

**CLASSIFICATION AND UTILIZATION
OF OYSTER LANDS IN OREGON**

Informational Report No. 76-7

by

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CLASSIFICATION AND UTILIZATION OF OYSTER LANDS IN OREGON

INTRODUCTION

The Oregon Legislature in 1969 directed the Fish Commission of Oregon (now the Department of Fish and Wildlife) to "investigate and classify state lands that are suitable for oyster cultivation". The present practice is to evaluate each newly filed oyster claim on the basis of location, acreage requested, and other uses of the area. An inspection of the area, if any, is not made until after a request for an oyster plat is received.

Basic information needed to properly classify the oyster-growing potential of an area includes salinity, water temperature, bottom type, turbidity, and current. Test plots to evaluate growth and survival are necessary for the most accurate classification. Such data are incomplete or lacking for most estuaries, especially if oysters have not been cultured in the area. However, the location of existing and past oyster leases, a general knowledge of the biological requirements of oysters, and past work, such as the mortality studies by Gibson (1974)^{1/}, enable one to make qualified judgments about the suitability of an area for oyster culture.

State Health Division restrictions limit the area where oysters may be harvested for commercial purposes. These restrictions are based on potential health hazards such as sewage treatment plant outfalls, runoff from pasture lands, and marinas. Sewage treatment plant outfalls necessitate a mandatory closure of 2,000 feet around them as do marinas and boat basins where pollutants are potential health hazards. Two or more inches of rainfall in 24 hours closes estuaries to commercial shellfish harvesting because the resultant heavy runoff from land increases the bacterial populations in the bays above acceptable levels. The bacterial counts usually decrease within 48 hours.

^{1/} Oyster Mortality Study, Fish Commission of Oregon, Summary Report, May 1974.

In some estuaries, the State Health Division closed areas coincide with the potential oyster area. With pollution abatement, these closed areas or portions of them could be made available to oyster farming.

This report classifies our major estuaries as to their potential for oyster production. Existing leases are noted and potential growing areas and culture techniques are outlined. State Health Division restrictions and conflicting uses in each estuary are noted. Each estuary is rated as a low, moderate or high risk oyster growing area. The rating is a judgment value. A map of each estuary is provided, showing pertinent features.

A discussion of oyster grower problems and oyster land utilization is followed by a review of the regulations and their enforcement. Four recommendations conclude the report.

OYSTER LAND CLASSIFICATION

NEHALEM BAY

EXISTING OYSTER LEASES

None

POTENTIAL OYSTER CULTURE AREA

The potential oyster culture area extends from the mouth of the bay to Fishery Point (390 acres).

POTENTIAL OYSTER CULTURE TECHNIQUES

Rack or raft culture may be feasible along the north spit. Stick or raft culture may be possible on the east side of the bay between Brighton and Fishery Point.

PHYSICAL LIMITATIONS OF OYSTER CULTURE AREA

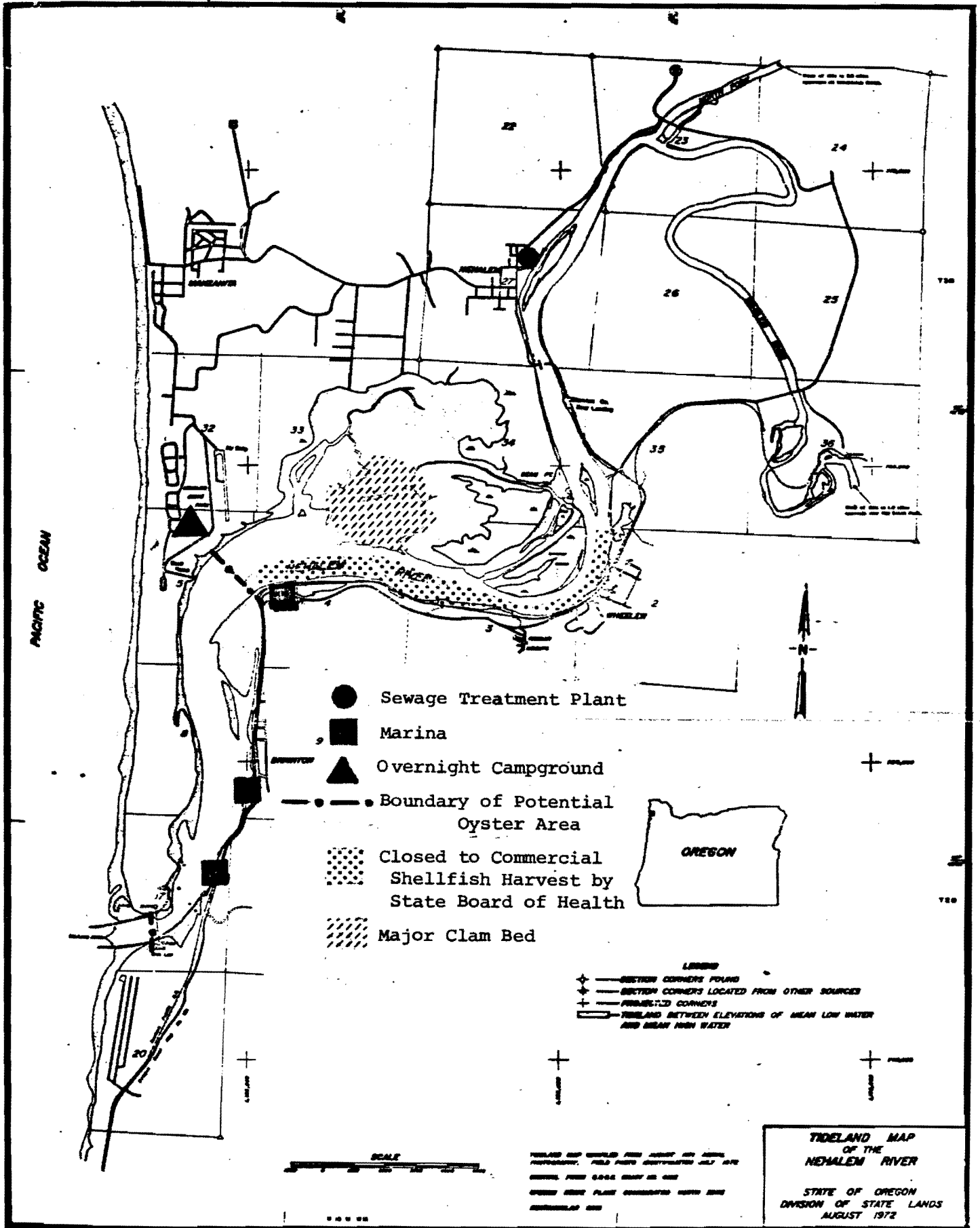
Much of the bottom is unstable sand. During the winter, heavy freshwater runoff in the bay results in low salinities, strong currents, and heavy silt load in the area.

CONFLICTING USES AND PROBLEMS OF OYSTER CULTURE AREA

There are three marinas within the potential oyster area, a boat ramp, and a nearby campground. The bay has heavy sport boat use during the summer and fall.

OYSTER GROUND RATING

Moderate risk.



TILLAMOOK BAY

EXISTING OYSTER LEASES

| <u>Grower</u> | <u>No. Acres Leased</u> | <u>No. Acres in Production</u> |
|---------------|-------------------------|--------------------------------|
| Hayes | 1687.00 | 700 |
| Harris | 199.24 | 75 |
| Olson | 197.90 | 174 |

POTENTIAL OYSTER CULTURE AREA

The potential oyster culture area extends from Hobsonville Pt. upbay to a line drawn between the Bay City Pier and Dick Point (3,300 acres).

POTENTIAL OYSTER CULTURE TECHNIQUES

Bottom, raft, rack and stick culture may all be feasible, depending on the exact area.

PHYSICAL LIMITATIONS OF OYSTER CULTURE AREA

Winter heavy freshwater runoff results in reduced salinities, strong currents, and heavy silt load in the area. Soft mud restricts bottom culture in some areas.

