

*Saving in
Beautiful Lake*

Saving a Beautiful Lake

AN OVERVIEW OF THE ECONOMIC AND
RECREATIONAL BENEFITS OF RECLAMATION
AND PROPOSED RECREATIONAL PROFILES
FOR THE FUTURE OF CAPITOL LAKE AND THE
VISUAL BASIN



SUMMARY

Capitol Lake, formed in 1949 by the construction of a dam at the Fifth Avenue bridge, is choking on over a million cubic yards of silt.

The accumulation of sediment in Capitol Lake, primarily from the Deschutes River basin, has become of increasing concern in recent years to the Capitol Lake Coordinating Committee, the Capitol Committee, the Department of General Administration, and other interested parties in Olympia and nearby communities. Reconnaissance studies of the problem were conducted in 1970 to determine the source and extent of the siltation problem.^{1,2}In 1973 a very comprehensive engineering study was conducted using the 1970 hydrographic information to determine how the sediment could be removed, possible disposal sites, and to provide a cost estimate for dredging the lake to 1949 depth conditions and for maintaining those conditions.³

According to these engineering and hydrologic studies, sedimentation has reduced the volume of water in upper basin by 77%, its mean depth having gone from about 8.75 feet in 1951 to a mean 2.1 feet dotted with seven islands.

Now the relentless muds are clogging the Middle and Lower Basins.

We have reached a critical point-in-time in the life or death of Capitol Lake.

Since the dam was constructed 23 years ago, which restricted the flow of water into Puget Sound, no dredging has been done in the lake.

The lake was created by a legislative investment of one million dollars in 1949. Dredging the lake now will protect that investment and save the lake from further deterioration and restore its usefulness as a freshwater and recreational resource of Washington State.

¹Wilson, John A., "Reconnaissance Geologic Investigation on the Siltation Problem of Capitol Lake, Olympia, Washington," for Wash. Dept. of Fisheries by the Soil Conservation Service, Oct., 1970.

²Walker and Byrne, "Hydrographic Survey of Capitol Lake, Olympia, Washington," for the General Services Administration of Washington, Nov. 5, 1970.

³Byrne, Patrick J., "Engineering Investigation for Rehabilitation of Capitol Lake, Olympia, Washington," Vols. I and II, April, 1973.

TABLE OF CONTENTS

I. INTRODUCTION	iii
II. EXISTING AND PROPOSED POLICIES PERTAINING TO CAPITOL LAKE	1
III. EFFECTS OF SILTATION ON THE RECREATIONAL USE OF THE LAKE.....	3
IV. PRESENT RECREATIONAL BENEFITS OF CAPITOL LAKE.....	5
V. ECONOMIC AND RECREATIONAL BENEFITS	7
VI. BENEFITS OF LAKE RECLAMATION	9
VII. RECOMMENDATIONS TO RESTORE CAPITOL LAKE BY DREDGING	11
VIII. PROPOSED TEN YEAR CAPITAL IMPROVEMENT SCHEDULE.....	15
IX. PROPOSED DEVELOPMENT OVERLAY LAKE RECLAMATION OVERLAY 1970 TOPOGRAPHY OVERLAY GENERAL OWNERSHIP PLATE.....	26
X. 1949 HYDROGRAPH OVERLAY TOPOGRAPHY PLATE.....	28

INTRODUCTION

In 1949, the Washington State Legislature, acting with wisdom and foresight, passed a Bill which authorized the construction of a dam at the Fifth Avenue bridge in Olympia, creating Capitol Lake, a unique fresh water and recreational resource for residents of the community and the State of Washington. Since the construction of the dam, Capitol Lake has become the catch basin for approximately one million cubic yards of silt* — or in other terms, approximately 1,600,000 tons of sediment. This progressive accumulation of silt has now become a problem of increasing magnitude, affecting many present uses of this popular lake.

We find ourselves today faced with responsibilities that were not foreseen when the man-made lake was created. After 23 years, we are now at the cross-roads — just as the efforts to continue development of the recreation resources of the lake were coming to fruition — we find ourselves past the brink of decline and approaching disaster.

* One million cubic yards of accumulated silt would cover a football field 468 feet high — or about the height of a 31 story building.

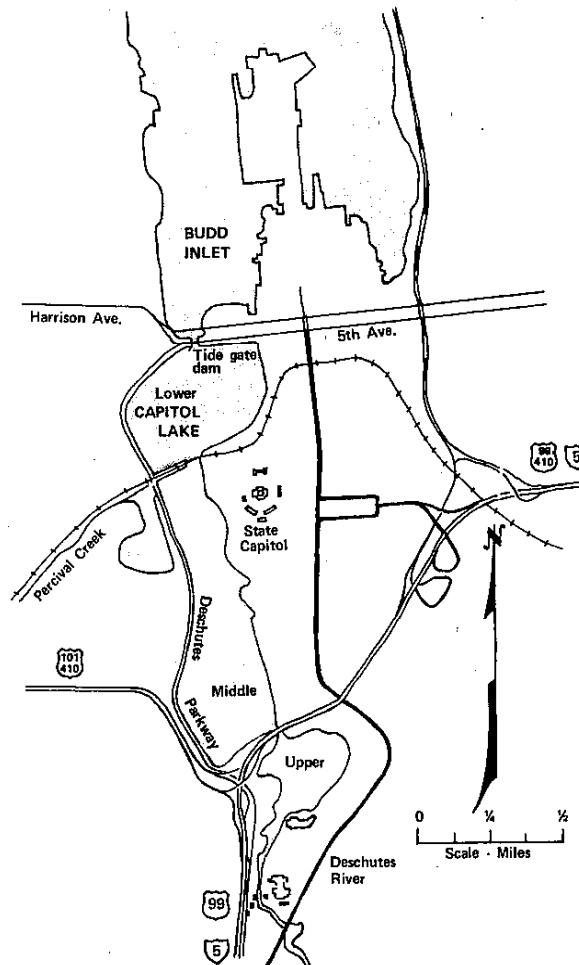


Figure 1. Location Map of Capitol Lake, Olympia, Washington

EXISTING AND PROPOSED POLICIES PERTAINING TO CAPITOL LAKE AND THE VISUAL BASIN

Capitol Lake bed is almost entirely owned by the State of Washington with the exception of some areas along the eastern shoreline and about half of the Upper or South Basin.

The most striking feature of Capitol Lake is the contrast of its wooded slopes as reflected in the lake surface. It is the visual basin—that area surrounding the lake which is visible from the water—about which there is also great concern.

The steep slopes and dense tree cover surrounding the lake shore have delayed building development in general. Most of the western slopes and crests of slopes are in private ownership, with the exception of twenty acres owned by Thurston County. The Thurston County property is located immediately south of Lake Drive and Deschutes Parkway.

That section of the proposed policies in the City of Olympia Policy Plan pertaining to Capitol Lake directly addresses the short range and long range objectives for the lake:

- Capitol Lake should be rehabilitated and enhanced as a recreational resource.
- Viewpoints from which Budd Inlet, Mt. Rainier and the Olympics can be seen should be designated and protected.
- Preservation of waterfront and viewpoints 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 Harbor, the Capitol Campus and Capitol Lake should be more fully utilized for tourist activities.
- There should be design-linkages between the downtown and the Capitol Lake and harbor areas.
- A City-wide bicycle and pedestrian circulation network should be established.
- The Capitol, downtown, Port, Capitol Lake and Brewery should be linked in one continuous network facilitating automobile, bicycle and pedestrian circulation.
- A mechanism should be established to ensure urban open space, such as plazas associated with high-rise commercial buildings or clustered residential development.

- An open space network linking points of interest in the urban area should be developed.
- Methods of increasing public access to the shorelines and viewpoints and 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 green-belts wherever possible.
- Building in ravines should be discouraged.
- Department of Fisheries and other programs to manage production of shell fish and salmon in both natural and artificial environments should be supported.

The Capitol Lake Executive Committee, representing twenty public and private agencies and organizations, has recommended goals regarding Capitol Lake. These goals are addressed to protecting the inherent and valuable resources of Capitol Lake.

These goals are:

- 1) Capitol Lake is a key part of the Capitol Campus and, as such, is of Statewide significance, as defined in Chapter 159, Laws of Washington, 1937.
- 2) Preserve the inherent resource values of Capitol Lake, including its visual quality, wildlife, active and passive recreational uses and other environmental characteristics.
- 3) Preserve and interpret the biological processes within the Upper (south) Basin, except in the area required for desilting operations.
- 4) Conserve the existing terrestrial vegetation within the entire visual basin of Capitol Lake.
- 5) Protect the key fish propagation areas of Capitol Lake, such as Percival Cove.
- 6) Encourage land uses within the Deschutes River Basin which will decrease sediment loading.

It is within the context of these goals, and within the framework of the participating agencies' existing or proposed policies and open space and recreational planning objectives pertaining to Capitol Lake that the proposed Capital Improvement Schedule was developed. This schedule may be found on pages 15 thru 16.

EFFECTS OF SILTATION ON THE RECREATIONAL USE OF THE LAKE

Siltation has been a major problem in both Capitol Lake and Percival Cove since the dam was constructed and the flow restricted into Puget Sound. The magnitude of the siltation of the lake was compiled in a 1973 engineering study.³ The study indicates that since it was formed in 1951, Capitol Lake's water storage capacity has been reduced by approximately one million cubic yards of sediment deposition.

Capitol Lake, once the southernmost reach of Budd Inlet and unique water and recreation resource of the State of Washington, is now rapidly "dying". Although some lakes die naturally in geologic time through the process of succession—the process which leads to the degeneration of a body of water — Capitol Lake is dying at an accelerated rate due to the construction of the Fifth Avenue dam which created a catch basin for tons of silt.

Since Capitol Lake was formed by the construction of a dam, the lake has been accumulating sediment deposits from the Deschutes River on the south and Percival Creek on the west. Other filling of the lake by man-made structures such as highway and industrial fills in the south end of the lake have further modified the lake geometry and hydraulic and water quality characteristics.

If the lake is not dredged the percentage of lake volume available for use will decrease. Also, nutrients in the bottom sediments will support plant life which will contribute to a more rapid eutrophication* rate. The usefulness of the lake will further deteriorate after each high flow.

At the present rate of accumulation, the Upper Basin would be theoretically non-existent in approximately six years, thus throwing the entire load of sediment accumulation into the lower basins. The Upper Basin, what had been a 28 acre basin averaging eight feet deep in 1952, is now becoming a river delta consisting of several islands and submerged sand bars reducing the average water depth to approximately 2 feet.

The majority of sediment now entering the lake from the Deschutes River, is being transported by the higher velocities through the Upper Basin into the Middle Basin, forming a large submerged sand bar north of the I-5 overpass. This delta deposit approximately 700 feet long and 300 feet wide in the center, tapering to a point at either end. Water depths over this delta area have been reduced to as little as two feet.



DELTA DEPOSIT — MIDDLE BASIN — DURING
DRAW DOWN

The majority of sediment now entering the lake from the Deschutes River is being transported by the higher velocities through the Upper Basin into the Middle Basin, forming a large submerged sand bar north of the I-5 overpass. This delta deposit is approximately 700 feet long and 300 feet wide in the center, tapering to a point at either end. The progressive accumulation of sediment in the middle basin has become a hazard to motorboaters and water skiers.

The Upper Basin, formed by the Interstate Highway fill, has had a 77% reduction in volume because it has served as a primary sedimentation basin for the Deschutes River sediment loads. As the Upper Basin has become filled, more of this sediment has been transported into the Middle Basin. The rate of deposition of sediment in the Middle Basin has accelerated — to the danger point — for recreational enjoyment of both motor boating and water skiing.

