



**Draft
Environmental
Impact
Statement**

Prepared For
DEPARTMENT OF GENERAL ADMINISTRATION
STATE OF WASHINGTON

JULY 1976

CH₂M  HILL

State of Washington

DANIEL J. EVANS, Governor



DEPARTMENT OF GENERAL ADMINISTRATION

KEITH A. ANGIER, Director

218 GENERAL ADMINISTRATION BUILDING, OLYMPIA, WASHINGTON 98504

Subject: Capitol Lake Recreation Plan - Draft
Environmental Impact Statement

This Draft Environmental Impact Statement for the proposed Recreation Plan for Capitol Lake is submitted for your review and comments. This statement has been developed concurrently with the Recreation Plan for Capitol Lake and with a Restoration Plan Engineering Report and its Draft EIS.

A public meeting has been scheduled for 25 August 1976 to receive your comments and discuss the impacts of the proposed Recreation Plan. The meeting will be held in the General Administration Building auditorium at 7:00 p.m. If you wish to present written comments, please send them by 31 August 1976 to:

George C. Garris, Manager of Facilities Planning
Department of General Administration
106 Maple Park
Olympia, Washington 98504



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S9640.D6.00



INTRODUCTION

ACTION SPONSOR

Department of General Administration, State of Washington

NATURE OF PROPOSAL

A plan is proposed for recreational development of newly formed public shorelands bordering Capitol Lake. New land area would be created from silt and sand dredged from the lake during the related lake restoration program.

The recreational development program would add 30 acres of landscaped grounds and 15 acres of marsh. Two beaches with 1/4 mile of waterfront are proposed along with 9-1/2 miles of walking and bicycle trails. An additional 8,400 feet of shoreline would be accessible to the public. Virtually all of the proposed development would occur in the middle and lower (north) basins; little change is proposed to the existing natural quality of the upper basin.

LOCATION

Capitol Lake, Olympia and Tumwater, Thurston County.

LEAD AGENCY

Department of General Administration

Responsible Official: Division of Facilities Planning

AUTHORS AND PRINCIPAL CONTRIBUTORS TO THE EIS

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assessment

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SUMMARY

PROPOSAL AND OBJECTIVES

The proposed action would develop a recreation plan for approximately 45 acres of new shorelands created by the dredging of Capitol Lake. The major objective of the plan is to provide recreational opportunities that meet public needs and enhance the lake's existing aesthetic, wildlife, and fisheries resources. Most of the recreational uses meeting these criteria are relatively quiet, passive activities.

DIRECT AND INDIRECT IMPACTS ON THE ENVIRONMENT

Physical Environment

Earth

No adverse impacts on soils, geology, or topography are anticipated. Positive impacts on soil will occur through fertilization and enrichment associated with landscaping. Contouring of the new shorelands will provide a more interesting topography.

Air

Air quality degradation will be minor, with total localized emissions increasing 5 to 6 percent because of recreational traffic. This level assumes recreational trips would be entirely by automobile; emissions would be reduced if public transit becomes a major mode of transportation to the lake.

Water

Water quality degradation will be limited to potential erosion and turbidity during construction and during the period when plantings are becoming established. This is a temporary impact and can be largely mitigated through construction specifications and supervision.

Approximately 127,000 gallons of water per day will be required during the 4 months per year irrigation is required for the new parkland.

Flora

The existing shorelands at the lake are lightly vegetated, so that extensive plantings of native vegetation will be the most apparent positive impact of the plan. The plan also

recommends retaining all existing upper basin vegetation not removed by dredging--a positive impact in terms of wildlife habitat and visual quality.

Fauna

New vegetation will provide additional habitat for wildlife. However, other dominant constraints--proximity to I-5, U.S. 101, Deschutes Parkway, and exposure to a larger number of people--will prevent attraction of the wilder species.

Noise

Noise impacts associated with the plan result primarily from recreation-oriented traffic and are not significant. No proposed uses, with the possible exception of group activities at the Percival Cove gravel pit site or motorboating (if permitted), will produce objectionable noise levels. Existing noise sources such as I-5, U.S. 101, the Deschutes Parkway, and the Burlington Northern marshalling yard will continue to produce the area's highest noise levels and will affect certain passive types of activities.

Light and Glare

Minimal lighting, principally for security and safety, is proposed. No adverse impacts are anticipated in terms of glare or light.

Land Use

No direct impacts to land use are anticipated.

Natural Resources

Impacts to natural resources are primarily positive because the plan provides new vegetated areas with few structures and little commitment of construction materials.

Human Environment

Population

No measurable impacts on population or housing are anticipated.

Economics

The recreation plan's initial 6-year capital improvement program (C.I.P.) will have about \$1,356,700 in capital costs and \$85,440 in maintenance costs. Capital costs projected

beyond the 6-year C.I.P. period total \$930,360. Annual maintenance costs range between \$12,600 and \$25,200 for the 20-year period. All costs are calculated in 1976 dollars and would be subject to inflation increases. The majority of materials used will be purchased within the state, and all salaries are assumed to be absorbed within the state. Spending and respending of salaries will generate additional income within the state of \$6,518,000 to \$10,777,000 over the 20-year period.

Economic benefits will also be associated with increased "recreation day" opportunities. Recreation days are valued from \$0.75 to \$2.25 per person per day for general recreation and \$3.00 to \$9.00 for fishing. Economic benefits from tourism are anticipated, but there is no reliable way to estimate the value of these benefits based on available plan data. A positive impact on property values in the vicinity of the lake is also expected.

Traffic

The primary impact from traffic will be automobile-pedestrian-bicyclist conflicts at crossings. Mitigation measures are proposed to reduce this hazard. Recreation-related traffic congestion may occur at the northeast corner of the lower basin and the southwest corner of the middle basin due to parking and turning limitations on peak days. Increases in traffic volume on adjacent streets will be insignificant.

Energy

Direct energy impacts will be insignificant because a minimum number of structures are proposed. Construction energy requirements would be similar to any land grading and landscaping project.

Indirect energy impacts are associated with reliance on the private auto as the probable means of transportation to and from the lake. The recreational development of Capitol Lake offers significant advantages over development of comparable facilities at a suburban location because the lake's proximity to the downtown area and the Capitol campus requires less driving.

Utilities and Health

No significant impacts to utilities or to human health are anticipated.

Aesthetics

A major positive effect of the plan will be the improved visual attractiveness of the lake shoreline. Improvements will be noticeable in the panoramic view of the lake and in individual view experiences at points around the shoreline of the lake. More shoreline access will allow greater enjoyment of the lake.

Recreation

Recreational impacts are considered generally positive and favor passive recreational activities. This appears consistent with community attitudes and desires. The plan does not provide for initial development of a continuous trail along the east shore of the middle basin because of possible adverse effects to private property owners. However, there are also disadvantages to the same residential property owners from the present plan's proposed street-end trail connections.

The plan does not provide for motorboating because of stated user preferences and noise and water quality considerations; this could be considered an adverse impact by those wishing to engage in this activity on Capitol Lake.

Archeological and Historical Significance

No impacts to archeological or historical resources are expected. Provision is made in the plan for including interpretive centers and archeologically and historically significant sites in the master plan, if feasible.

ALTERNATIVES

Most alternatives to the project involve active sports facilities, which are not consistent with user preferences. Such facilities would probably conflict with other goals and uses of Capitol Lake. More active sports would require more structures, which would increase construction and maintenance costs, and would produce higher levels of noise offensive to many other users. Motorboat use in particular would present noise and water quality problems to both people and wildlife.

A "no action" alternative is not considered feasible because this would imply leaving dredge spoils in a raw, unvegetated state.

Other alternatives involve location changes for trails, boat launch ramps, and parking facilities; changes in the proportion of park area devoted to grass and natural areas requiring

mowing and irrigation; and changes in management practices such as motorboat regulations.

MITIGATION MEASURES

Soil erosion and turbidity during construction and the initial growing period for plants can be controlled by use of sediment basins and timely seeding of cover vegetation.

Unnecessary disturbance to wildlife in the upper basin can be minimized by restricting trail and bridge construction to times other than nesting or breeding seasons.

Noise associated with construction equipment can be minimized by muffling in accordance with contract specifications.

Pedestrian-traffic conflicts can be minimized by controlling access points to the Deschutes Parkway and other streets and by installing signals at crossings if warranted.

Adverse impacts to wildlife (especially in the upper basin and southwest corner of the middle basin) due to trail location and increased human contact may be minimized by trail location adjustments when final construction drawings are made. This should be done in cooperation with terrestrial and aquatic biologists.

UNAVOIDABLE ADVERSE IMPACTS

Capital and maintenance/operation monies will be irrevocably committed. Temporary adverse impacts during construction will include some erosion and lake turbidity, minor noise from construction activities, and limited traffic congestion from construction equipment.

A slight increase in traffic volumes will have minor local adverse impacts in air quality and traffic congestion.



DESCRIPTION OF THE PROPOSAL

NAME OF PROPOSAL

Capitol Lake Recreation Plan

SPONSOR

Washington State Department of General Administration

LOCATION OF PROJECT

Cities of Olympia and Tumwater, Thurston County (see figure 1)

BACKGROUND

The proposed recreation/restoration program was developed after a thorough analysis that included the following factors:

- **Physical.** Climate, wind patterns, sun, soils, slopes, and geology.
- **Biological.** Forests and vegetation, sensitive environmental areas, and bird and wildlife habitats.
- **Man-related.** History, land use and ownership, transportation, user demand and need, visual resources, recreational uses, and public opinion.

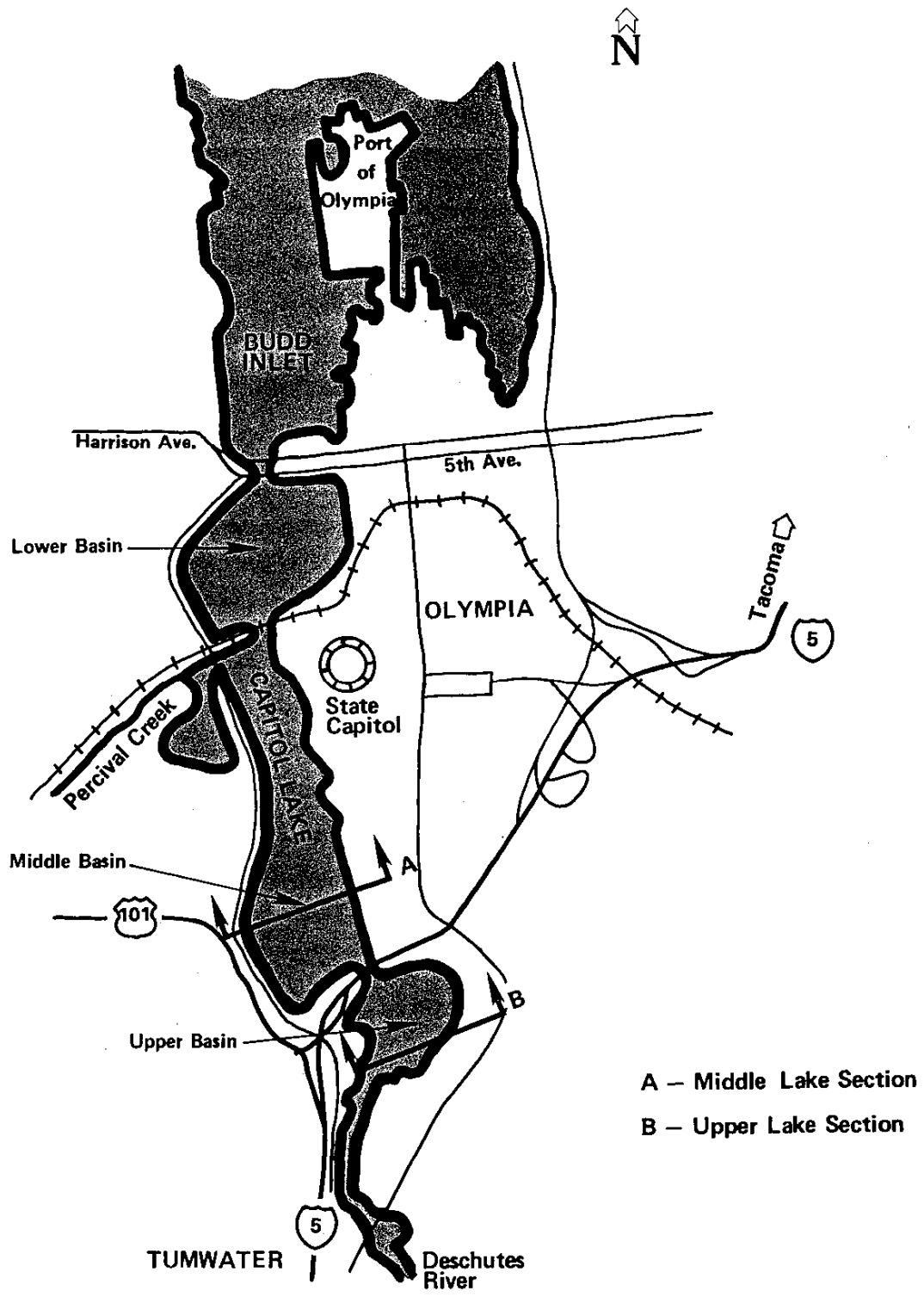
PROPOSED PLAN

A brief outline of the proposed activities is given below. A more detailed description may be found in the *Recreation Plan Design Report*.¹

Upper Basin

A nature trail connected with the Olympia watershed will encircle the entire basin. Pedestrian bridges will be located north of the old brewery building and under the I-5 structure. The boat ramp will be removed and the channel island will be replanted to form 3.5 acres of marsh. The Tumwater City Park site will be undisturbed. This basin

¹ Richard Haag Associates, et al. July 1976. *Capitol Lake recreation plan design report*. A report for the Washington State Department of General Administration.



