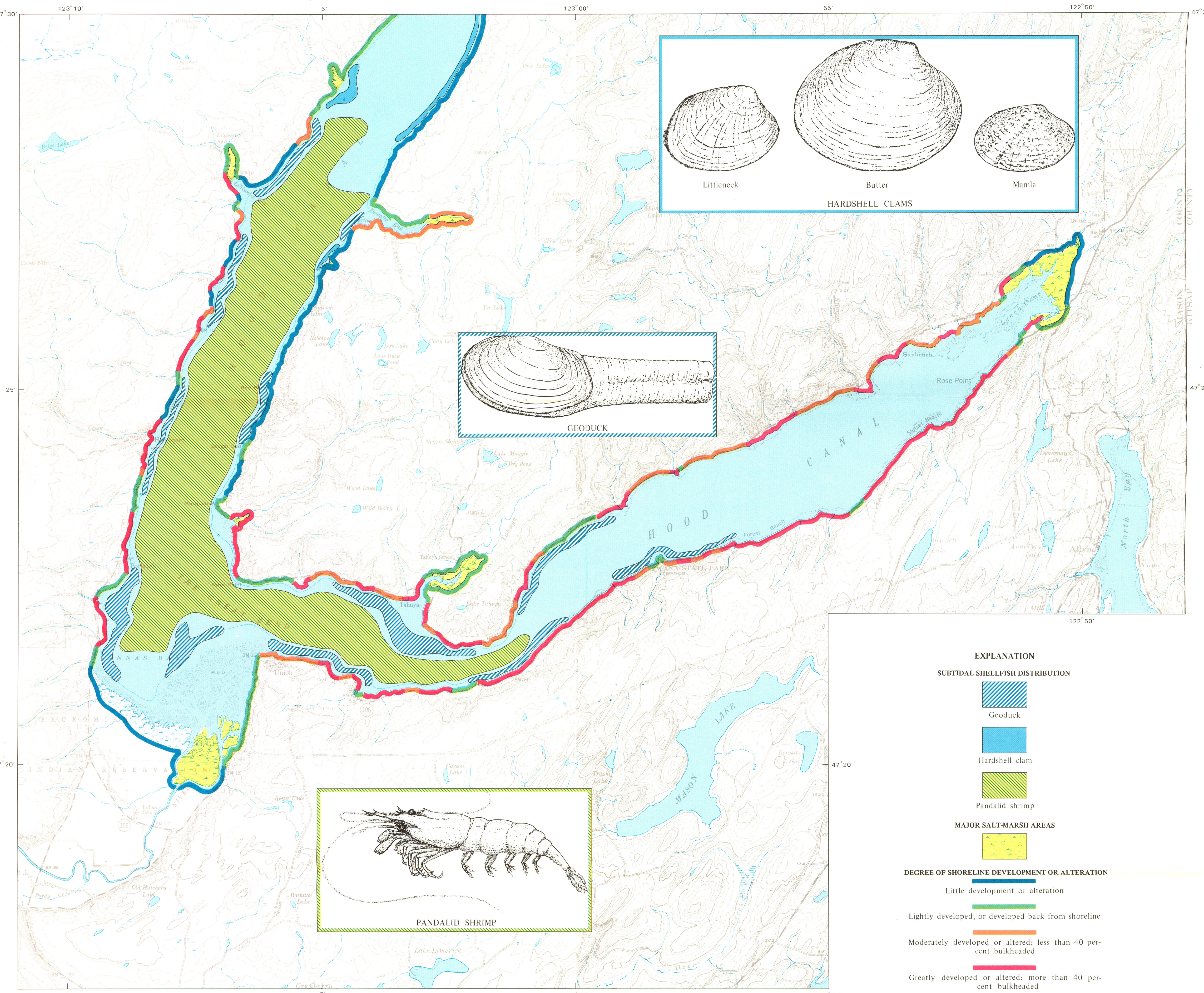
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

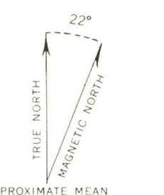
FOLIO OF THE SOUTHERN HOOD CANAL AREA, WASHINGTON
I-853-E



Base from U. S. Geological Survey, 1:62,500
Potlatch, 1937-52 and Allyn, 1938

MAP 1.–DISTRIBUTION OF SUBTIDAL SHELLFISH AND SALT-MARSH AREAS, AND DEGREE OF SHORELINE DEVELOPMENT.