A recent editorial in the Daily Olympian sharply addresses the matter of siltation of Capitol Lake:

Save Our Capitol Lake

It's been a long time coming but maybe now we'll get the job done. We're referring to the silt-removal proposal for Capitol Lake.

Governor Dan Evans has included \$4.2 million in his proposed budget for the rehabilitation of our downtown lake.

These are difficult financial times so that amount for lake cleanup for the next biennium may find tough sledding in the next Legislature. We would point out, however, that unless something is done now about the silting from the DesChutes River, our lake will turn into an extremely painful fiscal headache later on.

We urge legislators to consider carefully the lake proposal. And we say this not only because of its Olympia location but because actually it's everyone's lake. The Capitol campus and complex, of which the lake is a part, belong to everyone living and working in this state.

Institution of the lake some years ago added an important item to the over-all Capital City landscaping. State taxpayers went through considerable time, effort and money to establish it. There is no doubt that Capitol Lake is now a major plus for the Capitol itself. It would be tragic to have to let it deteriorate to the point of becoming a detriment and prohibitively expensive to clean.

Get the job done now.

Among the proposals for the rehabilitation is the construction of a settling basin and waterway improvements to prevent the recurrence of recent major DesChutes River silting. This is an excellent and most necessary move.

Our lake is expensive. Yet we must find the money to keep that prize item in tip-top shape. It would be a complete shame to have to watch the lake turn into a silty swamp.

The Daily Olympian
12/23/74

* The process of over-fertilization of a body of water by nutrients which produce more organic matter than the self-purification processes can overcome.

PRESENT RECREATIONAL BENEFITS OF CAPITOL LAKE

For description and utilization, the lake has been divided into three areas as follows:

1. North or Lower Basin — Extending from Burlington-Northern Railroad train trestle to the Fifth Avenue dam.
2. Middle Basin — Extending from Freeway I-5 overpass to Burlington-Northern railroad train trestle.
3. Upper or South Basin — Extending from Tumwater Falls to Freeway I-5 overpass.

Lower Basin

The City of Olympia operates a public swimming area on the northeast end of the North Basin. The swimming beach is a focal point for Olympia residents and visitors.

Sailing and other unmotorized boating activities take place during the summer months on the North Basin. The big summer event is the Capitol Lakefair which draws large crowds to watch and participate in a wide variety of activities. The Capitol Lakefair is an event which is a source of civic pride and tradition for the area and is the culmination of many months of planning and hard work by Olympia's citizens.

Capitol Lake Dam and fishway is utilized as a public interest area particularly during salmon migration periods, when the fish are viewed milling around in front of the dam and going into Capitol Lake.

The City of Olympia has invested \$250,000 of its bond issue of 1963 in the development of the swim-park area in the northeastern corner of the Lower Basin.

Concerned individuals and community organizations have donated time and funds for major improvements at the Capitol Lake Park site.

A fishing dock specifically designed and built for senior citizens and handicapped persons was dedicated and placed into service in 1972. The Capitol City Lions Club was the sponsor for the project, completing the project themselves and turning the facility over to the City of Olympia Department of Parks and Recreation. The value of the dock and adjacent park area is estimated to be in excess of \$40,000.

The Patrons of Olympia and South Sound Cultural Activities (POSSCA) submitted plans and a gift of \$5,000 to construct an entrance and a fountain at Capitol Lake Park. POSSCA also gave \$10,000 to design and develop the unique playground area adjacent to Capitol Lake swimming area.

In November, 1972, Daryl Wade, a candidate for Eagle Scout, installed a totel pole (carved as one of his Eagle

Scout projects) at the site, which depicts the purpose of the fishing area.

In 1970, a park area was completed next to the railroad fill on the southwest end of the North Basin and has picnic areas, parking areas, restrooms and a foot-bridge. The park is on a 58,000 cubic yard earth fill area. A trail is partially completed around this basin.

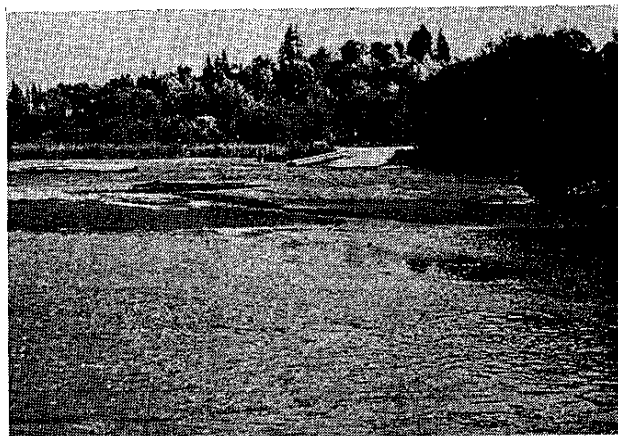
The beautification of Capitol Lake also took a big step forward with the planting of over 100 Kwansan flowering cherry trees along the lakeside of Deschutes Parkway. The cherry tree planting program was financed by contributions of local citizens and was the result of efforts by Olympia Businessman Jimmy Drees.

Middle Basin

The Middle Basin is primarily a power boat operating area, for water-skiing and fishing. Since the Lower Basin is closed to power boat operations, these activities take place in the Middle Basin. Water depths in certain areas of this basin have been reduced to an average of less than four feet.

Upper Basin

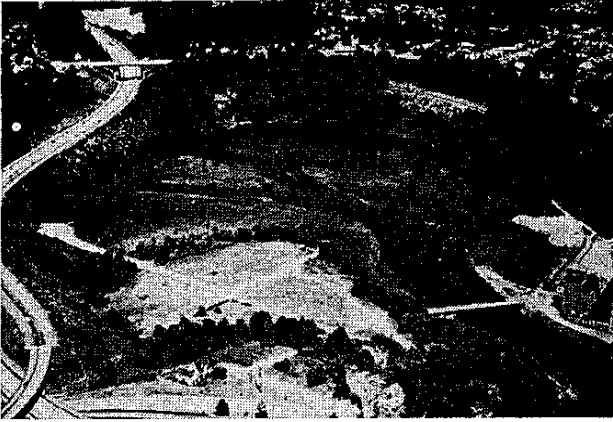
The Upper Basin has been affected the most radically of the three basins by the deposition of sediment and has



BOAT LAUNCHING RAMP — DURING DRAW DOWN OF LAKE

The Upper Basin has been affected the most radically of the three basins by the deposition of sediment and has undergone a radical change in use since 1952. Boating activity which originally encompassed this entire Upper Basin is now limited to the immediate vicinity of the boat launching ramp and can only be navigated with shallow draft boats and with extreme care.

undergone a radical change in use since 1952. Boating activity which originally encompassed this entire Upper Basin is now limited to the immediate vicinity of the boat launching ramp and can only be navigated with shallow draft boats and with extreme care.



UPPER BASIN

The Upper Basin has had a 77% reduction in volume because it has served as a primary sedimentation basin for the Deschutes River sediment loads.

Steelhead fishermen utilize the west shoreline for bank fishing and the main channel for drift fishing.

In 1974, the City of Tumwater acquired a 5 and ½ acre shoreline park site, presently designated as DesChutes Way Park, on the Upper Basin. This site is located on the east of Deschutes Parkway directly north of the Tumwater Falls. This acquisition preserves public access to a portion of the lake.

Tumwater Falls Park

Immediately south of DesChutes Way Park, in Tumwater Falls Park, are two concrete holding ponds built in 1962 at the head of the fishway to facilitate holding the salmon during peak of the spawning run in the fall.

Tumwater Falls Park is a fifteen acre private park open to the public. The site is one of great beauty where the Deschutes River tumbles down the gorge and cascades over beautiful Tumwater Falls and enters the Upper Basin of Capitol Lake.

Also located in the park area and providing another special point of interest for visitors are the fish ladders built by the Washington State Department of Fisheries in 1953 for the use of the Deschutes River spawning grounds by the newly established runs of anadromous fish.

The Park has considerable historic significance as Tumwater was the first pioneer settlement north of the Columbia River, at the end of the historic "Oregon Trail". Michael T. Simmons and a group of thirty pioneers, including eighteen children, settled in this area in 1845. Nathaniel Crosby II, Bing Crosby's grandfather, purchased the grist mill in 1848 and built a home here in 1860. The Crosby home, preserved by the Daughters of the Pioneers, is located immediately adjacent to DesChutes Way Park.

ECONOMIC AND RECREATIONAL BENEFITS OF FISHERIES PROGRAM

In 1946, the Washington Department of Fisheries initiated a juvenile rearing program for fall Chinook salmon in the Deschutes River above a series of impassable falls near the mouth of the river.

From 1949 to 1954, the returning adult salmon were trapped in Budd Inlet and transported above the falls to spawn naturally in the Deschutes River.

By 1954, the Department of Fisheries completed a series of fish ladders around the falls, giving migratory fish access to the upper river. Two large adult holding ponds were also constructed in conjunction with the fish ladders to collect adult salmon for enumeration, research and egg taking.

The spectacular adult salmon runs each fall, as high as 25,000 returning salmon, have attracted considerable public interest at the Capitol Lake dam, the fishways and at the adult holding ponds located in the Tumwater Falls Park. Crowds estimated as high as 5,000 spectators on a single day have observed special demonstrations of artificial spawning and egg taking. The fish are also viewed by large numbers of tourists, school children and local residents as the large salmon are counted, measured and released upstream on a daily basis from mid-September into early November most years. The educational, economic and recreational values of this salmon run to the people of the State of Washington are difficult to assess as are the sport fishing benefits to the many avid sport salmon fishermen. The salmon from this system also contribute heavily to the lower Puget Sound sport fishery.

The quality of the water and its location have made Percival Creek an important resource as both a spawning and a rearing area for anadromous fish. Percival Creek is a tributary to Capitol Lake at the northwestern corner of the Middle Basin, and presently maintains native runs of coho and chinook salmon, steelhead, cutthroat and rainbow trout. Most of the spawning grounds are located along lower Percival Creek.

Additionally, and of more importance economically, the Department of Fisheries conducts a chinook rearing program in Percival Cove. A feeding program has been instituted and the system operates at or near its capacity. In 1973, approximately 6 million fish were reared in Percival Cove, making it one of the largest fall Chinook stations on Puget Sound. The annual value of this operation to both commercial and sports fisheries has been estimated at between one and three million dollars.⁴

*"Capitol Lake is Washington State's most important fish rearing impoundment, having greater recreational and monetary value than any other fish farm in the State. Capitol Lake is annually stocked with between one and seven million chinook fry, and within the past ten years, these fish have returned from 8,000 to 25,000 adult salmon to the Deschutes fishway, where the Department has an investment of about \$450,000 in fish facilities. When the Department of Fisheries makes a plant of five million salmon in Capitol Lake, it costs the State about \$20,000. It is calculated that after these fish are released, they will contribute about 112,000 salmon having an approximate harvest value of \$1,500,000 to the sport and commercial fisheries. In addition to the fishery harvest, this same release should provide about 37,500 adults returning to the Capitol Lake system. These salmon are caught off the Washington coast as far south as Illwaco, as well as in the Strait of Juan de Fuca and Puget Sound. Although the recreational benefits from Capitol Lake salmon production are spread over a broad area, these fish also contribute heavily to the southern Puget Sound sport catch and are becoming an increasingly popular attraction to anglers in Capitol Lake itself."

The continued accumulation of silt in the basins, without corrective action, will also affect this program.

⁴Kramer, Chin & Mayo, Inc. — An Engineering Study of Percival Creek Drainage Basin — Prepared for the City of Olympia, Seattle, Wa., 1973.