Vicinity
Map 1

will retain its natural character and will remain a passive recreation site.

Middle Basin

The major fill of 21+ acres in the southwest corner will be developed with 17-1/2 acres of landscaped grounds. The new areas will primarily accommodate picnicking and fishing. Major berms and extensive planting will partially screen freeway and parkway traffic. A 600-foot beach and 4-1/2-acre marsh with nature study facilities will be constructed. The bicycle/foot trail will become a promenade behind the beach, then wind through wooded and open areas along the west shore. Fills in Percival Cove will provide fishing piers and an alternate trail route.

The trail will cross the basin parallel and adjacent to the railroad bridge and rise along the east slope to the Capitol through an extensive planting of rhododendrons, azaleas, dogwood, and other Pacific Northwest ornamentals. At the Capitol grounds, the trail divides and runs to the Capitol building and along the ridge crest to multiple viewpoints and a street end connection. The parking lot at the northwest corner of the Capitol campus will be modified to provide a major viewpoint and interpretive center.

Lower Basin

A trail down the north slope of the Capitol grounds will cross the Burlington Northern tracks to a major landscaped berm between the marshalling yard and the water. The north side of this berm will slope gradually down to a new beach that will be more than 1,100 feet in length. The bicycle/foot trail will separate the beach from the landscaped area, and there will be 8-1/2 acres of open play meadows and sequestered picnic groves. A trail along the south side of this berm will allow people to watch trains safely. The trail continues along the lake edge to the existing beach and park and crosses the dam. A new boat ramp will be provided in the vicinity of the existing parking lot at the east side of the lower basin.

The Percival Cove gravel pit will be contour terraced to provide a meadow and an open playfield of over 4 acres. This site will also have a children's play area and parking for about 40 cars.

CONSISTENCY WITH PROPOSED LAND USE AND ZONING

The proposed development plan is consistent with proposed land use plans and zoning ordinances for the entire area

except the Burlington Northern property east of the marshaling yard and below the Capitol campus. This area is designated for multifamily residential use by the City of Olympia.

The proposed parking lot modification on the Capitol campus is consistent with the present Capitol campus long-range master plan, which shows landscaping in a portion of the existing "temporary" lot.



EXISTING CONDITIONS

A complete inventory of existing conditions in the Capitol Lake area was conducted in conjunction with development of the proposed dredging program for Capitol Lake. To avoid duplication, only those aspects relevant to the proposed recreation plan are summarized in this section. The full inventory may be found in the *Draft Environmental Impact Statement, Capitol Lake Restoration*.¹

PHYSICAL ENVIRONMENT

Earth

Capitol Lake is situated in a deep gorge cut in glacial deposits by the Deschutes River. Subsequent to glacial retreat and melting of the continental ice sheets, the lower portion of the gorge was transformed into a marine bay (Budd Inlet) and delta formation began at the mouth of the Deschutes River. After Capitol Lake was formed in 1951, sediment deposition by the Deschutes River became largely confined to the lake.

The bottom of the lake consists of fine-grained sediments, with coarser sediments lining the main channel of the Deschutes River. Clayey silts and sandy silts are found along the lakeshore in all shallow areas of the upper basin and in the off-channel portions of the middle basin and Percival Cove. Sands and gravels lie under the deeper channels of Capitol Lake and Percival Cove. The glacially derived materials rimming Capitol Lake have weathered to loamy, fine sand and gravelly, sandy loam soils.

Air

Data from the Olympic Air Pollution Control Authority indicate that air quality in the study area is generally good.² The primary source of pollution is vehicle emissions along Interstate 5. The prevailing direction of the wind is south to southwest during the winter and lighter and more variable in the summer. The wind during most of the year is strong enough to disperse air pollutants rapidly. Air pollution episodes occur in late fall and winter under conditions of clear skies and light winds.

1 CH2M HILL. July 1976. A report prepared for the Washington State Department of General Administration.

2 Staff Report, the Olympic Air Pollution Control Authority, 1 August 1975.

Water

Capitol Lake's water level and flow rates are controlled by a tide gate located at the Fifth Avenue Dam. During periods of high tide, normally occurring twice per 24-hour period, flow through the lake virtually stops. When the tide drops, the gate opens, varying the lake's level only slightly under normal conditions.

Flow through the lake averages 405 cubic feet per second (cfs) from the Deschutes River and 30 cfs from Percival Creek. Lake volume is exchanged 130 times a year and as frequently as 3.5 times a day during high flow periods.

Sources of sediment are bank erosion and logging activities in the upper watershed of the Deschutes River and urban runoff in the Percival Creek watershed. Sediment accumulates at an average of 25,000 to 30,000 cubic yards per year and ranges from 4,000 to 60,000 cubic yards per year.

The water quality in Capitol Lake has been contaminated by sewage discharge in the past and was closed to swimming in July 1975. The problem still exists today. Plankton and alga blooms also have reached levels that required swimming closures. Saltwater flushing in the lake has been implemented to control the aquatic growth problems.

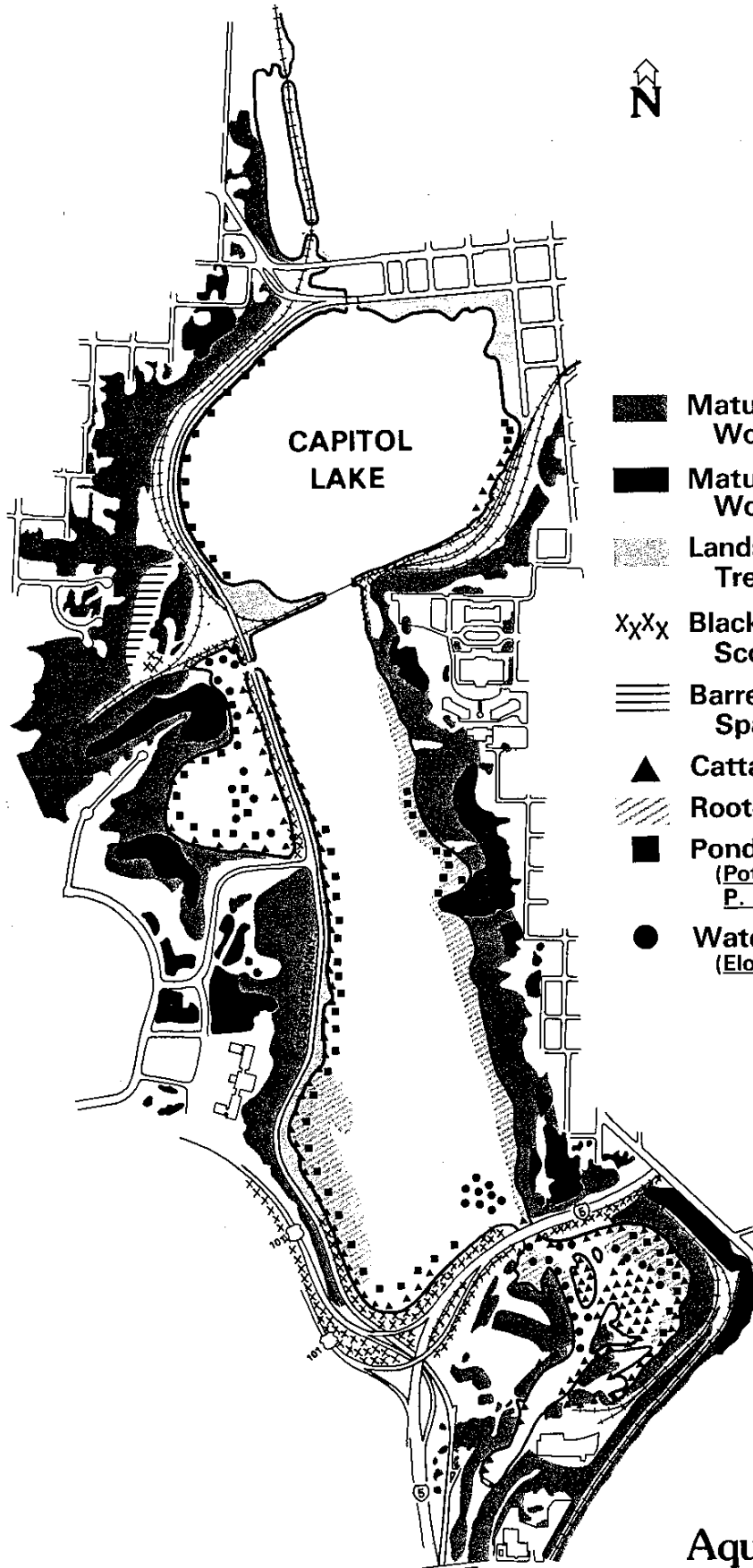
Ground water around the Capitol Lake shoreline can be found at the surface. Wells along the east shore are artesian with flows of up to 30 gallons per minute. The east half of the lake basin has mostly high-yield wells and abundant ground water, although most wells have been abandoned in the city of Olympia. The west half of the basin contains mostly low-yield wells.








Flora

A great diversity of terrestrial and aquatic vegetation is found in the study area. Figure 2 shows the general distribution of these species. A detailed species list is shown in appendix A.

The terrestrial flora includes cattail growth along the perimeter of the lake. Mature Douglas-fir stands are distributed throughout the basin. Secondary trees include generous growths of maple, alder, and willow trees. Thickets of vine maple, salmonberry, and blackberry are also abundant.

A narrow strip of landscaping lies between the Deschutes Parkway and the western shoreline of the middle basin. Grass, shrubs, and flowering cherry trees have been planted.



-  Mature Mixed Deciduous Woods
-  Mature Mixed Conifer Woods
-  Landscaped (Grasses, Trees, Shrubs)
-  Blackberry, Grasses, Scotch Broom
-  Barren Land and Sparse Grasses
-  Cattails (*Typha latifolia*)
-  Rooted Aquatics
-  Pond Weeds (*Potamogeton pectinatus*, *P. crispus*, *P. foliosus*)
-  Water Weeds (*Elodea canadensis*)

Terrestrial & Aquatic Vegetation **2**

A park in the southwest corner of the lower basin and a swimming and parking area in the northeast corner of that basin have been landscaped.

The upper basin has flora typical of an area in transition from aquatic to terrestrial plants. Elodea, cattails, and alder are common. Except for three large manmade scars on the western shoreline and at the boat ramp, the ground is well covered by vegetation.

Only a few private property owners have altered the vegetation along the shoreline. Some have cut trees to gain a better view from the eastern ridge, while a few others have replaced natural shoreline vegetation with landscaping.

There are no known rare or endangered plant species in the basins, but some species in the upper basin would be unexpected in an urban setting.

The aquatic flora consists primarily of the plant *Potamogeton pectinatus*, a change from 4 to 6 years ago when dense growths of *Elodea canadensis* were noted. *Elodea canadensis* has been controlled by saltwater flushing. Nearly equal quantities of *Potamogeton pectinatus* and *Elodea canadensis* are found in Percival Cove and the middle basin at depths of 5 feet or less.

Occasionally heavy blooms of *Spirogyra* and *Volvox* have been noted.¹ Some heavy growths of *Cladophora*² were noted in the upper and middle basins. This problem is lessened by the relatively rapid movement of water through the lake system.

Fauna

Dabbling ducks (mallard, pintail, widgeon, and teal) are abundant in the upper basin and in the shallow shoreline areas throughout the lake. These birds graze on submerged vegetation and thrive in the shallow water. Their feeding habits help control some growth of rooted aquatics.

The aquatic and shoreline vegetation is also habitat for a variety of insects. A large number of birds, including wrens, finches, sparrows, and blackbirds, are attracted to this source of food and have been observed in the upper basin during summer and early fall.

