings not previously recorded were observed in the early fall of 1982. D.O. levels in Percival Creek water were recorded as low as 6.5 ppm in daylight hours. This figure would drop much lower during the early morning (12:00 midnight to 4:00 a.m.) because the algae then consumes oxygen rather than photosynthesizing as occurs during daylight hours. D.O.'s during this dark period dropped to under 4 ppm. Generally with the coming of the October rains, the situation improves to safely rear the valuable yearling chinook.

The winter floods and gravel movement down Percival Creek seems to have increased dramatically since 1980. Not only is the north end of the cove filling, but the Lower Reach of Percival Creek where it enters the cove is becoming a tangle of fallen trees previously rooted along its bank. Generally, the years of siltation and gravel movement down both the Deschutes River and Percival Creek have reduced the average mean depth in the lake and the cove. This has resulted in increased thermal pollution which magnifies other problems (reduced flow, dissolved oxygen, etc.) and makes the salmon rearing efforts more vulnerable. (Keith Keown, Department of Fisheries)

d. Economic Benefits. Chinook salmon reared and released from Percival Cove and Capitol Lake are a major contribution to the state's (primarily Puget Sound's) sport and commercial fisheries, contributing an estimated $3.9 million in 1984.

3. Bird and Animal Resources. "Habitat requirements for birds vary seasonally and according to species, although all bird species require food, water, cover, and nesting sites. Riparian habitats are unique in being able to furnish all of these needs. Consequently the riparian and wetland areas are found to maintain the highest bird densities. Loss of any one of these specific requirements will automatically affect a species' population. This can happen through the destruction of habitat or through the disturbance of an adjacent habitat.

"The requirements for habitat to support mammals and other terrestrial species vary both seasonally and according to their needs. Unlike the bird species which can migrate away from inclement weather or search for a better food supply elsewhere, the less mobile mammals must generally satisfy all their requirements within the confines of the general area." (Inventory of Vegetative Communities and Associated Wildlife of the Skookumchuck River Drainage, 1979)

While located within a developing metropolitan environment, all of the Percival Creek corridor has value for wildlife. The mix of open water, wetlands, wooded hillsides, and open fields provides for a greater diversity and larger wildlife populations than would be found in a homogeneous habitat. As it currently exists, the corridor provides suitable habitat for a wide variety of wildlife such as deer (noted near Percival Cove) fur bearers, raptors, shore birds, and song birds. (Personal Communication, Mark Grandstaff, Department of Game)

4. Special Animals or Plants. There are no plant species defined as being either endangered, threatened or sensitive known to be located within the corridor planning area according to the data on file in the Natural Heritage data system. During the 1985 wetland field work a western pond turtle was encountered which is identified as a state "threatened" species by the Washington Department of Game. This occurrence was along the eastern edge of the wetland and under the BPA transmission line approximately 1,000 feet from the drainage ditch. The Great Blue Heron was the only other state-monitored species which was observed during that time.

5. Plant Communities. All of the area lying within the corridor plan was analyzed for its relative habitat value by means of the Department of Game land use/land cover system classification system. This methodology was used in 1973 for the original inventory of Thurston County shorelines. Its major habitat types are listed below:

TABLE 10: DEPARTMENT OF GAME--LAND USE/LAND COVER TYPES

1. Urban
2. Agriculture
3. Grass lands (non-forested, vegetated uplands)
4. Forested uplands
   -- Coniferous forest
   -- Broadleaf forest
   -- Mixed forest
   -- Disturbed forest
*5. Riparian vegetation
*6. Water
   -- Rivers and streams
   -- Lakes and ponds
*7. Wetlands
8. Barren lands

*Of these habitat areas, Riparian communities (#5 and #6) and Wetlands (#7) are known to be the most important to upland species.

SOURCE: Washington State Department of Game.

Riparian: "Riparian vegetation includes all plant communities adjacent to and directly influenced by rivers, streams, lakes, ponds and wetlands. Although riparian areas make up a small percentage of total habitat types, it is critically important to wildlife since it supports greater diversity and numbers of species than any other habitat. The riparian strip and its associated vegetative community types form a transition zone between the water and the adjacent habitats. (Inventory of Vegetative Communities and Associated Wildlife of the Skookumchuck River Drainage, 1979)

"A very close relationship exists between the stream system and the surrounding land. In most cases, this relationship is very complex since the organisms of the stream system are dependent on both the stream, and on the land and life beyond the stream. The opposite is also true, as many land animals are reliant on the ecosystem of the stream, and are unable to survive without its presence. The riparian strip is said to be used, in some way, by almost all the large animals of the adjoining land ecosystem. Some are critically dependent on the habitat for the majority of their life cycle, while other species may spend only specified time periods either in, or near, the water. Still other animals may simply visit the habitat periodically. For example, many large mammal species spend a good deal of their time in the upland regions with periodic visits to the stream valleys for food and water." (Ibid)

Wetland: "In general terms, wetlands are lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal

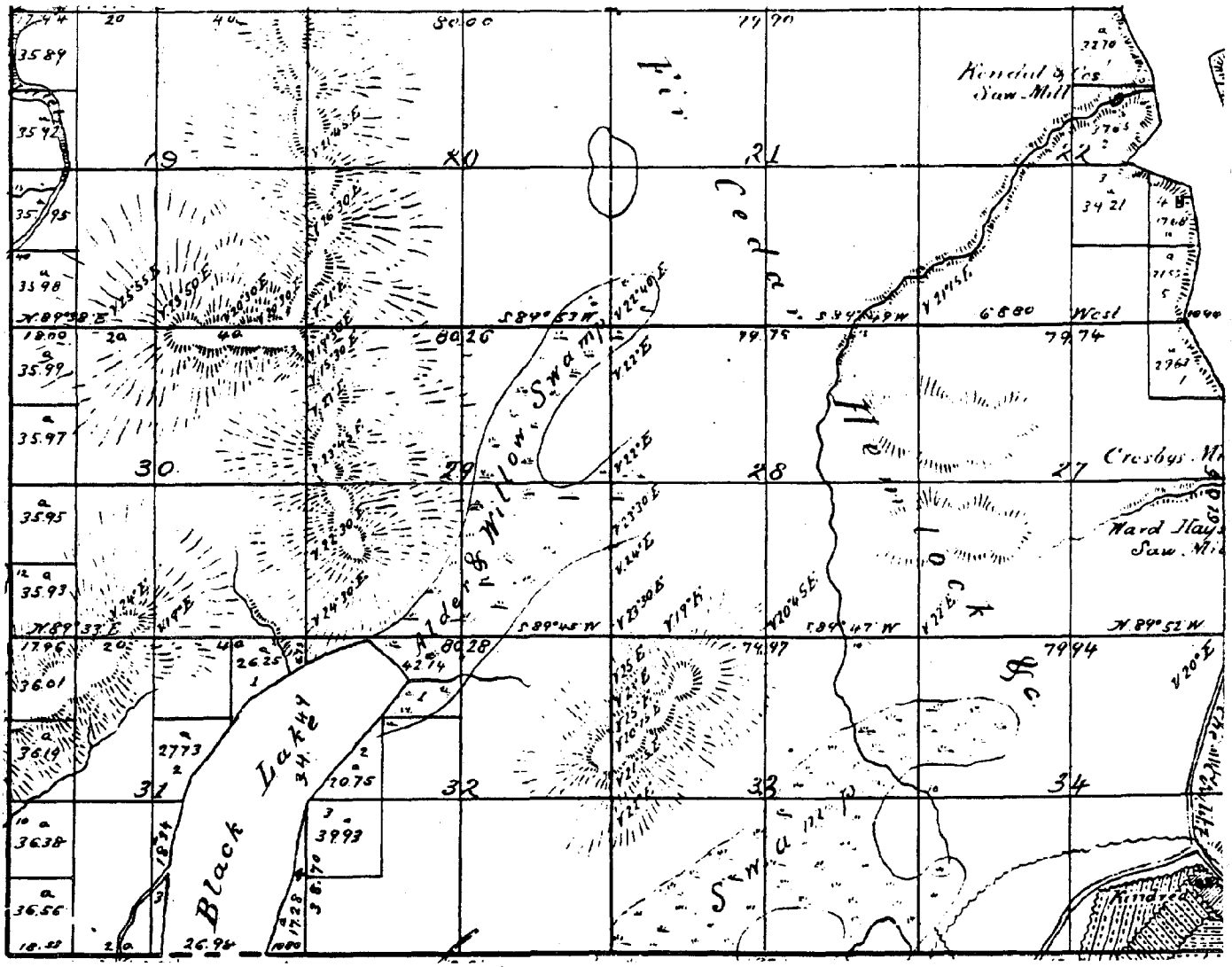
communities living in the soil and on its surface. The single feature that most wetlands share is soil or substrate that is at least periodically saturated with or covered by water. The water creates severe problems for all plants and animals except those that are adapted for life in water or in saturated soil." (Classification of Wetlands and Deep Water Habitats of the United States, 1979)

"Wetlands are extremely sensitive habitats. As a result, they can be easily altered and severely damaged. Their destruction involves the loss of many forms of unusual plant life endemic to wetlands because of unique moisture and soil conditions. Associated wildlife, also dependent on these habitats, suffer great losses. An abundance of wildlife species depend on wetlands for food, water, and nesting sites. Many wetland areas are critical habitat for waterfowl as wintering, molting, or breeding grounds." (op. cit.)

In the Upper Reach the wetlands, and those areas along with the drainage corridors being both the drainage ditch and the historic drainage channel, are relatively disturbance-free travel corridors for upland species. The drainage ditch is also important for providing a means for a anadromous fish to spawn in the tributaries of Black Lake (Mark Grandstaff, Department of Game).

The wetlands within the Upper Reach have been its most dominant historical characteristic. When Black Lake was first surveyed in 1854, the United States General Land Office records show this area to be a "willow swamp." Figure 7 is a copy of those early records for the Upper Reach. The purpose for constructing the Black Lake drainage ditch in 1922 was to improve the lands since it "is necessary by reason of the fact that said land is swampy in character and is overflowed by water for much of the year, and rendered agriculturally almost useless" (property owners petition, 1917).

FIGURE 7--1854 U.S. GENERAL LAND OFFICE SURVEY



"Construction of the drainage canal and dike road (Black Lake/Belmore Road) significantly modified the marsh and its free connection to the lake, but did not totally sever it. There was, and remains an unquestionable association between lake and marsh. The lake outlet is open and unregulated such that the wetlands receive annual and seasonal overflow from the lake and this overflow has served to maintain the ecological viability of the wetland area. The wetlands are not linked by the canal which is an extension of the lake water body. Dredging of the canal and drainage ditches dug perpendicular to it, mainly on the east side, have tended to counter the renewal cycle of lowland flooding and to advance vegetative succession and invasion by wet soil tolerant trees. In spite of the drainage, the soils throughout this area are saturated year round. (Letter from USFWS, Ralph Boomer, August 30, 1978)

"'Associated Wetlands,' under the Shoreline Management Act (WAC 173-22) are defined as all marshes, bogs, swamps, and river deltas associated with the streams, lakes, and tidal waters--subject to the Act. The drainage ditch and Black Lake are both identified as 'shorelines of the state' and regulated as such. . . The extent of the 'Associated Wetlands' would be continuous with the extent of the marshes, bogs, or swamps." (Ibid)

From June to August of 1985, the Washington Department of Ecology led a team of wetland biologists to the Upper Reach to locate the wetland edge for the purpose of establishing the limits of the Shoreline Management Act jurisdiction. The team consisted of representatives from local, state and federal governmental agencies. Opportunities were provided for property owners and local jurisdictions to have representatives on this team. Approximately 450 flagged and numbered stakes were placed along the wetland edge using the "wetland" definition previously described. The wetland line was then surveyed by the City of Tumwater and Thurston County with its approximate location plotted onto an overlay for the Upper Reach. Therefore, Figure 6, page M-6 identifies the wetland edge as it existed during the summer of 1985. It should also be noted that the wetland edge generally conforms to the 130/132-foot contour line and the soil boundaries of the McKenna gravelly silt loam, Mukilteo muck, Rifle peat, Semiahmoo variant muck, and Tisch silt loam from Figure 3, page M-1.

However, it should be realized that 1985 almost set the record for the dryest summer. Since varying hydrologic conditions effect plant occurrences upon which the field survey relied, the wetland edge may experience some variance from year to year, due to these conditions. Further, the line on Figure 6 represents a point where the combined vegetative community of the three layers (overstory, understory, and ground cover) falls below 50 percent occurrence for hydric (water tolerant) plants. No quantitative methods were employed to sample plant populations since the dominance of plant species was based upon visual occurrences. Some areas exhibited a broad transition zone from upland to wetland for which a line does not accurately represent. However, in all cases the wetland team located the wetland edge at a point which was clearly defensible based upon the criteria. Therefore, the wetland edge identified on Figure 6 represents a very conservative location given these conditions. Site-by-site investigations may be needed at the time of permit review to re-document the wetland edge and pursuant to WAC 173-22-055 "In the event that any of the wetland designations shown on the maps conflicts with the criteria set forth in this chapter (for identifying lands within shoreline jurisdiction), the criteria shall control."

Using the wetland classification system prepared by the United States Fish and Wildlife Service (Cowardian, et al, 1979), nine classes of wetlands were identified within the study area. For the purposes of this report, these were consolidated into four classes which are listed in Table 11 below and mapped on Figure 6, page M-2.

TABLE 11--UPPER REACH WETLAND CLASSES

Cowardian Class	Mapped on Figure 6
RIVERINE SYSTEM (lower perennial)	
1. Unconsolidated bottom	Open Water
2. Aquatic bed (upper perennial)	Open Water
3. Unconsolidated bottom	Open Water
4. Unconsolidated shore	Open Water
PALUSTRINE SYSTEM	
5. Emergent (persistent)	Emergent
6. Scrub-shrub (broadleaf deciduous)	Scrub-shrub
7. Forested (broadleaf deciduous)	Forested
8. Unconsolidated bottom (mud)	Open Water
9. Aquatic bed (rooted vascular)	Open Water

SOURCE Wetlands Associated with the North End of Black Lake, Thurston County, Washington--DRAFT (1986).

An abbreviated definition of these wetland classes is contained in the following:

Forested Wetland means that wetland class characterized by woody vegetation that is 20 feet (6m) tall or taller.

Scrub-Shrub Wetland means that wetland class dominated by woody vegetation less than 20 feet (6m) tall. The species include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions.

Emergent Wetland means that wetland class characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. THis vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants.

Open Water Wetland means those wetlands and deep water habitat classes with: (1) either an unconsolidated bottom/shore; or (2) an aquatic bed wetland dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years.

The wetlands within the upper Reach were determined to be of "high" value by the wetland team. While no longer in "pristine" condition due to road fills and the drainage ditch, this wetland is 159 acres in size and extends almost 1 mile from Black Lake which provides a great deal of "edge." This wetland edge along with the four wetland classes, including open water, provides a highly desirable mix of habitat types, even without the occurrence of a special animal. In conclusion, it is an extremely valuable resource which is sensitive to certain adjacent development activities.

A. Land Use

1. Historical Land Use. As noted in the discussion of the corridor history, the Percival Creek drainage has undergone substantial development over the past few decades. Some of the major actions affecting the corridor since the inmigration of white settlers are listed on Table 12. In general, this table indicates a dominance of two major land uses being transportation facilities and commercial/ industrial development.

   Figures 8, 9, 10 and 11, pages M-3, M-4, M-5 and M-6 are aerial photos of the corridor in 1961, 1970, 1977 and 1983, respectively. These Figures confirm this trend particularly with the census indicating a 2,870 percent growth in employment and 255 percent increase in population generally within the drainage basin* between 1970 and 1980. By comparison, the tri-cities areas grew at a population rate of only 25.3 percent. (*TAZ # 022, 023, 025, 026, 027, 078 and 079.)

TABLE 12: PERCIVAL CREEK--HISTORICAL EVENTS

Date	Event
1845	New Market (Tumwater) settled
1846	Smithfield (Olympia) settled
1854	Medicine Creek Treaty signed
1890	Northern Pacific Railroad constructed
1922	Black Lake Drainage Ditch constructed
1923	Black Lake Road and Belmore Road
1930's	Mottman Road crossing drainage ditch
1933	Grays Harbor/Puget Sound Canal proposed
1951	Capitol Lake created
1957	SR-101 constructed
1957	Fish ladders constructed
1968	Lakemoor (Ken Lake) platted
1969	Evergreen Park platted
1970	OTCC (now SPSCC) constructed
1971	Fish rearing begun at Percival Cove
1972	Westside (Percival Creek) sewer main installed
1972	Shoreline Management Act approved by voters
1972	Cooper Point Road constructed
1975	Mottman Area Annexed to Tumwater
1976	Mottman Road overpass at SR-101 (Decatur Street) completed
1978	Black Lake Drainage Ditch cleaned
1979	Capital Mall constructed
1981	Auto Mall platted
1981	Yauger Park constructed
1984	West Olympia Bridge approved
1984	West Olympia Bridge court settlement

SOURCE: Thurston Regional Planning Council.

2. Future Land Use. A comparison of Figure 12, page M-7, Zoning and Figure 1, page M-6, the 1983 land use aerial photo indicates a substantial amount of vacant land available for development. Much

of that area lies within the Upper Reach corridor. Table 13, which lists the developed and undeveloped areas by zoning district, indicates that as in the Middle and Canyon Reaches a substantial amount of land in the Upper Reach is undeveloped.

TABLE 13: PERCIVAL CREEK UPPER REACH--VACANT LANDS SURVEY

Jurisdiction	Zones	Total (acres)	Developed (acres)	Undeveloped (acres)	Undeveloped (%)
Tumwater	C1	236.3	46.8	189.4	80%
Tumwater	RA	40.3	1.0	39.3	98%
Thurston Co.	PID	3.7	1.0	2.7	73%
Thurston Co.	RR 1/1	96.5	21.5	75.0	78%
		376.8	70.3	306.5	81%

SOURCE: Thurston Regional Planning Council.

