In BC less than one percent of the total marine environment provides any level of protection for species and their habitat.

The ecological balance in the sea is being threatened by human activities. Scientists point to overharvesting, pollution, habitat degradation, climate change and the introduction of alien species as the most serious threats to marine biological diversity (or "biodiversity").

The signs of human impacts on the marine environment are becoming more frequent and more serious.

In Pacific Canada, as in other parts of the country and the world, we do not have a history of sustainably managing living marine resources. The traditional approach has been reactive—acting only after the damage is done, by closing fisheries or cleaning up sources of pollution.

We need a new approach that focuses on the conservation of marine biodiversity. This strategy should include: controlling sources of pollution; integrated coastal zone management; direct regulation of marine resources; community stewardship; use of economic incentives (or disincentives); and establishment of marine protected areas (MPAs).

"Because the destruction of our environment has proceeded so far, preventing things from vanishing is essential but not sufficient. Rather than adopting a goal of stopping the loss of endangered biological resources, the goal of marine biodiversity conservation should be to ensure that they do not become endangered, that is, the goal should be to maintain the integrity of life."
Dr. Elliot Norse,
Global Marine Biological Diversity

Marine protected areas (MPAs) are a much-needed, but underutilized tool for conserving marine biodiversity.

Cover: Standoff between predator and prey—red Irish lord sculpin and pygmy rock crab in Browning Pass.

52,000 tufted puffins nest on Triangle Island, part of the Scott Islands group—the largest seabird colony in BC.

The Three Levels of Marine Biological Diversity

Life occurs at several levels of biological organization. The that there are different heirarchical levels of biological diversity—genetic, species and ecosystem—has become a main organizing principle in the field of conservation biology.

The blood star is one of 68 different sea star species living in BC marine waters.

Species diversity is the middle, and perhaps most familiar, level of biological diversity. Diversity at the species level varies widely at different locations throughout the marine environment. Generally, species diversity is higher in tropical regions than in cooler regions. However, some of the species found in BC marine waters, such as starfish and kelp, are more diverse here than anywhere on Earth.

Ecosystem diversity is the diversity among biological communities and their physical settings. This is the highest level of diversity, and is characterized by differences in species composition, physical structure, and function. Ecosystem diversity is not difficult to see. Different physical settings favour different communities of species. This is very apparent in BC, where a variety of ecosystems are found with varying levels of species composition, community

The Precautionary Principle and the Burden of Proof

Threats—either existing or potential—to marine biodiversity are, in most cases, attributable to our use of the "wait-and-see principle," a principle which allows ecosystem degradation, pollution, or over-exploitation so long as there is an economic gain to be made and the environmental consequences are uncertain. With few exceptions, the burden of proof that an activity does not harm the marine environment does not reside with those engaging in the activity, but rather with regulatory agencies and non-governmental organizations. Under this system, conservation measures are initiated only when there is irrefutable evidence that damage is occurring.

Placing the burden of proof on the public and regulators—neither of which profit from the activity—is incompatible with sustainable use, and puts the guardians of the public interest at an inherent disadvantage. Complicating the matter is that, typically, the data required to determine whether or not a particular activity is sustainable simply does not exist, or is unavailable.

The alternative is to place the burden of proof on those who would alter the sea. Under the "Precautionary Principle," users must demonstrate that their activities are not harmful to species and ecosystems before engaging in them. Under this principle, information necessary for informed decision making must be provided before irreversible losses occur.

Black oystercatchers nest on barren rocky shores just above the high tide line, making them very susceptible to disturbances from humans.

structure, physical structure (including those created by organisms), and species dynamics within communities.

The least visible and least studied level of biological diversity is genetic diversity within species. ***Genetic diversity*** is the lowest level of biological diversity, and in simple terms can be defined as the diversity of genes within and among populations of a species. An example of genetically distinct populations, in this case separated by timing rather than geography, can be found in chinook salmon. Although intermingling with other populations on their feeding grounds in the Pacific, chinooks ultimately segregate and return to particular streams to breed at particular times. Genetic diversity is the raw material for evolution, and the certainty of accelerated environmental change makes conservation of genetic diversity an important marine conservation goal.

MPAs are an essential, but underused, component of an overall strategy for conserving marine biological diversity. They cannot solve all of the problems in the ocean environment, but they are an important foundation. Marine protected areas challenge us to consider marine ecosystems, the role of different species and habitats in these ecosystems and how they are interrelated.