Diving ducks (canvasbacks, merganser, goldeneye, and scaup), as well as kingfishers and grebes, have been observed in the

¹ Identified by C. A. Lindberg, Biologist, Olympia, Washington, 1975.
² Kral, K. B. 1970. *Water weed chemical control program in Capitol Lake in 1969. Progress report.* Washington State Department of Fisheries. Unpublished.

upper basin. This indicates the presence of fish and crustaceans, which are the primary food sources for these species.

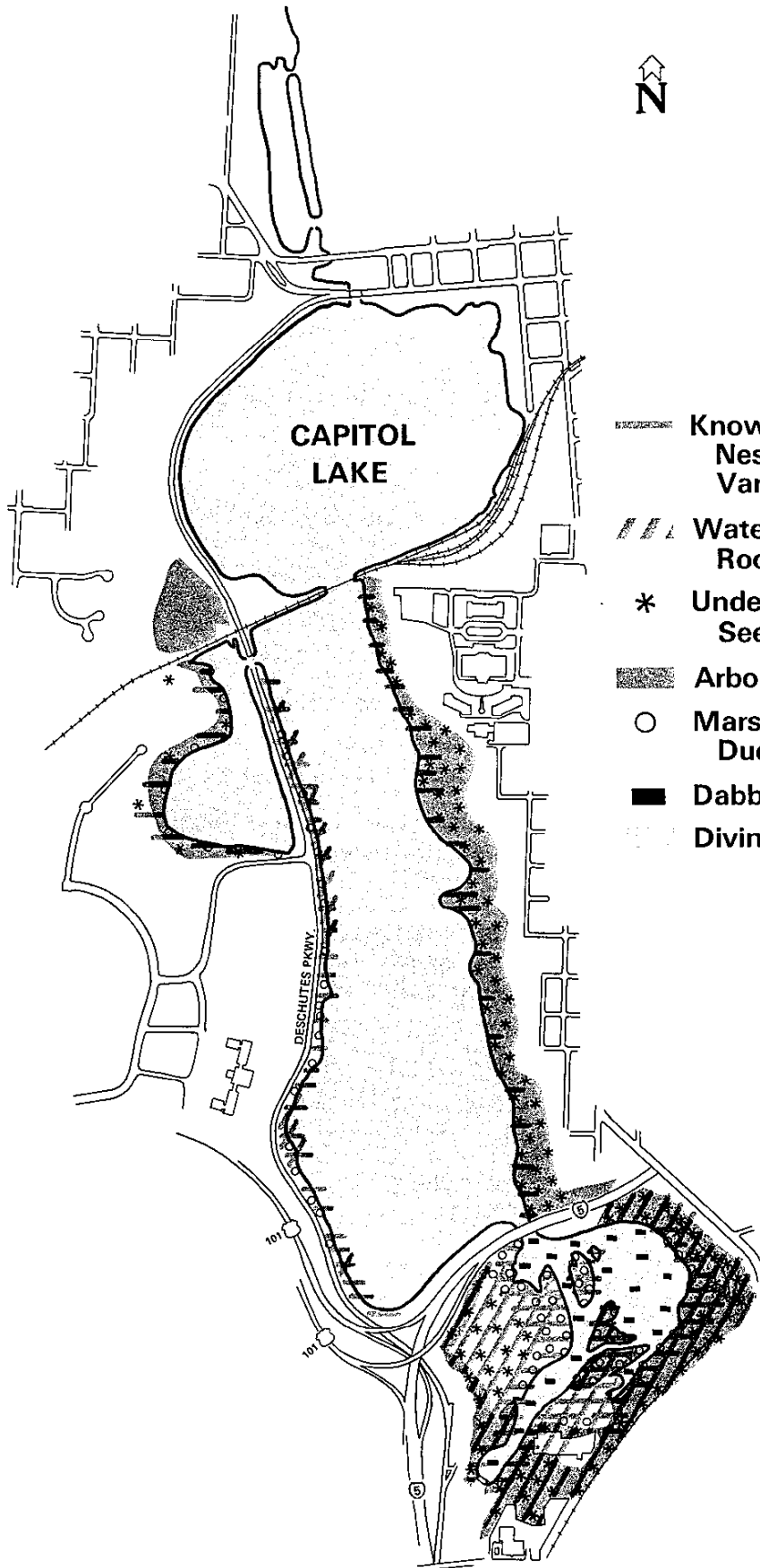
The islands in the upper basin are particularly important as protective cover and nesting and feeding areas for the waterfowl. Muskrat, deer, mink, otter, and beaver have occasionally been observed on the islands.






The fallen trees and underbrush along the lake's banks provide cover for small fish and crayfish. This habitat also offers a resting and feeding stop for birds, particularly waterfowl migrating along the Pacific flyway.

The trees along the steep slopes throughout the study area provide feeding and nesting habitat for arboreal birds (warblers, siskins, chickadees, etc.). Old-growth conifers provide roosting sites and potential nesting sites for hawks and owls. Herons are also found here. Bird habitat types and locations within the study area are shown in figure 3. A list of animal species found in the study is included in appendix A.

Capitol Lake, particularly at Percival Cove, is one of Washington State Department of Fisheries' largest impoundments for fish rearing. Three major salmon culture programs are conducted in the basin.

- Five to ten million fall chinook are transferred annually from nearby hatcheries. These fish are reared and fed in the lake and Percival Cove for approximately 60 days and released to Puget Sound as 3-inch fingerlings. An estimated 75,000 are caught by Washington and Canadian trollers and sport fishermen. Approximately 5,000 are harvested annually by Indian net fishing within inner Puget Sound.
- About 600,000 fall chinook and some spring chinook are transferred to Percival Cove annually as 4-inch fish when summer water temperatures permit. These are reared until March and released as 8-inch fish. The primary contribution is in the southern Puget Sound sport fishery and, to a lesser degree, a terminal net fishery. Adult salmon are passed upstream for natural spawning.
- Egg-taking facilities are located at Tumwater Falls. At these facilities as many as 10 million eggs are taken each fall for use by the Department of Fisheries.



-  Known and Probable Nesting Areas for Various Species
-  Waterfowl (Including Heron) Roosting Habitat
- * Understory, Fruit and Seed-Eating Bird Habitat
-  Arboreal Bird Habitat
- Marsh Wren, Blackbird, Duck, etc., Habitat
-  Dabbling Duck Feeding Area
-  Diving Duck Feeding Area

The lake has a natural run of salmon in addition to the state's program, comprised of selected salmon allowed to escape from the egg-taking facility. Capitol Lake serves as an important feeding area before this run enters Puget Sound.

Steelhead and cutthroat trout are also found in the lake. Other fish are present but are not significant in numbers or importance at this time.

Noise

There are numerous noise¹ sources around Capitol Lake that cause a relatively high ambient noise level for a recreational lake. Major noise sources include: Interstate 5 which crosses the lake on an elevated structure; the Burlington Northern railroad marshalling yard on the southeast corner of the lower basin; traffic on the Deschutes Parkway and around the bathing beach parking facility; and motorboat and seaplane activity.

Land Use and Land Ownership

Much of the lake's 4-mile shoreline is publicly owned and is designated for recreational use in existing land use plans. Although most of the steep slopes around the lake are privately owned, they have not been developed significantly. Private residential property is found along the east shore of the middle basin. About half the upper basin is in private ownership, with the Olympia Brewing Company owning the largest area. Burlington Northern Railroad owns land that includes a marshalling yard in the southeast corner of the middle basin.

The Washington Department of General Administration has legal responsibility for management of the lake. The State Department of Natural Resources has responsibility for adjacent state-owned uplands, and the state maintains a strong interest in the fishery resources of the lake. The Cities of Olympia and Tumwater, and the Thurston County Regional Council of Governments share planning jurisdiction over the surrounding study area.

All comprehensive plans designate the lake and publicly owned shorelands for recreational use. The City of Tumwater maintains the undeveloped Deschutes Park on the southwest shore of the upper basin. The City of Olympia's Six-Year

¹ Ambient noise level measurements by CH2M HILL staff have been used along with traffic noise estimates and projections, in determining impacts of the proposed plan.

Capitol Improvement Program calls for development of a park at the mouth of Percival Creek on the land immediately abutting Capitol Lake and on the slopes on both banks of the creek. The state already maintains a park in the southwest corner of the lower basin and along the Deschutes Parkway.

The Thurston County Regional Shoreline Management Plan designates most of the shoreline as a "Conservancy Environment," limiting development to ensure continuous use for public recreation. The only exception is the northeast corner of the lower basin which is designated as "Urban Environment."

Burlington Northern has considered developing its marshaling yard as a complex of condominiums, apartments, and housing for the elderly at some point in the future, but the market cannot support such a project at the present time.

HUMAN ENVIRONMENT

Population

Population in 1976 for the Olympia-Tumwater-Lacey area was 85,900; for Thurston County, 91,751¹. The county population has been increasing at an annual growth rate of 3 percent.

Total employment in the county was 32,037 in 1972. The largest employers were the government, with 13,875; retail trade, with 4,278; and manufacturing, with 2,566. The estimated current median income of \$15,200 is growing at an annual rate of 6.4 percent.

Economics

The economic value of Capitol Lake and Percival Cove centers on their use as a local recreation area and as one of the largest salmon-rearing facilities in the state of Washington. Recreational uses are more thoroughly covered in a following section.

About 6 million fish were reared in Percival Cove in 1973. A plant of 5 million salmon in Capitol Lake, costing about \$20,000, would "contribute about 112,000 salmon having an approximate harvest value of \$1,500,000 to the sport and commercial fisheries,"² according to the State Department of Fisheries. This major program is the mainstay of chinook (blackmouth) production for the sport fishing industry of southern Puget Sound.

¹ Statistics in this section were obtained from the Thurston County Planning Office.
² Washington State Department of Fisheries, 13 May 1973. Letter to Capitol Lake Coordinating Committee.

Traffic

The Deschutes Parkway along the west side of the lake serves as an alternate north-south traffic route for Olympia's central business district. In the master street plan, it is considered a local street. Connections to other streets at both the north and south ends of the lake are poor, and rely heavily on other streets and bridges to complete desired involvements.

Interstate 5 crosses the lake on an elevated structure dividing the upper basin from the middle basin. Connection to it near the lake is difficult. There is an off-ramp from I-5 south of the brewery; an on-ramp ties in directly in front of the brewery, but it can only be approached from the south or from the east. Traffic from the north or in the vicinity of the lakes cannot negotiate the sharp turn required to use that on-ramp. The only other access to I-5 in the vicinity of the lake is from SR 101.

SR 101, a 4-lane expressway, interchanges with Interstate 5 at the south end of the lake. Evergreen Park Drive forms an at-grade intersection with SR 101 less than 1 mile west of Interstate 5.

The only surface-street arterial corridor with east-west continuity is the system formed by Martin Way, the State-Fourth one-way couplet, Fourth Avenue as a two-way roadway, Harrison Street, and Mud Bay Road. The one-way couplet becomes a two-way street on Fourth Avenue in the vicinity of Water Street. From this point westerly, both Fourth and Fifth Avenues are two-way streets which carry all traffic across the bridges over the Capitol Lake outlet. The only access to the Deschutes Parkway from this east-west street system is from Fifth Avenue.

Utilities

A number of sewer and storm sewer outfalls enter Capitol Lake and Budd Inlet as reported in the draft EIS for the Capitol Lake Restoration Plan. An elevated powerline and a submerged sewer main in the upper basin are the only utilities with a right-of-way in the study area. Parking lot and watershed drainage from the Greenwood Inn area flows into the south end of the middle basin, causing sediment deposits.

Health

Capitol Lake has been closed to swimming in the past because of high coliform counts in the water. Extremely poor visibility (6 inches) caused by alga blooms has hindered and endangered swimmers.

Aesthetics

As a scenic focal point for the land surrounding it, the lake provides an aesthetically dramatic setting for the state capitol buildings. Residents and tourists place a high value on the lake's visual qualities; this value is demonstrated in goals developed by public and private agencies for preservation of the lake (see appendix B). A most striking feature is the view of the Capitol campus and wooded slopes reflected in the lake surface. Many photographers and visitors have commented on this unique panorama. The lake can be viewed from vistas on surrounding hills that rise as much as 125 feet above the lake, as well as from the lakeshore and parkway. Exceptional views of the lake are afforded from several points along the edge of the Capitol campus and from the proposed courthouse complex site. Nearly the entire eastern shoreline of the lake to the crest of the hillside is undeveloped and undisturbed. The contrast of dense forest, lake, and capitol structures provides a scenic quality that is extremely unusual in an urban setting.

