

The Baynes Sound

Coastal Plan for Shellfish Aquaculture



December, 2002

National Library of Canada Cataloguing in Publication Data

Main entry under title:

Baynes Sound Coastal Plan for Shellfish Aquaculture. --

Also available on the Internet.

Includes bibliographical references: p.

ISBN 0-7726-4848-4

1. Shellfish culture - British Columbia -- Baynes Sound - Planning. 2. Shellfish culture -- Government policy - British Columbia. 3. Aquaculture industry - British Columbia -- Baynes Sound - Planning. 4. Baynes Sound (B.C.) 5. Baynes Sound Region (B.C.) -- Environmental conditions.

I. British Columbia. Ministry of Sustainable Resource Management. Resource Management Division.

SH367.C3B39 2002

639'.4'097112

C2002-960208-4

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Letter from the Deputy Minister of Sustainable Resource Management



Reference: 31179

I am very pleased to approve the Baynes Sound Coastal Plan for Shellfish Aquaculture. This Plan has been developed in close collaboration with the Ministry of Agriculture, Food and Fisheries and Land and Water BC Inc. (LWBC) and is supported by their respective Deputy Minister and Chief Executive Officer.

This Plan has been developed pursuant to the Provincial mandate and jurisdiction over coastal and foreshore areas of British Columbia's coast. This document will be of great assistance to LWBC and other provincial agencies when considering tenure and licence applications for shellfish culture as well as regulating tenures and licenses. It will also greatly assist coastal communities, development proponents and participating First Nations, by identifying opportunities for, and constraints to, future shellfish aquaculture.

This Plan and the process used to develop it satisfy the draft Sustainability Principles under development by the Ministry of Sustainable Resource Management on behalf of government. As a living document, the Plan will require regular monitoring and will likely be subject to amendments over time as circumstances change and new information is made available. In the meantime we look forward to seeing this Plan generate new opportunities to achieve sustainable shellfish aquaculture in Baynes Sound.

Jon O'Riordan
Deputy Minister

Acknowledgements

We appreciate and acknowledge the valuable input contributed by individuals, associations, Comox and Qualicum First Nations, and elected officials and Planners for the Denman Island Local Trust Committee, Regional District of Comox-Strathcona and Nanaimo Regional District in the development of this Provincial Plan. We also appreciate the information and advice provided by Fisheries and Oceans Canada and Environment Canada (Canadian Wildlife Service).

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An accompanying document, *A Review of Activities and Potential Environmental Effects Associated with Shellfish Aquaculture in Baynes Sound*, prepared by Brian Emmett of Archipelago Marine Research Ltd. with contributions from Dr. Anthony Hodge of Anthony Hodge Consultants Ltd., is posted on the MSRM Website <http://srmrpdwww.env.gov.bc.ca/coastal/planning/index.htm> . John Kafka of Cornerstone Planning Consultants assisted in design and conduct of the Public Consultation program and liaison with First Nations. G.S. Gislason & Associates Ltd. compiled the socio-economic information presented in this Plan. Brian Kingzett provided photographs used in this Plan.

Definitions and Acronyms

Adaptive Management: Adaptive management involves specific management prescriptions in the face of uncertainty, monitoring the results of those prescriptions and then revising management approaches accordingly.

Shellfish Aquaculture: The growing of shellfish under controlled conditions.

Beach Culture: Culture of shellfish in or on the beach in the intertidal area between high and low tide. For example, oyster culture is on the beach and in the case of clam culture the animals live in the substrate under the beach surface.

Benthic: Pertaining to the seabed or bottom.

Biophysical Capability: The biological and physical ability of local waters to be utilized for aquaculture, based on an analysis of physical and biological characteristics and on the environmental requirements for successful aquaculture.

Blue Listed Species: Any indigenous species or subspecies considered to be vulnerable in British Columbia.

CWS: Canadian Wildlife Service, Environment Canada

CMPB: Coast and Marine Planning Branch, MSRM

DILTC: Denman Island Local Trust Committee.

Farm Gate Value: The price paid to farmers for product delivered to the processing plant.

FOC: Fisheries and Oceans Canada

Extensive Aquaculture: The growing of plants and animals in natural waters with no supplemental feed.

Foreshore (intertidal) area: the area between the mean high tide and low tide mark (i.e. below zero tide).

Invertebrates: Includes red and green urchins, octopus, crab, prawn, shrimp, sea cucumbers and other shellfish such as clams, oysters, scallops and geoducks.

Intensive Aquaculture: The growing of plants and animals in natural or man-made containers of water with feed supplementation or enrichment.

Land Act Reserve: A reserve established on LWBC reference maps to temporarily withdraw Crown land from disposition by tenure. A reserve is placed over an area to enable other agencies to undertake planning, to provide temporary protection or to maintain options for future use.

UREP: A *Land Act* reserve or notation of interest established for the “use, recreation and enjoyment of the public.”

LWBC (Land and Water British Columbia Inc.): The Provincial special operating agency for Crown land administration (formerly BC Assets & Land Corporation)

MAFF: Provincial Ministry of Agriculture, Food and Fisheries

MOF: Provincial Ministry of Forests

Marine Protected Area (MPA): A marine protected area may be established under a variety of Provincial and Federal government statutes, either as a temporary or permanent area for the conservation or protection of important biological, recreational and cultural features or values. An MPA may include a Provincial Marine Park, Ecological Reserve, Wildlife Management Area, Federal National Marine Conservation Area under the *National Marine Conservation Act*, fishery closure under the Federal *Fisheries Act*, or a Marine Protected Area under the *Canada Oceans Act*.

MSRM: Provincial Ministry of Sustainable Resource Management. Responsibilities include resource use planning and resource information management and mapping.

MWLAP: Provincial Ministry of Water, Land and Air Protection. Responsibilities agency

include planning and management of Provincial Parks and Protected Areas .

NRD: Nanaimo Regional District.

Near shore area: the sub tidal area below low tide mark, generally extending to the 20 metre is bathymetry depth.

Offshore area: the sub tidal area seaward of the 20 metre is bathymetric depth.

Off-bottom culture: Culture of shellfish such as oysters and scallops in deeper water offshore of the low tide areas using floating structures such as rafts and longlines.

Red Listed Species: Includes any indigenous species or subspecies that have, or are candidates, for status as extirpated, endangered, or threatened species in British Columbia

RDCS: Regional District of Comox-Strathcona.

Risk: Risk is unavoidable and present in virtually every human situation and has many acceptable definitions all with the common theme of uncertainty of outcomes. Here, “risk” refers to the uncertainty that surrounds future events and outcomes. It is the expression of the likelihood (i.e. probability) and negative effect (i.e.hazard) of an event.

Risk Averse: A strong aversion to (or tendency to avoid) a policy or decision that involves risk.

Sanitary Shellfish Closure: FOC closure of an area to shellfish harvesting due to bacterial contamination. This applies to harvest of wild and cultured shellfish.

SFU: Simon Fraser University

Sub-tidal culture: Culture of shellfish in areas below low tide where the culture is subsurface with no surface floats or structures (e.g., geoduck culture takes place on the seabed in sub-tidal areas).

Suitability: A policy-based judgement of whether a particular type of development is suitable and appropriate in a given area from the perspective of desirability and compatibility with other uses or risk of negative environmental effects.

Sustainable: Environmentally, socially and economically sustainable.

Upland area: the terrestrial area extending inland from the natural boundary of the sea.

UREP: A *Land Act* reserve or notation of interest established for the “use, recreation and enjoyment of the public.”

Vancouver Island Summary Land Use Plan: The 2000 Vancouver Island Summary Land Use Plan completed in 2000 is a consolidation of The Province’s 1994 Vancouver Island Land Use Plan

Executive Summary

Plan Purpose

The Ministry of Sustainable Resource Management (MSRM) has collaboratively developed this Plan with other agencies to address concerns specific to shellfish aquaculture in Baynes Sound. The Plan area is located between Denman Island and Vancouver Island, and includes Comox Harbour.

Baynes Sound is Provincially significant for shellfish culture and many shellfish farmers in the area are interested in expanding their operations. The BC Shellfish Growers Association and Malaspina University College have also proposed research and demonstration culture facilities in the southern part of the Plan area for environmental and developmental studies. Many other stakeholders, including commercial fishers, recreationalists, upland residents and commercial tourism operators also highly value the economic, environmental and social benefits of the area and view Baynes Sound as critically important for their quality of life.

This juxtaposition of different activities and values along with shellfish aquaculture has resulted in major coastal resource use conflict. Shellfish growers see their activities as beneficial to both the environment and the local economy. Opponents voice concerns over increased use of obtrusive technology, resource use conflicts, sound and noise impacts, beach litter, environmental impacts, non-compliance with regulations, and reduction of property values.

This Plan provides guidance to regulatory agencies and proponents regarding the sustainable development and management of the Baynes Sound shellfish aquaculture industry. This purpose is consistent with

coastal planning recommendations in the 2000 Vancouver Island Summary Land Use Plan.

The Baynes Sound Plan deals with siting (i.e. tenure allocation issues) and operational issues as separate entities to be addressed in different ways. This includes Management Areas to avoid spatial conflicts and description of appropriate enforcement,



Oyster Longlines

Standards of Operation (i.e. code of practice) and dispute resolution mechanisms as ways to address operational issues.

Public Consultation

The planning process involved a significant public consultation component with fairness and transparency as key objectives. This included public meetings, open houses, individual meetings with stakeholders, First Nations and local governments, and public review of, and comment on, a draft Plan posted on the MSRM website. The Plan provides detailed responses to the specific

issues, questions and statements people raised during these consultations.

Environmental Impact and Risk Assessment and Decision Analysis

This Plan accounts for scientific as well as social factors and recognizes there are uncertainties inherent in risk assessment that must be factored into decision making. In order to better inform the planning process from an environmental science perspective, MSRM hired a consultant to systematically summarize existing Baynes Sound environmental information, assess potential environmental effects associated with shellfish culture and develop a resource management decision analysis framework. Two marine science specialists contracted to independently review the consultant's report generally supported its analytic approach and findings.

The Plan recommends avoidance of activities where risk, or uncertainty regarding risk, is high and adaptive management where risk is low to moderate and where certainty is greater regarding risk.

Most shellfish culture activities present a low to moderate risk of negative environmental impact, but some uncertainty exists regarding severity of certain activities, due to information gaps. The significance of potential negative impacts is less for off-bottom culture than beach culture. Stream channelling, beach modification, and driving on the beach have the potential for significant environmental impacts in some cases. There are also potential positive effects on the environment from shellfish culture and these include coastal stewardship, improved water quality and predation refuges.

Information gaps include bird interactions with shellfish aquaculture, spawning requirements of smelt and sand lance (beach spawning fish) and biological carrying

capacity of Baynes Sound. Studies to fill these data gaps are now underway as a result of the Plan.

The potential for negative impact from the use of clam predator netting is considered low to moderate, but there is some uncertainty associated with this. The duration of any impact is likely to be short term, upon net removal. To address the uncertainty, the Plan recommends an adaptive management approach where approval for any clam predator netting would be contingent on a site-specific monitoring program approved by MAFF. Annual Aquaculture Licence renewal would be subject to the monitoring program results.

It is recommended that further stream channelling not be permitted and that Fisheries and Oceans Canada consider assessing whether existing channelled streams require restoration.

Regulation, Compliance and Enforcement

Shellfish growers must comply with all relevant licensing and tenure agreements as well as regulatory provisions related to environmental protection and public health. Compliance and enforcement were identified during consultations as important issues. Initially a compliance and enforcement strategy was envisaged specifically for Baynes Sound. However, during planning, a comprehensive Service Agreement on the Coordination of Compliance and Enforcement Programs between MAFF, MWLAP, MSRM and LWBC was developed to apply to all areas of the Province including Baynes Sound.

In addition, a Provincial Code of Practice (Standards of Operation) currently nearing completion will soon be enforceable under the Aquaculture Licence and apply to Baynes Sound as well as other areas of the Province.

Dispute Resolution

This Plan describes an existing dispute resolution process under the *Farm Practices (Right to Farm) Protection Act* that provides persons or groups with ways to address disputes about aquaculture practices. This includes direct discussions with aquaculture operators, contact with the Aquaculture Licensing and Compliance Branch in MAFF and filing a concern directly with the Farm Practices Board.

Management Areas

Recommendations in this Plan do not preclude the requirement for site-specific tenure applications and inter-agency review of those applications. Six "Management Areas" were developed for this Plan to guide future shellfish aquaculture development, based on resource use conflicts, the risk of negative environmental impact and data gaps.

These include:

1. Off Bottom: New off bottom tenure applications should be accepted (South Denman Island).
2. Special Management (Sub-tidal): Some applications for expansion of culture are recommended if development can avoid visual impacts and user conflicts through use of no surface structures (e.g. geoducks) on north Denman Island and Vancouver Island from Fanny Bay to Deep Bay. Applications for not for profit, Research and Development operations (one beach and one off-bottom) tenured to a research institution would be acceptable in the Fanny to Deep Bay area.
3. Special Management (Beach and Sub-tidal): Applications for beach and subsurface culture may be

acceptable (Vancouver Island, Base Flats).

4. Restricted Expansion (Off Bottom and Beach): conflicts are higher but applications for some limited expansion at existing sites and new First Nations development are recommended subject to meeting site-specific requirements (North part of Baynes Sound on Vancouver Island side).
5. Future Analysis: current conditions may prevent development but may not in the future, based on new information (Comox Harbour and Union Point).
6. No Additional Aquaculture: significant user and environmental conflicts prevent further development (South and Central part of Denman Island and Henry Bay at the north end of Denman Island).

With the exception of Management Areas 3 and 4 on Vancouver Island, no further beach tenure applications are recommended. There is some potential for beach culture in Area 5, depending on future conditions and information. Management Area 1 is the only area where applications for off-bottom facilities should be allowed. Five existing tenures in the Plan area have not yet been developed, but can, and likely will, be developed according to their approved Management Plans. The Plan will not affect existing tenures and licences issued before initiation of the Plan. They may continue, subject to terms and conditions of those tenures and licences. The Plan recommends no application for new tenures for expansion or development until the interim results of the biological carrying capacity study are received, a Provincial Code of Practice comes into force, and

compliance and enforcement measures have been put into effect.

Aquaculture development opportunities provided by this Plan, if fully realized, could represent an estimated expansion in area from the existing 573 ha. to about 670 ha. (approx. 18%) for the foreseeable future. This Plan is also sensitive to conflict issues and, as a consequence, has recommended a significant curtailment of development in areas of high resource use conflict, including areas with high visual impact potential for residential areas.

Consistency with Local Government Zoning

This Plan is not a zoning initiative (general support for, or exclusion of a class of activity). It is a tool to be used proactively in conjunction with an improved site-specific tenure and licence application process to reduce resource use conflicts and siting issues.

While the Regional District of Comox Strathcona (RDCS) and Nanaimo Regional District (NRD) Zoning Bylaws support shellfish aquaculture expansion, the Denman Islands Zoning Bylaw does not. As a result, some Management Areas in this Plan are consistent with Local government zoning and others are not.

Non-consistency of zoning with identified aquaculture development opportunities is not unique to Baynes Sound; it is common to a number of areas. As such, the issue warrants a provincial scale review. This Plan would be subject to any Provincial policy resulting from such a review.

Plan Implementation and Review

MSRM will work with other agencies to monitor and review the implementation and effectiveness of this Plan. Implementation includes MAFF-led meetings twice a year of an Aquaculture Forum of key stakeholder

groups. These meetings will allow for public dissemination of information about shellfish aquaculture as well as regulatory activities and for stakeholder representatives to provide government agencies with their views on the effectiveness of Plan implementation. The formal time frame for Plan review will be every three years. However, new information from research or monitoring may warrant earlier reconsideration of Plan recommendations.

1.0 Introduction

The Plan area is located between Vancouver Island and Denman Island, just south of Courtenay and North of Bowser, and includes Comox Harbour to Deep Bay as well as the west shoreline of Denman Island (see Figure 1).

Baynes Sound has been a provincially significant shellfish farming area for many years. However, shellfish aquaculture operators have stated that lack of access to potential new sites has hindered industry growth, despite the low potential for environmental impact and the ideal location of the area for this use. Resource use conflict over shellfish farming in the Sound has grown over time due to concerns raised by other resource users and upland residents regarding industry expansion, potential environmental impacts and operational issues. In 2000, the Vancouver Island Summary Land Use Plan identified Baynes Sound as a priority area for coastal Planning because of its importance for shellfish aquaculture, commercial fisheries, water quality and recreational opportunities. In the fall of 2001, Land and Water BC, Inc (LWBC), the Ministry of Agriculture, Food and Fisheries and the Ministry of Sustainable Resource Management (MSRM) agreed to undertake the Baynes Sound Coastal Plan to address these issues and provide certainty for all those with an interest in sustainable resource use of the area. LWBC agreed to not accept further applications for shellfish aquaculture pending the results of this Plan.

1.1 Purpose

This is a Provincial Plan designed to provide guidance for decisions regarding land tenure applications and to identify and address issues with the existing industry operation.

Baynes Sound Coastal Plan for Shellfish Aquaculture

The Province seeks to balance social and environmental issues and the needs of other resource users on the coast and at the same time provide economic opportunities for coastal communities. While Baynes Sound is no exception in this regard, it does represent an unusually difficult challenge, given the polarization of views regarding shellfish aquaculture, the intensity of existing development and the particular value that residents and resource users, including the shellfish aquaculture industry, place on the area.