(Three major types of shellfish are outlined on the map, each having its own environmental requirements and affected by man's activities in different ways. Although the shellfish beds shown here lie below lowest tide levels and are not reachable by sport diggers, they constitute an important commercial resource. The clam beds also provide a spawning stock that directly contributes clams to intertidal beaches of Hood Canal.)

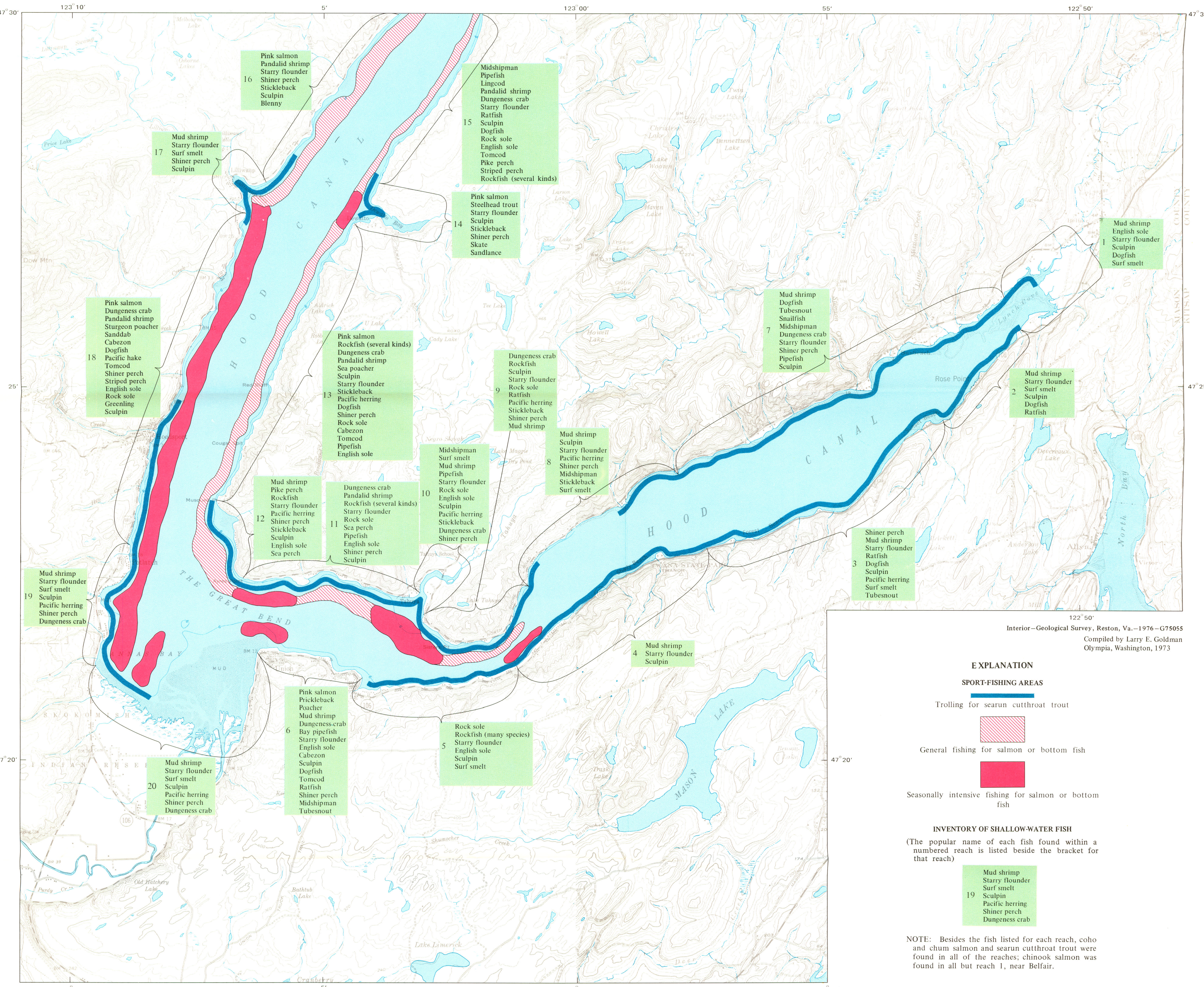


SCALE 1:62 500

1 ½ 0 1 2 3 MILES

1 .5 0 1 2 3 KILOMETRES

CONTOUR INTERVAL 40 FEET IN WESTERN HALF
AND 20 FEET IN EASTERN HALF
DATUM IS MEAN SEA LEVEL



Interior–Geological Survey, Reston, Va.–1976–G75055

Compiled by Larry E. Goldman
Olympia, Washington, 1973

MAP 2.–INVENTORY OF SHALLOW-WATER FISH AND DISTRIBUTION OF SPORT-FISHING AREAS.

(Inventory is based on a preliminary survey between December 1971 and June 1972 of shallow, nearshore waters–to 25 feet below sea level–of southern Hood Canal. Netting, identification, and counting of fish were conducted by students of Evergreen State College under the supervision of their instructors and personnel of the Bureau of Sport Fisheries and Wildlife.)

INTRODUCTION

Southern Hood Canal is a narrow, scenic extension of the Puget Sound system where sport fishing and boating are major recreational activities. However, the development of homes and communities along the shores of the Canal, in large part as a result of these activities, has created conditions that conflict with or are detrimental to them. This part of the Canal is a dead-end arm of Puget Sound, with limited circulation and flushing of its waters, especially east of Sisters Point (see maps) and has a relatively low freshwater inflow. The long, narrow shape of the Canal limits the water-surface area compared to the large shoreland area available for development. For these reasons, the southern Hood Canal is considered to be particularly sensitive to human activities that generally accompany development of shorelines and nearshore areas.

The purposes of this compilation are to: (1) provide a simple, graphic inventory of some of the principal fish, shellfish, and habitat resources of southern Hood Canal, (2) show the general extent of shoreline development and alteration along southern Hood Canal as of 1972, (3) delineate general areas of sport fishing for salmon, bottom fish, and searun cutthroat trout–the three major types of sport fish in the area–and (4) outline some of the human activities that may damage fishery resources and suggest ways in which undesirable effects of future development can be minimized.