What Does "Protected" Mean?

The purpose of protected areas is to help conserve the plants and animals that live within them. Human activities inside protected areas must be conducted in a way that is consistent with achieving this purpose.

The Pacific octopus is the largest species of octopus in the world, with an arm spread of up to 3m and weighing up to 50 kg.

MPAs are areas in the marine environment that have long-term legal protection. They include the seabed, water column, plants and animals and their habitats. They can range in size from small to large and they can provide for different levels of protection, from harvest refugia areas that are totally closed to all consumptive and possibly other human uses, to multiple-use areas, allowing for human uses compatible with the conservation objectives of the area.

There is no one perfect MPA design. The key to success is flexibility, tailoring each MPA to fit the needs of the area, but ensuring conservation comes first. According to marine scientists, human activities that threaten species or natural processes, namely mining, oil, gas and mineral exploration and development, dumping, finfish aquaculture, large-scale dredging and bottom trawling, must be prohibited within MPAs. Whether or not other activities should be allowed—to what extent and in what parts of a protected area—is best decided on a case by case basis. In addition, scientists have emphasized the need for areas that are closed to the harvesting of all marine life in the network of MPAs.

Benefits of Marine Protected Areas

Conservation of Productive Ecosystems and Biodiversity

MPAs can provide an important tool for protecting productive marine ecosystems and conserving marine biodiversity for future generations. Serious problems such as overfishing, habitat destruction and the introduction of exotic organisms reduce the diversity and impair the long-term integrity of marine ecosystems. The inclusion in the MPA system of productive ecosystems such as upwelling areas, kelp forests and estuaries, is essential in protecting habitats for the life stages of marine flora and fauna.

Conservation of Commercial Resources

International experiences have highlighted the role of MPAs in protecting and sustaining fisheries resources. Traditionally, fisheries management techniques have taken a "species-by-species" approach, and the regulation of fishing activity has included harvest quotas, closures, or gear restrictions. However, despite these measures many fisheries in Pacific Canada are not sustainable. It is now clear that we need to develop and employ new, innovative approaches to fisheries management that take more of an ecosystem perspective.

Upwelling Zones: The Engines of Marine Ecosystems

Upwelling is the oceanographic process by which water rises from lower depths into shallower regions. There are two general reasons for their occurrence. Broad upwelling events occur when winds drive surface water away from the coast, so that colder, nutrient-rich subsurface water rises to replace it. In BC, upwelling occurs off the west coast of Vancouver Island during summer, initiated by prevailing northwesterly winds.

A second, more localized, type of upwelling occurs where tidal currents are deflected upward by underwater ridges and shoals on channel floors. It is this type of upwelling which helps keep the water in the southern Strait of Georgia cold throughout the year, and which creates the strong water motions in tidal channels like Active Pass and Seymour Narrows.

Upwelling returns nutrients to the photic zone (the upper ocean in which the presence of light is detectable) as they are released by the decomposition of organic material in deeper waters. Higher primary productivity results, typically five to ten times higher than in the open ocean, making these areas exceptionally important to protect.

In 1999, the Committee on the Status of Endangered Wildlife in Canada officially listed the northern abalone and the Strait of Georgia's resident killer whale population as "threatened."

Protection of Critical and Unique Habitats

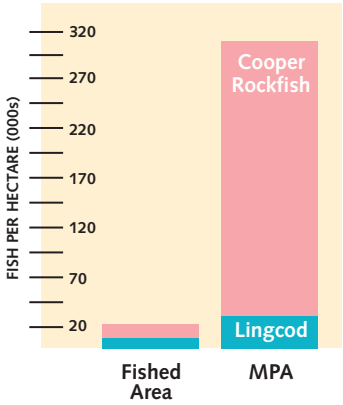
MPAs can be designated to protect critical habitats, such as nursery grounds or migration stopovers, against physical disturbance. Unique ecological communities that are isolated or confined in their distribution, such as hydrothermal vents and seamounts, should also be included in the MPA system.

Conservation of Endangered or Threatened Species

Preserving endangered and threatened species and their habitats is an important goal of MPAs. Suitable habitat and space to maintain the ecosystems and genetic pools that support viable populations of threatened species, must be included to achieve this goal.