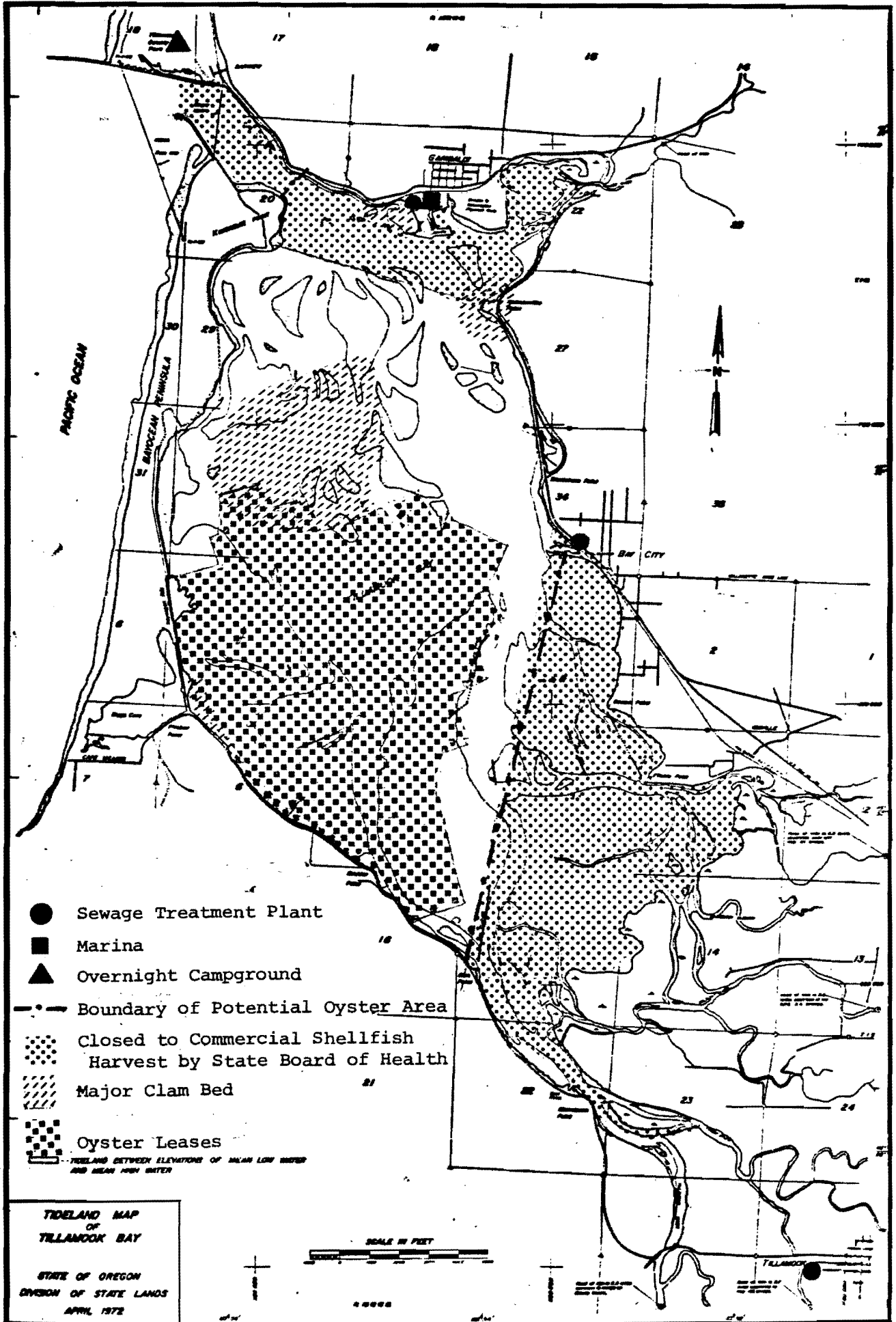
CONFLICTING USES AND PROBLEMS OF OYSTER CULTURE AREA

There are State Health Division closures on the commercial harvest of shellfish in two areas: north and seaward of a line drawn from Hobsonville Point across the bay to Kincheloe Point and upbay from a line drawn between the Bay City Pier and Dick Point.

There are numerous dairies around Tillamook Bay and runoff from pastures during heavy rainfall sometimes results in very high coliform bacteria counts in the bay. It is then closed to shellfish harvesting for at least 48 hours. There is a heavy recreational use of the lower bay by clambers, crabbers and anglers, and heavy boat traffic in the main and south channels.

OYSTER GROUND RATING

Low risk.



NETARTS BAY

EXISTING OYSTER LEASES

| <u>Grower</u> | <u>No. Acres Leased</u> | <u>No. Acres in Production</u> |
|------------------------------|-------------------------|--------------------------------|
| Ridderbusch, Madison, Trusty | 72 | 72 |
| Wood and Wood | 4 | 4 |
| Davis | 2 | 2 |
| Trusty | 2 | 2 |
| Oregon State University | 153 | 153 (Research) |

POTENTIAL OYSTER CULTURE AREA

The entire estuary (2,325 acres) is a potential oyster culture area.

POTENTIAL OYSTER CULTURE TECHNIQUES

Bottom, raft, rack and stick culture may all be feasible, depending on the exact area.

PHYSICAL LIMITATIONS OF OYSTER CULTURE AREA

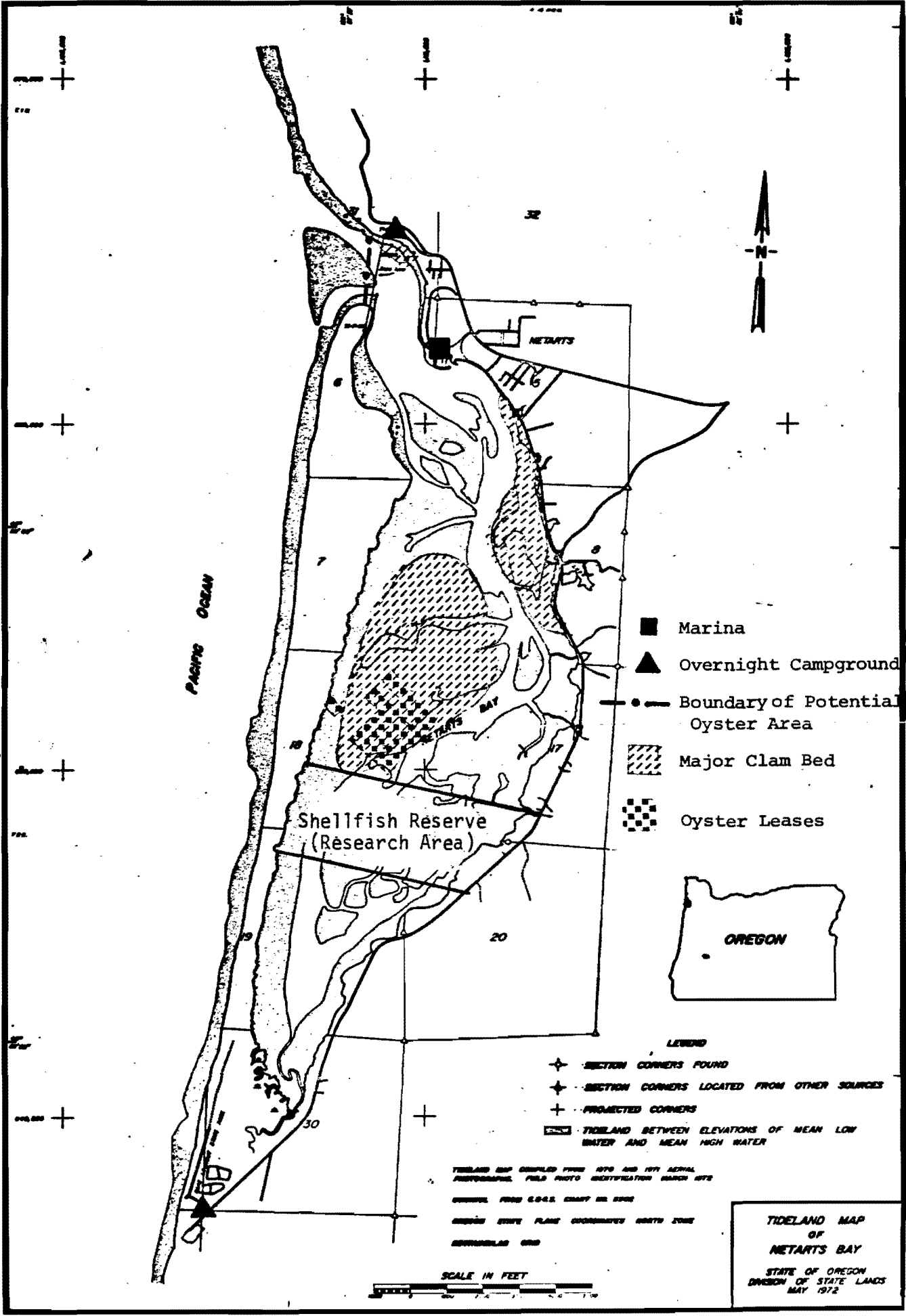
The lower part of the bay has an unstable sandy substrate.