This sheet is one of a series being prepared by the U.S. Department of the Interior in cooperation with several agencies to present basic environmental information and interpretations to assist land-use planning in the Puget Sound region.

FISHERY RESOURCES

SUBTIDAL SHELLFISH

The general extent of shellfish beds found below extreme low tide and of major salt marshes in southern Hood Canal are shown on map 1. Although the shellfish beds depicted lie below the reach of sport diggers, they constitute an important commercial resource. The clam beds also provide a spawning stock that directly contributes young clams to intertidal beaches of Hood Canal where they are harvested by sportsmen. Three major types of shellfish are outlined on the map, each having its own environmental requirements and affected by man's activities in different ways.

Geoducks.–The geoduck is the largest clam in the Pacific Northwest, with specimens having an average weight of about 3 pounds, and some reported to have weighed as much as 13 pounds. They are nearly rectangular in shape, with rough concentric rings on the external surface of their grey-white shells. These clams are of excellent eating quality and are sought by sportsmen during periods of extreme low tides. Commercial harvesting of geoducks has been increasing during recent years, and is likely to expand even more.

Hardshell clams.–This general grouping of clams comprises several types, including butter, native littleneck, and manila clams. Average size of these clams is 2-6 inches in diameter. Although most of the harvest in this area originally took place on intertidal beaches, the recent use of new harvesting methods has caused the subtidal stocks to be more heavily exploited. Hardshell clams comprise a large portion of the commercial catch and are sold fresh in the market, canned, or used in making clam chowder. Harvest of these clams from subtidal beds can be expected to increase in the future.

Pandalid shrimp.–The large Pandalid shrimp (4-8 inches in length) are a commercially important resource of Hood Canal. Shrimp beds generally lie at depths of from 90 to 400 feet below low water. Shrimp are harvested by means of pots (traps) in Hood Canal, and are sold fresh at markets along the Canal. They are also frozen and marketed as prawns throughout the region.