Examples of the goals of fisheries-oriented MPAs

Adult Recruitment	Providing refuge for adult spawners ensuring more dense populations of adults and large juveniles that will naturally migrate into other areas
Species Recovery	Protecting depleted stocks and their habitats during the rebuilding phase of a fishery
Life Stage Protection	Providing protection of fish and their habitats during sensitive or vulnerable life stages, such as spawning or rearing periods
Genetic Reservoirs	Protecting critical breeding stocks or unique sub-populations, to help maintain the genetic diversity of stocks and preserve the population and age structure of target species
Insurance Against Uncertainty	Providing insurance against unexpected events such as climate change, and against our lack of understanding of the dynamics of fisheries resources



MPAs in Washington State have documented the benefits of harvest refugia for enhancing groundfish populations.

Below: Low impact ecotourism in the Queen Charlotte Islands.

Scientific Research and Monitoring

MPAs can provide a number of opportunities for scientific research. By providing "control" areas it is possible to investigate ecological linkages (such as the relationship between oceanographic processes and marine species behaviour) and compare relatively "untouched" ecosystems with others that have been impacted by humans.

Scientific research within MPAs can further our knowledge of how ecosystems function and how conservation strategies contribute to the recovery of marine species and ecosystems. Management approaches can be tested, refined, and used as a basis for the establishment, design, and management, of subsequent MPAs. In this way, marine scientists and managers can better address the gaps in our understanding, reduce uncertainty, and provide a basis for adaptive management and future planning.

Enhancement of Recreation and Tourism Activities

MPAs can provide recreation and tourism opportunities, as well as the pursuit of activities of a spiritual or aesthetic nature. The protection of special recreation features, such as boat havens and anchorage sites, beaches and marine travel routes, can help secure the wealth and diversity of recreational opportunities available along the coast.

Tourism, recreation, and the consequent economic benefits of MPAs are intimately linked—benefits such as job creation, and private sector and government revenues, have been derived from MPAs in other countries. In BC, "eco-tourism" is the fasting growing industry.

Socio economic Benefits for Coastal Communities
MPAs can improve the economic base of coastal communities by enhancing the sustainability of commercial and sport fisheries, and by providing opportunities for recreation and tourism operations.

Zoning of a MPA

Marine protected areas could accommodate a broad spectrum of human activities compatible with the conservation objectives within and outside the protected area. In this example, the MPA contains a total of five zones: the main part of the MPA; a highly protected harvest refugia area, safeguarding a rocky point; a research-only zone, protecting the river estuary; a recreation zone, adjacent to one island; and a limited fishing zone which includes part of an offshore bank and a deep channel, where fishing is permitted but at lower levels than the main part of the MPA.

Network of MPAs

A network of MPAs should protect examples of the different kinds of habitat within a region. In this illustration, there are MPAs protecting examples of onshore and offshore habitat, shallow banks and deep channels, islands, estuaries, and sandy, rocky, and muddy areas. The MPAs are of different sizes and shapes, some having only one zone, others having two or three different zones. Together, the MPAs form a large network that protects a variety of habitats and covers the geographic range of broad ecological processes, such as upwellings and sediment outflows.

Legal Tools

A number of legal tools exist to establish MPAs in British Columbia (see table, opposite page), administered by a number of different federal and provincial government agencies. Three levels of government—federal, provincial and First Nations—all play a part in establishing MPAs.

"Is marine biodiversity adequately protected and are marine ecosystems adequately represented by our present system of marine protected areas? The answer has to be an unequivocal no… Few, if any, protect entire ecosystems, and the organisms in existing areas are inadequately protected."
Dr. Michael Hawkes,
Biodiversity in British Columbia

The Federal Role

Environment Canada can protect wildlife and wildlife habitats through the establishment of Migratory Bird Sanctuaries and National Wildlife Areas (including the newly legislated Marine Wildlife Areas, which permits the protection of wildlife habitats, for conservation, research, and education, out to the 12-nautical-mile territorial sea).

Parks Canada contributes to marine conservation through its National Marine Conservation Areas (NMCA) program. Its objective is to establish a system of protected areas representing each of Canada's 29 marine regions. An essential feature in all NMCAs is the zoning of different activities within the area, including protected core areas. Zoning allows for the many roles of NMCAs—conservation, preservation, public education, ecotourism, and research—to be fully realized.

With the passage in 1997 of the *Oceans Act*, the Department of Fisheries and Oceans became the newest MPA partner. Under this legislation, MPAs can be established in tidal waters out to the 200-nautical-mile limit, for the conservation and protection of fishery and non-fishery resources; endangered and threatened species; marine areas of high biodiversity and productivity; and unique habitats. The Oceans Act gives the Minister of Fisheries and Oceans a leadership role in coordinating regional ocean planning initiatives, which will include identifying, establishing, and managing comprehensive networks of MPAs.