Within Tumwater, the commercial/industrial activities are concentrated in only a few areas. To the east of the drainage ditch, the sole activity is the Graystone plant and washing pond. To the west of the drainage ditch the primary industrial park area lies immediately north of Jones Quarry along Black Lake Boulevard. Another smaller center lies to the south also along the boulevard and partially within the county zoning. A private unpaved airfield is located east of and parallel to the drainage ditch.

South of the commercial/industrial zone (C-1) in Tumwater and Planned Industrial Park District (PIPD) in the county, north shores of Black Lake are zoned for residences on one-acre lots. Due to the presence of the wetlands along the drainage ditch, the existing homes are located along Sapp Road or Black Lake Boulevard. Most of the lowland portion of the parcels from the boulevard to the ditch is being used for pasture.

3. Land Use Plan. As a part of the Tumwater Comprehensive Plan, a discussion of the appropriate uses and activities is contained for the recent "Jones Annexation" now called Planning Area #11. The future uses within this section of the Upper Reach are those allowed by zoning subject to the provisions of both the "guidelines for flood proofing and shoreline protection."

   That area recently annexed and the area to the south are identified on the Black Lake/Littlerock/Delphi Sub-Area Plan map. This map is compatible with the zoning adopted for the sub-area. It indicates that the industrial activities should be in a Planned Industrial Park Development, and that uses to the south and surrounding the lake should be residential at a density of one dwelling unit per acre. The map also identifies a shoreline overlay in the area of Associated Wetlands.

B. Shorelines

The existing boundaries of the Associated Wetlands, the extent of the 100-year flood plain, and the 200-foot dimension from the drainage ditch are all contained on Figure 13, page M-8. According to the Shoreline Management Act, the extent of the shoreline jurisdiction is the greatest extent of all of the above criteria. Previously to the Department of Ecology's adoption of the drainage ditch as a "shoreline of the state" (above 20 cfs mean annual flow), only the criteria for the Associated Wetlands applied. To comply with the Act, those areas which were formerly considered uplands (not wetlands), but now fall within 200 feet of the drainage ditch or within the 100-year flood plain are to be included in the local Master Program and identified by a shoreline "Environment." These provisions will apply to the 6,800 lineal feet of the drainage ditch which lies in the Upper Reach.

Based upon Figure 6, page M-2, and the jurisdictional criteria, the Associated Wetland is generally the most extensive criteria throughout this reach. Generally, the 100-year flood plain falls within the 200-foot horizontal distance and always within the Associated Wetland. New areas which will be subject to the 200-foot horizontal dimension from the ditch are limited to the following:

Ownership	General Location
Jones	North and west of Gray Stone plant
Farr	Strip along west side of ditch
Jones	Eliptical fill island on west side of ditch
Jones	Strip along east side of ditch along "Jones Island"

C. Ownership

The 1983 generalized ownership patterns for the planning area have been researched with the County Assessor and mapped on Figure 14, page M-9. The recommended categories from the Department of Ecology are as follows:

1. Large private -- water frontage more than 1,000 feet.
2. Small private -- water frontage less than 1,000 feet.
3. Federal
4. State
5. Local
6. Port District
7. Quasi-public and institutional (i.e., school districts, etc.).

First addressing the large private ownership, the one single owner with the most significant collection of parcel is William Jones. The Jones ownership parallels both sides of the ditch for the distance of 3,400 lineal feet and shares the east bank with Frank Farr on the west bank for another 1,500 feet. The Jones ownership also contains a substantial amount of Associated Wetlands. The historic drainage channel, the approved air strip, the gravel washing pond adjacent to Graystone, and almost all of the commercial/industrial buildings along Black Lake Boulevard lie within this ownership.

The only other remaining larger private ownership is that of Frank Farr. Activities there are focused on land excavation and heavy equipment storage. That parcel also contains a small pond presumably from a peat mining operation. There is no federal, port, or quasi-public lands within the Upper Reach corridor.

The significant County ownership is the Black Lake Drainage Ditch right-of-way which Thurston County accepted after abandoning Consolidated Drainage District #101 in 1976. From the Burlington Northern Railroad west, there is a 100-foot drainage way within which the creek bed is from 20 to 30 feet wide. The drainage way extends upstream to Black Lake but narrows to 50 feet in width near the lake.

The remainder of the parcels within the corridor into small private tracts which are mostly undeveloped. The tracts include a varying amount of wetland and upland area and some are constrained by the presence of the Bonneville Power Administration transmission line easements. The northern easement is 250 feet wider and the southeasterly approximately 375 feet.

D. Transportation and Utilities

Those existing public transportation and utility facilities lying within the planning boundary are identified on Figure 15, page M-11. The transportation and utility crossings within the Upper Reach are smaller and less numerous than those found downstream. Table 14 identifies the existing facilities in this reach.

TABLE 14: DRAINAGE DITCH--TRANSPORTATION AND UTILITY CROSSINGS

Site	Facilities
1. 25th Avenue extended	-- 12.5 KV electrical
	-- 4" gas line
2. North "Jones Island"	-- Private road bridge
3. South "Jones Island"	-- Electrical
4. North BPA easement	-- 250 KV electrical
	-- Footbridge
5. South BPA easement	-- Two 250 KV electrical
6. Black Lake/Belmore Road	-- Two-lane bridge
	-- 12.5 KV electrical
	-- 4" gas line

SOURCE: Thurston Regional Planning Council.

Neither Tumwater or Thurston County have any formally adopted Capitol Improvement Programs for sanitary sewer, water or storm drainage facilities. Both have a yearly updated six-year arterial street program, and this interfaces with the Urban Arterial Board and Federal Aid Urban System funding programs. All long-range programs are identified in the Transportation System Plan for the Thurston Metropolitan Area (1984) up through 1995.

The Transportation Plan schedules the potential facilities as short-, mid- and long-term improvements. It also identifies facilities which need to be analyzed and are beyond the scope of the region's immediate needs. Table 15 indicates the single facility which falls within the Upper Reach.

TABLE 15: 1995 TRANSPORTATION SYSTEM RECOMMENDATIONS

14.	Black Lake Boulevard--SR-101 to Black Lake/Belmore	Widen to 4 lanes in Olympia; 2 lanes with turn pockets in County with wider shoulders	$2,460,000 (long-range)

SOURCE: Transportation System Plan for the Thurston Metropolitan Area (1984).

The priority financing of facilities which are identified on a local six-year plan are:

1. Black Lake/Belmore Road--bridge approach improvements; County

The proposed road and utility crossings of the wetlands in the Upper Reach by the City of Tumwater include the following as mapped on Figure 16, page M-11:

1. 25th Avenue corridor (boundary of Middle and Upper Reaches)
2. 29th Avenue corridor
3. 34th Avenue corridor (Jones Bridge crossing).

The City has identified a desire to establish these three corridor crossings, but would ultimately anticipate construction at only two locations. The additional crossing was intended to allow some development flexibility within the concept of the Corridor Plan. Interest was expressed in determining what type of environmental and mitigation standards would need to be met. Finally, there was also a concern that crossing alternatives which were not economically feasible were not "Real" alternatives since they would most likely not be constructed.

All three crossings would include a full utility corridor (water, sewer, storm, gas, electric, telephone, telecable, etc.). There is no desire to split the utilities and the road improvements although utilities may precede the road improvements. General alignments were discussed with a brief discussion of minimum road improvement standards and a 70-foot right-of-way width. All crossing would require a public railroad crossing and eventually signals at Black Lake Boulevard.

Environmentally, the crossing should not block the flow of wildlife and aquatic resource along the ditch and retain the wetland in as large segments as possible. Mitigation options could range from no additional crossings; to minimizing the significance/scope of impacts; to rehabilitate or restore the affected environment; and to compensate for loss by replacement of that environment. The preferred means of wetland

crossing, where no reasonable alternative exists, is on elevated piers (bridge structure) versus a road fill (except or 34th Avenue Corridor which has already been filled). A comparison of these alternatives is contained in Table 16.

TABLE 16--UPPER REACH, PROPOSED WETLAND CROSSINGS

CORRIDOR	25th Avenue Corridor	29th Avenue Corridor	34th Avenue Corridor
I. BUILT ENVIRONMENT			
A. New Road Crossing	Yes	Yes	No
B. New Utility Crossing	No	Yes	No
C. Traffic Network	Best	Good	Poor
D. Utility Connection	Poor	Good	Best
E. Multi-Jurisdictional	Yes	No	No
F. Multi-Reach	Yes	No	No
II. NATURAL ENVIRONMENT			
A. New Corridor Crossing	Yes	Yes	No
B. Divides Extensive Wetland Areas	No	Yes	No
C. Crossing of Wetland	Yes	Yes	No
D. Distance of Crossing (feet)	400 - 700	500	0
III. CONSENSUS PRIORITY	Second	Third*	First

* = Only if no reasonable alternative exists.

After reviewing the proposed crossing alternatives, the city, state resource agencies and the advisory committee concluded that the 34th Avenue Corridor was the preferred alternative since it had the fewest constraints and involved an existing facility and alignment. The second priority was the 25th Avenue Corridor with an elevated structure over the wetland without providing substantial additional roadway design and environmental data which could be submitted at a later date. The 29th Avenue Corridor was last since it was not generally acceptable to resource agencies since it would divide a largely undisturbed section of wetlands which exhibit a desirable mix of wetland classes of primary importance to wildlife.

E. Recreation

Currently, there are no existing recreation facilities within the Upper Reach. At this time there are no proposals for any facilities within either the Tumwater or Thurston County park and recreation plans.

IV. SUMMARY OF PLANS, ORDINANCES AND STUDIES

Over the past two decades, the Percival Creek corridor and its drainage basin have experienced substantial growth. During that time a number of local land use, transportation, and water-related plans, ordinances or studies have been prepared in response to this growth and community concerns.

This chapter is divided into sections per document type:

A. PLANS
B. ORDINANCES
C. STUDIES

Plans will refer to comprehensive, or special purpose activity such as for open space, or transportation. Plans represent a statement of public policy. A plan is broad in context and establishes a framework within which growth, development and change should take place in accord with the community goals and aspirations. Typically, plans contain goals, policies and discussion of characteristics by neighborhoods or functional elements (i.e., housing, open space, utilities, etc.).

Ordinances implement adopted plans and provide regulations or standards for actual site-specific development. Ordinance generally apply community-wide and are implemented by means of an administrative permit process. Typical types of land use ordinances addresses zoning, subdivision, and/or land surface modification.

Studies are those documents and reports which have been prepared for a specific topic or functional element. Adoption of the studies generally require a local ordinance for implementation, and the report may also become a part of the local comprehensive plan. Studies are usually action-oriented and contain specific recommendations for resolution of a current issue.

A list of the most recent plans, ordinances and studies affecting the Percival Creek corridor is identified on the following Table 17. Individual summaries of those effecting the Upper Reach follows with a general discussion of the document and then identifies those particular elements which are relevant to this planning process.

TABLE 17: PLANS, ORDINANCES AND STUDIES AFFECTING THE PERCIVAL CREEK CORRIDOR

A. PLANS		
Comprehensive Plan	July 1975	Thurston County
	Nov. 1975	Olympia--Revision
	Oct. 1977	Tumwater--Revision
	Feb. 1979	Olympia--Westside Task Force
	Sept. 1981	Thurston County--Sub-Area #6: Black Lake/Littlerock/Delphi
Parks and Open Space	Dec. 1974	Thurston County
	June 1978	Tumwater
	Jan. 1980	Olympia
	Jan. 1983	Thurston County--Interim Open Space Tax
Transportation	Oct. 1975	Thurston Regional Comprehensive Transportation and Planning Study
	Jan. 1984	Transportation System Plan for the Thurston Metropolitan Area
B. ORDINANCES		
Environmentally Sensitive Areas	Sept. 1980	Thurston County--Zoning #20.36
	Dec. 1984	Olympia--Zoning #18.61
Flood Plain	Oct. 1980	Tumwater
	Feb. 1982	Olympia
	Dec. 1982	Thurston County
Land Clearing and Grading	Oct. 1980	Olympia
SEPA	June 1971	State Environmental Policy Act
	Oct. 1984	Olympia--Revision
	Sept. 1984	Tumwater--Revision
	Sept. 1984	Thurston County--Revision
Shoreline	Nov. 1972	Shoreline Management Act
	May 1976	Shoreline Master Program
	Oct. 1984	Shoreline Master Program--Revision
Subdivision	May 1978	Tumwater--Revision
	April 1980	Thurston County--Revision
	June 1982	Olympia--Revision
Zoning	Sept. 1980	Thurston County
	Sept. 1981	Thurston County--Sub-Area #6: Black Lake Littlerock/Delphi
	Dec. 1981	Olympia--Revision
	July 1984	Tumwater--Revision
C. STUDIES		
Regional Development	Mar. 1983	Urban Growth Management
Water	Feb. 1973	Percival Creek Drainage Basin
	Nov. 1974	Water Pollution Control and Abatement Plan for the Deschutes River Basin
	July 1976	Capitol Lake--Recreation and Restoration Design Plans
	Mar. 1983	Stormwater Management in Northern Thurston County
	Jan. 1984	Capitol Lake Restoration Analysis
	Jan. 1984	Stream Corridor Management Plan for the Deschutes River Basin

SOURCE: Thurston Regional Planning Council.

A. PLANS

1. Thurston County Comprehensive Plan (1975). This plan is largely a policy planning guide with goal and policy statements based upon functional elements (i.e., agriculture, wildlife, transportation, etc.). The plan also establishes the sub-area planning process. An Optimum Land Use Map is contained within the plan; however, it is of small scale and generally defines broad activity areas (i.e., growth, rural, timber, etc.) rather than specific sites.

   General references to the Percival Creek corridor from this Plan are as follows:

   > Page 17. "Department of Fisheries and other programs to manage production of shellfish and salmon in both natural and artificial environments should be supported." (Natural Resources; Aquaculture Policy 4.)
   >
   > Page 17. "The Capitol Lake rearing program resulted in a 1974 release of 60,000 chinook, most of which are expected to remain in the region for sports and commercial fishing."
   >
   > Page 49. "A system of bike and pedestrian paths coordinated with open space would be a regional asset, especially in the growth areas of the County." (See map.)
   >
   > Page 50. "The map--Urban Open Space Network Concept," indicates a park along Percival Creek and the Black Lake Drainage Basin from Black Lake to Capitol Lake. That linear park connecting with others along Capitol Lake, south along Little Percival Creek, and north along the Grass Lake drainage.

2. Tumwater Comprehensive Plan (1984). This plan for Tumwater comprises two major sections: one on goals and policies to guide all land use decisions, and the other on neighborhood development.

   The Plan contains a discussion regarding development of each of its ten planning areas as neighborhoods. The Upper Reach lies within Planning Area #11, Black Lake North.

   Specific recommendations from this document are as follows:

   > "The portion of this planning area, which is located along the Black Lake Drainage Ditch and in the wetland area just north of Black Lake, should be subject to construction and development guidelines for floodproofing and shoreline protection. The area should be continually protected not to prohibit uses, but to insure that activities will be compatible with the environment. The remaining portions of the property should be planned for a continuation of the commercial/industrial/warehouse type uses which exist there already because it appears that the land use trends in general have already been set. Care must be taken, however, to protect

the residential uses which exist within and adjacent to the planning area from undue impacts through the use of buffering and other means where possible. As part of the area is covered by valid surface mining permits from the State, those operations should be safeguarded.

"In order to lessen traffic conflicts on Black Lake Boulevard, the use of frontage streets and common driveways should be encouraged so that points of direct vehicular access to Black Lake Boulevard are kept to a minimum.

"The possibility of using a planned development concept for the property could be explored. Because of the many factors affecting the land, it may be easier and beneficial for all concerned to consider these options."

Specific references to the Percival Creek corridor are as follows:

Page PI-2. "There are certain areas of concern for the City of Tumwater which can only be addressed by individual in-depth planning studies. Among those studies considered vital at this time are the following arranged in order of priority:

"3. Water Studies. This study would concern itself with Tumwater's natural water bodies (Deschutes River, Percival Creek, Barnes Lake, Capitol Lake, and Trosper Lake) and how to maintain a high level of environmental quality. Preservation of these water bodies is essential in creating a high quality living environment in Tumwater." (Implementation)

3. Black Lake/Littlerock/Delphi Sub-Area Plan (1981). This sub-area is one of ten County planning areas. It includes background discussion of the natural and cultural features as well as recommended land use for this portion of the County.

Specific references to the Upper Reach of Percival Creek corridor are as follows:

Page 17. "Over half of the known peat deposits within the County occur in the sub-area, accounting for some 1,765 acres of peat. The Percival Creek area to the north of Black Lake contains 258 acres of peat. . . The above areas play an important role in their natural state due to their function in the ground water cycle. These areas are costly if not impossible to develop and provide a needed habitat for our vanishing wildlife. In their natural state, they provide a wilderness that can never be duplicated by man. Portions of the peat bog areas are not protected under the Shoreline Master Program." (Natural Resources)

Page 23. "In the Deschutes and in Percival Creek, the chinook and coho salmon are principally fall-run adults and

rearing juveniles. Between 1960 and 1970, the annual chinook salmon escapement averaged 12,620 per year, and the annual coho count averaged 3,195 per year. It is estimated that Percival Creek chinook runs have averaged 3,155 fish per year for the same period. Since the chum salmon do not readily ascend fishways, their occurrence is confined principally to the independent drainages, including Percival Creek of the Budd Inlet drainage." (Natural Resources)

Pages 23 and 24. "Concerning Percival Creek, which supports both salmon and steelhead spawning, it should be noted that the creek is the primary source of freshwater supply to the Percival Cove salmon rearing pond which is owned and operated by the Washington State Department of Fisheries." (Natural Resources)

Pages 51 and 52. "Black Lake Boulevard. Near the Olympia City limits, several heavy commercial and light industrial businesses have been established, including auto body repair and painting, motorcycle sales and marine supply. This road has good access to Highway 101 via a nearby interchange, there are few residences in the vicinity, and there is very little room for other development along the narrow corridor between the peat bog and the steep basalt hills. There is also a small area on the east side of the peat bog adjacent to the Mottman Industrial Park in Tumwater, as well as an "island" of gravel soils surrounded by the bog. This area should be zoned for planned industrial parks with provisions designed to protect surrounding residential uses, the traffic-carrying integrity of the arterial and the environmental values of the peat bog area." (The Proposed Plan)

Page 54. "Environmentally Sensitive Areas. . . . Therefore, areas with geologic hazards (slide or settling potential), marshes, swamps or bogs, and significant wildlife habitats such as the major streams are proposed to be designated as environmentally sensitive areas and preserved for their value as greenbelts. Very little development should be permitted; development on parcels including environmentally sensitive areas should be clustered on other parts of the site. Figure 17 identifies probably environmentally sensitive areas for the purpose of alerting property owners and public officials to potentially severe development limitations. The map is not intended to replace the need for an on-site inspection to determine the true situation." (The Proposed Plan)

Page 55. Figure 17. This graphic indicates that those areas containing peat resources located north of Black Lake and along the drainage ditch have been classified as an Environmentally Sensitive Area.