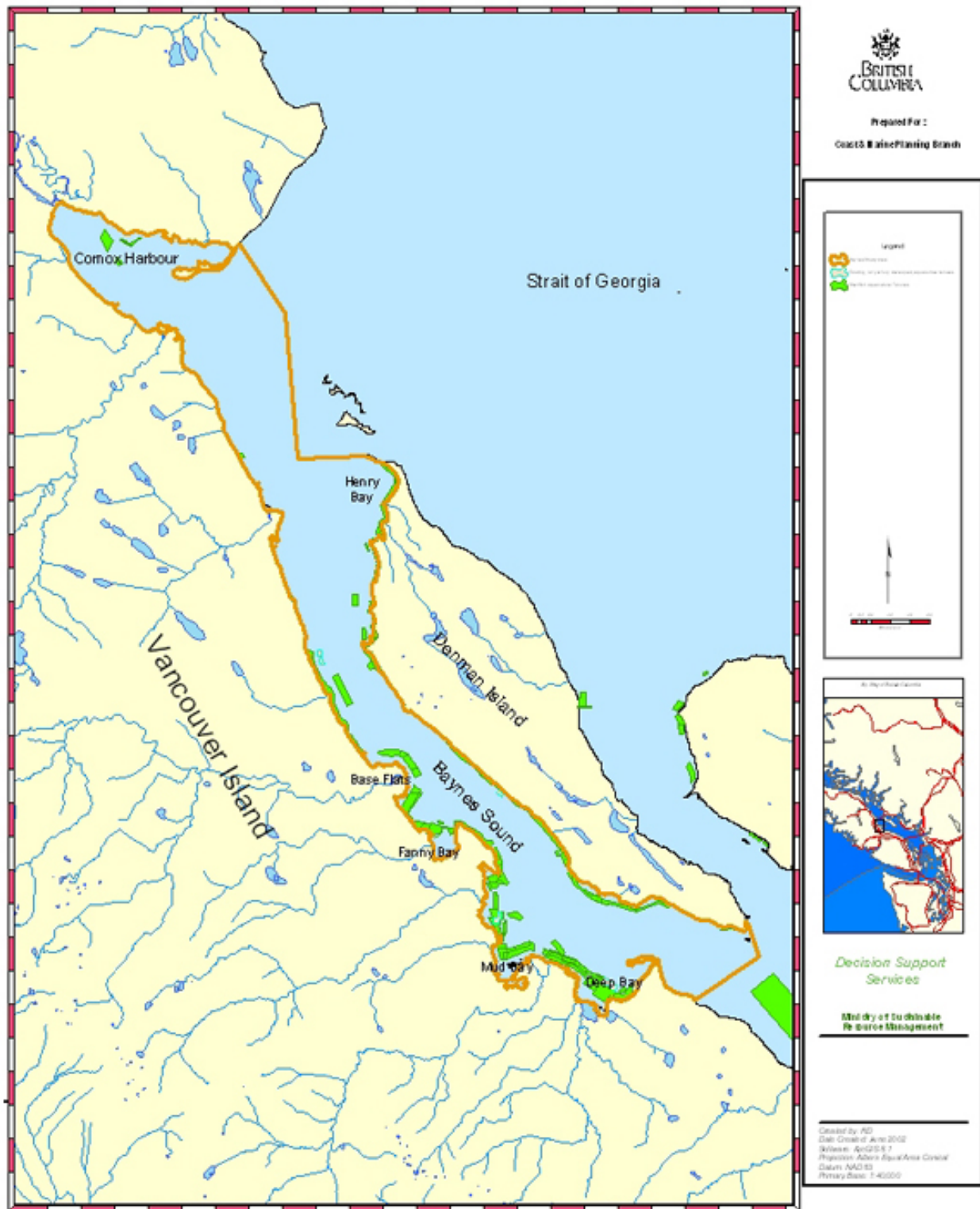
Baynes Sound Beach

The purpose of the Baynes Sound Coastal Plan is to employ a transparent and science-based approach to:

- Identify whether or not any additional areas are suitable for further shellfish aquaculture development;
- Address concerns of upland residents, fishery resource users and the aquaculture industry by documenting problem areas and developing workable industry management tools to apply where required;
- Ensure that, if any shellfish aquaculture expansion does take place, it does so in an environmentally sustainable fashion.

The study area for the Coastal Plan includes all near-shore waters, shoreline and inter-

Figure 1 Map of the Plan Area



tidal areas within Baynes Sound including Comox Harbour to the high tide mark (see Figure 1). See <http://srmrpdwww.env.gov.bc.ca/coastal/planning/index.htm> for complete Terms of Reference.)

1. 2 Jurisdiction

Provincial and Federal

The Province owns the seabed in the Plan area and has the mandate under the *Land Act* through LWBC Inc. to allocate and administer the use of these lands through tenures for aquaculture and many other activities. In addition, MAFF approves and regulates aquaculture operations through Aquaculture Licences under the *Fisheries Act* Strategy for Shellfish Aquaculture). The Ministry of Land, Water and Air Protection (MWLAP) is tasked with waste management under the *Waste Management Act* and wildlife habitat protection under the *Wildlife Act*.

Fisheries and Oceans Canada (FOC) manages fisheries and navigational safety under the *Fisheries, and Navigable Waters Protection Acts*, respectively, and the environmental assessment of development proposals under the *Canadian Environmental Assessment Act* and the *Fisheries Act*. The Canadian Wildlife Service is responsible for the protection of migratory birds under the *Wildlife Act* and *Migratory Birds Convention Act*. All of these Federal and Provincial agencies are responsible for enforcement under their regulatory mandates.

The technical and operational feasibility of a proposed shellfish aquaculture operation at the site-specific level are assessed through a “one-window” referral process, coordinated by LWBC at the tenure application stage. The proponent submits a tenure application and Management Plan which LWBC circulates for comment among all relevant provincial and federal referral agencies. While separate applications are still required for federal permits, a Provincial, one-Baynes Sound Coastal Plan for Shellfish Aquaculture

window, referral process employs a coordinated Provincial/Federal technical review team to facilitate the inter-agency review of applications. Regulation of shellfish aquaculture under various statutes includes review and adjudication of application as well as compliance and enforcement provisions as well. A number of Federal-Provincial policy-related discussions are currently under way to harmonize the federal and provincial review process to increase integration and efficiency.

Site-specific licence and permit application, referral and adjudication under Federal and Provincial statutes must still occur regardless of this Plan. The Plan simply provides a guide to LWBC and proponents on where site-specific applications may be more likely to receive approval, thereby decreasing the time that proponents and government must spend on applications for not suitable areas. The Plan does not guarantee that any site-specific application will or will not be approved. The site-specific application and referral process will continue to function as a more detailed level of analysis of the suitability of site-specific applications.

First Nations

The Plan area lies within the traditional territories of both the Comox and Qualicum First Nations. Any Treaty settlements negotiated between the Provincial, Federal and First Nations governments in the plan area will take precedence over any recommendations or guidance provided by this Plan. Also, any requirements for regulatory agencies to meet their obligations to consult with First Nations regarding infringement of aboriginal rights by specific development proposals continue to apply, regardless of the provisions of this Plan.

Local government

Three local governments have responsibilities for land use regulation in the Plan area. One is the Nanaimo Regional District (NRD)

which is responsible for the Vancouver Island side of Baynes Sound from the Southern limit of the Plan area up to, and including, Deep Bay. The second is the Regional District of Comox-Strathcona (RDSC), which is responsible for the Vancouver Island side of Baynes Sound from Deep Bay, north to the northern end of the Plan area, including Comox Harbour. The third is the Denman Island Local Trust Committee (DILTC) since part of Baynes Sound lies within the jurisdiction of the Islands Trust, which was established in 1974 by the *Islands Trust Act*. Included in the *Act* is the object to "...preserve and protect the Trust Area and its unique amenities and environment for the benefit of the residents of the Trust Area and of British Columbia generally, in co-operation with municipalities, regional districts, improvement districts, other persons and organisations and the Government of British Columbia." (Source: The Islands Trust Policy Statement). All three Local governments have authority to effect Zoning Bylaws under the *Local government Act* in their respective areas. It is anticipated that this will continue under the pending Local government Charter.

1.3 Background to the Baynes Sound Coastal Plan

Shellfish aquaculture has taken place in Baynes Sound since the early 1900's, when the Pacific Oyster (native to Japan, Korea and China) was first introduced to Fanny Bay. Since then, both wild and farm harvesting of the Manila clam and the Pacific oyster have become an integral part of the local economy.

In November 1998, the Province announced the Shellfish Development Initiative (SDI). Under the SDI, the Provincial Government worked with several communities and the industry to identify new shellfish aquaculture sites through a community based shellfish steering committee process.

The SDI was also intended to set regional targets for new tenures and to allow existing tenure holders to apply for expansion. In March 2000, a Comox Valley Shellfish Steering Committee (CVSSC) was established, which included Provincial agencies, First Nations, RDSC, DILTC and local stakeholders. The CVSSC met monthly to identify opportunities for new shellfish tenures in Baynes Sound. Ultimately, it failed to reach consensus on suitable areas next to Denman Island and was disbanded in August, 2000.

In Baynes Sound, 34 applications covering 147 hectares were submitted in 2000. As of April 2001, LWBC had adjudicated 33 of these expansions covering 141 hectares. As of November 2001, 14 of the 33 applications, covering 78 hectares, had received all the approvals required to expand their tenures. Sixty of the 78 hectares were intertidal and 18 hectares were deepwater. Although some expansions were approved and tenures issued on the west side of Baynes Sound next to Vancouver Island where NRD and RDSC zoning supports shellfish aquaculture expansion, no tenures were issued next to Denman Island where the Denman Island Local Trust Committee (DILTC) has instituted Conservation zoning.

The Denman Island Official Community Plan and Zoning Bylaw had originally both supported shellfish aquaculture since the early 90's. However, in 1997 the DILTC changed the zoning from "Aquaculture" to "Conservation" for all areas not under existing tenure to shellfish aquaculture. This new zoning designation does not provide for aquaculture development. Given that LWBC tenure offers were conditional on the proponents meeting Federal and Local government approval requirements, the Conservation zone effectively prevented any further shellfish aquaculture development next to Denman Island.

During consultations for this Plan the DILTC

emphasized that the new zoning was a response to pressure from many Denman Island residents to prevent further shellfish aquaculture development. The DILTC, and those residents opposing aquaculture expansion, want the “Conservation” zones in Baynes Sound to take precedence over Baynes Sound Plan provisions, where the two are not consistent. Some residents have stated that the Islands Trust “preserve and protect” mandate means that Baynes Sound should be treated as a Marine Protected Area.

There are other areas in the Province, besides Baynes Sound, where Local government zoning may not be consistent with coastal plans or the Provincial interest in sustainable aquaculture development. Given that this is a Provincial scale issue it requires resolution at the Provincial scale, rather than at the level of the Baynes Plan. The provisions of this Plan will be subject to any province-wide policy that addresses inconsistency between zoning bylaws and coastal Plans.

1.4 Current Situation for Shellfish Aquaculture Tenures in Baynes Sound

There have been a variety of opinions among Baynes Sound residents on how much area in the Sound has been taken up by shellfish aquaculture. Table 1 provides current data on this subject. Of the 1,530 hectares (ha.) of intertidal beach area in Baynes Sound¹, 493 ha. are under beach

¹ As shown in Table 1, this percentage is about the same for the Denman Island or Vancouver Island sides of the Sound. Also, a diversity of intertidal habitats exist in Baynes Sound that vary in composition, productivity, value to wildlife and capability to support shellfish aquaculture or wild fisheries. See the Archipelago Marine Research “*Review of Activities and Potential Effects...*” at http://srmwwwt.gov.bc.ca/rmd/coastal/planning/south_island/baynes/docs/Baynesrptver5.pdf for a more detailed breakdown of shellfish tenure areas by different intertidal habitat types.

culture tenure, representing about 32% of the total beach area in Baynes Sound. Of the 3,987 total ha. of water area in Baynes Sound, 61 ha. were under off-bottom shellfish aquaculture tenure, representing less than 2% of the total area of the Sound². Less than 3% of the intertidal area of Comox Harbour is under beach culture tenure, with no off-bottom culture present. Clam culture predator netting covers about 76 ha. (5%) of Baynes Sound between Denman Island and Vancouver Island (based on June, 2001 air photos) and about 0.05% of all the eelgrass beds (See Figure 1 for distribution of tenures).

Four tenures along the Vancouver Island side and one on the Denman Island side of the Sound were issued prior to Plan initiation and have not yet have been fully developed (for locations see Management Area Maps at: <http://srmwwwt.gov.bc.ca/dss/projects/sarp/baynes.htm>

Once tenures and aquaculture licenses have been issued, tenure/license holders have a legal right to develop their tenures according to their approved Management Plans, regardless of the recommendations in this Plan. As a result, these tenures can be expected to be fully developed, regardless of consistency with the Plan.

² For comparison purposes, there are 67 non-aquaculture related foreshore tenures totalling 210 ha. (this includes 65.2 ha. of intertidal Wildlife Management Areas, and 120 ha. of wild shellfish harvesting reserves).

Table 1: Approximate areas occupied by shellfish aquaculture tenures (Source MSRM, MAFF and LWBC data)

Location of aquatic lands and tenure (broken down by tenure type)	Aquatic land area in hectares (ha)	Percentage (%) of aquatic land under tenure
Total Plan area:		
- Total area (intertidal + water) - Intertidal Area - Area under beach culture tenure	8461 2215 511.9	23
Baynes Sound proper minus open area North of Denman Island and Comox Harbour:		
- Area of intertidal beach - Area under beach culture tenures - Total area of water - Area covered by off-bottom culture tenures - Area of water and intertidal beach - Area covered by beach and off-bottom tenures - Area covered by clam predator nets - Area of Denman Island intertidal beach within this portion of Plan area - Denman Island intertidal area under beach culture tenure - Vancouver Island intertidal area within this portion of Plan area - Vancouver Island intertidal area under beach culture tenure	1530.3 492.9 3987 61 5637 553 76 525.6 165.5 1005 327	32.2 1.5 9.8 4.9 31.5 32.5
Open water North of Baynes Sound:		
- Total area of water - Area covered by off-bottom tenure	1839 1.9	<0.2
Comox Harbour:		
- Total area of water - Total area of intertidal beach - Area covered by beach culture tenures - Off Bottom Tenures	300 685 19 0	2.7 0

1. 5 Issues and Perspectives

Most Baynes Sound resource users do not object to shellfish aquaculture in principle, but in Baynes Sound some feel that the industry may be approaching its environmental and social carrying capacity and may have exceeded it. Many people have been under the impression that intertidal oyster and clam culture occupy the majority of the beaches, alienating a public resource from recreational uses (See Table 1 for actual area occupied by tenures). Some also have the view that clam predator netting removes intertidal food sources by preventing bird access, alters the intertidal ecosystem and should not be approved until ecosystem studies initiated by Simon Fraser University and the Canadian Wildlife Service demonstrate no impact from this activity.

Many Deep Bay, Ships Point and Denman Island area residents stated that the industry has been escalating its use of off-bottom culture structures and technology which cause noise and visual impacts. They also expressed concern about litter on beaches and materials that float onshore from off-bottom facilities. Additionally, some people feel that impacts are created when aquaculture operators drive along the beach to service their tenures. Some landowners feel that visual impacts from shellfish culture have reduced their property values which will continue to decrease if the industry is allowed to expand. Most opponents of expansion feel that, regardless of the historical use of the area by the industry, recent developments have reduced their quality of life in the Sound.

Recreational users and commercial tourism operators believe that offshore culture interferes with water activities such as kayaking, ecotourism and recreational fishing and negatively affects the environmental values they depend on.

Tourism groups indicated that the Sound is a high day use area and that Henry Bay is the one remaining natural area for anchoring in adverse weather. These groups find shellfish culture visually obtrusive and claim that off-bottom shellfish culture technology interferes with marine travel routes.

Commercial underwater harvesters have been active in the area since the mid 1970's and identified areas of interest for geoduck harvesting. They expressed concern that these areas could be alienated from their use due to shellfish culture expansion and have asked that they not be allocated for shellfish farming. On the other hand, at least one individual involved in commercial underwater harvesting has expressed an interest in geoduck culture in the area.

Historically, the Sound has been a critically important area for herring spawning, although it is not possible to predict exactly where herring will spawn within from one year to the next or where the openings will take place. While all areas in the Sound are considered to have good spawning potential, some areas are more important than others. Herring fishers expressed concern that expanded beach culture and off-bottom culture will interfere with the gill-net and seine herring fishery and the ability of the herring to spawn. During the Planning process representatives of the Herring fleet and the shellfish growers met together with project team members to discuss conflict issues. Some Plan recommendations have resulted from that meeting.

Shellfish growers consider Baynes Sound to be a provincially significant shellfish growing area. They feel that an optimal combination of good growing conditions, high productivity and nearby infrastructure (i.e. transportation, processing and accommodation) makes the area particularly viable economically and highly desirable compared to other areas. Local growers feel that expansion should be

permitted, given the unique value of the area for shellfish culture. They see their industry as environmentally sustainable and the BC Shellfish Growers Association has made great efforts to develop a voluntary Code of Practice and Environmental Management System. The industry recognizes some operational, compliance and environmental management issues exist and have to be addressed, but believes it is possible to expand and coexist harmoniously with other resource users and the environment.

Shellfish growers commonly believe that many environmental benefits result from shellfish culture. Stated benefits include: increased food biomass for foraging wildlife under floating operations, additional seed washed onto the higher beach areas above and below tenures that forms food for birds, and a strong advocacy role to ensure that the marine environment is uncontaminated.

A significant portion of Baynes Sound waters have been subjected to bacterial contamination from a variety of upland sources such as sewage and agricultural runoff. Harvesting shellfish in Baynes Sound is under a sanitary management Plan overseen by FOC and the Canadian Food Inspection Agency. In some cases the contamination or risk of contamination (e.g. adjacent to urban areas in Comox Harbour) has been severe enough for FOC to close the areas to any harvesting. This has represented an economic loss to the wild and cultured shellfish fisheries and has also affected recreational harvests. In other cases contamination has been moderate, and, as a result, FOC has restricted those areas to depuration harvests (i.e. the product can be harvested under permit and purified at a depuration plant before marketing). In 1994 deteriorating water quality in the Sound resulted in the formation of the Baynes Sound Roundtable which is a joint community/government initiative for monitoring and remediation of water

quality. This initiative is resulting in gradual improvement of water quality in Baynes Sound. The Roundtable is currently pursuing a “No sewage discharge Zone” designation for Baynes Sound. In addition, the communities of Royston, Union Bay and Cumberland are all preparing or submitting Liquid Waste Management Plans for Provincial Government approval that will result in improved sewage treatment and disposal in the Plan area.

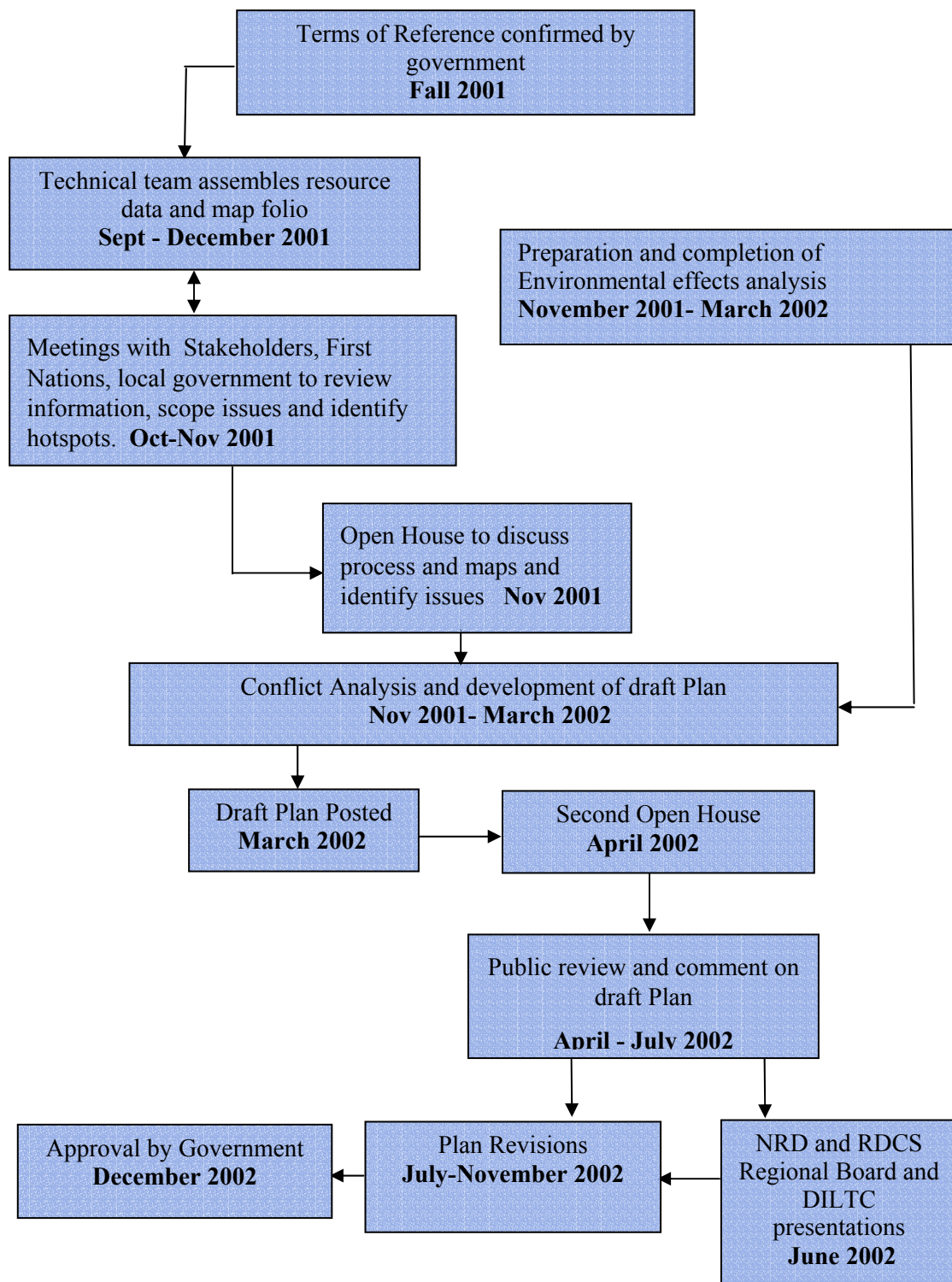
1.6 Planning Process and Consultation

1.6.1 Process

This Plan is based on social as well as technical and scientific information. A consultation program was established (see Section 1.6.2) to account for the personal values and beliefs of those people to be affected by the Plan. This includes both supporters and opponents of shellfish aquaculture in Baynes Sound.