Historically, some coastal First Nations prized the wolf eel as the "doctor fish" or *mukah*. Only the medicine man ate the flesh in order to enhance his healing powers.

The Provincial Role

At the provincial level, the *Park Act* provides for the establishment of marine parks, and the *Ecological Reserve Act* has been used to establish a number of ecological reserves with a marine component. Both of these designations are managed by the BC Parks department of the Ministry of Environment, Lands and Parks. Within the boundaries of provincial marine parks and ecological reserves, wharf developments, aquaculture activities, kelp harvesting, oyster harvesting and log booming are not permitted. Many of the existing provincial marine parks were selected for recreational purposes and most have been established as extensions of terrestrial parks or ecological reserves, or to protect specific coastal features, such as seabird colonies, seal haul-out sites, and safe anchorages. For the most part, only limited protection is given to marine species through harvesting closures in these areas.

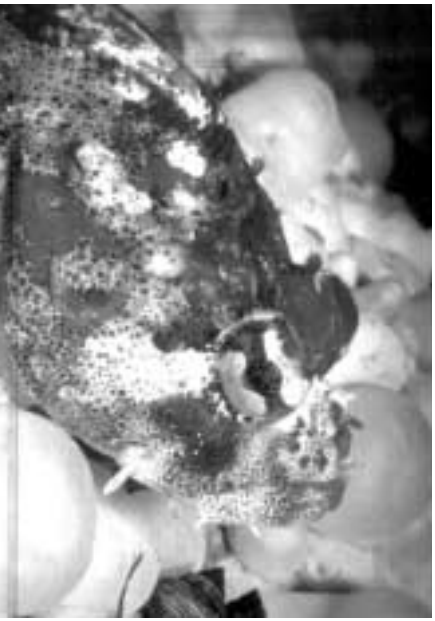
The Role of First Nations

The role of First Nation governments in MPA establishment is emerging and evolving. First Nations have a strong interest in conserving marine resources for cultural, subsistence, and economic reasons. As such, MPAs will be managed in

Government Agencies for MPAs in BC

Designation	Agency	Objectives	Examples
National Marine Conservation Area	Parks Canada	Protect and conserve marine areas of significance as part of a representative network of protected areas.	Gwaii Haanas NMCA Reserve (proposed)
Migratory Bird Sanctuary	Environment Canada – Canadian Wildlife Service	Protect nationally significant coastal and marine habitats used by birds for breeding, staging, migration or overwintering	Esquimalt Lagoon; Shoal Harbour
National Marine Wildlife Areas	Environment Canada – Canadian Wildlife Service	Conservation of marine wildlife, with emphasis on marine birds, through the maintenance and restoration of supporting habitats	Alaksen NWA
Provincial Parks	BC Ministry of Environment, Lands and Parks	Protect representative examples of natural diversity, and special natural, cultural heritage, and recreational features within BC	Botanical Beach; Desolation Sound; Cape Scott; Broughton Archipelago
Provincial Ecological Reserves	BC Ministry of Environment, Lands and Parks	Protect viable, representative examples of the natural diversity and exclude harvest of marine resources within the reserve	Satellite Channel; Robson Bight; Duke of Edinburgh
Marine Protected Areas (Canada Oceans Act)	Department of Fisheries and Oceans	Protect and conserve commercial and non-commercial fisheries resources, including endangered or threatened species, areas of high biodiversity or productivity, unique habitats, and marine mammals and their habitats	Four pilots – Gabriola Passage; Race Rocks; Bowie Seamount; Endeavour Hydrothermal Vent

Common inhabitants of rocky shorelines, younger specimens of red lord sculpins are frequently found hiding in tide pools.



collaboration with aboriginal governments in accordance with mutual interests in marine conservation, and will be identified and designated in a manner consistent with aboriginal land claims and rights.

Cooperative management provides a means of marine conservation and protection, pending the resolution of treaties, and offers opportunities for better resource management through the inclusion of traditional knowledge and management practices. The mutual learning among scientific and aboriginal experts is critical for successful stewardship of the oceans. There are a number of co-management institutions in Canada, particularly in the North (such as the Inuvialuit Final Agreement) and with the Inuit of Northern Quebec. In BC, the joint Archipelago Management Board—a cooperative arrangement between the Council of the Haida Nation and the federal government assigned with managing Gwaii Haanas National Park Reserve/Haida Heritage Site—is poised to demonstrate the effectiveness and fairness of potential cooperative regimes in marine conservation, including MPA identification, establishment, and monitoring.

