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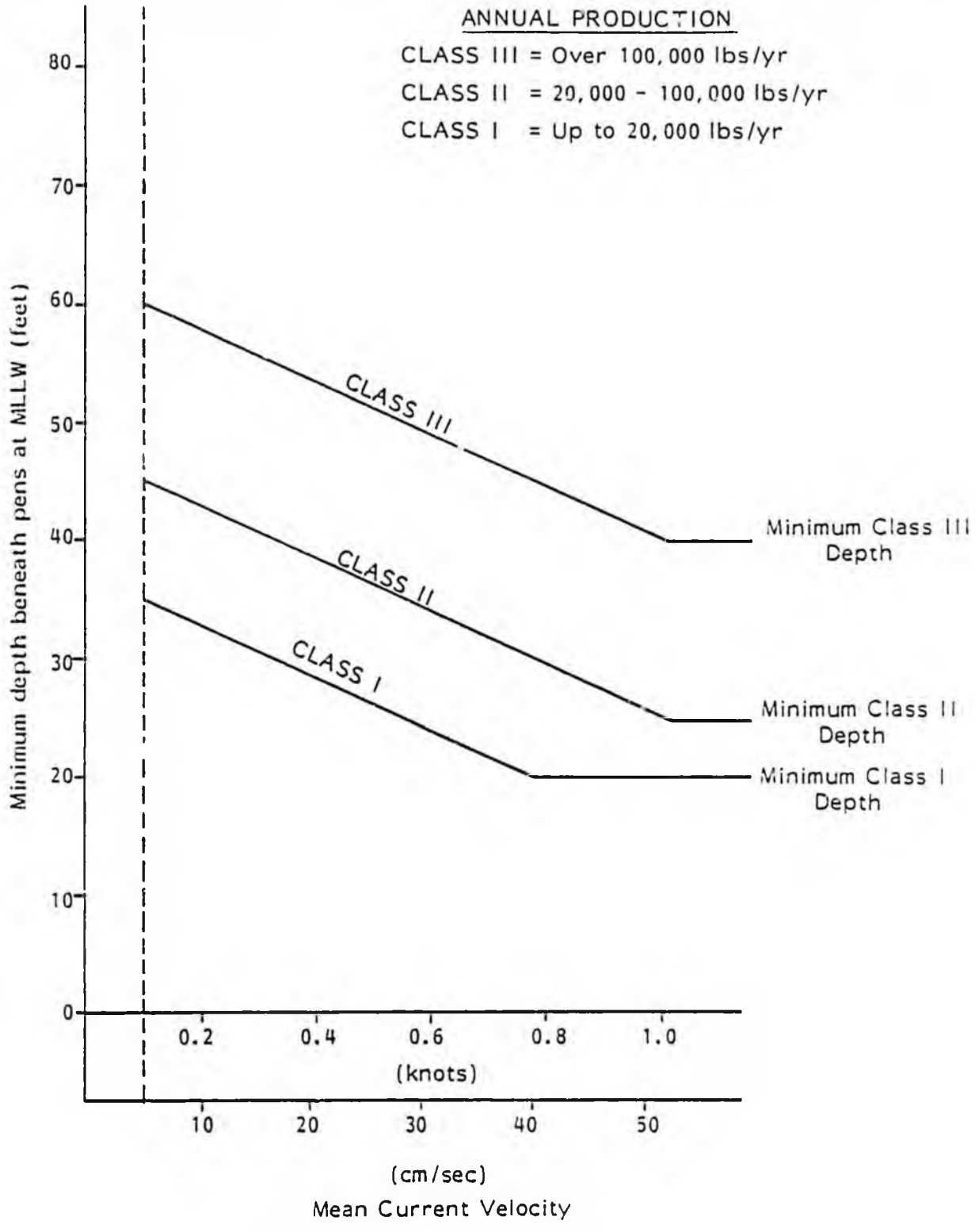

Figure 1

MINIMUM DEPTH AND CURRENT GUIDELINES
FOR NET-PEN SITING

Table 1

HABITATS OF SPECIAL SIGNIFICANCE

- Eelgrass (Zostera marina) beds having densities exceeding 13 turions (i.e., "shoots") per 0.25 m^2 in summer or 10 turions per 0.25 m^2 in winter. These densities should be based on 20 random 0.25 m^2 quadrat samples taken in the eelgrass bed. In addition to the density criteria above, culture should not be permissible if more than 10% of the samples exceed 20 turions per 0.25 m^2. These guidelines are those used by the Washington Department of Fisheries (WDF) in defining areas unacceptable for hardshell clam harvesting (DNR/WDF, 1981).

- Kelp beds (i.e., dense beds of attached macroalgae, especially bull kelp, Nereocystis luetkeana).

- Rocky reef habitats (high profile rock outcrops colonized by organisms such as hydroids, macroalgae, abalone, sea urchins, sea anemones, starfish, and other attached organisms).

- Geoduck (Panope abrupta) populations with densities exceeding 0.4 animals per m^2. This density is the criterion used by state agencies to define major geoduck beds (DNR/WDF, 1985).

- Hardshell clam populations with densities exceeding 1.2 kg (2.5 lbs) per m^2. This density is that required for hardshell clam harvest (DNR/WDF, 1981).

- Habitats having significant populations of, or which are important to the feeding, reproduction or other life stages of Dungeness crabs (Cancer magister), herring (Clupea), lingcod/greenling (Hexagrammidae), true cod (Gaddidae), soles and flounders (Pleuronectiformes), rock fishes (Scorpaenidae), cabezone and other large sculpins (Cottidae), or sea perch (Embiotocidae). The occurrence of these species in a potential culture area does not necessarily exclude it from development. The determination of whether the site is of special significance to these species will be determined by WDF on a case-by-case basis.

- Wildlife refuges and habitats of endangered or threatened species. (A 300 foot separation from net-pens is recommended regardless of current direction).

- Other habitats of special significance, regardless of depth, as determined on a case-by-case basis.

3. Net-pens should not be located within 1500 feet of bird and mammalian habitats of special significance including seal and sea lion haulout area, seabird nesting sites or colonies, and areas specifically identified as critical for feeding or migration of birds and mammals. The Washington Department of Game will be responsible for the designation of habitats of special significance for birds and mammals.

4. Siting guidelines have been developed to minimize the likelihood that net-pen culture will adversely affect water quality or contribute significantly to phytoplankton productivity in any given area. Culture is not recommended in areas with chronic water quality problems. On the basis of this approach guidelines have been developed as shown in Figure 2 and Table 2 and as summarized below:

   - Recommended limits are placed on the maximum fish production within specified geographic areas for most of southern Puget Sound, the Port Orchard area, Whidbey Basin, northern Hood Canal, Sequim Bay and Discovery Bay. These production limits range from 50,000 lbs/yr in Sequim Bay to 5,900,000 lbs/yr in Skagit Bay. There are no restrictions on whether the production allotment for a given area is utilized by a single operation or divided among several smaller operations, provided that culture density does not exceed more than 1,000,000 lbs annual production per square nautical mile (defined as a square area having dimensions of 6076 feet on all sides).

   - Budd Inlet, Holmes Harbor and Hood Canal south of Hazel Point are areas of special concern because of chronic low dissolved oxygen at depth and persistent nitrogen depletion in surface waters. Net-pen culture, therefore, is not recommended unless the applicant can demonstrate that: 1) respiration and biochemical oxygen demand (BOD) will not significantly depress dissolved oxygen concentrations; and 2) nutrient input attributable to net-pen culture will not affect the frequency, extent, intensity or duration of phytoplankton blooms.

   - There are no water quality-based limits on the number of net pen operations in the Strait of Juan de Fuca, the Strait of Georgia, San Juan Islands, Main Basin of Puget Sound, and the southern Sound in the area of Anderson Island, Nisqually Reach and Tacoma Narrows. Culture density, however, should not exceed 1,000,000 lbs annual production per square nautical mile. More stringent production limits may be imposed in some instances to protect water quality in specific embayments.

5. Unpelletized wet feed (i.e., minced fish or shellfish) should not be used in net-pen culture.

6. If predator control is necessary, non-lethal predator control measures should be used against both bird and mammalian predators. Predator control methods must comply with appropriate federal and state rules, and the pen operator shall possess all necessary permits.

7. Tributyltin should not be used as an antifouling agent on the nets. The use of other antifouling agents should be reviewed on a case-by-case basis by state environmental management agencies. Any antifoulant use should be reported to the Washington Department of Ecology.

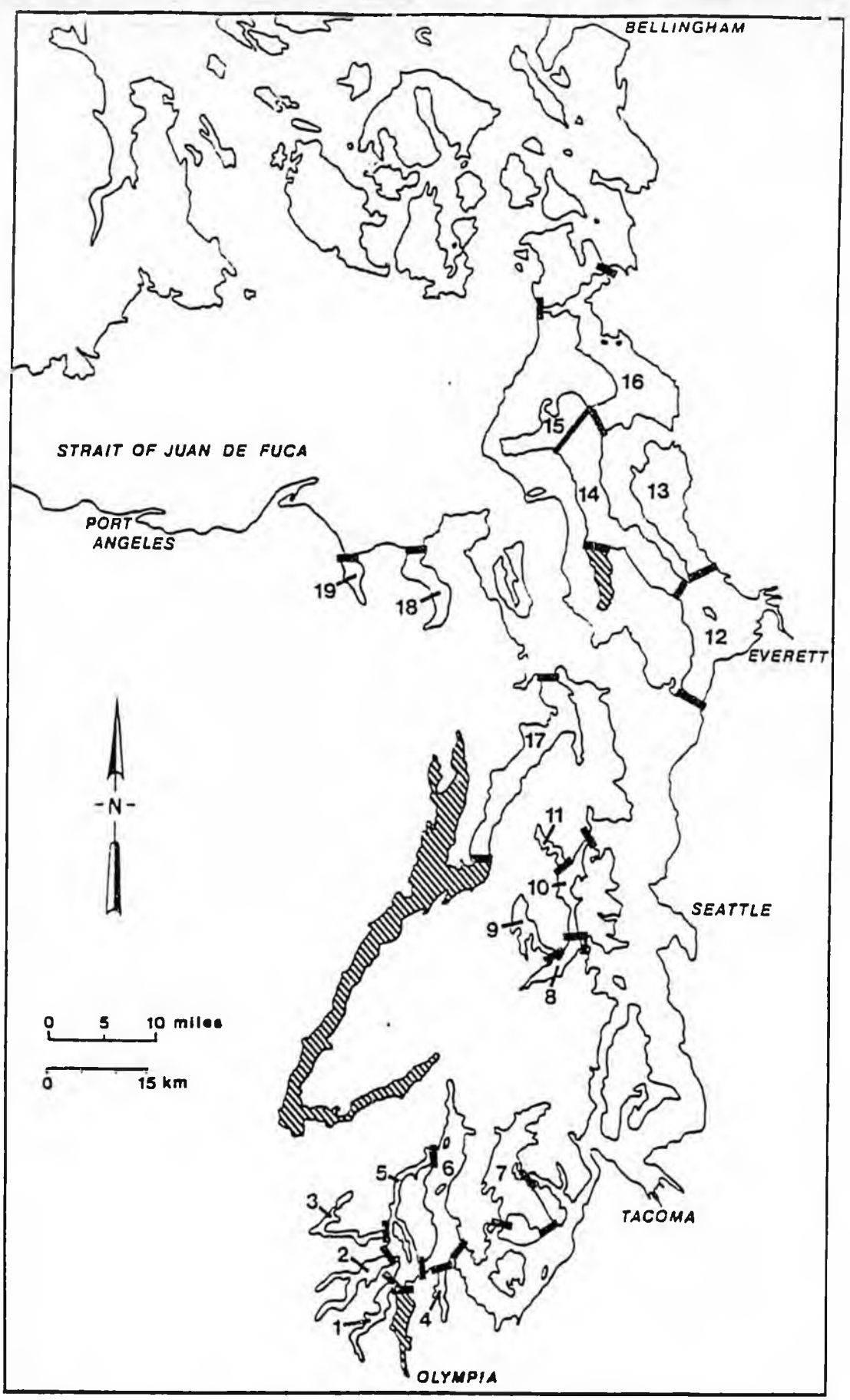

Figure 2. SUB-DIVISIONS OF PUGET SOUND USED IN ESTABLISHING THE WATER QUALITY GUIDELINES. CROSS-HATCHING DENOTES AREAS OF SPECIAL CONCERN.

Table 2

WATER QUALITY GUIDELINES

Area	Description	Maximum Annual Salmon production (thousand lbs/yr)
1	Eld Inlet	190
2	Totten and Skookum Inlets	190
3	Hammersley Inlet and Oakland Bay	240
4	Henderson Inlet	80
5	Squaxin, Peale and Pickering Passage	680
6	Dana Passage and Case Inlet	980
7	Carr Inlet	1100
8	Sinclair Inlet	190
9	Dyes Inlet	460
10	Port Orchard	260
11	Liberty Bay	120
12	Possession Sound	3200
13	Port Susan	1100
14	Saratoga Passage	2000
15	Penn Cove and Crescent Harbor	730
16	Skagit Bay	5900
17	Northern Hood Canal	1900
18	Discovery Bay	540
19	Sequim Bay	50

The following are areas of special concern in which culture is not recommended unless the applicant can demonstrate that culture will not result in adverse environmental effects:

- Budd Inlet
- Holmes Harbor
- Hood Canal south of Hazel Point

The interim guidelines place no limits on the number of net-pen operations or total allowable production in the following areas:

- Strait of Juan de Fuca
- Strait of Georgia
- San Juan Islands
- Main Basin of Puget Sound
- Southern Puget Sound in the vicinity of Tacoma Narrows, Nisqually Reach and Anderson Island

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[1] See Figure 2 for the location of the areas and McLellan (1954) for the precise geographic boundaries.

8. Only antibiotics licensed by the Food and Drug Administration shall be used, and these should be used only on a short-term basis for disease treatment or disease prevention. Antibiotics should not be used prophylactically on a long-term basis. The Washington Department of Fisheries should be notified of all antibiotic usage at the time of treatment, and should be informed of the disease or condition being treated and the antibiotic used.

9. Transfer of live fish or their reproductive products within the state or their importation into state shall be done in accordance with all applicable state and federal standards.

10. To facilitate environmental review, applications for culture should be accompanied by an operations plan which is to be submitted to the Department of Natural Resources (DNR) for distribution to other agencies. This plan should include projections for: (1) improvements at site (e.g., pens, log booms) and their relationship to natural features (e.g. bathymetry, shorelines); (2) pen number, size and configuration; (3) schedule of development and maintenance; (4) species cultured; (5) fish size at harvest; (6) annual production; (7) pounds of fish on hand througnout the year; (8) average and maximum stocking density; (9) source of eggs and smolts; (10) type of feed used; (11) feeding method; (12) chemical use (e.g., antibiotics); (13) predator control measures; and (14) antifoulant use.

11. A site characterization survey should be performed prior to permit application. This survey includes: (1) a bathymetric survey; (2) a hydrographic survey; and (3) a diver survey of biological resources to be done in the period April through September. The applicant is strongly encouraged to consult with state and local officials prior to permit application and in designing the site characterization survey. The initial state contact should be made with the Washington State Department of Agriculture, and this agency will facilitate additional contacts with the Departments of Fisheries, Ecology, Natural Resources, Game and Parks and Recreation.

12. A benthic baseline survey consisting of sediment chemistry and benthic infauna sampling should be performed by all operations with an anticipated annual production in excess of 100,000 lbs. The baseline survey should be conducted after net-pen installation, but before stocking with fish.

13. An annual summer diver survey should be performed by all operations with an anticipated annual production in excess of 20,000 lbs. For those operations growing in excess of 100,000 lbs per year, annual summer monitoring should also include: (1) sediment chemistry and infauna sampling; (2) water quality sampling; and (3) a hydrographic survey.

BACKGROUND INFORMATION AND DISCUSSION FOR THE INTERIM GUIDELINES

1.0 INTRODUCTION

The net-pen culture of salmon is expanding throughout the world including Puget Sound. This growth is creating additional management responsibilities for state and local agencies. At both the state and local level there is a need for a coordinated approach to environmental review and regulation of this relatively new industry. These interim guidelines are intended to provide a basis for such a coordinated approach until completion of the programmatic Environmental Impact Statement (EIS) for the salmon net-pen industry.

The goal of the guidelines is to avoid significant adverse environmental effects from net-pen operations permitted prior to completion of the programmatic EIS. The recently completed review, "The Environmental Effects of Floating Mariculture in Puget Sound" (Weston, 1986), and many other studies have demonstrated that the environmental effects of net-pen culture are highly dependent upon siting and operational practices. Therefore, the goal of the guidelines is pursued through a combination of recommendations for project siting and operational practices, as well as a recommended protocol for annual monitoring. Although environmental protection is the primary goal, these interim guidelines have been developed to meet two secondary goals. First, it is anticipated that the guidelines will lessen the burden of environmental review at the county level. These guidelines should assist local government review of permit applications under the Shoreline Management Act and the State Environmental Policy Act. Secondly, it is also anticipated that these guidelines will assist the industry in application for new sites, and facilitate permitting of operations in sites which meet these guidelines. The permitting of sites which do not meet the guidelines is likely to be a more difficult process and will place the burden of proof on the applicant to demonstrate that culture can be conducted with minimal environmental affect.

As the term "interim guidelines" implies, this document is intended to provide guidance to state and local authorities responsible for the regulation of salmon net-pen culture. These recommendations for siting, operation and monitoring are intended to be flexible, and do not eliminate the need for careful case-by-case review of permit applications. The interim guidelines are, by necessity, generic in nature. It is therefore anticipated that site-specific

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As the term "interim guidelines" implies, this document is intended to provide guidance to state and local authorities responsible for the regulation of salmon net-pen culture. These recommendations for siting, operation and monitoring are intended to be flexible, and do not eliminate the need for careful case-by-case review of permit applications. The interim guidelines are, by necessity, generic in nature. It is therefore anticipated that site-specific

conditions may require that these guidelines be made more restrictive or relaxed occasionally on a case-by-case basis. Departures from these guidelines, however, are expected to be relatively rare. If a given project is made subject to restrictions or requirements not specified in these guidelines, state and/or local officials should provide the applicant, if requested, with an explanation of the environmental reasons for doing so. If relaxation of these guidelines is requested, it is the responsibility of the applicant to demonstrate that deviation from these guidelines can be made with minimal environmental effect.

These guidelines are formulated to minimize possible effects of net-pen operation on habitats of special significance as well as sediment and water quality. They do not address considerations of aesthetics, navigation or water/land use conflicts. These and similar issues are best considered at the county level on a case-by-case basis.

The guidelines apply to all net-pen operations in which salmon are grown with the intent to harvest and market the fish upon attainment of sufficient size. The guidelines do not apply to net-pen operations in which salmon are held primarily for research purposes because these facilities are typically of very small size and thus have a reduced potential for environmental effects. The guidelines do not apply to delayed release facilities used for enhancement of wild stocks. There are three reasons for this exclusion. First, fish are held in the delayed release facilities only for a period of four to six months, thus reducing the potential for effects such as feed and feces accumulation under the pens. Secondly, fish are not in the pens during the summer months when water quality concerns are the greatest. Finally, only commercial operations growing fish to a marketable size show significant growth potential in the near future in Puget Sound. Rapid growth of delayed release operations is not anticipated, thus the issue will be deferred to consideration in the programmatic EIS.