CONFLICTING USES AND PROBLEMS OF OYSTER CULTURE AREA

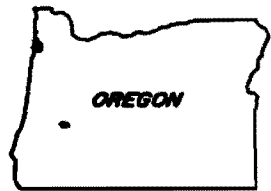
Netarts Bay is the only completely clean estuary in Oregon according to State Health Division standards. However, extensive clam beds and suitable habitat for other marine animals make this bay one of the more popular estuaries for clamming, crabbing and boating. A nearby state park and campground attract many people to the area. A shellfish research area is closed to commercial oyster farming and all clam digging. Netarts Bay is the only bay in Oregon where the Japanese oyster drill is established. Special care is required to prevent spread of the drill to other estuaries.

OYSTER GROUND RATING

Moderate risk because of the oyster drill problem.

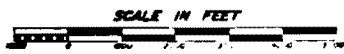


- Marina
- ▲ Overnight Campground
- Boundary of Potential Oyster Area
- ▨ Major Clam Bed
- ▣ Oyster Leases



- LEGEND**
- ⊕ SECTION CORNERS FOUND
 - ⊕ SECTION CORNERS LOCATED FROM OTHER SOURCES
 - + PROJECTED CORNERS
 - ▭ TIDELAND BETWEEN ELEVATIONS OF MEAN LOW WATER AND MEAN HIGH WATER

TIDELAND MAP COMPILED FROM 1970 AND 1971 AERIAL PHOTOGRAPHS, FIELD PHOTO IDENTIFICATION MARCH 1972
 SOURCE: FROM U.S.G.S. MAP OF 1966
 BOUNDARY LINE PLANE COORDINATE NORTH ZONE
 SPHEROID: NAD 83



TIDELAND MAP OF NETARTS BAY
 STATE OF OREGON DIVISION OF STATE LANDS
 MAY 1972

SAND LAKE

EXISTING OYSTER LEASES

None

POTENTIAL OYSTER CULTURE AREA

About a 100 foot-wide area on both sides of the channel west of Whalen Island (75 acres) may be a potential oyster culture area.

POTENTIAL OYSTER CULTURE TECHNIQUES

Rack, stick or raft culture along the channel might be feasible oyster culture techniques.

PHYSICAL LIMITATIONS OF OYSTER CULTURE AREA

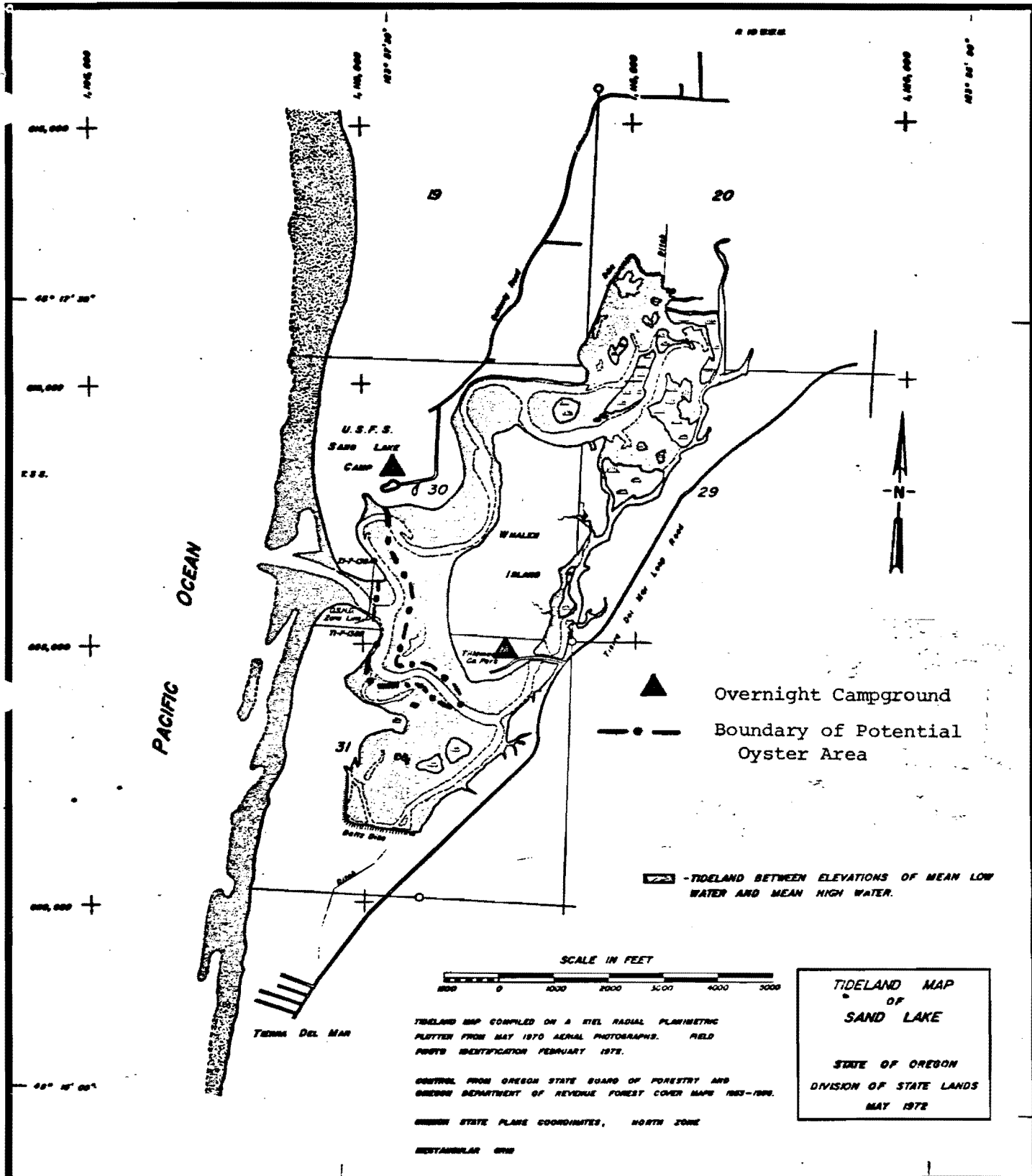
The estuary is shallow and the bottom is unstable sand.

CONFLICTING USES AND PROBLEMS OF OYSTER CULTURE AREA

There is an overnight campground on Whalen Island and on the north side of Sand Lake. Boating is minimal, but the area has steady shore angling pressure during the summer and fall.

OYSTER GROUND RATING

High risk.



-11-
NESTUCCA BAY

EXISTING OYSTER LEASES

None

POTENTIAL OYSTER CULTURE AREA

The potential oyster culture area consists of the Big Nestucca portion of the estuary from the mouth to the confluence of the Big and Little Nestucca rivers (150 acres).

POTENTIAL OYSTER CULTURE TECHNIQUES

There may be very limited bottom, rack, or stick culture along the north spit and raft culture along the east side of the bay.