A Question of Jurisdiction

Jurisdiction over the marine environment in BC is currently divided between the federal and provincial governments. The federal government retains exclusive constitutional jurisdiction over the conservation and management of all organisms in the water column (including marine mammals, finfish and shellfish), as well as issues transcending international boundaries, navigation, marine pollution and migratory birds.

The provincial government owns all coastal property above the low water mark and the seabed within inland waters, except in federal harbours, and has the responsibility for the conservation and management of marine plants, oysters, and

Sgan Gwaii, located in Gwaii Haanas National Park Reserve/Haida Heritage Site, highlights the close connection between coastal First Nations and the marine environment.

steelhead. The province regulates coastal land use, establishes coastal parks, and has authority for foreshore leases. On the open coast, it is generally agreed that all land east of a headland to headland demarcation are under provincial jurisdiction, and all west are federal.

Coastal Communities and the Fishing Sector

To be successful, MPAs should be selected, designed, and managed in part by the people who will be most affected—those who live nearby, make a living from, or are otherwise closely tied to the ocean and its resources. For coastal sites in particular, many different, and sometimes competing, human needs must be considered in order to decide, for example, whether a small "no-take' area or a large, zoned, multi-purpose area is most appropriate.

The role of coastal communities in MPA management ranges from nomination and co-management of sites to consultation activities and public awareness programs. In the end, the successful establishment of representative networks of MPAs lies as much with grassroots organizations involved with "bottom-up" approaches to MPA establishment as it does with government MPA managers and scientists involved in systematic, or "top-down" approaches. For MPAs to succeed in BC, these two processes must be complimentary to each other.

Equally critical is the involvement of fishers, who are not only strong proponents for conserving the marine resources upon which they obtain their livelihoods, but also whose knowledge is critical to the scientific information that shapes the approach taken to identifying, establishing, and managing MPAs. Experience suggests that MPAs need strong support from fishing interests, and that support for MPAs grows when harvesters become involved on the Pacific coast of Canada, more and more fishers are advocating the use of an ecosystem approach to fisheries management.

First Nations have constitutional rights to fish for food, social and ceremonial purposes. The BC Treaty Negotiation process intends to clarify rights, jurisdictions, and entitlements. It is expected that new cooperative management arrangements will be established in MPAs between First Nations and federal and provincial agencies, modeled on existing cooperative management boards. The implications of the recent Supreme Court of Canada decision on Delgamuukw for resource issues in BC are still being determined, but are expected to be far-reaching.

A Promising Beginning

The federal and provincial governments in BC have committed to speeding up the process of establishing MPAs. In 1994, those agencies with responsibility for the establishment of MPAs in BC created an intergovernmental steering committee, which is now in the process of developing a coordinated Marine Protected Areas Strategy for the Pacific coast of Canada. The committee is comprised of senior officials from six agencies: Fisheries and Oceans Canada, Environment Canada, Parks Canada, BC Land Use Coordination Office, BC Ministry of Fisheries and BC Parks Department. An MPA working group has been established to help develop the strategy. A draft MPA Strategy discussion paper was released in August 1998.

A Representative Approach

A guiding principle of conservation biology is that an ecologically representative approach to protected areas—one which aims to represent, or "capture," all natural regions—is needed. Although it is not yet clear how many protected areas are needed, or where they need to be, to complete an effective MPA network in BC, it is clear that we need to protect habitats within all types of marine environments: nearshore and offshore; shallow and deep waters; saltmarshes; estuaries; muddy, sandy, and rocky bottoms; and open oceans and sheltered bays.

For Map Reference :
see inside flap at the back of this publication.

We must protect areas that are obviously very productive, for example, where seabirds and whales gather, as well as others that, at first glance, may appear barren or of little interest to us, but in fact support key features. This is not to say that MPAs need to be anywhere and everywhere. Rather, the goal is to complete a carefully planned, science-based network of MPAs that will be as efficient and effective as possible at protecting marine species and habitats.