The interim guidelines are to be used in the permitting and management of net-pen operations in Puget Sound, the Strait of Juan de Fuca and the Strait of Georgia. They apply to net-pen operations which have not yet been permit-

ted, and do not apply to projects already in operation or permitted unless these facilities undergo significant expansion of modification of their original permit specifications. In this case, the expansion or modification may be evaluated for consistency with these guidelines.

2.0 DEPTH AND CURRENT GUIDELINES

The net-pen culture of salmon generates substantial amounts of excess feed and feces which ultimately settle to the sea floor. The amount of feed and fecal material generated will depend on the level of production of the operation, and the fate of the material will depend principally upon the depth and water currents at the site. These guidelines consider current velocity and facility production in conjunction with water depth.

The objectives of the guidelines are: (1) to minimize the rate of accumulation of feed and feces on the bottom; and (2) to minimize biological changes in benthic communities caused by culture activities. The guidelines consider both depth and current in an attempt to insure that feed and feces are dispersed over a broad enough area to minimize chemical and biological changes in the sediment. If net-pens are sited in accordance with the guidelines, the depth and lateral extent of visible accumulation of feed and feces should be considerably reduced from that currently reported under existing net-pens. There may be subtle and localized changes in sediment chemistry, or enhancement of species tolerant of organic enrichment. The potential for complete absence of macrofauna or the accumulation of thick mats of feed and feces that have been previously reported will be significantly reduced.

It should be emphasized that these guidelines represent the one of the few attempts anywhere in the world to minimize feed and feces accumulation by establishing depth criteria for siting, and the only effort to incorporate current velocity and facility production. Data that would allow exact determination of the combinations of depth and current required for adequate dispersal are, for the most part, lacking. In addition, few data exist on the assimilative capacity of the benthos. The interim criteria draw upon all available data, but rely heavily on scientific judgment. It is clear that more data are needed. The anticipated programmatic EIS will evaluate the effectiveness of these depth and current guidelines, and permit later refinement if necessary. The annual monitoring program recommended by these guidelines (Section 7.0) will, in part, serve to provide the data needed for this evaluation.

The variables of water depth current and operation size all interact to determine the extent of feed and feces accumulation on the bottom. The interim depth and current guidelines recognize this interaction in the siting of net-pen operations. The guidelines are displayed graphically in Figure 3. It is evident from this figure that recommendations for water depth and current velocity are dependent upon the size of the operation: the greater the annual production of the facility, the greater must be the water depth and/or current velocity. Net-pen operations are divided into three size classes as follows:

Class I:

- Operations with a production capacity of up to 20,000 pounds/year.

Class II:

- Operations with a production capacity in excess of 20,000 pounds/year, but no greater than 100,000 pounds/year.

Class III:

- Operations with a production capacity in excess of 100,000 pounds/year.

Figure 3 illustrates depth and current guidelines for each operational class. At any given current velocity, the minimum recommended depth beneath the pens is specified. Since these guidelines attempt to maximize the dispersal of feed and feces as they settle from the net-pens, current velocity should be measured mid-way between the bottom of the net-pens and the sea floor as described in Section 6.1. Surface current velocity is not an appropriate substitute. The guidelines are based on mean rather than maximum current velocity. A minimum mean current velocity of 0.1 knots (5 cm/sec) is recommended. At sites with a mean current velocity below this value, currents will not be adequate to insure dispersal of solid wastes, and no culture should be permitted.

The depth of concern has been defined as the distance from the bottom of the net-pens to the sea floor rather than total water depth. In application of the guidelines to a net-pen complex on a sloping bottom, the depth of concern is the smallest depth under any of the net-pens, and this value is to be used

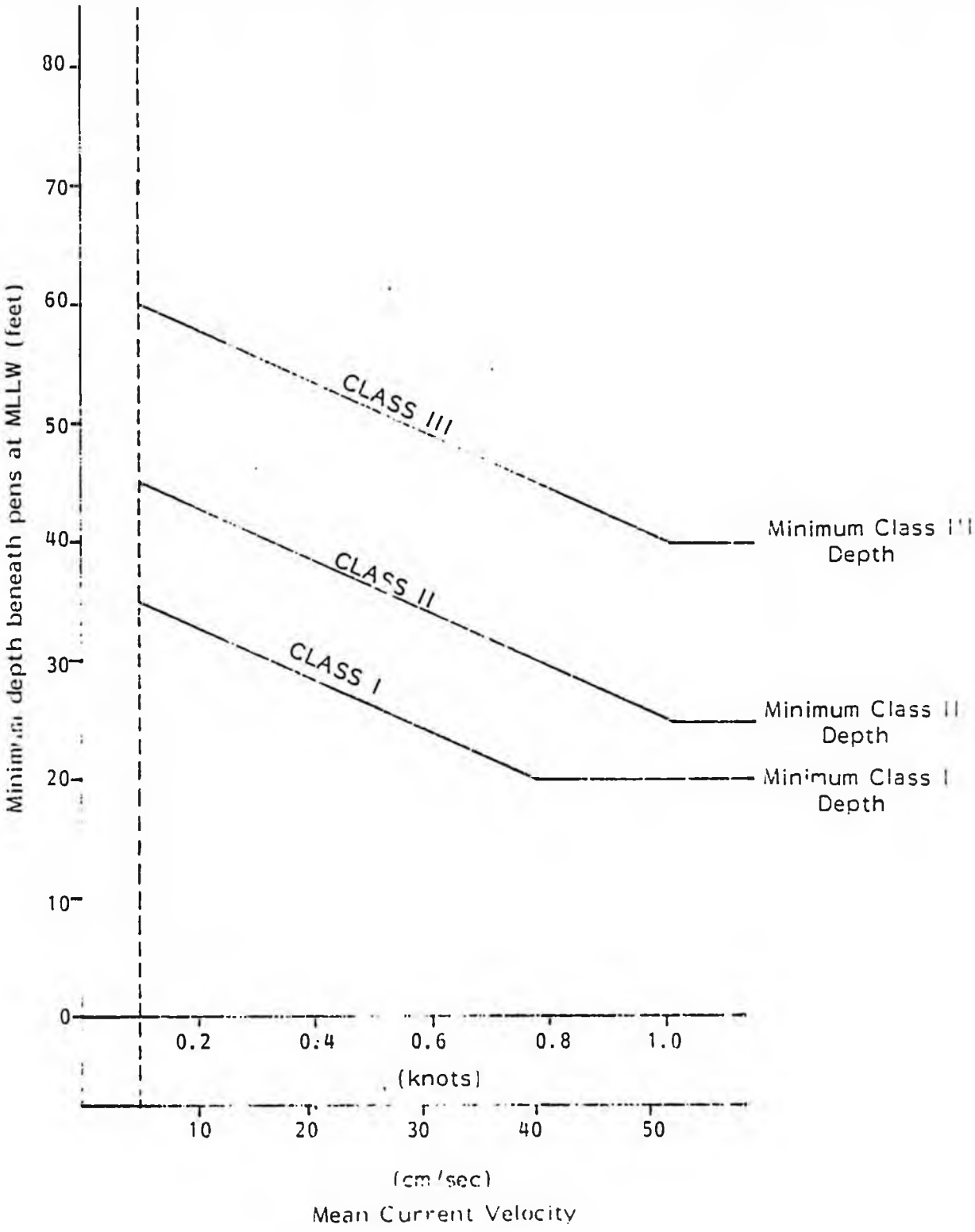

Figure 3

MINIMUM DEPTH AND CURRENT GUIDELINES
FOR NET-PEN SITING
(See text for explanation of Class I, II, and III
operations and for definition of mean current velocity)

in determining compliance with the guidelines. Depths are based on mean lower low water (MLLW). MLLW is the chart datum employed on nautical charts, thus simplifiying application of the guidelines.

Pen configuration is also a significant factor in determining the depth and lateral extent of solids accumulation beneath a net-pen facility. Pens oriented in a row parallel to the prevailing current will tend to cause the greatest depth of solids accumulation per unit area, but may affect the least amount of bottom area. Pens oriented perpendicular to the prevailing current may affect a greater area of bottom, but may have the least accumulation per unit area. The guidelines do not specifically address pen configuration because it will be extremely operation-specific, and because of the limitations in sedimentation models which currently do not allow prediction of an optimal design. For those operations which meet the depth and current guidelines, however, pen configuration may ultimately prove to be an important consideration in further mitigating effects. This issue will require further consideration in the programmatic EIS.

3.0 HABITATS OF SPECIAL SIGNIFICANCE

Net-pens should not be located where their siting or the accumulation of excess feed and feces are likely to adversely affect habitats important to commercial or sport fisheries, that are of critical ecological importance, or that are especially sensitive to degradation by culture activities. These habitats should be afforded protection over and above the depth and current guidelines discussed in Section 2.0. The habitats of special significance are listed in Table 3. The Washington Department of Fisheries (WDF) will have responsibility for the designation of and assessment of impacts on plant, invertebrate and fish habitats of special significance. The WDF has considerable existing data concerning habitats of special significance for foodfish and shellfish, and is able to provide available information or comments in this regard.

It is recommended that net-pens not be sited within 300 feet from habitats of special significance located in the direction(s) of prevailing tidal currents. A 150-foot separation is recommended in all other directions. These distances are to be measured laterally from the net-pen perimeter. A review of the literature (Weston, 1986) found that visible accumulation of feed and feces or changes in sediment chemistry was generally reported to extend to distance from the net-pens of 100 feet or less. The greatest reported distance of visible accumulation was 150 feet from the net-pens. A separation of 300 feet in the direction(s) of prevailing currents should provide an additional margin of protection.

Habitats of special significance are, by definition, herein limited to water depths of 75 feet or less at mean lower low water (MLLW). Except in special cases (Item 8 of Table 3), no habitat restrictions are placed on net-pens if water depths within a 300-foot distance are in excess of 75 feet. For example, the occurrence of dense geoduck beds within 300 feet from a proposed net-pen site in the direction of prevailing current is sufficient to exclude that site from consideration if the beds are in a depth of 75 feet or less. These geoduck beds will not ordinarily be of concern in siting if they are at a depth greater than 75 feet. The 75-foot limitation to habitats of special significance has been established principally because of the reduced likelihood of feed and feces bottom accumulation at greater depths. For many of the

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Table 3

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4. Geoduck (Panope abrupta) populations with densities exceeding 0.4 animals per m^2. This density is the criterion used by state agencies to define major geoduck beds (DNR/WDF, 1985).

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6. Habitats having significant populations of, or which are important to the feeding, reproduction or other life stages of Dungeness crabs (Cancer magister), herring (Clupea), lingcod/greenling (Hexagrammidae), true cod (Gaddidae), soles and flounders (Pleuronectiformes), rock fishes (Scorpaenidae), cabezone and other large sculpins (Cottidae), or sea perch (Embiotocidae). The occurrence of these species in a potential culture area does not necessarily exclude it from development. The determination of whether the site is of special significance to these species will be determined by WDF on a case-by-case basis.

7. Wildlife refuges and habitats of endangered or threatened species. (A 300 foot separation from net-pens is recommended regardless of current direction).

8. Other habitats of special significance, regardless of depth, as determined on a case-by-case basis.

habitats of special significance, the 75-foot depth limitation is of little consequence for these habitats are found only in much shallower water (e.g., eelgrass, kelp, herring spawning areas).

Net-pens should not be sited within 1500 feet of habitats of special significance as identified by the Washington Department of Game (WDG). These include seal and sea lion haulout areas, seabird nesting sites or colonies, and areas specifically identified as critical for feeding or migration of birds and mammals. It is not clear what effects, if any, net-pen operations would have on these species or habitats, however, the intent of this guideline is to reduce the likelihood of interactions between net-pen operations and these species, and thus reduce the need for predator control measures. WDG will have the responsibility for the designation of mammal and bird habitats of special significance.

4.0 WATER QUALITY GUIDELINES

The primary objective of the water quality guidelines is to minimize any potential effect of net-pen activities on phytoplankton productivity (i.e., initiate or sustain blooms). Secondarily, the guidelines attempt to prevent the input of feed and feces with a high biochemical oxygen demand (BOD) in areas which have chronically low dissolved oxygen concentrations. The guidelines address only incidentally potential toxic effects that result from the accumulation of metabolites (principally ammonia) or the respiratory depletion of oxygen in the water passing directly through the culture structure. Salmon are very sensitive to both elevated ammonia concentrations and low dissolved oxygen, and thus, the size of the operation is likely to be self-limiting with respect to toxic effects. In addition, net-pen operations of the size typical of Puget Sound are unlikely to cause increases in ammonia concentrations to the point where toxicity would become a concern (Weston, 1986).

A general overview of the water quality interim guidelines is shown in Table 4 and Figure 4. Net-pen culture is not recommended in Budd Inlet, Holmes Harbor or Hood Canal south of Hazel Point unless the applicant can demonstrate culture can be conducted without significant environmental effects. In the Main Basin of Puget Sound, portions of the southern Sound (Anderson Island, Tacoma Narrows and Nisqually Reach), the Strait of Juan de Fuca, the San Juan Islands and the Strait of Georgia the guidelines establish no water quality-based limitations on the number of net-pen operations, although the density of culture should not exceed more than 1 million pounds annual production within one square nautical mile (hereafter defined as a square area having the dimensions of 6076 feet on all sides). Much of the remainder of Puget Sound has been sub-divided into areas numbered 1 through 19 based primarily on the sub-divisions of Puget Sound used by McLellan (1954). In each of these sub-divisions, a maximum annual salmon production has been recommended. The guidelines place no restrictions on how the maximum production is distributed among operations. A single operation may utilize the production allotment for a sub-division, or the production allotment may be divided among several smaller operations. However, the annual production density should not exceed 1 million pounds per square nautical mile.

Table 4

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Area[1]	Description	Maximum Annual Salmon production (thousand lbs/yr)
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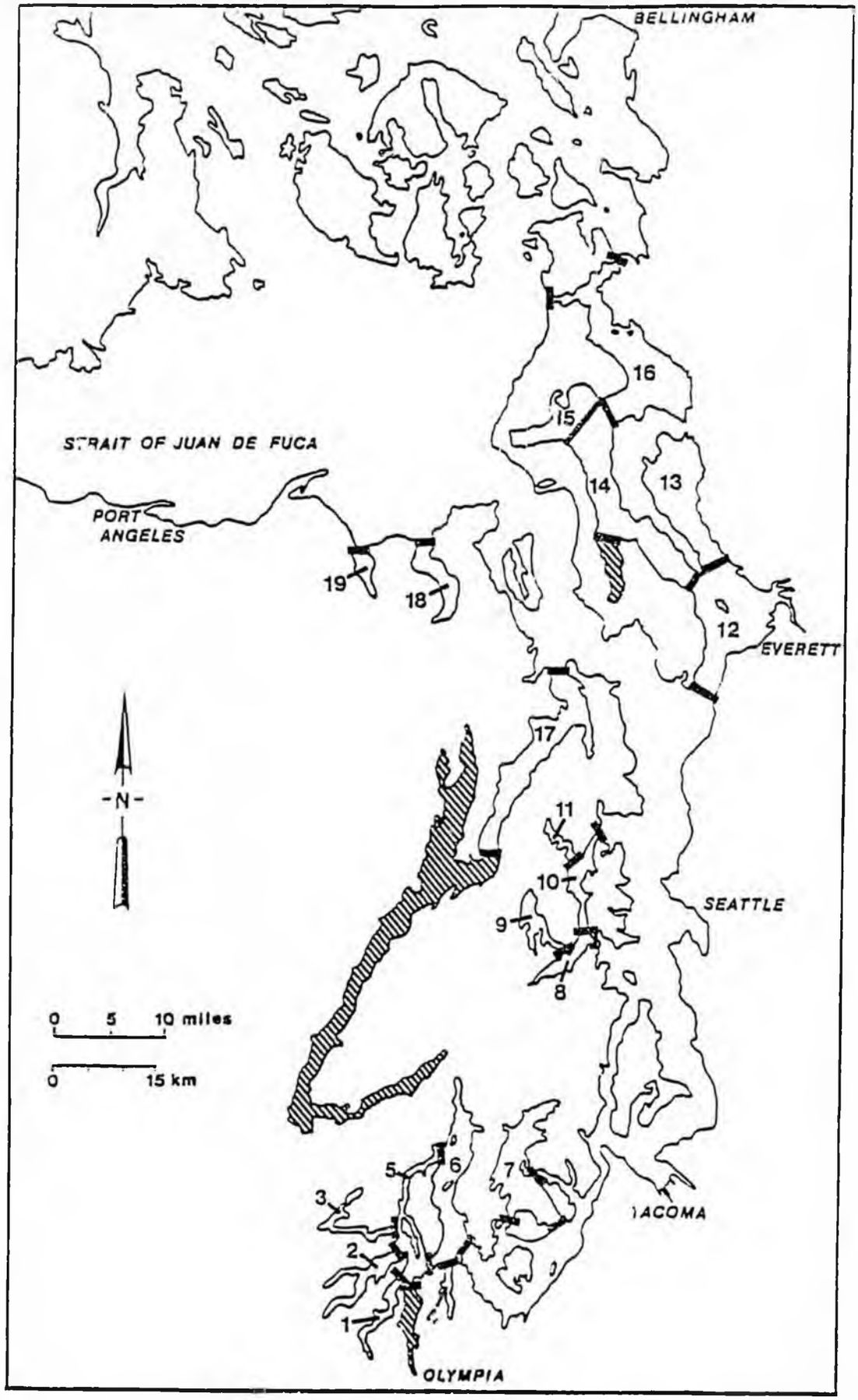

Figure 4. SUB-DIVISIONS OF PUGET SOUND USED IN ESTABLISHING THE WATER QUALITY GUIDELINES. CROSS-HATCHING DENOTES AREAS OF SPECIAL CONCERN.

To understand the basis for the water quality guidelines, existing water quality conditions throughout Puget Sound must be examined. Figures 5 through 7 illustrate dissolved oxygen and nitrogen concentrations throughout the Sound based on the Department of Ecology water quality monitoring data. Ecology monitoring stations are sampled monthly from April through November. Samples are collected at depths of 0, 33 and, if the water is of sufficient depth, at 98 ft. (corresponding to 0, 10 and 30 m). Data collected from April 1981 through November 1985 (approximately 40 sampling events) were used in development of these guidelines.

Figure 5 illustrates the percentage of observations with less than 5 mg/l dissolved oxygen in samples collected at a depth of 33 ft.. Two areas, Budd Inlet and the extreme southern end of Hood Canal, had chronically low dissolved oxygen concentrations at depths of 33 ft. Dissolved oxygen concentrations less than 5 mg/l were regularly reported at depths of 98 ft. in Hood Canal northwards to, and including, Dabob Bay (Figure 6). In Holmes Harbor dissolved oxygen concentrations less than 5 mg/l were observed in 15% of the samples.