PHYSICAL LIMITATIONS OF OYSTER CULTURE AREA

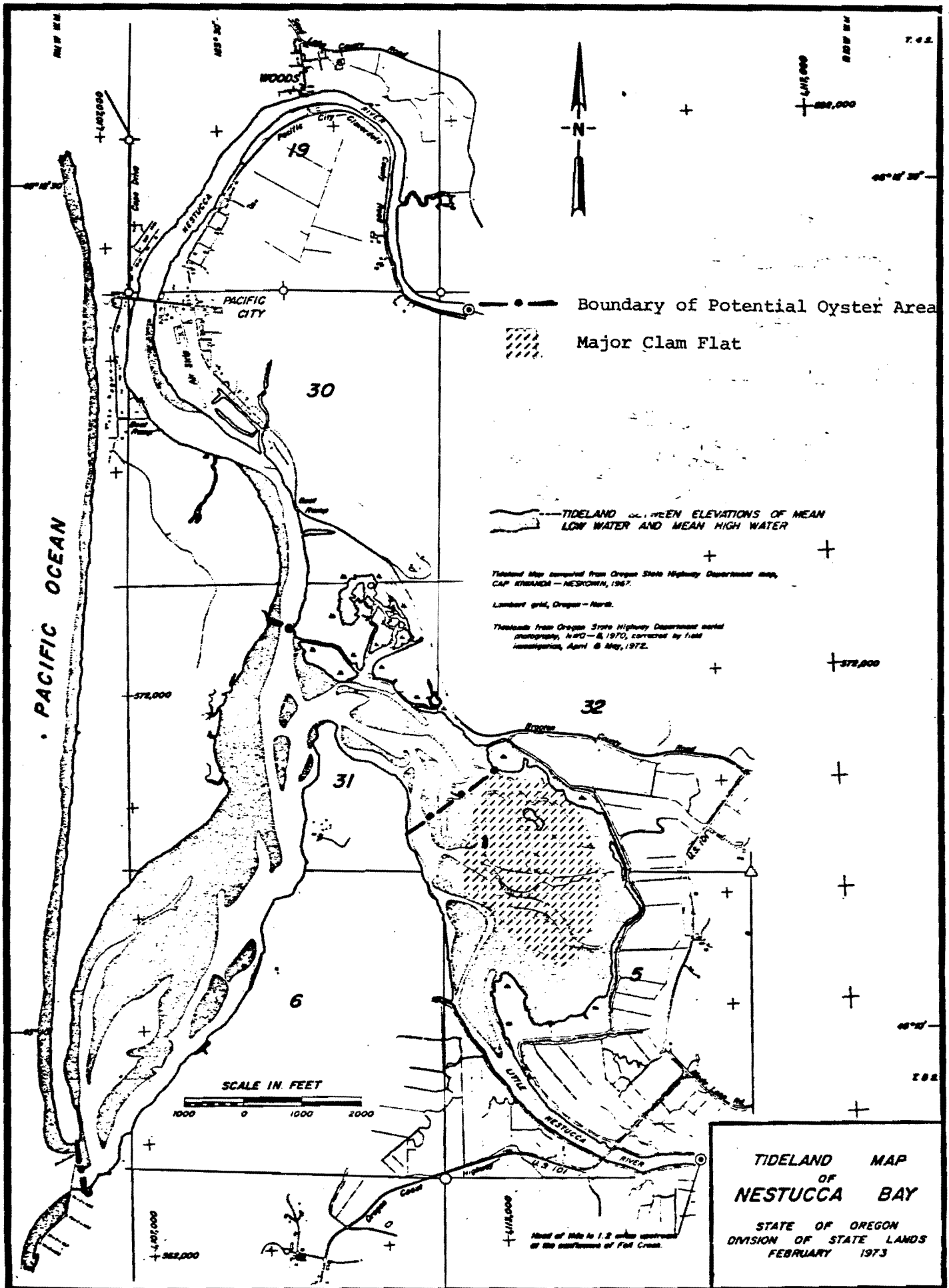
The bottom is mostly unstable sand. The intertidal area is exposed on most low tides. During the winter, heavy freshwater runoff results in low salinities, strong currents, and heavy silt load in the area.

CONFLICTING USES AND PROBLEMS OF OYSTER CULTURE AREA

There is considerable boat traffic in the area during the summer and fall.

OYSTER GROUND RATING

High risk.



SALMON RIVER

EXISTING OYSTER LEASES

None

POTENTIAL OYSTER CULTURE AREA

The potential oyster culture area extends from the mouth of the estuary to the Lincoln County boat ramp (20 acres).

POTENTIAL OYSTER CULTURE TECHNIQUES

Potential oyster culture techniques include rack or stick culture and very limited raft culture.

PHYSICAL LIMITATIONS OF OYSTER CULTURE AREA

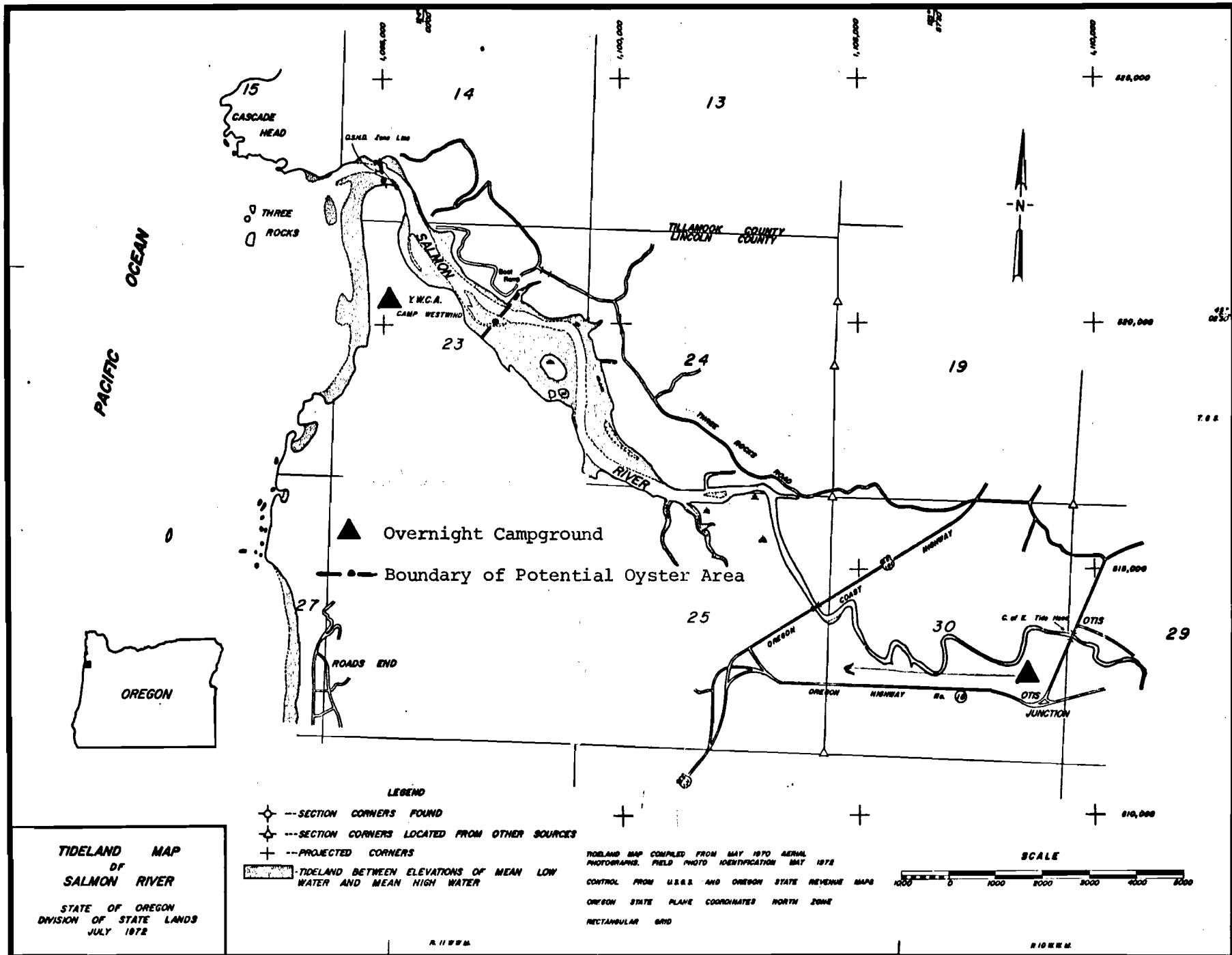
Some of the bottom is sandy and unstable. During the winter, heavy freshwater runoff results in low salinities, strong currents, and heavy silt load in the area.

CONFLICTING USES AND PROBLEMS OF OYSTER CULTURE AREA

The 1974 U.S. Congress placed the Salmon River Estuary within the Cascade Head Scenic-Research area. This may restrict or eliminate commercial oyster farming. A Y.M.C.A. camp is located on the west bank of the area. Two public boat ramps in the estuary are used by commercial dory fishermen.

OYSTER GROUND RATING

High risk.



PACIFIC OCEAN



**TIDELAND MAP
OF
SALMON RIVER**

STATE OF OREGON
DIVISION OF STATE LANDS
JULY 1972

- LEGEND**
- ⊕ --- SECTION CORNERS FOUND
 - ⊕ --- SECTION CORNERS LOCATED FROM OTHER SOURCES
 - ⊕ --- PROJECTED CORNERS
 - ▨ --- TIDELAND BETWEEN ELEVATIONS OF MEAN LOW WATER AND MEAN HIGH WATER

TIDELAND MAP COMPILED FROM MAY 1970 AERIAL PHOTOGRAPHS, FIELD PHOTO IDENTIFICATION MAY 1972

CONTROL FROM U.S.G.S. AND OREGON STATE REVENUE MAPS

OREGON STATE PLANE COORDINATES NORTH ZONE

RECTANGULAR GRID

SCALE

0 1000 2000 3000 4000 5000

R. 11 1972

R. 10 1972

SILETZ BAY

EXISTING OYSTER LEASES

Johnny Teaque made "50 plantings" in 1950. The fate of the plantings is unknown, except that there is no oyster production from the area at present.

POTENTIAL OYSTER CULTURE AREA

About 150 acres of potential oyster land exists from the mouth of the estuary upstream to a line stretching from south Cutler City to the northern tip of the "Lagoon" on Salishan Spit.

POTENTIAL OYSTER CULTURE TECHNIQUES

There is potential for limited raft culture along the south spit near edge of channel and rack or stick culture in the lower intertidal areas.