SALT-MARSH AREAS

The salt marshes shown on map 1 are an essential link in the Hood Canal aquatic system; they perform a valuable energy transfer function that indirectly sustains a wide range of fish and wildlife populations. They also play a role in pollutant or waste assimilation and in nutrient storage and cycling. Many commercially important fish use the marshlands as nursery areas. Waterfowl and shorebirds, such as herons and bitterns rely almost exclusively on the marshlands for nesting and feeding. Because such habitats are so critical, their destruction can prove catastrophic to a wide range of fish and wildlife.

SPORT–FISHING RESOURCES

Salmon and bottom fish.–The main areas of sport fishing in southern Hood Canal for salmon and bottom fish (such as lingcod, cabezon, and cod) are in nearshore waters of moderate depth generally west and north of Sisters Point (see map 2). Prime fishing areas for these species are beyond the direct effects of any landfills, bulkheads, docks, and piers, and are generally in areas where good water quality and clean bottom conditions currently exist. Salmon fishing in many areas fluctuates seasonally, especially around the mouths of streams, where it is fairly heavy during spawning runs in the fall, and is moderate to light in other seasons. Bottom fish are especially sensitive to changes in bottom conditions, and will avoid areas where dredging, deposition of sludge or trash, or excessive sedimentation from inflowing streams occur.

Searun cutthroat trout.–Map 2 shows those parts of southern Hood Canal where sport fishing for searun cutthroat trout is known to occur. Good fishing areas also may exist, or may develop in the future, in other areas such as along the east side of Hood Canal north of Musqueti Point. Fishing for these trout usually consists of trolling close to shore with a lure trailing about 50 to 150 feet on a line behind the boat. The trout generally are caught in the intertidal zone during periods of high tide; they are seldom taken from zones below the level of extreme low water. Construction of barriers extending out from the shore forces the trolling fisherman into deeper waters where these trout are not found. Angling for the trout has been effectively eliminated by extensive shoreline development from Belfair to Union and from Belfair to Tahuya. Intertidal barriers are also a hazard to boaters during periods of rough water.

Fishing for searun cutthroat trout usually is intensive from spring to early fall, and is especially so during the late summer. It has increased in the area as more people have become aware of the rich potential catch. Coho salmon, which spend much of their lives in the shallow waters of Hood Canal, also occur in large numbers, and are sometimes taken while fishing for trout.

INVENTORY OF SHALLOW SALT-WATER FISH

An inventory of shallow, salt-water fish was conducted to provide a much-needed baseline knowledge of present-day fishery resources in the shallow water of Hood Canal. Future changes in the species present and their location and relative abundance would be a significant indication of changes in the aquatic environment. (See "Selected References.")

For the inventory, the map area was divided into 20 reaches, largely by convenient geographical features, but also by beach-habitat types; for example, the mouths of all large streams entering the canal are shown as separate reaches. The inventory is not intended to indicate that only those fish listed occur in the reaches shown, but serves merely to indicate the populations that were present when the survey was made. Several types of fish are migratory in nature and would be found using every reach at some time. Such fish include all the salmon varieties, steelhead and searun cutthroat trout, sculpin, starry flounder, surf smelt, Pacific herring, dogfish, shiner perch, English sole, and Dungeness crab.

CONFLICTS–FISHERY RESOURCES VERSUS DEVELOPMENT

Conflicts between preservation of fishery resources and development of shorelands can be resolved if developmental practices and their harmful consequences to fish resources are recognized and controlled by sound planning. Some of the consequences of man's activities may be slow to appear; however, once significant shifts in a delicate aquatic system begin, great damage can be done to the local fisheries before problems are recognized. By that time, uses and conditions in established shorelands may virtually preclude effective remedial measures.

Fish and shellfish use certain parts of southern Hood Canal where environmental conditions are especially suited to their own feeding, hiding, migrating, reproduction, and other life requirements. Not all the species shown on the maps are considered important either commercially or for sport fishing; however, all are significant members of the Hood Canal ecological system, the removal or degradation of which could reduce other fishery resources of value to both commercial and sport fishermen.

GENERAL CONSIDERATIONS

Undesirable effects that man's activities can have on sport-fishing opportunities may be grouped into four categories: (1) degradation of water quality; (2) creation of unfavorable bottom conditions; (3) obstructions built into Canal; and (4) elimination of intertidal areas critical for feeding and reproduction. Each of these types of human activities has a different impact and requires different remedial or preventive measures.