Figure 7 illustrates the frequency with which nitrogen concentrations (sum of ammonia, nitrite and nitrate) drop below 0.1 mg/l. In Puget Sound nitrogen concentrations below this value suggest that nitrogen may limit phytoplankton growth, and that the addition of nitrogen by net-pen culture could increase primary productivity. The highest frequency of nitrogen limitation was observed in Hood Canal northwards to and including Dabob Bay. Nitrogen depletion below 0.1 mg/l was also observed at a frequency greater than 60% in Holmes Harbor, Budd Inlet, Totten Inlet, Port Orchard and Liberty Bay. In the Strait of Juan de Fuca, the San Juan Islands and the Main Basin of Puget Sound nitrogen was rarely limiting to phytoplankton growth.

The data displayed in Figures 5 through 7 were used to determine the maximum intensity of culture recommended in any given area under these interim guidelines. The conclusions drawn from the Ecology water quality monitoring data set were also compared and verified with readily available published data (Collias, et al., 1974; Friebertshauser, et al., 1971). It should, however, be recognized that the data search conducted for the interim guidelines was by

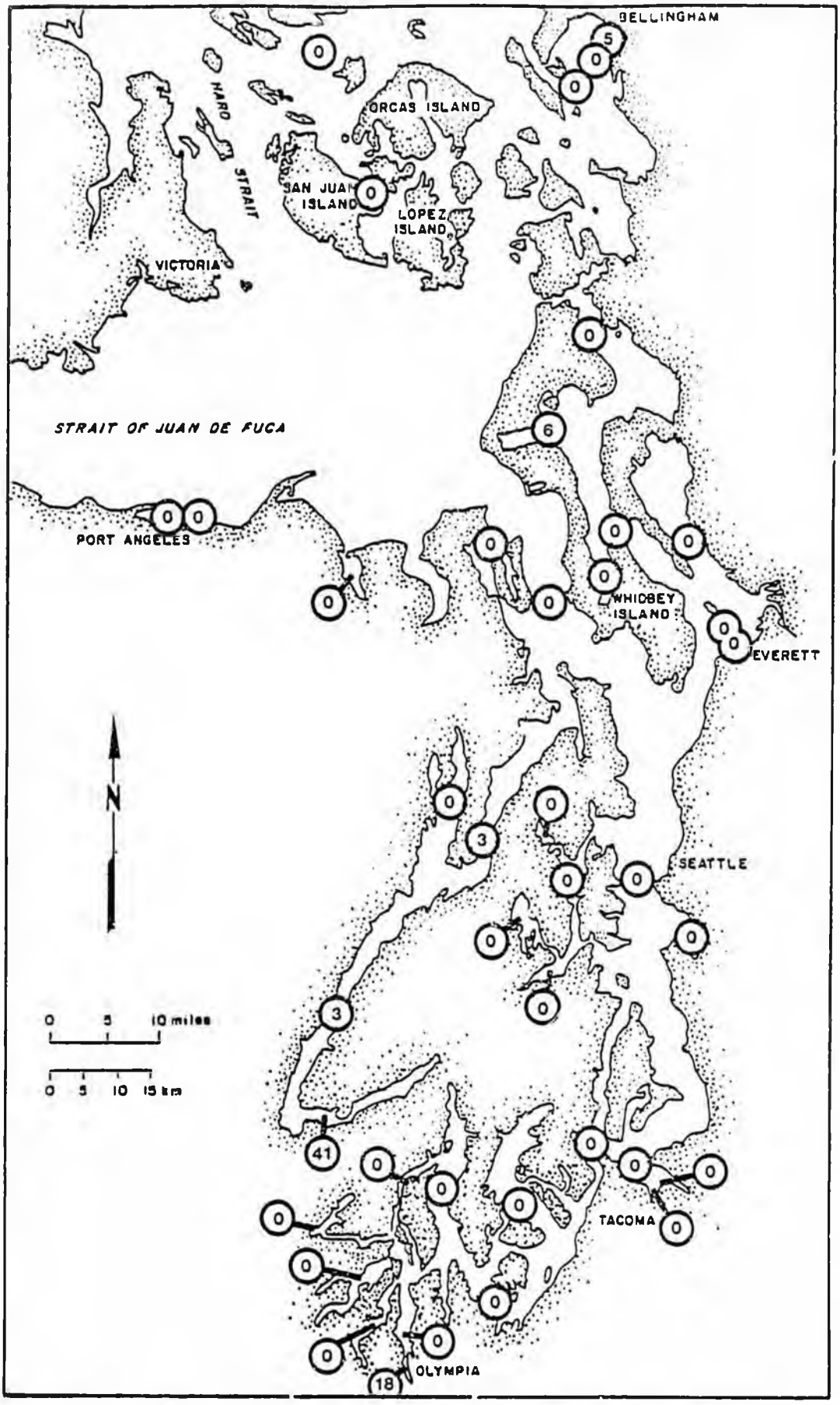

Figure 5. PERCENTAGE OF OBSERVATIONS WITH < 5 mg/ℓ OXYGEN AT A DEPTH OF 33 ft (n=35-40)

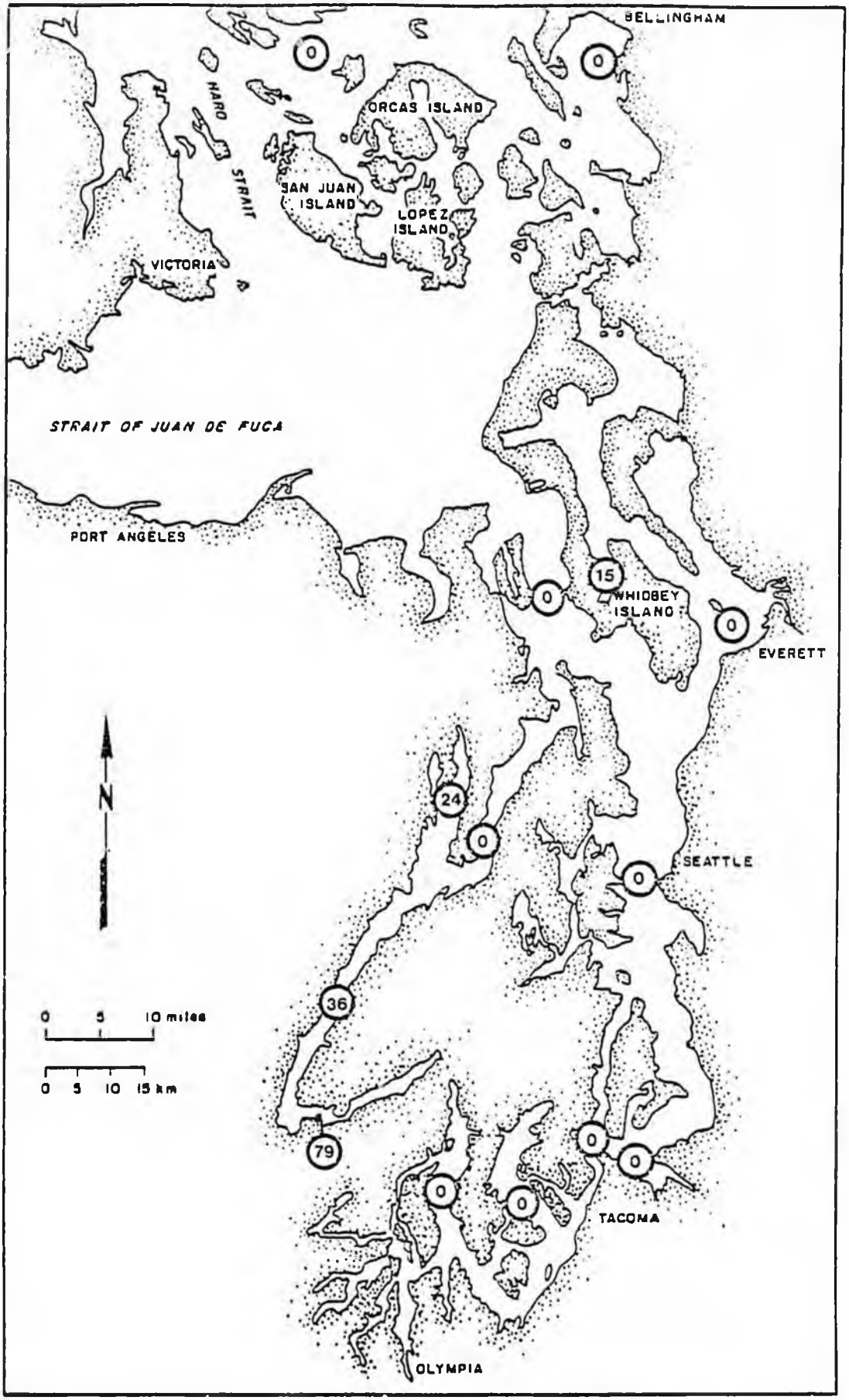

Figure 6. PERCENTAGE OF OBSERVATIONS WITH < 5 mg/ℓ OXYGEN AT A DEPTH OF 98 ft (n=35-40)

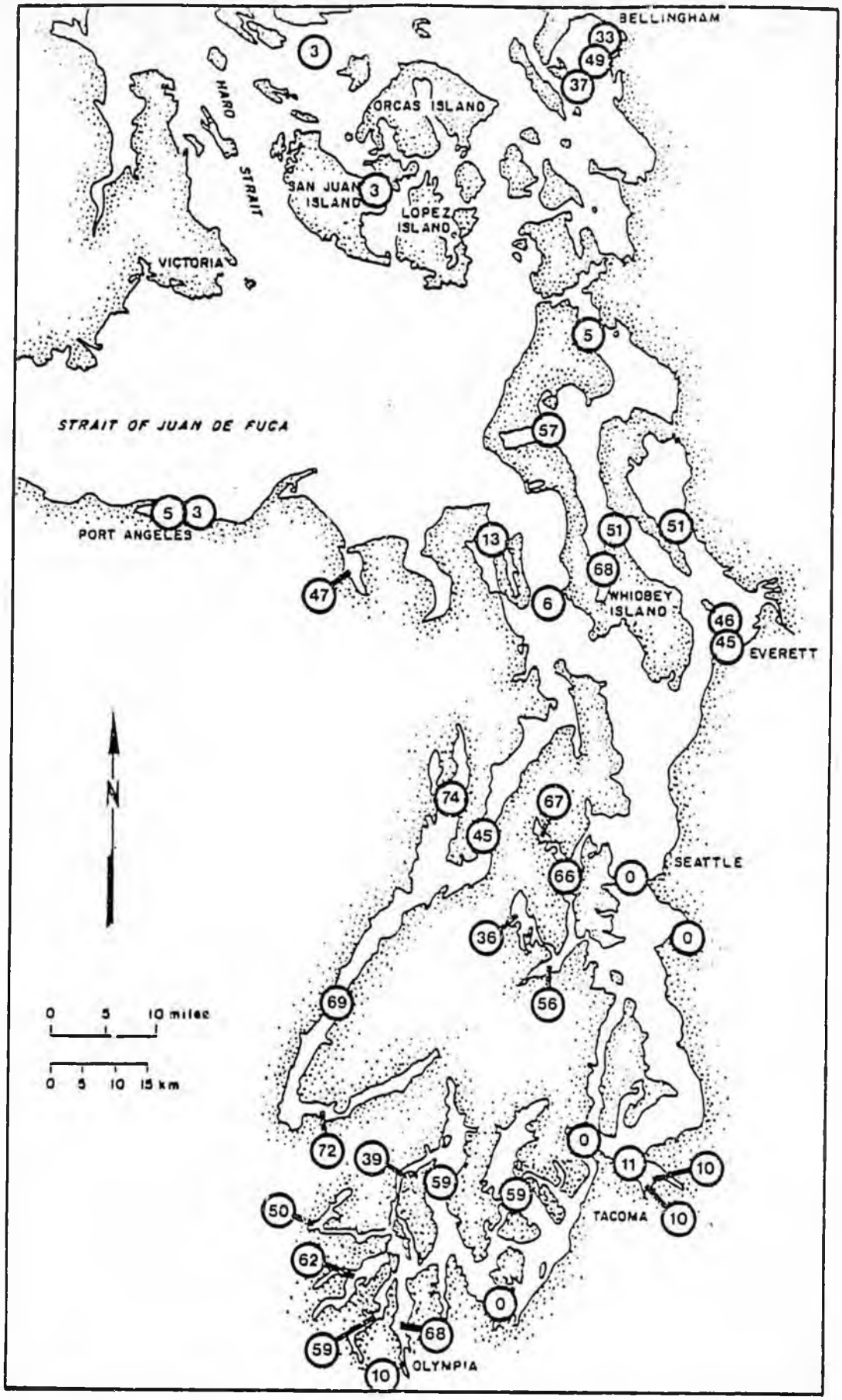

Figure 7. PERCENTAGE OF OBSERVATIONS WITH LESS THAN 0.1 mg/ℓ NITROGEN IN SURFACE WATERS (n=35-40)

no means exhaustive. Much additional data from site-specific studies could not be utilized because of the limited time available for development of the interim guidelines. As this site-specific information becomes available, there may be justification to either relax these guidelines or make them more restrictive on a case-by-case basis. Assessment of additional data through the programmatic EIS process may also result in changes in the intensity of culture permissible in any given area. Given that the interim guidelines are based on a limited data set, a deliberately conservative approach has been used in their formulation.

The maximum recommended intensity of culture in any given area has been based on the frequency of oxygen depletion and nitrogen limitation in that area. Budd Inlet, Holmes Harbor and Hood Canal south of Hazel Point appear to have chronic oxygen depletion at depth and persistent nitrogen limitation in surface waters. In view of the existing poor water quality in these areas, any application for culture should be given careful scrutiny as to the potential environmental consequences. Culture is not recommended in these areas unless the applicant can demonstrate: 1) respiration and BOD will not significantly reduce dissolved oxygen concentrations; and 2) input of additional nutrients will not affect the frequency, extent, intensity or duration of phytoplankton blooms. The exclusion of much of Hood Canal is generally consistent with Washington Department of Ecology policy pertaining to municipal wastewater discharges to this water body. Since 1972 Ecology has required secondary treatment of all wastewater discharges to Hood Canal, and currently requires tertiary treatment (Bollen, unpub.; M. Palko, WDOE, pers. comm.). Although Ecology policy applies to all of Hood Canal, persistent oxygen and nitrogen depletion in the area north of Hazel Point were not evident in the data set reviewed for the interim guidelines. This area, therefore, has not been excluded from net-pen culture under these guidelines.

Areas where oxygen depletion or nitrogen limitation were observed infrequently include the the southern Sound in the area of Anderson Island, Tacoma Narrows and Nisqually Reach, the Main Basin of Puget Sound, the Strait of Juan de Fuca, San Juan Islands and the Strait of Georgia. In these areas, phytoplankton productivity is generally governed by factors other than nitrogen availability; thus the input of additional nitrogen from net-pen culture should not

stimulate additional phytoplankton growth. In addition, dissolved oxygen concentrations are rarely, if ever, reduced to biologically limiting levels. Inputs of nutrients and BOD associated with net-pen operation probably would not have measurable biological consequences, although site-specific conditions should be assessed on a case-by-case basis. These areas are also likely to be well-flushed with little opportunity for a nutrient enriched or oxygen depleted water mass to maintain its integrity for an appreciable length of time. Therefore, the interim guidelines place no water quality-based restrictions on the number of net-pen culture operations in these areas. However, in order to avoid excessive culture in a very localized area, it is recommended that the density of culture not exceed 1 million pounds annual production per square nautical mile. More stringent productin limits may be imposed in some instances to protect water quality in specific embayments.

In the remainder of Puget Sound (most of the southern Sound, Port Orchard area, Whidbey Basin, northern Hood Canal, Sequim and Discovery Bays) recommended limits are placed on the maximum production of fish in any given region. The 1 million pounds annual production per square nautical mile applies in these areas as well. The approach taken in development of these guidelines allows net-pens to increase by a very small percentage the natural flux of nitrogen into the embayment that occurs with each tidal cycle. The natural tidal flux of nitrogen into the embayment is determined and net-pens are allowed to increase this flux by 1%. The weight of cultured fish that would produce this 1% increase is the maximum recommended production for the embayment. Each area of Puget Sound will have some capacity to assimilate additionial nitrogen input. This assimilative capacity will, however, vary in each area, and in no case is there a means to predict, a priori, what this assimilative capacity may be. Lacking these data, the 1% increase has been specified throughout Puget Sound as an increase of small enough magnitude that it should be adequately protective.

The sub-divisions in the water quality guidelines are shown in Figure 4 and in general are based on those of McLellan (1954). In most cases the boundaries used by McLellan have been adapted without modifications since there is clear geomorphologic and hydrographic justification (e.g., Eld Inlet, Dyes Inlet and Sequim Bay). A number of McLellan's subdivisions have been grouped if there

was no apparent hydrographic reason for maintaining their distinction (e.g., three of McLellan's subdivisions grouped to form the Port Orchard sub-division of the interim guidelines).

Determination of the natural tidal nitrogen flux in a given area begins with calculation of the "half-life" of water in the area:

$$0.50 = e^{(-\frac{\Delta v}{v} \cdot T \cdot R)}$$

where 0.50 represents removal of half the initial water volume, v is the intertidal volume, v is the total volume of the embayment, T is the number of tidal cycles and R is the refluxing coefficient (a value of 0.5 was used). The equation is solved for T and then this solution is substituted in:

$$E = \frac{0.5v}{T}$$

where E represents the effective intertidal volume. Multiplying E by the nitrogen concentration of the water (measured at the surface in these calculations) yields the natural tidal nitrogen flux. A 1% increase in this flux from net-pen culture is then calculated. A more detailed discussion of the approach can not be presented here, but further explanation of some elements can be found in URS (1986). The calculations for each embayment are presented in Table 5, and further details on the approach are presented in the notes which follow Table 5.

Table 5

CALCULATIONS FOR WATER QUALITY GUIDELINES[1]

Area	Description	Total Volume (10^{12} ℓ)	Δv/v	T	Effective Intertidal Volume (10^{11} ℓ)	Nitrogen Concentration (mg/ℓ)	Tidal Nitrogen Flux (10^{6} g)	Fish Production (10^{3} lbs/yr)
1	Eld Inlet	0.130	0.455	3.05	0.213	0.049	1.04	190
2	Totten and Skookum Inlets	0.168	0.536	2.59	0.324	0.032	1.04	190
3	Hammersley Inlet and Oakland Bay	0.0519	0.840	1.65	0.157	0.083	1.30	240
4	Henderson Inlet	0.0426	0.558	2.48	0.0859	0.049	0.421	80
5	Squaxin, Peale and Pickering Passage	0.481	0.309	4.49	0.236	0.070	3.75	680
6	Dana Passage and Case Inlet	2.22	0.143	9.69	1.15	0.047	5.41	980
7	Carr Inlet	4.44	0.085	16.4	1.35	0.046	6.21	1100
8	Sinclair Inlet	0.375	0.124	11.2	0.167	0.063	1.05	190
9	Dyes Inlet	0.204	0.313	4.43	0.230	0.11	2.53	460
10	Port Orchard	0.431	0.194	7.14	0.302	0.048	1.45	260
11	Liberty Bay	0.0387	0.577	2.40	0.0806	0.079	0.637	120
12	Possession Sound	12.6	0.039	35.6	1.77	0.10	17.7	3200
13	Port Susan	4.36	0.068	20.4	1.07	0.059	6.31	1100
14	Saratoga Passage	8.75	0.049	28.1	1.56	0.072	11.2	2000
15	Penn Cove and Crescent Harbor	0.829	0.207	6.70	0.619	0.065	4.02	730
16	Skagit Bay	0.881	0.407	3.40	1.30	0.25	32.5	5900
17	Northern Hood Canal	5.04	0.064	21.6	1.17	0.089	10.4	1900
18	Discovery Bay	0.465	0.067	20.7	0.112	0.267[2]	2.99	540
19	Sequim Bay	0.0845	0.128	9.98	0.0423	0.066	0.279	50

[1] See explanatory notes for Table 5 on following page.