PHYSICAL LIMITATIONS OF OYSTER CULTURE AREA

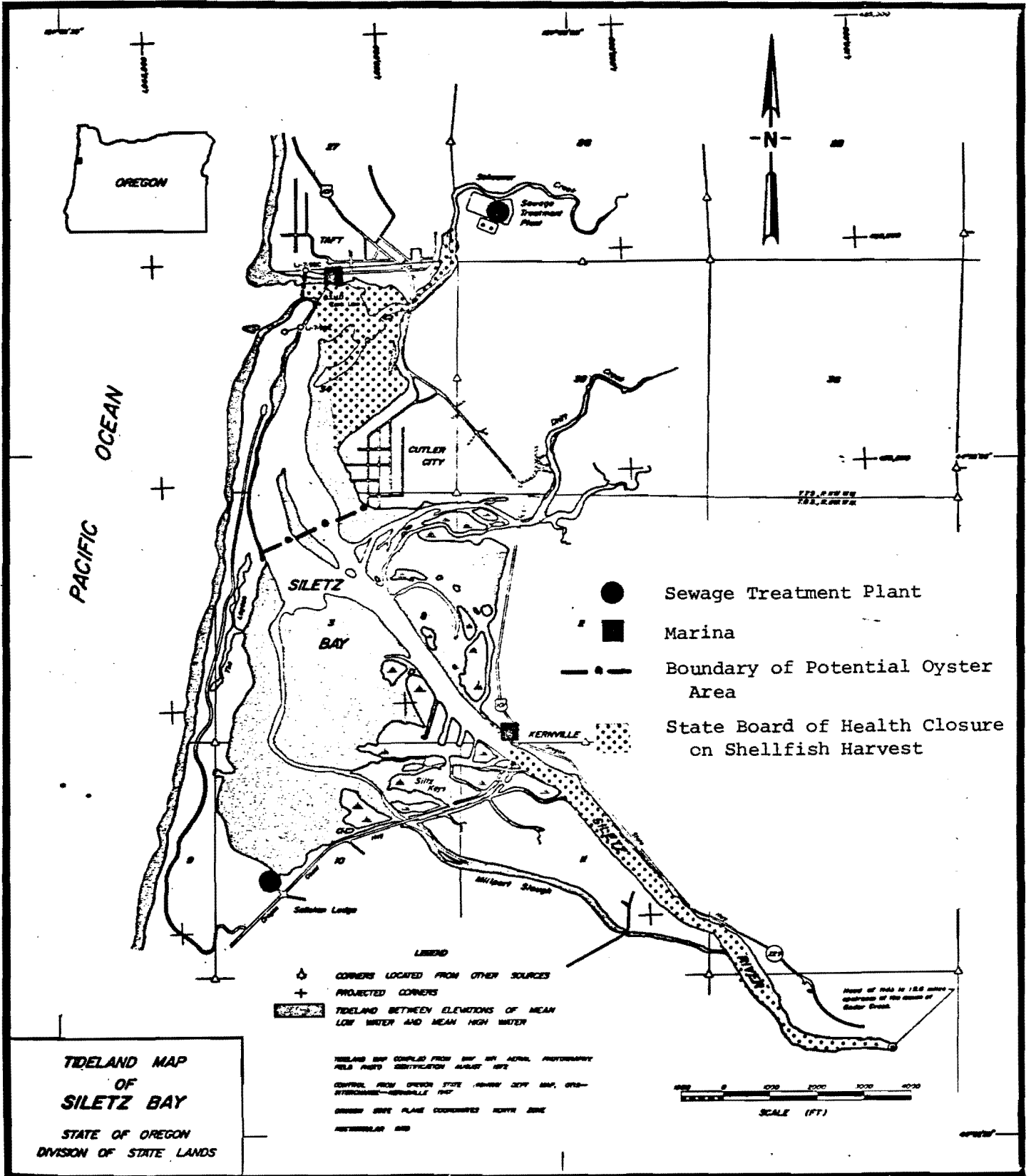
The bottom is sandy and unstable. During winter, heavy freshwater runoff results in low salinities, strong currents, and heavy silt load in the area.

CONFLICTING USES AND PROBLEMS OF OYSTER CULTURE AREA

The State Health Division has closures on the commercial harvesting of shellfish upbay from the Highway 101 bridge at Kernville and downbay from a line drawn northwesterly from Cutler City to the tip of the Salishan sandspit. The south-bay tide flat near Salishan sewage treatment plant outfall, although now open, will probably be reclassified as closed in the near future. There is a heavy seasonal use of the bay by boat anglers and other recreationists. Much of the east side of the bay is developed (Cutler City and Taft) and the south spit (Salishan) has a restricted access housing development.

OYSTER GROUND RATING

High risk.



YAQUINA BAY

EXISTING OYSTER LEASES

| <u>Grower</u> | <u>No. Acres Leased</u> | <u>No. Acres in Production</u> |
|-------------------|-------------------------|--------------------------------|
| Fowler, G. | 125.17 | 75 |
| Donaldson, J.R. | 57.99 | 0 |
| Becker, T. | 61.34 | 10 |
| Angstrom, L. | 60.62 | 30 |
| Dollar, V. | 21 | 10 |
| Cassell, Dr. | 5 | 5 |
| Oregon Oyster Co. | 74.97 | 50 |
| Lewis, J. | 45 | 20 |

POTENTIAL OYSTER CULTURE AREA

The potential oyster culture area extends from a line drawn across the bay at Coquille Point upbay to river mile 9 (655 acres).

POTENTIAL OYSTER CULTURE TECHNIQUES

Bottom, raft, rack, and stick culture may all be potential oyster culture techniques.

PHYSICAL LIMITATIONS OF OYSTER CULTURE AREA

Some of the bottom is soft and silty. During the winter heavy freshwater runoff results on low salinities, strong currents, heavy silt load, and debris.

CONFLICTING USES AND PROBLEMS OF OYSTER CULTURE AREA

There are three areas closed to the commercial harvesting of shellfish by the State Health Division: (1) Below a line from Idaho Point across the bay to the landfill at McLean Point, (2) along the east bank of the river to mid-channel between Coquille and Oneata points and (3) above the mouth of

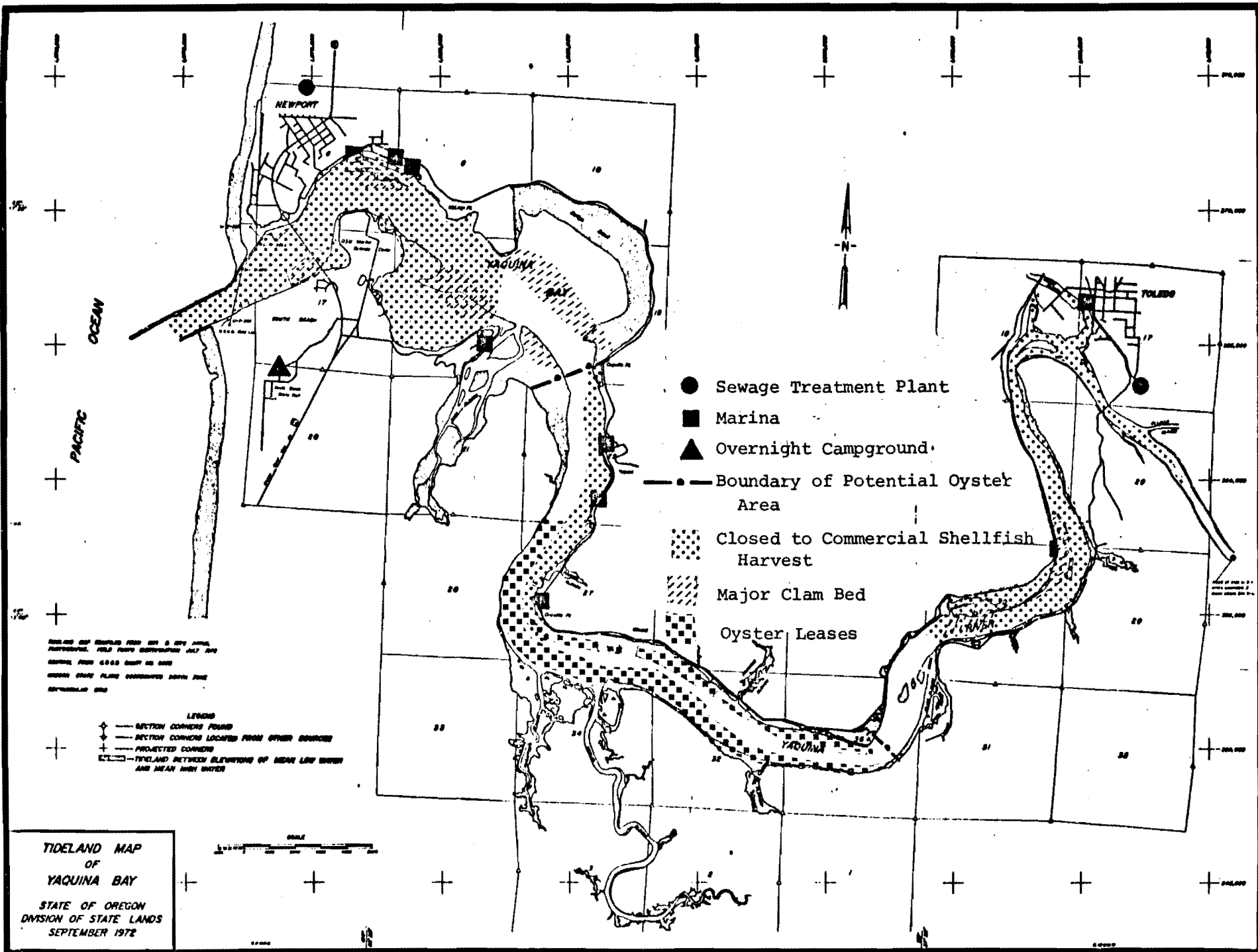
Boone Slough.