Recreation

The recreational value of Capitol Lake is one of its most important features. Activities include boating, swimming, fishing, leisure driving, sightseeing, bird-watching, photography, and picnicking.

A special attraction on the lake is the annual Capitol Lakefair. The purpose of this event is to provide recreation, fun, and fellowship and to bring attention to Capitol Lake as an important recreational area. More than 50 events occur during this 3-day festival each July. The president of Lakefair has noted: "The economic effect of Lakefair cannot be measured in dollars which come into the community. Nor can the number of visitors drawn to this community for the first time as a result of Lakefair be measured."¹ Lakefair, Inc. estimates that over 100,000 persons are attracted to the event each year.

Boating and swimming, although sometimes hindered or prevented by the lake's condition, take place in the lower and middle basins. Several property owners on the eastern shore of the middle basin have small boat docks. One boat ramp is located in the northwest corner of the upper basin.

Fishing is another popular year-round sport on the lake. Salmon have long been abundant. An estimated 12,840 man-hours of sportfishing took place on the lake in the 1973-74

¹ Statement by Steve Masini, President, Capitol Lakefair, Inc., 20 October 1975.

season.¹ A major increase in steelhead fishing had developed in the last 3 years, with as many as 68 fishermen counted on a single day during the steelhead season. The Washington Game Department places the annual Deschutes River catch at 759, based on reports by fishermen.

Each year, many tourists and school children enjoy watching salmon return to the hatchery at Tumwater Falls Park. The fish are also viewed as large salmon are counted, measured, and released upstream. As many as 5,000 spectators a day observe special demonstrations of artificial spawning and egg taking.

Three primary sources for existing community attitudes² toward recreational activities were used in the development of the proposed recreational plan and as an evaluation tool in this EIS. The first was the *Survey of Community Attitudes Toward Park and Recreational Use in Thurston County*.³ The major need identified by this survey was for additional beach access, both salt- and freshwater, in the county. This is registered as an extremely strong need by a ratio of 9:1. The survey also identified fishing, biking, and boating as the three top outdoor activities desired by respondents. The construction of more trails was cited as one of the most critical facility needs.

A second survey⁴ was conducted in order to obtain community opinions on recreational activities more specifically related to Capitol Lake. Respondents to the survey indicated that Capitol Lake is visited frequently even in its present state. The list of favored activities was topped by swimming, with 89 percent of the respondents indicating the need was felt to be either important or very important. Picnicking was second, and fishing was third listing as important, followed by fish-viewing, nature study, nonpower boating, hiking, ball sports, bird-watching, water skiing, motorboating, and train-watching.

Regarding the question of what was most appreciated about Capitol Lake, the largest number of responses concerned the *visual* and *scenic quality* of the lake setting. Swimming, fishing, and the convenience of outdoor recreational opportunities within an urban setting also rated high.

Dislikes cited by respondents centered on the lake's filling in with silt and on its pollution and alga growth problem.

¹ Letter from Washington Department of Fisheries to Port of Olympia, 7 July 1975.

² Summaries of these surveys are given in appendix C of the *Recreation plan design report*.

³ C. Montgomery Johnson & Assoc. March 1976. Report for the Thurston County Parks and Recreation Department.

⁴ GMA Research Corporation. May 1976. *Capitol Lake opinion survey*.

By far the majority of respondents wished the lake to maintain the types of activities and facilities that are presently provided. Other facilities and activities noted as desirable at Capitol Lake included tennis courts, picnic and cooking areas, and bicycle and walking paths. A number of other individual suggestions were recorded.

A number of respondents indicated that they would like to participate in a workshop on the plan. This workshop was subsequently held; comments were incorporated into this plan.

The third source consisted of a more detailed version of the telephone survey, printed and distributed at meetings held during the planning process. The responses were generally consistent with the telephone survey. The questionnaire also measured public opinion toward the goals developed by the concerned organizations, and elicited more specific responses to the plan design. The results are discussed further in appendix C of the *Recreational Plan Design Report*.¹

Archeological and Historical Significance

Capitol Lake, particularly the area around the upper basin, was the site of significant prehistoric and historic activities. Information prepared for the State Capitol Museum² indicates that American settlers began the original settlement of Tumwater in 1845 at the approximate site of Deschutes Way Park.

Two sites along the lake have been registered with the Washington Archeological Research Center in Pullman as prehistoric resources. One 2-acre site in Tumwater Park contains evidence of an Indian fishing village and shellfish collecting site. Artifacts indicate this site may have been a permanent village of the Nisqually Indian tribe for 500 years or more. Another area on the east shore of the lake was probably occupied for hunting and fishing activities. A third site recently discovered along the lake's west shore was most likely a fishing location and contains scattered cultural materials.³

Historic resource sites or structures within the Capitol Lake basin consist of:

- The Olympia-Chehalis Valley Railroad Line (1877). This 15-mile narrow-gauge railroad paralleled the

¹ Richard Haag Associates, et al. July 1976. A report for the Washington State Department of General Administration.

² Derek Valley, studies on Tumwater for the State Capitol Museum.

³ Exact locations of these sites have not been given in this document to avoid the possibility of unauthorized removal of archeologically important materials.

Deschutes River to its mouth and north to Butler Cove.

- Crosby house (1858). A two-story Gothic-style home, this structure is on the National Register of Historic Places and is being preserved and maintained by the Olympia Chapter of the Daughters of the Pioneers.
- The George Biles house (1860). A large two-story structure of Gothic Revival style similar to the Crosby residence.
- Robert Esterly house (1895). This was a two-story Victorian style having an exterior with scrollwork and gingerbread ornamentation.
- Olympia Brewery (1896). Included in the original structures were a boiler or heating plant, an aging house, two brewhouses, a wellhouse and a wharf. Subsequent construction has altered many of the original structures, but the 1907 brewhouse remains.
- James Ott house (1895). A small wood frame structure with scrollwork on the front.
- Long Bridge (1860). A wagon bridge connecting Tumwater and Olympia over Budd Inlet. It was about 1,150 feet long and 15 feet wide. The bridge section over the Deschutes River channel rotated to create a 20-foot channel passage for ships.
- S. N. Cooper mill (1866). (Washington Saw and Planing Mill Co.) Produced doors, sashes, and blinds.
- S. N. Cooper house (1895). Recent information indicates that this was a single-story wood frame structure located south of the Esterly home.
- Abraham Whitemarsh mill (1872). A large two-story structure at the south end of the Long Bridge.
- Mill complex (1870). A collection of mills and factories included the Kendall sawmill, the Esterly mill, and the Pressey chair factory.
- Lincoln flour mill (1864). A six-story wood structure, water powered, four-story grist mill with a capacity of 50 bushels per day.

- Puget Sound Milling Company (1847) . The foundation and piling are still visible.
- Simmons mill (1846-47) . The log structure was located at the base of the falls and on the west bank of the Deschutes River .
- Horton pipe factory (1868) . Wood water pipes were made from wood poles by water-powered drills.
- Washington Waterpipe Manufacture and Water Company (1870) . The former Horton pipe factory, it was converted to a sawmill in 1880.
- Olympia Light and Power Company (1905) . A second powerplant was constructed from cement and stone block at the base of the falls . A metal penstock ran upriver to the dam at the upper falls . The powerplant produced up to 4,500 kilowatts for the Olympia-Tumwater trolley car system and for public use.
- Biles and Carter tannery (1860) . A series of wood frame buildings and several small out-buildings .

■ ■ DIRECT AND INDIRECT IMPACTS ■ ■ UPON THE ENVIRONMENT

The impacts of the proposed recreation plan are grouped under categories of earth, air, water, flora, fauna, noise, light and glare, land use and ownership, natural resources, population, economics, traffic, energy, utilities, health, aesthetics, recreation, and history/archeology. Available information on public values, or attitudes, is included under applicable topics. Public values were obtained primarily through three sources:

- A review of goal statements from the City of Olympia comprehensive plan and from the Capitol Lake Coordinating Committee (appendix B).
- The opinion surveys conducted for Thurston County and for Capitol Lake.¹
- The comments derived from a series of agency and public meetings held during plan development (appendix C).

Impacts discussed in this document deal only with implementation of the recreation plan. Impacts associated with dredging and deposition of dredge spoils around the lake-shore are discussed separately in the EIS for the restoration plan.

PHYSICAL ENVIRONMENT

Earth

Although the Capitol Lake dredging plan is expected to have significant impacts on siltation patterns and on the lake shoreline through creation of new landmasses, the recreation plan will have only a small effect on the geology and soils of the new landmasses. Soil fertility will be improved by the addition of some topsoil and other nutrient material. Initial planting begun as part of the dredging plan will aid in soil erosion control.

Topographic changes caused by the recreation plan will be significant. Impacts will be positive, providing a more varied and interesting landscape scene. Shoreline areas designated for marsh will be sloped gradually into the water to provide shallows for aquatic plant growth and waterfowl habitat. Extensive grading of the dredge spoils is proposed

¹ See appendix C, *Recreation Plan Design Report*.

in the southwest corner of the middle basin and the southeast corner of the lower basin to create berms, or mounds, to provide varied views of the lake and to screen undesired views and to provide noise buffers. The berms will vary in height up to 40 feet. The largest landscaped berm will be placed in the southeast corner of the lower basin between the railroad marshalling yard and the lake. The high point of the berm would support a pedestrian bridge crossing the railroad track to the capitol grounds. The north face of this berm will slope gradually down to the beach. All the berms would be sloped to avoid unstable soil conditions and reduce erosion potential.

Grading at the Percival Cove gravel pit would be limited to contour terracing to provide an informal play meadow.

Air Quality

Air quality impacts were determined by evaluating contaminants from the exhaust of the additional traffic that would be generated by the project. The contaminants include carbon monoxide (CO), hydrocarbons (HC), nitrogen oxides (NO_x), and particulates. To evaluate the severity of the impact, the amount of each pollutant emitted from the additional traffic in the year 2000 was compared to that emitted if no park improvements were made. The methodology used in predicting pollutant emissions and a discussion of health effects and existing standards for each contaminant are given in appendix D.

The emitted quantities of carbon monoxide, oxides of nitrogen, and lead are shown in table 1 for 1976 and table 2 for the year 2000. These amounts are summarized below.

TRAFFIC EMISSIONS (tons/year)

	Year 1976	Normal Traffic	Additional Traffic
Carbon monoxide	950	480	30
Nitrogen oxides	180	105	5
Lead	1.3	1.5	.1

The effects of the recreational traffic generated by the proposed project are small, with an increase in total emissions of only 5 to 6 percent. This is far offset by the reductions from the 1976 levels due to the improvement in automotive emission controls. The analysis assumes that present-day controls are continued and that the percentage

Table 1. AUTO EMISSIONS, 1976

Street Name	Location	Peak-8-hour Vehicle Miles	Speed	Emission Factor (gm/mi)			Emissions (lb/peak-8-hour period)		
				Carbon Monoxide	Nitrogen Oxides	Lead	Carbon Monoxide	Nitrogen Oxides	Lead
I-5	SW	7,560	50	20	6.7		333	112	
I-5	SE	14,880	45	22	6.4		721	210	
U.S. 101	S	12,930	50	20	6.7		570	191	
Deschutes Pkwy.	S	1,300	25	35	5.2		100	15	
Deschutes Pkwy.	W	1,300	25	35	5.2		100	15	
Deschutes Pkwy.	W	1,850	25	35	5.2		143	21	
Deschutes Pkwy.	NW	1,850	25	35	5.2		143	21	
Lakeridge Dr.	W	420	20	44	4.8		41	4	
Fourth Ave.	N	5,600	20	44	4.8		543	59	
Fifth Ave.	N	5,750	20	44	4.8		557	61	
Water St.	NE	60	15	55	4.5		7	.6	
Water St.	NE	170	15	55	4.5		21	2	
Capitol Way	NE	3,780	20	44	4.8		366	40	
Capitol Way	SE	14,250	25	35	5.2		1,100	163	
TOTALS		71,700					4,745	915	6.32

Table 2. PREDICTED AUTO EMISSIONS, 2000

Street Name	Location	Year 2000			Emission Factor ^a (gm/mi)			Emissions (lb/peak-8-hour period)				
		Unaffected Traffic	Additional Traffic	Speed	Carbon Monoxide	Nitrogen Oxides	Lead	Unaffected Traffic	Additional Traffic	Carbon Monoxide	Nitrogen Oxides	Lead
I-5	SW	12,300	--	45	6	2.4		163	65			
I-5	SE	24,400	+	40	6.6	2.3		355	124			
U.S. 101	S	21,100	--	45	6	2.4		280	112			
Deschutes Pkwy.	S	2,150	900	20	12	1.8		57	9	24	4	
Deschutes Pkwy.	W	2,150	800	20	12	1.8		57	9	21	3	
Deschutes Pkwy.	W	3,000	800	20	12	1.8		79	12	21	3	
Deschutes Pkwy.	NW	3,000	900	20	12	1.8		79	12	24	4	
Lakeridge Dr.	W	690	150	15	15	1.7		23	3	5	.5	
Fourth Ave.	N	13,000	550	20	12	1.8		344	52	15	2	
Fifth Ave.	N	5,550	900	20	12	1.8		147	22	24	4	
Water St.	NE	60	100	10	19.6	1.6		3	.2	1	.4	
Water St.	NE	170	530	10	19.6	1.6		7	.6	8	2	
Capitol Way	NE	6,200	--	15	15	1.7		205	23			
Capitol Way	SE	23,400	--	20	12	1.8		619	93			
TOTALS		117,170	5,630					2,418	537	7.74	143	0.37

^a 1990 estimates from Environmental Protection Agency.

of post-1975 cars continues to increase until very few pre-1975 vehicles are on the road in the year 2000. The carbon monoxide and oxides-of-nitrogen emissions would be reduced by 50 percent and 42 percent, respectively. The lead emissions are highly dependent upon the long-range control strategy adopted by control authorities. The factors used result in a predicted 15-percent lead emissions increase due to increased traffic volumes.