The planning process commenced with development of Terms of Reference and an exercise to map environmental, resource and human use values (see Figure 2 for a flowchart of the planning process). This included soliciting local ecological and human use knowledge in the early stages of Plan development, as well as determining community and resource user interests and issues. The issues were then reviewed and listed and, upon Plan completion, a set of responses was prepared to issues, questions and statements raised during consultations (see Appendix A). The inter-agency technical team met frequently to develop and modify Plan components and to ensure that all identified issues were documented and responses prepared. The consultation program served to inform local government, First Nations, stakeholders and the public on the Planning process and to invite their review of, and comments on, draft Plan materials.

Figure 2: Plan Process Flowchart



During early consultations, area residents expressed several environmental concerns. To address these MSRM retained Archipelago Marine Research Ltd. to:

- review and summarize existing environmental information on Baynes Sound;
- analyze environmental interactions of shellfish aquaculture; identify information gaps and areas where additional information is necessary; and, provide advice on a decision oriented sustainable resource management framework for shellfish aquaculture (See Section 3.0 and Appendix B).

This was to be a non-critical summary of existing local and global environmental information to assist Provincial decision making by providing clarity on relative risk of shellfish aquaculture and by identifying information gaps.

Following the public review of the Archipelago report and the draft Plan, some residents were dissatisfied that the environmental analysis had been conducted by only one company, rather than an independent panel. To address that concern, MSRM retained Timothy Parsons, Ph. D., Professor Emeritus of Earth and Ocean Sciences at the University of British Columbia, and Jackie Booth, M.Sc., Consulting Marine Biologist, to independently review the Archipelago report for appropriateness of methodology and correctness of results.

During the planning process work was initiated on a Compliance and Enforcement Strategy, including a compliance assessment based on aerial photography taken during the summer of 2001 and issues identified during the Plan consultation process. As the Plan proceeded the Compliance and Enforcement Strategy evolved into a Provincial “Service Agreement on Coordination of Compliance and Baynes Sound Coastal Plan for Shellfish Aquaculture

Enforcement Programs between MAFF, MWLAP, MSRM and LWBC” (See Section 4.0 and Appendix C) which is Provincial in scope, but still germane to implementation of this Plan.

The consultations raised several other operational topics that clearly needed to be considered but were beyond the scope of the Baynes Sound planning process. These included an enforceable Provincial Standards of Operation (Code of Practice) for shellfish aquaculture (see Section 4.0) which would also be applicable to Baynes Sound and other parts of the west coast as well.

During the consultations it was evident that many residents of the Plan area were not aware of an existing dispute resolution process for aquaculture under the *Farm Practices Protection (Right to Farm) Act*. In order to clarify understanding of this process the Plan provides information on that process (see Section 5.0 and Appendix D).

Following the environmental effects analysis, the inter-agency technical team determined the types of shellfish activity that would be acceptable in principle, based on environmental risk. These were then considered for each area of interest identified by shellfish aquaculture representatives as well as the potential for resource use conflict (See appendix E). The conflict analysis included areas of interest and use identified by other resource users, such as commercial tourism operators, commercial fisheries and recreational users as well as the public, local government and upland property owners. The evaluation also accounted for areas of both low residential density and intensified upland residential activity to determine the potential for visual and noise impacts from aquaculture development. Management Areas were then developed (see Section 6.0), based on the environmental and resource use conflict analysis. Management

provisions associated with each Management Area were developed based on both environmental interaction information and the potential for conflict. Identified information gaps helped in determination of whether or where opportunities for areas with development potential should be considered. A final component of this Plan was the implementation and monitoring process (Section 7.0).

1.6.2 Public Consultation

The Baynes Sound Coastal Plan process provided opportunities for Local governments, First Nations, stakeholder groups and the public to provide comments, advice and recommendations on the future of shellfish aquaculture in the Sound. To assist in this process MSRM retained Cornerstone Planning Consultants to assist in the conduct of the public and First Nations consultations.

The consultation process began with meetings with some key stakeholder groups during development of the Plan Terms of Reference in August and September, 2001. To initiate the Plan, public meetings were held in Fanny Bay and on Denman Island in November 2001. The project team introduced itself, presented the Terms of Reference for the Coastal Plan, reviewed preliminary base maps and received input on key issues from the local residents. About 300 people attended with 65 people returning questionnaires provided at the meetings. Separate meetings were also held with key stakeholder groups as well as the Comox and Qualicum First Nations. An "Issues and Responses" document (Appendix A) was prepared to answer how issues and questions were being addressed. A technical Planning phase followed, during which the Inter-agency technical team developed a draft Plan that took into account all information gathered, including public and stakeholder input. The draft Plan was posted on the MSRM

website in March 2002. Following a public review period, another set of consultations was organised that included separate meetings with key stakeholder groups and open houses on Denman Island and Union Bay. Attendance was similar to the introductory meetings held in the fall of 2001. Although the public was initially given a month to respond with comments, MSRM continued to receive and accept comments, letters, other documents and numerous telephone calls through the spring, summer and fall of 2002.

Presentations were also made in June 2002 to the NRD and RDCS Regional Boards and the DILTC as well as the Comox First Nation. Staff were unable to arrange a second meeting with the Qualicum First Nation.

It is important that the process for reviewing implementation of the Plan include an opportunity for public input. This applies especially to the ongoing regulatory agency activities that flow from Plan recommendations. To provide this opportunity the Plan recommends MAFF-led meetings of a Community Aquaculture Forum twice a year to discuss progress of the Plan and provide feedback to government (see Section 7.2 for details).

2.0 Description of the Study Area

2.1 Biophysical Environment

Baynes Sound comprises about 8,500 hectares of shoreline and aquatic areas with a variety of biophysical characteristics. It is a shallow coastal channel fringed by protected bays, open foreshore, intertidal mud and sand flats, low grade deltas, tidal estuaries, inshore marshes and rocky shorelines. Comox Harbour is one of the largest low-gradient deltas on the East Coast of Vancouver Island.

The Sound supports a variety of plant life and provides biologically diverse habitats for bird and marine species. These rich, productive habitats are a result of the combination of sheltered water, low gradient tidal areas, fine substrates and nutrient-rich freshwater input. Several of these areas have been incorporated into Wildlife Management Areas and reserves for wild shellfish harvesting (to view resource maps go to:

<http://srmwww.gov.bc.ca/dss/projects/sarp/baynes.htm>).

A number of native and exotic intertidal bivalves are found in the area, including: Pacific oysters, Olympia oysters, foolish mussels, varnish clams, Manila clams, little neck clams, butter clams, geoducks, horse clams, basket cockles, soft-shell clams, Baltic Macomas, bentnose macomas, and pointed macomas.

Sound waters have experienced increasing pollution related to rural and urban development and these have affected the area available for shellfish aquaculture. Of the 8,500 hectares in Baynes Sound, 2091 ha. (25%) are affected by Sanitary Shellfish Closures (See Definitions and Acronyms). Seasonal closures also affect the majority of the Sound. Causes include runoff from

agricultural areas, faulty sewage disposal in residential areas and microbial contamination from activities around nearby commercial and recreational wharfs.



Baynes Sound

Concern has also been growing over sewage discharges from boats in the Sound. Continued residential development around the Sound and a lack of a comprehensive Liquid Waste Management Plan for the area will continue to reduce water quality and increase public health hazards. A Management Plan for shellfish harvesting in the Sound has been in place since 1998. Led by Environment Canada and the Canadian Food Inspection Agency, that Management Plan involves determining safe harvesting times based on rainfall events and results of continued water quality monitoring funded by shellfish growers in the area (Source: MAFF).

The area is a critical staging, breeding and wintering area for migratory birds and considered the most important waterfowl habitat in British Columbia after the Fraser River estuary. Over a typical year, more than 176 bird species use the area. Of these, 20 species are on the British Columbia Conservation Data Centre list as being species of concern (Blue listed), while 4 are considered threatened (Red listed) (Source: Canadian Wildlife Service). Globally

significant populations of nine species of birds including trumpeter swans, great blue herons and Pacific loons use the area. The Sound is an important part of a large system of wildlife corridors, linkages and migratory paths in the ecological region of Vancouver Island's East Coast and the Gulf Islands. Numerous streams entering Baynes Sound provide spawning and rearing habitat for coho, chum, chinook, pink, sockeye, coastal cutthroat and steelhead salmon in addition to other fish species. Estuaries provide important habitat for the early life stages of some salmonid species. The Sound is also viewed as a highly productive Pacific herring spawn area.

2.2 Economic and Social Activities

The Plan area represents a mix of resource uses and is somewhat different in population growth and income compared to the rest of the Province. Population in the area declined by about 275 people between 1996 and 2001 compared to a 5% increase provincially. The participation rate, which is the share of the 15+ years of age population available for work, is 63% for the Plan area compared to 68% for the Province. Per capita incomes in the Plan area are growing slower than per capita incomes for the Province as a whole. The composition of incomes in the area is weighed less towards employment income and more towards pension income than is the case for tax payers in the Province as a whole. (Source: MSRM socio-economic profile).

Aquaculture

Baynes Sound produces approximately 50% of the Province's cultured shellfish. The major commercial bivalves cultured are Pacific oysters and Manila clams with some Japanese scallops. Biophysical capability studies for clams, oysters and scallops conducted by MAFF, show a significant

number of areas within Baynes Sound with medium or good capability ratings. This natural capability combined with a well-developed infrastructure makes Baynes Sound the most significant area for shellfish aquaculture production in B.C.

Aquaculturists in Baynes Sound are also developing geoduck clam culture which has significant potential in the area. This type of culture takes place below low tide ("sub-tidal"), with no surface technology.

The BC Shellfish Growers Association (BCSGA) is interested in developing a research and development beach culture facility in the Sound. The Center for Shellfish Research at Malaspina University College would also like to develop one off-bottom culture field site in Baynes Sound in association with the BCSGA proposal. These small scale, not for profit, sites would function as demonstration facilities for training (e.g. code of practice and compliance) and research (e.g. new technologies and environmental effects) and would also be used to showcase the industry to the public. Both groups are interested in the Deep Bay area as a preferred location for both sites due to biophysical characteristics, proximity of infrastructure and accessibility to the public.

The Comox Indian Band also has great interest in shellfish aquaculture in the Sound and has identified several sites within the Plan area as having potential for beach culture development. These sites are located in Comox Harbour and along the Central and Northern portion of the Sound next to Vancouver Island. The Band has signed a Memorandum of Understanding (MOU) with LWBC that reserves 60 ha. of aquatic land for the Band to apply for intertidal aquaculture tenure. Areas identified in the MOU would be protected by a *Land Act* Map Reserve. The Band also wants to negotiate an additional MOU for off-bottom culture, including a site in Henry Bay, but

has not yet entered into negotiations with LWBC for these areas.

Presently 119 shellfish beach and off-bottom aquaculture tenures cover about 573 hectares of useable area in Baynes Sound (Source: MSRM, MAFF and LWBC data). In 2001, about 50 distinct companies or individuals holding these tenures produced an estimated 3360 tonnes of product worth \$8.0 million to growers (farm-gate value – See Definitions and Acronyms). About 850 tonnes were clams worth \$4.9 million farm-gate and 2510 tonnes were oysters worth \$3.1 million farm-gate (for general information about shellfish culture in BC go to: <http://www.bcsqa.ca/> . For information on shellfish aquaculture technologies go to: www.bcsqa.ca/bcsqirs/main/sgmain.htm).

Five major processing plants in the Plan area process clams and oysters. In 2000, the last year for which data are available, these plants processed an estimated \$17.6 million worth of product (processed or wholesale value). Part of the \$9.7 million from clam processing was for commercially caught wild clams rather than cultured ones but the figures cannot be separated. Some of the overall processing value also reflects other BC product imported to the Plan area. Shellfish aquaculture in and around Baynes Sound generated 225 jobs on farm sites in 2000 and 165 jobs for processing in 1999. Most of this employment is full-time, year round with the annual wage bill for the 390 employees to be about \$8 million (Source: MSRM socio-economic profile).

Commercial Fisheries

The roe herring fishery in Baynes Sound is extremely important to the fishing industry with 2001 catches amounting to approximately 8,400 metric tonnes for the seine fleet and 400-1000 tons for the gillnet fishery, for a total landed catch value of \$15-25 million dollars (Source: Fishing Vessel Owners Association). Baynes Sound

accounts for 100% of the Strait of Georgia seine fleet and a significant portion of the Strait of Georgia gillnet fleet. The herring fishery in the area has most recently occurred mainly at the north and south ends of Lambert Channel, east of Comox Bar off Cape Lazo and in the south off Boyle Point on Denman Island. The Herring fishers have identified the Baynes Sound area as a significant area of interest over the long term. Sea urchin, prawn and commercial intertidal clam fisheries have long been active in the Sound.

Baynes Sound represents an estimated 320 ha. of geoduck fishing area (Source FOC). Consultations with the Underwater Harvesters indicate that several important areas for geoduck harvesting are located in the Sound. The inside geoduck fishery operates on a three year rotational basis, the last year for Baynes Sound being 2001. During that year over \$2 million dollars worth of geoducks were landed from Comox Bar south to Mapleguard Point. Excluding Comox Bar, the landed value would be \$1.1 million dollars. The wild clam fishery in Area D, which includes Hornby, Denman and Lasqueti Islands averaged about 227,000 kilograms annually from 1990 to 1997 (Source: MAFF). There are no data specific to Baynes Sound alone.

Tourism and Recreation

Baynes Sound has been identified as an important destination for many recreational users visiting the Comox Valley. Tourists and local residents alike use the recreation sites. Popular activities such as boating, beach combing, sport fishing, kayaking, and marine wildlife viewing are dependent on access to the foreshore and adjacent waters. Tourism-related businesses such as bed and breakfasts, water and land tours and gift shops cater to the influx of tourists and are a major economic contributor to the local economy. A meeting with tour guide operators provided information on day use

areas in the Sound and identified Henry Bay as the only remaining useable natural anchorage left in the area and therefore critical for boater use. No local economic figures were available from these groups.

Transportation and Navigation

Baynes Sound is an important transportation corridor for commercial fishing and towing vessels and pleasure craft, as well as the ferry travelling between Vancouver and Denman Island.

Upland Values

Upland areas around the Sound are utilised for agricultural, forestry, settlement and other commercial and recreational purposes. Many residents and property owners emphasize that privately owned upland areas are valued highly for accommodation, recreation, private property economic values and quality of life. No economic figures on these values were available.

3.0 Environmental Analysis & Independent Review

3.1 Approach to Assessing Environmental Effects

Two reports on interaction between shellfish aquaculture operations and the environment in Baynes Sound had been completed prior to initiation of the Plan. These are:

1. A Review of the Impacts of Shellfish Aquaculture Lease Operations on Marine and Shorebird Species in Baynes Sound, British Columbia by Axsy Environmental Consulting Ltd. in 2000; and,
2. Phase 0 - Review of Environmental Impacts of Intertidal Shellfish Aquaculture in Baynes Sound by the Pacific Science Assessment and Review Committee (PSARC) in 2001.



Great Blue Heron

In 2001, the Ministry of Agriculture, Food and Fisheries also conducted a global literature review of the environmental effects of shellfish aquaculture. Together, these reports documented the best

knowledge available with the first two making recommendations specific to Baynes Sound (see Appendix B Sections 1.0 and 2.0 for summary). However, public debate has continued over conclusiveness of this information, the potential for negative effects from shellfish culture and whether sufficient information exists to determine whether shellfish aquaculture should be allowed to expand in Baynes Sound.

To help inform the Plan, MSRM retained Archipelago Marine Research Ltd. to summarize and clarify the information in these environmental reports in a non-critical way. Terms of reference for the review were to:

1. Review the above three reports;
2. Provide an objective summary of their contents in terms of potential environmental effects from shellfish aquaculture;
3. Prepare an analysis of environmental interactions of both intertidal and off-bottom culture for Baynes Sound;
4. Identify data gaps where additional information is required; and,
5. Provide direction on building a decision oriented, sustainable resource management framework for shellfish aquaculture in Baynes Sound.

The Archipelago Marine Research report resulting from this contract is posted on the MSRM website

http://srmwwwt.gov.bc.ca/rmd/coastal/planning/south_island/baynes/index.htm

3.2 Results of the Environmental Issues and Decision Analysis

Most human activities have the potential to both positively and negatively affect the environment. Understanding the significance of negative effects and probability of their occurrence (i.e. risk) is critical in deciding whether to allow, or how

to manage, any proposed resource development activities. (see Appendix B, Section 4.0, for a discussion of risk and decision making). Archipelago reviewed the literature provided, consulted with scientists studying shellfish aquaculture impacts, described the potential effects in terms of severity, duration and extent, if they were to occur, and indicated where significant uncertainties exist.

Probability of occurrence is a key component of risk analysis, but is extremely difficult to determine in qualitative (non-numerical) assessments such as this. Consequently, describing the effects if they were to occur was a conservative way of removing probability of occurrence as a barrier to the evaluation. It was then possible to focus primarily on whether severity, duration and extent of potential effects were low, moderate or high.

Several conclusions and recommendations related to environmental effects can be derived from the preceding information (for a more complete summary see Appendix B part 2.0). Based on the contractor's relative ratings it can be concluded that most shellfish culture activities, if they were to occur, present a low to moderate risk to the environment. Exceptions to this would be stream channelling and vehicular use of the intertidal area. Although use of clam predator netting is likely to result in low to moderate negative impacts with short duration upon removal of netting, some uncertainty remains concerning the significance of these potential impacts. There are also uncertainties regarding the timing and habitat requirements of beach spawning animals such as sand lance and smelt. The significance of potential impacts from off-bottom culture is less than from beach culture.