There is barge traffic between the ocean and the city of Toledo, eliminating the use of the channel for raft culture. Boat and shore anglers use the area seasonally and clam digging is popular in the narrow intertidal areas.

The downbay part of the oyster area contains three boat moorages.

OYSTER GROUND RATING

Low risk. All existing oyster ground is within the potential culture area.



TIDELAND MAP
OF
YAQUINA BAY
STATE OF OREGON
DIVISION OF STATE LANDS
SEPTEMBER 1972

ALSEA BAY

EXISTING OYSTER LEASES

There are no current leases in Alsea Bay. However, Wibbenhorst, Tackleberry, Middleton, and Dolan planted oysters prior to 1934. Starr made experimental plants in 1937 and MacDuffee leased 400 acres on the north side of the channel in 1947. The MacDuffee lease was given up in 1951 due to silting. MacDuffee planted 110 cases of seed on the south side of the bay in 1952. The fate of these oysters is unknown.

POTENTIAL OYSTER CULTURE AREA

The potential oyster culture area extends from the mouth of the bay to a line drawn just upstream from Lint Slough northwesterly across the bay (460 acres).

POTENTIAL OYSTER CULTURE TECHNIQUES

Raft culture might be possible on the north side of the channel just below and above highway 101 bridge. Stick culture might be feasible in the lower intertidal area.

PHYSICAL LIMITATIONS OF OYSTER CULTURE AREA

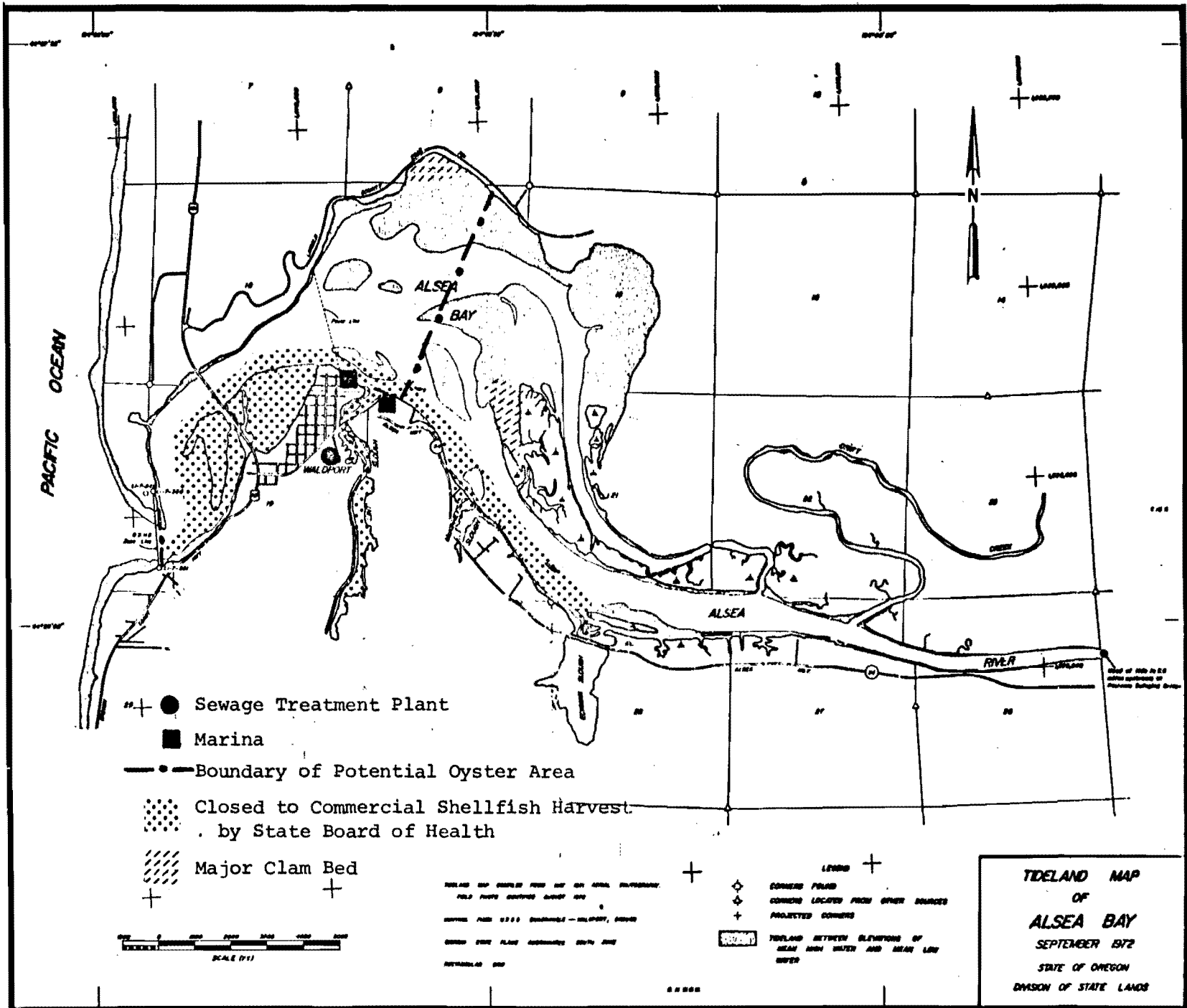
About one half of the area has a sandy, unstable bottom. Parts of the upbay tideflat have very soft mud bottom. During the winter heavy freshwater runoff results in low salinities, strong currents, and heavy silt load in the area.

CONFLICTING USES AND PROBLEMS OF OYSTER CULTURE AREA

A State Health Division closure on the commercial harvesting of shellfish exists south of a line following mid-channel of the estuary from the mouth to Eckman Slough. There are two marinas within the potential oyster culture area and heavy seasonal use by boat anglers. Ghost and mud shrimp are taken commercially within the oyster area, and there is moderate use of intertidal areas by clam diggers.

OYSTER GROUND RATING

Moderate risk.



● Sewage Treatment Plant

■ Marina

---●--- Boundary of Potential Oyster Area

⋯ Closed to Commercial Shellfish Harvest
by State Board of Health

▨ Major Clam Bed



TIDELAND MAP SHOWS THE BOUNDARY OF THE TIDELANDS
 AND THE LOCATION OF THE TIDELANDS
 WHICH ARE SUBJECT TO THE TIDELANDS ACT
 AND THE TIDELANDS ACT OF 1972
 AND THE TIDELANDS ACT OF 1972
 AND THE TIDELANDS ACT OF 1972

LELAND +
 CORNER FOUND
 CORNER LOCATED FROM OTHER SOURCES
 PROJECTED CORNER
 TIDELAND BETWEEN ELEVATIONS OF
 MEAN HIGH WATER AND MEAN LOW
 WATER

TIDELAND MAP
 OF
 ALSEA BAY
 SEPTEMBER 1972
 STATE OF OREGON
 DIVISION OF STATE LANDS

SIUSLAW BAY

EXISTING OYSTER LEASES

None

POTENTIAL OYSTER CULTURE AREA

There is little potential area available.

POTENTIAL OYSTER CULTURE TECHNIQUES

Raft culture may be feasible.

PHYSICAL LIMITATIONS OF OYSTER CULTURE AREA

The sandy substrate is unstable. During the winter, heavy freshwater runoff results in low salinities, strong currents, and heavy silt load in the area.