Water

The proposed recreation plan will have no appreciable impact on water quality. A positive effect may be that increased soil area and vegetation adjacent to the Deschutes Parkway may help filter and assimilate pollutants washed off the roadway surface. However, the magnitude of this impact will be slight.

The proposed plantings and their timing should minimize erosion and sediment transport into the lake. Some minor lake turbidity could result from landscaping operations, but this would be limited to the several-month period between grading and the time that root growth stabilizes the soil. Adverse weather conditions during this period could increase the seriousness of the impact.

Irrigation for the proposed vegetation will be provided either by well or by a connection to the Olympia municipal system. Water usage for this purpose is estimated at 127,000 gallons per day during the 4-month period from June through September.¹ Irrigation is not proposed during the remainder of the year. This low-level requirement will not impose a burden on the region's water supplies.

Flora

One of the most significant impacts will be to the vegetation within the Capitol Lake basin. The major change in flora would occur through the creation of 30 acres of landscaped park area. Approximately 26 acres would be open grassy areas, with 4 acres of trees, shrubs, and native ground cover. Native and other low-maintenance plant species would be favored. A minimum-care edge is to be provided between planting areas to reduce the requirement for hand labor.

Positive impacts also would include vegetation of a new marshy island area in the upper basin and the creation of a marsh environment in the southwest corner of the middle

¹ This figure is for the initial dredging acreage only; water usage would be approximately double upon completion of the entire plan.

basin (9 acres). Marsh plants for these two areas would be obtained from existing growth in the upper and middle basins and would provide rapid revegetation. A period of 2 to 3 years would be needed to stabilize the new marsh vegetation.

Another beneficial impact is the proposed retention in the upper basin of all native vegetation (except that lost through dredging) and the encouraged retention of all native vegetation on the slopes in the Capitol Lake visual basin. The forested slopes that surround Capitol Lake are in large part responsible for the visual linkage between the lake and the Capitol Campus and the general attractiveness of the lake setting. The plan recommends redesignating the Burlington-Northern property east of the marshalling yard from high-rise residential to open space in order to preserve the critical band of vegetation directly below the Capitol campus.

A positive impact involving vegetation in the lower basin would be the addition of tree plantings at the swimming beach and street tree plantings in the blocks adjacent to the public park. The parking configuration of the existing lot to the southeast of the beach would be realigned to allow for planting islands between the rows of cars.

Because the recreation plan deals principally with new land areas created from deposition of dredge spoils, no adverse impacts to vegetation would result from plan implementation. Impacts to existing vegetation through dredging and spoil deposition were addressed in the *Restoration Draft Environmental Impact Statement*.

Fauna

Mammals, particularly the smaller species, would regain much of the natural habitat lost from dredging in the upper basin. However, it is unlikely that the wilder species such as otter, mink, deer, and beaver will be able to adapt to the new habitat, particularly during initial habitat growth. If a large number of people use the trails and enjoy nature watching, this condition is likely to persist. The impact would be similar for waterfowl species and arboreal birds.

Species most likely to inhabit the new marsh area in the middle basin and the remaining marsh areas in the upper basin will be those that can tolerate close human contact. These include mallards, red-winged blackbirds, crows, and songbirds. Human contact and noise sources will be too close to permit nesting or breeding of the wilder species such as teal, gadwall, pintail, and hawks. This situation

will be especially true if Tumwater Park draws large crowds of people. The upper basin is too small to successfully combine wildlife habitat and activities with large numbers of people.

On the positive side, the quantity of wildlife habitat will be greatly multiplied by the proposed recreational plan. Only the wilder species will lose suitable habitat due to increased contact with people.

Impacts to the lake's fisheries are expected to be generally beneficial. The final grading at the water's edge will produce gradually sloping shallow areas suitable for aquatic growth, insect production, and sheltering of fish fingerlings. Aquatic plantings are also proposed at the water's edge to provide shade and cover in this important life zone.

A possible, but minor, adverse effect upon fish could occur from turbidity caused by erosion of the new soil areas. The plan states that erosion control would be provided. Any turbidity would occur principally because of failure to carry this intent through into construction specifications, inadequate supervision during erosion control planting and grading, or heavy precipitation or flooding before the soil is fully stabilized. In view of the estimated 2 to 3 years required for full stabilization, such condition is a possibility. However, except in the worst weather conditions, the actual effects on the lake's fishery would be minimal due to the small amount of fill in proportion to the total lake volume. Impacts would be most severe in the upper basin and least severe in the middle basin. Steps to offset this problem are discussed further in the section on mitigation measures.

Noise

The noise levels in the lake area have been analyzed¹ both for existing conditions (1975) and for projected conditions in the year 2000.

Noise impacts associated with the proposed recreation plan result primarily from recreation-oriented traffic. No proposed uses, with the possible exception of the amphitheater and boating, would be expected to produce objectionable noise levels. The possible uses of the Percival Cove gravel pit area are not sufficiently known at this time to permit any evaluation of potential noise. The use of motorboats would be severely restricted or prohibited by the

¹ Background information on noise and the methodology used in this analysis are shown in appendix E of the *Recreation Plan Design Report*.

recreation plan, so that noise contributions should be insignificant from this source.

The plan-related increases in noise levels for the year 2000 are shown in table 3. In most cases this increase is negligible.

Table 3. NOISE IMPACTS

	Noise Levels (dBA ^a at 100 ft)							
	1975		2000				Increase From Park Traffic	
	<u>L₅₀^b</u>	<u>L₁₀^c</u>	<u>No Park</u>		<u>With Park</u>		<u>L₅₀</u>	<u>L₁₀</u>
Fourth Avenue	62	74	68	77	69	77	1	0
Fifth Avenue	62	74	63	74	62	74	-1	0
Deschutes Parkway North	52	56	54	58	56	59	2	1
Deschutes Parkway Middle	52	56	54	58	56	58	2	0
Deschutes Parkway South	51	55	53	57	54	58	1	1
Lakeridge Drive	45	51	48	52	49	53	1	1
Capitol Way South	63	74	67	76	67	76	0	0
Capitol Way North	62	74	66	76	66	76	0	0
Water Street South of Fifth	41	46	41	46	47	50	6	4
Water Street North of Fifth	41	46	41	46	45	48	4	2

a dBA is a noise intensity measurement that includes the sensitivity of the human ear in the determination of loudness. A loudness of 60 dBA corresponds to normal speech; 70 dBA, to a vacuum cleaner; 80 dBA, to a garbage disposal.

b L₅₀ is the noise level exceeded 50 percent of the time during the peak traffic hour.

c L₁₀ is the noise level exceeded 10 percent of the time during the peak traffic hour.

NOTE: These noise estimates are based on the assumption that traffic is and will continue to be the dominant noise source, and are based on estimates of present and future traffic.

Lower Basin

The noise levels along Fourth and Fifth Avenues at a 100-foot distance are calculated to have an L₁₀ of about 74 dBA at present. Without the park, this is expected to increase about 3 dBA by 2000 for Fourth Avenue and remain unchanged for Fifth Avenue because of rerouting. On weekends, the

predicted noise levels would probably be about 5 dBA lower during peak hours, thus producing weekend noise levels in the adjacent park within the design L_{10} of 70 dBA. The park project does not influence the future average annual traffic flows on those two streets enough to have any noise impact.

The greatest park-related noise level increases in the study area were predicted for Water Street. An increase of about 10 dBA is predicted for this street in the year 2000, but only 4 dBA will be caused by park-related traffic. The noise levels will possibly be higher due to traffic on Fourth and Fifth Avenues, Columbia Street, and Capitol Way. However, the perceivable impact will be slight because the area is not residential and because of noise from the nearby railroad marshalling yard.

The Deschutes Parkway will only generate an L_{10} of about 59 dBA at 100 feet in the year 2000. This noise level would make several areas along the west side of the lower and middle basins suitable for serenity and quiet.¹ A specific area of low noise level will be the park area and bridge separating the lower and middle basins, except when train traffic uses the railroad bridge.

The provision of berms and planting between the marshalling yard and the lake will provide a visual and acoustic barrier for the marshalling yard. The proposed berms could effect about a 15 dBA reduction at 100 feet; the traffic-generated noise of about 50 dBA from Fifth Street across the lake will then become predominant.

Middle Basin

The southwest corner will be subject to the highest noise levels in the park. Berms can effectively reduce the noise levels from the Deschutes Parkway only; the predominant sources are U.S. 101 and I-5. Both of these are elevated too high to be fully shielded by noise barriers. However, a small excess attenuation² can be expected due to tree plantings on the highway embankment. This attenuation is estimated at about 3 dBA per 100 feet, but will vary depending on the forest density and tree type. Without excess attenuation, the 100-foot dBA levels in table 1 will be about 6 dBA lower at 200 feet and about 6 dBA higher at 50 feet.

With no effective barriers, the L_{10} for the year 2000 will approach 70 dBA at a distance of 300 feet from I-5. At 150

1 An L_{10} of 60 dBA is considered suitable for serenity and quiet. An L_{10} of 70 dBA is suitable for active sports.

2 Excess attenuation is the noise reduction in excess of 6 dBA per doubling of distance outdoors with no barrier of any type.

feet, which is the average point of contact between I-5 and the shoreline trail, the L₁₀ would be approximately 72 dBA assuming heavy tree plantings on the freeway embankments. At 1,200 feet west of I-5 and 100 feet from Deschutes Parkway, the L₁₀ will be about 65 dBA. The predominant noise source will be I-5 at all points within 800 feet of it. The predicted noise levels are consistent with active sports areas and parks. The noise levels in this area are not likely to be increased by park-related traffic.

Noise from Capitol Way will not be increased due to the project. However, the L₁₀ levels at 100 feet will increase by 9 dBA due to nonpark-related traffic. This increase is not likely to impact Capitol Lake because the street is elevated about 150 feet above the park and is several blocks away from the eastern lakeshore. In addition, the rows of residences and buildings along Capitol Way will attenuate noise levels 3 to 5 dBA per row, with a maximum excess attenuation of 10 dBA.

Upper Basin

I-5 will continue to be the predominant noise source in the upper basin. Noise levels will approximate those estimated for comparable distances in the southwest corner of the middle basin. These noise levels could increase slightly depending on the results of studies by the Department of Highways on the feasibility of freeway widening in this area.

No significant noise would be generated in the upper basin by the proposed plan.

Light and Glare

Minimal lighting, principally for security and safety, is proposed. No adverse impacts are anticipated in terms of glare or light.

Land Use and Land Ownership

No measurable direct or indirect impacts on land use are anticipated.

Natural Resources

Impacts on natural resources will be generally favorable. Because the plan proposes uses and activities requiring few structures, there will be little commitment of construction materials. The stock of trees and other terrestrial vegetation adjacent to the lake will be greatly increased.

HUMAN ENVIRONMENT

Population and Housing

No measurable impacts to population size, composition, or distribution are anticipated; nor is any impact to housing expected due to the nature of the proposed action.

Economics

The recreation plan's initial 6-year capital improvement program will have about \$1,356,700 in capital costs.¹ Capital costs projected beyond the 6-year C.I.P. period total \$930,360. Capital costs are those for grading, fertilizer, trees and shrubs, picnic tables, benches, construction of viewpoints and trails, and other landscaping material and recreational equipment.