A number of positive effects can also occur. These include coastal stewardship, improved

water quality and sediment productivity, improved sediment quality, predation refuges and structural habitat features.

Simon Fraser University and the Canadian Wildlife Service recently embarked on an ecosystem study of the environmental effects of shellfish aquaculture (See Appendix B Section 2.0 for details). The Malaspina University College Shellfish Research Center is also planning a comprehensive applied research program that includes the interactions of shellfish aquaculture with the environment. A component of this will be herring behaviour and interactions with shellfish aquaculture operations. The Plan will benefit over time from the results of these complimentary programs for adaptive management of shellfish aquaculture in Baynes Sound.

3.2.2 Decision Analysis:

A significant component of the Archipelago project was to develop a resource management decision framework. Appendix B, Section 3.0 provides a summary of information stemming from these meetings, as well as the Archipelago report, including a discussion on risk assessment.

The Plan accepts the Archipelago exercise as a qualitative risk assessment, which is the most frequent type of risk assessment performed for resource development projects. Qualitative assessments are different from the more formal health and environmental risk assessments usually applied to contaminants work, where quantities and probabilities are often defined numerically. The Archipelago report carefully defined the precautionary approach and advocated that where risk is high, a that approach be taken, but where risk is low to moderate an adaptive management approach be taken. In some cases this Plan is risk-averse in recommending avoidance or mitigation of activities with high or

uncertain risk. In other cases the Plan takes an adaptive management approach where the risk is low to moderate (see Sections 6.0 for description of Management Areas and 7.0 for recommended actions).

The contractor recommended several criteria for effective public engagement to overcome the public mistrust of government apparent in the Plan area:

- A commitment to collaborative planning, decision making and periodic public reporting of results through a system of performance measurement and progress monitoring and assessment;
- Collaborative development of mechanisms and rules of engagement with all communities of interest. A small team or committee for effective continued interaction with all interests can be effective.
- Systems of performance measurement and progress assessment for continuous learning and effective adaptation to change over time.
- Immediate designations are only a minor step in a continuous process of change in Baynes Sound to manage human use of resources and ensure both human and ecosystem well being.

The Baynes Sound Plan has striven to meet these criteria through public consultations before and during Plan preparation, science-based qualitative risk assessment, a transparent stakeholder interest evaluation and conflict avoidance exercise, and long term monitoring, review and revision of the Plan.

3.3 Independent Review

After public review of the draft Plan some criticism was received that the Archipelago analysis was conducted by only one entity, rather than by a scientific panel. Upon discussing these comments with the author of the Archipelago report, the consultant

indicated this approach and impact evaluation had been discussed with other experts. To further increase the objectivity of this exercise, the MSRM contracted two marine specialists, Dr. Timothy Parsons, Ph.D., Professor Emeritus, Department of Earth and Ocean Sciences, University of British Columbia, and Jackie Booth, M.Sc., Consulting Marine Biologist, to independently review the Axys, Phase 0 and Archipelago reports. They were directed to advise on the approach taken for the analysis and to indicate whether or not they were in agreement with the results of the assessment. Both reviewers generally agreed with the approach and findings in the Archipelago report. As a result, it is not considered necessary to alter any of the conclusions or recommendations in this Plan.

3.4 Biological Carrying Capacity

During public review of the draft Plan, some members of the public and government staff were uncertain whether shellfish aquaculture was exceeding the biological carrying capacity of Baynes Sound (See Appendix B, Section 4.0 for an explanation of biological carrying capacity). Baynes Sound shellfish growers have not yet reported a decrease in size or production of shellfish. This can be considered a rough indication that the biological carrying capacity of Baynes Sound has not yet been approached or exceeded. However, this has not been verified scientifically and provides no indication of what the ultimate carrying capacity of the Sound might be. To address this data gap, the Province has initiated a carrying capacity study, with interim and final results expected by the end of December 2002 and March 2003, respectively.

4.0 Compliance and Enforcement

At the outset of this planning process, it was evident that the issues of compliance and enforcement needed to be addressed.

Initially, government staff began developing a Compliance and Enforcement (C&E)

Strategy specific to Baynes Sound,

but it soon became apparent that agencies needed to collaborate on C&E on a Provincial scale. As a

result, agencies continued to collect related information in

Baynes Sound, but MAFF,

MWLAP, MSRM and LWBC

expanded this work to develop a

Provincial “Service Agreement on the Coordination of Compliance and Enforcement”. The Agreement

is available at:

www.agf.gov.bc.ca/fisheries/compl/service%20agreement2.pdf and in Appendix C of this Plan.

In the summer of 2002, MAFF Fisheries Inspectors implemented an inspection program in Baynes Sound to determine levels of compliance with government regulations as well as the voluntary Code of Practice developed by the BC Shellfish Growers Association. MAFF Inspectors are now evaluating the data collected, following up with related questions to selected operators and will be reviewing, selecting and implementing appropriate options for enforcement in cases where compliance with government regulations is an issue. MAFF is also allocating additional licensing and enforcement staff to meet the increased requirements for compliance and enforcement in Baynes Sound and elsewhere.

Many Plan area residents expressed the wish for an enforceable Code of Practice for shellfish aquaculture operators in Baynes Sound. However, a broadly applicable province-wide Code is needed, rather than

only one for Baynes Sound. In the spring of 2002, the Province undertook an exercise to prepare an enforceable provincial Code of Practice (Standards of Operation). A consultant developed a draft Code and undertook public consultations on that draft.



Denman Island clam beach

The Province is now reviewing a final draft Code as well as legal mechanisms and implementation details before putting the Code into force. Once in effect, this Code will have significant implications for Baynes Sound. The draft Code is available at:

www.agf.gov.bc.ca/fisheries/shellfish/BCM%20AFF%20COP%20draft%2002may31.pdf

5.0 Dispute Resolution

Many people in the Plan area expressed a desire for better dispute resolution and indicated they did not know where to register their concerns. This Plan has been designed to proactively identify social and environmental conflicts at the heart of past disputes and avoid many of those disputes before they occur. However, plans seldom eliminate all disputes.



Oyster Rafts in Baynes Sound

In Baynes Sound, some disputes may still arise over the operation of specific aquaculture facilities. A dispute resolution process (called “Complaint Resolution Process”) already exists under the *Farm Practices Protection (Right to Farm) Act* (FPPA), but people generally do not appear to be familiar with it. To address that difficulty, the Plan provides detailed description and flowchart of that process in Appendix D.

¹ The fundamental policy of the FPPA is that farmers have a right to farm in BC’s important farming areas, provided they use normal farm practices and follow other legislation listed in the *Act*. The FPPA applies to all licensed commercial aquaculture operations in The Province.. Under the FPPA “Normal Farm Practices” are those conducted by a farm business in a manner consistent with proper and accepted customs and standards as established and followed by similar farm business under similar circumstances. The Farm Practices Board is the authority for determining what is or is not a “Normal Farm Practice”.

The main body for overseeing disputes around aquaculture is the Farm Practices Board. The Board was established in the FPPA in 1996, and is responsible for providing a fair and equitable process for resolving farm practices disputes out of court. The FPPA prohibits nuisance lawsuits from being brought against operators in normal farm practices while providing a non-litigious process for resolving conflicts between farm operators and their neighbours. The Farm Practices Board consists of up to 20 members who represent both farming and non-farming interests across the Province. The Board is also responsible for making recommendations and resolving disputes as to whether aquaculture operations are using normal practices¹. It should be recognized that the Farm Practices Board only deals with disputes over "normal" farm practice, not land-use or allocation issues. Site-specific land-use and allocation issues are addressed by LWBC.

6.0 Management Areas and Future Opportunities

6.1 Analysis and Method

The "Management Area" system was developed to provide guidance for applications for future shellfish aquaculture development or restriction of such applications and to provide the basis for operational conditions of new shellfish tenures.

The Plan identifies six "Management Areas" to guide potential aquaculture tenure applications. Each Management Area is depicted on one or more of three large scale, overlapping maps titled "Baynes Sound Planning Initiative: Management Areas of the Northern (or Central or Southern) Baynes Sound Study Area" (see: <http://srmwww.gov.bc.ca/dss/projects/sarp/baynes.htm>). Small scale versions of these same maps are also presented in Appendix F in hard copies of this Plan.

The central channel of Baynes Sound has not been designated as a Management Area. No applications for this area are recommended or likely to be approved due to navigational constraints.

The Management Areas were developed during a resource and spatial analysis (See Appendix E for details). The project team considered additional development or expansion of shellfish aquaculture only in areas where potential negative environmental effects are considered to be low to moderate and where conflicts would be minimal.

These Management Areas are designed to guide applications for new development or expansion. They do not affect existing operations which will normally be allowed

to continue, subject to tenure and licensing terms and conditions.

None of these designations preclude the need for site-specific application referral, review and adjudication through the interagency referral process coordinated by LWBC (e.g. MAFF and Fisheries and Oceans Canada site-specific concerns still



Oyster long line

have to be met). The Plan does not preclude any provincial requirements that may exist regarding local government zoning, nor does it guarantee that any application in any area will result in a tenure or licence being issued.

Some existing tenures issued prior to this Plan have not yet been fully developed (See large scale Management Area Maps for locations). These tenures are legal documents with the Province. As a consequence, the tenure holders can legally develop their tenures fully, whether or not they are consistent with the Management Areas in this Plan, subject to tenure terms and conditions.

Although the risk of negative environmental impact from off-bottom culture is low, many of the areas under application or of interest to the shellfish growers are subject to significant resource use conflict. As a result, only one area where conflicts are considered minimal, provides for new off-bottom culture facility applications. The

Plan does support application for one small combined beach and one off-bottom culture Research and Development facility in the Deep Bay area.

6.2 Management Areas and Descriptions

6.2.1 Area 1: Off Bottom

Given the lower potential for conflict with off-bottom culture in this area, the following management direction should be taken:

- a. Acceptance of applications for new off-bottom culture is recommended, given the low visual impact and reduced number of conflicts.
- b. No new or expansion of beach culture. This is because of potential conflicts with natural values and other resource uses and existing high levels of extensive beach culture use in this area.
- c. Tenures may be subject to prescriptive advice from referral agencies

6.2.2 Area 2: Special Management (Sub-tidal)

This area is characterized by intensified residential development, high environmental value and potential for resource use conflict, and optimal locations for research and demonstration. The following management direction should be taken:

- a. Applications for expansion or new sub-tidal culture tenures limited to acceptance of applications for:
 - operations with no above water surface structures, subject to Coast Guard requirements(e.g. geoduck farming);
 - operations using equipment that is unobtrusive in terms of sound generation;
- b. No applications for new tenures, or expansion of existing beach culture tenures or development of conventional off-bottom culture

technology such as rafts and long lines are recommended. This is based on potential conflicts with natural and upland residential values, other resource uses and existing high levels of extensive beach culture use.

- c. Acceptance of two applications for not-for-profit research and development facilities in the area from Fanny Bay to Deep Bay : one for beach culture and one for off-bottom culture. It is recommended that only applications from a research institution be accepted. As platforms for applied environmental research these facilities will assist in adaptive management.

6.2.3 Area 3: Special Management (Beach and Sub-tidal)

Given a moderate potential for conflict in this area, the following management direction is recommended:

- a. Limited opportunity for applications for expansion of existing tenures.
- b. Limited Opportunity for new beach culture tenure applications from First Nations.
- c. No other new off-bottom tenures due to conflicts and visual impacts.
- d. Application for new sub-tidal culture tenures limited to:
 - Operations with no above water surface structures, subject to Coast Guard requirements (e.g. geoduck farming).
 - Operations using equipment that is unobtrusive in terms of sound generation

6.2.4 Area 4: Restricted Expansion (Off-Bottom and Beach)

Given the values, including high First Nation interest in shellfish culture, and

concerns in the area which include some environmentally sensitive areas and some wild shellfish fisheries, the following management direction is recommended:

- a. Acceptance of expansion applications limited to areas contiguous with existing tenure only. This recommendation is based on potential conflicts with natural values and other resource uses in this area.
- b. Limited Opportunity for new beach culture tenure applications from First Nations

6.2.5 Area 5: Future Analysis

Given the values, including high First Nations interest in shellfish culture, and concerns in the area, the following management direction is recommended:

- a. Given the environmental and social concerns including bacterial contamination of the water, First Nations interests and constraints of these two areas, aquaculture applications are generally not advisable. However, applications may be considered based on changing circumstances (e.g. improved water quality to FOC standards, or reduced environmental or resource use conflict).

6.2.6 Area 6: No Additional Aquaculture

Potential for conflict is very high in these areas. The following management direction is recommended.

- a. No new applications for tenures or expansion of existing beach or off-bottom tenures, due to high levels of existing extensive beach culture use of the area, potential herring fishery and other conflicts, visual impacts, anchorages, and the use of the area for recreational or conservation purposes.

6.3 Summary of Future Opportunities and Constraints

If the new opportunities identified in this Plan are realised, the areas available for development would represent an estimated 8 to 10 new tenures for intertidal culture, including First Nations tenures, and 4-5 new tenures for off-bottom culture in the south east part of the Sound adjacent to Denman Island. Based on areas occupied by existing farms (2-10 ha. for beach culture and an average size of about 2 ha. for off-bottom) and 60 ha. for the Comox Band for beach tenure, these new tenures could involve an estimated additional 80 to 100 hectares of useable area beyond the 573 hectares currently occupied by the existing 119 beach and off-bottom tenures. This would represent an expansion in farm area and production of about 18 %. Such an increase in production would increase revenues to growers by about \$1.5 million dollars, revenues to processors by about \$2.7 million and farm and plant employment by about 72 jobs. This would increase the wage bill by about \$1.5 million. (Source: extrapolation from MSRM socioeconomic profile figures). If zoning continues to prevent further development adjacent to Denman Island, the economic benefits from new development in the Plan area would be reduced by about 20-30%.

There is additional potential for greater production and economic benefit from existing tenures through technological advances over time, but no estimate figures are available. There is also potential for development of subsurface culture species, such as geoducks, in the northeast portion of the Sound adjacent to Denman Island and in the southwest part of the Plan area near Vancouver Island. The potential for subsurface aquaculture development is difficult to estimate, given that this is an emerging culture activity and Federal government policy regarding geoducks is still evolving. There may be conflicts due to

the potential for both wild geoduck fisheries as well as geoduck culture operations in some areas. As a result, the Plan constrains neither.

The provisions in this Plan provide for reduced conflicts with other resource users by avoiding expansion of technologies that could cause visual or noise impacts in areas of intensified upland residential development and conflicts with other resource users (e.g. Henry Bay anchorages).

7.0 Plan Implementation

7.1 Recommended Actions

A number of actions should be taken before LWBC accepts applications for shellfish aquaculture for tenure expansion or new development in Baynes Sound. These include, but are not limited to:

1. Review of aerial photographs to screen for possible tenure infractions;
2. Reviewing historic data and files to scope non-compliance issues;
3. Site inspections of all aquaculture tenures in Baynes Sound;
4. Issuance of letters by LWBC to non-compliant operators as an initial step to bringing them back into compliance;
5. Completion and the coming into force of an enforceable Code of
6. Practice (Standards of Operation) for shellfish aquaculture. (Note: The new provincial Code of Practice will include provisions for noise and light management) ;
7. Biological Carrying Capacity Study results are known;
8. No issuance of new tenures fronting Denman Island until zoning issues are resolved between Islands Trust and the Province; and,

A number of other activities are recommended, but not pre-requisite to tenure issuance. These include:

1. A survey of spawning habitat and timing for sand lance and smelt. This would provide a valuable clarification on relative risk as well as the development of mitigation measures such as timing windows for shellfish culture operations.

2. The comprehensive research to be undertaken by the Malaspina University College Shellfish Research Center should include a study of interactions between herring and off-bottom culture facilities. One objective should be to determine if herring concentrate beneath off-bottom shellfish culture facilities.



Oyster beach culture harvest

3. Anchors should be designed to reduce snagging of herring nets and connections to anchor lines should be designed to allow easy disconnection of culture facilities from anchors for temporary relocation if required to avoid herring fishery conflicts;
4. Use of anchors that have low impact potential for herring fisheries (e.g. contoured to reduce snagging of nets).
5. LWBC consider the feasibility of temporarily relocating off-bottom facilities when a herring fishery opening occurs in the vicinity of shellfish aquaculture operations;
6. Although potential negative impacts from predator netting are low to moderate, there are uncertainties associated with the information. Any new Management Plan that includes predator netting should only

be approved subject to inclusion of a tenure-specific monitoring program, acceptable to MAFF, that quantifies the effects of netting on bird presence and feeding. Annual renewal of the Aquaculture Licence should be subject to results of the monitoring program. Baseline monitoring and monitoring after deployment of nets at new sites will assist the assessment of environmental effects by providing on-site experimental control.

7. Creation of a joint interagency team to monitor and report on implementation and effectiveness of the Plan.
8. No further channelling of streams. It is recommended that FOC consider site-specific assessments of existing channelled streams and development of a restoration plan, if required.
9. Applications should continue to avoid eelgrass areas, as is normally required under the tenure application review process.
10. Application review process should consider commercial wild clam fisheries in the area.
11. An evaluation to determine site-specific impacts of driving on the beach specific to each site, and mitigation required, where necessary and appropriate.
12. MAFF develop terms of reference for, and establish, a Community Forum which should meet twice a year.

7.2 Plan Review and Monitoring:

This Plan will be useful for many years, but is likely to evolve over time based on new information and results from Plan implementation and effectiveness monitoring. This should include progress reports and communication between implementing agencies and the public. Once Plan implementation is underway, a feedback mechanism is needed for Baynes

Sound residents to receive progress reports and to comment on Plan success. The Province will seek the assistance of the NRD, RDCS and the DILTC to establish a Community Aquaculture Forum to help government determine if it is meeting its objectives and to foster better communication and trust between government and stakeholders. The Forum would be a small group, ideally 10-15 people from the Plan area, to represent a broad range of stakeholder issues and views. The Regional Districts and DILTC would have the discretion to be members of the Forum or not. The Forum's primary responsibility would be self-education, dialogue between government, shellfish growers, community members and the scientific community as well as feedback to government regarding Plan implementation. More specifically the Forum would:

- share accurate, up-to-date information on marine management in Baynes Sound regarding shellfish aquaculture (e.g. carrying capacity and sand lance/smelt studies);
- provide feedback to government on the success of Plan implementation;
- discuss results of scientific research on the positive and negative effects of shellfish aquaculture as information comes available;
- receive information on technological and policy developments related to the shellfish aquaculture industry;
- function as a mechanism for two-way information flow between the shellfish aquaculture industry and other stakeholders (e.g. information sharing meetings, tours of beaches, shellfish culture facilities); and,
- assist in developing a distribution list for government to provide information to community residents on implementation of the Plan.

MAFF has agreed to organize Forum meetings twice a year. The lead agencies for liaison with the Forum will be MAFF

and LWBC because the Forum's primary purpose is to address day-to-day operational activities that flow from Plan recommendations. MSRM would also attend, given its lead role in Plan monitoring. The forum would not be a decision-making body. The first meeting is anticipated in the spring of 2003.