4. Tumwater Park and Open Space Plan (1978). Adopted as an element of the Tumwater Comprehensive Plan, it represents an assessment of the present requirements of City residents for open

space, as well as needs for conservation of valuable natural lands in the light of anticipated urban growth. One of the intents of the plan is to:

> Page 1. "Provide basic guidelines for the conservation of land with unique natural features."

A number of Findings and Recommendations were included in the Plan based upon the State Open Space Plan and a Tumwater committee report.

> Page 3. Consider methods of land use control as means of preserving and acquiring recreational and scenic areas, and also areas which are environmentally sensitive. "Improving environmental quality requires revision of codes, ordinances, regulations, and environmental practices. This can be accomplished through combining recreational opportunities and environmental enhancement by protecting a resource from pollution, noncompatible uses, or providing essential open space in highly developed areas. It will be important to set environmental quality criteria to limit encroachments of noncompatible uses on recreation and open space systems and prevent further deterioration of already damaged areas." (Washington State-wide Comprehensive Outdoor Recreation and Open Space Plan, 1973)
>
> Page 4. Coordinate the City's Master Bikeway Plan with regional plans in providing a contiguous system of urban greenways, incorporating walking trails, and paths for the use of non-motorized transportation connecting recreational, educational, and other public use facilities.

To implement objective #2 of the Plan, the following policies were identified which are directly or indirectly related to the Percival Creek corridor:

> Page 8.
>
> 7. Pedestrian and bicycle networks should be developed throughout the City in accordance with the City Master Bikeway Plan.
>
> Page 9.
>
> 14. The City should investigate the possibility of leasing property from Bonneville Power Authority or utilizing other utility easements for recreational purposes.
>
> 18. Where physical constraints (swamps, drainage ways, steep slopes, etc.) render areas unsuitable for development, they should be preserved as open space and should not be used for active recreation that would disturb the natural systems of those areas.

5. Thurston County Open Space, Parks, Recreation and ATV Plan (1974). This Plan does not mention Percival Creek by name. The Plan does mention, as an objective of the Open Space Goals, the following:

> Page 108. "The linkage of shoreline parks and public access points through provisions for linear open spaces should be encouraged. Such open spaces could include hiking paths, bicycle paths, ATV trails, and/or scenic drives."

6. Open Space Taxation (1985). During the past two years, the Thurston County Planning Commission, planning staff and Assessor's Office explored innovative means of selecting priority lands for enrollment under the Washington State Open Space Taxation Act (RCW 84.34). This recently adopted open space program (for unincorporated lands) would include prioritized eligibility criteria and a formula to calculate the percentage of tax reduction based upon the three factors. Those factors are listed below:

   a. The type, number, and priority of on-site resources (i.e., archaeological sites, urban open space, etc.).

   b. Use by the public (i.e., none, seasonal or unlimited).

   c. Reserved as permanent open space (i.e., deed restrictions or conservation easements).

Thurston County Open Space Tax Program

I. Basic Qualifying Eligibility--Priority Resources (at least one priority resource must be present in order to qualify for classification). Maximum 9 points

A. HIGH PRIORITY RESOURCES--3 points each

1. Aquatic Ecosystems
2. Archaeological Sites
3. Geologic and Shoreline Features
4. Historical Sites
5. "Natural" Shoreline Environments
6. Significant Wildlife Habitat Areas
7. Special Animal Sites
8. Special Plant Sites
9. Terrestrial Ecosystems
10. Private Recreation Areas

B. MEDIUM PRIORITY RESOURCES--2 points each

1. Public Lands Buffers
2. "Conservancy" Shoreline Environments
3. Scenic Vista or Resources
4. Urban Open Spaces

C. LOW PRIORITY RESOURCES--1 point each

1. Anadromous Fish-Rearing Habitat--Ponds and Streams

II. Eligibility Enhancements

A. Conservation Easement -- 3 points — Maximum 3 points

B. Access -- 1 to 3 points as follows: — Maximum 3 points

* Some Public Access (Members or Seasonal) -- 1 point

* Limited Access Due to Resource Sensitivity -- 3 points

* Unlimited Public Access -- 3 points

TOTAL -- MAXIMUM 15 POINTS

Eligibility: 0-2 points = Not eligible; 3-15 points = Eligible

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As proposed, the tax reduction for enrolled properties would range from 50 to 90 percent depending upon the on-site resources, public benefit, and permanency of the open space classification. This portion of the program was not adopted.

Currently, none of the municipal jurisdictions in the county have specific enrollment criteria for open space lands beyond those established in the Act.

7. Transportation System Plan for the Thurston Metropolitan Area (1984). Adopted as an update of the 1975 Plan, this revised Regional Transportation System Plan includes goals and policies to guide transportation activities within each of the local jurisdictions in Thurston County, and recommends various circulation improvement projects and programs which are in conformance with the goals and policies.

The revised Plan identifies unique transportation problems associated with eight broad travel corridors in Thurston County, and recommends transportation improvements tailored to resolve them. The Plan identifies the following transportation facilities improvements that would affect the Upper Reach.

Transportation System Improvements

Reconstruction of Existing Arterials

Black Lake Boulevard--SR-101 to Black Lake/Belmore	Widen to 4 lanes in Olympia; 2 lanes with turn pockets in County with wider shoulders

B. ORDINANCES

1. Flood Plain Ordinance. In accordance with the requirements of the National Flood Insurance Program administered through the Federal Emergency Management Agency, all three jurisdictions have adopted ordinances with stringent requirements for new construction and land development within designated "special flood hazard ares," or areas of 100-year flooding. The ordinance requires that administrative approval be obtained from the Building Official prior to the commencement of construction, and that the proposed development adhere to general regulations designed to mitigate flood hazards.

   The Black Lake Drainage Ditch has been designated as a "special flood hazard area." (Refer to Figure 13, page M-8)

2. State Environmental Policy Act--SEPA (1971). All three jurisdictions have adopted ordinances implementing SEPA within their boundaries. In general, the purposes of the Act are:

   "a. To declare a state policy which will encourage productive and enjoyable harmony between man and his environment.
   b. To promote efforts which will prevent or eliminate damage to the environment and biosphere.
   c. Stimulate the health and welfare of man.
   d. To enrich the understanding of the ecological systems and natural resources important to the state and nation." (RCW 43.21C.010)

   SEPA provides a review process which requires the assessment of project impacts upon the natural and the manmade environment. It establishes a minimum threshold when "environmental checklists" are required based upon the type and size of the proposal, but also can require a checklist when the project is located within an Environmentally Sensitive Area or on lands covered by water.

   When a project is found to be a major action with significant adverse environmental impacts, a detailed document referred to as an Environmental Impact Statement is to be prepared and circulated to the public. When adverse impacts are identified, specific mitigation measures may be required thereby conditioning a permit approval. Finally, when mitigation is not possible or practical and the impacts of the project are determined to be significant and adversely affecting the environment, the project can be denied on that basis. No permits may be issued until the SEPA process is complete.

3. Shoreline Management Act (1972). Shoreline activities along the Percival Creek corridor are regulated by the Shoreline Master Program for the Thurston Region. This program was adopted to implement the Shoreline Management Act (RCW 90.58) which was enacted in November, 1972 by the citizens of Washington State. The Act required every general purpose governmental jurisdiction to (1) complete an inventory of local shorelines; (2) establish a permit system to regulate shoreline development; and (3) develop a Master Program to guide future development of shorelines.

The Act and Washington State Department of Ecology approved local master programs governing development within all streams and rivers of the State and their "associated wetlands," with a mean annual flow of 20 cubic feet per second or more. Originally, only Percival Creek below the confluence with the Black Lake Drainage Ditch met this criteria; however, a recent evaluation by the Washington State Department of Ecology indicated that the drainage ditch has a mean annual flow of 46 cfs and is also subject to shoreline jurisdiction.

The areas along Percival Creek which lie within shoreline jurisdiction are defined by the Act and the Shoreline Master Program for the Thurston Region (1983) as those lands extending landward for 200 feet in all directions as measured on a horizontal plane from the ordinary high-water mark (the vegetation line), or the 100-year flood plain as established and mapped on the Flood Insurance Rate Maps published by the Federal Emergency Management Agency. However, this typical boundary may extend to the outer perimeter of marshes, bogs or swamps if it lies adjacent to a designated water body. Such areas are referred to as "associated wetlands."

While the previous discussion defines a specific limit to shoreline jurisdiction, the Act also states:

> "This chapter is exempted from the rule of strict construction, and it shall be liberally construed to give full effect to the objectives and purposes for which it was enacted." [Emphasis Added] (RCW 90.58.900)

The adverse impacts of activities often extend well beyond the boundaries of the activity, property lines, or the typical 200-foot boundary. Logical boundaries for planning purposes are the natural features such as the tops of bluffs, lines of vegetation, or manmade features such as railroads and highways.

Therefore, for the purposes of the Percival Creek Corridor Plan, "adjacent lands" should be referred to as the following:

> Adjacent lands are those lands immediately adjacent to and abutting lands under permit jurisdiction of the Shoreline Management Act which extend landward to the extent necessary to control direct and significant impact to shorelands and to implement the management policy articulated in the Act, the Department of Ecology guideline, and the local Master Program. The inland extent will necessarily vary with the particular management objectives and the shoreline setting.

4. Shoreline Master Program for the Thurston Region (1984). The seven municipal jurisdictions which are required to administer the Shoreline Management Act, in cooperation with the Thurston Regional Planning Council, have adopted a revised Shoreline Master Program to replace the original document. Although jointly

adopted, the new Master Program did not become effective until authorized by the Washington State Department of Ecology.

The Shoreline Master Program is a combination of public goal statements, policy plan, development plan and standard-setting ordinance. It contains general goals and policies for all of the various use activities that make use of shorelands and their waters. These goals and policies apply to those shorelines areas along Percival Creek and the Drainage Ditch. In order of the least to most intense development, the existing environments are: "NATURAL, CONSERVANCY, RURAL AND URBAN." The extent of the Natural Shoreline Environment is mapped as wetlands on Figure 13, page M-8.

The Master Program is also a development guide for shoreline activities. It begins by assessing the existing development patterns, biophysical capabilities and limitations of shoreline areas, and the goals of the citizens. From this process, varying intensities of land use allowed by segment of shoreline are mapped out. These shoreline segments have been designated as one of four shoreline "Environments" although additional environments can be considered.

The method of establishing shoreline "Environments" is based on the degree of human intrusion into the shoreline and the degree of significance of the existing physical features. In addition to these four generalized environmental designations, local governments are also authorized to use more flexibility to develop other shoreline designations which address the unique circumstances of the jurisdiction.

The Environment designation system is designed to encourage uses in each "Environment" which enhance the character of that shoreline. Environment designations should not be considered a substitute for local planning and zoning. Zoning may further refine the allocation of space and regulation of uses. For example, the Master Program may designate a large area "URBAN" (to be used for intensive development), but the zoning then may "divide up" that "URBAN" area into areas of different use such as residential, commercial or industrial. Further, a local code, such as sign ordinance, may be much more detailed than the general sign regulations contained within the Master Program. Finally, the Master Program also contains specific regulations of uses and activities as established by each shoreline environment.

Because the Master Program is technically a State law (adopted by the Department of Ecology), the requirements of the Master Program will prevail in the event of a conflict with the local zoning or plan. Whether there is a "conflict" will depend upon the specific subject under consideration. However, a conflict will generally not exist if the zoning or plan requirements are more protective of the shoreline; the requirements of the more restrictive code would prevail.

5. Subdivision Ordinance. All three jurisdiction have adopted ordinances providing for the legal subdivision of land within their boundaries. The State Platting Act (RCW 58.17.120) provides for the following:

> "The city, town or county legislative body shall consider the physical characteristics of a proposed subdivision site and may disapprove a proposed plat because of flood, inundation, or swamp conditions. Construction of protective improvements may be required as a condition of approval, and such improvements shall be noted on the final plat."

6. Thurston County Zoning Ordinance (1980). In 1980, Thurston County adopted its first zoning ordinance text for the entire County. Mapping designation, land use types and density provisions are established only after a sub-area planning process has been undertaken. To date, all but two of the sub-area plans have been completed.

The Zoning Ordinance has a special chapter on Environmentally Sensitive Areas (20.36) which would apply (1) to the Percival Creek corridor. This chapter would apply since the peat deposits along the Black Lake Drainage Ditch were mapped as "Environmentally Sensitive" in the Sub-Area Plan; (2) the area is also a wetland of over one acre in size; and (3) the watercourse which is an anadromous fish rearing habitat. The Environmentally Sensitive designations is referred to as an overlay zone and is in addition to the primary criteria of the zoning map and text.

The provisions of the Environmentally Sensitive Chapter provide that "certain test and analytical studies be made prior to approval of development proposals," and "that mitigating steps be taken . . . to eliminate or minimize the adverse effects of construction." The chapter also provides that "in addition to meeting the minimum standards of the underlying zone, more restrictive conditions may be prescribed (including the following areas):

"1. Building and development coverage
2. Setbacks
3. Size of lots and development sites
4. Height limits
5. Density limits
6. Restoration of ground cover and vegetation
7. Other measures for environmental protection."

In addition to the Environmentally Sensitive provisions, the Zoning Ordinance also contains a chapter regarding "Standards Relating to Physical Limitations of Land (20.35)." This chapter contains (1) grounds for disallowance of development permit; (2) requires a drainage study of subdivisions and site plan review permits; (3) requires a soils analysis on slopes above 30 percent; (4) limits clearing and grading in ravines; and (5) protects open space from clearing and grading.

7. Tumwater Zoning Ordinance (1984). In July of 1984 a revised Zoning Ordinance and map took effect in the City. Those zoning map designations as a result of the Planning Area #11 annexation are identified on Figure 12, page M-7.

C. STUDIES

1. Urban Growth Management--Memorandum of Understanding (1983). The local jurisdictions of Olympia, Tumwater, Lacey and Thurston County have agreed to a Memorandum of Understanding which recognizes the need for interjurisdictional cooperation on urban growth and service provision issues. The Memorandum designates an Urban Growth Management Planning (UGMP) boundary within which urban services are appropriate and will be established. Percival Creek lies within this boundary. The Memorandum requires that local jurisdictions take all reasonable steps to minimize urban growth outside the UGMP area by creating incentives for urban development inside the UGMP area.

2. Water Pollution Control and Abatement Plan for Deschutes River Basin (1974). During 1972, 1973 and 1974, a consultant in conjunction with the Thurston Regional Planning Council, a technical and a coordinating committee prepared a report on the sanitary sewer facilities in the metropolitan area.

   Although not specifically mentioning Percival Creek, the following conclusions and recommendations may be applicable:

   Conclusion

   Page viii. 13. Regulatory agencies may require stormwater discharges to be treated within the 30-year period considered in this report.

   Recommendations

   Page ix. 1. The major facilities of the Regionalization Plan for the urban area of the Deschutes River Basin should be managed by one agency.

   Page xi. 14. A budget item should be established for the Thurston-Mason Health District for a full-time employee and equipment to monitor lake and stream water quality degradation expected from increased developments utilizing septic tanks and drainfields.

   a. The monitoring program should be coordinated with other agencies to implement a unified course of action when water quality degradation or health hazards are detected.
   b. An increase in septic tank permit fees should be considered to fund this recommendation.

   Page xii. 19. Buffer strips of varying widths composed of brush, non-merchantable evergreens, and hardwood species

should be left along shorelines to help maintain proper water temperatures and minimize erosion for the protection of aquatic life and water quality.

Page xii. 20. Detailed operational procedures should be developed and implemented for management of watershed lands so as to substantially reduce or eliminate the availability of silt for runoff into and for transport by the Deschutes River.

3. Capitol Lake Restoration and Recreation Plan Design Report (1976). These plans and their accompanying Environmental Impact Statements compiled a great deal of data regarding the proposed improvements to Capitol Lake. While the two elements are integrally related, the restoration activity is primarily related to establishment of a dredging and maintenance program for the lake. The recreation element explored the possible beneficial uses of dredged spoil sites by providing for expanded recreational and habitat use. Those parts of the 1976 Plan specifically affecting the Percival Creek corridor are as follows.

   The east bank of Percival Cove is identified as a disposal site for dredged material. Percival Cove would be dredged of 20,000 cubic yards of sands and gravels to allow complete drainage during the annual lake draw down and to provide a sediment trap at the mouth of Percival Creek.

   The proposed plans for the Percival Cove gravel pit are for contoured terracing providing a meadow and an open playfield of over four acres. The site is also to have a children's play area and parking for about 40 cars. A pedestrian trail is proposed along the east side of Percival Cove and would continue easterly from Deschutes Parkway along the north bank of the creek for the distance of the park.

4. Stormwater Management in North Thurston County (1983). During March and April of 1981, the jurisdictions of Lacey, Olympia, Tumwater and Thurston County passed resolutions recognizing the need for a coordinated and comprehensive approach to stormwater management, and supporting an investigation into the creation of a stormwater utility.