Maintenance costs for the initial 27.8-acre² development and additional areas totalling 26.9 acres are estimated at \$625 per acre for high-maintenance (lawn) areas and \$100 per acre for low-maintenance (meadow grass and natural planting) areas. For the three bienniums included in the 6-year capital improvement program, the total maintenance costs would average \$28,480 per biennium. Costs for the 1979-1981 biennium would be \$25,200; for the 1981-1983 biennium, \$27,980; and for the 1983-1985 biennium, \$32,260.

All costs are calculated in 1976 dollars and would be subject to inflation increases.

Labor will take approximately 60 percent of the total cost, materials 40 percent. When salaries are spent and respent, they will generate additional income of \$3,086,000 to \$4,628,000 over a 20-year period. Maintenance will require one full-time employee at the beginning of the period and an additional full-time employee by the year 2000.

Development of the proposed recreation area will generally benefit recreation users of the Olympia-Tumwater-Lacey area. Projections made by the project architects indicate that peak usage would approach 11,000 per day in the summer, with average daily summer usage of 5,500 and winter usage 1,500.³ This estimate was based on current observations coupled with population and park capacity forecasts and assumes full utilization.

¹ A detailed breakdown of capital cost estimates is given in appendix B of the *Recreation Plan Design Report*.

² The upper basin island and other marshes are no-maintenance areas and therefore are not included in the estimates.

³ Estimate for the year 2000.

The economic value of a general recreation day "involving primarily those activities attractive to the majority of outdoor recreationists," ranges from \$0.75 to \$2.25 (1973 dollars) according to the Federal Water Resources Council.¹

In addition to general recreation benefits, special recreation benefits such as salmon fishing will increase. Easier access to the lake and a larger supply of fish should attract more fishermen. A specialized recreation day such as fishing is valued at \$3.00 to \$9.00.² The park should also draw tourists visiting the Capitol Campus if easy access is provided.

Besides general enhancement of the capitol campus and downtown area, the development of recreation property usually has an impact on surrounding property values. Although developments of this type are not necessarily considered amenities to residential areas, attractive parks with adequately buffered activity areas will usually have a positive influence on surrounding land values.

Traffic

Traffic impacts have been estimated³ for the year 2000 to coincide with the end of maintenance dredging and the completion of the recreation plan development. The peak-8-hour traffic volumes and average speeds for 1976 and the year 2000 are shown in figure 4.

The primary impact of the vehicular volumes will be at pedestrian and bicycle crossings. The crossing at Fifth Avenue is particularly hazardous due to the high vehicular volumes and proximity to the intersection with the Deschutes Parkway. Plans should include a pedestrian grade separation if the area north of Fifth Avenue is developed.

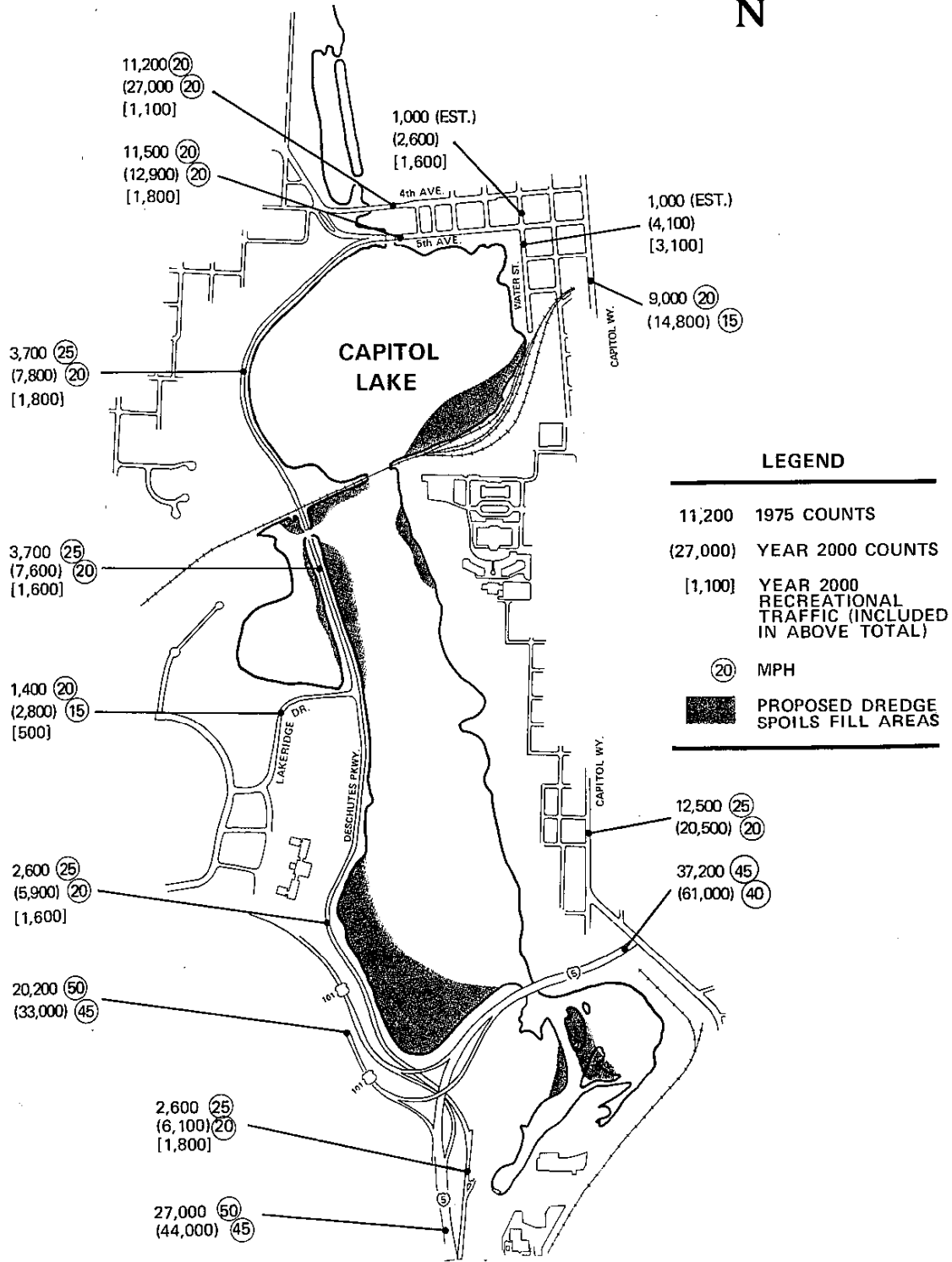
Traffic volumes along Deschutes Parkway will be substantially lower than those on Fifth Avenue. However, the proposed four trail crossings in less than one-half mile will increase pedestrian/bicycle exposure to traffic. To mitigate the impact on traffic, the proposed crossings should be consolidated and landscape barriers should be added to discourage crossing at undesignated locations.

The projected vehicular volumes will probably cause occasional congestion at the northeast corner of the lower basin and the southwest corner of the middle basin. In both cases, a causative factor will be a lack of parking adequate

¹ U.S. National Archives, Water Resources Council *Establishment of Principles and Standards for Planning*, Federal Register, Vol. 38, No. 174, 10 September 1973.

² Ibid.

³ The methodology used in preparing the traffic estimates is described in appendix F of the *Recreation Plan Design Report*.



- Based on data from the Thurston Regional Planning Council
- Based on population estimates obtained by extrapolating planning council population projections through 1990.
- Based on population projections and sample telephone survey.

Peak-8-Hour
Traffic Estimates **4**

for the probable peak intensity of beach and swimming activities.

The access to the northeast corner of the lower basin will be restricted by heavy traffic volumes along the Fourth Avenue - Fifth Avenue corridor. Most of the traffic in this arterial corridor will not be lake-related because it is the only route north of the lake for east/west access across town.

Energy

Direct energy impacts associated with developing and maintaining the new park areas will not be significant. Energy-consuming construction activities are limited to finish grading by earthmoving equipment, and topsoil and plant material delivery by truck. Energy impacts associated with other construction such as restrooms, drinking fountains, or interpretive center would be comparable to similar activities in any construction project. The plan calls for low-maintenance plantings that will require a minimum amount of machine mowing or trimming. Mowing will be the most energy-demanding maintenance activity, and will consume an amount of gasoline comparable to that required for freeway right-of-way grass mowing. Impacts of these activities are considered to be insignificant and have not been calculated.

Indirect energy requirements would be more substantial and would result mostly from increased gasoline consumption by private vehicles driven to the park facilities. This effect could be mitigated considerably by the increased use of public transit for park visits. The plan indicates the desirability of increased public transit use for this purpose, but does accommodate automobile-oriented attendance during the early stages of park development. Development of Capitol Lake offers significant automobile-related energy consumption advantages over comparable development in a suburban location due to the proximity of the park to the capitol and the Olympia downtown area.

Utilities

Implementation of the proposed plan will require connection to the Olympia public water supply, at least for drinking fountains and restroom facilities. Landscaping irrigation will be accomplished either by using the municipal water supply, drilling a well for that purpose, or withdrawing water from Capitol Lake itself. Sewer connections will be required for the restrooms and a minor amount of storm drainage will be required, principally in the parking areas.

Health

No direct impacts to human health are anticipated. However, emphasis in the plan on water-based activities such as swimming, fishing, and boating relies on a concurrent effort to solve the existing fecal coliform contamination and excessive nutrient problems. Increased use of the lake for water-contact sports carries an obligation to correct this situation, and the Department of General Administration is conducting a monitoring program to determine the sources of pollution.

Aesthetics

The lake's appearance will be greatly improved through the proposed dredging plan. The recreation plan will build upon this to provide significant positive benefits. The plan provides a major sweeping vista of the lake from a view point on the Capitol Campus (figure 5).

Other view points and vistas are provided at major focal points around the lake. Plant species numbers and varieties (primarily natives) will greatly enhance the visual quality of the lakeshore and will complement the existing forested slopes of the basin. The trail system and earth berms will provide a much more interesting and varied series of visual experiences of the lake than exists today. The visual quality of the lakeshore will be positive even during construction if plans are implemented to immediately seed newly created land areas with native grasses and other vegetation.

Recreational Use

The impacts of the plan on the lake's recreational use were evaluated relative to:

- General compliance with state and local recreational policies
- Responsiveness to community preferences and attitudes
- Consistency with biological resources and natural processes
- Conformity to recreational planning standards

Recreational Goals

Capitol Lake is recognized as a unique multiple-use recreational resource by the Cities of Olympia and Tumwater,

Thurston County, and the State of Washington. Each of these agencies has stated policies and objectives that relate directly or indirectly to the use of the lake. The recreation plan's compliance with these policies and objectives is summarized in figure 5.

The proposed recreational plan provides a high level of achievement for most of these goals and objectives. It would significantly enhance the amenities of the lake environment and provide substantially increased opportunities for passive recreational activities.

One significant opportunity that is not included in the initial plan development is a trail connection along the eastern shoreline of the middle basin. Without a trail link on this shoreline, pedestrian access to the adjacent basins is substantially restricted and public access to a large portion of the lake is eliminated. The plan chose not to include this trail segment because the land is privately owned and a trail would present problems with acquisition and potential vandalism to the abutting homes.

Tourist facilities such as parking and turning areas for school/tour buses, adequate rest area facilities, and interpretive aids are not included in the plan. Because it is likely that the lake will become a significant tourist attraction when the plan is implemented, specific provision should be made for such use. Provision of rest area facilities could be of interest to the State Department of Highways, and this possibility should be pursued.

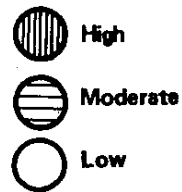
Responsiveness to Community Attitudes and Preferences

Two community surveys and questionnaire results were used to determine local attitudes and preferences for recreational use of Capitol Lake. Respondents indicated a preference for quiet, unobtrusive activities such as swimming, picnicking, fishing, nature study, and hiking. Found least desirable were the high-profile, noisy activities such as water skiing, motorboating, and train watching.

The proposed recreation plan appears to be responsive to the recreational preferences expressed by respondents to the opinion surveys for the three most preferred activities (swimming, picnicking, and fishing); the plan makes adequate provisions in numbers of sites and in location. Fish viewing also was indicated as a high-desire activity, and the plan proposes such a facility at the dam. Nature study, nonmotor boating, and hiking were the next highest preferences. These are provided for through the boat launch areas in the lower and middle basins and the trail system that rings the lake. Residents and present users of the lake seem to

	Lower Basin	Middle Basin	Upper Basin
Enhance lake as a recreational resource			
Preserve and enhance shoreline			
Develop public access to shorelines			
Provide vistas and viewpoints			
Develop integrated trail system (bicycle and pedestrian)			
Encourage tourist use of lake			
Highlight open space network linking points of interest in urban area			
Preserve and enhance natural ecosystems			
Use steep unstable slopes for open space			
Develop passive recreational opportunities			
Integrate Capitol Campus and lake			
Conserve vegetation within visual basin			

LEGEND



1. Goals of the City of Olympia and the Capitol Lake Executive Committee

Note: A low rating does not necessarily indicate an omission or weakness in the plan. It may also indicate a conflict in goals such as a desire for increased access and a wildlife need for some isolation in the upper basin, or a goal that relates more to one basin than another.