CONFLICTING USES AND PROBLEMS OF OYSTER CULTURE AREA

The whole estuary is closed to the commercial harvest of shellfish by the State Health Division. Recreational anglers utilize three marinas and several shore access points. The south side of the estuary is within the Oregon Dunes National Seashore. This would eliminate any commercial oyster grower who might use the south shore as a base. There is commercial fishing boat traffic and movement of ocean going barges through the estuary. Since the estuary is already narrow, this greatly reduces available oyster ground.

OYSTER GROUND RATING

High risk. Area not available at this time.

UMPQUA BAY

EXISTING OYSTER LEASES

None

POTENTIAL OYSTER CULTURE AREA

The potential oyster culture area extends from the mouth of the bay upstream to the area between "The Point" and the northern tip of Steamboat Island.

POTENTIAL OYSTER CULTURE TECHNIQUES

Bottom, raft and stick culture may be feasible oyster culture techniques.

PHYSICAL LIMITATIONS OF OYSTER CULTURE AREA

During the winter heavy freshwater runoff results in low salinity, strong currents, and heavy silt load in some areas. Some of the bottom is unstable sand.

CONFLICTING USES AND PROBLEMS OF OYSTER CULTURE AREA

The State Health Division has closures on the commercial harvesting of shellfish south of a line drawn between Winchester and Cornwall points and upstream of a line drawn from the mouth of Province Creek north to the three-mile directional light. The lower bay has extensive, seasonal boat traffic. Barges travel the length of the estuary and would limit oyster cultivation in the main channel.

OYSTER GROUND RATING

Moderate risk.

COOS BAY

EXISTING OYSTER LEASES

| <u>Grower</u> | <u>No. Acres Leased</u> | <u>No. Acres in Production</u> |
|---------------|-------------------------|--------------------------------|
| Qualman | 76.29 | 37.55 |
| Heckard | 8.4 | 8.4 |
| Stocks | 2.2 | 2.2 |
| Walker | 4 | 4 |
| Yunker | 4.3 | 0 |
| Lindsey | 47.593 | (Plants made) |

POTENTIAL OYSTER CULTURE AREA

The potential oyster culture area extends from the mouth of the bay upstream to the lower reaches of Haynes and North slough (2,875 acres). (See map). However, pollution abatement and improved circulation are required to reclaim the oyster ground above Sitka Dock.

POTENTIAL OYSTER CULTURE TECHNIQUES

Bottom, raft, and stick culture all are feasible techniques, depending on the specific area.

PHYSICAL LIMITATIONS OF OYSTER AREA

During the winter heavy freshwater runoff results in low salinities, and heavy silt load in some areas. Haynes and North sloughs have been crossed by a highway fill reducing circulation. Probably as a result, some of the tideflats in this area are very soft and silty, and no longer produce oysters.

CONFLICTING USES AND PROBLEMS OF OYSTER CULTURE AREA

The State Health Division forbids the commercial harvesting of shellfish above a line drawn east-west through Sitka Dock. Coos Bay has heavy harbor and ship traffic and maintenance dredging which would limit oyster cultivation in the main bay. Three sewage treatment plants discharge effluent into the estuary.

Extensive subtidal clam beds and sport and commercial clamming limits some of the area that would also grow oysters. All existing oyster leases are in South Slough.

OYSTER GROUND RATING

Low risk.

COQUILLE BAY

EXISTING OYSTER LEASES

None

POTENTIAL OYSTER CULTURE AREA

The potential oyster culture area extends from the mouth of the bay upstream to a line across the bay, about 3,000 feet upstream from the Bandon Sewage Treatment Plant (117 acres).

POTENTIAL OYSTER CULTURE TECHNIQUES

Limited raft culture might be feasible on the north side of the channel.

PHYSICAL LIMITATIONS OF OYSTER CULTURE AREA

In the winter, heavy freshwater runoff results in low salinities, strong currents, and a heavy silt load in the area.

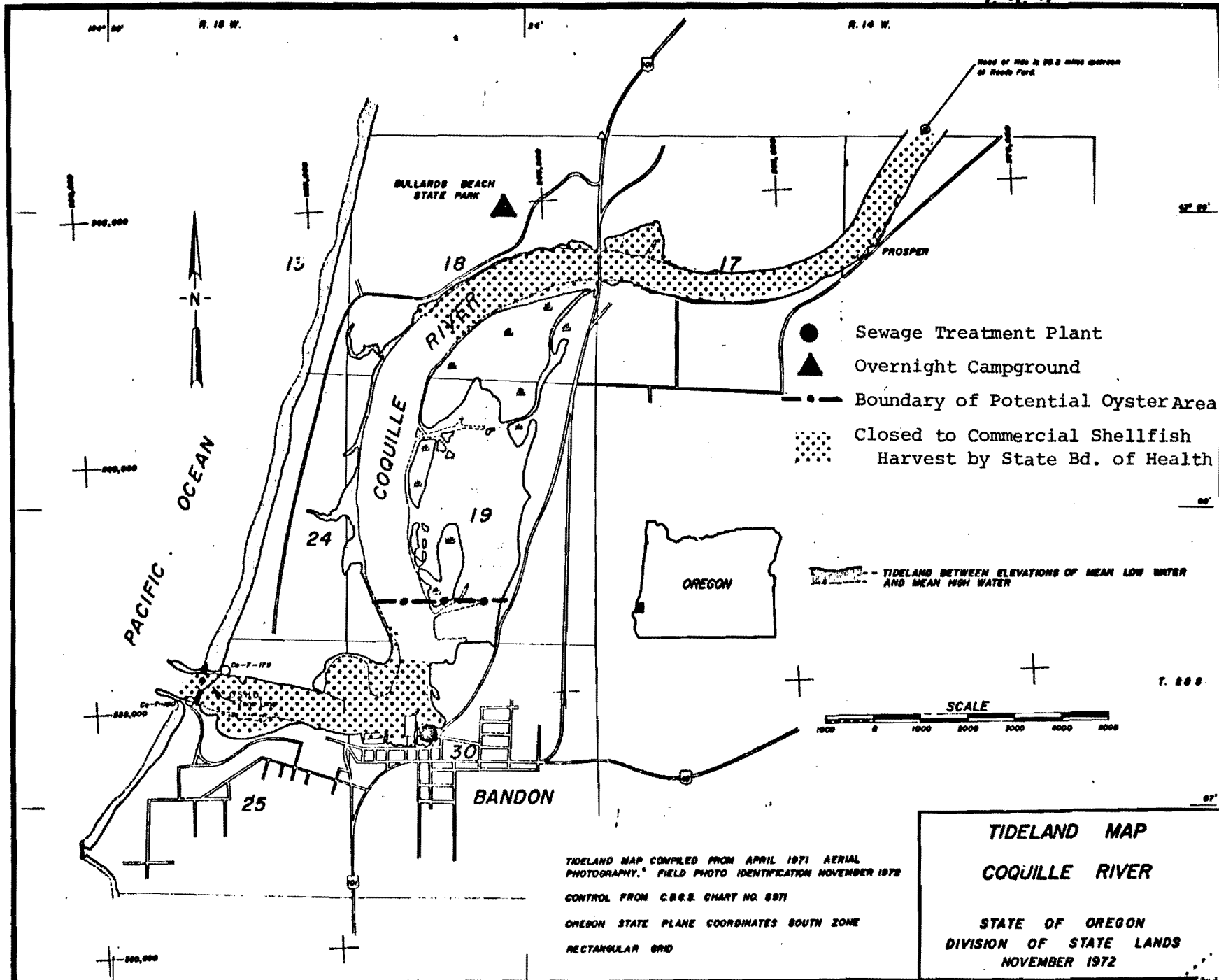
CONFLICTING USES AND PROBLEMS OF OYSTER CULTURE AREA

There is a State Health Division closure on the commercial harvest of shellfish above a line drawn across the estuary 1,000 yards below the Highway 101 bridge and another closure downbay from a line drawn from a filled point of land on the east side of the estuary, northeast of Bandon, straight across the river to the west bank. A sewage treatment plant outfall is within the area.

During the summer and early fall, recreational angling and crabbing is important in the area.

OYSTER GROUND RATING

High risk.



TIDELAND MAP COMPILED FROM APRIL 1971 AERIAL PHOTOGRAPHY. FIELD PHOTO IDENTIFICATION NOVEMBER 1972
 CONTROL FROM C.B.S. CHART NO. 8971
 OREGON STATE PLANE COORDINATES SOUTH ZONE
 RECTANGULAR GRID

TIDELAND MAP
COQUILLE RIVER
 STATE OF OREGON
 DIVISION OF STATE LANDS
 NOVEMBER 1972

ROGUE AND CHETCO RIVERS

EXISTING OYSTER LEASES

None

POTENTIAL OYSTER CULTURE AREA

There is very little potential oyster culture area available.