   In response to the resolutions, the Thurston Regional Planning Council coordinated a study of program alternatives and financing options for stormwater management during 1982 and 1983.

   The major short-term recommendations of Volume I are as follows:

   a. Separate stormwater expenditures in each municipal budget.

   b. Establish a stormwater enterprise utility in each jurisdiction, funded by:

      (1) Traditional street maintenance sources
      (2) Assessment of "stormwater utility charge."

c. Support interjurisdictional coordination by public works staffs by:

(1) Inventory existing drainage facilities
(2) Providing a consistent complaint and problem monitoring program
(3) Install cooperative rainfall monitoring
(4) Adopt a uniform design manual
(5) Designate priority basins for detailed basin planning
(6) Reviewing "Regional" management concerns (i.e., operation, capitol construction, maintenance, critical areas, etc.).

d. Assume maintenance for detention ponds and other facilities in:

(1) New development
(2) Existing development
(3) Individual on-site facilities

e. Establish and implement target levels of regular maintenance for street drainage systems.

f. Establish desired levels and funding for regulation activities.

g. Contour mapping of the north County drainage.

h. Adopt stormwater utility rates.

i. Identify priority problem areas requiring remedial action.

While the various reports in Volume II are general in nature, some of the more important aspects are noted below:

a. Consider the Department of Fisheries position paper on adopting the dominate stream flow (typically a 1.5- to 2-year storm occurrence) as the allowable runoff release rate. (Note: Refer to the discussion of this concept in the following document.)

b. Regionalize stormwater management and continue to rely on retention/detention ponds of a minimum size and design.

c. Give further study to areas designated as wetlands and their impacts from urban stormwater runoff.

5. Capitol Lake Restoration Analysis (1984). Prepared for the Washington State Department of General Administration, this report provides specific recommendations for needed water quality improvements needed in Capitol Lake. The goals identified in the report were to:

a. Prevent future fish kills
b. Provide management policy for sedimentation of the lake
c. Identify historical water quality issues
d. Evaluate the swimming beach restoration at Capitol Lake Park.

This document notes the need for a comprehensive basin-wide drainage program due to the following observations:

Page 63. "A stream channel under natural conditions is in a state of quasi- or dynamic equilibrium with its flow regime. It is generally thought that the channel is in equilibrium with a peak flow rate and volume having a return frequency of approximately two years; this flow is called the dominant flow. Increasing urbanization, without effective hydraulic controls, will significantly increase the dominant flow; the channel will therefore respond by establishing a new equilibrium which can only occur by erosion of the channel. If developed runoff rates are controlled to only a 10-year return frequency, the sediment flow in the developed basin would still be significantly greater than that which existed prior to development."

Page 63. "An on-site facility is typically designed and located without consideration of the effect of the timing of its discharge on either adjacent facilities or on the historic runoff regime of the stream itself. Theoretical and field studies have demonstrated that the placement of on-site facilities in a random fashion throughout the basin using the same design criterion will not necessarily mitigate the impacts of development (McCuen, 1979; Hardt and Burges, 1976; Minton, 1983). In fact, depending upon its location in the basin, the facility may make peak rate conditions in the stream worse than if the facility had not been installed."

Page 63. "The Rational Method, which is typically used to determine the 10-year design runoff, commonly overestimates the true value, particularly for moderate to well-drained soils. As a result, the outlet may be oversized, allowing peak discharges which are greater than a 10-year storm."

Page 64. "The desired hydraulic condition for the basin can best be maintained by the careful sizing and placement of "regional" ponds located at a few points within the basin, complemented by on-site facilities where needed. Ideally, the design criteria are varied with each facility as a function of its location and relationship to the other facilities. Basin-wide hydraulic modeling is required to define such relationship."

Pages 64-66. "Based upon these observations, "it is recommended that a basin-wide management plan be developed to help identify (and reduce) existing problems and to mitigate problems likely to occur with continued development of the watershed. Development of such a plan should include the following elements:

a. Define existing conditions
b. Determine biological maintenance goals
c. Prepare a hydrologic/hydraulic model
d. Identify and evaluate technical issues
e. Citizen involvement
f. Formation of a storm drainage utility or authority."

As a first-priority level task, the Percival Creek Watershed Master Plan described in this report is estimated to cost $250,000 and would be implemented by Olympia, Tumwater and Thurston County

with the Departments of Fisheries and Game as advisory agencies. Potential funding sources have been identified as Referendum 39 and local contribution.

The report also contained several third-priority recommendations for actions affecting Percival Cove. The cove was to be added to the Capitol Lake dredging cycle and dredged once every 16 years (page 127). Seal off Enriched sediments from fish food and wastes were to be sealed of by the use of aluminum sulfate (alum) treatment (page 123). Performance monitoring of water quality within the drainage basin was to be done at 12 stations to evaluate the effectiveness of program and provide long-term baseline date (page 124).

6. Stream Corridor Management Plan for the Deschutes River (1984). Prepared by the Thurston County Conservation District as a part of the Capitol Lake Restoration Analysis, this document details the sedimentation and erosion issues within the drainage basin. This report concludes that:

> "The excessive erosion of the steeply gravelly banks of the Lower Reach of Percival Creek is a recent occurrence coincidental to the development of new shopping and business centers in West Olympia. . . Stormwater runoff from this development must be addressed to reduce negative impacts to the stream system." (page 49)

The report found five debris accumulations of which none were considered severe, and only two of six leaning trees posed bank erosion problems. Based upon a cost/benefit ratio of minimizing erosion sources versus dredging Percival Cove, no specific corrective action was proposed along the creek.

D. GENERAL INFORMATION

1. Stormwater Policy. At the present time, the three jurisdictions within the basin (Olympia, Tumwater and Thurston County) implemented drainage control practices for significant developments. The jurisdictions require the contractor to use erosion control measures during the construction period and the installation of permanent, on-site stormwater control facilities, such as ponds or underground tanks, to moderate the increased runoff rate. Facilities are currently designed to meet a 10-year flow per 100-year storm criterion. That is, the outlet of the facility is sized to keep the runoff rate equal to or less than that expected from a storm with a 10-year frequency under natural (predeveloped) ground cover conditions; and the facility volume must be sufficient to contain a 100-year storm (post development).

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A. Advisory Committee

As a continuation of the Percival Creek Corridor Plan preparation of the text for the Upper Reach also involved interested parties in the planning process. Unlike the Corridor Plan for the Canyon and Middle Reaches a single advisory committee was established to assist the staff and provide a broadest spectrum of review. The committee contained departmental representatives from the three local jurisdictions, affected state agencies, an Indian Tribe, property owners and community groups with both "environmental" and "business" viewpoints.

Early on a field trip was made to the drainage ditch and wetlands. The committee also received technical presentations on selected issues. All meetings were open to the general public and several interest community groups which followed the previous Corridor Plan continued to attend the meetings. The Committee reviewed and critiqued the plan a chapter at a time. Only once was a vote necessary to decide an issue, with jurisdictional differences recognized and consensus reached on all other issues. In general the advisory committee meetings were characterized by a free exchange of views, interaction and favorable progress.

During those meetings the committee's input largely charted the final course for the policies and regulations. The quality and usability of this document can directly be attributed to the countless hours spent by each individual. It is by no small measure that their assistance and participation was absolutely invaluable to the corridor staff.

The various committee members and their representatives are listed below:

UPPER REACH ADVISORY COMMITTEE

Tumwater Parks Department	Jerry Petheram
Tumwater Planning Commission	Bob Bruce
Tumwater Planning Department	Alice Conrad
Tumwater Public Works Department	Doug Johnston
Thurston County Health Department	Marilou Taylor
Thurston County Planning Commission	Hans Littooy
Thurston County Planning Department	Tom Clingman
Thurston County Public Works	Patti Ingersoll
Olympia Planning Commission	Jay Butts
Olympia Planning Department	John Hubbard
Squaxin Indian Tribe	Brian Wood
WA State Department of Ecology	Joe Williams
WA State Department of Fisheries	Jim Fraser
WA State Department of Game	Mark Grandstaff
WA state Department of General Administration	Bob Arndt
Black Hills Audubon Society	Chuck Chambers
Property Owner Representative	Jim Whisler
Property Owner Representative	Bill Jones/Elliott Brown
Tumwater Action Committee	Jack Rabourn
Tumwater Interested Citizen	Howard Godat

B. Wetland Boundary Mapping

Although not identified in the initial scope of work, it soon became apparent to both the staff and the advisory committee that identification of the wetland boundary was a top priority. It was only with the assistance of the Department of Ecology and the Tumwater Public Works Department that such an effort was possible.

A team of wetland or riparian technicians was organized by the Department of Ecology, representing local, state, and federal agencies. An opportunity was provided for both property owners and local jurisdictions to have representatives in the wetland boundary team. Approximately 450 individually numbered stakes were placed along the wetland edge representing over a week of field work. The location of these stakes were field located by the City of Tumwater and Thurston County, and platted as an overlay for the Upper Reach base map. It is only with the contribution of this survey work and twenty-three (23) field days for the wetland team that the wetland boundary was field located.

It is with deep appreciation that the following individuals assisted in this effort:

WETLAND BOUNDARY TEAM

Mary Burg (Team Leader)	WA Department of Ecology
Bob Ziegler	WA Department of Game
Mark Grandstaff	WA Department of Game
Dyanne Sheldon	King County Planning and Community Development
John Cooper	U.S. Fish and Wildlife Service
Kathy Combs	U.S. Environmental Protection Agency

The following crew from the Washington Conservation Corps also provided by the Department of Ecology assisted in clearing the wetland boundary line, largely enabling the surveying to be completed:

WASHINGTON CONSERVATION CORPS

Lynn Gordon (Crew Chief)
Todd Webster
Larry McDonald
Kevin Trenberth
Dick Lemcke
Rob Freedman

C. Issues and Concerns

During the first meeting of the Percival Creek Corridor Plan Upper Reach Advisory Committee, the representatives were asked to describe their concerns or identify the major issues as they saw it. A summary of those statements follows:

Evergreen Park, Inc.

-- Looking forward to see outline of wetlands and associated wetland material.

Squaxin Island Tribe

-- Although there are different features in the Upper Reach, consistency should be sought between the upper and downstream reaches to implement the concept of a "corridor" management plan.
-- What happens to the wetland is critical issue and changes will effect the hydrology which may result in adverse downstream impacts.

Jones Quarry

-- First priority is to establish a definitive survey map or photograph which identifies what areas are considered "Natural" (in shoreline jurisdiction) and those that are not (in uplands).
-- A second concern is directly related to the issues identified above (wetland versus uplands) and its effects on taxation.

Tumwater Planning Department

-- The planning process should result in a clear and accurate delineation of the wetland areas.
-- Would like to see balance of recognition of wetland and its importance to the general public and at the same time a very strong support for any private property rights.
-- This document and planning process should show that the Upper Reach really is an entirely different area in its problems, issues, and concern from other reaches.

Tumwater Public Works Department

-- Interested in identifying utility and transportation corridors and helping establish those in such a way they will optimize the public's benefit and create flexibility in the usage of those corridors.
-- Hoping to identify more corridors than in the other reaches due to the undeveloped nature of this area.

Thurston County Public Works Department

-- Concerns primarily focused on stormwater management and as drainage ditch still is retained in county ownership.

Department of Game

-- Primary concern is that the wetland is a travel corridor and a significant habitat for wildlife. Further, that the drainage ditches travel corridor for both trout and salmon which migrate up the ditch and spawn in the tributaries of Black Lake.

Tumwater Action Committee

-- Concern that environmental issues should be addressed but not without the total recompense of private property rights.

Thurston County Planning Commission/Delphi Association

-- Concern about the visual deterioration of areas in the Upper Reach along Black Lake Boulevard.
-- "Greenway" concept proposed in lower reaches has some appeal due to its relation to aesthetics.
-- Also concern about recreational aspects of the Upper Reach and other modes of transportation along Black Lake Boulevard such as bicycles and pedestrians.

Thurston County Planning Department

-- Also, this type of resource which we usually get concerned about reclaiming just about the time we get done ruining it.
-- Pleased that all jurisdictions involved had general good words and that this type of program is needed to prepare a plan which can be implemented by the jurisdictions with predictability and specifically with an accurate identification of the wetlands.

Tumwater Citizen

-- The Upper Reach Advisory Committee has a greater challenge before it. This will be in keeping some consistency throughout the Percival Creek Corridor and still recognize the unique topographic and other physical features.

Olympia Planning Department

-- Agree that the challenge will be to provide reasonable consistency between the reaches realizing that what occurs in the Upper Reach affects the lower two reaches.

Tumwater Planning Commission

-- Doesn't believe stormwater concerns will be as critical in the Upper Reach as they were in the lower two units due to the slope and the fact that developers will be providing on-site retention.
-- Concern that adequate provisions are made for future transportation utility corridors within the reach.
-- Does not wish to see large parcels of ownership so subdivided that the city is dealing with property owners who own nothing but wetland.

Department of Ecology

-- Identification of the wetland is a very critical element and that it is in the benefit of the property owner to have these wetlands accurately located.
-- Believes that the process can result in flexibility and consistency and that identification of the wetland boundary is the first step within the designation of uses within the corridor as the second step.

Olympia Planning Commission

-- Agreed with comments which have been previously made.

Thurston County Health Department (verbal comment with staff)

-- Major concern is regarding water quality preservation inasmuch as the two major issues for that will be preservation of the wetlands and managing urban stormwater.

Department of Fisheries (verbal comments with staff)

-- Primary concern is the water quality affecting the fish-rearing facility at Percival Cove.
-- Concern also for adequate water quality within the drainage ditch for migration of salmon.

Tumwater Park Department (written correspondence)

-- The Black Lake Drainage Ditch is an area which must be carefully planned to ensure industrial and commercial development is compatible to the environmentally sensitive lands surrounding this narrow corridor.
-- Provide equal support for parks and open spaces as residential/ commercial and industrial areas.
-- Recommend reliance strongly upon the Tumwater Comprehensive Plan for the Upper Reach.

Corridor Planning Staff

-- Wish to continue with the format which has been established in the previous plan; however, modify it so that the process for the Upper Reach is reflective of the different natural, cultural, and jurisdictional elements.
-- An essential element of the Upper Reach planning process will be the identification of shoreline jurisdictional edge (and the wetland boundary).
-- A preliminary concept of management units would be to create a separate management units for the industrial/commercial area and another for the residential area adjacent to the north end of Black Lake.
-- Need to resolve inconsistent "Natural" shoreline environment with areas zoned for commercial/industrial use.

D. Corridor Objectives--Upper Reach

As a result of the preceeding issues and concerns, along with a review of the significant features, a list of goals and objectives was prepared for the Upper Reach. This list refelects a combination of both the staff and committee's concerns. The objectives became the basis for detailed management policies and regulations and are specific for the Upper Reach.

1. Process

-- Establish a Shoreline Master Program special area management plan for the Upper Reach of the Percival Creek Corridor which is acceptable to the effected local governments and Washington Department of Ecology, while recognizing the concerns of other agencies and interested parties.

-- Recognize existing plans, ordinances and approved development, but identify inconsistencies, conflicts and seek to resolve them.

-- Use an inventory of significant "natural features" and "manmade features" to identify potential use conflicts or policy inconsistencies.

-- Designate shoreline "management units" in the Upper Reach based upon jurisdiction, zoning, and the wetland/upland boundary.

-- Consider the impacts of those properties within or adjacent to the wetland boundary of primary concern and those further removed but within the drainage basin of equal magnitude but a secondary concern.

2. Environmental Systems

-- Preclude filling of the wetlands except for designated road and utility crossings where no reasonable alternative exists.

-- Protect fragile natural resources and protect significant fish and wildlife resources within the corridor.

-- Provide an upland buffer adjacent to the drainage ditch and wetlands as necessary to protect habitat and water quality.

3. Water Resources

-- Protect the wetland for its value in reducing downstream pollution and sediment levels.

-- Recognize that stormwater impacts are the most significant single issue within the Corridor Plan and seek to maintain high water quality for fishery and recreational uses.

-- Agricultural practices including the use of chemicals and animal keeping should be conducted in a manner which protects water quality.

4. Community Development

-- Strive for a balance between the protection of the creek while providing for economic growth and vitality.

-- Prepare environmental regulations which allow for future development of both existing commercial ownerships and public improvements within the corridor.

-- Where conflicts arise between economic development and the protection, conservation and management of existing natural resources, the latter should be given priority.

-- Allow for the continued maintenance of the Black Lake Drainage Ditch while protecting the natural hydrologic functions of the wetlands.

-- Projects to maintain the drainage ditch should incorporate features to enhance the habitat value of the ditch and adjacent wetland.

-- Designate new road and utility crossings at locations with existing facilities or which minimize filling of the wetlands.

-- Allow for the continued maintenance of existing utilities within the corridor.

5. Use Regulations

-- Establish land use regulations on the basis of land capabilities locating the most intense development on land with the least environmental limitation.

-- Recreational opportunities should be explored within the publicly-owned Black Lake Drainage Ditch and the shoreline jurisdiction where access easements can be attained to the degree compatible with the conservation or restoration of the drainage ditch ecosystem. These opportunities should be discussed by the local park departments, affected state agencies, and adjacent property owners.

-- Development uses or activities which can be identified as hazardous to the waters of the drainage ditch or which would require a pollution discharge permit should be prohibited.

6. Implementation

-- Consolidate all development standards which affect lands within the Upper Reach into one document and provide for appropriate cross referencing to other regulations where necessary.

-- Adopt those appropriate ordinances implementing the plan including, but not limited to, an amendment to the local Shoreline Master Program for each effected jurisdiction.

-- Adopt a Special Area Management Plan which includes maps, policies, use regulations, dimensional standards, review procedures, and definitions which are compatible with local zoning ordinances.

-- Implement the requirements of the plan uniformly upon governmental or private projects.

-- Coordinate and circulate future development proposals within the Upper Reach to other state agencies, local municipalities or interested parties.

-- Communicate with the Thurston County Assessor's Office so that information on the limitations imposed by land use regulations is available during property appraisals.