[2] Ecology does not maintain a water quality monitoring station in Discovery Bay as they do in all other areas listed. Therefore the nitrogen concentration is based on the June 1986 survey of the bay by Rensel (unpub. data).

Explanatory notes for Table 5

- Tidal flushing is treated as an exponential decay process. "New" water is introduced into the embayment on the flood tide. The ebb tide removes some portion of the "new" water as well as some portion of the "old" water. Over successive tidal cycles the intertidal volume consists of a greater and greater proportion of "new" water and a lesser and lesser proportion of "old" water. The effective tidal volume has been calculated by determining the number of tidal cycles required to remove 50 percent of the "old" water, and then determining the average volume of "old" water removed per tide.

- The calculations allow for refluxing; some portion of the water entering on the flood tide is the same water which left on the previous ebb tide. The refluxing coefficient will vary with each embayment, but a generalized estimate has been established at 0.5 for all interim guideline calculations.

- Intertidal and total volumes have been determined from the data of McLellan (1954). This source also provides the precise geographic boundaries that define the sub-divisions.

- Nitrogen concentrations are based on mean surface concentrations at each Ecology water quality monitoring station during the summer months (June through September) over the past five years (1981 through 1985).

- The quantity of nitrogen released into the environment by net-pen culture has been based on data from Ackefors and Södergren (1985), Penczak et al. (1982) and Warrer-Hansen (1982). These authors reported values ranging from 83 to 100 g N/kg fish produced/yr. This rate of nitrogen production has been expressed as 0.055 g N/ lb. fish produced/tidal cycle in the interim guideline calculations.

5.0 MISCELLANEOUS GUIDELINES

1. Feed should be provided to the fish in a pelletized form. Unpelletized wet feed (i.e., minced fish or shellfish) should not be used in net-pen culture. The amount of uningested feed is several times greater for unpelletized wet feed than for either pelletized dry or moist feed (Ackefors and Södergren, 1985).

2. If predator control measures are necessary, non-lethal methods should be used against both bird and mammalian predators. The use of predator control measures is contingent upon receipt of appropriate National Marine Fisheries Service and U.S. Fish and Wildlife Service permits and must be conducted in accordance with permit restrictions and pertinent state requirements.

3. The use of tributyltin (TBT) as an antifouling agent should not be used on either the net-pens or the surrounding predator control nets. Studies have shown TBT to be exceptionally toxic to shellfish larvae (Hall and Pinkney, 1985). The National Marine Fisheries Service has also shown that fish held in TBT-treated nets tend to accumulate residues of the chemical in their tissues (Short and Thrower, 1986). Although no public health risk has been demonstrated for TBT residues in food fish, the cessation of its usage would appear prudent. It should be noted that there is currently no known use of TBT in Puget Sound net-pen culture. The use of other antifouling agents is not precluded under the guidelines, but proposed antifoulants should be evaluated by state agencies on a case-by-case basis. Antifoulant use should be reported to the Washington Department of Ecology.

4. Only antibiotics licensed by the Food and Drug Administration (FDA) for use in food fish shall be used. At the present time, FDA-approved antibiotics are limited to oxytetracycline (Terramycin), sulfamerizine and Romet 30. These substances should be used as sparingly as possible as required for disease treatment, or only on a short-term basis for disease prevention. Antibiotics should not be used prophylactically on a long-term basis. The WDF chief pathologist should be notified of antibiotic usage at time of treatment and should be provided information on the disease or condition being treated and the antibiotic used.

5. Transfer of live fish or their reproductive products within the state or their introduction into state waters shall be in accordance with applicable federal standards (Title 50) and state laws, rules, and policies (e.g., RCW 75.08.080, 75.08.285, 75.08.295; WAC 220-20-039, 220-20-040, 220-69-300, 220-76-015; WDF Policy 82-1). Depending on the point of origin and the species being transferred or introduced, the culturist may be required to obtain a transfer or importation permit, provide a Fish Health Inspection Report, provide a health history of the stock and hatchery, surface disinfect eggs, or hold fish in a quarantine facility. The state importation and transfer requirements may be modified in the near future by rules currently being adopted under the Aquaculture Disease Control Law (RCW 75.58).

6. Applications for culture must be accompanied by an operations plan which is to be submitted to and approved by DNR. This plan should include projections for:

- Improvements at site (e.g., pens, log booms) and their relationship to natural features (e.g. bathymetry, shorelines);
- Pen number, size and configuration;
- Schedule of development and maintenance;
- Fish species cultured;
- Size at harvest;
- Annual production;
- Pounds of fish on hand throughout the year;
- Average and maximum stocking density;
- Source of eggs and smolts;
- Feed type used;
- Method of feeding;
- Use of chemicals (e.g., antibiotics);
- Predator control measures;
- Antifoulant use.

6.0 ENVIRONMENTAL SURVEYS

Before a site can be developed for net-pen culture, an applicant must acquire numerous local, state, and federal permits. The permits, licenses, or approvals generally required include a Substantial Development Permit (local), SEPA (local), Aquaculture License and Permit (WDF), Seed Stock Importation Permit (WDF), Hydraulics Project Approval (WDF), Marine Lands Lease (DNR), Coastal Zone Certification (WDOE), Shoreline Conditional Use or Variance (WDOE), and Section 10/404 Permit (COE).

Many of these permits address water or land use conflicts which range far beyond the biological effects considered by these guidelines. However, the effect of development on the marine environment is a major consideration, therefore certain site-specific information is required for permit review. In order to assess the suitability of a site for net-pen culture and to evaluate the extent of environmental effects after initiation of culture, several environmental surveys should be performed at net-pen operations. These surveys include a site characterization survey, a baseline survey, and annual monitoring. The components of each of these surveys are summarized in Table 6 and discussed in detail in Sections 6.1 through 6.3.

6.1 SITE CHARACTERIZATION SURVEY

A site characterization survey should be performed prior to permit application. This survey would serve two principal functions. The primary purpose would be to provide state and local governments with the information necessary to evaluate the potential extent of environmental effects. Although not its primary intent, the site characterization survey will also provide the applicant with information critical to determining the suitability of the site for culture. A site characterization survey is composed of four principal elements: (1) initial consultation with state and local government; (2) a bathymetric survey; (3) a hydrographic survey; and (4) a diver survey.

CONSULATION WITH STATE AND LOCAL GOVERNMENT

After selecting a potential culture site, but prior to performing the site characterization field survey, the prospective applicant should contact state

Table 6

RECOMMENDED ENVIRONMENTAL SURVEYS FOR
PUGET SOUND NET-PEN CULTURE

	Site Characterization Survey	Baseline Survey	Annual Monitoring
Class I Facilities	• Recommended consultation with state and local authorities • Bathymetric survey • Hydrographic survey - Current velocity and direction • Diver survey	• None	• None
Class II Facilities	• Recommended consultation with state and local authorities • Bathymetric survey • Hydrographic survey - Current velocity and direction • Diver survey	• None	• Benthic survey - Diver survey
Class III Facilities	• Recommended consultation with state and local authorities • Bathymetric survey • Hydrographic survey - Current velocity and direction - Drogue tracking - Vertical hydrographic profiling • Diver survey	• Sediment chemistry sampling • Benthic infauna sampling	• Benthic survey[1] - Diver survey - Sediment chemistry - Benthic infauna • Water quality sampling • Current velocity and direction

[1] Replaced by baseline survey during first year of facility operation

resource management agencies (Departments of Ecology, Fisheries, Natural Resources, Game and Parks and Recreation), federal and local officials (the shoreline administrator). Initial contact should be made with the Department of Agriculture, and this agency will then facilitate consultations with all other appropriate state agencies. These consultations cannot be required of the applicant, but are highly recommended to provide state and local officials with an opportunity to comment on the potential site at an early stage in the planning process. Resource management agencies may be able to identify nearby habitats of special significance (Section 3.0) or existing conditions (e.g., water quality problems) that would make the site unacceptable for development. County officials may be able to identify major use conflicts that would significantly reduce the probability of permit approval. Other government agencies or tribes may also need to be contacted if the potential site is likely to affect land or resources under their jurisdiction.

One of the principal purposes of these consultations is to determine the proximity of the potential site to habitats of special significance. WDF staff may be aware of nearby critical spawning areas or major shellfish beds. WDG staff should be able to identify haulout areas for seals and sea lions, seabird nesting sites and colonies, and critical feeding areas and migration routes for both seabirds and marine mammals. WDG maintains a Wildlife Data System which can be accessed to obtain informaiton on endangered, threatened, sensitive, or monitor species.

State and local government officials should be given an opportunity to comment on the proposed field surveys (i.e., bathymetric, hydrographic and diver surveys). The survey content should be determined in consultation with those agencies having permit authority. The survey protocol described below is intended to provide the information necessary for permit review by a standardized and cost-effective method. This protocol should be adequate in most instances, but there may be certain site-specific concerns that would require minor modification of the generic protocol. For example, the diver survey may be modified to devote particular attention to areas of special concern. Departure from this protocol should be allowed only with strong justification, and modifications should generally result in the collection of more, rather than less, data.

BATHYMETRIC SURVEY

A bathymetric survey should be performed in order to apply the guidelines pertaining to depth and current (Section 2.0) and to identify the presence of any bathymetric features which might affect bottom accumulation of excess feed and fecal material (e.g., depressions). The area of concern is the seabed directly under the net-pens and within 300 feet of the net-pen perimeter. Multiple fathometer transects should be established with a density and spacing so as to adequately characterize the bathymetry under and around the pens. The position of the transects will depend upon the intended pen configuration. Figure 8 provides a recommended survey design given a rectangular net-pen configuration. The bathymetric survey report should note the period during the tidal cycle when the survey was made, and it should relate the measured depths to MLLW (mean lower low water).

HYDROGRAPHIC SURVEY

Information on current velocities and directions is necessary to apply the depth and current guidelines (Section 2.0) and to predict the dilution and dispersion of excess feed and wastes. The hydrographic survey should include: (1) current velocity and direction; (2) drogue tracking; and (3) vertical profiles of temperature, salinity and dissolved oxygen. Class I and II facilities, as defined in Section 2.0, should not be required to perform the drogue tracking and vertical hydrographic profiling studies because of their small size and reduced potential for water quality degradation.

Current velocity and direction - Current velocity and direction should be monitored at the center of the potential net-pen site. Both near-surface and mid-depth measurements should be made. The near surface measurements should be taken at a depth of 6 feet (corresponding to one-half the depth of typical net-pens). The mid-depth measurements should be taken mid-way between the maximum depth of the proposed net-pens and the sea floor. At both depths current velocity and direction should be monitored throughout one complete tidal cycle (one flood tide, one ebb tide). A minimum of ten measurements evenly spaced throughout the tidal cycle should be made at each depth. For purposes of applying the depth and current guidelines, "mean current" is determined by an arithmetic average of these ten or more measurements. The measurements

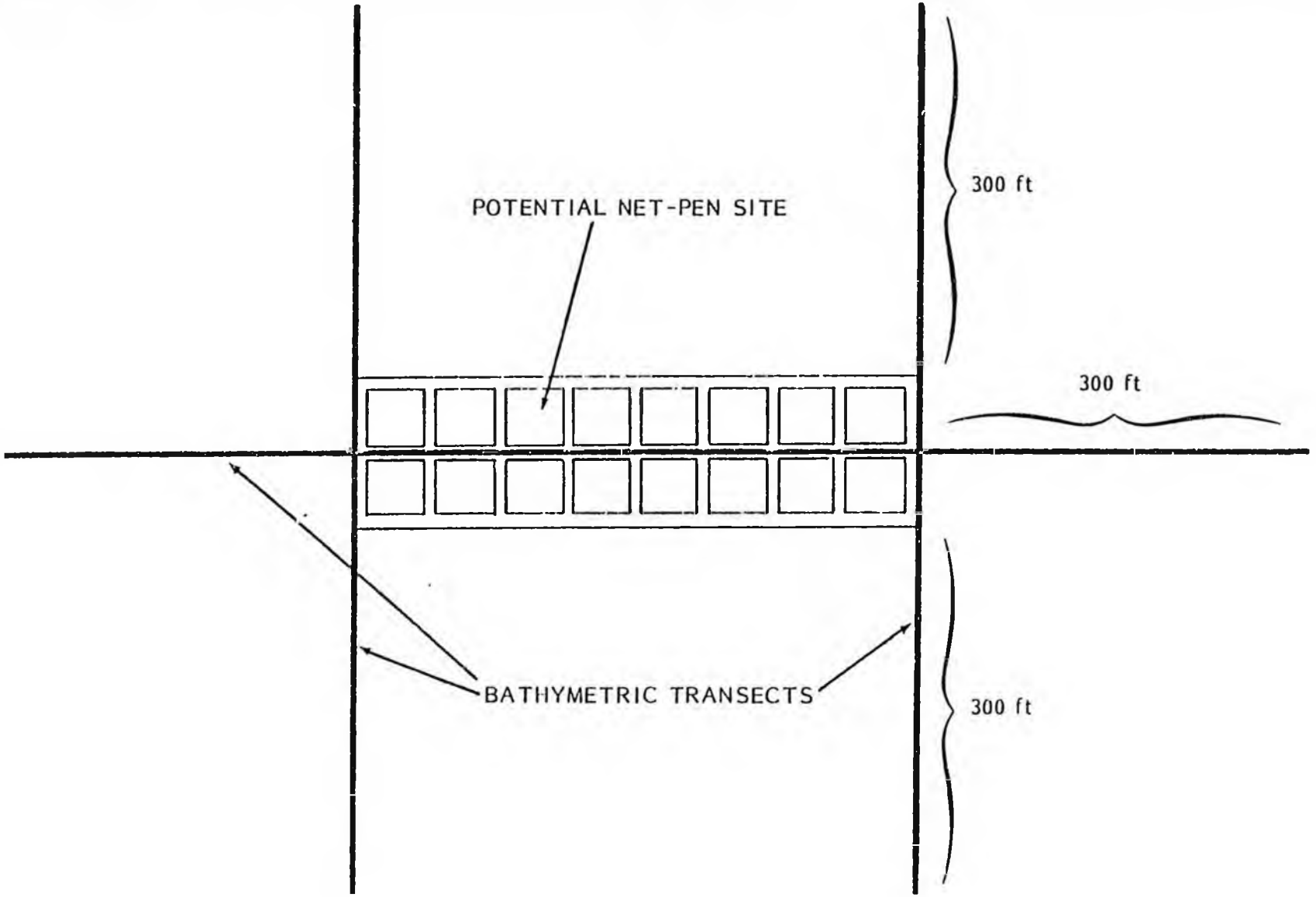

Figure 8. RECOMMENDED BATHYMETRIC SURVEY TRANSECTS FOR SITE CHARACTERIZATION

should be made during a period of "average" tides, and should not be representative of either extreme neap or extreme spring tides. The report of results should note any conditions (e.g., weather, extreme tidal range) that might make the data unrepresentative of "typical" conditions. If the prospective applicant believes the data do not reflect "typical" tidal currents and direction, resampling may be done, but all data collected should be used in determining a mean velocity.

Drogue tracking - Drogue tracking should be performed to estimate the potential fate of particulate material, and the potential for eddy circulation (i.e., the same parcel of water is repeatedly cycled through the area of the net-pen). Two drogues should be released from the center of the potential net-pen site. One should be set at a depth of 6 feet. The second drogue should be set at a depth mid-way between the bottom of the potential net-pens and the sea floor. The trajectory of these drogues should be followed for as long as daylight permits, and not less than 8 hours. The drogues may be reset at the original release site during this 8-hour period if they are transported beyond a practical tracking range.

Salinity, temperature, and dissolved oxygen profiles - Vertical profiles of salinity, temperature, and dissolved oxygen may be used to evaluate the intensity of water column stratification, a factor important both from the standpoints of environmental protection and the health of the cultured fish. Prospective applicants should provide any existing information on the site from such sources as the Ecology water quality monitoring network, Collias, et al. (1974), Friebertshauser, et al. (1971) and other site-specific studies. The prospective applicant should also take measurements of temperature, salinity and dissolved oxygen throughout the water column at the center of the potential site during the hydrographic survey. Measurements should be made at depths of 1, 10, 20, 30 feet, and at 30 foot intervals thereafter. The deepest measurement should be made 3 feet above the sea floor.

DIVER SURVEY

The diver survey is primarily intended to determine if habitats of special significance (Section 3.0) are present in the vicinity. Since many of the habitats of special significance would be readily visible only in the spring

and summer months (e.g. geoduck beds), the diver survey should be performed during April through September. The requirements for a diver survey during site characterization depend on the water depths in the vicinity of the site. No diver survey should be required if the area within 300 feet of the potential site is greater than 75 feet deep. A diver survey is required if water depth (MLLW) at the site or within a 300 foot radius of the potential location is less than or equal to 75 feet. If any portion of the area within 300 feet of the potential net-pens is in depths of 75 feet or less, it is potentially subject to accumulation of feed and fecal material, and therefore should be surveyed by a diver, even if the net-pens will be located over a site that is deeper than 75 feet. The design of the diver survey should be formulated in consultation with state and local government officials. WDF will take the lead role for the state in design of this survey. The number and spacing of the transects will depend on the particular site and should be established during these consultations. As a general guide, if all or most of the area is 75 feet or shallower, then 3 to 5 transects, each 200 feet long, should be surveyed per acre of pen. A larger pen complex would require additional transects; fewer transects would be required if most of the area is in depths greater than 75 feet. A diver should traverse the area making observations on substrate type, presence/absence of Beggiatoa mats and the density of geoducks and hardshell clams, eelgrass, kelp, demersal fish, crabs, and other large invertebrates. If eelgrass is present, counts of turion density in 0.25 m^2 quadrats are required to determine compliance with guidelines pertaining to habitats of special significance. Geoduck and hardshell clam density should be estimated by counts along transects. The abundance of other invertebrates and fishes should be noted by descriptors such as "rare," "common," etc.