*Excerpts from letter to Capitol Lake Coordinating Committee from Washington State Dept. of Fisheries, May 13, 1969.

BENEFITS OF LAKE RECLAMATION

The rejuvenation of Capitol Lake will provide recreational benefits that will give enjoyment to present and future generations.

The following are some of the benefits of reclamation, the economic spin-off that could occur and the consequences that will result if no action is taken:

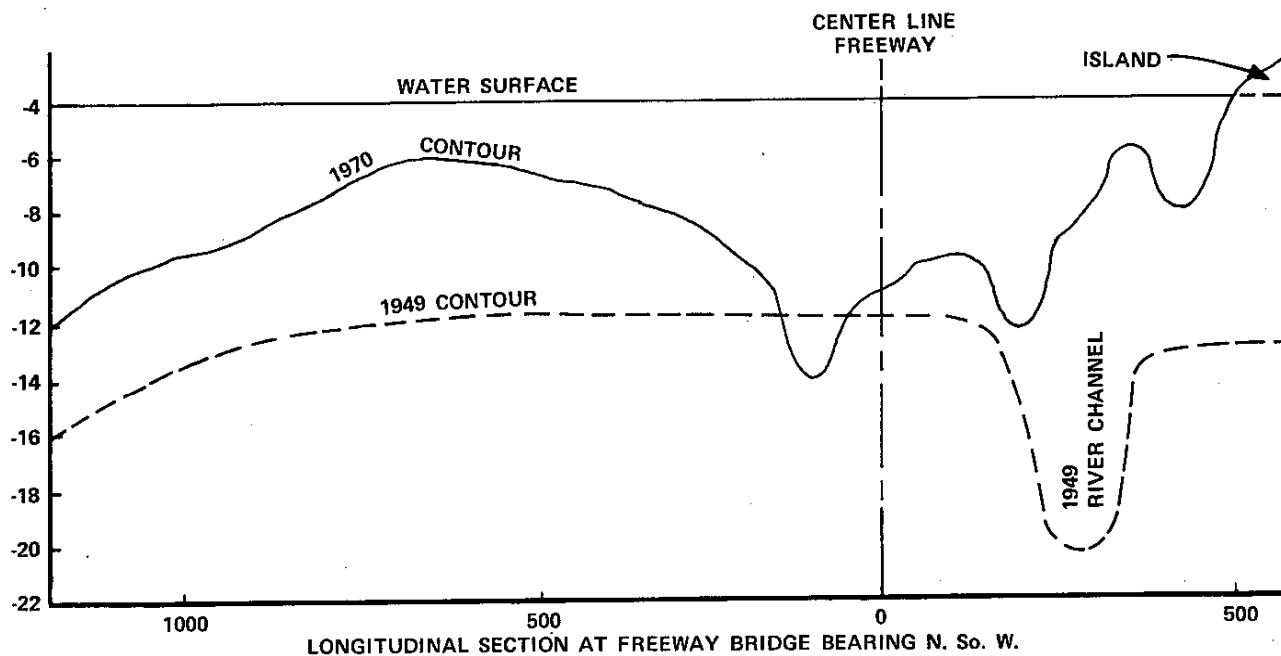
Recreational Benefits from Reclamation

- Increasing the depth increases the recreational opportunities and provides for more use during the summer when the demand is high.
 - Dredged material can be used to create on-site park areas to provide additional access to the lake.
 - Dredging provides for:
 - Cooler water at depth in summer.
 - Opportunities for improved sports fishing.
- In addition, there is a benefit due to greater diversity and area of usable fishing habitat.
- Removal of sand bars, deltas, and other boating hazards.
 - By use of spoils, increase public access to lake shoreline.
 - East half of South Basin would become a sediment basin while existing islands and marsh area on western half of basin would remain a marsh.
 - Increased aesthetic value.

- Deep water will assist in decreasing algae and associated growth, thus decreasing maintenance cost.
- Burlington-Northern Railroad plans development of switching yard into compatible lakeshore development. Burlington-Northern would also provide public access and insure continuation of the trail system around the North Basin. If Burlington-Northern were to develop its holdings, the tax revenues and economic spin-off could be beneficial to the community.
- The City of Tumwater has acquired 5½ acres of park site on the shoreline of the South (upper) Basin. The future plans call for linking the trail system of the Upper and Middle Basin.
- Funds for the acquisition of open space and development of recreational resources of the visual basin will be addressed to the Secretary of Interior's Land and Water Conservation Contingency Fund.
- Lake rehabilitation will enhance and increase the recreational benefits and use of the lake.

Consequences of No Action

- Continued deposition downstream (north) of the I-5 highway bridge has begun to severely limit usage of the Middle Basin. It is also indicated that the Upper Basin can no longer serve as an effective sedimentation basin for the rest of Capitol Lake unless portions of the Upper Basin are dredged.
- Continued siltation will cause many areas of the lake bed to flourish with biological activity. Photo-synthesis in shallow, slow current lake-bed areas will



promote production of algae and associated plant life, thus increasing maintenance costs. All basins in the lake become very turbid during periods of the high river flow.

- No dredging will continue to reduce the recreational opportunities.

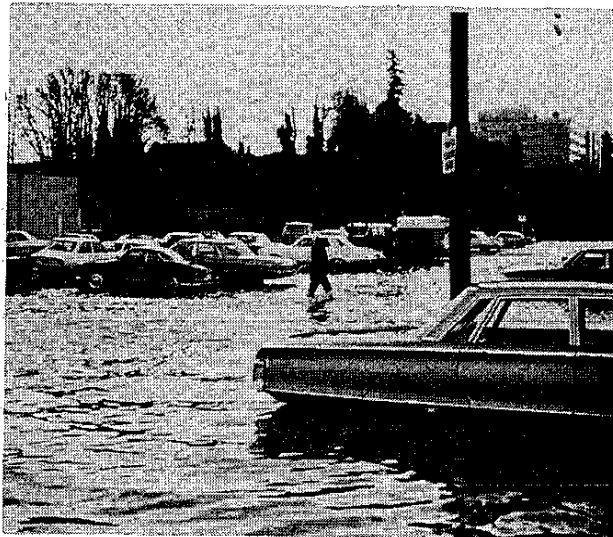
Nutrients are introduced and are either part of the surface erosion process, or through infiltration. When these nutrients combine with settlement, sunlight and warmer water temperature they accelerate algal growth and subsequent eutrophication.

- South or Upper Basin will, in approximately 6 years, become completely filled with sediment.
- Burlington-Northern has indicated that without a reclamation program of the lake, it would be difficult to justify an investment of several million dollars if the aesthetic quality of the area was allowed to waste away.*
- Without the sediment removal and maintenance system in the Upper Basin Deschutes Way Park's attractiveness and usefulness as a freshwater access site and water oriented recreational resource is greatly diminished.
- Failure to provide funds for reclamation of the lake could adversely affect any applications directed to the Secretary of the Department of Interior's Land and Water Conservation Contingency Fund.

Long Range Consequences of No Action

- Eliminate the type of water sports now enjoyed in the basins.
- The abandonment or removal of expensive capital improvements now existing.
- Seriously curtail salmon rearing program.

- As forecast in the Engineering Study, eventually the lake will, for all practical purposes, completely fill with sediment if nothing is done to remedy the situation. The present situation in the Upper Basin will be repeated in the Middle and Lower Basins, gradually building up land areas and vegetation. During this ecological evolution, the entire lake will be filled, leaving the Deschutes River to wind its course through the Basins much in the same manner as before the dam was constructed.



FLOODING IN DOWNTOWN OLYMPIA —
January 16, 1974

The problem of handling flood flows through the filled-in basin must also be addressed. Overflow into downtown sections or routing to avoid damage are potentially high cost problems for the community if storage volume in the basins is not maintained.

*Burlington-Northern's Project Manager, in a letter to the Capitol Lake Executive Committee dated October 16, 1974, stated "Reclamation of the lake and providing public amenities will generate interest for private development because of the visual quality and the appeal of a park-like atmosphere . . . Capitol Lake and its preservation is one of the keys to Olympia's future."

EFFECTS OF DELAY

To continue the lake-oriented concept requires a direct attack of the problem of sediment accumulation. Briefly outlined are some of the consequences that would result from a delay in the reclamation work for Capitol Lake:

"The effects of delay, when measured in terms of years, are basically two-fold; the first effect being that the unit-costs of reclamation work (dredging, etc.) are increasing at an alarming rate and that the quantity of material to be removed is increasing by approximately 40,000 cubic yards every year. This results in a greater cost each year the project would be delayed.

The second effect can be measured in terms of coordination, or lack of coordination, as the case may be, with the planned activities of the Port of Olympia. Much of the material dredged from Capitol Lake will be useful to the Port of Olympia in constructing their planned improvements. Letters of intent and agreements on cost sharing and mutual benefits of a joint dredging-filling operation should be commenced as soon as possible with the Port. If the lake reclamation work is delayed beyond the time the Port can utilize the material dredged from the lake, serious problems develop in regard to disposal of excess spoils.

In light of the situation that prevails, the seriousness of any delay becomes quite clear."*

A. Recommended Dredging and Filling in Upper Lake⁵

The recommended changes in the Upper Lake are shown in Figure 2 in dashed lines superimposed on the existing geometry. The major phases of the recommended dredging in the Upper Lake are:

1. Uniform channel from the vicinity of the warehouse (old brewery) dredged to a depth of about 10 feet down past the two largest islands and protect the left bank with gabions at 1A.
2. Install a groin to deflect the passage of most of the flow down the new channel between the two larger islands.
3. Fill the low-lying area, or portions of it, downstream of the warehouse to serve as a materials handling site for disposal of dredged materials as part of the lake maintenance program. The fill should be high enough to prevent flooding of the handling facilities. The facilities should be designed by a consultant to handle anticipated dredged materials. The nearness of the railroad makes this an ideal location for handling and removing the dredged material.³
4. Fill the major channel between the two islands to provide a much longer travel path for the flow, and a much larger quiet area for sediments to be deposited.

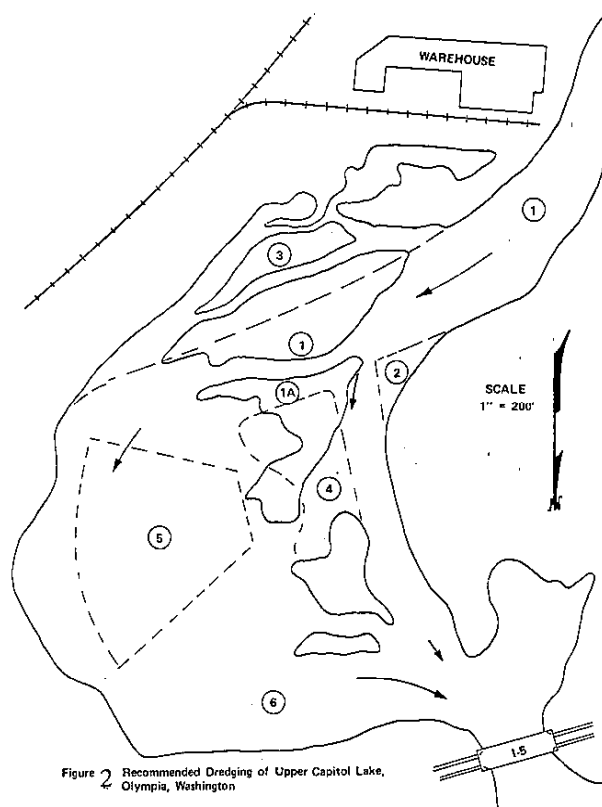


Figure 2 Recommended Dredging of Upper Capitol Lake, Olympia, Washington

5. Dredge a deeper area (15 feet minimum) behind the new island to provide for slower velocities and improved settling conditions.
6. Leave the rest of the Upper Lake in essentially its existing state, except as discussed in the next section for recommendations on matters other than dredging.