Marine Ecological Classification

The task of mapping marine habitat types in Canada has really just begun. The Province of BC, following earlier work by Environment Canada, has recently developed a comprehensive ecological classification system for MPA planning in Pacific Canada that includes mapping of natural regions and representative habitats.

Protected from hunting in 1970, Steller sea lion populations in BC are now considered stable, although still below historical levels.

In this classification, scientists have identified 12 distinct regions of the Pacific coast, referred to as ecosections. Distinguished from each other on the basis of a variety of biophysical features, each marine ecosection represents marine communities with broadly similar habitat requirements and biological productivity. This classification provides a framework for establishing a representative MPA network, and efforts continue among the marine scientific community to refine this system through the application of further biophysical criteria.

As demonstrated in the following section, these 12 regions also provide us with a means of comparing the variable marine habitats found along the BC coast, and can be used to highlight key sites worthy of protection within each ecosection.

A Representative Approach

1. Juan de Fuca Strait

Juan de Fuca Strait is a deep trough of semi-protected waters. With its strong, "estuarine-like" buoyancy currents, Juan de Fuca Strait acts as a conduit for major water exchanges between the open ocean and the protected Strait of Georgia. It is

also a geographic barrier between certain genetically distinct stocks of marine species in Puget Sound and the Strait of Georgia.

The exposed shoreline between Victoria and Port Renfrew displays a variety of productive rocky intertidal and subtidal ecosystems, accented by assorted lagoons, spits, tidal pools, flats and surf zones. Invertebrate species found in this area include clams, crab, sea cucumbers, abalone, sea urchins and octopus. Botanical Beach, southwest of Cape Renfrew, is widely known for its diverse intertidal marine life, its picturesque sandstone formations, and its high archaeological and historical values.

At **Race Rocks Ecological Reserve**, energy and nutrient inputs are large, and light penetration in the shallow, clear waters is excellent. These factors result in a high production of marine plants (including extensive stands of bull kelp), and invertebrates. The abundance and diversity of fish and invertebrates at this site attracts a variety of whales, sea lions and seals. With so many special features, it is not surprizing that Race Rocks was announced in August 1998 as a "pilot" MPA as part of the joint federal-provincial MPA strategy.

Top: Botanical Beach.

Above: Probably the most photogrpahed nudibranch in BC, the alabaster nudibranch has a mouth with file-like "radulas" used to scrape food off the surrounding rocks.

2. Vancouver Island Shelf

The Vancouver Island Shelf ecosection is a narrow, gently sloping shelf, with an open coast exposed to the full impact of ocean waves. Here, northward buoyancy currents, resulting from freshwater discharge from Vancouver Island, hug the coast, while seasonal upwellings occur along the outer margins of the shelf, maintaining highly productive planktonic and benthic (bottom-dwelling) communities.

This ecosection represents the northern limit for a variety of fish species, including hake, sardine, northern anchovy, and Pacific mackerel. Important marine food web linkages can be found at areas such as Cook Bank (surrounding the Scott Islands) and La Perouse Bank. These areas are rich fishing grounds, for species such as lingcod, Pacific cod, rockfish, black cod, halibut, shrimp and crab.

The exposed outer coast of Vancouver Island experiences some of the heaviest surf anywhere in the world. Strong waves help stir up an oxygen-concentrated, nutrient-rich soup in the upper water layer, supporting important coastal populations of bull kelp, anemones, giant mussels, abalone, geoduck, sea urchin, clams, and

Each year, approximately 22,000 gray whales make their way up the Pacific coast on the longest migration of any species in the world—from their calving grounds in the warm waters of the Baja in Mexico to their rich summer feeding grounds off the BC and Alaskan coasts.

gooseneck barnacles, to name only a few. The three Steller sea lion rookeries found at the Scott Islands are the most important on the BC coast. The charismatic sea otter, at one time nearly extinct and currently considered threatened, can be found at **Checleset Bay Ecological Reserve** (where transplantation occurred in the 1960s and 70s).

Pacific Rim National Park Reserve, with a marine component of over 21,000 hectares, lies within this ecosection. The **Scott Islands**, a biologically diverse marine area with important populations of migratory seabirds and marine mammals, could become a Canadian Wildlife Service Marine Wildlife Area. The establishment of a large, zoned MPA at Scott Islands, would significantly contribute to better representation of this important marine ecosection.