REPORT PREPARATION

The results of the bathymetric, hydrographic and diver surveys should be assembled in a site characterization report to be submitted to Departments of Ecology, Fisheries, Game, Natural Resources and the county shoreline administrator. The site characterization report should include a figure of the proposed net-pen site in plan view at a scale of 200 feet or less to the inch. The figure should show nearby landmarks, the size and configuration of the proposed net-pens, bathymetric contours and the position of the diver transects. The report should also include identification of habitats of special

significance in the vicinity as determined in consultation with state agencies and the applicant's own surveys. The report should be a summary, analysis and interpretation of the data. The report should include, for example, a sectional view of the bathymetric profiles. A figure of the drogue trajectories should be also be included. The benthic survey should be described in narrative form with quantitative data provided when required or available.

6.2 BASELINE SURVEY

The baseline survey is intended to characterize bottom conditions at the net-pen site, before they could potentially be altered by culture activities. Sediment chemistry and benthic infaunal sampling were not included in the site characterization survey because of an anticipated uncertainty in the precise net-pen location and the difficulty of relocating samples without the aid of a moored net-pen as a position reference. Therefore, a baseline benthic survey should be required after emplacement of the net-pens, but before stocking the pens with fish. This survey should include sediment chemistry and benthic infauna sampling and may also include a diver survey if required by state resource management agencies or the county shoreline administrator. The baseline survey should be required for Class III operations, as defined in Section 2.0, but should not be required of Class I and II operations.

Stations should be established along a transect on the "downcurrent" side of the pens as determined by the prevailing currents (as measured at the mid-depth station in the site characterization survey). Stations should be established along this transect beginning directly under the perimeter of the net-pens and extending away from the net-pens at distances of 20, 50, 100, and 200 feet in the direction of prevailing currents. Each site should be sampled by three replicate diver cores or three replicate grab or box corer samples from which sub-cores are removed. Cores should be collected for analysis of total organic carbon, total Kjeldahl nitrogen and grain size distribution (median phi, percent gravel, sand, silt/clay). Cores should be inserted to a depth of two inches in the sediment. Care should be taken to insure that the core is representative of the undisturbed sediment column. Transparent cores should be used so that the redox potential discontinuity (RPD) depth can be noted and recorded. The position of the RPD is reflected by change in sedi-

ment color form brown to black. Each core should be homogenized for analysis, but the replicates should be treated as distinct samples and not pooled prior to analysis.

Benthic infauna samples may be collected either by a diver using a core sampler having an area of at least 0.01 m^2 or by a grab or box corer having an area of at least 0.1 m^2. The same stations sampled for sediment chemistry (0, 20, 50, 100 and 200 feet from the net-pens) should be sampled for benthic infauna. Three replicate samples should be collected at each site. The same grab/box corer samples used for sediment chemistry should be used for benthic infaunal analysis provided no more than one-quarter of the surface of each sample has been removed for sediment chemistry sampling. Each benthic infauna sample should be sieved on a 0.5 mm screen or nested 1.0 and 0.5 mm screens. All macrofaunal organisms retained on the screen(s) should be identified to the lowest practical taxonomic level, generally species.

The results of the baseline benthic survey should be assembled in a report consistent with the report guidelines provided for the site characterization survey (Section 6.1) and the annual monitoring (Section 6.3). The baseline report should be submitted to DNR, and this agency will take responsibility for distribution to other appropriate state and local authorities.

6.3 ANNUAL MONITORING

The annual monitoring program is designed to serve two purposes. First, it is intended to monitor potential changes in water and sediment quality resulting from culture acitivities. Secondly, it is intended as a data gathering effort in support of the programmatic EIS. As additional data are obtained on the environmental effects of salmon net-pen culture, the annual monitoring protocol may be substantially revised. It is also possible that monitoring at some culture sites may be curtailed or eliminated entirely if little or no measurable effect on environmental quality is found after several years of operation. The determination to curtail or eliminate monitoring at any site will be made after agency review of survey results. However, no schedule for "phasing out" of the monitoring program at any site has been provided at this time since the interim guidelines are intended only for short-term application.

The annual monitoring progam consists of three principal elements: (1) a benthic survey; (2) water quality sampling; and (3) a hydrographic survey. Class I facilities should be exempted from annual monitoring. Class II facilities should be required to conduct only a diver survey.

BENTHIC SURVEY

The benthic survey is intended to assess the extent of solids accumulation on the bottom in the vicinity of the culture operation and the biological effect of this accumulation. The survey consists of diver observations and sampling of sediment chemistry and benthic infauna. During the first year of facility operation, the benthic sampling conducted during the baseline survey should suffice in place of the annual monitoring benthic survey. Thereafter, the benthic survey as described below should be conducted annually.

Diver observations should be made if the net-pen or any portion of the bottom within 300 feet of the site is at a water depth of 75 feet or less. Four transects, each at least 200 feet in length, should be established as illustrated in Figure 9. The transects should be extended if feed or feces accumulation is visible 200 feet from the pens. Additional transects may be required to survey habitats or resources of special concern. Some transects may be shortened or eliminated entirely if they would require the diver to operate in depths greater than 75 feet. If any portion of the area within 300 feet of the net-pens is in depths of 75 feet or less, it should be surveyed even if the net-pens are located in depths greater than 75 feet.

One of the principal objectives of the diver survey is to document the depth and lateral extent of solids accumulation. The diver should estimate the depth of feed and feces accumulation at 20-foot intervals along each transect, and should note the greatest distance from the net-pens that visible accumulation is present. The diver should also note the presence/absence of Beggiatoa mats and estimate densities of demersal fish, crabs and other invertebrates. The annual monitoring benthic survey for Class III operations should also include collection of sediment chemistry and benthic infauna samples. The station location and sampling protocol should be exactly as described in the baseline benthic survey (Section 6.2).

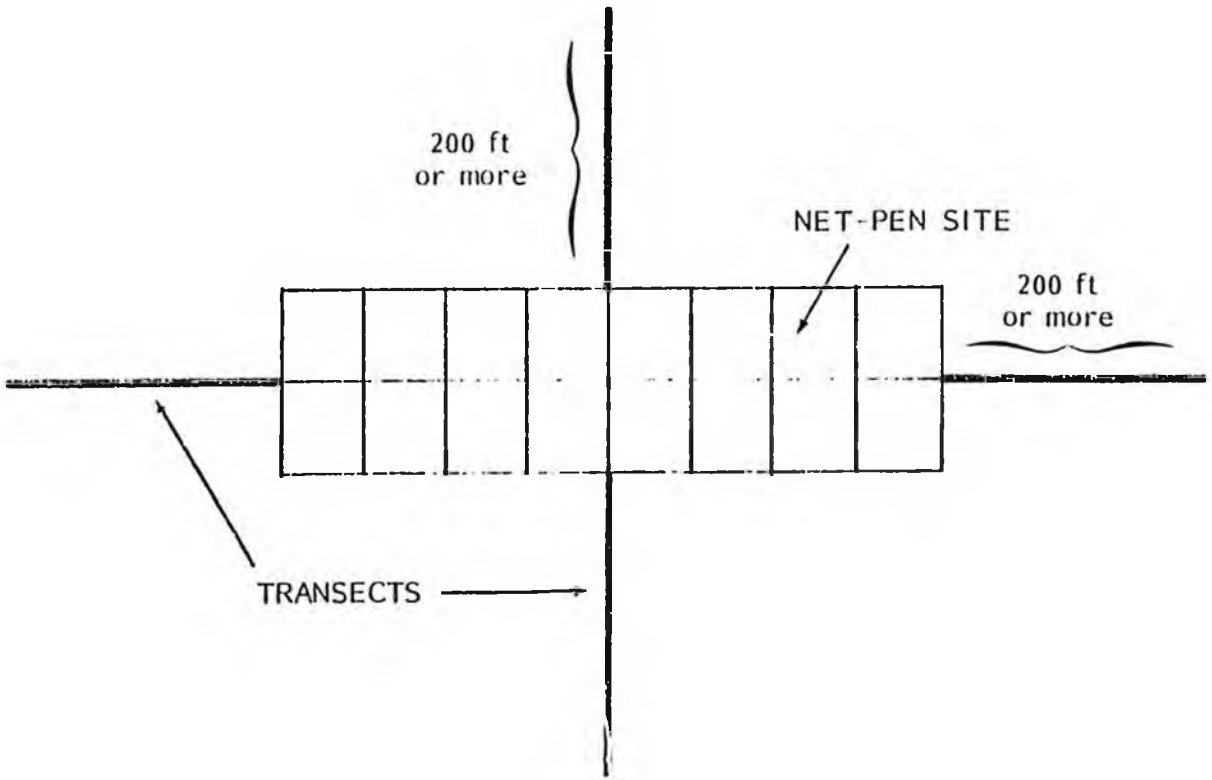

Figure 9. RECOMMENDED DIVER TRANSECTS DURING THE ANNUAL MONITORING SURVEY

WATER QUALITY SURVEY

Water quality sampling is intended to document the effect of culture activity on dissolved oxygen and nutrients in the water passing through the culture structure. The survey should be conducted in July, August or September of each year that the facility is in operation. Sampling in July through September is recommended since it is during this period that dissolved oxygen reductions or nutrient enrichment are of greatest concern. Three stations should be sampled: 100 feet upcurrent of the net-pens; 20 feet downcurrent; and 100 feet downcurrent. The precise location of the stations will depend on net-pen configuration, but they should be located so as to monitor the water passing through the greatest possible number of net-pens. Sampling should be conducted within one hour of slack tide. Three replicates should be taken at each station at a depth mid-way between the water surface and the bottom of the net-pens. Samples should be analyzed for the following parameters: dissolved oxygen; temperature; salinity; pH; ammonia; and nitrite/nitrate (either separate or combined). The concentration of unionized ammonia should also be calculated.

HYDROGRAPHIC SURVEY

Current velocity and direction should be measured at the depth at which the water quality samples are taken. A single measurement should be made 20 feet downcurrent of the net-pens concurrently with collection of the water quality sample from this station. Loading estimates (g/kg fish/day) should be calculated for ammonia and nitrite/nitrate based on: (1) the net increase in concentration between the upcurrent station and the 20 foot downcurrent station; (2) the current velocity 20 feet downcurrent; (3) the cross-sectional area of the net-pen complex; and (4) the weight of fish on hand at the time of the water quality survey.

REPORT PREPARATION

The comments made regarding the site characterization report apply here as well. Specifically, analysis and interpretation of the data should be provided, not merely presentation of the raw data. However, the raw data should be provided in appendices so as to permit independent assessment of conclusions.

In addition to a description of methods and data analysis and interpretation, the annual monitoring report should also include information on operational practices over the past year. This information should include:

- General description of facility (species cultured, size at which fish will be marketed, etc.).
- Size, number and configuration of net-pens at time of sampling.
- Significant changes in size, number and configuration of net-pens over the previous year.
- Annual production (pounds).
- Estimated weight of fish on hand during survey (pounds).
- Stocking density (average and range) (pounds/ft^3).
- Type of feed used and feeding method employed.
- Types of antibiotics used and frequency of usage over the past year.
- Interactions with birds and marine mammals and a summary of types and frequency of predator control measures used.
- Types of antifoulants employed and frequency of net treatment.

The annual monitoring report should be submitted to DNR and this agency will take responsibility for distribution to other appropriate state and local authorities.

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THE RESOURCES AGENCY OF CALIFORNIA
Department of Fish and Game
1416 Ninth Street
Sacramento, California 95814

MARINE RESOURCES - INFORMATION LEAFLET[1/]
REGULATIONS GOVERNING MARINE AQUACULTURE

Registration Requirements

All facilities used for the controlled growing and harvesting of aquatic plants and animals in the State, whether on public or private lands, must be registered annually. All forms of marine fish and shellfish that are approved by the Fish and Game Commission may be cultivated. Registration forms are issued by the Department of Fish and Game under provisions of the Fish and Game Code and regulations of the Fish and Game Commission. Pertinent regulations are cited in this leaflet.

The annual aquaculture registration fee for the period January 1 - December 31, or portion thereof, is [redacted]$150.

How to Register Aquaculture Facilities

A person desiring to propagate and rear marine life should make application on Form FG 750 attached to the back of this leaflet. Additional copies may be obtained from the Department. Common and scientific names are to be used when listing species to be cultivated. Examples are listed on page 2.

Applications, together with the required fee, should be transmitted to the Marine Regional office nearest you. The mailing addresses of the five offices are listed below:

California Department of Fish and Game
Marine Resources Region
245 W. Broadway
Long Beach, CA 90802

California Department of Fish and Game
Marine Resources Region
2201 Garden Road
Monterey, CA 93940

California Department of Fish and Game
Marine Resources Region
411 Burgess Drive
Menlo Park, CA 94025

California Department of Fish and Game
Marine Resources Region
619 2nd Street
Eureka, CA 95501

California Department of Fish and Game
Marine Resources Region
State Building, Room 6042
1350 Front Street
San Diego, CA 92101

1/ Prepared by Emil J. Smith, Jr., July 1974; revised June 1979, January 1982, October 1983, August 1985.

An application for renewal, together with the required fee, should be transmitted to the Department of Fish and Game, Licenses and Revenue Branch, 3211 S Street, Sacramento, CA 95816, prior to the expiration of your current license. Possession of a valid aquaculture registration is a condition of all aquaculture leases.

Examples of Common and Scientific Names for Plants and Animals that Could be Propagated by Registered Marine Aquaculturists are:

Nori	Porphyra tenerima
Agar	Gelidium sp.
Prawn, Giant Freshwater	Macrobrachium rosenbergii
Prawn, Spot	Pandalus platyceros
Prawn, Japanese	Penaeus japonicas
Lobster, Eastern	Homarus americanus
Lobster, Spiny	Panulirus interruptus
Crab, Dungeness	Cancer magister
Mussel, Bay	Mytilus edulis
Mussel, California Sea	Mytilus californianus
Scallop, Japanese Bay	Patinopectin yessoensis
Scallop, Speckled	Argopectin aequisulcatus
Scallop, Rock	Hinnites giganticus
Oyster, Native	Ostrea lurida
Oyster, European Flat	Ostrea edulis
Oyster, Portuguese	Crassostrea angulata
Oyster, Australian Rock	Crassostrea commercialis
Oyster, Giant Pacific	Crassostrea gigas
Oyster, Eastern	Crassostrea virginica
Clam, Pismo	Tivela stultorun
Chione, Mexican	Chione cortezi
Clam, Common Littleneck	Venerupis staminea
Clam, Japanese Littleneck	Venerupis japonica
Clam, Japanese Red	Anadara broughtoni
Clam, Northern Quahog	Mercenaria mercenaria
Clam, Softshell	Mya arenaria
Abalone, Pink	Haliotis corrugata
Abalone, Japanese	Haliotis discus hannai
Abalone, Green	Haliotis fulgens
Abalone, Giant	Haliotis gigantea
Abalone, Red	Haliotis rufescens
Abalone, White	Haliotis sorenseni
Sablefish	Anoplopoma fimbria
Yellowtail	Seriola lalandei
Pompano	Trichinotus carolinus
White Seabass	Atractoscion nobilis
Orangemouth Corvina	Cynoscion xanthulus
Mullet	Mugil cephalus
Yellowfin Tuna	Thunnus albacares
Bluefin Tuna	Thunnus thynnus

GENERAL INFORMATION FOR APPLICANTS

Inspection of Marine Aquaculture Facilities

Before a marine aquaculture facility is first registered, an inspection will be made of the culture area. A person from your Regional Office will make an appointment with you. It is not always possible to make special trips immediately for such inspections. They are usually made on a scheduled trip into the area.

Sources of Fish and Shellfish

Marine fish or shellfish stock for cultivation or breeding purposes may be obtained from licensed commercial fishermen, the Department of Fish and Game, registered aquaculturists or by the registered aquaculturist under the provisions of Section 15301(b) of the Fish and Game Code, page 30 and Section 243, Title 14, California Administrative Code, page 54. For information regarding sources of breeding stock, please contact the Marine Resources Branch, 1416 9th Street, Sacramento, California 95814.

Lease of State-Owned Tidelands

The use of state-owned tidelands for aquaculture purposes is regulated by the Fish and Game Commission under authority delegated by the Fish and Game Code. A person desiring to lease state tidelands should make application to the Commission on Form "A" attached to the back of this leaflet. The lease form contains instructions for completion of the application. Additional copies may be obtained from the Department.

Private Lands

Persons operating on private tidelands are required to complete an aquaculture agreement with the state. Application form "A" in this leaflet may be used for that purpose.

Sale of Marine Fish and Shellfish

Marine fish and shellfish cultivated under the provisions of an aquaculture registration may be sold irrespective of seasons, bag limits, or angling license provisions. Some of the laws and regulations governing the sale of aquaculture products are cited in this leaflet.

Importation into California

Written permission is required to import live fish, shellfish, and aquatic plants into this State, Fish and Game Code Section 15600, page 36. For specific instructions regarding shellfish, please refer to Section 236.1 of the Fish and Game Commission regulations page 44. For additional laws or questions relating to marine aquaculture activities or the importation of fish or aquatic plants, please contact the Regional Marine Office nearest you.

Aquaculture Sanitary Requirements

Marine fish and shellfish cultivated under the provisions of an aquaculture registration may only be grown, processed, and marketed for human consumption under the laws established by Sections 28500-28519.5 of the State Health and Safety Code, pages 13 to 20. The provisions of the Health and Safety Code are enforced by the State Department of Health Services (SDHS).

All shellfish harvested commercially for human consumption in California must come from growing water which meets certain standards of cleanliness. These standards set maximum allowable levels for bacteria in the water, as well as for other contaminants such as pesticides, toxic organic compounds, and heavy metals. Within the Department of Health Services, the Sanitary Engineering Branch is responsible for approving shellfish growing-water quality.

During the evaluation of a shellfish growing area, prior to issuance or denial of a growing water certificate, considerable weight is placed on bacterial data reflecting "total" and "fecal" coliform levels. The watershed or source of water as a whole is also considered, and an attempt is also made to determine the hazards associated with all actual and potential sources of pollution which might impinge on the growing waters. This includes such things as sewage treatment plants, areas of urban runoff, industrial plants, agricultural operations, and the like.

Although the Sanitary Engineering Branch must study and decide on the acceptability of all commercial shellfishing areas, commercial operators are required to provide preliminary and on-going water-quality data to the Agency as deemed necessary to evaluate the area and to ensure year-round protection of the shellfish consumer. The amount of sampling required of the operator depends on the location and susceptibility of the harvesting sites to pollution problems.

The Department of Health Services', Food and Drug Branch is responsible for approving facilities, equipment, and procedures used for handling, shucking, storing, packaging and shipping of fish and shellfish after harvest. That Branch also enforces meat quality standards, and sets requirements for proper packaging and labeling of all fish and shellfish moved in commerce.

To facilitate consideration of your aquaculture proposal by SDHS, please include a description of your plans and map showing the locations of your proposed harvesting areas on your permit application forms. Also, include a description of the type and location of any facilities to be used for handling, packaging, or storing the aquaculture products within the State.