7.3 Timelines for Plan Implementation, Review and Amendment

The time horizon for this Plan will be long term, with a major review every three years to determine success in implementation and effectiveness. Plan recommendations and provisions may be subject to review and revision before the formal review period based on receipt of new information, such as results of ecosystem studies or ongoing monitoring. For example, Comox Harbour, which is currently under a Sanitary Closure, may provide opportunities for development if water quality improves from water quality remediation or implementation of community Liquid Waste Management Plans. MSRM will lead an interagency team in developing Plan performance indicators and in monitoring the Plan. See Table 2 for schedule and agency roles.

Table 2: Projected Timelines for Plan Implementation

Dates (year/month)	02/10	02/11	02/12	03/01	03/06	04/01	04/06	05/01	05/06	06/01	06/06	07/01
Task/(Lead Agency)												
Plan Complete (MSRM)			X									
Compliance inspection report (MAFF/LWBC)			X									
Compliance inspections (MAFF/FOC)					X		X		X		X	
Compliance and enforcement activities (MAFF/LWBC)			X	X	X	X	X	X	X	X	X	X
Code of Practice (MAFF)			X									
Carrying Capacity study interim ¹ / final ² Results (MAFF)			X ¹	X ²								
Sand lance and smelt survey (MSRM/MAFF)		X	X	X								
Environmental interactions research (Malaspina College Center for Shellfish Research)					X	X	X	X	X	X	X	X
Investigate feasibility of relocations to avoid herring fishery (LWBC)				X								
Tenure and license referral and decisions (LWBC/MAFF)				X	X	X	X	X	X	X	X	X
Community Forum established (MAFF)				X								
Community Forum meetings (MAFF)				X	X	X	X	X	X	X	X	X
Beach culture ecosystem studies (SFU/CWS)	X	X	X	X	X	X	X	X	X	X	X	X
Driving on beach assessment/mitigation (FOC/MAFF and industry)				X	X	X	X	X	X	X	X	X
Stream Channelling Assessment (FOC)				X	X	X	X	X	X	X	X	X
Establish Plan monitoring Team (SRM)					X							
Predator Netting monitoring program (MAFF/Industry)		X	X	X	X	X	X	X	X	X	X	X
Formal Plan review & amendment (MSRM)										X		

Appendices

Appendix A - Issues and Responses

Following in the left (“Issues”) column are statements or questions raised by the public during Plan consultations. In the right (“Response”) column are the responses.

BIRD ISSUES	RESPONSE
Studies must be done to identify the impacts of shellfish aquaculture before decisions are made regarding expansions.	• Archipelago Marine Research Ltd. has summarized existing environmental overview reports, conducted an environmental issues analysis, identified data gaps and provided direction on a decision oriented, sustainable resource management framework. • The Archipelago report indicates that generally the environmental risk from shellfish aquaculture is low to moderate for beach and off-bottom culture. • The potential for negative environmental impact is higher for beach culture than off-bottom culture • There is some uncertainty as to severity of potential effects on birds related to use of predator netting, although duration of impact is likely to be low upon removal of netting. The Plan recommends that any approval of new predator netting be subject to a monitoring program that meets MAFF requirements. The monitoring program results would be linked to the Aquaculture Licence renewal and would require a baseline and post- net deployment phase in order to establish an appropriate scientific methodology. This is necessary because if one compares variables at predator net sites with those at non-predator net sites, the environmental differences between the sites will make it difficult to determine if there is any effect from the predator netting. Monitoring a site, deploying predator nets and then monitoring the effect at the same site reduces the chance of environmental variability confusing study results. • Both SFU and Malaspina University College are involved in research on the environmental interactions of shellfish aquaculture. This is expected to assist in the adaptive management of the shellfish aquaculture industry in Baynes Sound.

BIRD ISSUES	RESPONSE
Continued	Two independent reviews of the Archipelago report by reputable marine scientists, Tim Parsons and Jackie Booth, generally support the approach and findings presented in the Archipelago report.
Baynes Sound is an important bird area because of the abundance of herring, which are there because of the eelgrass. Does shellfish farming impact eelgrass?	- There are potential impacts to eelgrass habitat from clam netting, which covers less than 1% of eelgrass habitat in the Sound - Beach harvesting activity may also impact eelgrass beds although the interaction between oyster beds and eelgrass beds is low - Management Areas take into account the location of eelgrass beds and other potential conflicts - When tenure applications are made, the site-specific application referral process pays close attention to avoid impact on eelgrass habitat - FOC has in the past recommended excluding documented eelgrass areas from tenure applications, and recommendations in this Plan are consistent with this.
The Brant goose population is declining due to habitat loss. Raft activities force the birds from their habitat.	- Bird and other resource value maps were used in a compatibility analysis to assess suitability of areas for future shellfish development - The project team has mapped important bird use areas based on input from the Canadian Wildlife Service - Management Areas have accounted for potential for bird impacts, including Brant, and the need to avoid them

BIRD ISSUES	RESPONSE
Predator netting now covers Heron feeding habitat.	• Predator netting on existing shellfish farms occupies about 5% of the Sound's inter-tidal area • The Axys report on bird interactions suggests that herons appear to benefit from culture activities. • For a number of conflict-related reasons, the Plan recommends no new beach culture development for most areas in the Sound, and limited expansion of existing operations and a small number of new First Nations opportunities in a few areas.

TOURISM ISSUES	RESPONSE
Tourism representatives need to be included in the process because shellfish farming impacts tourism and kayaking.	• The project team met with Tourism Comox Valley, Coastal Eco-Tourism Operators Association and Desolation Sound Charters. • Information from these groups on important tourism and ecotourism areas was mapped during the planning process. • Development of the Management Areas took this information into account. • As a result, the Plan recommends no beach culture in most areas of the Sound, and only limited opportunities in other areas and off-bottom culture in one small area.
Many boat owners oppose new shellfish farming because of restrictions on navigable waters and anchorage, risks associated with hitting underwater hazards and the need to protect public access to beaches. Ecotourism operators indicated Henry Bay is a valuable, sheltered area for yachters and the whole of Baynes Sound is a day use area; they do not want to see any expansion of the shellfish aquaculture industry.	• The Plan has excluded Henry Bay from future development to preserve anchorage and avoid further conflicts. • Any site-specific proposal for new development or expansion must be reviewed and approved by the Coast Guard, regardless of this Plan. All such reviews involve a consideration of safety risks. • Any of the limited opportunities identified in this Plan for aquaculture expansion were based on a review of the potential for conflict with other resource users, including the ecotourism industry. As a result Henry Bay was ruled out for aquaculture expansion because of the conflicts and anchorage requirements.

ENVIRONMENTAL ISSUES	RESPONSE
Visible and noise pollution are major concerns for residents.	• Government is developing a Code of Practice (Standards of Operation) for shellfish aquaculture; this code will be enforceable under the terms and conditions of Aquaculture Licence for each operation. • Management Areas have taken visual and noise pollution into account to reduce further conflicts.
Workers are not provided with washrooms; they use the beach and the private foreshore as their toilet.	• Government is developing a Code of Practice (Standards of Operation) for shellfish aquaculture; this code will be enforceable under the terms and conditions of aquaculture licences and includes such issues. • Toilet facilities must be provided by the employer under the <i>Workers Compensation Act</i>.
Why is it that Baynes Sound receives oysters from polluted areas to be cleansed in our waters?	• Only oysters grown in marginally contaminated areas are permitted to be relayed (i.e. transferred) to an uncontaminated area or a depuration plant so they can flush out bacterial contamination prior to marketing. This is an approved activity. • The relay process is highly regulated and monitored by the Canadian Food Inspection Agency, Environment Canada, Fisheries and Oceans, and MAFF • Marine water quality is monitored on an on-going basis by Environment Canada
If it is environmentally unsound for residents to drive their vehicles on the beach, how is it environmentally OK for shellfish farmers to drive their vehicles on the beach?	• This activity is required for operators to service their tenures. • The Plan recognizes that in some cases the potential exists for impact from this activity and management of this activity is under discussion between FOC and Provincial agencies • It is likely this issue will be addressed in the future on a site-by-site basis

ENVIRONMENTAL ISSUES	RESPONSE
How can shellfish farming be “environmentally sensitive” when the beaches are littered with their industrial debris? Predator netting? Infrastructure on the beach, such as rebar, is a safety hazard.	• Farmers rely on a specific kind of netting to protect their product from wildlife predators • Less than 5% of inter-tidal areas in the Sound are covered by predator netting • The plan allows for one small area on the west side of Baynes Sound to be made available for new deep inter-tidal culture and some opportunity for limited expansion of tenures on the North west side of Baynes Sound; predator netting will not be authorized in these areas • Government is developing a Standard of Operations for shellfish aquaculture which will include addressing the issue of beach debris management. This Code of Practice will be enforceable under the terms and conditions of the aquaculture licence • The shellfish farming industry regularly initiate beach clean ups to deal with these problems; government recommends this practice continue.

ENVIRONMENTAL ISSUES	RESPONSE
Continued	• The Archipelago assessment indicates that for most shellfish aquaculture activities the overall risk from shellfish aquaculture is low with some uncertainty around the effect of predator netting on bird habitat. • The Plan takes an adaptive management and scientific approach to addressing predator netting uncertainty. The Plan recommends that any approval of new predator netting be subject to a monitoring program that meets MAFF requirements. The monitoring program results would be linked to the Aquaculture Licence renewal and would require a baseline and post-net deployment phase in order to establish an appropriate scientific methodology. This is necessary because if one compares variables at predator net sites with those at non-predator net sites, the environmental differences between the sites make it difficult to determine if there is any effect from the predator netting. Monitoring a site, deploying predator nets and then monitoring the effect at the same site reduces the chance of environmental variability confusing study results. • This information, along with an objective evaluation of potential conflicts, has played a significant role in developing the Management Areas • “Science- based” does not mean that the Province will not consider non-scientific information in the analysis. While science is a key component of the planning exercise this Plan has also considered other non-scientific information, such as the views, values, existing uses and interests of people affected by the Plan

ENVIRONMENTAL ISSUES	RESPONSE
Fish streams should not be rerouted for shellfish aquaculture.	• This Plan recommends no channelling of streams • Proposals to channel streams are rare and must be approved by Fisheries and Oceans Canada, LWBC and MAFF. The Plan recommends that FOC consider options regarding streams that have already been channelled.
What is the biological carrying capacity of Baynes Sound and how do we know it has not been exceeded already	• In this context, carrying capacity is the degree to which the Sound can accommodate shellfish aquaculture and still support the existing ecosystem requirements for biological production. A rough indicator of whether the carrying capacity has already been affected would be the size and production of shellfish in the Sound. Farmers have not reported a decrease in either shellfish size or production. • This issue was raised by several people during the review of the draft Plan and by one of the independent reviewers of the Archipelago report. MSRM discussed this with MAFF and, with funding assistance from MSRM and Environment Canada, MAFF is currently conducting a biological carrying capacity study of Baynes Sound. The Plan recommends that any additional proposed expansion of the industry be deferred until results from this study have been received.

SHELLFISH INDUSTRY ISSUES	RESPONSE
The government has not provided adequate expansion opportunities.	• The Plan has provided some limited expansion opportunities for off-bottom culture adjacent to Denman Island, beach culture adjacent to Vancouver Island and Sub-tidal culture in both areas.
Some of the Plan's Management Areas adjacent to Denman Island are not consistent with Islands Trust zoning which does not support any expansion of shellfish aquaculture.	• LWBC procedure has been to make tenure offers for shellfish development or expansion conditional on proponents meeting the approval requirements of Local and Federal Government. • The Plan systematically identified areas suitable for expansion of the industry and also that some Management Areas are inconsistent with Denman Island zoning. • The Plan recommends that this inconsistency issue be resolved at a provincial scale given that there are other areas in the Province as well as Baynes Sound, where zoning and provincial interest in development opportunities are not consistent.
The different branches of government that have responsibilities for shellfish farming aren't speaking to each other.	• The Plan has been developed collaboratively by a multi-agency Provincial project team with advice provided by FOC and information by Environment Canada (Canadian Wildlife Service). • The Plan is a valuable guide for LWBC and referral agencies to determine whether tenure and Licence applications should be accepted for areas in Baynes Sound • The interagency referral process has been improved to increase coordination and efficiency. LWBC coordinates the referral of tenure applications to other agencies. In this process, referral agencies often interact with each other regarding specific applications.

SHELLFISH INDUSTRY ISSUES	RESPONSE
Industry has a desire to see shellfish farming grow in a sustainable fashion.	• MSRM has led this planning process with great care to ensure a fair treatment of all resource users and the development of a balanced set of recommendations. • Based on all the information gathered and analyzed, the plan has identified some limited opportunities for additional development, pending the results of the biological carrying capacity study.
The dispute resolution process needs to be aligned with Farm Practices Board.	• The dispute resolution process described in the Plan is the Farm Practices Board dispute resolution process.

ISSUE WITH TERMS OF REFERENCE and CONSULTATION PROCESS	RESPONSE
The timelines to complete the study are too rushed.	• The Province is responding to a desire in coastal communities to complete Plans in a more timely and cost effective fashion. • To meet this need the Province is playing a stronger leadership role in planning. • Instead of using planning tables composed of stakeholders to prepare the plans, government staff prepare the plans, based on feedback obtained from interest groups and other stakeholders during consultations. • Considerable time was made available for the public to review and comment on the draft Plan.
Why are you conducting more research into the environmental impacts when the government commissioned the Axys Report of April 2000 which recommends taking a precautionary approach and the Pacific Science Advisory Review Committee identified concerns regarding further shellfish farming expansion in Baynes Sound?	• New research was not conducted during this process; Archipelago Marine Research was hired to review the Axys Report and the Pacific Science Advisory Review Committee (PSARC) Phase 0 Environmental Impact Report and suggest decisions that could be made given the information available. The Archipelago report also identified uncertainties and information gaps consistent with the Axys and Phase 0 report. • This Plan recommends further studies to address these information gaps. • The Axys report did not recommend taking a precautionary approach. The report presented two scenarios, one of which was the precautionary approach and the other involved recommended actions if some development were to be allowed.

ISSUE WITH TERMS OF REFERENCE and CONSULTATION PROCESS	RESPONSE
Continued	• The interpretation of the term “precautionary approach” has been the subject of considerable debate. This Plan has included a risk assessment and taken an adaptive management approach. This recognizes that uncertainty is inherent in science, that decision makers need to identify where there is sufficient information on risk to make an informed decision to proceed or not. Where risk appears to be low to moderate, uncertainties warrant action in association with monitoring and research and adjusting management in response to incoming information, where necessary (Adaptive Management).
There is not enough information available to make a decision to expand the industry in Baynes Sound. An ecosystem study of three to five years duration is necessary to demonstrate that there will be no or a low impact from shellfish culture, before any expansion is allowed.	• This question is consistent with only one of several interpretations of the “Precautionary Approach”. Without baseline monitoring or research prior to development and then follow-up monitoring after development has occurred, it is common for scientific study of existing operations to result in continued uncertainty. Adaptive management addresses this by monitoring the environment before and after new development takes place. • Generally there is enough information locally and globally to indicate that most activities associated with shellfish aquaculture have a low to moderate risk. In locations where resource use conflict potential is low some development is warranted with appropriate regulatory controls and Codes of Practice. Where there are uncertainties, as is the case for predator netting, for example, the Plan takes an adaptive management approach. See above discussion on the adaptive management and precautionary approaches.

ISSUE WITH TERMS OF REFERENCE and CONSULTATION PROCESS	RESPONSE
Was the outcome of this planning process predetermined?	• No. The project team approached the analysis with no assumptions. The team made a sincere attempt to gather the best resource and resource use information available as well as a significant amount of community and resource user input to determine if any areas in Baynes Sound were suitable for further shellfish farming development or not. • As it initiated and carried out the planning process the project team was prepared to accept a “no further development” scenario if the information collected supported such a recommendation. However, on balance, the information collected supports some limited expansion opportunities. The Plan recommendations are conservative and provide for avoidance of conflicts with many other coastal and marine values • The Plan also provides information on approaches for better management of the industry and dispute resolution. This creates greater certainty for industry and other resource users.
Are we going to have a chance to meet with the consultants or review their findings and your recommendations before the next meeting? Or are you simply going to tell us what you found? (Note: This question was asked prior to the spring 2002 open Houses)	• The public was provided an opportunity for review of, and feedback on the Archipelago report following its posting on the internet. • The author of the Archipelago Marine Research report, Brian Emmett, attended the Open Houses in April, 2002 to answer questions regarding the reported findings.

ISSUE WITH TERMS OF REFERENCE and CONSULTATION PROCESS	RESPONSE
Who is a stakeholder? Some individual members of the public indicated that they should be considered stakeholders.	• A wide variety of groups have been consulted during this process including the public, industrial, recreational and commercial resource users, concerned residents, and First Nations. • Individuals who may not have a commercial interest, but do live in communities around Baynes Sound and value its resources and benefits or derive benefit from land value were also considered stakeholders.
Keep speakers to time limits at public meetings to avoid monopolization of time by one interest group. There was not enough time to address resident's concerns at public meeting (Note: Both these statements arose after the November 2001 public meetings when some members of the public did not adhere to the requested time limit for questions)	• For the public review of the draft Plan the project team employed an open house format to avoid a situation where some people could dominate the floor and where other individuals did not have adequate opportunity to ask questions. All individuals had the opportunity to meet one-on-one with project team members.
New shellfish aquaculture structures are appearing on some shellfish farms when government said there would be no approvals granted while this planning process is underway.	• LWBC placed a hold on expansion and new development applications and their Management Plans pending the results of this Plan and has adhered to this procedure during the planning process. • This hold does not apply to tenures and Management Plans that were issued prior to initiation of the Plan because, once issued, tenures and their Management Plans are legal documents with the Crown that allow the tenure holders to develop their tenures, subject to site specific and general tenure terms and conditions. • A few tenures were issued in April 2000; development of some of those tenures has been occurring concurrently with, but not as a result of, this planning process.

ENFORCEMENT AND COMPLIANCE ISSUES	RESPONSE
Does the Provincial government endorse the Shellfish Growers Association (SGA) Code of Practice? If they don't, when will the government develop its own code?	• The government has used the BCSGA Code of Practice as a starting point for developing its own Code of Practice (Standards of Operation). • Preparation of the Code of Practice has not been part of this planning process, but has been taking place concurrently. • The Code is expected to be in force under the Terms and Conditions of the Aquaculture Licence by early 2003.
Why were the Fisheries and Oceans Canada and the Ministry of Water, Land and Air Protection not involved in the development of the Code of Practice?	• The BCSGA as well as other stakeholder groups were invited to participate in a public consultation program regarding a draft provincial Standards of Operation. • The Province is involving FOC in the development of the Code.
If the Shellfish Growers Association received Provincial funds to develop a code, are there funds also available to allow other stakeholders to review the code and provide other options?	• The BCSGA received a grant from Fisheries Renewal BC (FsRBC) to assist it in developing of its code. • FsRBC was an independent funding agency that no longer exists, therefore funds are no longer available for this purpose.
There is no complaint resolution process.	• There is an existing dispute resolution process already in place under the <i>Farm Practices Protection (Right to Farm) Act</i>. That process is described in detail in the Plan (See Section 5.0 and Appendix D of the Plan).