-- Provide information to property owners about the Open Space Taxation Act in Thurston County as it relates to their property within the Upper Reach.

A. Management Concepts

Contained within the Management Unit Regulations chapter are the policies, regulations, and definitions for the Percival Creek Corridor Plan. A single "Management Unit" similar to zoning district was identified and contains all of the specific definitions policies and regulations for the Upper Reach. The Upper Reach--Management Unit, was established on the basis of similar natural features, land use ownership patterns and/or jurisdictional boundaries. The Percival Creek Corridor Plan Official Map for the Upper Reach is Figure 17, page M-12.

B. Implementation

The Percival Creek Corridor Plan--Volume 2 is intended to be implemented as a local amendment to the Shoreline Master Program for the Thurston Region (1984), which will require adoption by both the city of Tumwater and Thurston County. Within the City of Tumwater, a modification to the zoning map designating a 50-foot Greenbelt zone around the wetland would be necessary to relfect the provisions for a wetland buffer. Such a provision could be administerd by the Thurston County Zoning Ordinance without a change to the zoning map. Once the "Management Unit Regulations" chapter is adopted by both local jurisdictions and the Department of Ecology, this will supercede the current shoreline environment designation for the Black Lake Drainage Ditch and wetlands associated with Black Lake.

C. Stormwater Management

Generally those issues raised in the previous chapter by the various interest groups have been incorporated into the specific policies and regulations for the "Management Units," except for one. Stormwater management issues are major in scope and corridor-wide in nature and are by far the most significant single issue identified by the Corridor Plan.

Stormwater management and the protection of the Percival Cove facility were identified as the most common concerns identified throughout all reaches of the creek. Stormwater runoff has recently been found to be one of the three non-point pollution sources impacting both Woodard and Woodland Creeks and resulting in the partial closure of Henderson Inlet for shellfish harvesting. For over a decade, the Department of Fisheries has expressed its concern about the potential risks of water quality degradation within the Percival Creek Corridor effecting their fish culture program at Percival Cove.

While identified as the most significant single issue within the Corridor Plan, the ability of this land use document to implement meaningful stormwater mitigation measures is limited. Therefore, the following elements have been arranged in an "Action Plan" format and, in many cases, are simply a restatement of previously prepared recommendations. Suggested implementation measures are contained within the policies.

Stormwater Management Action Elements

1. A basin-wide management plan should be developed for Percival Creek and the Black Lake Drainage Ditch which includes the following elements:

   a. Form a storm drainage utility or authority
   b. Define existing condition
   c. Determine biological maintenance goals
   d. Prepare a hydrologic/hydraulic model
   e. Identify and evaluate technical issues
   f. Citizens involvement.

2. The stormwater management problems of the Corridor should be handled in a cooperative effort between all affected agencies and municipal jurisdictions. Therefore, a basin coordinating committee should be established consisting of the affected local and state agencies.

3. Percival Creek should be used as a model basin to establish the basin planning process for other watersheds in urban areas.

4. It would be desirable if a single agency were selected to coordinate all the water quality/water quantity questions, inspections and sampling; however, this may not be possible.

5. Existing stormwater facilities (pipes and ponds) within basin should be mapped and analyzed.

6. Water monitoring stations should be established throughout the watershed. These stations should record flow data and samples should be tested for a wide range of water quality indicators important to fish and shellfish.

7. Guidelines should be established for "fishable" and "swimmable" waters for both Percival Creek and Percival Cove.

8. Policies and standards should be established for stormwater management to include wetlands and stream shoreline edges.

9. A "Best Management Practice" manual should be developed for stormwater management which emphasizes water quality. This stormwater manual should consider:

   a. Establishing a uniform runoff rate vs. a variable rate based upon slope, soil and cover type.

   b. Limiting the release rates of on-site or major stormwater retention/detention basins to predevelopment levels.

   c. Adopting the Department of Fisheries "Dominant Flow" criteria for the creek and drainage ditch.

d. Requiring energy dissipators/filtration devices at all discharge points to the creek and drainage ditch.

e. Promoting the use of large multiple use retention/detention sites which are publicly-owned and maintained. Such an existing facility is Yauger Park within the westside drainage area.

f. Identifying a required maintenance schedule of all stormwater devices.

10. To increase public awareness of Percival Creek and its watershed, a demonstration creek signing program should be implemented at all road crossings. It should include:

a. Design of a special sign and stream logo
b. Contain a pollution hotline phone number
c. Solicitation of community groups and property owners' associations for a stream watch program.

UPPER REACH MANAGEMENT UNIT
(Refer to Figure 17, page M-12)

A. Scope/Boundary

The Upper Reach Management Unit has been split into three sub-units based upon the differing physical and jurisdictional boundaries. All lands identified below are governed by the provisions of the Shoreline Master Program and Act, except for the wetland buffer which shall be governed by the provisions of the local zoning ordinance. Lands within this Management Unit are as follows:

1. Associated Wetlands of Black Lake and its adjacent fifty (50) foot buffer area.

2. Black Lake Drainage Ditch and its adjacent fifty (50) foot buffer area

3. Those lands extending from the Black Lake Drainage Ditch buffer to the two hundred (200) foot shoreline boundary or the edge of the 100-year flood plain whichever is greater.

B. Policies

These policies shall only apply to those areas described above.

1. Uses should protect the wetlands from urban expansion by encouraging "planned" development concepts which accommodate innovation, creativity and design flexibility. Such "planned" developments would be characterized by lower intensity uses and activities along the shoreline and associated wetland which would provide a buffer and create environmental protection from competing upland activities.

2. Existing structures and uses should conform to the provisions of this management unit to the greatest extent possible.

3. Provide an upland buffer and other means adjacent to the drainage way and associated wetlands as necessary to protect habitat and water quality.

4. Development uses or activities which can be identified as hazardous to the water quality of the Black Lake Drainage Ditch or which would require a Pollution Discharge Permit should be prohibited.

5. Where conflicts arise between economic development and the protection, conservation, and management of existing natural resources, the latter should be given priority.

6. Agricultural practices, including use of chemicals and animal keeping, should be conducted in a manner which protects water quality.

7. Recreational opportunities should be explored within the publicly-owned Black Lake Drainage Ditch and the shoreline jurisdiction, where access easements can be attained and to the degree compatible with the conservation or restoration of the drainage ditch ecosystem. These opportunities should be discussed by the local park departments, affected state agencies, and adjacent property owners.

8. Projects to maintain the Black Lake Drainage Ditch should incorporate features to enhance the habitat value of the ditch and associated wetland.

9. Preclude filling of the associated wetlands except for road and utility crossings where no reasonable alternative exists.

10. Developments are encouraged to arrange their site design to:

    a. Cluster required open space areas, small courtyards, plazas, or other pedestrian-oriented amenities within or adjacent to the drainage way or wetlands.

    b. Orient office spaces of industrial development towards the drainage way or wetlands.

    c. Use compatible natural exterior surfaces and colors as a preferred architectural treatment.

C. Use Regulations

1. Allowable uses and activities located within the Black Lake Drainage Ditch, its buffer, the associated wetland of Black Lake, and its buffer are as follows:

    a. Primary Uses

        (1) Aquaculture. Aquacultural activities relating to the fishing and harvesting of wild and planted stock for recreational and commercial purposes.

        (2) Recreation. Low intensity and passive recreational facilities (viewpoints, unpaved trails, limited picnic facilities) including public- or privately-owned passive parks, wildlife refuges, or open spaces.

        (3) Research and Education. Temporary, water-dependent and wetland-oriented research and educational facilities.

        (4) Road Design and Construction. The continued use and maintenance of existing facilities is allowed.

Future transportation corridors which cross the wetlands will be improved to minimum road standards of at least a collector roadway, and include a sixty (60) foot right-of-way, a public railroad crossing and eventual signalization at Black Lake Boulevard. Future transportation corridor crossings will only be allowed in the following prioritized locations:

(a) 34th Avenue--at grade
(b) 25th Avenue--elevated structure across the wetland

(NOTE: The elevated structure is the preferred alternative at 25th Avenue without providing additional roadway design alternative(s) and an environmental assessment of the potential impacts of the alternative design(s) upon the wetland and its habitat values.)

(5) Utilities. The continued maintenance of existing facilities is allowed including the Black Lake Drainage Ditch provided that such an activity includes features which increase the habitat value of the ditch and adjacent wetlands. Specific uses include stormwater retention/detention ponds, storm sewer lines and drainage ways, sanitary sewer, water, gas, electricity, telephone, telecable, and other similar utilities. Stormwater discharges to the creek shall utilize existing discharge points to the extent feasible.

Future utility improvements which cross the drainage ditch and/or associated wetlands shall be allowed only within the corridors described below. Utility improvements may precede the roadway improvements with these corridors and where the utilities span the drainage ditch or former channel an aerial crossing shall be used. The prioritized utility corridors are as follows:

(a) 34th Avenue
(b) 25th Avenue--In conjunction with the elevated structure or immediately adjacent to the existing utility easements.
(c) 29th Avenue--Only if no reasonable alternative exists.

b. Accessory Uses. The following are allowed only when shown to be clearly subordinate or incidental to the primary use; is the minimal area necessary to accomplish the proposed use; conforms to all appropriate local, state, and federal regulations; and to be subject to the following performance criteria:

(1) Dredging. When allowed, this activity shall:

(a) Be a part of an approved fisheries or wildlife habitat enhancement project.

(b) Be subject to the required plans, review and conditions of the "Special Plans" Section E.

(2) Forest Management Practices. When allowed, this activity shall be of limited scope such as selective tree harvesting for the preservation of view corridors or for trees affected by fire, disease or insects.

(3) Landfilling. When allowed, this activity shall be subject to the required plans, review, and conditions of the "Special Plans" Section E.

(4) Shoreline Protection. When allowed, this activity shall provide for bank protection devices or in stream construction for the purpose of fisheries or wildlife enhancement.

c. Nonconforming Uses. A use lawfully existing prior to the effective date of this Upper Reach Management Unit, the Shoreline Master Program for the Thurston Region, or any amendment thereto which is rendered nonconforming by the adoption of this Management Unit or an amendment thereof, may continue in a manner and to the extent that it existed upon the effective date of the Management Unit or amendment respectively.

2. Allowable uses and activities located beyond the Black Lake Drainage Ditch buffer to the boundary of the shoreline jurisdiction are as follows:

a. Primary uses and their customary accessory uses (subject to "b" below)

(1) Sales
(2) Service
(3) Storage
(4) Manufacturing
(5) Residential
(6) Parks, open space and recreation facilities
(7) Uses of a similar nature as determined by the local administrator.

b. Uses or activities which can be identified as hazardous to the water quality of the Black Lake Drainage Ditch and the associated wetlands of Black Lake or which would require a pollution discharge permit are prohibited.

D. Dimensional Standards

Other than those standards below, dimensional standards within this Management Unit shall be pursuant to the underlying zoning.

1. Drainage Ditch Buffer. For properties abutting the Black Lake Drainage Ditch, a fifty (50) foot undisturbed native vegetation buffer shall be retained, as measured from the ordinary high-water mark.

a. The administrator may authorize a vegetation enhancement plan for those locations within the buffer where substantial native vegetation is lacking.

b. All vegetation enhancement plans shall be designed to increase wildlife or aquatic habitat by including riparian species similar to those listed in Suggestions for Stream Bank Revegetation in Western Washington.

c. When an adjacent property owner desires to landscape the public-owned Black Lake Drainage Way, the vegetation enhancement plan shall be reviewed and approved by Thurston County Public Works.

d. The provisions of the "Wetland Buffer" shall supersede this section.

2. Wetland Buffer. For properties abutting the associated wetlands of Black Lake, a fifty (50) foot undisturbed native vegetation buffer shall be retained.

a. Land uses and activities which encroach into the required buffer area on the effective date of the implementing ordinance shall retain the existing buffer with no further clearing or habitat destruction.

b. Vegetation enhancement plans shall be designed to increase wildlife or aquatic habitat by including riparian species similar to those listed in Suggestions for Stream Bank Revegetation in Western Washington.

c. The administrator may reduce the wetland buffer when lots of record are less than two hundred (200) feet in depth from the front property line to the wetland edge. In this case, the buffer shall not be greater than fifty percent (50%) of parcel depth, but in no case reduced beyond twenty-five (25) feet. Further, in this case, a vegetation enhancement plan shall be provided for the wetland and/or its buffer.

3. Density. That portion of a residentially-zoned parcel containing a part of the Associated Wetlands of Black Lake shall be calculated based upon one (1) dwelling unit per ten (10) acres. The Wetland Buffer shall be calculated based upon the underlying zoning district.

4. Building Height. Thirty-five (35) feet within shoreline jurisdiction.

E. Special Plans

Substantial developments within the shoreline jurisdiction will be required to submit these special plans or studies and undergo the special review as follows:

1. Environmental Checklist. There shall be no categorical exemptions under the State Environmental Policy Act for land subject to this management unit. Therefore, all developments requiring a local permit shall prepare an Environmental Checklist.

2. Clearing and Grading Plan. This plan shall specifically identify vegetation to be removed, a schedule for vegetation removal and replanting, and the method of vegetation removal. Clearing and grading activities shall be undertaken only during the drier months of the year and shall be in accordance with all local ordinances. Undergrowth shall be retained to the extent feasible. Yarding methods which minimize soil disturbance shall be used.

3. Temporary Erosion Control Plan. This plan would identify the specific mitigating measures to be implemented during construction to protect the water from erosion, siltation, landslides and deleterious construction materials.

4. Stormwater Control Plan. Except for individually owned duplex and single-family residences not within a "project," a permanent stormwater control plan which take into consideration existing and projected development in surrounding areas and identifies the means of protecting water quality shall be required.

   a. Stormwater Maintenance Agreement. A maintenance program for the storm drainage system, which identifies maintenance activities, schedules, and responsibilities shall be part of the stormwater control plan.

   b. Stormwater Plan Review. Authorization of all stormwater systems shall be by the local jurisdiction with review by the Department of Fisheries and the Squaxin Island Tribe.

5. Supplemental Review. Copies of all Environmental Checklists and their attached plans or reports shall be circulated for review to the Squaxin Island Tribe, the Departments of Game, Fisheries and General Administration and the adjacent municipal jurisdiction within the corridor. Development proposals shall incorporate applicable recommendations from these agencies for preventing and mitigating adverse impacts on fish or wildlife resources and enhancing wildlife habitat.

6. Water Quality Assessment. A detailed assessment of the water quality impacts and proposed mitigation measures will be a required part of the Environmental Checklist.

F. Permit Process

a. "Substantial development" located within the shoreline jurisdiction and not expressly exempted by WAC 197-14-040 will require a Substantial Development Permit.

b. Uses and activities exempted by the State Shoreline Management Act and WAC 173-14-040 shall still comply with the policies and regulations of this management unit.

c. When a Substantial Development Permit is required, the Administrator shall undertake a consolidated review of the project by the affected parties identified in Section E and seek to minimize the time in the permit process through close coordination with the applicant.

DEFINITIONS

"Adjacent Lands": Lands immediately adjacent to and abutting lands under permit jurisdiction of the Shoreline Management Act which extend landward to the extent necessary to control direct and significant impact to shorelands and to implement the management policy articulated in the Act, the Department of Ecology guideline, and the local Master Program. The inland extent will necessarily vary with the particular management objectives and the shoreline setting.

"Administrator": Person appointed by the legislative body to administer the provisions of these regulations within the boundaries of that jurisdiction.

"Associated Wetlands": Those lands or wetland areas which influence or are influenced by and are in proximity to any stream, river, or tidal water, or combination thereof, subject to the Shoreline Management Act [WAC 173-22-030(2)].

"Black Lake Drainage Way" or "Drainage Way": Those dry lands along both banks of the Black Lake Drainage Ditch which were part of the Drainage District #101 and are now publicly-owned.

"Canyon" or "Percival Creek Canyon": Lands along Percival Creek which extend upstream from Percival Cove to the Mottman Road crossing of the Black Lake Drainage Ditch. This area also extends from the centerline of the creek to the top of the bank, and includes the Burlington Northern Railroad right-of-way.

"Canyon Reach-Olympia Management Unit": That portion of the Percival Creek Canyon located within the City of Olympia.

"Canyon Reach-Tumwater Management Unit": That portion of the Percival Creek Canyon located within the City of Tumwater.

"Corridor" or "Percival Creek Corridor": Those lands adjacent to Percival Creek and the Black Lake Drainage Ditch, including those areas extending upland from the centerline of the creek to the nearest paralleling road or railroad and extending from Percival Cove to Black Lake.

"Drainage Ditch Buffer": A required area of undisturbed natural vegetation outside of and adjacent to the drainage ditch for the purpose of protecting the drainage ditch and maintaining its natural hydrological, biological, visual and cultural functions and values.

"Drainage Way Buffer": A required area of undisturbed natural vegetation outside of and adjacent to the drainage way for the purpose of protecting the drainage way and maintaining its natural hydrological, biological, visual and cultural functions and values.

"Environment," "Master Program Environment" or Shoreline Environment": The categories of shorelines of the state established by the Shoreline Master Program for the Thurston Region to differentiate between areas whose features imply differing objectives regarding their use and future

development. These existing Environments are: Urban, Rural, Conservancy and Natural.

"Environmental Management District": An area which has been designated by the local government as meeting certain criteria for which a special management plan, policies and regulations are prepared.

"Lot of Record": A lot shown as a part of a recorded subdivision or any parcel of land described by metes and bounds in a recorded deed, record of survey or other appropriate document recorded in the office of the County Auditor.

"Management Units": Those portions of the Percival Creek Corridor which has been segregated into areas which have a predominance of similar features, land use ownership patterns and/or jurisdictional boundaries.

"Middle Reach Management Unit": Those lands upstream from the Mottman Road crossing of the Black Lake Drainage Ditch to 25th Avenue extended and within the City of Olympia.