If you have any questions concerning the procedures followed by the State Department of Health Services in permitting commercial aquaculture operations, please contact:

For Growing Area Certification

Mr. Douglas W. Price
Department of Health Services
Sanitary Engineering Branch
50 D Street, Suite 205
Santa Rosa, California 95404
(707) 576-2145

For Processing and Marketing Information

Mr. A. L. Bloch
Department of Health Services
Food and Drug Branch
714 "P" Street
Sacramento, California 95814
(916) 445-2263

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AQUACULTURE PERIODICALS

AQUACULTURE
Associated Scientific Publishers
P.O. Box 211
1000 AE Amsterdam
The Netherlands

AQUACULTURE DIGEST
9434 Kearny Mesa Road
San Diego, California 92126

AQUACULTURE ENGINEERING
Elsevier Science Publishers
52 Vanderbilt Avenue
New York, New York 10017

AQUACULTURE MAGAZINE
P.O. Box 2329
Asheville, North Carolina 28802

CALIFORNIA AQUACULTURE
University of California
Cooperative Extension
Division of Agriculture Sciences
1422 Harbour Way South
Richmond, CA 94804-3688

FISH FARMER INTERNATIONAL REVIEW
Agriculture Press and Const., Ltd.
1 Throwley Way
Sutton, Surrey SM1 1QQ
England

FISH FARMING INTERNATIONAL
Highway Publication, Ltd.
London, England

JOURNAL OF THE WORLD MARICULTURE SOC.
World Mariculture Society
177 Pleasant Hall
Division of Continuing Education
Louisiana State University
Baton Rouge, Louisiana 70803

JOURNAL OF SHELLFISH RESEARCH
National Shellfisheries Association
P.O. Box 12559
Charleston, SC 29412

CALIFORNIA GOVERNMENT CODE SECTIONS REGULATING THE PROPAGATION AND HARVESTING OF MARINE LIFE AND THE PURIFICATION OF MOLLUSKS

The following section of the Code of Civil Procedure provides that:

1822.58 A warrant may be issued under the requirements of this title to authorize personnel of the Department of Fish and Game to conduct inspections of locations where fish amphibia, or aquatic plants are held or stored under Division 12 (commencing with Section 15000) of the Fish and Game Code.

The following section of the Food and Agriculture Code provides that:

23.5 The commercial production of fish propagated and raised by a registered aquaculturist pursuant to Section 15101 of the Fish and Game Code in the state is a growing industry and provides a healthful and nutritious food product, and, as a commercial operation, utilizes management, land, water, and feed as do other agricultural enterprises. Therefore, the commercial production of that fish and marine life shall be considered a branch of the agricultural industry of the state for the purpose of any law which provides for the benefit or protection of the agricultural industry of the state, except those laws relating to plant quarantine or pest control.

The following sections of the Labor Code provide that:

6302. As used in this division:

(a) "Director" means the Director of Industrial Relations.

(b) "Department" means the Department of Industrial Relations.

(c) "Insurer" includes the State Compensation Insurance Fund and any private company, corporation, mutual association, and reciprocal or interinsurance exchange, authorized under the laws of this state to insure employers against liability for compensation under this part and under Division 4 (commencing with Section 3201), and any employer to whom a certificate of consent to self-insure has been issued.

(d) "Division" means the Division of Occupational Safety and Health.

(e) "Standards board" means the Occupational Safety and Health Standards Board, within the Department.

(f) "Appeals board" means the Occupational Safety and Health Appeals Board, within the department.

(g) "Aquaculture" means a form of agriculture as defined in Section 17 of the Fish and Game Code.

The following sections of the Public Resources Code, provide that:

DIVISION 1

Chapter 4. AQUACULTURE DEVELOPMENT

825. This chapter shall be known and may be cited as the California Aquaculture Development Act.

826. The Legislature finds and declares that it is in the interest of the people of the state that the practice of aquaculture be encouraged in order to augment food supplies, expand employment, promote economic activity, increase native fish stocks, enhance commercial and recreational fishing, and protect and better use the land and water resources of the state.

827. The purpose of this chapter is to establish a policy and program toward improving the science and practice of aquaculture as a means of expanding aquaculture industry and related economic activity in the state.

828. As used in this chapter, "aquaculture" means the culture and husbandry of aquatic organisms, including, but not limited to, fish, shellfish, mollusks, crustaceans, kelp, and algae. Aquaculture shall not mean the culture and husbandry of commercially utilized inland crops, including, but not limited to rice, watercress, and bean sprouts.

829. As used in this chapter, "director" means the Director of the Department of Fish and Game.

830. As used in this chapter, "department" means the Department of Fish and Game.

833. The department shall be the lead agency for purposes of the California Environmental Quality Act (commencing with Section 21000 of the Public Resources Code) for any project involving the issuance of a permit required pursuant to Division 12 (commencing with Section 15000) of the Fish and Game Code.

DIVISION 20

Chapter 2. DEFINITIONS

30100.2 "Aquaculture" means a form of agriculture as defined in Section 17 of the Fish and Game Code. Aquaculture products are agricultural products, and aquaculture facilities and land uses shall be treated as agricultural facilities and land uses in all planning and permit-issuing decisions governed by this division.

Chapter 3. COASTAL RESOURCES PLANNING AND MANAGEMENT POLICIES

Article 3.

30222.5 Ocean front land that is suitable for coastal-dependent aquaculture

shall be protected for that use, and proposals for aquaculture facilities located on those sites shall be given priority, except over other coastal-dependent developments or uses.

Chapter 5. STATE AGENCIES

Article 2.

30411. (a) The Department of Fish and Game and the Fish and Game Commission are the principal state agencies responsible for the establishment and control of wildlife and fishery management programs and neither the commission nor any regional commission shall establish or impose any controls with respect thereto that duplicate or exceed regulatory controls established by these agencies pursuant to specific statutory requirements or authorization.

(b) The Department of Fish and Game, in consultation with the commission and the Department of Boating and Waterways, may study degraded wetlands and identify those which can most feasibly be restored in conjunction with development of a boating facility as provided in subdivision (a) of Section 30233. Any such study shall include consideration of all of the following:

(1) Whether the wetland is so severely degraded and its natural processes so substantially impaired that it is not capable of recovering and maintaining a high level of biological productivity without major restoration activities.

(2) Whether a substantial portion of the degraded wetland, but in no event less than 75 percent, can be restored and maintained as a highly productive wetland in conjunction with a boating facilities project.

(3) Whether restoration of the wetland's natural values, including its biological productivity and wildlife habitat features, can most feasibly be achieved and maintained in conjunction with a boating facility or whether there are other feasible ways to achieve such values.

(c) The Legislature finds and declares that saltwater or brackish water aquaculture is a coastal-dependent use which should be encouraged to augment food supplies and to further the policies set forth in Chapter 4 (commencing with Section 825) of Division 1. The Department of Fish and Game may identify coastal sites it deems appropriate for aquaculture facilities. I the department identifies these sites, it shall transmit information identifying these sites to the commission and the relevant local government agency. The commission, and where appropriate, local governments shall, consistent with the coastal planning requirements of this division, provide for as many coastal sites identified by the Department of Fish and Game for any uses that are consistent with the policies or Chapter 3 (commencing with Section 30200) of this division.

(d) Any agency of the state owning or managing land in the coastal zone for public purposes shall be an active participant in the selection of suitable sites for aquaculture facilities and shall make the land available for use in aquaculture when feasible and consistent with other policies of this division and other provision of law.

The following section of the State Penal Code provides that:

487. Grand theft is theft committed in any of the following cases:

1. When the money, labor or real or personal property taken is of a value exceeding four hundred dollars ($400); provided, that when domestic fowls, avocados, olives, citrus or deciduous fruits, other fruits, vegetables, nuts, artichokes, or other farm crops are taken of a value exceeding one hundred dollars ($100); provided, further, that when fish, shellfish, mollusks, crustaceans, kelp, algae, or other aquacultural products are taken from a commercial or research operation which is producing that product, of a value exceeding one hundred dollars ($100); provided, further, that where the money, labor, real or personal property is taken by a servant, agent or employee from his principal or employer and aggregates four hundred dollars ($400) or more in any 12 consecutive month period, then the same shall constitute grand theft.

2. When the property is taken from the person of another.

The following sections of the Revenue and Taxation Code provide that:

17063. For purposes of this chapter, the items of tax preference are:

(a) An amount equal to the excess itemized deductions for the taxable year (as determined under Section 17063.2).

(b) With respect to each "Section 18212 property" (as defined in Section 18214), the amount by which the deduction allowable for the taxable year for exhaustion, wear or tear, obsolescence, or amortization exceeds the depreciation deduction which would have been allowable for the taxable year, had the taxpayer depreciated the property under the straight line method for each taxable year of its useful life (determined without regard to Section 17211.7 or 17228.5) for which the taxpayer has held the property.

(c) With respect to each item of Section 18211 property (as defined in Section 18214) which is subject to a lease, the amount by which --

(1) The deduction allowable for the taxable year for depreciation or amortization, exceeds.

(2) The deduction which would have been allowable for the taxable year had the taxpayer depreciated the property under the straight [illegible] method for each taxable year of its useful life for wh[illegible] taxpayer has held the property.

(d) With respect to the transfer of a share of stock pursuant to the exercise of a qualified stock option (as defined in subdivision (b) of Section 17532) or a restricted stock option (as defined in subdivision (b) of Section 17534), the amount by which the fair market value of the share at the time of exercise exceeds the option price.

(e) With respect to each property (as defined in Sections 17681 to 17690, inclusive), the excess of the deduction for depletion allowable under Section 17681 for the taxable year over the adjusted basis of the property at the end of the taxable year (determined without regard to the depletion deduction for the taxable year).

(f) An amount equal to one-half of the amount by which net long-term capital gain exceeds the net short-term capital loss for the taxable year.

(g) Subdivision (f) of this section shall apply only to taxable years beginning after December 31, 1970, and ending on or before November 30, 1972. For taxable years beginning after December 31, 1971, the amount of the tax preference income with respect to capital gains shall be an amount (but not below zero) equal to the difference between (1) the taxpayer's total net capital gains and losses (determined without regard to any capital loss carryover) for the taxable year, and (2) the taxpayer's net capital gains and losses recognized by virtue of Section 18162.5 for the same taxable year.

(h) The amount of net farm loss in excess of fifty thousand dollars ($50,000) which is deducted from nonfarm income. In the case of a husband or wife who files a separate return, the amount specified in the preceding sentence shall be twenty-five thousand dollars ($25,000). This subdivision shall not apply if two-thirds or more of the taxpayer's average gross income from all sources for the taxable year and immediately preceding two years is from farming. Nor shall this subdivision apply if the net farm loss is the result of aquaculture activities. For purposes of this subdivision, "aquaculture" means a form of agriculture which is devoted to the controlled growing and harvesting of fish, shellfish, and plants in marine, brackish, and fresh water.

(i) The excess of the intangible drilling and development costs described in Section 17299(c) paid or incurred in connection with oil, gas, and geothermal wells (other than costs incurred in drilling a nonproductive well) allowable under this part for the taxable year over the amount which would have been allowable for the taxable year if such costs had been capitalized and straight line recovery of intangibles (as defined in Section 17963.3) had been used with respect to such costs. This subdivision shall be applied separately with respect to:

(1) All oil and gas properties which are not described in paragraph (2), and

(2) All properties which are geothermal deposits (as defined in Section 613 (e)(3) of the Internal Revenue Code of 1954).

The following sections of the Health and Safety Code provide that:

Chapter 5. FOOD

26569.4 (a) The state department may adopt regulations which name and describe the characteristics of salmon and any other fish or other seafood it considers appropriate. The state department shall consult with the Department of Fish and Game, the Joint Committee on Fisheries and Aquaculture, consumers, commercial fishermen, aquaculturists, and seafood processors, wholesalers, restaurateurs, and other retailers before adopting these regulations. The state department shall not adopt any regulation that conflicts with the common name of any fish designated by the Department of Fish and Game pursuant to Section 8023 of the Fish and Game Code.

(b) In addition to the consultations required by subdivision (a), the state department shall consult and seek the recommendations of the groups named in that subdivision concerning the possible need for, or desirability of, any further legislation or regulations affecting seafood labeling. The state department shall report to the Legislature the results of the consultations required by this subdivision, and make recommendations to the Legislature concerning any legislation it considers appropriate, on or before January 1, 1986.

(c) No regulation adopted pursuant to this section shall deviate from a pertinent United States standard where the fish or seafood product specified is packed or processed as a standardized product under a United States standard.

(d) Nothing in this section or in regulations adopted pursuant to this section shall be construed to require the use of more than the common family name of any fish or seafood by any restaurant in menus or advertisements.

Chapter 10. SANITARY CONTROL OF SHELLFISH
Article 1. Declaration of Policy and Definitions

28500. The Legislature finds and declares that the public health interest requires that the people of this state be protected from adulterated shellfish grown and harvested in state waters for sale to the public and for introduction into interstate commerce. This protection is a matter of statewide concern and the purpose of this chapter is to establish uniform sanitation standards for the growing waters, harvesting, shucking, packing, repacking, and handling of shellfish and shellstock intended for human consumption.

28501. Unless the context otherwise requires, the definitions set forth in this article govern the construction of this chapter.

(a) "Shellfish" means native or nonnative bivalve mollusks, which include oysters, rock scallops, clams, and mussels, either fresh or frozen, and either shucked or in the shell.

(b) "Shellstock" means shellfish which remain in their shells.

(c) "Growing area" means any offshore ocean, coastal estuarine, or freshwater area that may be classified by the department for natural shellfish growth or artificial shellfish propagation and includes open seawater systems.

(d) "Approved area" means a shellfish-growing area not adversely affected by sewage or other wastes.

(e) "Conditionally approved area" means a shellfish-growing area that may be occasionally affected by sewage or other wastes.

(f) "Prohibited area" means a shellfish-growing area not certified because of its proximity to a waste discharge or because the area is influenced by other detrimental environmental factors.

(g) "Restricted area" means a shellfish-growing areas subjected to a limited degree of pollution which makes it unsafe to harvest a shellfish for direct marketing but where harvesting for relaying or depuration may be permitted.

(h) "Other wastes" means wastes, such as, but not limited to, animal, industrial, radiological, and agricultural wastes which would render shellfish unsafe or unfit for human consumption.

(i) "Department" means the State Department of Health Services.

(j) "Director" means the State Director of Health Services.

(k) "Person" includes any individual, partnership, corporation, and association.

(l) "Closed area" means an area that the shellfish taken therefrom have been declared to be unsafe or unfit for human consumption.

Article 2. General Requirements

28502. (a) The director may declare any area within the jurisdiction of this state to be a closed area if it is determined that shellfish taken from the growing area may be unsafe or unfit for human consumption.

(b) The director shall close to the taking of shellfish for a period deemed advisable any waters to which shellfish from a closed area may have been transferred.

(c) The director shall establish by order the areas which he or she declares unsafe or unfit for shellfish harvesting and shall modify

or revoke the order in accordance with the results of chemical, toxicologic, and bacteriological surveys conducted by the department. The director shall file the order in the office of the department, and shall furnish copies of the orders describing closed areas to the Department of Fish and Game, the State Water Resources Control Board, and to any interested person without charge.

(d) Prior to the director's declaration that shellfish-growing waters may be unsafe and shellfish grown in these waters may not be taken for human consumption, the department shall do all of the following:

(1) Give at least 20 days' notice of its intended action. The notice shall include a statement of either the terms or substance of the intended action or a description of the subject and issues involved, and the time when, the place where, and the manner in which, interested persons may present their views thereon.

(2) Afford all interested persons reasonable opportunity to submit data, views, or arguments orally or in writing. The department shall consider fully all written and oral submissions respecting the proposed action.

(e) If the department finds that the shellfish harvested from an area is unsafe or unfit for human consumption and states in writing its reasons for that finding, it may proceed without prior notice or hearing to take emergency action. The action may be effective for a period of not longer than 30 days, during which time the department shall initiate the procedures contained in subdivision (d).

28503. (a) The department shall adopt rules and regulations regarding all of the following:

(1) The classification and minimum requirements for growing and harvesting areas, for relaying and depuration procedures, and for aquaculture facilities which are used for the cultivation and production of shellfish.

(2) Specifications for plant facilities and for the harvesting, transporting, storing, handling, packing, and repacking of shellfish.

(3) Fees.

(b) The department may adopt any regulations which it determines are necessary to interpret and enforce the provisions of this chapter. The regulations shall be adopted by the department in the manner prescribed by Chapter 3.5 (commencing with Section 11340) of Part 1 of Division 3 of Title 2 of the Government Code.

(c) The rules and regulations shall conform, so far as possible, to

the standards which are adopted by the National Shellfish Sanitation Program that pertain to the evaluation of shellfish-growing areas and handling facilities, but shall provide for regulating other wastes or contaminants not covered by the National Shellfish Sanitation Program which would render shellfish unsafe or unfit for human consumption.

28504. (a) The director, or the director's duly authorized agent, shall conduct sanitary surveys of any shellfish growing water as deemed necessary to assure each of the following:

(1) Any shellfish grown in the water is safe as an article of food and meets bacteriological, chemical, and toxicologic standards as prescribed by regulation.

(2) Any shellfish grown in prohibited or restricted areas is either relayed to or depurated in approved water for a period of time as necessary to meet bacteriological, chemical, and toxicologic standards, as prescribed by regulation.

(3) For good cause shown, a shellfish grower or harvester may request the resurvey of restricted or unapproved growing water, and the director, or the director's duly authorized agent, shall conduct the sanitary resurvey.

(b) If it is found that the shellfish and growing water are in compliance with the rules and regulations promulgated under this chapter, the director shall issue a certificate attesting to the compliance to the lawful grower or harvester of the shellfish.

28505. It is unlawful for any person to engage in commercial shellfish cultivation or the harvesting for human consumption of shellfish from naturally occurring populations, except as provided for in Sections 5670, 7850, 8500, and 15101 of the Fish and Game Code and in regulations adopted by the department pursuant to this chapter, with regard to growing areas, relaying and depuration procedures, and aquaculture facilities.

28506. The director, or the director's duly authorized agent, may, at any reasonable hour of the day, do any of the following:

(a) Enter and inspect any facility or area used for cultivation, production, depuration, processing, transporting, or sale of shellfish.

(b) Obtain samples of water and shellfish. Upon request, split samples shall be given to the person from whose property the samples were obtained.

(c) Inspect all shellfish plants and the practices followed in the handling and packaging of shellfish. If it is found that the operator is complying with the rules and regulations promulgated under this chapter, the director shall issue a certificate attesting to the compliance.

(d) Cause a reinspection to be made at any time and may revoke the certificate upon refusal of the operator to permit an inspection or free access at all reasonable hours, or upon a finding that the plant is not being operated in compliance with the rules and regulations promulgated under this chapter.

(e) No revocation, suspension, annulment, or withdrawal of any certificate is lawful unless, prior to the institution of department proceedings, the department gave notice by mail, to the certificate holder, of facts or conduct which warrant the intended action, and the certificate holder was given an opportunity to show compliance with all lawful requirements for the retention of the certificate, pursuant to Section 28518.8. This section does not preclude the department from taking immediate action in accordance with subdivision (e) of Section 28502.