RIPARIAN RIGHTS ISSUES	RESPONSE
Riparian rights are not respected. Lease expansions need to involve upland landowners.	• Where a lease would infringe upon the riparian rights of an upland property owner, written approval from that owner will be required prior to a tenure being granted. • Where a riparian infringement can be demonstrated to occur without the written consent of the owner of the adjacent upland property, the offending structure(s) must be removed, altered or relocated. • Where a proposed use can be demonstrated to infringe upon the riparian rights of the owner of an adjacent upland property, that property owner, by refusing to provide his written consent, may veto that use unless it can be clearly demonstrated that the use is in the public interest.
Farmers should work between the hours of 7 am and 11 pm and not on Sundays in populated areas.	• The industry Code of Practice addresses ways to reduce social impacts from these activities; the Provincial Code of Practice addresses night time operations in terms of noise and light. • Part of the normal business of shellfish aquaculture involves some activities at night in order to take advantage of low tides and exposed beaches in the fall and winter.
More attention should be paid to new technologies that make the industry invisible to upland landowners (e.g. Manatee Holdings Ltd. – Gartley Point Shellfish Nursery).	• The Plan has identified some Management Areas where no further aquaculture applications for development are recommended, except for activities that use sub-tidal technology (i.e. under the surface such as geoduck culture) in high visual impact areas.

RIPARIAN RIGHTS ISSUES	RESPONSE
How can we deal with industrialization of shellfish farming vs. local zoning?	• Local government plays an important role in the regulation of land use • This Plan has systematically identified suitable areas for expansion of the industry. • The Plan recognizes that the DILTC has zoned the east side of Baynes Sound as “Conservation” in order to prevent further development or expansion of the shellfish aquaculture industry and that some of the Management Area provisions are not consistent with this zoning. • LWBC procedure has been to issue tenure offers on the condition that the proponents meet Local and Federal Government approval requirements. • The Plan recommends that approaches to resolve that inconsistency at a provincial scale so that all areas of the Province are treated equally. • The Plan will help inform rezoning activities or any future discussions about zoning between the Islands Trust, other Local governments and the Province regarding zoning issues.

MISCELLANEOUS ISSUES	RESPONSE
How important an economic contributor is shellfish farming? For instance, how much revenue did the Province generate from oyster leases over the past 5 years? What are the projections for the next 5 years? What was the amount of the grants/subsidies to lease holders over the past 5 years?	• Shellfish aquaculture tenure holders have not received grants or subsidies in the last five years • Shellfish production in the Sound is worth about \$8 million per year to the growers and about \$15 million to processors, not including spin-off benefits to the area. About 390 jobs are produced by the industry in the Sound. • It is estimated that 4-5 new off-bottom tenures in addition to about 60 ha. of First Nations beach culture tenures and some limited expansion of existing beach tenures on Vancouver Island would result in an 18% increase in the area under tenures from 573 to about 673 ha. (see Section 6.3 of the Plan for more detail).
LWBC is not accountable to the public when issuing foreshore leases.	• As a special operating agency that reports to the Province, LWBC is accountable to the public. • LWBC is making efforts to increase its efficiency and accountability.
New/expansion tenures resulting from the Shellfish Development Initiative will be mainly approved in Baynes Sound and no where else on the coast.	• The objectives of the Shellfish Development Initiative do not necessarily apply in Baynes Sound. This Plan was prepared to determine what, if any, potential exists for future development in the Sound and has taken no direction from the Shellfish Development Initiative. • In this Plan area, some areas with the least amount of conflict are indicated as having expansion potential. • Many areas for which LWBC has received applications will not be available for development. • More shellfish farming opportunities have been made available in other areas, including the West Coast of Vancouver Island

FISHERIES RESOURCE ISSUES	RESPONSE
Is there conflict between shellfish farming and other resource industries in Baynes Sound including the herring Roe, geoduck and commercial clam fisheries?	• The project team consulted on a number of occasions with the Fishing Vessel Owners Association and Underwater Harvesters and mapped their areas of interest. • The Plan includes provisions that resulted from a collaborative meeting between the shellfish growers and the herring fishers, such as limited expansion, development of low impact anchors for shellfish operations and research on herring behaviour beneath off bottom culture facilities. • The Plan has identified some Management Areas that allow no further beach or off-bottom culture and some areas with limited opportunity for beach culture expansion and off-bottom culture potential.

FIRST NATIONS ISSUES	RESPONSE
Comox Indian Band is interested in shellfish aquaculture development and also wants to ensure that its wild harvest areas are not impacted.	• The project team has consulted with the Comox Band and has mapped its areas of interest for shellfish aquaculture in the Plan Area. LWBC has signed a Memorandum of Understanding (MOU) for several areas in the Sound that the Comox Band will be able to apply for beach culture tenure. These MOU areas (totalling 60 ha) are in locations where the Plan has recommended some opportunities for First Nations. • The Band will be consulted in the event that shellfish applications by Non-Comox Band proponents are made within Comox First Nation Traditional Territories to determine if there would be any potential for infringement on aboriginal rights.
The Comox Indian Band is interested in environmentally sensitive and sustainable shellfish farming.	Management Areas and recommendations in the plan have been developed to ensure the industry is environmentally sustainable both in terms of operational management and siting
Were any issues raised by the Qualicum Band?	▪ The project team met with the Qualicum Band and inquired whether it would be interested in aquaculture or providing information on its areas of interest ▪ The Band indicated that areas of interest to them had already been alienated. ▪ The Project Team contacted the Band to determine its interest in meeting to discuss the Draft Report but received no response.

Appendix B – Summary of Environmental Effects and Decision Analysis

1.0 Summary of the Axyx and Phase 0 Report Recommendations

Management recommendations in the Axyx report presented two scenarios:

- 1 a precautionary approach whereby intertidal expansion would be prohibited until further studies are completed and conclusive evidence of environmental impact be gathered; and,
- 2 expansion of intertidal aquaculture based on the economic importance of shellfish aquaculture, increased foraging opportunities for some bird species and the apparent co-existence of marine birds with aquaculture operations. For this option, a number of mitigation measures were recommended:
 - Prohibit use of seine predator nets;
 - Restrict tenure expansion to areas of lower shorebird density and deep water areas;
 - When possible, time aquaculture activity to periods of low shorebird density;
 - Securely anchor predator guards;
 - Restrict disturbance of substrate at key shorebird locations;
 - Investigate a cover material that offers least disruption to shorebirds;
 - Ensure that raft culture sites have sufficient well-secured netting below an appropriate diving depth;
 - Restrict surface coverage by culture rafts to allow continued access and foraging by diving birds; and,
 - Ensure no destruction or disturbance of eelgrass beds.

Recommendations in the Phase 0 Report included:

- A multi-agency research initiative to identify the nature of existing and potential future impacts and if necessary how they can be mitigated;
- A network of protected areas in Baynes Sound that exclude shellfish aquaculture;
- Potential adverse impacts from intertidal shellfish culture need to be identified and mitigation actions, where appropriate, implemented. Ocean management in Baynes Sound should be considering intertidal aquaculture both as an economic asset and as an ecological disturbance that may be negatively influencing important ecosystem processes; and,
- With increasing bivalve culture in Baynes Sound, the overall carrying capacity of the system with respect to Phytoplankton production and its removal by filter-feeders needs investigation, both with regard to annual and seasonal fluctuations.

2.0 Summary of findings by Archipelago Marine Research and resulting Plan recommendations

1. Clam Beach Culture:

- Baynes Sound is a particularly important area for bird use;
- The primary concern with beach culture relates to the uncertainty regarding the significance of negative impacts on shorebird habitat from clam predator netting. This is primarily due to data gaps. It is recommended that approval of predator netting proposed in new Management Plans be subject to the development and

approval by MAFF of a monitoring program specific to each tenure to quantify the effects of netting on bird presence and feeding. The annual renewal of the Aquaculture Licence, including approval of continued use of predator netting would be contingent on the results of the monitoring program;

- An absence of data regarding sand lance and smelt spawning habitat requirements warrants a beach survey to determine time windows for clam culture activities.

Note: During, but independent from, this planning process a major study was initiated by Simon Fraser University in collaboration with the Canadian Wildlife Service to provide a knowledge base to assist the shellfish aquaculture industry to operate in a way that maintains the balance and long term productivity of the marine system. The following areas are being investigated:

- Geochemical cycles of carbon, phosphorus and nitrogen in the intertidal region (ecosystem function study);
- Species diversity, abundance and distribution within the intertidal region (ecosystem structure study);
- Type and exploitation of different habitat types by migratory birds that rely on the intertidal area for part of their life history (ecosystem structure study);

2. Oyster Beach Culture:

- A relatively high percentage (about 32%), of Baynes Sound (between Denman Island and Vancouver Island) intertidal area is tenured for beach culture, most of which is for oyster culture).
- Oyster beach culture presents a low risk of impact on intertidal habitat.

3. Stream Channelling:

- Stream channelling has the potential for high severity and medium duration impact on streams and fish habitat and that is considered high risk;
- There should be no further channelling of streams. It is recommended that FOC consider site specific assessments of existing channelled streams and development of a restoration Plan, if required.

4. Habitat modification due to clam harvesting:

- Habitat modification during clam culture has a potential to both positively and negatively impact beach spawning species such as sand lance and smelt through habitat creation and disruption, respectively;
- Harvesting activity during periods of beach spawning and egg incubation could have significant impacts (high severity) on spawning success of sand lance and smelt.
- Data are missing on where and when these species spawn on the beach throughout British Columbia and,
- A survey of spawning location and timing should be done. This would provide a valuable clarification on relative risk as well as the development of mitigation measures such as timing windows for culture activities such as harvesting and use of predator netting.

5. Driving on the Beach:

- This activity has the potential for long term modifications to near shore habitat, particularly in areas with perennial vegetation such as marsh grasses;
- The level of negative impact varies depending on site-specific habitat characteristics;
- An evaluation to determine site-specific impacts should be made of each circumstance regarding vehicle access; and,
- Mitigation should be required, where necessary and appropriate.

6. Potential Positive Impacts:

- Better watershed management and improved water quality resulting from pressures to reduce bacterial contamination;
- Improved water quality and sediment productivity – from filtering plankton out of the water column;
- Improved sediment quality – re-suspension of fine sediments and organic material from harvesting activities can reduce anaerobic conditions;
- Predation refuges – predation netting can reduce predation, thereby increasing the biomass of clams, number of animals spawning and increasing the wild recruitment outside tenures; and,
- Structural habitat features – oyster beds and associated attached algae provide a potential habitat for diverse fish and invertebrate communities.

3.0 Summary of decision-related information stemming from a review of the Archipelago report and subsequent discussions with the consultant

- Heightened public concern, poor success of many resource management approaches (particularly in fisheries management) and the rapid growth of scientific knowledge and associated technologies has resulted in an increased emphasis on precautionary approaches to environmental and resource management. However, the context for applying the precautionary approach is often unclear and decision making is frequently stalled rather than facilitated due to uncertainty as to how to apply the precautionary approach.
- Principle 16 of the 1992 Rio Declaration (the Precautionary Principle) states that “Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be a reason for postponing cost effective measures to prevent environmental degradation”.
- In science, full scientific certainty is usually not achievable and that acceptance or rejection of hypotheses is usually based on accepted levels of probability or occurrence.
- Management processes must now recognize uncertainty as part of the decision-making process.
- Decision making needs to take account of the level of risk and ways to avoid or reduce it where unacceptable;
- Risk assessment involves three key considerations:
 - significance of impact (severity, duration and extent);
 - probability of occurrence; and,
 - degree of uncertainty regarding the above two factors.
- Decisions should be consultative, innovative and adaptive in order to address complex issues in a fair manner; and,

- Resource allocation decision making should demonstrate its effectiveness through monitoring and feedback mechanisms to garner public trust and willingness to accept change. Monitoring is also a significant component of the adaptive management approach.

4.0 Explanation of Biological Carrying Capacity

Biological carrying capacity of a system is the ability of the environment to maintain a certain level of ecosystem production and functioning. Although carrying capacity involves more factors than food supply and may vary depending on fluctuating environmental factors, food supply plays a key role in maintaining the carrying capacity of a system. Most systems have an inherent flexibility to meet significantly increased food demands, without negative effects, but there are limits to the demands that any system can handle.

Culturing shellfish places an increased demand on the food supply of a system. The carrying capacity of the BC coast for shellfish culture is considered to be generally high, given the temperate climate combined with estuarine and coastal up-welling conditions that recharge nutrients for phytoplankton production. However, in some relatively restricted waterways that support significant shellfish production (e.g. Gorge Harbour on Cortes Island, and Malaspina Inlet system and Baynes Sound), there has been some uncertainty regarding carrying capacity for shellfish culture, prompting research into this topic and related aspects of ocean circulation. (Dr. W. Heath, MAFF, personal communication). Carrying capacity studies have been completed for Cortes Island and the Malaspina Inlet System and are underway in Baynes Sound.

Appendix C – Compliance and Enforcement Programs

**Service Agreement
on
Coordination of Compliance and Enforcement Programs
between
Ministry of Agriculture, Food and Fisheries,
Ministry of Water, Land and Air Protection,
Ministry of Sustainable Resource Management, and
Land and Water British Columbia Inc.**

1. Agreed Upon Vision:

A sustainable growing aquaculture industry that meets high standards for environmental protection and has a high level of public confidence in the compliance and enforcement role of government.

2. Lead Agency Concept:

The Ministry of Agriculture, Food and Fisheries is the lead agency for aquaculture development in British Columbia. Critical functions and authorities also reside within the Ministry of Water, Land and Air Protection (MWLAP), the Ministry of Sustainable Resource Management (MSRM), and Land and Water British Columbia Inc. (LWBC), hereafter referred to as the “agencies”.

The lead agency concept is designed to deliver services, permits and approvals to industry through a single window via service agreements, delegations of authority and pre-approval agreements with other agencies in all three levels of government.

3. Development of Service Agreement:

Issues associated with compliance and enforcement of the aquaculture industries are shared between both MAFF and MWLAP, who are responsible for these functions on behalf of all agencies. Provincial government representatives are committed to coordinating responsibilities in the area of compliance and enforcement to eliminate inter-agency overlaps, reduce duplication of efforts by single agency presence in the field for compliance activities, increase efficiencies, and to demonstrate a strong, integrated and accountable compliance and enforcement regime.

The agencies wish to identify and clarify respective roles regarding finfish and shellfish aquaculture compliance and enforcement activities, outline specific responsibilities, identify projected resource requirements, and develop protocols for dealing with issues that may arise on occasion.

3. Development of Service Agreement - continued:

This multi-signatory Service Agreement sets out the agreed upon approach between agencies of interest, outlines specific roles and responsibilities, training requirements, implementation timelines and required communication and protocols in responding to identified issues.

4. Goals of Service Agreement:

Development of this Service Agreement is based on the following common goals:

- efficient use of staff resources to minimize duplication;
- one window approach to aquaculture development;
- high level of compliance;
- early intervention to avoid non-compliance;
- effective enforcement, successful prosecution and rehabilitation where required;
- public confidence; and,
- transparency.

5. Performance Based Standards:

This Service Agreement recognizes that government is committed to the development of performance based standards in three key areas: waste management; fish health; and escape prevention. This Service Agreement also recognizes that agencies are working towards a performance-based management regime that acknowledges the key environmental standards.

Signatories to this agreement also acknowledge that application of a combination of regimes, including “rules-based” and “results-based” will be required on an interim basis, until government is satisfied that industry has either achieved or exceeded objectives in the areas of waste management, fish health and escape prevention.

6. Environmental Monitoring

For the purpose of this Service Agreement, it is agreed that environmental monitoring activities pursuant to the *Aquaculture Waste Control Regulation* will remain with the lead regulatory agency, MWLAP, with participation by MAFF Inspection staff. Similarly, the administration of the dive audit program will remain with the lead regulatory agency, MAFF.

Environmental Monitoring – continued:

Environmental monitoring activities are to be conducted by biological monitoring staff (technicians, biologists, statisticians) at MWLAP, and, for this reason, are not considered part of the Service Agreement. Specific environmental monitoring activities include:

- conducting reviews of industry environmental monitoring data;
- annual monitoring of sediments at salmon farms;
- development of appropriate sampling protocols and quality assurance/control programs;
- establishing priorities for ministry monitoring of sediments at salmon farms; and,
- conducting environmental sampling at salmon farms, providing feedback to facility.

The agencies agree to conduct joint environmental monitoring activities on site in order to achieve harmonization between compliance inspections and on-site activities. This agreement is subject to operational considerations such as scheduling.

The specific provision on Environmental Monitoring will be reviewed at the end of the first year to ensure identified objectives are being met in the most effective and efficient manner.

7. Compliance and Enforcement – Roles and Responsibilities:

For the purpose of this Service Agreement, it is agreed that MAFF has the lead role in compliance and that MWLAP has the lead role in enforcement and a shared role in late stage compliance.

“Compliance” is defined as conducting the following activities:

- site specific management plan development;
- awareness, education, promotion and training activities;
- partnership and practices activities;
- monitoring, inspections and audits;
- administrative remedies pertaining to agency’s licensing authority;
- early intervention to prevent non-compliance;
- provision of data, samples, monitoring results, inspection reports, and fish escape reports to the lead enforcement agency based on a predetermined schedule; and,
- support for enforcement actions including development of procedures and provision of information, technical support and expert witness support for investigation to ensure the ability of MWLAP to achieve successful prosecution.

Compliance and Enforcement – Roles and Responsibilities - continued:

“Enforcement” is defined as carrying out the following activities:

- verifying and substantiating an alleged offence;
- implementing necessary enforcement responses.

Specifically:

- a) MAFF Compliance staff will serve as the lead in developing site specific management plans and conducting all finfish and shellfish inspections, monitoring and audits on behalf of MWLAP, LWBC, and MSRM.
- a) MWLAP Enforcement staff will serve as the investigative lead on all enforcement activities associated with formal prosecutions, court orders and administrative penalties for finfish and shellfish aquaculture on behalf of MAFF, LWBC and MSRM.

MAFF and MWLAP Compliance and Enforcement Managers will work with federal DFO officials to harmonize compliance and enforcement activities and develop a protocol on sharing information, participating in inspections and enforcement as required, and addressing common issues of interest.

8. Transition from Inspection to Investigation:

MAFF Compliance staff will contact MWLAP Enforcement staff to initiate an investigation when instance(s) of non-compliance by an operator requires further review or action by the lead agency for enforcement. Specific responses will be outlined in a matrix to be developed by respective Compliance and Enforcement Managers.

It is anticipated this transition will involve consultation, a request for shared inspections and/or a request to consider enforcement sanctions such as formal prosecutions. MAFF will provide a support role to MWLAP enforcement staff as required when a request for an investigation has been made.

For the purpose of this Service Agreement, MWLAP Enforcement staff and MAFF Inspection staff will regularly communicate on status of inspections and files and activities undertaken by either agency. MAFF Inspection staff may issue violation tickets as defined within the matrix. The matrix will indicate under which circumstances agencies must consult prior to proceeding with enforcement action. , which will identify those areas of non-compliance in which consultation will occur between agencies

Transition from Inspection to Investigation - continued:

Escapes:

- MAFF Compliance staff will attempt to visit sites within 72 hours of discovery of an escape incident. Where possible, particularly with escape incidents that are viewed as “significant”, MWLAP Enforcement staff will attend jointly with MAFF Compliance staff.
- The role of MAFF Compliance staff will be to ensure appropriate measures have been implemented to preclude further escapes and provide technical support for the investigation where required.
- The role of MWLAP Enforcement staff will be to assess the state of compliance leading up to and including the actual event.