"Shoreline Environmental Management District": An area of the Region which contains a unique combination of physical features and/or resources which could not be safeguarded adequately simply by the preceding provisions of the Master Program; where the jurisdiction of the Shoreline Management Act is too restrictive and the activities upon adjacent lands may be critically important to the viability of the resource; where diverse uses would be conflicting and incompatible without management techniques specifically designed for that area; where the uniqueness of the area demands an even greater degree of environmental protection, then a local government may establish a special Shoreline Environmental Management District as an amendment to the Shoreline Master Program for the Thurston Region.

"Shoreline Management Act Jurisdiction" or "Shoreline Jurisdiction": Those lands lying within the following locations:

a. Two hundred feet on both sides of creek or drainage ditch;
b. A 100-year flood plain; and/or
c. An associated wetland.

"Top of the canyon": A significant break in the slope less than 30 percent (16.7 degrees) and at least 15 feet wide. At the confluence of Percival Creek (from Trosper Lake) and the Black Lake Drainage Ditch, the "top of the canyon" for Percival Creek shall be a line drawn from the highest most point along the east bank to the corresponding side on the west bank.

"Upper Reach Management Unit": Those lands upstream from 25th Avenue extended along the Black Lake Drainage Ditch to Black Lake and within the City of Tumwater and Thurston County.

"Wetland Buffer": A required area of undisturbed natural vegetation outside of and adjacent to the wetland edge for the purpose of protecting the wetland from intrusion and maintaining its natural hydrological, biological, visual and cultural functions and values.

"Wetland Edge": The line around a wetland where the prevalence of hydrophytes, or wetland plants, ceases. For the purposes of defining the wetland edge, the prevalence of hydrophytes ceases at the point where the combined percent of hydrophytes in the overstory, understory and ground cover falls below fifty percent (50%).

"Wetlands": Wetlands are lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface. The single feature that most wetlands share is soil or substrate that is at least periodically saturated with or covered by water. The water creates severe problems for all plants and animals except those that are adapted for life in water or in saturated soil." (Classification of Wetlands and Deep Water Habitats of the United States, 1979) (NOTE: Not the same as the Shoreline Management Act definition.)

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IX. APPENDIX

A. CZM Grant September 1984--Scope of Work

B. CZM Grant July 1985--Scope of Work

C. Department of Ecology--Shoreline Inventory Procedures

D. Geo-Hydraulic River Zone Classification

APPENDIX A

SCOPE OF WORK

Project Title: Thurston Region Shoreline Management Program Enhancement.

Project Description: Thurston Regional Planning Council (TRPC) provides management services for the shorelines of Thurston County and the cities of Olympia and Tumwater. Under this grant, TRPC will undertake two efforts to enhance the shoreline management capabilities of local governments. Under Element I, TRPC will prepare a management plan for the Percival Creek corridor. Under Element II, the agency will identify and map county aquaculture activities. The elements are further described as follows:

Element I: Percival Creek Management Plan

Element Description: This element is comprised of two task which will result in the development of a special management plan for the Percival Creek corridor between Black Lake and Percival Cove.

Task 1: That portion of Percival Creek lying north of Black Lake and south of the intersection of Park Drive S.W. and Black Lake Boulevard has only recently been determined to meet the criteria for a "shoreline" under 173-18 WAC. Under this task, the necessary information will be obtained so that the provision of the SMA can be applied and the stream reach can be included within the Percival Creek Special Management Unit. Specific activities include:

1. Inventory and map the stream and associated wetlands using a biologist to determine the location and extent of shoreline jurisdiction for inclusion in the local Shoreline Master Program, and determine habitat quality.

2. Identify shoreline uses and activities within the mapped area, and collect and analyze data on resources, adjacent land uses, and similar information. This will be used to develop recommendations for the appropriate environmental designations under Chapter 173-16 WAC.

3. Expand the work strategies of the management plan concept to this area to specifically include proposed uses and activities and performance standards.

Task 2: The information and materials acquired under Task 1 for the upper segment of Percival Creek will be combined with the information currently being obtained for the middle and lower segments (under an existing coastal zone grant.) A single management plan for all three segments of Percival Creek will be prepared. The Percival Creek Management Plan will be developed and formatted in a manner to replace and supersede existing provisions of the Shoreline Master Program for

the Thurston Region which pertain to the creek. The management plan wi be transmitted to local governments for their review and action prior to th termination of this grant agreement. It is acknowledged that local adoption the plan may exceed the grant period. TRPC will make reasonable efforts t expedite the process and assist local governments in forwarding the necessa materials to WDOE for amendment of the Shoreline Master Program.

Element II: Shoreline Aquaculture Districts - Identification and Mapping

Element Description: Thurston County has been moving toward defining an protecting aquaculture activities over the past several years. In December 1981, the local Shoreline Master Program was amended to allow for the creation of aquaculture districts within the marine waters of Thurston County. Since this time, the Thurston County Planning Department has bee working to identify the areas being used for aquaculture and to work with other agencies and aquaculture operators to gather information and solicit support.

The purpose of this project is to take the information collected thus far and:

1. Create a permanent list of aquaculture by inlet.

2. Map the specific locations on 1:1,000 scale.

Upland as well as subtidal ownerships would be indicated, including stat oyster tracts and existing activities would be delineated within the inlet as aquacultural districts. Additional reduced scale maps at a scale of 1":1 mile (8½x11") would be included in the Shoreline Master Program.

BUDGET

	Element 1	Element 2	Total
Salaries	$6,972	$2,905	$9,877
Benefits	731	304	1,035
Graphics/Mapping	2,000	500	2,500
Indirect	697	291	988
	$10,400	$4,000	$14,400
80% FEDERAL Share	$8,320	$3,200	$11,520
20% GRANTEE Match	$2,080	$ 800	$ 2,880

APPENDIX B

SCOPE OF WORK

PROJECT TITLE: Thurston Region Shoreline Mangement Program Enhancement

ELEMENT I Percival Creek Corridor Plan Implementation

Element Description: This element is comprised of two tasks which will result in the development of a special area management plan for the Percival Creek corridor between Black Lake and Percival Cove.

Task 1: That portion of Percival Creek lying north of Black Lake and south of the intersection of Park Drive S.W. and Black Lake Boulevard has only recently been determined to meet the criteria for a "shoreline" under Chapter 173-18 WAC. Under this task, the necessary information will be contained so that the provision of the SMA can be applied and the stream reach can be included within the Percival Creek Special Management Unit. Specific activities include completing activities begun in the previous funding cycle:

1. Inventory and map the stream and associated wetlands using a biologist to determine the location and extent of the shoreline jurisdiction for inclusion in the local shoreline master program, and determine habitat quality.

2. Identify shoreline uses and activities within the mapped area, and collect and analyze data on resources, adjacent land uses, and similar information. This will be used to develop recommendations for the appropriate environmental designations under Chapter 173-16 WAC.

3. Expand the work strategies of the management plan for this area to specifically include proposed uses and activities and performance standards.

Task 2: The information and materials acquired under Task 1 for the upper reach of Percival Creek will be combined with the information obtained for the Middle and Canyon reaches (under a previous coastal zone grant). The management plan for all three segments of Percival Creek will be formatted in a manner to replace and supersede existing provisions of the Shoreline Master Program for the Thurston Region which pertains to the creek and its associated wetlands. A shoreline amendment package shall be prepared for this plan and submitted to Olympia, Tumwater, and Thurston County.

This package would include staff support to assist the local jurisdictions and WDOE in their review process. TRPC will make reasonable efforts to expedite the process and assist local governments in forwarding the necessary materials to WDOE for amendment of the shoreline master program prior to the end of the grant period.

ELEMENT II: Deschutes Corridor Recreation Plan

Element Description: The Deschutes River begins in the foothill slopes of the Cascades. It descends from the relatively steep, forested slopes of the Bald Hills, the river flows for 40 miles generally in a northwest direction through open farmland interspersed occasionally by dense forest land. Several species of salmon are found in the river and its gentle current makes the lower Deschutes a popular river to float by canoe, kayak, rubber raft or inner tube. While there are no estimates of the number of people who use the Deschutes, those who do use it report crowded parking at various put-in points. Tumwater Falls park, near the river's terminus, is one of the most heavily used parks in the county.

The section of the Deschutes River to be studied is from the Rich Road Bridge to the Fourth Avenue Dam in Olympia. The corridor planning area will extend from the river channel itself to the floodplain and the adjacent upland.

The purpose is to identify major public policy issues and propose a plan to balance various interests while enhancing access to and along the river. The plan would link the urban and rural recreational opportunities which the river provides in a relatively short distance. As well, it would enhance the tourism potential of the river by providing opportunities and information to tourists who are attracted to our area by its water and shoreline resources.

Tasks: This plan will be accomplished by preparing the following:

1. Appoint an advisory committee to establish the framework for an inventory, identify the needs of the public (including tourists) for recreation, and assess the opportunities and constraints for meeting those needs. The advisory committee will be composed of representatives from the following:

    a. Tumwater, Lacey, Olympia, and Thurston County Parks departments

    b. Tumwater, Lacey, Olympia, and Thurston County Planning departments

    c. State Parks and Recreation Commission

    d. Interagency Committee for Outdoor Recreation (IAC)

    e. State Department of General Administration

    f. State Department of Fisheries

    g. State Department of Game

    h. Soil Conservation Service

    i. Squaxin Indian Tribe

j. Tumwater Action Committee

k. Tumwater Historical Society.

2. Inventory existing features and uses of and along the river from Rich Road to the Fourth Avenue Dam in Olympia.

3. Prepare maps which show topography, floodplain, ownership/roads, zoning, shoreline jurisdiction, and erosion areas.

4. Summarize existing regulations that apply to the corridor planning area.

5. Inventory recreational potential for:

   - canoe/float/kayak areas
   - trails
   - nature observation
   - active recreation sites

6. Identify areas of valuable wildlife habitat.

7. Summarize other corridor plans (Spokane, Yakima, Boise, Eugene, King County).

8. Identify areas recommended for public acquisition.

9. Prepare a completion report.

10. Because the involvement of property owners along the river and users of the river resource is crucial to the implementation of the plan, early and continuing participation by these citizens will be sought and encouraged.

BUDGET

	Element 1	Element 2	Total
Salaries	$ 7,426	$13,795	$21,221
Benefits	1,521	2,826	4,347
Indirect	743	1,379	2,122
Graphics	500	2,000	2,500
	10,190	20,000	30,190
80% State Share	$ 8,152	$16,000	$24,152
20% GRANTEE Match	2,038	4,000	6,038

APPENDIX C

Shoreline Inventory. In addition to the grant requirements listed above, the Washington State Department of Ecology has prepared a booklet containing the inventory procedures for implementing the Shoreline Management Act of 1971.

> "Before any comprehensive Master Program can be prepared for the 'Shorelines of the State,' it is imperative that basic information in the form of existing patterns of land use be known and that a thorough survey of the natural characteristics of the shoreline be accomplished. Such information is also essential in analyzing the immediate impact of substantial developments being proposed to be located on, or adjacent to, shorelines. Finally, when combined with other planning information, the inventory will provide a basis for the delineation of 'environments.' The inventory should be designed to include, but not be limited to, a survey of the general natural characteristics of the shoreline, the land uses on the shorelines, and the existing generalized pattern of land ownership. It is the emphasis on the natural situation of the shoreline and planning area that differentiates the approach being described here the more traditional land use planning process. Identification of selected natural features and the processes in the inventory phase are intended to make apparent where and to what extent use limitations and performance standards should be applied to guide economic development and modification of the shorelines" (Procedure for Shoreline Inventory, DOE, 1972).

The shoreline inventory format should consist of two elements: a map or series of maps depicting existing land uses, ownership patterns, topography, and other information; and a series of descriptive analysis of water characteristics and the natural features of the shoreline. Descriptive analysis and done on an area-by-area basis, should be keyed to the map element in a clear and direct manner. Recommended categories for identification of existing land and water uses included residential, commercial, industrial, general welfare and community service, parks and recreation areas, circulation network, utilities, agricultural, commercial forest, undeveloped land, and water uses. Generalized ownership patterns were to be identified as small private, large private, federal, state, local, port districts, and quasi-public and jurisdictional.

The third element of the shoreline inventory was to be a survey of the natural characteristics, including analysis based upon a four-category system developed by the Washington State Interagency Committee for Outdoor Recreation for segmenting rivers into units for description and analysis. Physical elements were to be identified as topography, soil characteristics, beach characteristics, mineral resources, shore defense works, and water level fluctuations. Biotic resources were to include characteristic vegetation and animal species and communities. A final element was to include a summary of related plans and programs of local governments which have a direct bearing on shorelines. These plans and programs were to include planned road networks, major street improvements, sewer and water plans, special planning studies, and, if known, the plans of major private land owners.

APPENDIX D

Geo-Hydraulic River Zone Classification

Estuarine Zone I. This zone is characterized by a zero gradient stream course which is directly affected by tidal actions in the receiving estuary. The upper limit of the Estuarine Zone is the limit of tidal influence. Estuarine Zones are typically characterized by wide, flat valleys and branched stream courses. The bed material is generally fine sands and silts often visible along the shoreline as mud or ooze.

Pastoral Zone II. The Pastoral Zone is characterized by a gradient of 0 to 5 feet per mile and a fairly wide, flat, flood plain valley in which the river meanders in wide loops. The bed material is generally sands and silts.

Gravel Beach Zone III. The Gravel Beach Zone has a gradient of 5 to 25 feet per mile, is often found in narrower valleys, has a bed of gravel and cobbles, and often is characterized by a braided channel. The Gravel Beach Zone also can be distinguished by its numerous sand bars and islands.

Boulder/Cobble Zone IV. The Boulder/Cobble Zone has a fixed stream course, a narrow steep-sided valley, and a gradient of more than 25 feet per mile. Its bed is characterized by boulders where gradients exceed 50 feet per mile and cobbles between 50 to 65 feet per mile. Boulder/Cobble Zone streams are typically very fast-rushing streams which transport finer sediments to lower segments of the stream course.

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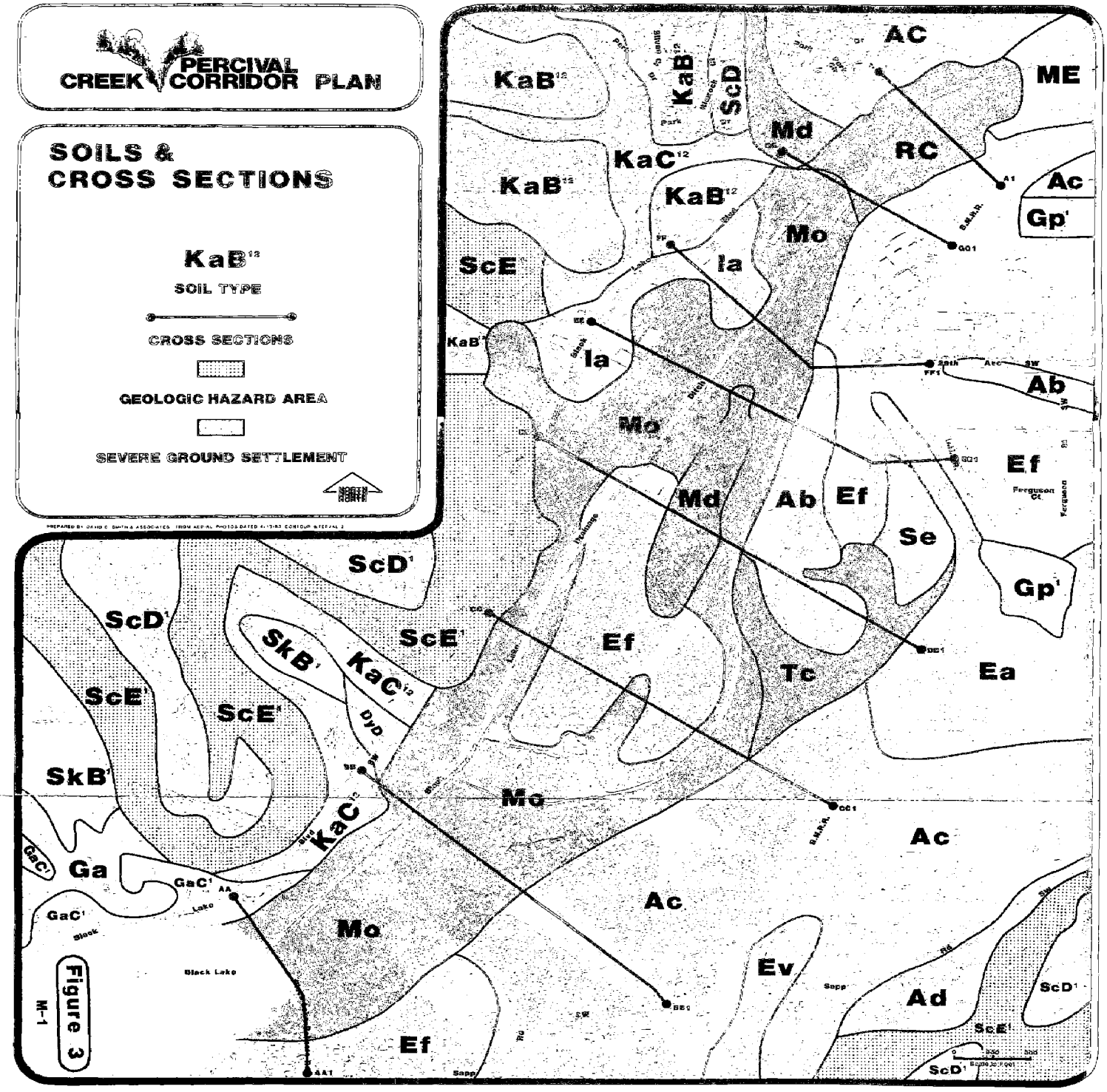