28507. It is unlawful for any person to take, sell, offer, or hold for sale any shellfish from an area declared by the director to be unsuitable for harvesting for human consumption, without complying with all rules and regulations promulgated by the department to ensure that the shellfish have been purified.

The intent of this section is not to prohibit the transplanting of shellfish from restricted or prohibited growing areas, if permission for the transplanting is first obtained from the Department of Fish and Game pursuant to Section 237 of Title 14 of the California Administrative Code.

28508. It is unlawful for any person to sell, offer, or hold for sale any shellstock or shucked shellfish which has not been harvested from a growing area which has been certified by the department or which has not been purified in accordance with Section 28504.

28509. It is unlawful for any person to sell, offer, or hold for sale any shellstock or shucked shellfish which has not been handled and packaged in accordance with specifications under this chapter, and regulations adopted pursuant to this chapter.

28510. It is unlawful for any person to sell, offer, or hold for sale any shellfish where the facilities for packaging and handling of the shellfish do not comply with regulations promulgated by the department under this chapter.

28511. It is unlawful for any person to operate a shellfish plant engaged in the handling and packaging of shellfish, either shucked or in the shell, without a valid certificate issued by the department for each plant or place of business.

28512. It is unlawful for any person to sell, offer, or hold for sale any shellstock or shucked shellfish without a label which bears a valid certificate number and is in compliance with Chapter 4 (commencing with Section 26400) of Division 21.

28513. It is unlawful for any person to sell, offer, or hold for sale any

shellfish not in a container bearing a valid certificate number from a state or a nation whose shellfish certification program conforms to the then current Manual of Recommended Practice for Sanitary Control of the Shellfish Industry, issued by the United States Public Health Service.

28514. The provisions of Sections 28512 and 28513, with respect to labeling requirements, shall not apply to any of the following:

(a) Shellstock held in dry storage under refrigerated conditions not for shipment or sale.

(b) Shellstock sold on premises when the sale is the ultimate point of sale.

28515. Any shellfish which are held or offered for sale at retail or for human consumption, and which have not been handled and packaged in accordance with the specifications fixed by the department under this chapter, or which are not in a certified container as provided in Sections 28512 and 28513, or which are otherwise found by the director to be unfit for human consumption, are subject to immediate condemnation, seizure, and confiscation by the director or the director's duly authorized agent. The shellfish shall be held, destroyed, or otherwise disposed of as directed by the director.

28515.5 The director may suspend or revoke any certificate issued pursuant to this chapter for any violation of this chapter or the regulations promulgated pursuant thereto.

Article 3. Fees

28516. The department shall charge and collect a fee for each certificate issued. The amount of the fee shall be established by regulation.

Article 4. Penalties

28517. Any person who willfully violates any provision of this chapter, or any regulation adopted pursuant to this chapter, is guilty of a misdemeanor and shall, if convicted, be subject to imprisonment for not more than six months in the county jail or a fine of not less than one hundred dollars ($100) nor more than five hundred dollars ($500), or both. If the violation is committed after a previous conviction under this section which has become final, or if the violation is committed with the intent to defraud or mislead, the person shall be subject to imprisonment for not more than one year in the county jail or a fine of not more than one thousand dollars ($1,000), or both.

28517.5 One-half of all fines collected by any court or judge for any violation of any provision of this chapter shall be paid into the State Treasury to the credit of the General Fund.

Article 5. Proceedings

28518. (a) The Attorney General, any district attorney, or any city attorney to whom the department reports any violation of this chapter shall begin appropriate proceedings in the proper court.

(b) Before any alleged violation of this chapter is reported to the Attorney General, a district attorney, or a city attorney for the institution of a criminal proceeding, the person against whom this proceeding is contemplated may be given appropriate notice and an opportunity to show cause why he or she should not be prosecuted and to present additional facts which may mitigate the action. The showing may be presented either orally or in writing, in person, or by attorney.

28518.2 The department is not required to institute proceedings under this chapter for minor violations of this chapter, if the department believes that the public interest will be adequately served in the circumstances by a suitable written notice or warning.

28518.5 When the state asserts a violation of this chapter, the state need not negate any exemption or exception from the requirements of this chapter in any pleading, or in any trial, hearing, or other proceeding. The burden of proof with respect to any such exemption or exception rests upon the person claiming its benefits.

28518.8 Except to the extent otherwise provided in Section 28502 and subdivision (e) of Section 28506, or when a violation is asserted pursuant to Section 28517, when the department asserts a violation of this chapter, all affected persons shall be afforded an opportunity for an administrative hearing after 20 days notice.

(b) The notice shall include all of the following:

(1) A statement of the time, place, and nature of the hearing.

(2) A statement of the legal authority and jurisdiction under which the hearing is to be held.

(3) A reference to the particular sections of the statutes, regulations, and rules involved.

(4) A short and plain statement of the matters asserted.

(c) Opportunity shall be afforded all persons to respond and present evidence on the issues involved.

(d) Hearings authorized or required by this chapter shall be conducted by the department or any agent as the department may designate for that purpose.

(e) Oral proceedings or any part thereof shall be transcribed at the request of any person. The person requesting the transcription shall bear the cost of the transcript.

(f) Final decisions or orders adverse to any person shall be in writing or stated in the record. A final decision shall include findings of fact and conclusions of law, which shall be separately stated. Persons shall be notified either personally or by mail of any decision or order.

28519. A person who has exhausted all administrative remedies available within the department and who is aggrieved by a final decision or order is entitled to judicial review pursuant to this chapter.

28519.5 All regulations applicable to this chapter, and currently in effect at the time this chapter takes effect, shall remain in effect until the department adopts regulations pursuant to Section 28503.

FISH AND GAME CODE SECTIONS REGULATING THE PROPAGATION AND HARVESTING OF MARINE LIFE AND THE PURIFICATION OF MOLLUSKS

The following sections of the Fish and Game Code provide that:

General Provisions and Definitions.

14. "Anadromous fish" means fish which spawn in fresh water and spend a portion of their lives in the ocean.

17. "Aquaculture" means that form of agriculture devoted to the propagation, cultivation, maintenance, and harvesting of aquatic plants and animals in marine, brackish, and fresh water. "Aquaculture" does not include species of ornamental marine or freshwater plants and animals not utilized for human consumption or bait purposes that are maintained in closed systems for personal, pet industry, or hobby purposes, however, these species continue to be regulated under Chapter 2 (commencing with Section 2116) of Division 3.

61. "Ocean ranching" means aquaculture where juvenile anadromous fish are reared and released into state waters to grow and return to an aquaculture facility to be harvested commercially.

DIVISION 2.

Chapter 7. CONSERVATION OF AQUATIC RESOURCES.

1700. It is hereby declared to be the policy of the state to encourage the conservation, maintenance, and utilization of the living resources of the ocean and other waters under the jurisdiction and influence of the state for the benefit of all the citizens of the state and to promote the development of local fisheries and distant-water fisheries based in California in harmony with international law respecting fishing and the conservation of the living resources of the oceans and other waters under the jurisdiction and influence of the state. This policy shall include all of the following objectives:

(a) The maintenance of sufficient populations of all species of aquatic organisms to insure their continued existence.

(b) The recognition of the importance of the aesthetic, educational, scientific, and nonextractive recreational uses of the living resources of the California Current.

(c) The maintenance of a sufficient resource to support a reasonable sport use, where a species is the object of sport fishing, taking into consideration the necessity of regulating individual sport fishery bag limits to the quantity that is sufficient to provide a satisfying sport.

(d) The growth of local commercial fisheries, consistent with aesthetic, educational, scientific, and recreational uses of such living resources, the utilization of unused resources, taking into consideration the necessity of regulating the catch within the limits of maximum sustainable yields, and the development of distant-water and overseas fishery enterprises.

(e) The management, on a basis of adequate scientific information promptly promulgated for public scrutiny, of the fisheries under the state's jurisdiction, and the participation in the management of other fisheries in which California fishermen are engaged, with the objective of maximizing the sustained harvest.

(f) The development of commercial aquaculture.

DIVISION 3.

Chapter 3.

Article 3. Fish, Reptiles, Amphibia, and Aquatic Plants Generally.

2270. It is unlawful for any person to receive, bring, or cause to be brought into this state, for the purpose of propagation, any fish, reptile, amphibian, or aquatic plant from any place wherein any infected, diseased, or parasitized fish, reptile, amphibia, or aquatic plants are known to exist.

2271. (a) No live aquatic plant or animal may be imported into this state without the prior written approval of the department pursuant to regulations adopted by the commission. A written application for the importation, submitted in conformance with the procedural requirements established by the commission, is deemed approved where it has not been denied within 60 days.

(b) This section does not apply to the following plants or animals unless the plants or animals are or may be placed in waters of the state:

(1) Mollusks.
(2) Crustaceans.

(3) Ornamental marine or freshwater plants and animals that are not utilized for human consumption or bait purposes and are maintained in closed systems for personal, pet industry, or hobby purposes.

(c) The section does not apply to any live aquatic plant or animal imported by a registered aquaculturist.

2272. Each package containing any live aquatic plant or animal shall bear, in a conspicuous place, a tag on which shall be stated the name and address of the consignor, the name and address of the consignee, and the exact contents of the package.

Chapter 4.

Article 1. Dead Wild Birds, Mammals, Fish and Reptiles and Amphibia.

2345. This article applies to all dead wild birds, mammals, fish, and amphibia. This article also applies to live mollusks and crustaceans which are transported for purposes other than placement in the waters of this state. This article does not apply to animals imported for purposes of aquaculture under Division 12 (commencing with Section 15000).

DIVISION 6. FISH

Part 1. Generally

Chapter 1. MISCELLANEOUS

5503. It is unlawful to take any fish for the sole purpose of removing its eggs except for the purpose of developing a brood stock for aquaculture purposes under Division 12 (commencing with Section 15000) pursuant to regulations promulgated by the Fish and Game Commission.

The commission shall also determine ownership and regulate distribution of progeny taken from wild brood stock, other than those obtained pursuant to section 15300.

Chapter 2. POLLUTION

Article 2. Shellfish Area Contamination.

5669. For purposes of this chapter, "shellfish" means any bivalve mollusk.

5670. It is unlawful to take shellfish used or intended to be used for human consumption from any area from which it shall be determined, as provided in this article, that the taking of shellfish does or may constitute a menace to the lives or health of human beings.

5671. The State Department of Health Services may:

(a) Examine any area from which shellfish may be taken.

(b) Determine whether the area is subject to sewage contamination.

(c) Determine whether the taking of shellfish from the area does or may constitute a menace to the lives or health of human beings.

5672. Upon determination by the State Department of Health Services that the area is or may be subject to sewage contamination, and that the taking of shellfish from it does or may constitute a menace to the lives or health of human beings, it shall ascertain as accurately as it can the bounds of the contamination, and shall post notices on or in the area describing its bounds and prohibiting the taking of shellfish therefrom.

The taking of shellfish from the area is unlawful after the completion of the publication of the notices as prescribed in this article.

5673. The fact of posting the notices shall be published once a week for four successive weeks in some newspaper of general circulation published in the county in which the contaminated area is situated, if there is such a newspaper, and if there is none, then in such a newspaper published in an adjoining county.

5674. The State Department of Health Services shall enforce the provisions of this article, and for that purpose the inspectors and employees of that agency may enter at all times upon public or private property upon which shellfish may be located.

5675. If examinations are conducted pursuant to this article for purposes of certifying the quality of shellfish-growing waters, certification of water quality shall be commenced within 30 days, and completed within three months of the filing of an application by an aquaculturist.

Article 2.5. Purification of Mollusks

5700. Notwithstanding Sections 5670, 5672, 8341, and 9050, native and nonnative mollusks may be taken in Districts 12 and 13 and moved to other areas to be purified for human consumption under such rules and regulations as shall be established by the commission. Such regulations may include, but are not limited to bag limits, methods of harvest, and provisions for public use. Mollusks taken under this section shall not be used for human consumption unless such use is approved by the State Department of Health Services.

5701. The State Department of Health Services may make sanitary surveys of mollusk-growing areas or may use sanitary surveys of mollusk-growing areas made by qualified state or county agencies and, based on such information, may classify such areas for purposes of harvesting and moving mollusks which are to be purified for human consumption in accordance with Section 5700. The State Department of Health Services shall adopt such rules and regulations as are necessary to implement this section.

5701.5 If examinations are conducted by the State Department of Health Services pursuant to this article for purposes of certifying the quality of shellfish-growing waters, certification of water quality shall be commenced within 30 days and completed within six months of the filing of an application by an aquaculturist.

5702. Any person who moves any native mollusks taken under regulations of the commission from Districts 12 and 13 for purposes of purification for human consumption, shall pay a royalty, as the commission may prescribe, of not less than two cents ($0.02) per pound of mollusks so taken.

Chapter 4. INFECTED OR DISEASED FISH

6300. This chapter applies to all fish and amphibia, including but not limited to, fish and amphibia being imported or transported. This chapter does not apply to activities governed by Division 12 (commencing with Section 15000).

6301. The department is authorized to enter at any time any car, warehouse, depot, ship, or growing area where any fish, amphibia, or aquatic plants are held or stored for the purpose of making an examination to ascertain whether such fish, amphibia, or aquatic plants are infected, diseased, or parasitized.

6302. Except as otherwise provided in Division 12 (commencing with Section 15000), all fish, amphibia, or aquatic plants found to be infected, diseased, or parasitized are a public nuisance and shall be summarily destroyed by the department.

6303. All fish, amphibia, or aquatic plants which the department determines are merely deleterious to fish, amphibia, aquatic plants, or aquatic animal life, shall be destroyed by the department unless the owner or person in charge of the fish, amphibia, or aquatic plants ships them out of the state within a period of time to be specified by the department.

6304. If the department finds any infected, diseased, or parasitized fish, amphibia, or aquatic plants within this state, the department shall post notices describing, as nearly as possible, the boundaries of the area within which the fish, amphibia, or aquatic plants are found, and shall state the period during which the taking, carrying, and transportation of the fish, amphibia, or aquatic plants from the area shall be unlawful. The fact of posting the notices shall be published once a week for four successive weeks in some newspaper of general circulation in the county in which the infected area is situated and, if there is no such newspaper in that county, then in a newspaper of general circulation published in an adjoining county.

6305. It is unlawful to carry or cause to be carried from one point in this state which has been posted according to the provisions of this article, to any other point in this state, any infected, diseased, or parasitized fish, amphibia, or aquatic plant.

6306. The expense of any examination made necessary by the provisions of this code, shall be borne by the owner of the fish, amphibia, or aquatic plants, or the person or persons importing them into this state; provided that the department may assume such expense in the case of fish imported to provide fishing under the authority of a sport fishing license in the public waters of this state.

Chapter 5. FISH PLANTING AND PROPAGATION

Article 1. General Provisions

6400. It is unlawful to place, plant, or cause to be placed or planted, in any of the waters of this state, any live fish, any fresh or salt water animal, or any aquatic plant, whether taken without or within the State, without first submitting it for inspection to, and securing the written permission of, the department.

6401. Any person may, under the terms of a permit first obtained from the department, under regulations the commission may prescribe, purchase or receive live fish from any registered aquaculturist, and may stock the fish in a stream or a lake.

6403. This chapter does not apply to activities governed by Division 12 (commencing with Section 15000).

Part 3. Commercial Fishing

Chapter 1. GENERALLY

Article 1. Application of Part

7600. The provisions of this part apply to the taking and possession of fish for any commercial purpose. This part does not apply to activities governed under Division 12 (commencing with Section 15000).

Article 7. Packing and Processing Licenses and Taxes.

8045. Every person operating under a license issued pursuant to this article, in addition to the license fee, and a fisherman as described in Section 8015 who sells fish, mollusks, or crustaceans in any load or lot of 100 Pounds or more to persons not licensed pursuant to Section 8040, shall pay a privilege tax for each pound, or fraction thereof, of fish purchased, received, or taken by him in accordance with the following schedule.

	Rate per pound
(a) All fish, irrespective of use, except as otherwise specified in this section.....	$0.0013
(b) Mollusks and crustaceans irrespective of use,	

excluding squid and crab..... 0.0125

(c) Crab and squid, irrespective of use 0.0019

(d) Salmon, except imported salmon offal, based on the weight in the round, irrespective of use..... 0.0500

(e) Sardines irrespective of use..... 0.0063

(f) The following fish when used for bait or human consumption, except canning 0.0125

(1) Albacore
(2) Barracuda
(3) Bluefin
(4) Broadbill swordfish
(5) Flying fish
(6) Frogs
(7) Giant seabass
(8) Halibut
(9) Saltwater worms
(10) White seabass
(11) Yellowtail

(g) Anchovy 0.0006

Provided, however, that when the price paid as stated on the fish receipt required in accordance with Section 8011 is in excess of fifty dollars ($50) per ton, the tax on anchovy shall be $0.0013 per pound.

All fish, except shrimp (Pandalus jordani) and crab (Cancer magister), imported into California from another state or country, and which are for human consumption and are not thereafter canned or cooked by a licensee, shall not be subject to such a privilege tax.

Shrimp (Pandalus jordani) and crab (Cancer magister) imported into California from another state or country, irrespective of use, shall not be subject to such privilege tax.

Chapter 2. PARTICULAR VARIETIES OF FISH

Article 3. Clams and Other Mollusks

8341. All of the species of clams commonly known as littlenecks, chiones and hard-shell cockles, including thin-shelled littleneck, common littleneck, Japanese littleneck, rough-sided littleneck, smooth chione, wavy chione, and banded chione, may be taken at any time, except in the waters of Marin County, where they may be taken only between September 1st and March 31st.

No such clams measuring less than one and one-half inches in greatest diameter may be taken, possessed, transported, or sold.

The bag limit on such clams is 50 per day, in the aggregate. Not more than one daily bag limit of such clams may be possessed by any person during one day.

Clams of the species herein designated, when legally taken outside the state and brought within the state pursuant to this code, may be possessed, transported and sold without restrictions, except that all shipments of such clams into this state shall be accompanied by a bill of lading, or invoice, showing the species, total number or weight, and the origin of the clams.

8345. It is unlawful for any person to sell or purchase any rock scallops (Hinnites multirugosus) or scallops (Pecten circularis), except that scallops cultivated pursuant to Division 12 (commencing with Section 15000) which may be sold or purchased subject to regulations of the commission.

DIVISION 9. FINES AND PENALTIES

Chapter 1. GENERAL PROVISIONS

12000. The violation of any provision of this code, other than Sections 3009 and 12001, or of any rule, regulation, or order made or adopted under this code, is a misdemeanor.

12002. The maximum punishment for a violation constituting a misdemeanor is a fine of one thousand dollars ($1,000) or imprisonment in the county jail for six months, or both, except as follows:

12010. Notwithstanding Section 12000, the maximum penalty for a violation of Sections 15202 or 15509 is a fine of two thousand dollars ($2,000) or imprisonment in the county jail for one year, or both the fine and imprisonment.

DIVISION 12. AQUACULTURE

Chapter 1. GENERAL PROVISIONS

15000. The business of aquaculture is governed by this division. Aquaculture and its products are exempt from those provisions of this code dealing with commercial fishing and harvesting.