Appendix I provides the detailed compliance continuum and breakdown of agency activities and responsibilities.

9. Communication and Protocols:

In order to ensure an environment of trust and respect, effective communication between agencies is necessary.

It is agreed:

- that compliance and enforcement activities and responsibilities are clearly defined and communicated with all staff;
- where an aquaculture activity has resulted in a significant impact of mutual concern, a jointly agreed upon briefing note will be forwarded to the Executive of all agencies. Compliance and enforcement staff will work together to develop the briefing notes;
- that information regarding an investigation being pursued by MWLAP staff is considered highly confidential and distribution must be limited to only those operational staff involved in the file. It is agreed that if charges are approved by Crown on an investigation, that Executive and Communications staff will be advised once charges have been sworn in and the company has been advised;
- that communication of data, samples, monitoring results and inspection reports between the agencies will be transparent, timely and direct, to allow either agency to make independent judgements about the state of compliance at any time;

Communication and Protocols - continued:

- that all compliance and enforcement activities are complementary and mutually supportive in nature;
- that clear policies and procedures are created that will outline how agencies will communicate with one another; and,
- that the agencies will be mutually involved in the development of compliance strategies and workplans and agree that MAFF compliance staff will be consulted on decision points regarding appropriate or possible enforcement responses by MWLAP staff.

10 . Resolving Differences:

Where conflict arises relative to different opinions within the scope of relevant authorities or appropriate sanctions, it is agreed that differences are to be resolved as quickly and efficiently as possible by staff involved in discussions, and at a maximum, within 30 days of the issue being identified.

If satisfactory resolution can not be achieved between Inspection or Conservation Officer staff, matters will be raised to the Regional Enforcement Manager for MWLAP and the Manager of Aquaculture Licensing and Compliance in MAFF.

If the issue in question can not be resolved within 14 days at this level, it will be brought forward to respective Assistant Deputy Ministers for discussion and resolution within 14 days.

11. Proposed Implementation Timelines:

- January, 2002 - Approval in principle to coordinated compliance and enforcement regime by Deputy Ministers.
- February, 2002 - Development of Service Agreement between agencies of interest.
- Feb./March, 2002 - Approval and sign-off of Service Agreement between agencies of interest. Approval by CORE review table.
- March, 2002 - Development of "Compliance Strategy Matrix".

Proposed Implementation Timelines - continued:

- April to July, 2002 - Training for both MWLAP and MAFF staff –
will be conducted by on-site training
inspections and participating in one or more
joint enforcement investigations
- Arrange appropriate powers and delegated
authorities for staff.
- April, 2003 - Transition phase complete

12. Training Requirements:

Agencies agree that joint training for appropriate staff will be undertaken to deliver on this Service Agreement.

13. Delegation of Authorities:

To effectively administer the numerous statutes that apply to finfish and shellfish aquaculture, delegation or appointment of authority is necessary. MAFF Inspectors will require specific powers to collect inspection data and specific delegated authorities to inspect operations pursuant to both LWBC's and MWLAP's statutory framework.

In most cases, legislation appears to provide the appropriate Minister power to delegate authorities.

Appropriate agencies will work with the Aquaculture Licensing and Compliance Manager to move forward and expedite necessary approvals for MAFF Inspection staff to secure delegated authorities.

14. Resource Requirements:

For the inception of this Service Agreement, it is assumed that resource requirements between both compliance and enforcement agencies will remain the same. Discussions on ability of both agencies to meet identified objectives will occur at the end of the first year.

15. Transparency of Data:

This Service Agreement recognizes the requirement to provide the public with clear, transparent and accountable data on the state of compliance for finfish and shellfish aquaculture industries.

It is agreed that information collected and subsequent enforcement results will be collected and submitted in a joint agency report for distribution to industry and the public via an acceptable medium. The responsibility for completion of this Annual Report will reside with the Compliance and Enforcement Managers in both MAFF and MWLAP in consultation with MWLAP's Environmental Protection Managers. It is expected that the first joint report will be completed and published on or before April, 2003.

16. Service Agreement Requirements:

Immediate Requirements:

- a) Agreement and sign-off on all requirements set out in Implementation Timelines, above.
- b) Draft policies and procedures on how and when agencies will communicate.
- c) Develop overall compliance strategy and workplan for inspection cycle commencing 2002, incorporating necessary training requirements in the workplan.
- d) Confer necessary delegated authorities on MAFF Inspection staff.

Quarterly Requirement:

- a) Meeting or conference call with respective Compliance and Enforcement Managers to discuss issues and resolve concerns.
- b) A regular quarterly review meeting between appropriate Assistant Deputy Ministers and Deputy Ministers will be necessary to ensure the goals set out in this Service Agreement are being achieved.

Annual Requirements:

- a) All elements contained within the Service Agreement will be reviewed annually by respective Compliance and Enforcement Managers. Recommended changes to scope of agreement will be forwarded to appropriate Executive staff for discussion, agreement and implementation. Any agreed upon changes will be submitted via amended Service Agreement with appropriate signatory sign off.

17. Service Agreement Requirements - continued:

- b) Review of respective resources, compliance strategy and workplan elements will be conducted to determine if resources are appropriately allocated. Any reallocation requests will be forwarded to respective Executive staff for review, discussion and approval.
- c) Respective MAFF and MWLAP Compliance and Enforcement Managers will measure the effectiveness of both the compliance and enforcement programs to ensure identified objectives are being met, including licensing and legislative. Adjustments in workplan activities will be modified as appropriate.

18. Termination of Service Agreement:

It is agreed that the Deputy Minister of Water, Land and Air Protection or the Deputy Minister of Agriculture, Food and Fisheries may terminate the intent of this Service Agreement by providing 90 days notice in writing.

Agencies of interest will be consulted as appropriate.

19. Signatories:

For Ministry of Agriculture, Food and Fisheries

Deputy Minister
Agriculture, Food and Fisheries

Date _____

For Ministry of Water, Land and Air Protection

Deputy Minister
Water, Land and Air Protection

Date _____

For Ministry of Sustainable Resource Management

Deputy Minister
Sustainable Resource Management

Date _____

For Land and Water British Columbia Inc.

Chief Executive Officer
Land and Water British Columbia Inc.

Date _____

Appendix I

Service Agreement

Breakdown of Compliance Continuum Activities by Agency

Ministry of Agriculture, Food and Fisheries

Awareness, Education, Promotion and Training Activities:

- advising public of the requirements of the law;
- consultations with parties affected by the law;
- communications strategies and public reporting of the compliance program;
- training programs for staff, clients and other interested parties.

Partnerships and Practices:

- developing cooperative partnerships and agreements contributing to government objectives, including building on and coordinating activities with federal authorities;
- building on reliance on professionally qualified persons;
- promoting industry best management practices (Codes of Practice/Conduct);
- promoting self-monitoring/auditing and reporting on practices;
- promoting International Certification.

Monitoring, Inspections, Audits:

- receiving information/data (with exception of environmental monitoring data) provided by finfish or shellfish sector and forwarding to appropriate regulatory agency;
- conducting all inspections and follow-up inspections (with exception of environmental monitoring program) and audits in the field on behalf of LWBC, MSRM and MWLAP;
- conduct follow up with operators on results of inspections and required remedial actions – identified non-compliance issues under MWLAP's regulatory authority will be referred for discussion and/or appropriate follow-up to MWLAP;
- acting as initial contact for public and industry complaints with respect to issues provided under finfish and shellfish licence terms and conditions, the provincial *Fisheries Act*, *Aquaculture Regulation*, and in the case of shellfish aquaculture, the *Land Act*; and,
- dependent on necessary mitigative measures for farms in excess of chemical trigger, MAFF Inspection staff may conduct monitoring and inspections.

Administrative Remedies:

- aquaculture licence suspension or cancellation proceedings.

Appendix I - continued

Service Agreement

Breakdown of Compliance Continuum Activities by Agency

Ministry of Water, Land and Air Protection

Mitigative Measures:

- evaluation of remediation plans (where required) when farms exceed the chemical trigger prescribed in the *Aquaculture Waste Control Regulation*;
- implementation of mitigative measures (where required) for farms that have exceeded the chemical trigger and/or standards.

Enforcement:

- verifying and substantiating an alleged offence;
- implementing necessary enforcement responses on behalf of all finfish and shellfish aquaculture activities in the province, including finfish escapes. Enforcement activities are defined as warnings, tickets, administrative penalties, orders and formal prosecutions for governing statutes and regulations.

LWBC and MSRM

- Both agencies will provide MAFF Inspection staff and MWLAP Enforcement staff necessary information in completing necessary activities. Examples may include digital aerial photographs and licence and tenure documents.

Appendix II

Mutual Areas of Concern – Compliance and Enforcement MWLAP and MAFF

Issue:
Operation conducted within approved tenure boundaries
Farm sites well marked and posted
Access to water so as not to impede riparian rights
Diligent Use
Environmental Monitoring
Method and location of blood water and disposal
Method and location of net cleaning, waste treatment and disposal
Use of freshwater from a stream/lake
Feed Handling, type and volume
Method of mort disposal and location
Wildlife/predator destruction, disposal method and location
Firearm and ammunition storage and possession
Sewage treatment and disposal
Method and location of refuse storage and disposal
Spill containment for hazardous materials including footbaths
Environmental management
Chemical and fuel storage
Premises appropriately licensed for aquaculture
Culturing approved species with management plan(s)
Compliance with licence conditions and special provisos
Annual or quarterly reporting requirement compliance
Harvested product appropriately tagged (shellfish)
Product sold to registered Fish Processors
Appropriate use of tenure (mitigate laundering of illegally harvested product)
Record keeping requirements such as stock inventory, mortality records
Escape prevention and response programs
Boat operations
Net cage deployment, including net weighting and system anchoring
Predator avoidance plans including feed storage and predator control
Net maintenance, marking and record keeping
Daily inspections and logs
Administration of drugs
Compliance with management plans, including site configurations, biomass and approved species

⁸Mutual areas of concern also include both finfish and shellfish issues reviewed by MAFF and MWLAP on behalf of other agencies such as LWBC (i.e., operation conducted within approved tenure boundaries).

Appendix D - Dispute Resolution

1.0 Dispute Resolution Options (see flow chart below)

If an individual has site-specific concerns regarding noise, aesthetics, or other disturbances arising from a shellfish aquaculture operation it is recommended that she/he consider pursuing the following three options in sequence for dispute resolution. The following discussion makes reference to “complaint” and “complainants”. No pejorative connotation is intended with this terminology. It is used to be consistent with language in the *Farm Practices Protection (Right to Farm) Act* and the Farm Practices Board Formal Complaint Process.

Option 1.

Initially contact the operator to discuss the concerns. In many cases, the operator may be able to explain the nature of the operation and/or resolve the concern at this local level.

Option 2.

If the person has talked to the aquaculture operator and has not been able to resolve the concern, or, if the complainant feels uncomfortable communicating with the shellfish operator directly, he/she may contact Aquaculture Licensing and Compliance Branch staff at MAFF. All complaints received concerning possible legislative, regulatory or licence violations will be logged and a case file initiated by a MAFF Fisheries Inspector to assess the validity of the complaint. Depending on the outcome of the case file, appropriate enforcement sanctions may apply. Referrals to appropriate regulatory agencies, such as the Fisheries and Oceans Canada, the Ministry of Water, Land and Air Protection and LWBC will also be conducted by MAFF Inspectors, depending on the Inspector’s findings. Complainants can contact 1-250-897-7540 to register their complaint.

MAFF staff will endeavour to develop a timely and reasonable resolution to a concern. Often peer advisors - aquaculture operators familiar with the farm practices in question - play an important role in such a resolution.

Option 3.

If the concerned party does not wish to approach the aquaculture operator directly or contact Licensing and Compliance staff at MAFF, they can file a complaint directly with the Farm Practices Board. The full process is pictured in a flowchart and outlined in detail in 2.0 below.

The Farm Practices Board will undertake an initial investigation by contacting all the interested parties and give the complainant the opportunity to be heard. The FPB then has a number of options:

- a.** The FPB can "refuse" the complaint if it considers it trivial, frivolous, vexatious or not made in good faith.
- b.** The FPB can, if it is acceptable to all the parties, adjourn the matter to the informal MAFF "concerns" process.
- c.** The FPB can use a formal "settlement" process that may include MAFF, peer advisors and/or a mediator. The FPB oversees this process.
- d.** The FPB can convene a hearing. The hearing panel must either dismiss the complaint or order the farmer to cease or modify the practice in question. The

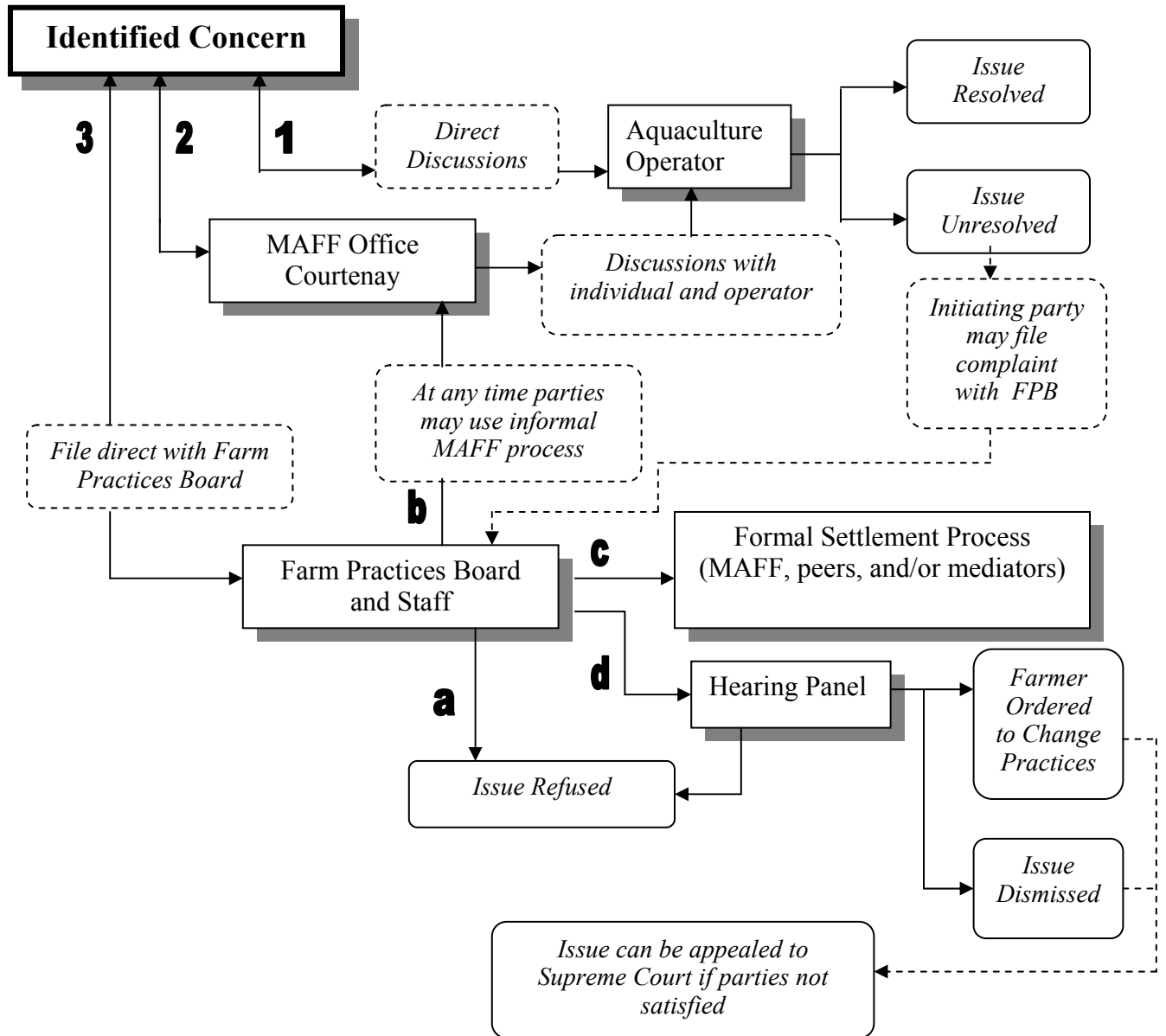
panel may also refuse the complaint for the same reasons as in "a" above. FPB decisions can be appealed to the Supreme Court on an issue of law or jurisdiction.

Contacts for Ministry of Agriculture, Fisheries and Food and the Farm Practices Board:

Farm Practices Board
3rd floor, 1007 Fort St.
PO Box 9129 STN PROV GOVT
Victoria, V8W 9B5

MAFF
Aquaculture Licensing and Compliance Branch
2500 Cliffe Avenue
Courtenay, BC, V9N 5M6
250-897-7540

Dispute Resolution Process



2.0 Farm Practices Board Formal Complaint Process

Revised September 5, 2000

Steps/Action

1. A potential complainant contacts the Farm Practices Board (FPB) prior to filing an official complaint. FPB staff will informally discuss the nature of the complaint with the complainant and explain the formal complaint process under the legislation. If the person does not wish to file an official complaint, they will be redirected to the MAFF (MAFF) office nearest to them for information on MAFF's informal 'concerns' process. No further FPB action will normally be taken unless a formal complaint is filed.
2. An official complaint is filed. **It must be in writing and have information regarding the nature of the complaint, the name and address of the complainant, the name and address of the farmer and the location of the farm. It must also be accompanied by a non-refundable filing fee of \$100.00.** The normal extent of MAFF staff involvement in the filing of a formal complaint (if the informal process has failed or a person does not wish to use it) would be to provide the potential complainant with the preceding information and the FPB's address and telephone number.
3. FPB staff will acknowledge receipt of the complaint and send a letter to the complainant and the farmer explaining the complaints process in detail. Staff's letter to the farmer will also enclose a copy of the written notice of complaint and any supporting documentation the complainant provided with the notice.
4. In most cases, following the receipt of a complaint, a member and staff representative of the FPB will visit the complainant and the farmer at the location of the complaint. This informal visit will be used to establish expeditious and effective communication with the parties, to ensure that the FPB process is understood and to assist the FPB staff in preparing for Steps #5 and #6. The member will not serve on any FPB panel that may eventually hear the complaint and details of the visit will not, without the agreement of the parties, be communicated to the hearing panel.
5. In consultation with the parties, FPB staff will commence assembling background information and identifying any other 'interested parties' that might become involved. Normally, FPB staff will contact the appropriate MAFF, or other external agency, office as part of this background investigation.
6. FPB staff will make initial recommendations to the FPB chair regarding the best approach, or combination of approaches (see Steps #7-11) to handle the complaint. The chair will then issue the appropriate direction(s). Usually, this direction will include the establishment of a hearing panel regardless of whether the complaint will be proceeding directly to a hearing.
7. If deemed appropriate, and before appointing a panel, the chair may seek to determine whether the complaint should be referred to a panel for the purposes of a hearing. After giving the complainant an opportunity to be heard on the issue, the chair will decide whether the subject matter of the application is trivial, the application is frivolous, vexatious or is not made in good faith, or whether the complainant has a sufficient personal interest in the subject matter of the application. If so, the chair may '**refuse**' the complaint.
8. If acceptable to all parties, the complaint may be adjourned in order for the parties to participate in the MAFF 'concerns' process. The FPB would not be directly involved pending a successful resolution, or the failure to achieve one.