PERCIVAL CREEK CORRIDOR PLAN
SOILS & CROSS SECTIONS
KaB12
SOIL TYPE
CROSS SECTIONS
GEOLOGIC HAZARD AREA
SEVERE GROUND SETTLEMENT
AC
ME
KaB12
KaB12
ScD
Md
RC
KaC12
KaB12
KaB12
Ac
Gp1
Mo
ScE
Ia
KaB12
Ia
Ab
Mo
Ef
Md
Ab
Ef
Se
Gp1
ScD1
ScD1
SkB1
KaC12
ScE1
Ef
Tc
Ea
ScE1
ScE1
DyD
SkB1
Mo
KaC12
Ac
GaC1
Ga
GaC1
GaC1
Ac
Mo
Ev
Ad
ScD1
ScE1
Ef
ScD1
Black Lake
Sapp
Ferguson Ct.
Scale in Feet

Figure 3

M-1

PERCIVAL CREEK CORRIDOR PLAN

WETLANDS: UPPER REACH

A	OPEN WATER
B	EMERGENT (GRASSES AND HERBS)
C	SCRUB/SHRUB
D	FORESTED
U	UPLAND
	SURVEYED WETLAND EDGE— JULY/AUGUST 1985

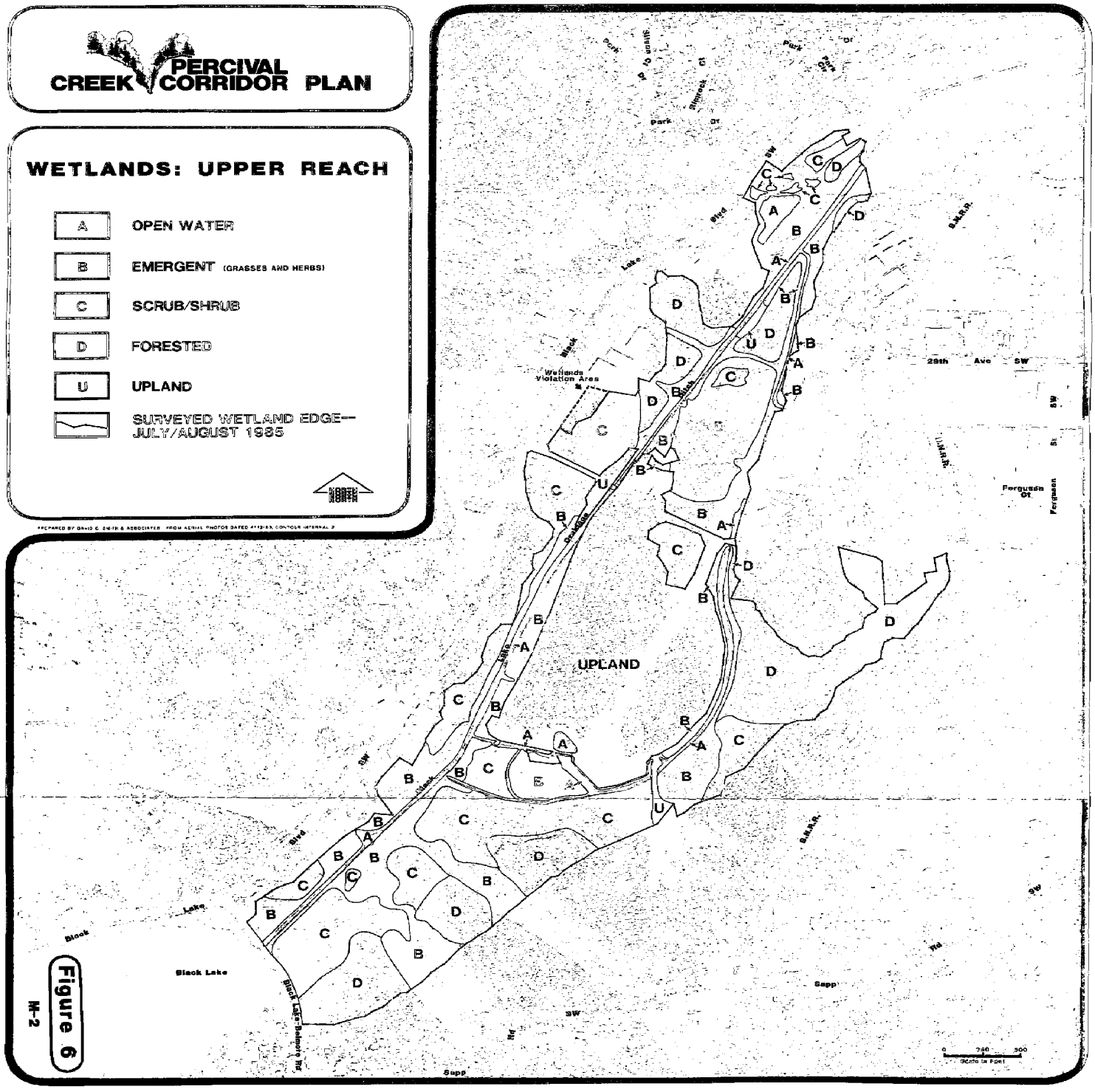


Figure 6
M-2

PERCIVAL CREEK CORRIDOR PLAN

Upper Reach

1961 Land Use Aerial Photo

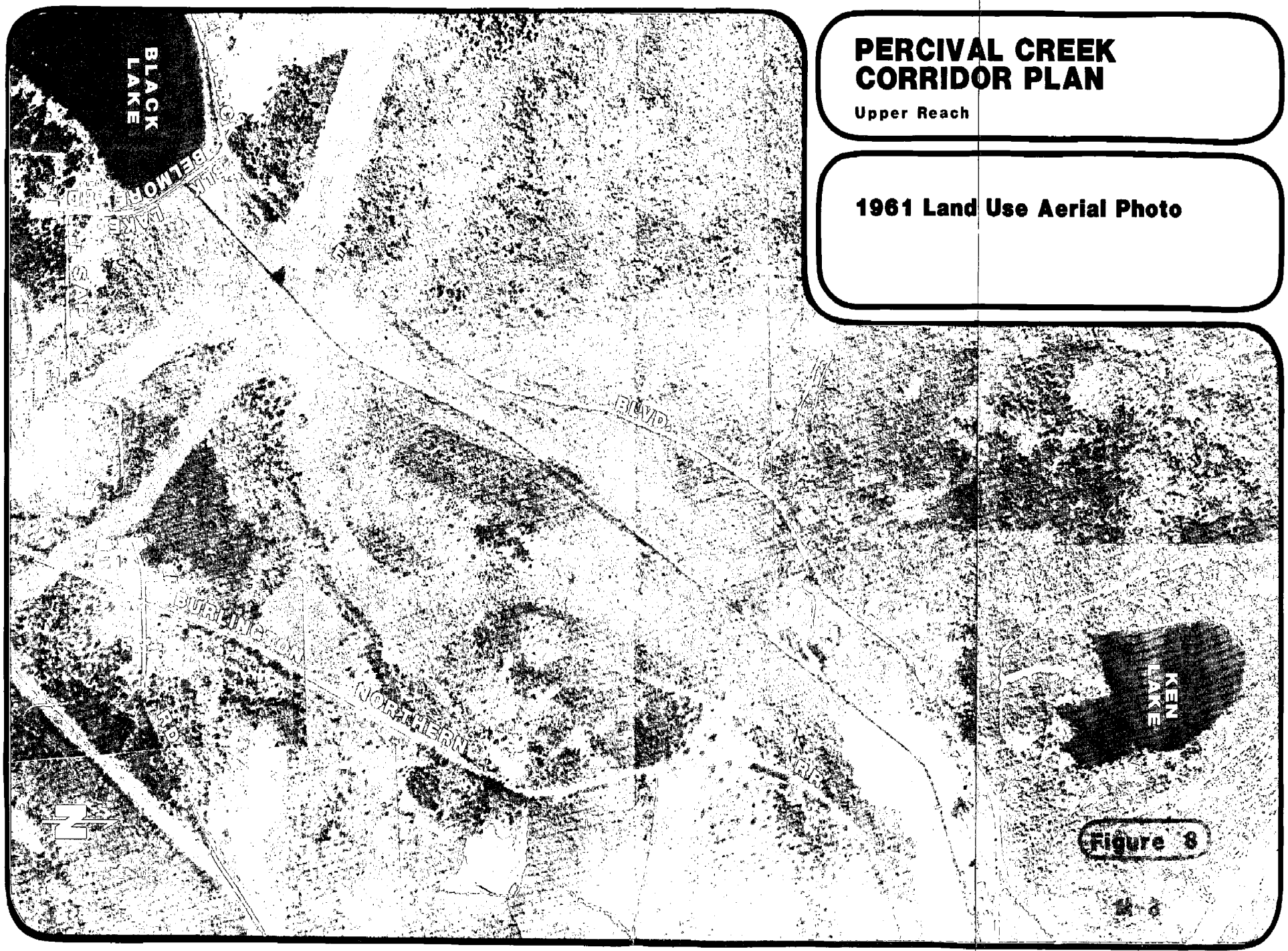
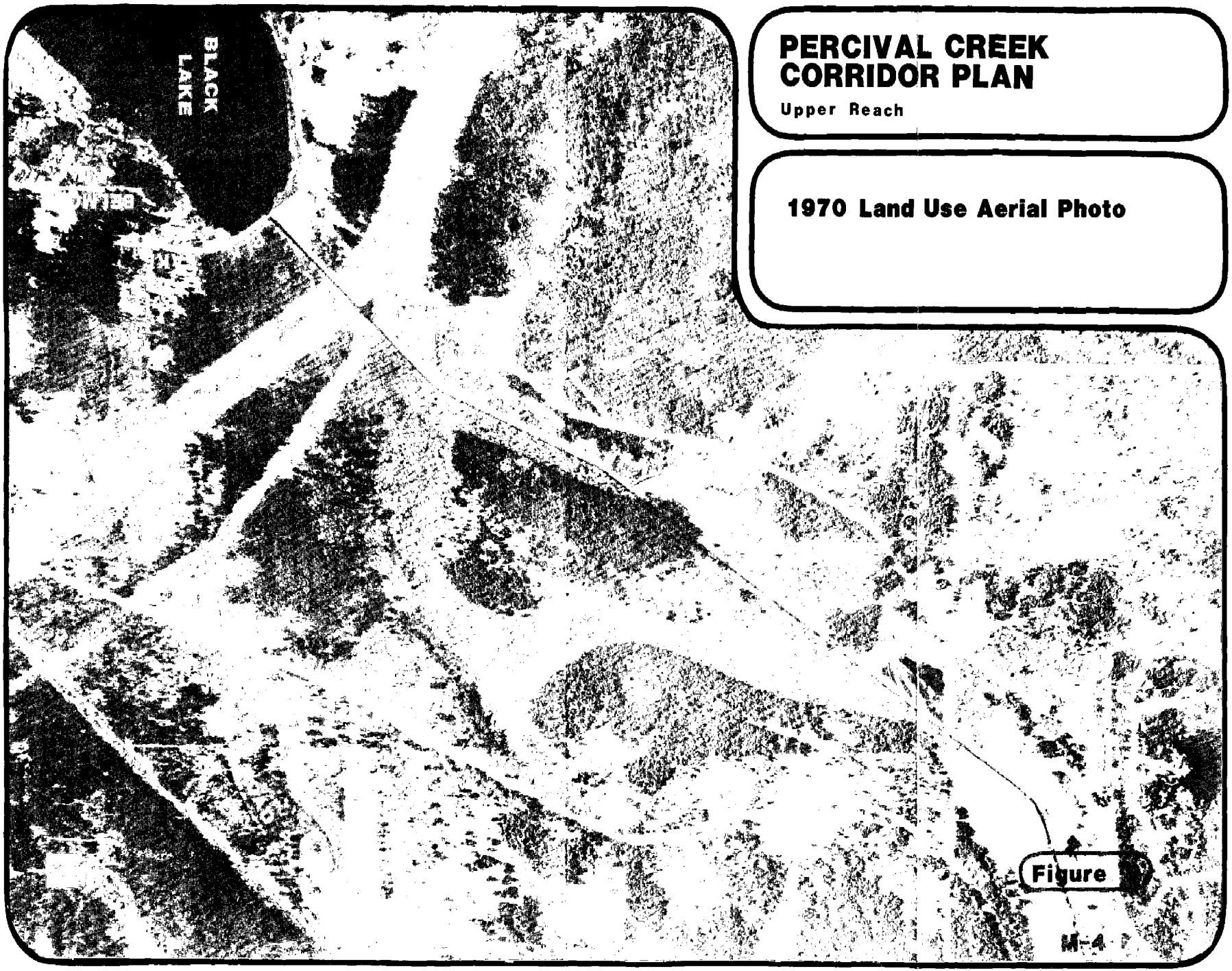


Figure 8

PERCIVAL CREEK CORRIDOR PLAN

Upper Reach

1970 Land Use Aerial Photo



Figure

M-4

PERCIVAL CREEK CORRIDOR PLAN

Upper Reach

1977 Land Use Aerial Photo

PERCIVAL CREEK CORRIDOR PLAN

Upper Reach

1983 Land Use Aerial

Figure 11

M-6

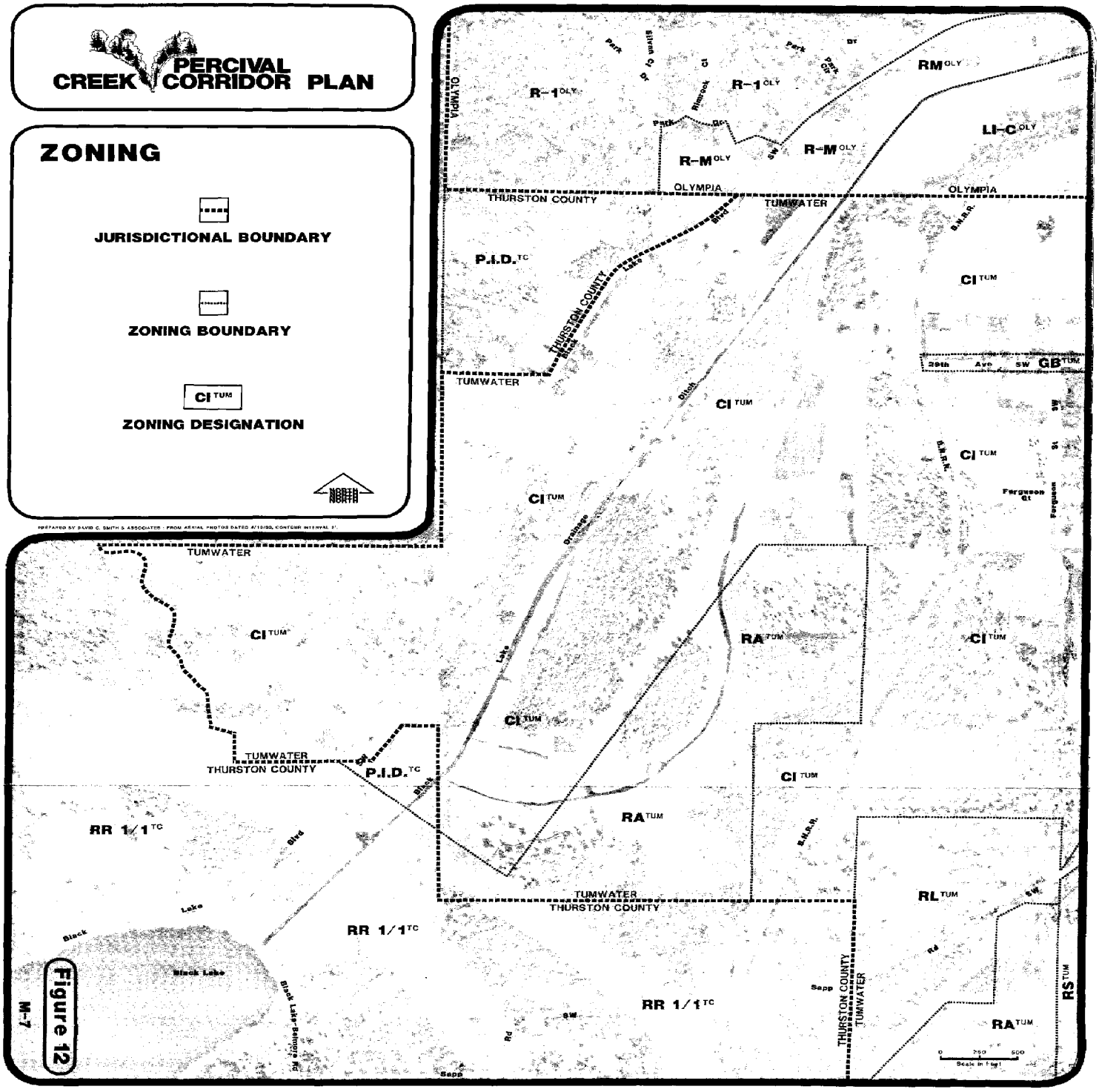

PERCIVAL CREEK CORRIDOR PLAN
ZONING
JURISDICTIONAL BOUNDARY
ZONING BOUNDARY
CI TUM
ZONING DESIGNATION
NORTH
R-1 OLY
R-1 OLY
RM OLY
LI-C OLY
R-M OLY
R-M OLY
OLYMPIA
THURSTON COUNTY
TUMWATER
OLYMPIA
P.I.D. TC
CI TUM
29th Ave SW GB TUM
CI TUM
CI TUM
CI TUM
CI TUM
RA TUM
CI TUM
CI TUM
CI TUM
TUMWATER
THURSTON COUNTY
P.I.D. TC
RA TUM
RR 1/1 TC
RR 1/1 TC
RR 1/1 TC
RL TUM
RA TUM
RS TUM
TUMWATER
THURSTON COUNTY
THURSTON COUNTY
TUMWATER
Black Lake
Black Lake-Belmore Rd
Ditch
Drainage
Lake
Black
Blvd
Sapp
Rd
Ferguson St
Scale in Feet

Figure 12

PERCIVAL CREEK CORRIDOR PLAN

SHORELINES

200' EITHER SIDE OF DRAINAGE DITCH

F.E.M.A. 100-YEAR FLOOD PLAIN

WETLANDS

NORTH

PREPARED BY DAVID G. SMITH & ASSOCIATES - FROM AERIAL PHOTOS DATED 4/13/89, CONTOUR INTERVAL 2'.