CONTAMINATION–POLLUTION

The degradation of natural water quality, to the extent that it affects the biological function of humans, fish, and wildlife, is a major threat to the fisheries resources of the area. Southern Hood Canal is particularly vulnerable to pollution because of the long time necessary for it to be flushed out by the tides and water currents. The poor water circulation tends to concentrate, rather than to carry away, contaminants that enter the Canal. Dissolved oxygen (DO), which is essential to sustain fish life, is commonly used as an indicator of pollution conditions. Samples taken in the southern part of Hood Canal show that the DO of the water presently is considered low (less than 5 milligrams per litre–mg/l) during much of the year at sampling depths of 10 and 20 metres (Yoshinaka and Ellifrit, 1974, p. 30). A DO concentration of 5 mg/l is generally considered to be the minimum needed for the general well-being of salmon, trout, and associated biota; lesser DO concentrations are likely to be detrimental to the salt-water creatures (National Technical Advisory Committee, 1968, p. 33, 36). The low DO content in Hood Canal water is partly a natural phenomena, due to physiographic and hydraulic conditions; however, it is aggravated by the addition of oxygen-depleting wastes to the salt water, particularly raw sewage and effluent from nearshore septic-tank systems which are defective or inadequate in their operation. The density of houses close to the Canal have created a chronic source of contamination; additional houses with similar septic-tank conditions could result in a further reduction of DO in Hood Canal.

Water pollution can adversely affect shellfish and other fish, thereby threatening man's use of them in several ways. The animals can be killed either directly by introducing toxic substances into the water, or indirectly by adding a substance that spurs the growth of organisms that kill shellfish. Uptake of certain substances contained in polluted water can render shellfish unfit for human consumption. Shellfish tend to concentrate pathogenic (disease-causing) organisms in their tissues as a result of filtering ingested food organisms from the water medium. This threat is of immediate and serious concern in southern Hood Canal. Submarine discharges of partly treated sewage and seepage from ineffective household septic-tank systems are absorbed by shellfish which can transmit disease-producing organisms to humans. For this reason, state health authorities designate an area around each submarine sewer outfall as a "dilution zone," where shellfish harvesting is legally prohibited. A large number of sewage-treatment facilities with submarine outfalls could eliminate shellfish harvesting from many areas of southern Hood Canal. Also, effluent from densely spaced, nearshore septic-tank systems could constitute a threat to local shellfish beds.

To reduce the pollution of Hood Canal waters, adequate sewage collection and treatment facilities and proper disposal locations should be developed before allowing more concentrated (additional) land use, especially in nearshore areas. Existing standards for individual septic-tank systems for uses adjacent to Hood Canal have not provided adequate protection of water quality. Alternatives include: (1) construction of community sewers and central treatment facilities for sewage from nearshore residences, with disposal of treated waste in areas other than the southern Hood Canal drainage area or in a less sensitive part of the canal north of Musqueti Point and Hoodsport; (2) restrictions on population density immediately adjacent to Hood Canal; and (3) allowing continued degradation of water quality and gradual elimination and tainting of desirable fish and shellfish populations of the Canal.

MODIFICATION OF BOTTOM CONDITIONS

Human activities can modify bottom conditions in several detrimental ways. Landfilling or the dumping of waste materials, such as trash and dredge spoil, in the Canal can permanently destroy shellfish beds. Dredging may remove productive clam beds and may also indirectly inhibit the growth of shellfish and other bottom organisms by increasing the turbidity of water and sedimentation on bottom surfaces in areas adjacent to the dredging.

To avoid serious bottom modification, sedimentation caused by man should be carefully controlled. For example, construction work undertaken at or adjacent to the shoreline that could produce sediment and wastes into the salt water should be carefully regulated and supervised. Dredging activities should be kept to a minimum, and any dredged material should be placed on uplands.