15001. The cultured progeny of wild plants and animals lawfully obtained under Section 15300 are the exclusive property of that person who cultured them or that person's successor in interest.

15002. Any person who takes aquaculture products without lawful entitlement is subject to prosecution for theft.

15003. (a) The department may assess a fee on persons growing aquaculture products on public lands and in public waters based on the price per pound of the products sold. The fees, if imposed, shall be

set at amounts necessary to defray the costs of the commission and the department in administering this division. however, the fees if any, may not exceed the privilege taxes as provided in section 8045.

(b) the price per pound for these taxation purposes shall be based on the whole product weight or its equivalent as taken by the lessee.

(c) the privilege tax imposed by this section shall be paid monthly to the department within 30 days after the close of each month. if not paid within 60 days after the close of the month in which it is due, a 10 percent penalty shall be paid.

15004. aquaculturists operating under this division shall pay all costs incurred by the department when conducting any inspections of plants, animals, facilities, or culture areas required by this division, or by regulations made pursuant to it, when requested by the aquaculturists.

15005. (a) When necessary for the protection of native wildlife, the commission may regulate the transportation, purchase, possession, and sale of specific aquaculture products as provided for in this section.

(b) The commission may determine that aquaculture products shall be accompanied by a document containing any of the following information:

(1) The name, address and registration number of the aquaculture producer.
(2) The species.
(3) The weight, volume or count within the container.
(4) The date of the shipment.
(5) The name and address of the intended receiver.

(c) The commission may require that certain aquaculture products shall be additionally identified as being aquaculture produced, except for the following:

(1) Trout.
(2) Catfish.
(3) Kelp and aquatic plants.
(4) Frogs and amphibia.
(5) All bivalve mollusks (except littleneck clams).
(6) All members of the family Centrarchidae.
(7) Crayfish.
(8) Sea urchins.
(9) Shrimp and freshwater prawns.
(10) Crab.

15006. Nothing in this division applies to authorized species of ornamental marine or freshwater plants and animals not utilized for human consumption or bait purposes that are maintained in closed systems for personal, pet industry, or hobby purposes.

15007. Except as specifically authorized in Chapter 10 (commencing with Section 15900), nothing in this division permits ocean ranching.

Chapter 2. AQUACULTURE DEVELOPMENT SECTION

15100. There is within the department the Aquaculture Development Section. The Aquaculture Development Section shall perform all of the following duties:

(a) Promote understanding of aquaculture among public agencies and the general public.

(b) Propose methods of reducing the negative impact of public regulation at all levels of government on the aquaculture industry.

(c) Provide information on all aspects of regulatory compliance to the various sectors of the aquaculture industry.

(d) Provide such advice to aquaculturists on project siting and facility design that may be needed to comply with regulatory requirements.

15101. The owner of each aquaculture facility shall register all of the following information with the department by March 1 of each year.

(a) The owner's name.

(b) The species grown.

(c) The location or locations of each operation or operations. The department may provide registration forms for this purpose and may impose a registration fee not to exceed [redacted] dollars [redacted]. Anyone failing to register under this section shall be operating unlawfully.

15102. The department may prohibit an aquaculture operation or the culturing of any species at any location where it is determined it would be detrimental to adjacent native wildlife.

Chapter 3. STOCKING AQUATIC ORGANISMS

15200. The commission may regulate the placing of aquatic plants and animals in waters of the state. Movement of live fish between two registered aquaculturists who are registered for those species does not require a permit.

15201. A permit is required to place fish on public or private land or water in any watershed above an established public or private fish hatchery. The department shall deny the permit if there is evidence that water quality and potential disease transfers will be adverse to the established hatchery.

15202. The commission may prohibit the placement of specific species of aquatic plants or animals in designated waters of the state. The prohibition may not include species that are found to be native or that are stocked by the state in a location where prohibition is contemplated.

Chapter 4. BROOD STOCK ACQUISITION

15300. Aquatic plants or animals may be legally obtained for use as brood stock from all of the following sources:

(a) A holder of a commercial fishing license.

(b) A registered aquaculturist.

(c) The department.

(d) Imported sources authorized by Chapter 7 (commencing with Section 15600).

15301. (a) The department may sell wild aquatic plants or animals, except rare, endangered, or fully protected species, for aquaculture use at a price approximating the administrative cost to the department for collection or sale of the plants or animals. The commission shall set this price.

(b) Aquatic plants and animals may be collected by a registered aquaculturist only with the written approval of the department. The department may specify the time, place, and manner of collection and may collect a fee from the aquaculturist in an amount sufficient to cover the cost of processing the approval.

Chapter 5. LEASING OF STATE WATER BOTTOMS

15400. The commission may lease state water bottoms to any person for aquaculture. The commission may adopt regulations governing the terms of the leases. No state water bottoms shall be leased, unless the commission determines that the lease is in the public interest.

15401. .. as used by the public for digging clams shall not be leased. The department shall designate those areas.

15402. A lessee of a state water bottom owns all lawfully cultivated organisms that are described in the application for the lease and produced in the area leased. The lessee has the exclusive right to cultivate and harvest the aquatic organisms in the area leased.

15403. Persons wishing to lease a state water bottom shall make a written application to the commission. An application shall contain all of the following information:

(a) A map showing the area to be leased, its general vicinity, and all

ownership and boundary lines in the vicinity.

(b) A description of the organisms to be grown and the culture techniques to be used.

(c) An estimate of the acreage to be leased.

(d) A nonrefundable one hundred dollar ($100) filing fee.

The lessee shall assume responsibility for any infringement on privately owned water bottoms, or water bottoms owned by, or under the jurisdiction of any city, county, or district.

15404. (a) If the commission finds that the area applied for is available for lease and that the lease would be in the public interest, it shall publish a notice that the area is being considered for leasing.

(b) The commission shall have legal notices published in a newspaper of general circulation in each county where the water bottom, or any part thereof, is located, describing the area to be leased and the type of operation to be conducted. The publication shall comply with Sections 6060 and 6066 of the Government code.

15405. No initial term of a state water bottom lease shall exceed 25 years.

15406. (a) Each state water bottom lease shall specify a period prior to expiration when renewal of the lease may be requested by the lessee. If during this period the lessee is still actively engaged in aquaculture, as determined by the commission, the lessee shall have a prior right to renew the lease on terms agreed upon between the commission and the lessee. If terms are not agreed upon, the commission shall advertise for bids on the lease. If a request for renewal is not made by the lessee, the commission shall advertise for bids on the lease. The commission shall consider bids only from aquaculturists registered pursuant to Section 15101.

(b) Notwithstanding subdivision (a), with respect to any lease of state water bottoms in effect on January 1, 1983, the lessee shall have a prior right to renew the lease. If the lessee does not renew the lease, the commission shall advertise for bids on the lease. The commission shall consider bids only from aquaculturists registered pursuant to Section 15101.

(c) A lease may be renewed for additional periods not to exceed 25 years each.

15406.5 The commission shall award water bottom leases to the highest responsible bidder, if the bid meets or exceed the minimum annual rent established by the commission, which shall not be less than two dollars ($2) per acre, for all species cultivated, unless the acreage applied for is 10 acres or less, in which case the minimum acceptable rent shall be ten dollars ($10) per acre. The annual rent for any lease in effect on January 1, 1983, for the cultivation of oysters

shall be one dollar ($1) per acre until the expiration thereof. The commission may reject any or all bids for the lease of state water bottoms if it deems the rejection to be in the public interest.

15406.7 In addition to the rent provided for in Section 15406.5, every person operating under an oyster lease shall pay a privilege tax of two cents ($0.02) per packed gallon or fraction thereof of shucked oysters harvested by the lessee.

If the oysters are marketed in the shell, the tax shall be based on the equivalent yield of shucked oyster meat. In determining the yield of oysters, it shall be deemed that 100 oysters are equivalent to one packed gallon of shucked oyster meat.

The tax imposed by this section is the exclusive privilege tax that shall be imposed on lessees of state water bottoms for oyster cultivation, notwithstanding subdivision (a) of Section 15003.

15407. The annual rent shall be paid to the department within 30 days of the commencement of the lease and within 30 days of the anniversary thereof. The commission may establish penalty fees for late payment and may cancel the lease if rent is not paid within 90 days of the commencement of the lease or within 90 days of any anniversary thereof.

15408. The commission shall promulgate regulations governing the termination of leases due to failure to pay rent or improper use of the leasehold.

15409. Upon termination of a lease, for any reason, all structures will be removed at the lessee's expense from the leasehold, and the area shall be restored to its original condition. If the lessee fails to remove the structures, the state may remove them and the lessee shall pay the removal costs so incurred.

15410. All leases shall be subject to the power of the Legislature to increase or decrease the rents, fees, taxes, and other charges relating to the lease, but no increase in rent shall be applicable to an existing lease until it is renewed.

15411. Lessees under a state water bottom lease may not unreasonably impede public access to state waters for purpose of fishing, navigation, commerce, or recreation. The lessee may, however, limit public access to the extent necessary to avoid damage to the leasehold and the aquatic life culture therein.

The commission may prohibit any recreational activity in any aquaculture area subject to a state water bottom lease if it determines that the activity is detrimental to the enhancement of the resource.

15412. No water bottom lease may be assigned without the prior approval of the commission. Application for approval of a lease assignment shall comply with all of the requirements for an original lease.

15413. No person may enter upon any area subject to a water bottom lease in which aquatic life is cultivated, or remove the aquatic life therefrom without the consent of the lessee, or willfully destroy the cultivated aquatic life or any markers intended to designate the boundaries and limits of the leased area.

15414. A water bottom lease may require periodic reports that the commission deems necessary for the proper administration of the state's water bottoms.

15415. The department shall notify the State Lands Commission of all applications for water bottom leases.

The department shall inform the State Lands Commission of all leases executed, renewed, or assigned pursuant to this chapter, and shall furnish the State Lands Commission with such information concerning these leases that it may require.

Chapter 6. DISEASE CONTROL

15500. Upon the recommendation of the department and after consultation with the Aquaculture Disease Committee created pursuant to this chapter, the commission shall compile a list of diseases and parasites and the aquatic plants and animals they are known to infect or parasitize. All government activities relating to aquaculture disease detection, control, and eradication that do not affect human health and safety are the responsibility of the department.

15501. The department may enter, under an inspection warrant issued pursuant to Title 5 (commencing with Section 1822.50) of Part 3 of the Code of Civil Procedure, at any time, any car, warehouse, depot, ship, or growing area where any aquatic plants or animals are held or stored, for the purpose of making an examination to ascertain whether the aquatic plants or animals are infected, diseased, or parasitized.

15502. The director, in consultation with the Aquaculture Industry Advisory Committee and the Interagency committee for Aquaculture Development, shall appoint an 11-member Aquaculture Disease Committee consisting of at least six industry producers selected to represent geographic, species, and other diverse aspects of the industry; two to represent the department; one to represent the Department of Food and Agriculture; and academic scientist who is an expert in aquatic diseases; and one representative of the University of California Cooperative Extension. Members of the committee shall serve without compensation, but shall be paid their necessary expenses.

15503. The Aquaculture Disease Committee may recommend regulations to the commission designed to safeguard wild and cultured organisms from the list of harmful organisms compiled pursuant to Section 15500.

15504. Regulations recommended under Section 15503 and adopted by the commission may include all of the following:

(a) Routine monitoring procedures.

(b) Standardized diagnostic procedures.

(c) A requirement for the confirmation of the diagnosis by the state through at least one other independent and qualified laboratory.

(d) Criteria for ordering quarantine, condemnation, or destruction.

(e) A stated maximum time period between diagnosis and destruction.

(f) Methods to be employed in animal destruction and facility cleanup.

(g) Procedures for determining fair and rapid compensation.

(h) Any other related procedures that the commission may determine are necessary.

15505. If any of the diseases or parasites listed pursuant to Section 15500 is found to exist which the director, in consultation with the Aquaculture Disease Committee and consistent with the regulations adopted under Section 15504, deems to be detrimental to the aquaculture industry or to wild stocks of aquatic plants and animals, the director may do any of the following:

(a) Establish the area to be quarantined and list the aquatic plants and animals affected by it.

(b) Post notices describing, as nearly as possible, the boundaries of an area within which specific disease or parasite infestations are found. Notices posted pursuant to this subdivision shall be published once a week for four successive weeks in a newspaper of general circulation in the county in which the infected area is located. If there is no newspaper of general circulation in that county, then the notice shall be published in a newspaper of general circulation published in an adjoining county.

(c) Hold and impound diseased or parasitized plants and animals.

(d) Forbid, prevent, or restrict the movement of all plants and animals subject to the disease or parasite from or into the area, or from place to place within it, during the existence of the quarantine.

(e) Order the destruction and disposal of diseased or parasitized plants and animals consistent with Section 15504.

15506. Except for those diseases in the list compiled pursuant to Section 15500, infected plants or animals shall not be quarantined or destroyed, unless the director, in consultation with the Aquaculture Disease Committee, finds that an outbreak of aquatic disease among privately cultured plants or animals presents a threat to the aquaculture industry or to fish life or plant life.

15507. If the director, in consultation with the Aquaculture Disease Committee, finds that a disease is present in a nearby government operated facility or in nearby wild stocks, infected plants or animals in a private aquaculture facility shall not be quarantined or destroyed unless similar action is taken with respect to the government facility and wild stocks.

15508. Reports of those diseases and parasites compiled pursuant to Section 15500 shall be immediately forwarded by the director to the Aquaculture Disease Committee and shall be promptly investigated by the department.

15509. No person may move, or allow to be moved, any of the aquatic plants or animals which are subject to a quarantine established pursuant to Section 15505 across the quarantine line which is established, unless the person has first obtained a permit from the director authorizing the movement.

The director may issue a permit after inspection, if the aquatic plants or animals, premises, transportation vehicles, and equipment which are subject to the quarantine established pursuant to Section 15505 are properly cleaned and disinfected.

15510. If the director determines that any disease designated pursuant to Section 15500 exists among domestic aquatic plants and animals, or that aquatic plants and animals have been exposed, or may have been exposed, to the disease, or to the vectors of the disease, in any other state or territory in the United States or in any foreign country, and the importation of aquatic plants or animals from the state, territory, or foreign country may transmit, carry, or disseminate the disease to domestic plants and animals within this state, the director shall notify the commission which may, after consulting the State Department of Health Services and the Department of Food and Agriculture, issue a regulation restricting or prohibiting the importation of the diseased or infected aquatic plants or animals into this state from any other state, territory, or foreign country.

15512. (a) If aquatic plants or animals are destroyed pursuant to subdivision (e) of Section 15505, the owner shall be promptly paid from the General Fund an amount equal to 75 percent of the replacement value of the plants or animals, less the value determined by the department of any replacement stock provided by the department under subdivision (b) if the claim is submitted pursuant to Section 15513. If the replacement value is not settled between the owner and the department, the replacement value shall be determined by an appraiser appointed by the director and an appraiser appointed by the owner. Appraiser's fees shall be paid by the appointing party. Disputes between these two appraisers shall be submitted to arbitration under the commercial Arbitration Rules of the American Arbitration Association.

(b) If the department provides replacement stock to an aquaculturist whose plants or animals are destroyed pursuant to subdivision (e) of Section 15505, the amount to be paid to the aquaculturist

pursuant to this section shall be reduced by the value of the replacement stock, as determined by the department.

(c) The result of the arbitration or the amount settled between the owner and the department, reduced by the value determined by the department of any replacement stock provided under subdivision (b), may be submitted as a claim by the owner to the Board of Control pursuant to Section 15513.

15513. Claims against the department arising under this chapter may be submitted pursuant to Section 905.2 of the Government Code.

15514. No claim arising under this chapter shall be paid where the director, in consultation with the Aquaculture Disease Committee, finds that the claimant's management practices were negligent or in violation of law, and that the negligence or violation was the proximate cause of the disease or infection prompting the order of destruction or finds the claimant willfully violated any provision of Section 15505.

15515. The owner of an aquaculture product who does not diligently pursue the eradication of a disease from its facility when ordered to do so by the director shall be responsible for paying to the director the full costs of the department for all disease eradication efforts conducted by the department to eradicate the disease. Payment of the costs under this section shall not excuse compliance with the provisions of law, regulations of the commission, and orders of the director, nor be a defense in any criminal or civil proceedings.

Chapter 7. IMPORTATION OF AQUATIC PLANTS AND ANIMALS

15600. No live aquatic plant or animal may be imported into this state by a registered aquaculturist without the prior written approval of the department pursuant to the regulations adopted by the commission.

15601. A written application for the importation submitted in conformance with the procedural requirements established by the commission is deemed to be approved where it has not been denied within 60 days.

Chapter 10. OCEAN RANCHING

15900. A registered aquaculturist may be granted a permit by the commission, under any terms and conditions that the commission may prescribe, to release and capture anadromous fish in state waters which have been reared in an aquaculture facility.

15901. Prior to the issuance of any permit by the commission, a public hearing shall be held in the county or counties affected. Notice of the hearing shall be published at least once, and at least 10 days prior to the hearing, in a newspaper of general circulation in each of the counties in which the hearing is to be held, or if no such newspaper is published in that county or counties then in such a newspaper in an adjoining county. The hearing shall be conducted by

the commission, a member of the commission designated by it, or the director if requested to do so by the commission.

15902. No permit shall be issued which may tend to deplete the natural runs of anadromous fish, result in waste or deterioration of fish, or when the proposed operation is located on a stream or river below a state or federal fish hatchery or egg-taking station.

15903. All fish released into the wild under authority of this chapter during the time they are in the wild are the property of the state and may be taken under the authority of a sport or commercial fishing license.

15904. Requirements for the screening of outlets may be waived by the commission. The waiver shall only be during the period fish are being released and captured under a permit issued under authority of this chapter. The condition of the waiver shall be described in any permit issued.

15905. Any permit granted by the commission pursuant to this chapter shall contain the following conditions:

(a) The department shall determine under what conditions and the number of fish to be permitted access to the stream above the hatchery site.

(b) If after a hearing the commission finds that the operation described in the permit and conducted pursuant to this chapter is not in the best public interest, the commission may alter the conditions of the permit to mitigate the adverse effects, or may cause an orderly termination of the operation under the permit. Proceedings to cause the alteration or termination shall be conducted in accordance with Chapter 5 (commencing with Section 11500) of Part 1 of Division 3 of Title 2 of the Government Code, and the commission shall have all the powers granted therein. An orderly termination shall not exceed a three-year period and shall culminate in the revocation of the permit in its entirety. During this period, the permittee may continue to examine and take specified anadromous fish reared according to the provisions of the permit, but may not release additional fish.

(c) If the commission finds that the operations has caused deterioration of the natural run of anadromous fish in the waters covered by the permit, it may require the permittee to return the fishery to the same condition as it was prior to issuance of the permit. If the permittee fails to take appropriate action, the commission may direct the department to take the action, and the permittee shall bear any cost incurred by the department.

(d) Prior to release into state waters, the fish may be examined by the department to determine that they are not diseased or infected with any disease which, in the opinion of the department, may be detrimental to the state fishery resources.

(e) The permittee has the right to divert all fish returning to the