B. Other Recommendations

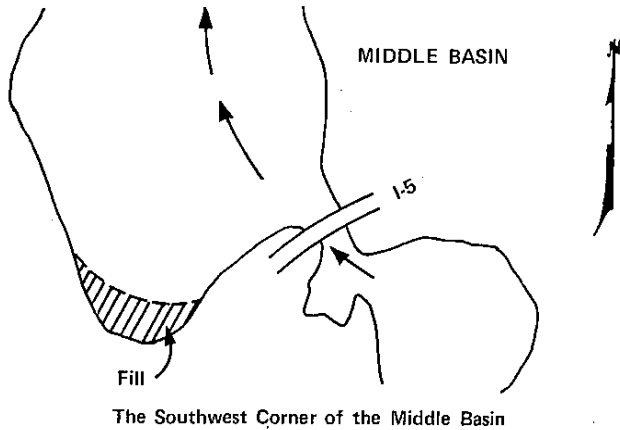
1. The initial dredging of the entire lake should be performed by a dredging contractor.
2. Initial dredging should follow these general guidelines:

The numbers in the text correspond to those in Figure 2.

- a) the Upper Lake should be dredged as shown in Figure 2 based on the hydraulic design for sediment removal;
- b) the new shallow upper end of the Middle Lake, just downstream of the I-5 bridge, should be dredged to a minimum depth of 15 feet to provide for trapping sediment that spills out of the Upper Lake in the future, and to remove a boating hazard;

* Letter from Patrick J. Byrne, Consulting Engineer, October 8, 1974.

- c) the rest of the lake should be dredged to a minimum depth of 12 feet wherever possible to reduce weed growth; and
 - d) the upper one-half foot to one foot bottom deposits should be dredged to remove nutrients.
3. Hazards such as old pilings and tree stumps should be removed as part of the dredging operation.
 4. The decisions regarding Percial Cove which is used



for raising fingerlings should be made following further discussions with the Department of Fisheries; the amount of dredging is only a small fraction of the total lake, but the rearing area is an important asset of Capitol Lake.

5. Maintenance dredging should be handled on a regular basis by the Department of General Administration through the purchase of a small dredge ("Mud-cat" type). This will provide a "clean" dredging operation and temporary sealing off of the basin to control turbidity which would not be necessary.
6. Some dredged materials should be utilized to develop recreation areas, such as in the southwest corner of the Middle Lake near I-5.
7. Boardwalks, a footbridge, and observation platform should be constructed from the west shore of the small channel (Figure 2) over to the newly formed island for access to the new area and wildlife observation. The bridge should be above flood levels, and this would allow for small boat access through this channel.

ALTERNATIVES

The two general alternatives to the recommended dredging program which can be considered are: A. More complete dredging of the entire Lake back to 1950 conditions; or B. No dredging at all.

Alternative A. Deeper Dredging of the Lake to 1950 Conditions

This was an initial alternative under consideration during and prior to 1973. But, as a result of the sedimentation and water quality studies it has been determined that dredging to 1950 depths would not be as beneficial as selective dredging based on hydraulic and water quality design criteria. Complete dredging would decrease the efficiency of the Upper Lake as a sediment trap compared to selective dredging, and remove valuable wetlands. Deeper dredging of the Middle and Lower Lakes would not improve their utility, because the recommended selective dredging provides adequate depths for boating, removes hazards and optimizes water quality conditions. Some maintenance dredging will have to be performed, but this can be accomplished with the Mudcat dredge on a scheduled basis at minimum costs.

Alternative B. No Dredging

Without dredging Capitol Lake at this time, the following detrimental and hazardous conditions will result:

1. The Upper Lake will become more completely filled with sediment, debris, brush and aquatic growth, and cease to function as a sediment trap for the rest of Capitol Lake.

2. The sediment load which would have been dropped in the Upper Lake will accumulate in the Middle Lake, thereby decreasing its usefulness.
3. More sediment will be transported into the Lower Lake as the Middle Lake fills.
4. As all parts of the Lake become shallower, weed and algae growth will increase due to increased water temperatures, and the water quality will be degraded.
5. The rate of degradation of Capitol Lake will be accelerated due to the fact that an average annual inflow of sediment will decrease the remaining volume in the Lake by a larger percentage each year.

Further Disposition of Dredged Material

The Port of Olympia has developed a comprehensive plan for development of the Port area which involves a considerable amount of land fill and dredging work.

This project is planned to begin in 1975 at the south end of the east waterway, by constructing a small boat marina, northward to the Cascade Pole plant as a first stage. The remaining portion north to the northmost end would be constructed some time in the future as funds are available. This is one of the areas that would be available for spoils material.

⁵Orsborn, John F., "Summary Report on Sedimentation Studies of Capitol Lake, Olympia, Washington," Department of Civil and Environmental Engineering, College of Engineering, Pullman, Washington, December 20, 1974.

PROPOSED TEN YEAR CAPITAL IMPROVEMENT SCHEDULE

CAPITOL LAKE AN ENVIRONS*

PROJECT DESCRIPTION

I. Immediate Objectives

- A. Develop mini-park at Fifth Avenue at dam.
- B. Re-establish a mantle of native vegetation on the barren hillside immediately south of Percival Cove to assist in restoring this slope to its natural appearance.
- C. Construct and install interpretive signs at strategic locations around the lake.

II. Short Range Objectives **Jurisdiction

A. Stage One 1975

- 1. Prepare initial dredging contract specifications. State
- 2. Develop preliminary design plans for utilizing dredged spoils for shoreline parks. State/Olympia/
Tumwater
- 3. Acquire scenic or trail easements around bluffs of western shoreline. State/Olympia/
Tumwater
- 4. Acquire through acquisition or acquisition of rights to open space adjacent to Percival Cove and Percival Creek. Olympia/State
- 5. Develop design plans for trail system along Percival Creek from Capitol Lake to Mottman Road. Olympia/State/
Burlington-
Northern
- 6. Develop preliminary design plans for DesChutes Way Park and trail system. Tumwater/State
- 7. Develop preliminary design plans for Island Mini-park with provisions for physically handicapped. State/Tumwater
- 8. Develop preliminary design plans for railroad marshalling yard with public access and trail system. Burlington-
Northern/
State/Olympia
- 9. Develop preliminary design plans for foot-bridge over dam to complete trail system on north shore of Lower Basin. State/Olympia
- 10. Develop preliminary design plans of shoreline parks: State/Tumwater
 - a. Southwestern corner of Middle Basin.
- 11. Develop design plans for re-creation of Pioneer Block House on lake site. State
/Participating
Agency
- 12. Develop preliminary design plans for land base and site for desilting plant in Upper Basin. State/Olympia
Brewery

- B. Stage Two 1976 Jurisdiction
- 1. Dredge Capitol Lake basins. State
- 2. Develop preliminary design plans to extend pedestrian and bicycle path: State/Olympia/
Burlington-
Northern
 - a. Around North Basin with Provisions for physically handicapped
 - b. Along shoreline to link Middle and Upper Basins. State/Tumwater
- 3. Utilize dredged spoils to create lake shoreline park in S.W. corner of Middle Basin. State
- 4. Begin removal of railroad marshalling yard. Burlington-Northern
- 5. Develop preliminary design plans for access from Capitol grounds to Percival lake. State/Burlington-
Northern/Olympia
- 6. Develop trail system along Percival Creek. Olympia/State
- 7. Acquisition of High Shoreline Park site. This is a 20 acre site overlooking the lake at Lake Drive and Deschutes Parkway. Thurston County
Parks and
Recreation
Department
- 8. Acquisition of 11 acres gravel removal area immediately north of Percival Cove. State/Olympia
- 9. Develop preliminary concept plans of interpretive center for gravel removal area near Percival Cove. State/Participating
Agency
- 10. Begin development of DesChutes Way Park. Tumwater
- 11. Acquire additional parcels adjoining DesChutes Way Park to connect trail system. Tumwater
- 12. Develop design plans for access to artesian well located in Lower Basin. State/Burlington-
Northern
- 13. Conduct feasibility study to determine cost, site location, scope, economic and cultural benefits of re-creating historic Town of Tumwater. Participating
Agency

II. Long Range Objectives

- C. Stage Three 1977 Jurisdiction
- 1. Begin development of shoreline park in southwestern corner of Middle Basin. State/Participating
Agency
- 2. Develop Island Mini-Park in Upper Basin. State/Tumwater
- 3. Develop preliminary plans to connect Capitol Lake trail system with urban trail system. Participating
Agencies
- 4. Develop preliminary concept plans for High Shoreline Park. Thurston County
Parks & Recrea-
tion Dept.
- 5. Develop gravel removal area near Percival Creek. Olympia/State
- 6. Continue development of DesChutes Way Park. Tumwater

- | | |
|--|--|
| 7. Use of train station at railroad switching yard as possible interpretive center. | Participating Agency |
| 8. Develop preliminary design plans for Visitor Information Center at Capitol Lake Park. | Participating Agency |
| 9. Construct Pioneer Block House on lake site. | State/Participating Agency |
| D. Stage Four 1978 | Jurisdiction |
| 1. *Develop preliminary design plans for creation of historic Town of Tumwater. | Tumwater/Participating Agency |
| 2. Begin development of marshalling yard with public access to lake. | Burlington-Northern |
| 3. Develop access from Capitol grounds to the lake. | State/Burlington-Northern |
| E. Stage Five 1979 | |
| 1. *Begin development of historic Town of Tumwater. | Tumwater |
| F. Stage Six 1980 | Thurston County Park and Recreation Dept. |
| 1. Begin development of High Shoreline Park site. | |
| G. Stage Seven 1981 | Thurston County Park and Recreation Dept. |
| 1. Continue development of High Shoreline Park. | |
| H. Stage Eight 1982 | Thurston Co. Park and Recreation Dept. /Participating Agencies |
| 1. Develop connection of Capitol Lake to urban trail system. | |
| I. Stage Nine 1983 | Jurisdiction Olympia/State |
| 1. Develop design plans for underground fish viewing tunnel at Fifth Avenue dam. | |
| J. Stage Ten 1984 | Olympia/State |
| 1. Develop underground fish viewing tunnel at Fifth Avenue dam. | |

* Contingent on results of feasibility study and funding resources.

* Exact facilities have not been determined because the scale of development is unknown. Detailed consideration will be necessary to determine a reasonable estimate of costs and available funding resources.

**Joint effort. Agency listed first could be lead agency.

Authorization of Capitol Lake

On March 18, 1947, the Governor of the State of Washington approved House Bill 236, authorizing the issuance of bonds against the Capitol Building Construction Fund for the completion of the Deschutes Basin, detailing the purposes for which the proceeds may be used, defining the powers of the State Capitol Committee in connection therewith, making an appropriation, and declaring an emergency.

The maximum amount of bonds that could be issued was one million dollars, at a maximum interest rate of 5%, for a maximum period of 20 years.