POTENTIAL OYSTER CULTURE TECHNIQUES

Raft culture might be feasible oyster culture technique.

PHYSICAL LIMITATIONS OF OYSTER CULTURE AREA

Both river mouths are narrow, without any significant intertidal areas. In the winter, heavy freshwater runoff results in low salinities, strong currents, and heavy silt load in the area.

CONFLICTING USES AND PROBLEMS OF OYSTER CULTURE AREA

Neither of the estuaries are listed by the State Health Division as having areas closed to commercial shellfish harvesting, probably because the issue has never been raised. Both estuaries would be closed to such harvest because of the presence of marinas and a very restricted river mouth. Boat traffic is seasonally heavy.

OYSTER GROUND RATING

High risk. None available.

DISCUSSION

Present Culture Methods

Oyster culture methods in Oregon for Pacific and Kumamoto oysters have changed little since the inception of the industry in the late 1800's. Then, as now, oyster spat were collected on shell (cultch) and the cultch placed in the growing area. Most Oregon oyster production still comes from cultch placed on intertidal tide flats in Tillamook and Coos bays. Bottom cultch is also used in Yaquina Bay, but cultch on strings or in trays suspended from rafts is also used. Native oysters were once important, but are now nearly nonexistent.

Problems

Oystermen have been plagued by many problems. Since native oysters have all but disappeared and Pacific and Kumamoto oysters will not spawn because Oregon bay waters are too cold, "seed" oysters are imported from other states or nations. Most of the seed comes from Japan, and some comes from the state of Washington. In 1975, the price of Japanese seed rose sharply and some Oregon growers at least, are looking for another source of seed. At the same time, oyster spawning in Washington was a near-total failure. These events prompted one grower to request a permit to import seed from the Republic of Korea which is priced at about one-half the price of Japanese seed. However, the import of Korean seed into the U.S. is prohibited by a United States agreement (Exchange of Notes) with The Republic of Korea because of potential disease and pest problems in Korean oysters.

Pollution and potential pollution hazards are also problems for our oyster industry. Sewage outfalls, marinas, and boat traffic have closed all of some estuaries and large parts of others to the commercial harvest of shellfish. Pollution abatement could enhance oyster production considerably.

Closely akin to pollution is siltation, which is a major problem in Tillamook and Coos bays. Past logging and road building practices and natural disasters

have contributed greatly to the silt loads which have covered much of the tideflats in these two bays where oysters are grown on the bottom.

Related to siltation is the large population of mud and ghost shrimp whose burrowing activities soften the bottom, allowing the oysters to sink and die in the mud.

Oyster Land Utilization

Table 1 summarizes the number of acres leased for oyster production in each estuary and the number of acres in production either as oysters harvested or seed planted. The potential oyster land available in each estuary is also shown. The number of acres in production is an estimate by the grower, and the potential acreage is an estimate by the Department of Fish and Wildlife staff.

It is evident that all of the land available for growing oysters is not under lease and only 47% of the leased land is being utilized. The silting problem in Tillamook and Coos estuaries accounts for 78% of the unused land. In Yaquina Bay several growers utilize raft culture technique and use only a small part of their leases. Full utilization of leased land and adoption of alternative culture methods such as rafting cultchless seed in stack trays could boost production many times. However, conflicting uses in or adjacent to the oyster growing area would have to be evaluated and considered. These uses include clam digging, navigation, pleasure boating, fishing, and sewage disposal.

Alternatives

One method used on the east coast to utilize clams from polluted areas is depuration. This involves holding the clams in unpolluted water for a prescribed time to allow them to rid themselves of polluting substances. Depuration has not been used for oysters in Oregon, but it is sanctioned by the State Health Division.

Table 1. Oyster Ground Acreages.

| Estuary | No. Acres Leased | No. Acres in Production | Percentage in Production | Potential Acreage ^{1/} |
|-----------|------------------|-------------------------|--------------------------|---------------------------------|
| Nehalem | 0 | 0 | 0 | 45 |
| Tillamook | 2,064.14 | 949 | 46 | 2,755 |
| Netarts | 80.00 | 80 | 100 | 275 |
| Sand Lake | 0 | 0 | 0 | 1 |
| Nestucca | 0 | 0 | 0 | 25 |
| Salmon | 0 | 0 | 0 | 15 |
| Siletz | 0 | 0 | 0 | 45 |
| Yaquina | 451.09 | 200 | 44 | 600 |
| Alsea | 0 | 0 | 0 | 40 |
| Siuslaw | 0 | 0 | 0 | 60 |
| Umpqua | 0 | 0 | 0 | 460 |
| Coos | 144.08 | 57 | 40 | 525 |
| Coquille | 0 | 0 | 0 | 75 |
| Rogue | 0 | 0 | 0 | 0 |
| Chetco | 0 | 0 | 0 | 0 |
| Total | 2,739.31 | 1,286 | 47(mean) | 4,921 |

^{1/} Potential acreages do not include navigation channels.

Alternative culture methods would more fully utilize land already leased. More extensive use of raft culture using string or tray cultch would increase production in Yaquina and Coos bays. Some of the soft areas in Tillamook Bay could be reclaimed by using stick culture.

The technology for an oyster hatchery is available. Water temperature control and forced feeding could increase the growth rate, thus reducing the amount of time in the growing area. This has been demonstrated in Yaquina Bay where oysters from the Oregon State University pilot hatchery grew to market size in 18 months rather than the usual 36 months. An oyster hatchery could also provide a source of seed independent of out-of-state supplies.

Chemical control of ghost shrimp has also been demonstrated as a possible useful tool, but clams and crabs were affected as well. Environmental standards and rules may make this alternative impractical.

Regulations and Enforcement

The statutes governing the oyster industry are ORS 509.425 through 509.510 which deal with oyster plats, licensing, classification of oyster lands, fees, taxes, and reports. Administrative rules OAR 10-275 through OAR 10-295 deal with importing oysters, activities in protected areas, and harvest restrictions.

Some questions and problems arise when the regulations are read and one is aware of customary industry practices and our administrative rules. In light of the fact that over one-half of the platted land is not being used to grow oysters, ORS 509.439 states in part (1) that the Commission may withdraw in excess of one-half of unproductive lands from a claim if (a) the land has been unproductive for at least three years, (b) the plat was filed after 1969, (c) more than one half of the claim is involved, and (d) the reason for unproductiveness does not include restrictions by governmental health authorities, the unavailability of seed, or

infestation by pests or disease. Nealy all of the land involved has been unproductive more than three years, but the plats were filed before 1969; more than one-half of each claim is involved, and the reason for no production is siltation in most cases. The filing date is the only criteria not being met for the state to withdraw the unproductive lands from the claimants. The status quo had, in fact, tied up state lands, prohibiting any other uses, and has stopped other growers from trying to utilize the lands, probably with alternative culture methods. We cannot believe that this was the intent when the state offered the privilege to grow oysters to private individuals.

We have record of only one inquiry to withdraw unproductive lands (in Yaquina Bay), but we have no record that any action was taken, even though the grower involved consented to the action.

ORS 509.427 and 509.431 detail the procedure for converting oyster plantations to plats and the requirements for applying for new plats. One problem we have experienced is the overlapping of plats. This is due in part to a careless or incomplete survey by the applicant, and in part to inadequate procedures by the agency to determine if the land applied for is available and classified as oyster land. The Division of State Lands prepared a set of maps in 1975 showing the oyster plats according to the legal descriptions. The maps were taken to the growers and the maps were declared incomplete, inaccurate, and now obsolete by the oystermen.

Another recurring problem is the frequent violoation of OAR 10-280 and 10-285 which provide for a permit to import oysters into Oregon, and for their inspection for disease and pests. All of our seed comes from out-of-state, but we are rarely informed of its arrival, and then usually after the fact. Exotic species have also been imported by some growers as an experiment. One grower imports

adult Pacific oysters to Newport for processing, but may hold them in a livebox in Yaquina Bay for several days. We often learn of this at a later date.

The import problem becomes more confusing because any individual can bring in a few oysters for personal use and hang them off his boat dock. One individual was cited recently for importing two cases of seed into Oregon from Washington without a permit.

Another practice of which we have become aware is that one grower at least, is using land outside his lease, experimentally. If his experiment is successful, then he claims he will file for the area. We do not know if this practice is widespread, because we have no one checking the plat boundaries.

RECOMMENDATIONS

1. Evaluate oyster land leasing statutes in light of present land use planning policies.
2. Accurately map all oyster plats, resurveying where necessary.
3. Begin enforcing import regulation (OAR 10-280 and 10-285).
4. Hire an oyster biologist to work on oyster problems at least on a part-time basis.