Figure 13

M-8

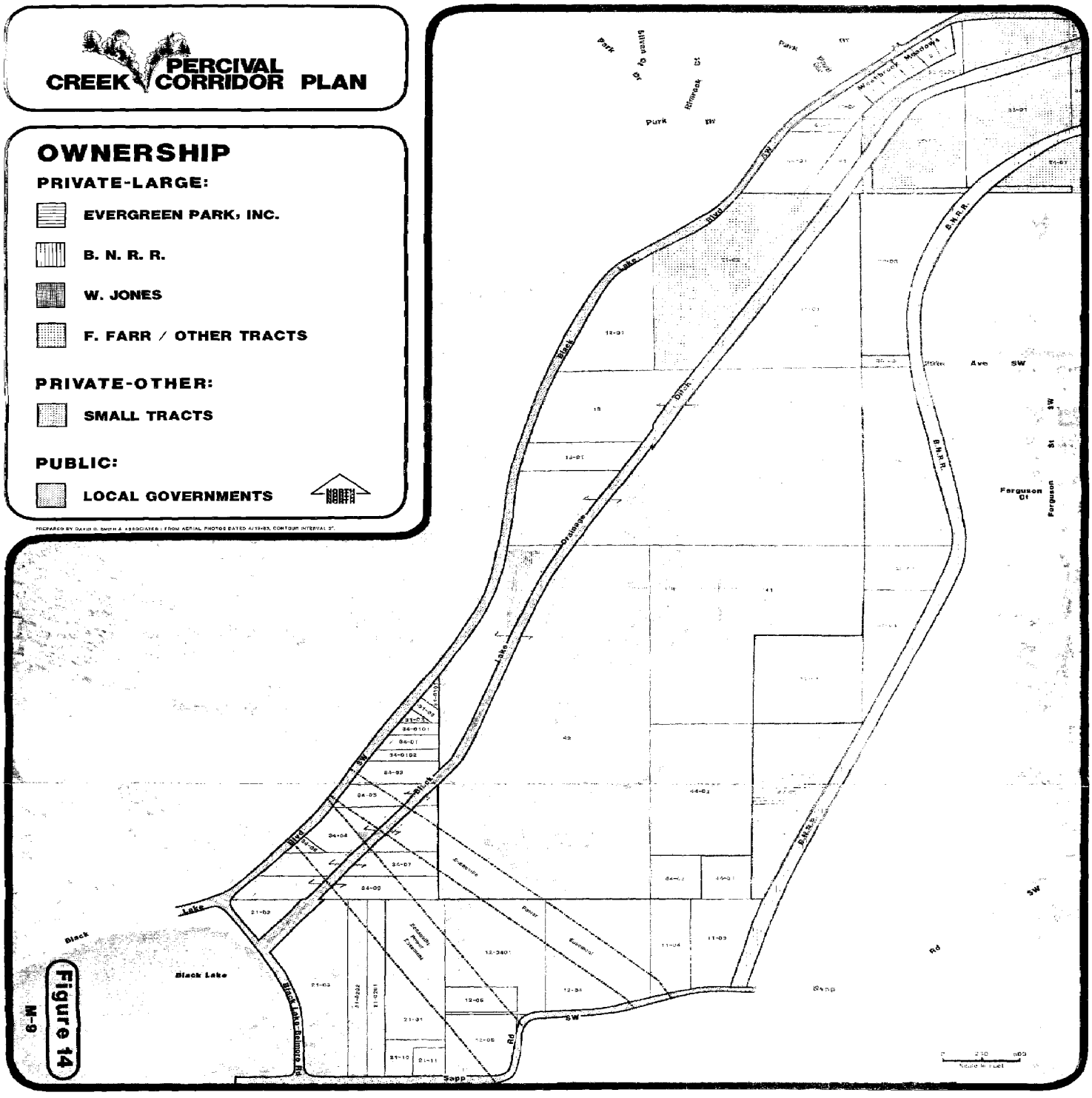

CREEK PERCIVAL CORRIDOR PLAN
OWNERSHIP
PRIVATE-LARGE:
EVERGREEN PARK, INC.
B. N. R. R.
W. JONES
F. FARR / OTHER TRACTS
PRIVATE-OTHER:
SMALL TRACTS
PUBLIC:
LOCAL GOVERNMENTS
NORTH
Black Lake Blvd SW
Black Lake Drainage Ditch
B.N.R.R.
Ferguson Ct
Ferguson St SW
Black Lake
Black Lake-Belmore Rd
Sapp Rd
Sapp Rd SW
Scale in Feet

Figure 14

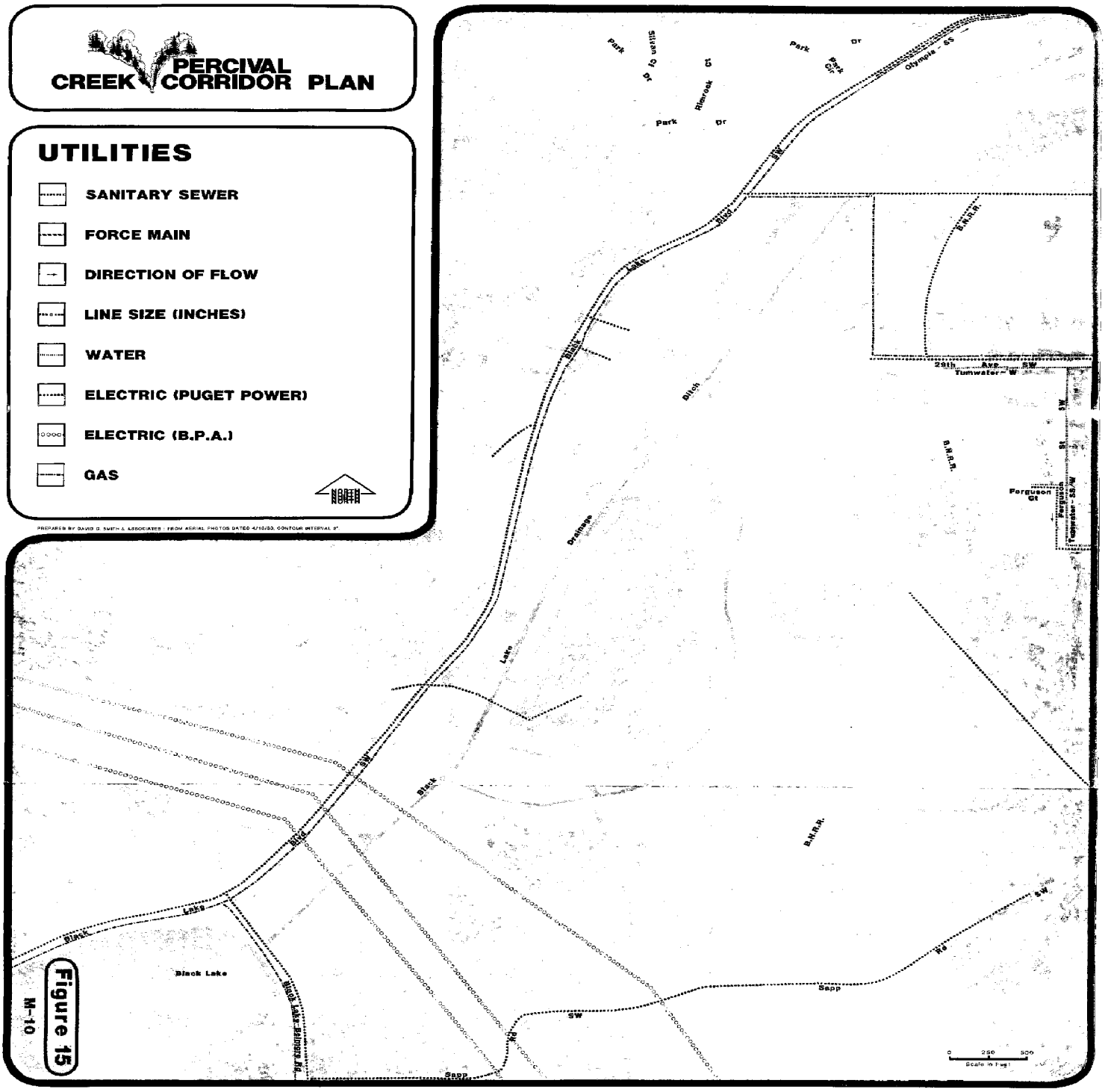
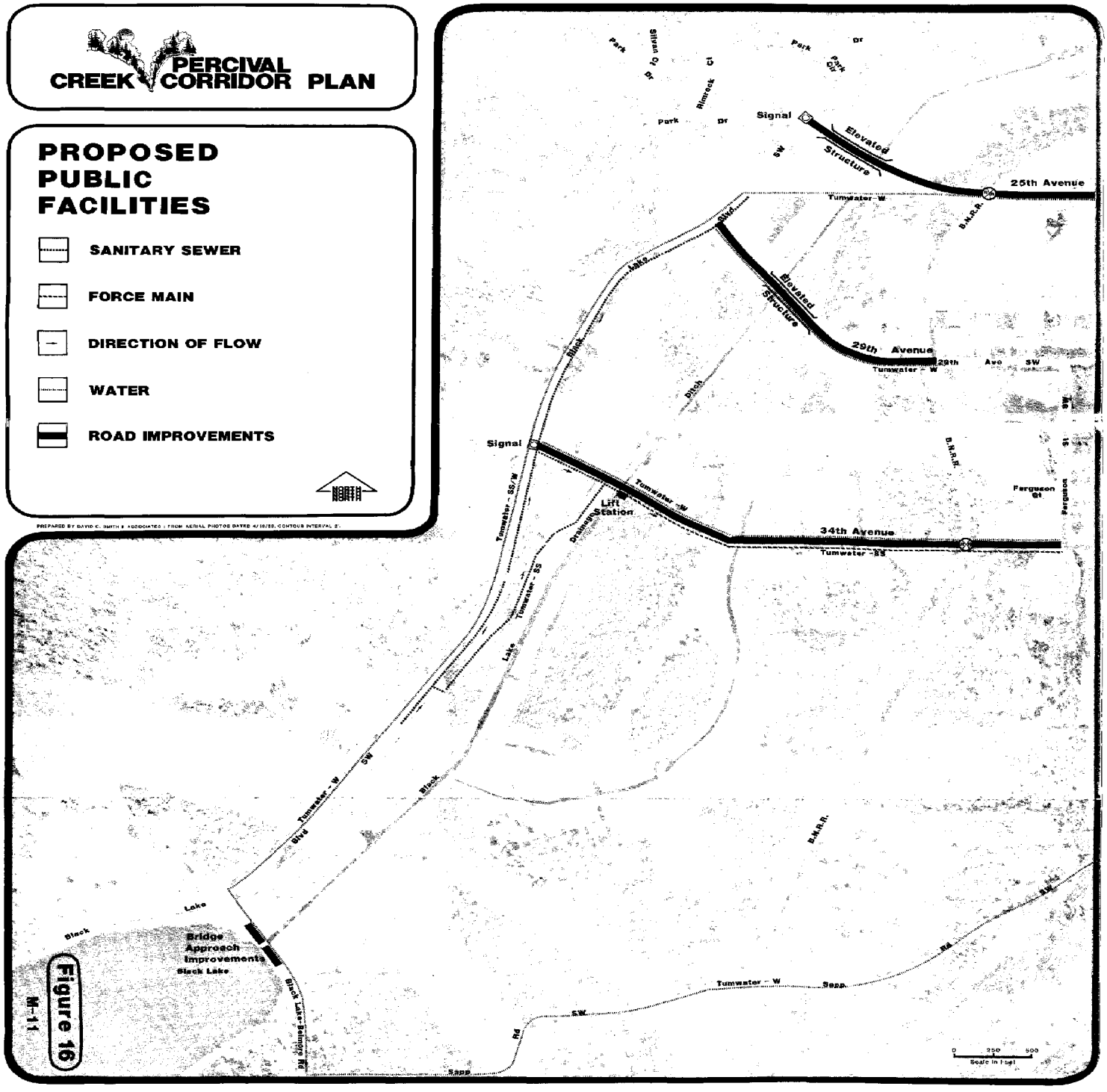


Figure 15

M-10


PERCIVAL CREEK CORRIDOR PLAN
PROPOSED PUBLIC FACILITIES
SANITARY SEWER
FORCE MAIN
DIRECTION OF FLOW
WATER
ROAD IMPROVEMENTS
NORTH
PREPARED BY DAVID C. SMITH & ASSOCIATES : FROM AERIAL PHOTOS DATED 4/19/89, CONTOUR INTERVAL 2'.
Signal
Elevated Structure
25th Avenue
Tumwater - W
B.N.R.R.
Black Lake Blvd SW
Elevated Structure
29th Avenue
Tumwater - W
29th Ave SW
Ditch
Signal
Tumwater - 35/W
Tumwater - W
Lift Station
Drainage Ditch
34th Avenue
Tumwater - 35
B.N.R.R.
Ferguson St
Tumwater - 35
Tumwater - W
Black Lake Blvd SW
Black Lake
Bridge Approach Improvements
Black Lake
Black Lake-Belmore Rd SW
Tumwater - W
Sapp Rd SW
Sapp Rd SW
B.N.R.R.
0 250 500
Scale in Feet
Figure 16
M-11

PERCIVAL CREEK CORRIDOR PLAN

UPPER REACH CORRIDOR MAP

- Shoreline Jurisdiction
- 50' from Ditch O.H.W.M.
- 50' from Ditch Right-of-Way
- Property Lines
- City Limits
- 50' from Surveyed Wetland Boundary

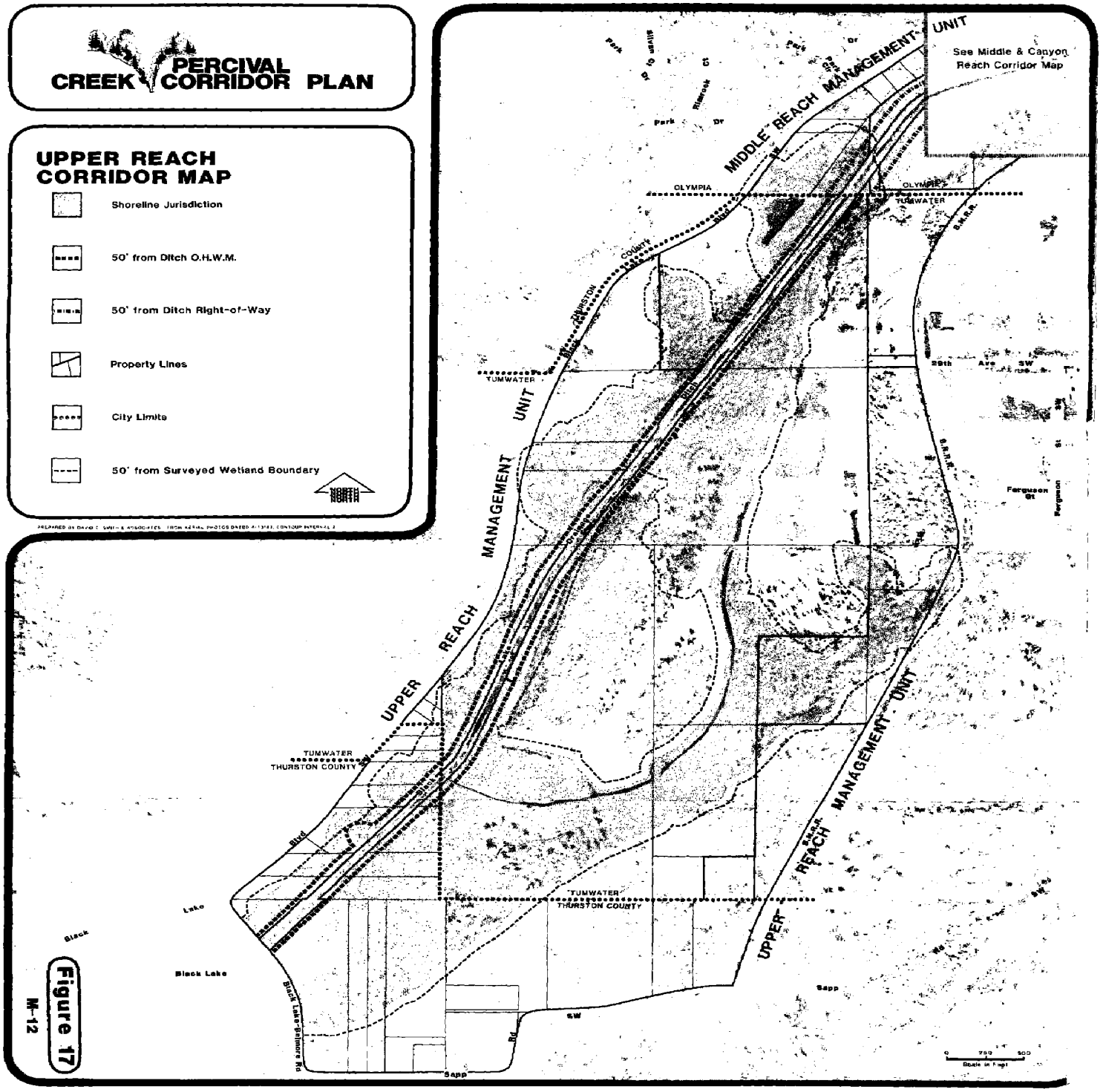


Figure 17

M-12

BRUNSWICK COUNTY THOROUGHFARE PLAN
PROJECT OBJECTIVES

A county thoroughfare plan enables the County government to become actively involved in the selection of improvements and new construction of its highways. This plan, if adopted by the Department of Transportation and Highway Safety, will become an active part in the states comprehensive transportation plan for Brunswick County.

A thoroughfare plan should be based on present and projected traffic volumes, topography, land-use, location of major traffic generators, origin-destination data, and other related consideration of mass transportation

The objectives of this plan are:

1) Develop short range, high priority rights-of-way
2) Develop priorities for county road improvements
3) Develop priorities for new road construction
4) Develop association between adopted land use plan and transit priorities.

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Thoroughfare Classification System 3

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Implementation 17

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