Scope of work

The items of work under this authorization were defined under Section 7 of Chapter 186 (H.B. 236), State of Washington Session Laws of 1947, and were as follows:

"(1) the acquisition by purchase or condemnation of necessary lands or easements; (2) the construction of a dam or weir along the line of Fifth Avenue in the City of Olympia and a parkway and railroad over the same; (3) the construction of a parkway on the west bank of the Deschutes Basin from the Pacific Highway at the Deschutes River to a connection with the Olympic Highway; (4) the construction of a parkway from the vicinity of Ninth Avenue and Columbia Street in the City of Olympia around the south side of the north Deschutes Basin, using the existing railroad causeway, to a road along Percival Creek and connecting with the Olympic Highway; (5) the preservation of the precipitous banks surrounding the basin by the acquisition of easements or other rights whereby the cutting of trees and the building of structures on the banks can be controlled; (6) the construction by dredging of varying level areas at the foot of the bluffs for access to water and to provide for boating and other recreational areas; and (7) such other undertakings as, in the judgment of the Committee, are necessary to the completion of the project." (RCW 79.24.160)

Construction of Dam & Parkway

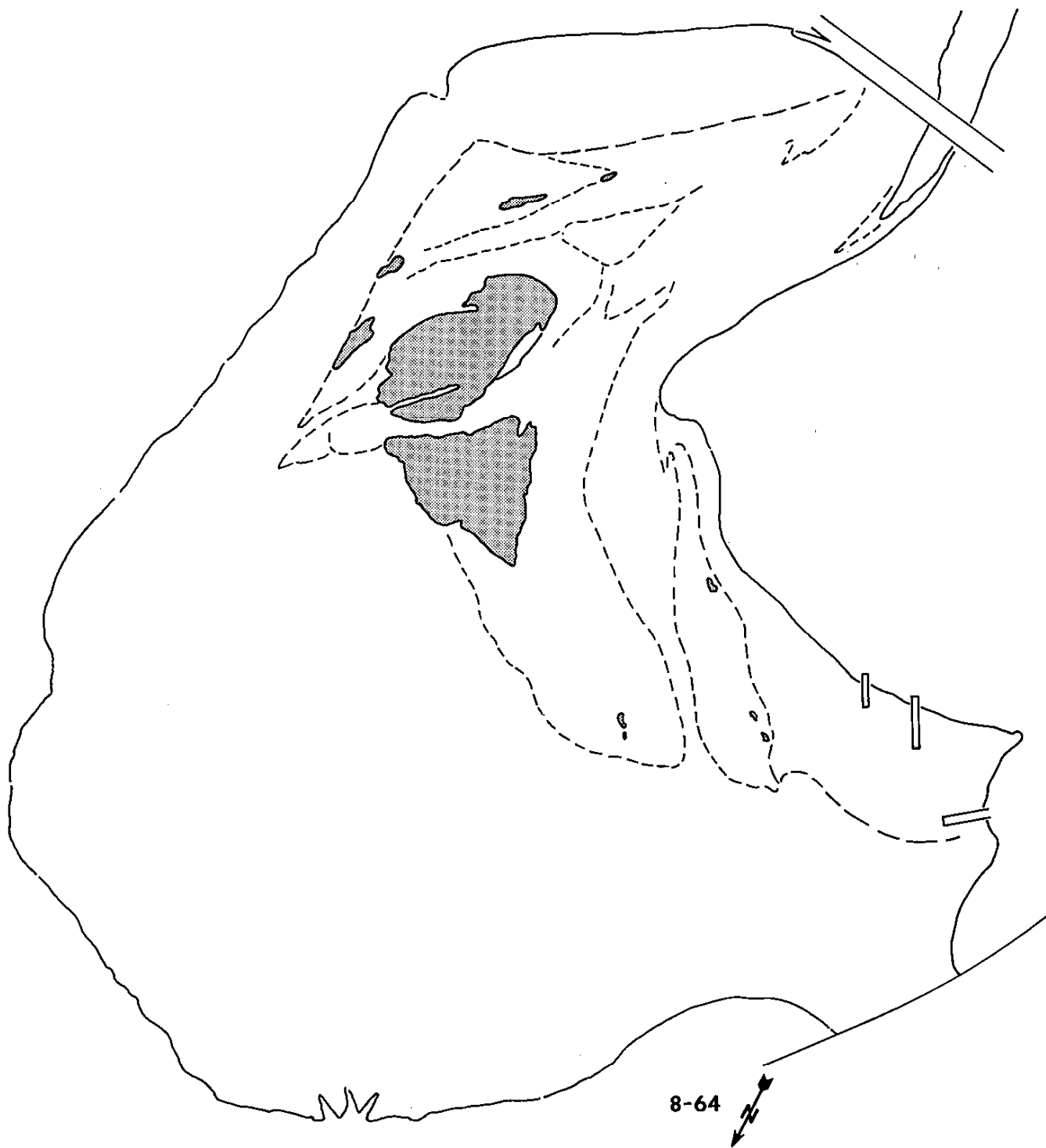
On June 1, 1948, an application was made to the U.S. Army Corps of Engineers for approval to construct a 230,000 cubic yard earth dam at the north end of the basin (5th Avenue) with an 80 foot concrete spillway structure. Along with the dam, the request was made to construct an earth fill of 186,500 cubic yards along the westerly shore for DesChutes Parkway and an additional earth fill of 375,000 cubic yards at the northeast end of the basin, where the City beach is at present.

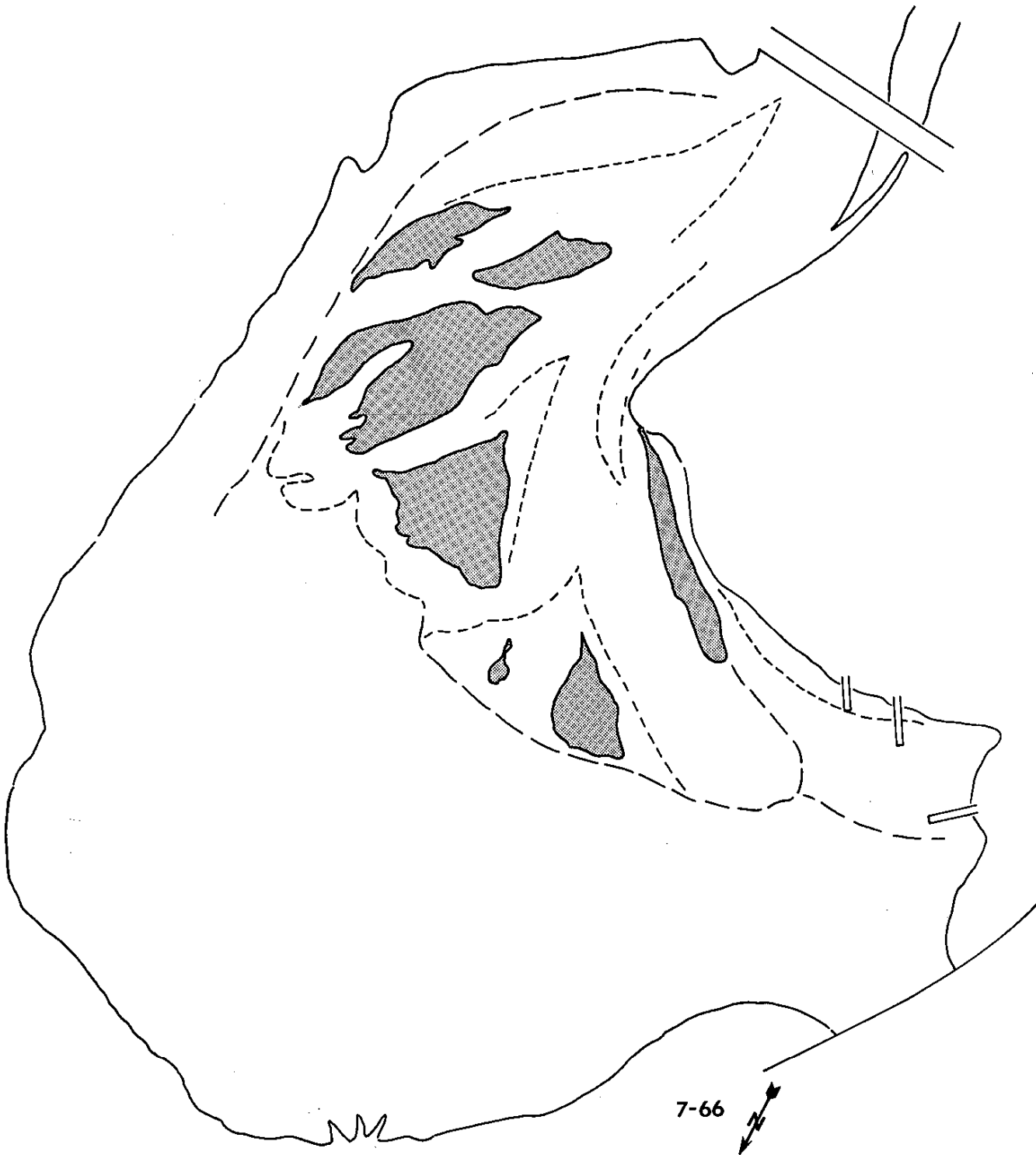
This request was subsequently approved by the Corps on February 4, 1949, and construction was completed on October 10, 1951.

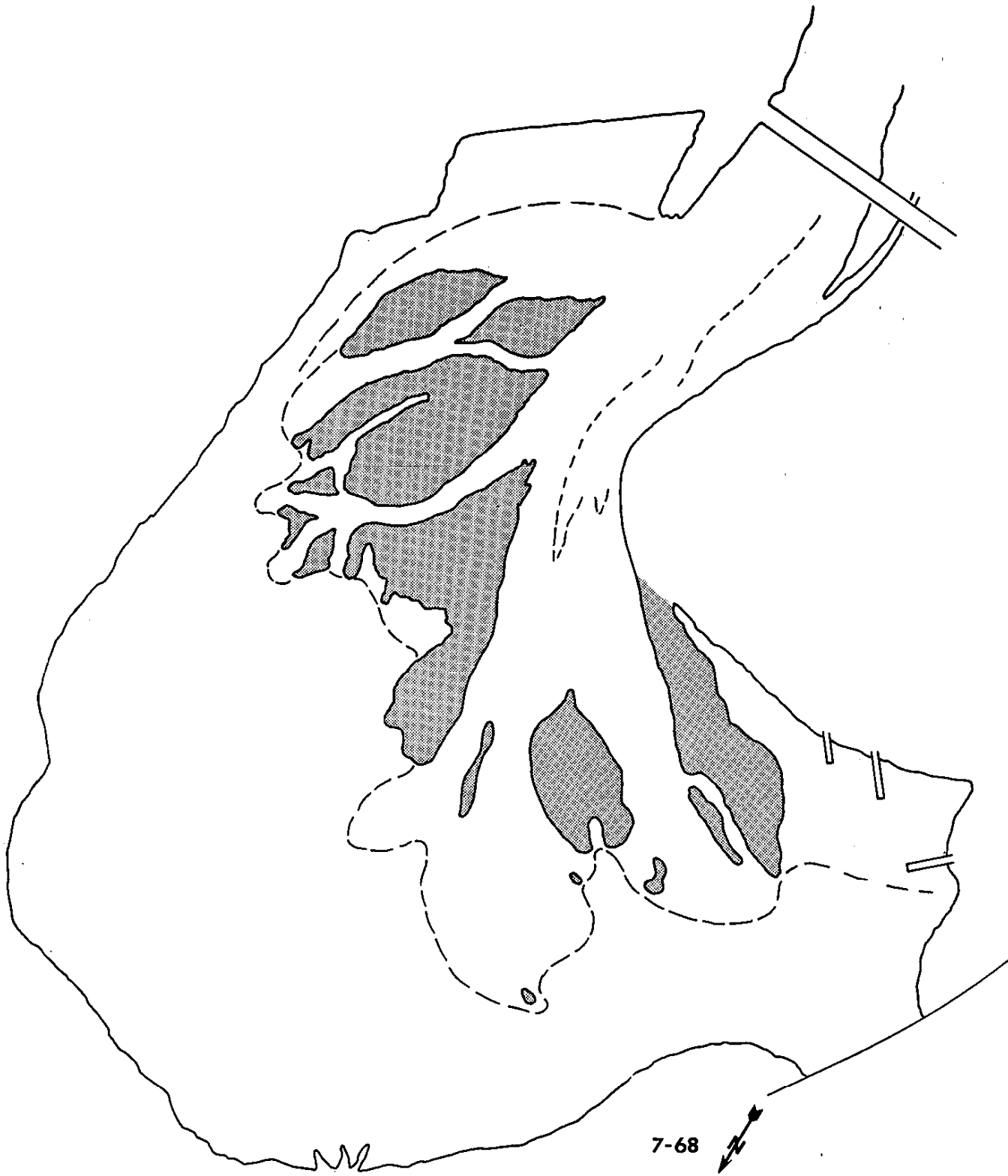
Since the dam was constructed, no funds have been allocated to remove the silt from Capitol Lake.