STRUCTURAL ENCROACHMENT

Piers, houses, and commercial buildings built on piling or floats are the most common structural encroachments in intertidal areas of Hood Canal. Such structures gradually alter the natural environment. Large numbers of piling create a habitat favorable to the sculpins, dogfish, and adult salmon that prey on young salmon and trout. They may also affect adjacent beaches and areas further offshore by changing the natural wave patterns and sea currents that control erosion and deposition of sediments. Such changes can cause significant alteration of shorelines and shallows by natural processes. Increasing the density of structures reduces opportunities for public access to fishing areas and degrades the quality of the fishing experience. Structures that extend into intertidal areas prevent nearshore trolling for searun cutthroat trout. They also compete with other activities (mainly recreational) that require the use of the water surface, and limit access areas for boat launching. Some recreational activities, such as waterskiing, scuba diving, and boating, also are generally in conflict with sport fishing. In places such as Hood Canal, where these sports are popular, appropriate areas could be set aside for their enjoyment without impinging on or competing with unique sport-fishing grounds.

The extent to which structures that extend into water areas will cause changes in ecological relationships depends upon their concentration and the degree to which they affect water circulation. Because of the many undesirable effects of such structures, the need for them and their location should be very carefully examined and controlled. Where they are deemed essential, they should be grouped so as to minimize their impact. Instead of a dock for each home, many property owners could share a single structure; or boats could be moored at buoys rather than at piers and docks.

BEACH BULKHEADS–LANDFILLING

Construction of bulkheads or artificial banks and fills is among the most destructive of man's activities on fishery resources. Such construction completely alters the beach zone, destroying areas normally used for feeding, resting, reproduction, migration, and other necessary biological functions, and leads to a serious loss of fishery resources (Heiser and Finn, 1970; Washington Department of Fisheries, 1971). Examples of this activity in the southern Hood Canal area are found along the shores of Lynch Cove, east of Sisters Point, and immediately north and south of Hoodsport. Development in some of this area has eliminated extensive beaches formerly used as spawning grounds by surf smelt, and the feeding and migrating areas used by juvenile salmon and trout. Because landfill and bulkhead construction is not compatible with fishery resources, the only way to protect fish habitats from its impact is to keep such construction at an absolute minimum. Fills or bulkheads should be permitted only where they are necessary to land uses dependent on water access for their function, and then only if other, less harmful alternatives are not possible.

LOSS OF INTERTIDAL AND MARSH AREAS

Landfills, diking, or other alterations of salt-marsh and intertidal habitat have serious consequences to fishery resources. Irreplaceable marshland, principally in the Lynch Cove area, has been filled and converted to residential use. Conversion of additional salt marshes for residential-recreational development is being considered and, if accomplished, would bring about an irreversible loss of a valuable natural resource. Remaining marshlands are already functioning at their capacity and cannot accommodate additional loads imposed by the diversion of fish and wildlife from other areas of southern Hood Canal.

To preserve natural marshland environments, human intrusion and activities should be kept to a minimum. Fishery resources cannot be maintained where marshlands are filled. Any essential development that requires proximity to sea water for its function should be diverted away from tidal and marshland areas.

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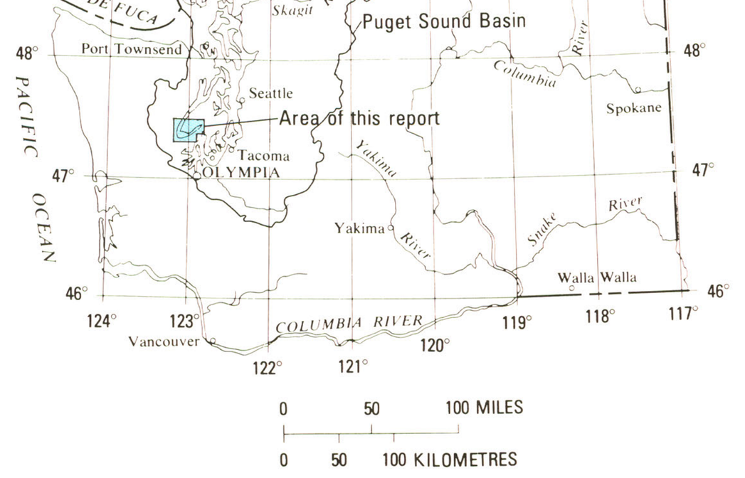

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SALT-WATER FISHERY RESOURCES AND SHORELINE DEVELOPMENT IN THE SOUTHERN HOOD CANAL AREA, WASHINGTON

By
R. K. Martinson
U. S. Fish and Wildlife Service
1976

For sale by U. S. Geological Survey, Denver, Colo. 80225 and Reston, Va. 22092, price $.75