9. If Step #8 is not used, the formal ‘settlement’ process may be utilized. This may include MAFF, peer advisors, and/or a mediator (all “**knowledgeable persons**”). This is similar to Step #8, except that the FPB maintains an active and direct management of the process.
10. A pre-hearing conference is held. This will occur if the settlement process is not used, or if it fails. This is a formal process, conducted in person or by telephone, to confirm the issues and parties involved, to identify the background information required and to set the date, time, location and procedures for the hearing.
11. A hearing is conducted. This will be done on a date and in a location suitable to all parties. Although a standard hearing process is employed, the formality and type of hearing (which may include a tour of the farm) will vary depending on the issues and parties involved.

After a hearing has begun, the panel may ‘**refuse**’ the complaint for the same reasons as the chair might in Step #7.

At any time **before a panel decision is issued**, the complaint can return to (or commence) the settlement process in order to attempt a resolution not requiring an FPB decision.

12. A decision is issued by the FPB panel. **The FPB must dismiss the complaint or order the farmer to cease or modify the practice in question.** Once the written ‘reasons for decision’ are issued, the FPB’s role in the complaint is essentially terminated. A copy of the FPB’s decision will be forwarded to the MAFF office of primary interest, upon request.
13. A party to the appeal has 60 days in which to appeal the FPB’s decision to the Supreme Court of British Columbia on a question of law or jurisdiction.

If the farmer does not comply with the decision of the FPB, a court may order the farmer to comply, the farmer may be subject to contempt proceedings and he or she will be open to nuisance and other actions initiated in the courts or at the Local government level.

In certain cases, the FPB may follow up with post-decision comments and/or recommendations regarding larger issues that may have been identified during the resolution of a complaint.

Appendix E - Management Areas Analysis and Rationales

1.0 Method and Analysis

A major focus of this Plan was to determine if, given environmental values and competing resource interests, there are areas within the Sound suitable for future shellfish aquaculture development. The project team investigated all known resource databases to generate resource maps of the Plan area. These included eelgrass, kelp and clam beds, salmon streams, red and blue listed species (See Definitions and Acronyms), and areas used by waterfowl and migratory birds.

A significant step involved analyzing potential environmental effects from various aspects of shellfish culture by Archipelago Marine Research (Section 3.0). In consultation with stakeholders and the public, the team mapped various residential, commercial and recreational uses in the Sound, including upland residential development, commercial fisheries (e.g. geoduck, herring, sea urchins, prawns) and sea kayaking. Existing shellfish aquaculture tenures were also mapped, as were outstanding shellfish applications and areas of future interest. The team then conducted a spatial analysis using this information and knowledge of conflicts between shellfish aquaculture and other values to determine areas of potential resource use conflict (See <http://srmwww.gov.bc.ca/dss/projects/sarp/baynes.htm> for copies of biological and resource use maps). Results of the spatial conflict analyses are provided below.

A meeting held between the representatives from the shellfish aquaculture industry and the herring fishers identified that:

- Beach culture has historically not caused observable impacts on herring fishing;
- Herring fishermen are concerned over potential negative impacts of off-bottom culture facilities on the herring seine fishery;
- Herring fishermen do not want to interfere with economic development of the shellfish aquaculture industry but also do not want the shellfish aquaculture industry to interfere with economic benefits from the herring fishery.
- Herring fishermen would be prepared to see a small increase in development;
- Anchors for shellfish operations should be designed so that they are less likely to snag gear;
- Anchors should be designed so that rafts or long lines could be moved temporarily to reduce the potential for net snagging on anchors;
- Research on herring behaviour beneath rafts and long lines should be done to determine if herring are concentrating under rafts and long lines and appropriate action be taken if they do concentrate; and
- Monitoring of herring fishery and shellfish operational interactions should occur to determine the level of impact that actually occurs.

2. 0 Results of Spatial Conflict Analysis

1) Off-Bottom

This area is located along the lower, west side of Denman Island in the vicinity of Metcalf Bay. An analysis of the values in the area gave the following results. A "+" indicated a favourable factor, a "-" indicated a conflict, and a "+/-" indicated that the interaction was either neutral or required more consideration

+ Favourable Factors	+/- Neutral/Further Consideration	- Conflicting Factors
+ shellfish industry interested in area and has historical use; + no geoduck, sea urchin or prawn fisheries + small areas of eelgrass + no kelp beds + upland is zoned ALR; + no bird colonies + no sea lion or seal haul outs + no salmon streams; + no identified red and blue listed species + no kayaking or outer identified tourism use routes; + no parks, Wildlife Management Areas or reserves;	+/- low to moderate migratory bird values +/- area used by the herring fishery but is not a major tie-up/anchoring point;	- foreshore zoning is incompatible with aquaculture - clam beds on shore

Given the relative lack of significant conflicts in this area, the Plan recommends that some applications for new tenures or expansion of existing off-bottom tenures be permitted in this area. Beach culture is not recommended because of potential conflicts with clam beds and small areas of eelgrass. Concerns of the herring fishery should be addressed prior to the issuance of new tenures.

2) Special Management Area (Sub-tidal)

This area is located along the upper, west side of Denman Island in the vicinity of Denman Point, as well as in the Fanny Bay to Deep Bay areas along Vancouver Island. An analysis of the values in the area gave the following results. A "+" indicated a favourable factor, a "-" indicated a conflict, and a "+/-" indicated that the interaction was either neutral or required more consideration.

+ Favourable Factors	+/- Neutral/Further Consideration	- Conflicting Factors
+ shellfish industry interested in area and has historical use; + no urchin or prawn fisheries; + no kelp beds + no bird colonies + no sea lion or seal haulouts; + no bird colonies + no salmon streams; + no identified red and blue listed species + low migratory bird values	+/- area used by the herring fishery but is not a major tie-up/anchoring point;	- foreshore zoning is incompatible with aquaculture (Denman Island) - clam beds on shore - areas with eelgrass - major kayaking and identified tourism routes - adjacent to Henry Bay, a preferred anchorage - geoduck harvesting area - upland is primarily private, residential, and not ALR

Given the relative concentration of conflicts with other private and recreational users, as well as the herring fishery, the Plan recommends that no applications for expansion or new beach or off-bottom culture be accepted. The Plan recommends that applications for new tenures with no above water structures (i.e. Sub-tidal) that are visually unobtrusive and have minimal impact of adjacent upland users be accepted. The site-specific application review process would have to consider conflicts with wild geoduck and herring fisheries prior to the issuance of new tenures.

3) Special Management Area (Beach and Sub-Tidal)

This area is located around Base Flats on the east side of Vancouver Island. An analysis of the values in the area gave the following results. A "+" indicated a favourable factor, a "-" indicated a conflict, and a "+/-" indicated that the interaction was either neutral or required more consideration.

+ Favourable Factors	+/- Neutral/Further Consideration	- Conflicting Factors
+ shellfish industry interested in area and has historical use. + First Nations interest in this area for shellfish culture. + no sea urchin, geoduck or prawn fisheries. + no kelp beds + no eelgrass + no bird colonies + no sea lion or seal haul outs + upland is primarily agricultural and is in the ALR + no identified red and blue listed species + foreshore zoning is compatible with aquaculture + few visual concerns + not on major kayaking and identified tourism use routes	+/- area used by the herring fishery, but is not a major tie-up/anchoring point; +/- several salmon streams;	- clam beds on shore - area is a very important harvesting area for the commercial wild clam fishery - Area is important for migratory birds

Given the moderate number of conflicts in the area, the Plan recommends that applications be accepted for expansion of existing beach culture tenures, new First Nations beach culture tenures and sub-tidal shellfish aquaculture. The Project Team believed there was little conflict with the herring fishery since there would be no additional infrastructure for the fleet to deal with. An potential outstanding conflict is with the wild clam fishery and migratory birds which should be considered at the site-specific application stage.

4) Restricted Expansion Area (Beach and Off-Bottom)

This area is located in two areas from just South of Comox Harbour to, but not including Base Flats, and excluding Union Point on Vancouver Island. An analysis of the values in the area gave the following results. A "+" indicated a favourable factor, a "-" indicated a conflict, and a "+/-" indicated that the interaction was either neutral or required more consideration.

+ Favourable Factors	+/- Neutral/Further Consideration	- Conflicting Factors
+ no sea urchin or prawn fisheries + no kelp beds + no bird colonies + no sea lion or seal haulouts + no identified red and blue listed species + foreshore zoning is compatible with aquaculture + low migratory bird values	+/- area used by the herring fishery, but is not a major tie-up/anchoring point +/- some kayaking, not a major route +/- several salmon streams +/- shellfish industry has historic use of Base Flats, but less south of Comox Harbour; limited expression of interest in expansion	- clam beds on shore - areas of eelgrass - some geoduck harvesting - upland is primarily residential and has high levels of recreation use - some Wildlife Management Areas and Reserves

Given the moderate number of conflicts in the area but the high amount of residential upland and public recreation in parts of this Management Area, as well as Comox Band interest in Shellfish aquaculture, the Plan recommends acceptance of applications only for limited beach culture expansion contiguous to existing tenures and a limited number of new First Nations tenures. Except for Comox Harbour, much of this area is heavily exposed and it is anticipated there will not be a large increase in development of this area. Development would occur primarily where the public and other users are familiar with, and have accommodated, the use. There are some uncertainties regarding the interaction of shellfish culture facilities and herring fishing. However, this is not a large issue in this area since there would be little new additional infrastructure of concern to the herring fishers.

5) Future Analysis Areas

These two areas are located in Comox Harbour and on Union Point. Given the existing bacterial contamination in these area, extremely high importance to birds, major areas of kelp and eelgrass, potential conflicts with other industrial and recreational users, upland residential development and interest from First Nations, applications are not recommended at this time. However, Future analysis is recommended. Applications, particularly those for First Nations, may be considered on the basis of new information, that indicates applications could be accepted.

6) No Additional Aquaculture Areas

There are three of these areas:

- Henry Bay on Northern Denman Island;
- midway up the west side of Denman Island; and,
- the South end of Denman Island around Repulse Point.

An analysis of the values in these areas gave the following results. A "+" indicated a favourable factor, a "-" indicated a conflict, and a "+/-" indicated that the interaction was either neutral or required more consideration.

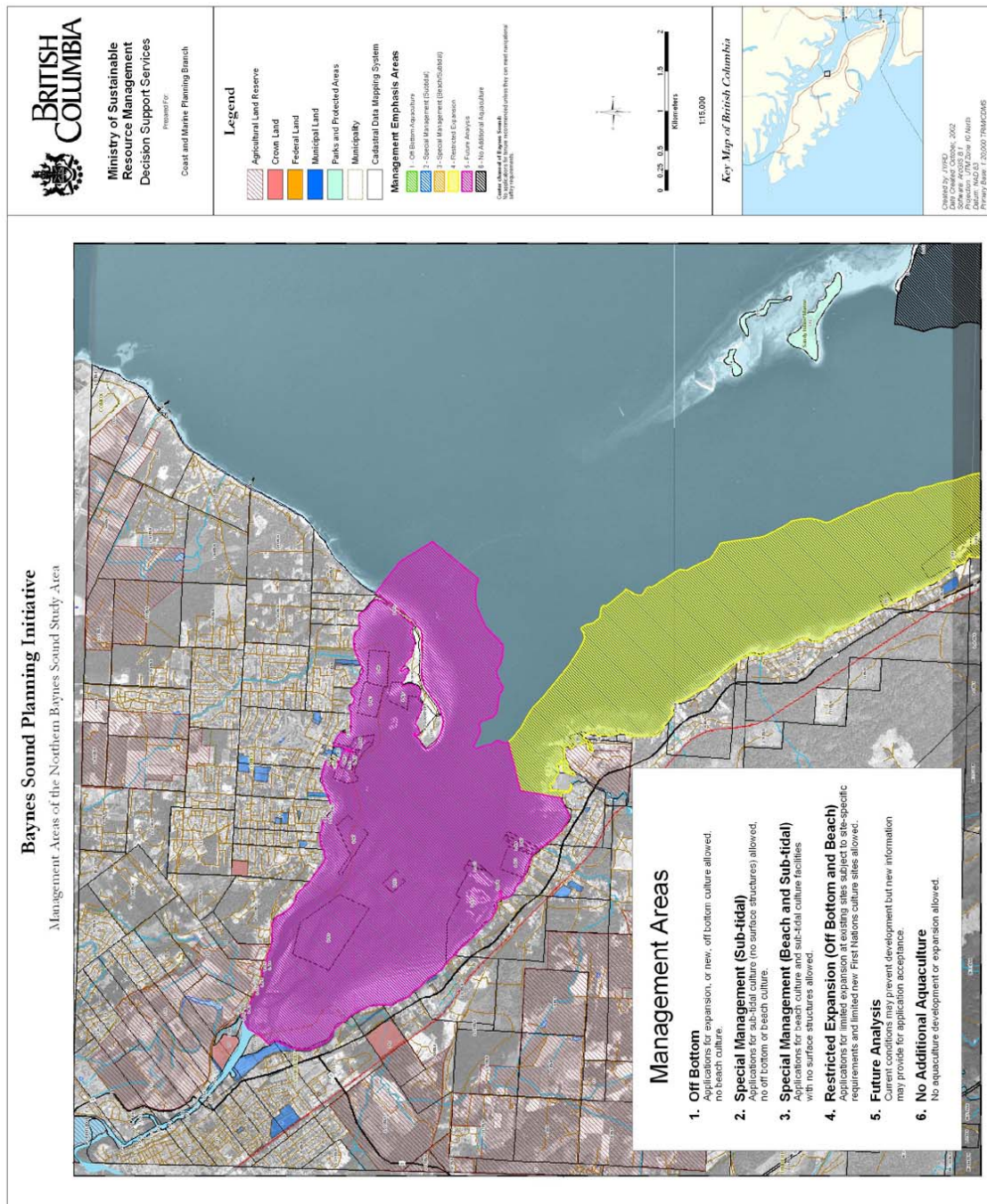
+ Favourable Factors	+/- Neutral/Further Consideration	- Conflicting Factors
+ shellfish industry interested in area and has historical use + no sea urchin or prawn fisheries + no kelp beds + no identified red and blue listed species	+/- foreshore zoning is incompatible with aquaculture on Denman Island and supportive on Vancouver Island	- very important migratory bird values - clam beds on shore - several major wild clam fisheries - areas of eelgrass - major kayaking and identified tourism use routes (Mud Bay and Henry Bay to Sandy Islets) - bird colonies - sea lion or seal haul outs - numerous salmon streams - Henry Bay is a preferred anchorage - major geoduck harvesting area - upland is primarily private, residential around Henry Bay, Vancouver Island and southern Denman Island (except Henry Bay) with high visual impact potential - very important area used by the herring fishery and area also used as major anchoring point

		- Area is heavily subscribed for beach culture already.
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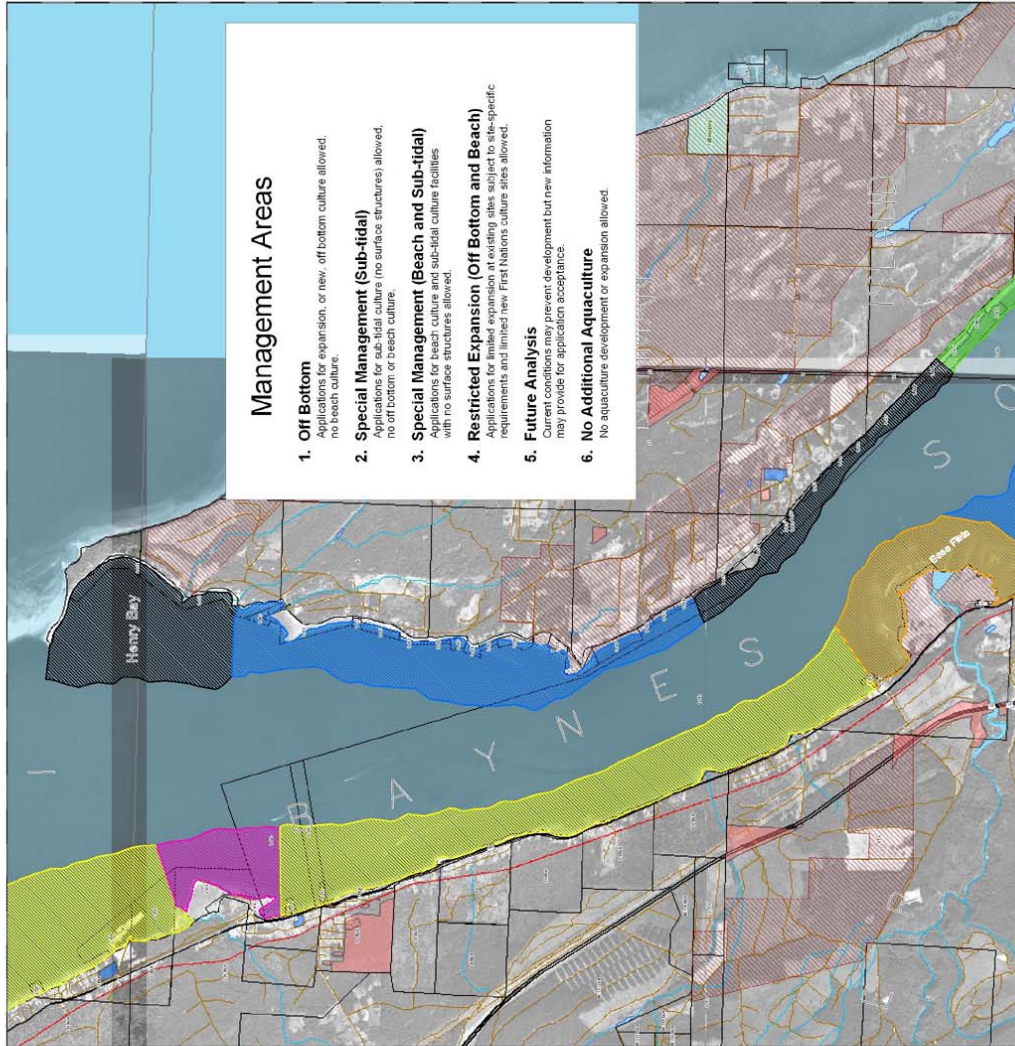
Given the considerable resource and user conflicts that exist in these areas, the Plan recommends that no applications for further expansion or new development of shellfish aquaculture be accepted for these areas and that no additional tenures be issued.

Appendix F: Management Area Maps

For Website Copy of this Plan go to <http://srmwww.gov.bc.ca/dss/projects/sarp/baynes.htm> for large scale maps. For hard copies of this report the maps are included below.

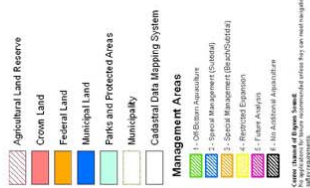


Baynes Sound Planning Initiative
Management Areas of the Central Baynes Sound Study Area



Ministry of Sustainable
Resource Management
Decision Support Services
Presented For
Coast and Marine Planning Branch

Legend



Key Map of British Columbia



Created by: J. Smith
 Date Created: October, 2002
 Project: Baynes Sound Study
 Drawn: J. Smith
 Date: May 23, 2003
 Project: Baynes Sound Study
 Project: Baynes Sound Study