Project Goal
Achievement
Evaluation **5**

prefer passive forms of recreation, and the plan provides for the continuation and enhancement of this theme.

A majority of the people responding to the Capitol Lake survey indicated that the scenic beauty of the lake--the water, the relationship of the lake to the capitol, the natural scenery, and the views from the lake--was its single most valuable feature. The plan recognizes this value adequately by providing features such as varied topography and shoreline plantings of native vegetation.

The proposed recreation plan attempts to accommodate motor-boating by controlling it closely enough to provide recreational benefits while not adversely impacting adjacent residents or persons attempting to enjoy the park's amenities. However, this could create enforcement problems that could add to costs of plan implementation while still not providing a thoroughly satisfactory solution.

The proposed plan is largely consistent with biological and other natural processes associated with the lake. Critical shoreline vegetation would be preserved and disturbed marsh areas would be reconstructed or replaced to provide biological habitat. No building or grading is proposed in areas that show evidence of unstable soils.

Conformity with Recreational Planning Standards

Capitol Lake is a unique recreational asset with an ability to satisfy neighborhood, community, regional, and statewide recreation needs. Consequently, specific recreational standards such as acreage required for child play areas and picnicking, or for size of the park itself, are conceded to be inapplicable. The governing criterion for the ultimate level of recreational development of the lake is its "carrying capacity." The carrying capacity, or ability to withstand continuous pressure of recreational pursuits, is quite limited in the upper basin due to wildlife needs. The middle and lower basins are more resilient and therefore are restricted primarily by parking limitations. The planned activity areas are well within recognized space standards for park activities, and in fact, could absorb additional numbers if parking limitations could be overcome by public transit service.

Archeological and Historical Significance

The recreation plan has no direct impact on the area's historic or prehistoric sites. The plan could easily be adapted to incorporate public enjoyment of these cultural resources if they should be developed. One nearby site contains remains of an Indian fishing and hunting encampment on the west side of the middle basin. This site was verified

during the course of the archeological investigation for the restoration EIS, and has not yet been explored for cultural materials. After such exploration is completed, it may be desirable to provide an interpretive center and display at the site. The proposed trail system could be modified to include this site.

■■ RELATIONSHIP BETWEEN LOCAL, SHORT-TERM USES
■■ OF MAN'S ENVIRONMENT AND MAINTENANCE AND
ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The proposed short-term uses of the environment impose relatively slight stress upon the area's natural systems. Recreational activities provided for are principally passive. There are few structures and there is an emphasis on planting with native flora. The primary adverse impacts are related to a reliance on the private automobile for transportation (energy demands, air quality degradation potential, and parking and traffic problems) and collection and disposal of trash left by visitors.

Aside from these localized impacts upon the natural systems, the proposed plan offers substantial benefits in the maintenance and enhancement of long-term environmental productivity. The plan will add significant amounts of vegetation to the lakeshore and in time will build up the fertility of the soil. The plan provides for planting predominantly native species that will provide habitat for a wide variety of birds and animals. Marsh development in the upper and middle basins will also contribute to the preservation of a diversity of species. Because the plan is oriented toward passive recreation and proposes few structures, maximum flexibility for recreational or other use of the land is maintained. Few, if any, options are closed; long-term productivity of the land is assured through plantings that approximate the natural state. In terms of man's social environment, the proposed plan offers long-term benefits for recreational and aesthetic enjoyment.

■ ■ ADVERSE ENVIRONMENTAL IMPACTS ■ ■ WHICH MAY BE MITIGATED

A potential exists for soil erosion to occur on the newly graded berms and other slopes. The erosion could cause excessive turbidity in the lake along the lakeshore. This potential problem can be mitigated by making provision in construction specifications for sediment basins, seeding and/or other slope stabilization measures immediately after grading, and close on-site construction supervision by a landscape architect.

Unnecessary disturbance to wildlife, particularly in the upper basin, can be avoided or minimized by scheduling trail and bridge construction at times other than nesting or breeding seasons. It would be desirable to have the services of a terrestrial biologist available at this time to assist in construction supervision.

Noise associated with construction activities may be mitigated by provisions in contract specifications requiring muffling of all earthmoving and related equipment. Screening of noise from I-5, the Deschutes Parkway, and other adjacent roadways should be incorporated as much as possible in final design drawings. Maximum use should be made of earth berms to provide shielding from noise sources.

Traffic congestion related to construction can be partially mitigated by scheduling the work to avoid peak traffic loads.

Potential pedestrian-traffic conflicts inherent in the plan may be partially mitigated by strictly controlling access points to roadway with heavy landscaping barriers, by paying careful attention to path locations, and by constructing overcrossings or undercrossings where justified. Traffic congestion from recreation-oriented parking and traffic can be reduced through signalization and directional signing.

■ ■ ■ ALTERNATIVES

In most projects, the possibility of a "no action" alternative is analyzed in as much detail as the action alternatives. The proposed recreation plan is unusual in this respect, since a "no action" choice would mean leaving the dredge spoils in a raw, unvegetated state. This is not a feasible alternative, and is not considered in this EIS. The proposed recreation plan is directly tied to a specific plan to dispose of dredge spoils within the Capitol Lake basin; the disposal plan and other disposal alternatives are discussed in the *Capitol Lake Restoration Draft EIS*.

A second level of choice in the plan is the decision to emphasize passive forms of recreation. This choice is well documented in the plan, and is based largely upon site constraints and an interpretation of user preferences.¹ The alternative to passive activities would be to design the park around active forms of recreation; this alternative was rejected.

Feasible alternatives within the plan are limited to alternative *activities* or alternative *sites* for particular activities. The major alternatives, all of which were rejected in favor of the plan proposals, are:

LOWER BASIN

- *Parking Lot, Northeast Corner*. An alternative would be to reduce the parking lot as shown on the plan, but utilize the new park area for an expanded children's play area or other more active recreation area.
- *Beach Area, Southeast Corner*. This area could be modified to provide more convenient parking for beach users, or it could be developed as a natural area.
- *Trail*. The proposed trail crossing at Fifth Avenue will be at grade, which will present some safety hazard. An alternative overcrossing or undercrossing could be provided, but at a considerably increased expense.

MIDDLE BASIN

- *Trail*. As noted in the section dealing with recreational impacts, the trail discontinuity along the eastern shore of the middle basin could be corrected by purchase of an easement.

¹ *Recreation plan design report, appendix C.*

- *Southwest Corner*. This entire area comprising 24 acres is sufficiently large to permit baseball diamonds or other facilities for active recreation. The marsh could be deleted to provide additional room for increased human use of that land area, whether for active or passive recreation.
- *Percival Cove Gravel Pit*. An alternative use for this area would be more structured facilities such as tennis courts; another would be to provide parking to serve the boat launch area or other adjacent recreational areas.

UPPER BASIN

- *Use*. More active uses could be considered for the upper basin, although the wildlife habitat would be degraded correspondingly.
- *Marshy Island*. Human access by bridge to the marshy island in the center of the upper basin is a possibility. This alternative was rejected in the plan due to the adverse effect on wildlife.
- *Trail*. The trail system in the upper basin could be modified somewhat to provide greater or lesser protection to wildlife. Lesser protection, but more access for humans could be achieved by expanding the trail system and locating it closer to the water's edge. More protection to wildlife could be achieved by limiting the amount of trail bordering the swampy portion of the Tumwater Park site. In particular, the northern segment of this loop could be eliminated to protect wildlife.

Other significant alternatives that would affect both the lower and middle basins include:

- The proportion of mowed-lawn area to native trees, shrubs, and ground cover could be varied.
- The number of recreational structures relating to specific activities could be increased. This could provide all-weather court facilities such as tennis, handball, racketball; and/or partially enclosed picnic areas, pavilions, amphitheaters, and similar structures. However, this would make the plan less flexible and would substantially increase the cost of plan implementation.
- Motorboat alternatives could include either unlimited use or total prohibition. Unlimited motorboating is inconsistent with the desires expressed in the surveys. Total prohibition would prevent water skiing and would limit troll fishing.



UNAVOIDABLE ADVERSE IMPACTS

The following adverse impacts cannot be completely eliminated:

- Temporary construction impacts including noise, traffic congestion, limited soil erosion, turbidity
- Capital and maintenance monies (1976 dollars) estimated at \$1.4 million will be expended during the initial 6-year capital improvement program. Capital costs projected beyond the 6-year C.I.P. period total \$930,360. Annual maintenance costs vary from \$12,600 the first year to \$25,200 the 20th year. The increase in maintenance costs in later years is due to the increased park area.
- Hazards to pedestrians at trail/street crossings; cannot be completely mitigated except by specifying pedestrian overcrossings or undercrossings



Species Lists



PLANT SPECIES LIST

These plants have been identified in the Capitol Lake study area¹.

CATTAIL BEDS

Cattails *Typha latifolia* L.*
Burred *Sparganium* sp.
Wild rice grass *Zizania aquatica* L.
Spike rush *Eleocharis* sp.
Rush *Juncus* sp.
Pond weeds *Potamogeton pectinatis**, *P. foliosus**, *P. crispus**,
*Elodea canadensis**
Waterplaintain *Alisma* sp.
Green alga *Spirogyra**
Sedges *Volvox** and *Cladophora**

ALDER THICKETS

Alder *Alnus rubra* Bong.*
Willow *Salix* sp.*
Salmonberry *Rubus spectabilis* Pursh*
Himalyan blackberry *Rubus discolor* Weihe & Nees*
Evergreen blackberry *Rubus ursibus* Cham. & Schlecht*
Wild rice grass *Zizania aquatica* L.

HEAVY DECIDUOUS FOREST

Maples *Acer macrophyllum* Pursh*
Alder *Alnus rubra* Bong.*
Not investigated fully but presumably also has
Salmonberry *Rubus spectabilis*, Evergreen blackberry
Rubus ursinus, Salal *Gaultheria shallon* Pursh, etc.

HEAVY CONIFEROUS FOREST

Old mature Douglas fir *Pseudotsuga menziesii* (Mirbel) Franco*
Otherwise similar to deciduous forest

MISCELLANEOUS

Freeway bank grasses
Rubus discolor Wiehe & Nees
Scotch broom *Cytisus scoparius* (L.) Link*
Plaintain *Plantago major* L.
St. John's wort *Hypericum perforatum* L.
Timothy grass *Phleum pratense* L.
Orchard grass *Dactylis glomerata* L.

NOTE: * indicates species identified during 29 October 1975 field observations by Charles Lindberg and Christopher Dlugokenski, researchers.

1

Species usage from Hitchcock, C. L., and Cronquist, A. 1973. *Flora of the Pacific Northwest*. Seattle and London: University of Washington Press.

Blackberry (trailing)
Birch
California hazelnut
Cedar
Cottonwood
Devil's club
Fern (2 species)
Gordon mock orange
Hemlock
Madrona
Oregon grape (2 species)
Salal
Skunk cabbage
Trillium
Vine maple
Wild cherry



CAPITOL LAKE WILDLIFE POPULATION

The following animals, or recent signs of their presence, were observed in the Capitol Lake area on a field trip conducted 29 October 1975 by Charles Lindberg and Christopher Dlugokenski.

MAMMALS

Deer *Odocoileus* sp.
Muskrat *Ondatra zibethica*
Striped skunk *Mephitis mephitis*
Raccoon *Procyon lotor*
Voles *Microtus* sp., *Clethrionomys* sp.
Mink *Mustela vison*
Mountain beaver *Aplodontia rufa*
River otter *Lutra canadensis*
Deer mouse *Peromyscus maniculatus*
Bushytail woodrat *Neotoma cinerea*
Pacific mole *Scapanus orarius*
Bat *Myotis* sp.

AMPHIBIANS

Frogs
Turtles
Lizards

BENTHIC ANIMALS

Crayfish
Snails

FISH

Salmon
Steelhead
Cutthroat trout



CAPITOL LAKE AREA BIRD POPULATIONS

These populations were compiled from the lists of the Black Hills Audubon Society, and are concerned with the area of the lake between the I-5 bridge and Tumwater Falls.