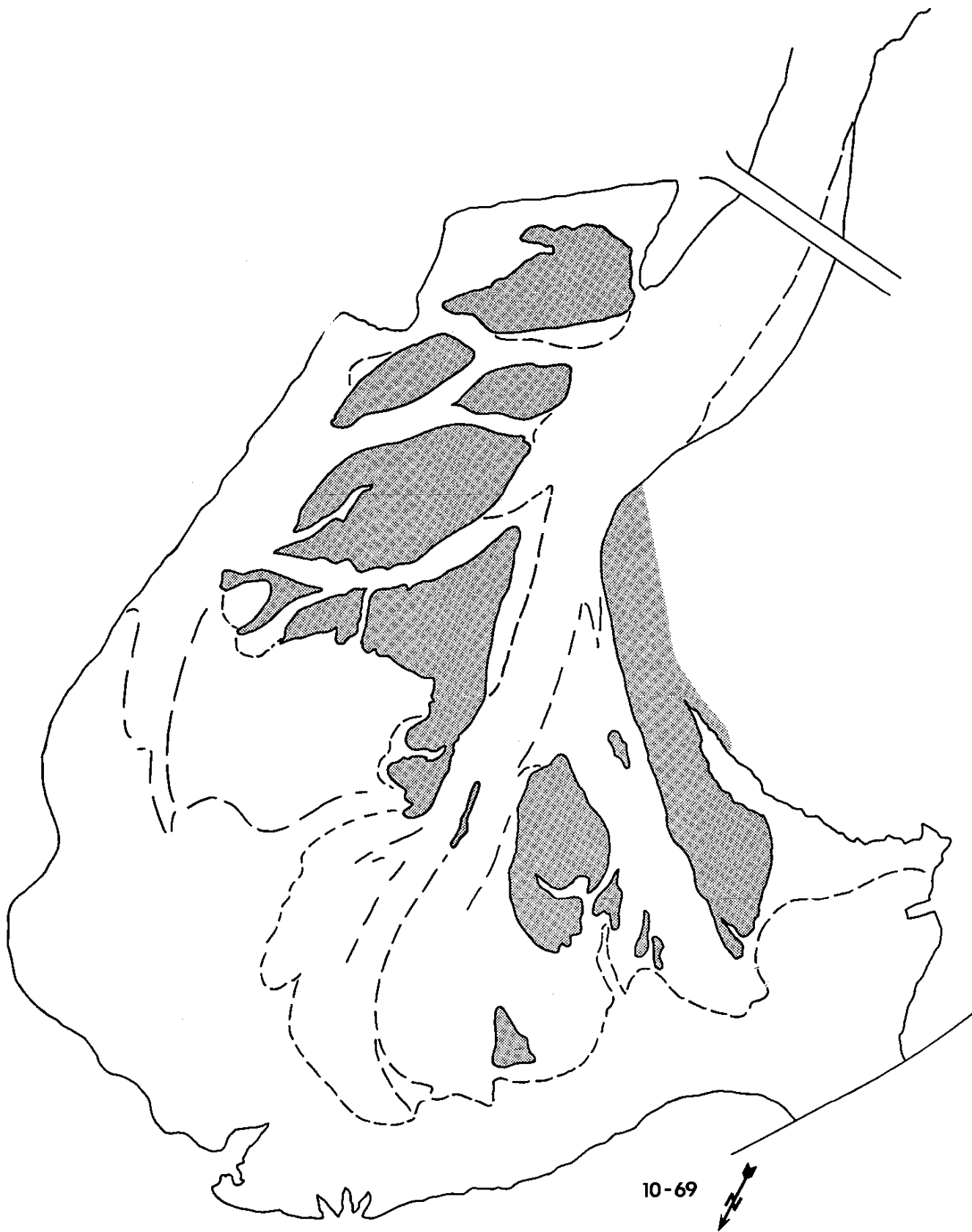
The following 6 pages illustrate the progressive accumulation of sediments that have formed deltas and islands in the upper basin.