WINTER RESIDENTS

Common loon ***
Horned grebe*
Eared grebe*
Western grebe*
Pied-billed grebe*
Double-crested cormorant*
American bittern
Gadwall*
Pintail*
Green-winged teal*
American widgeon*
Northern shoveler
Ring-necked duck*
Canvasback**
Greater scaup ***
Lesser scaup*
Common goldeneye***
Barrows goldeneye***
Bufflehead*
Ruddy duck*
Hooded merganser*
Common merganser ***
Red-breasted merganser*
American coot*
Common snipe*
Spotted sandpiper
Least sandpiper
Dunlin***
Western sandpiper
California gull
Ring-billed gull*
Mew gull
Bonaparte's gull*
Winter wren***
Varied thrush ***
Golden-crowned kinglet
Ruby-crowned kinglet ***
Northern shrike
Evening grosbeak ***
Golden-crowned sparrow ***
Fox sparrow ***

PERMANENT RESIDENTS

Great blue heron ***
Green heron ***
Mallard*
Sharp-shinned hawk**
Cooper's hawk ***
Red-tailed hawk
California quail
Ring-necked pheasant*
Killdeer ***
Glaucous-winged gull*
Belted kingfisher*
Common flicker ***
Pileated woodpecker ***
Yellow-bellied sapsucker
Hairy woodpecker*
Downy woodpecker
Steller's jay ***
Common crow*
Black-capped chickadee
Chestnut-backed chickadee*
Common bushtit ***
Red-breasted nuthatch ***
Brown creeper
Dipper ***
Bewick's wren*
Long-billed marsh wren*
American robin ***
Cedar waxwing
Starling ***
Hutton's vireo ***
Yellow-rumped warbler*
House sparrow ***
Red-winged blackbird ***
Brewers blackbird ***
Purple finch ***
House finch*
Pine siskin*
American goldfinch
Rufous-sided towhee ***
Dark-eyed junco*
Song sparrow*

* Indicates birds observed 29 October 1975, Charles Lindberg, Christopher Dlugokenski, and Douglas Canning, researchers.
** Indicates species that are unusual for the area.
*** Indicates species seen since 20 October 1975.
NOTE: Bald eagle observed 21 April 1976.

SPRING AND SUMMER RESIDENTS

Turkey vulture
Band-tailed pigeon**
Common nighthawk
Rufous hummingbird ***
Violet-green swallow ***
Tree swallow
Rough-winged swallow
Barn swallow ***
Cliff swallow ***
Solitary vireo ***
Red-eyed vireo
Warbling vireo
Swainson's thrush
Orange-crowned warbler ***
Yellow warbler
Black-throated gray warbler
Yellowthroat ***
Wilson's warbler
Brown-headed cowbird
Western tanager
Black-headed grosbeak
Savannah sparrow
White-crowned sparrow ***

BREEDING BIRDS AND POTENTIAL BREEDERS

Green heron	Violet-green swallow
Blue grouse**	Tree swallow
Ruffed grouse**	Rough-winged swallow
California quail	Barn swallow
American coot	Cliff swallow
Killdeer	Steller's jay
Screech owl	Common crow
Great horned owl	Chestnut-backed chickadee
Saw-whet owl**	White-breasted nuthatch
Rufous hummingbird	Red-breasted nuthatch
Belted kingfisher	Brown creeper
Common flicker	Dipper**
Pileated woodpecker	House wren
Yellow-bellied sapsucker	Winter wren
Hairy woodpecker	Bewick's wren
Downy woodpecker	Long-billed marsh wren
American robin	House sparrow
Varied thrush	Red-winged blackbird
Swainson's thrush	Brewer's blackbird
Golden-crowned kinglet	Western tanager
Ruby-crowned kinglet	Black-headed grosbeak
Cedar waxwing	Evening grosbeak
Starling	Purple finch
Hutton's vireo	House finch

Solitary vireo
Red-eyed vireo
Warbling vireo
Orange-crowned warbler
Yellow warbler
Yellow-rumped warbler
Yellowthroat
Wilson's warbler

Pine siskin
Rufous-sided towhee
Dark-eyed junco
Savannah sparrow
White-crowned sparrow
Song sparrow



Goal
Statements

■ ■ Appendix B
■ ■ GOAL STATEMENTS APPLICABLE TO A
CAPITOL LAKE RECREATION PLAN

The following goals have been suggested by concerned public and private agencies as essential to a lake recreation plan.

CAPITOL LAKE COORDINATING COMMITTEE

- Recognize Capitol Lake as a key part of the Capitol campus with statewide significance.
- Preserve the visual quality, wildlife, active and passive uses, and other environmental characteristics of the lake.
- Preserve the biological processes within the upper basin, except in the areas required for desilting operations.
- Conserve the terrestrial vegetation within the entire visual basin of the lake.
- Protect the key fish propagation areas such as Percival Cove.
- Encourage Deschutes River Basin land uses that will decrease sediment loading.

CITY OF OLYMPIA

- Capitol Lake should be rehabilitated and enhanced as a recreational resource.
- View points from which Budd Inlet, Mt. Rainier and the Olympics can be seen should be designated and protected.
- Preservation of waterfront and view points for public use should be a high priority of the city and the Olympia Parks Department. Olympia's water resource should be enhanced by well-designed water-related shoreline land use.
- The Capitol campus and Capitol Lake should be more fully utilized for tourist activities.
- There should be design linkages between downtown and the Capitol Lake and harbor areas.
- A city-wide bicycle and pedestrian circulation network should be established.

- The Capitol, downtown, the port, Capitol Lake and the brewery should be linked in one continuous network facilitating automobile, bicycle, and pedestrian circulation.
- An open space network linking points of interest in the urban area should be developed.
- Methods of increasing public access to the shorelines and view points and of preserving open space other than by fee simple acquisition should be identified and utilized.
- Land not suited for development because of ecological, soil, and/or topographical conditions should be protected as public open space. Steep slopes, especially in areas with potential slope instability or soil settling problems, should be zoned as open space. Ravines should be preserved in their natural condition and protected as greenbelts wherever possible.
- Building in ravines should be discouraged.
- Department of Fisheries and other programs to manage production of shellfish and salmon in both natural and artificial environments should be supported.

INTERAGENCY COMMITTEE FOR OUTDOOR RECREATION (IAC)

The recreational priorities of the IAC are currently ranked in the following order:¹

1. Acquisition of shorelines
2. Development of local recreational areas
3. Development of shorelines
4. Acquisition of locally significant features
5. Acquisition of local recreational areas
6. Trail acquisition and development
7. Acquisition and development of regional recreation areas

¹ Washington Statewide Comprehensive Outdoor Recreation and Open Space Plan, Vol. 1, 1973.

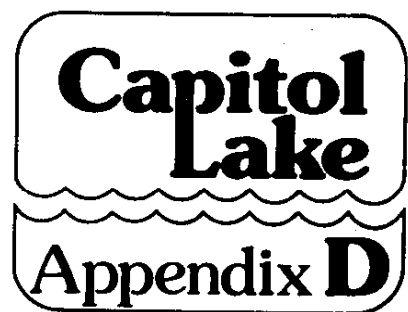


Public & Agency
Participation


Appendix C
PUBLIC AND AGENCY PARTICIPATION

During the course of the planning process for both the restoration of Capitol Lake and the recreation plan development, public comments and suggestions have been encouraged. Presentations were made to agencies and organizations known to have an interest in the project and to members of the public. The record of this participation is listed below. Minutes of these meetings are on file with the Department of General Administration.

<u>Group</u>	<u>Type</u>
Muskoxen (representing key Federal and state agencies concerned with development)	Federal/state agencies
Tumwater Historical Commission	Local government
Tumwater Park Commission	Local government
Audubon Society	Community group
Capitol Lakefair Committee	Community group
League of Women Voters	Community group
Tumwater City Council	Local government
Olympia City Council	Local government
Thurston County Planning Commission	Local government
South Capitol Neighborhood Association	Community group
Open Public Workshop	Public



Air Quality
Analysis

■ ■ Appendix D ■ ■ AIR QUALITY ANALYSIS

This appendix details the criteria and methodology used in assessing the air quality impact of the proposed recreation plan.

POLLUTANT HEALTH EFFECTS AND STANDARDS

Carbon Monoxide (CO)

Carbon monoxide reduces the ability of the blood to carry oxygen to the body cells. The quantity of carbon monoxide in the blood can be directly related to the concentration of CO in the air.

There are two U.S. Environmental Protection Agency ambient air standards for CO. The standards listed below are not to be exceeded more than once per year.

- Maximum 8-hour average concentration 10 mg/cu m¹
- Maximum 1-hour average concentration 40 mg/cu m

Oxides of Nitrogen (NO_x)

The concentration of nitrogen oxides in the air is a combination of nitrous oxide, NO, and nitrogen dioxide, NO₂. This combination is commonly referred to as NO_x, most of which is NO as it leaves the exhaust pipe. The NO combines with the oxygen in the air to form NO₂.

The human health effects of NO_x relate to increased incidence of respiratory disease at an annual average concentration greater than 100 µg/cu m². In addition, NO_x combines with hydrocarbons to form photochemical smog.

The U.S. Environmental Protection Agency (EPA) standard for NO_x in ambient air is 100 µg/cu m annual arithmetic average.

Lead

Lead in the atmosphere has the well-known effect on humans of lead poisoning. The buildup of lead concentrations in the bloodstream can cause a low grade of anemia. Unlike other constituents of total particulate matter in the atmosphere, lead is almost exclusively generated by automotive sources using gasolines with lead additives for increased antiknock operation.

¹ Milligrams per cubic meter.
² Micrograms per cubic meter.

The Environmental Protection Agency has not set standards for ambient concentrations of lead. A standard of $2.0 \mu\text{g}/\text{cu m}$ is being considered, however, and California has adopted a maximum 30-day average of $1.5 \mu\text{g}/\text{cu m}$. Rather than establish an ambient air standard, the Federal government has adopted controls for the lead content of gasoline.

Hydrocarbons

Hydrocarbons combine with NO_x to form photochemical smog. Some, such as benzopyrene, are carcinogens suspected of causing lung and skin cancers. Federal standards are set, based on photochemical smog formation. The standard is a maximum average 6:00 a.m. to 9:00 a.m. concentration of $160 \mu\text{g}/\text{cu m}$.

Photochemical Oxidants

Photochemical oxidants are formed by the combination of NO_x and HC in the presence of sunlight. The human health effects of high concentrations include irritation of the mucous membranes and tear glands. The Federal standard for photochemical oxidant is a 1-hour average of $160 \mu\text{g}/\text{cu m}$, not to be exceeded more than once per year.

Particulates

Particulates in the air are produced mainly by industrial or fixed sources. Only about 10 percent of the particulates nationwide are estimated to be due to motor vehicles. The human health effects of particulates are irritation of the respiratory system and the holding of absorbed toxic gases in the respiratory tract for longer periods of time, thus intensifying their effects. EPA primary standards to safeguard people from particulates in ambient air are as follows:

- Maximum annual geometric mean $75 \mu\text{g}/\text{cu m}$
- Maximum 24-hour concentration $260 \mu\text{g}/\text{cu m}$

POLLUTANTS EVALUATED

The pollutants selected for evaluation of the air quality impact are carbon monoxide (CO), nitrogen oxides (NO_x), and lead. Hydrocarbon concentrations should follow the same trends as the CO levels. Photochemical oxidant concentrations and their relationship to HC and NO_x are still not well defined. Particulates were not considered because only a small percentage is generated from automotive sources.

PREDICTION METHODOLOGY

There are two methods of evaluating the impact of increased traffic on ambient air quality. The most comprehensive method involves the prediction of air contaminant concentrations at specific locations utilizing historic meteorological data and proven atmospheric dispersion models. The second method involves a comparison of total emissions, based on automotive emission factors, from traffic not affected by the facility to the additional traffic generated by the proposed improvements. The emission comparison approach assumes that, on an area basis, the ambient air concentrations are proportional to the total emissions.

A majority of the additional traffic generated by the proposed improvements will be on the west and north sides of the lakes. Since the prevailing winds are from the southwest to northwest quadrant, there are no residential areas directly adjacent to the downwind side of the affected traffic areas. Due to the small percentage increase in traffic volumes and the averaging effects of dispersion to locations a reasonable distance downwind, the approach comparing total emissions was selected for predicting the impact on ambient air quality.

The area analyzed is bordered by I-5 and U.S. 101 on the south, Deschutes Parkway on the west, Fourth Avenue on the north, and Capitol Highway on the east. This is an area about 2 miles long and 3/4 mile wide. The traffic data are presented on a peak-8-hour basis, which relate to the critical ambient air standard for carbon monoxide. The annual traffic volumes can be approximated at 400 times the peak-8-hour figures.

Emission factors in grams per mile traveled were extracted from Supplement 2 of the Compilation of Air Pollution Emission Factors published by EPA. The factors are averages for highway vehicles based on nationwide statistics. EPA has published factors through 1990. The 1990 figures were used for the year 2000 estimates.