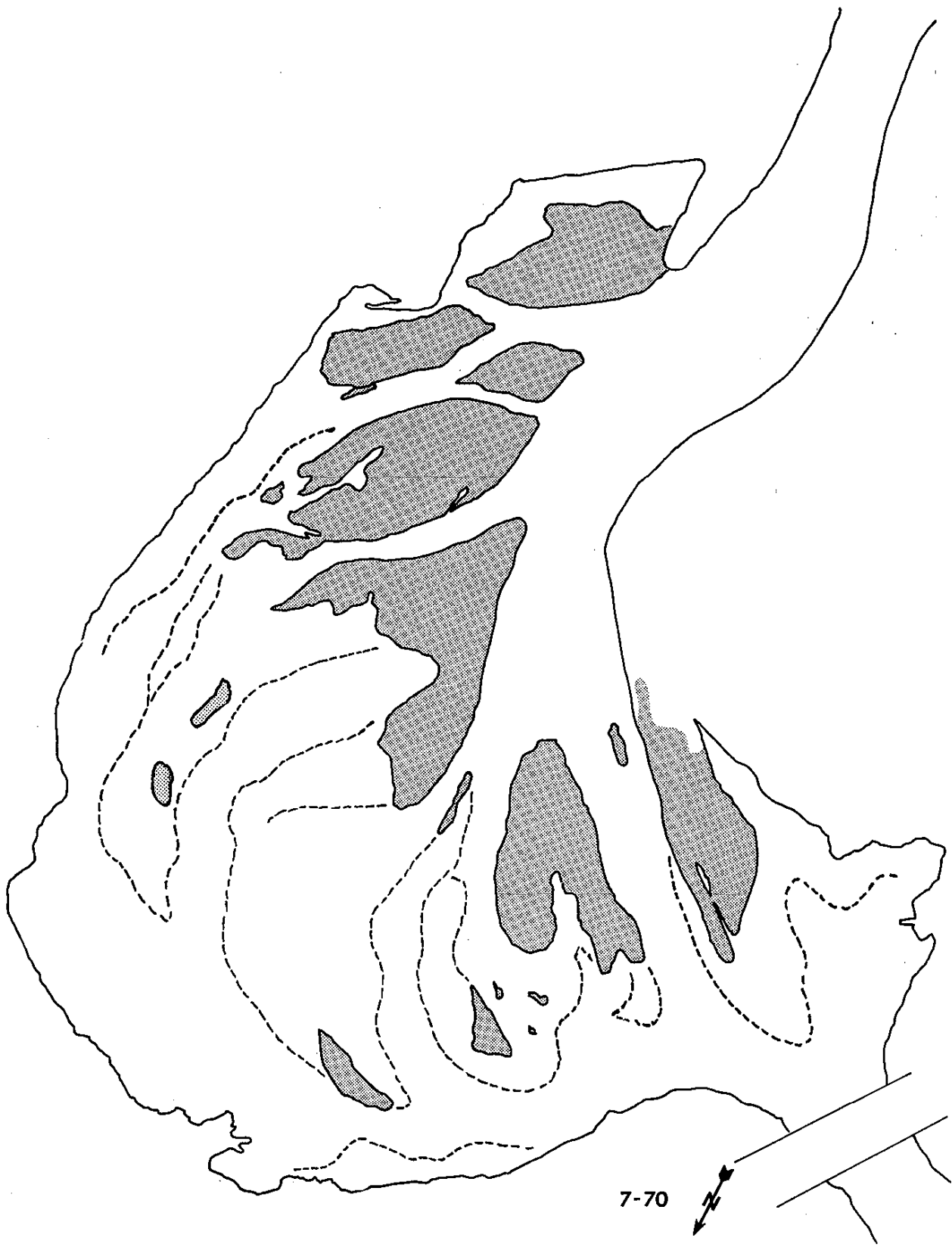






10-69







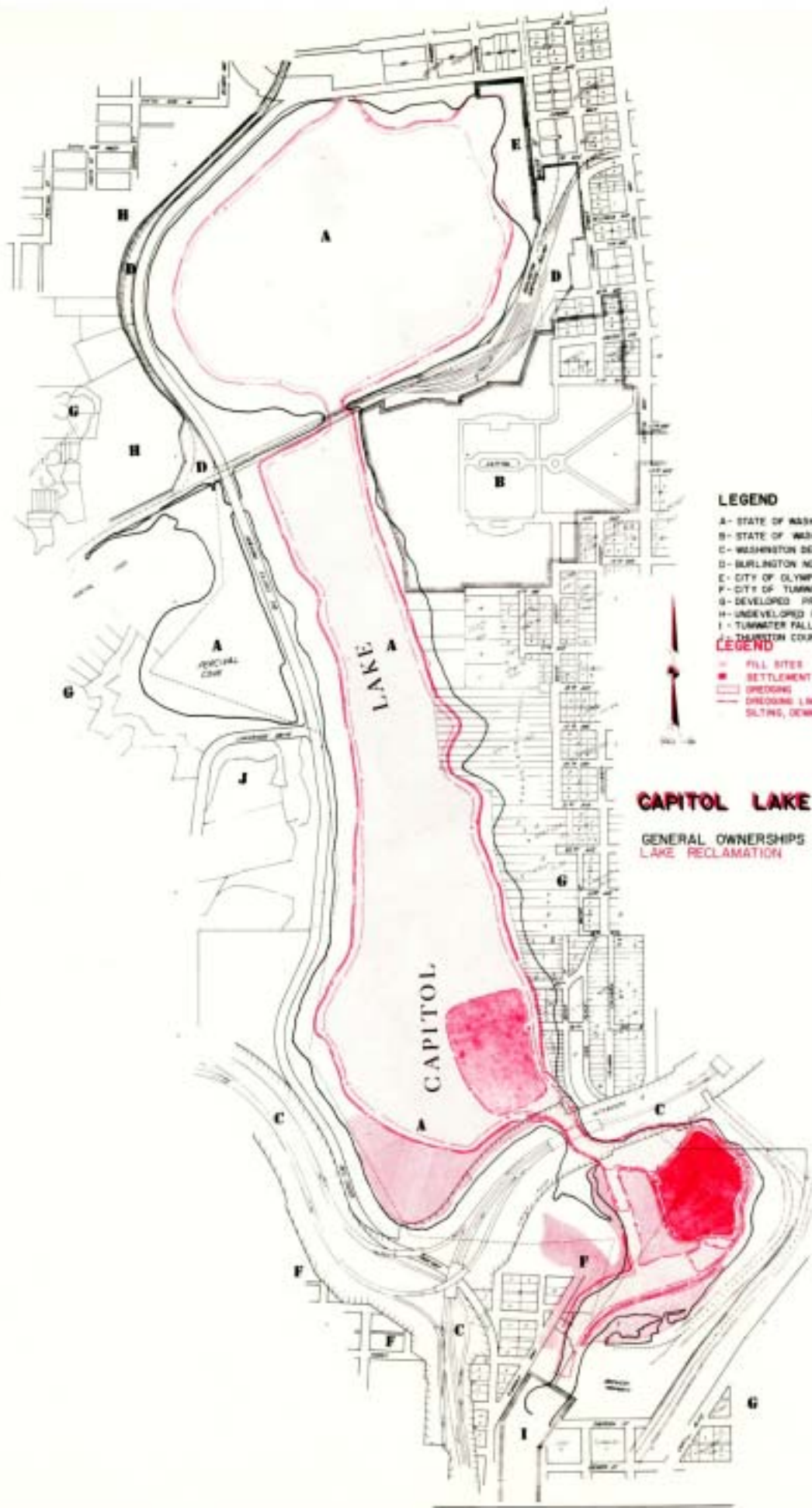
LEGEND

- 1- CONSTRUCT FOOTBRIDGE AT DAM
- 2- CONSTRUCT TRAIL LOWER BASIN
- 3- BURLINGTON NORTHERN TRAIL & ACCESS
- 4- MINI PARK - BUDD INLET
- 5- FISH VIEWING TUNNEL - O'AVE
- 6- CONSTRUCT TRAIL PERICAL CR TO MOTTMAN RD
- 7- DEVELOP THURSTON CO PARK
- 8- CREATE SHORELINE PARK FROM DRAINAGE SPILLS
- 9- LINK UPPER & LOWER BASIN WITH TRAIL
- 10- BRIDGE/OBSERVATION PLATFORM ON ISLAND
- 11- DEVELOP CITY TUMPKATER'S PARK
- 12- FORMING ACCESS ON TRUNKLINE BRUSH
- 13- MATERIALS HANDLING SITE
- 14- INTERPRETIVE CENTER SITE

LEGEND

- A- STATE OF WASHINGTON LAKE
- B- STATE OF WASHINGTON CAPITOL
- C- WASHINGTON DEPT HIGHWAYS
- D- BURLINGTON NORTHERN
- E- CITY OF OLYMPIA PARK
- F- CITY OF TUMWATER
- G- DEVELOPED PRIVATE PROPERTY
- H- UNDEVELOPED PRIVATE PROPERTY
- I- TUMWATER FALLS PARK - PRIVATE
- J- THURSTON COUNTY

CAPITOL LAKE
 GENERAL OWNERSHIPS
 PROPOSED DEVELOPMENT



LEGEND

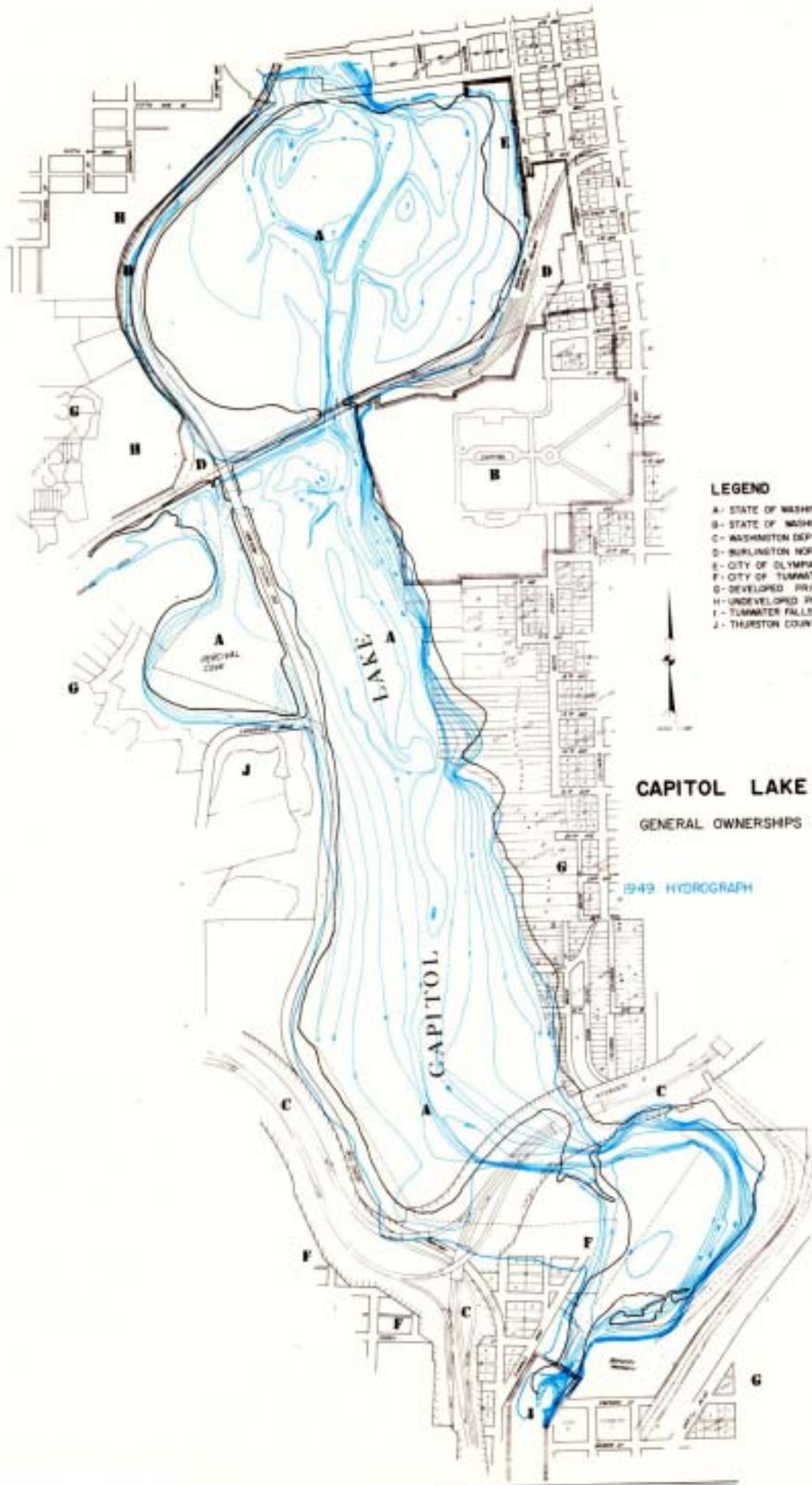
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- FILL SITES
- SETTLEMENT BASINS
- - - DREDGING LIMITS
- DREDGING LIMITS
- SILTING, DEWATERING AREA W FILL

CAPITOL LAKE

GENERAL OWNERSHIPS
LAKE RECLAMATION





LEGEND

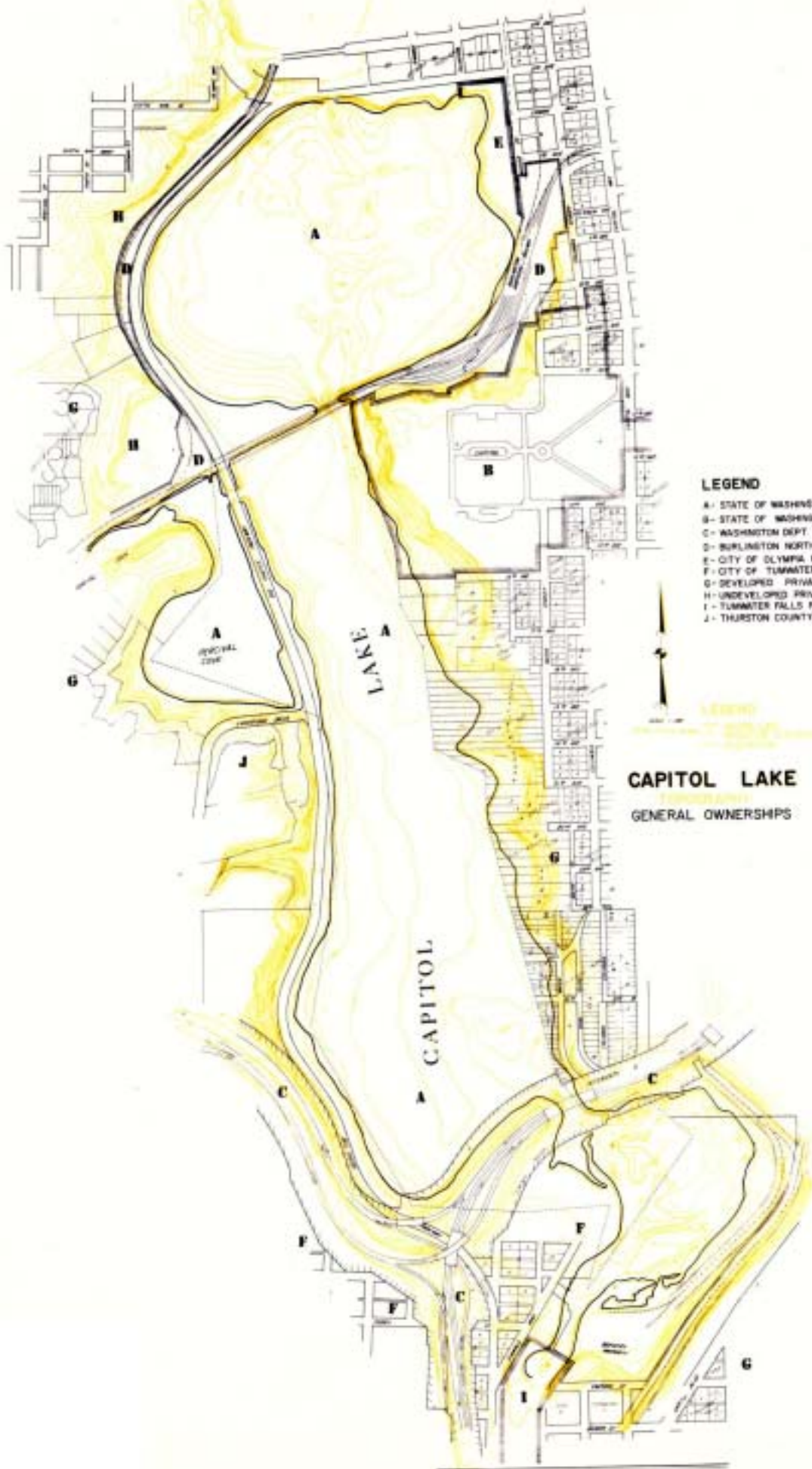
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CAPITOL LAKE

GENERAL OWNERSHIPS

1949 HYDROGRAPH



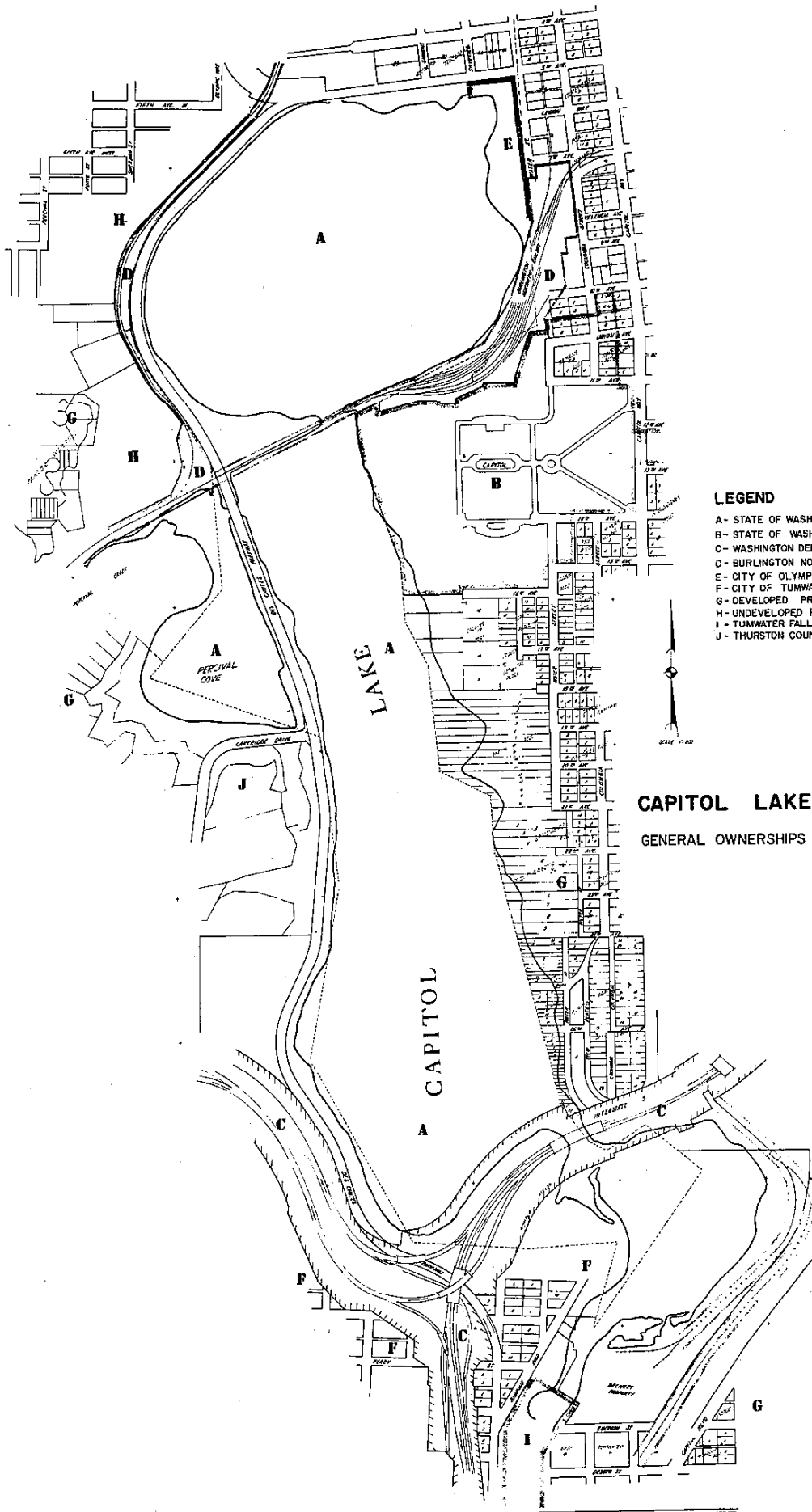


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CAPITOL LAKE
GENERAL OWNERSHIPS

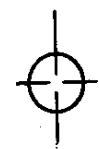


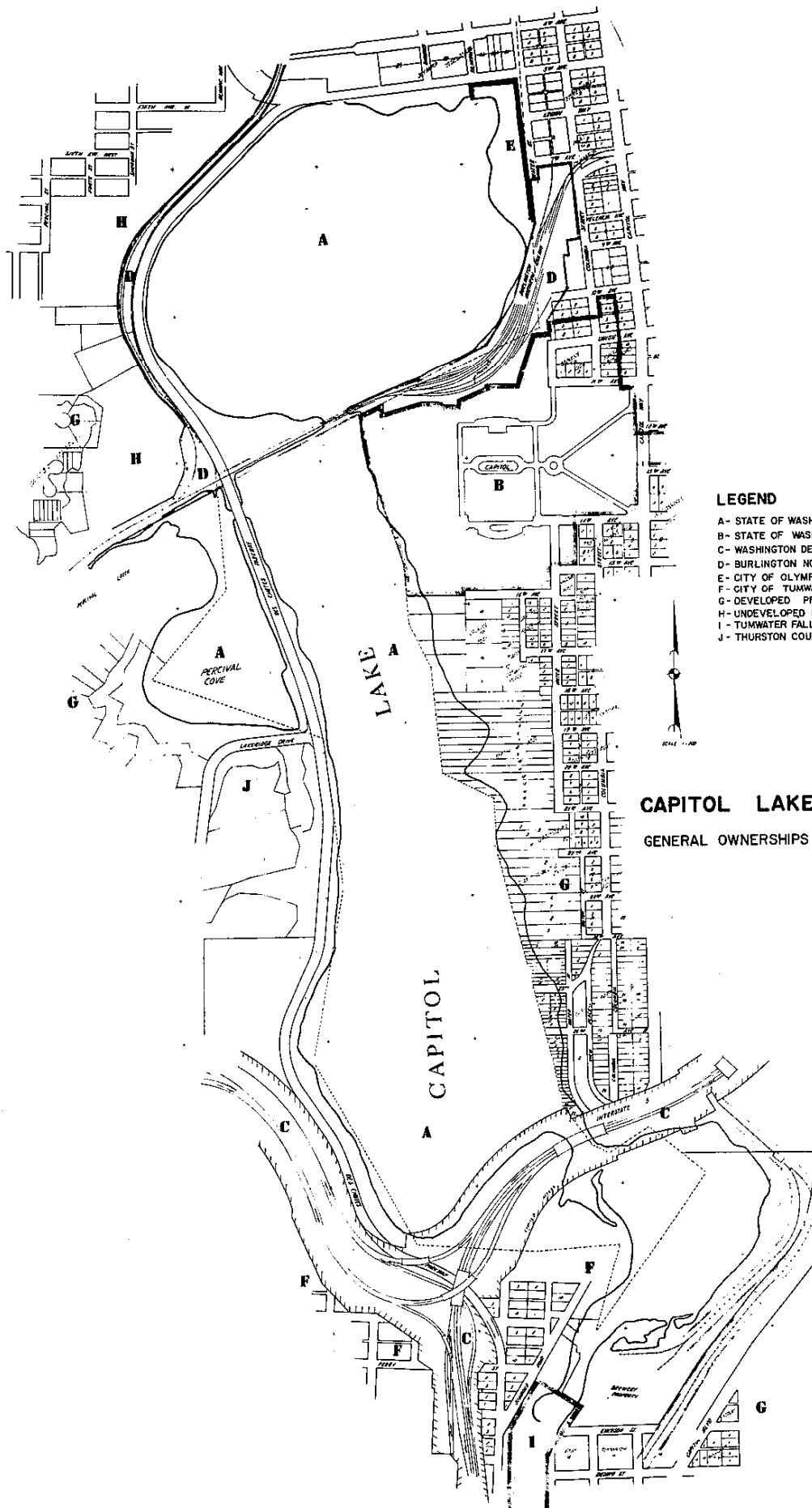


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CAPITOL LAKE
GENERAL OWNERSHIPS

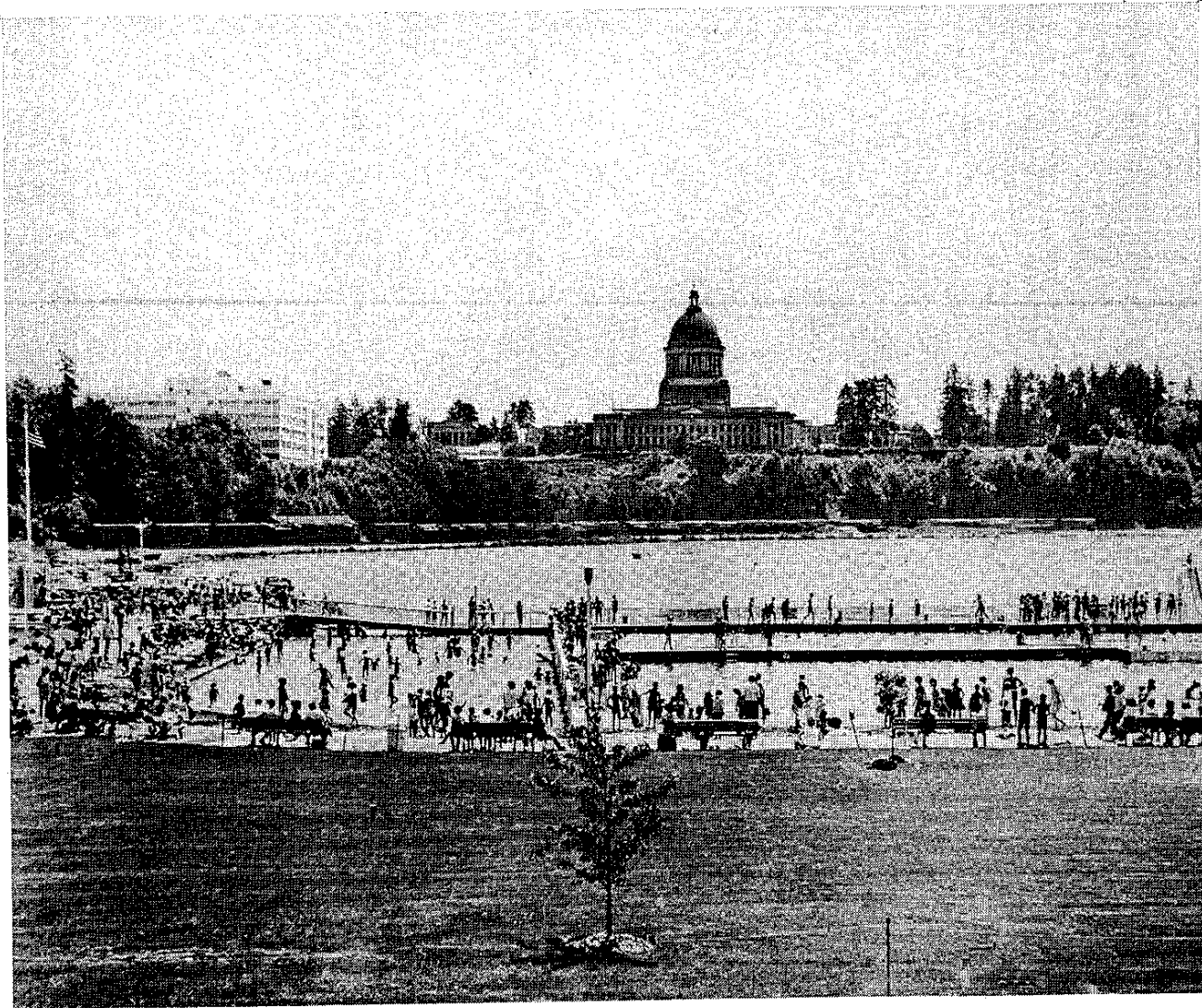




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CAPITOL LAKE
GENERAL OWNERSHIPS



The scenic value of Capitol Lake is a use which cannot be assessed by statistics. The lake waters and the Capitol dome are a dramatic view for travelers on Interstate 5 approaching Olympia. The view along Deschutes Parkway is an asset to the State Capitol grounds which is irreplaceable. As such, Capitol Lake and its environs, including Percival Cove and Percival Creek, deserve our best efforts to preserve and enhance them for the scenic, aesthetic, recreational and economic dimensions they add to our community and the State. Beauty and value may be in the "eye of the beholder", but, as one observer pointed out—Capitol Lake is worth at least ten times the cost it would take to dredge it.