3. Strait of Georgia

The coastal waters of the Strait of Georgia, a broad shallow basin sheltered from the Pacific Ocean by Vancouver Island, represents one of the most important marine regions in BC. Freshwater input from the Fraser River and other tributaries combine with the enriched marine waters which enter through Discovery Pass and Johnstone

In the Strait of Georgia, as with other regions of coastal BC, marine ecotourism is a rapidly growing industry and has demonstrated the potential for integrating economic development with marine education and conservation.

Strait in the north and Juan de Fuca Strait in the south. This fresh and salt water mixing, combined with ocean turbulence, enhances plankton growth, which in turn supports an abundance and variety of marine species.

Much of this region is steep and rocky, with varied but restricted habitats. Localized upwelling areas, such as Active Pass and Seymour Narrows, generate the colder, nutrient-rich waters which help sustain a wide range of species. Underwater reefs and cliffs provide habitat for a range of sea life, including the giant Pacific octopus, wolf eels, rockfish and lingcod. The entire Strait of Georgia represents the geographic range of a southern group of resident killer whales. Harbour seals and Steller sea lions are a common sight, and the California sea lion, whose population to the south of BC is expanding, have been spotted as far north as Campbell River.

Herring spawn in huge schools in shallow areas throughout the Strait, including Baynes Sound and Menzies Bay. The Strait of Georgia is also a critical region for marine birds. Migrating and wintering loons, cormorants, grebes, murres, gulls and ducks are common. Breeding sites for bald eagles and pigeon guillemots can also be found in this area.

To date, no protected marine areas within this ecosection meet minimum CPAWS/WWF Canada protection standards. With nearly three-quarters of BC's population located around its shores, and with evidence of habitat loss, species exploitation, water pollution and other forms of marine environmental degradation, further protection of the marine environment in the Strait of Georgia ecosection is clearly needed.

Candidate MPA sites in this region include **Gabriola Passage**, which was recently announced as a "pilot" MPA and could be the first no-take MPA under the Canada Oceans Act. Local grass-roots organizations are working to advance other candidate MPA sites, most particularly in the Southern Gulf Islands. Parks Canada is interested in the establishment of a National Marine Conservation Area in the southern Gulf. Such a large, multi-use MPA could provide strong protection for a variety of important habitats, species, and features, while accommodating proposed uses from various marine stakeholders.

The decorated warbonnet is frequently found sharing its cave with shrimps, which comprise the bulk of its diet.

Next to humans, killer whales are the most widely distributed animal on Earth, inhabiting all of the world's oceans.

4. Johnstone Strait

The bold, rugged, and highly scenic coastline of Johnstone Strait, indented by inlets and bays, and laden with islands of all sizes, are separated by a medley of narrow channels. These protected coastal waters, less stratified than the Strait of Georgia, are subject to high current velocities as tidestreams, often on the order of 2-3 metres per second, are forced through constricted passages.

Clown shrimps often live around sea anemones. Not threatened by the anemone's stinging tentacles, they feed on food it has discarded.

This marine region is highly productive and supports a diverse species assemblage. Subtidal communities of anemones, hydroids, nudibranchs, crabs and sponges, carpet the bottom and sides of tidal passages. Sea urchins, sea stars, rockfish, greenlings, and octopus are numerous, usually in lower current areas. The deep, flat-topped substrate around Numas Island provides feeding habitat for a variety of fish, including halibut. Pacific salmon migrate through the area on their way to the Fraser River and other spawning sites. The region is also heavily utilized by a northern population of resident killer whales, with the salmon feeding areas and rubbing beaches of Robson Bight being a preferred site. Other marine mammals, including Pacific white-sided dolphins, harbour porpoise, Dall's porpoise, resident harbour seals, and wintering Steller sea lions, are common. Shorebirds and seabirds, including ducks, gulls, alcids, loons, phalaropes

and bald eagles, abound, especially during migration periods.

Native communities, past and present, provide this region with a rich cultural heritage. Traditional First Nation use of the marine environment continues at villages on Gilford Island and at the head of Kingcome Inlet. Pictographs, burial sites, and shell middens at abandoned villages on Harbledown, Village and Turnour Islands, to name only a few sites, offer a fascinating glimpse into Kwakiutl and Coast Salish culture and history.

Many of the larger protected marine areas in the Johnstone Strait ecosection, such as **Broughton Archipelago** and **Desolation Sound Marine Parks**, were established primarily for their anchorage and/or recreational values. At **Robson Bight (Michael Bigg) Ecological Reserve**, established in 1982 to protect killer whale rubbing beaches and upland forests, a warden system has been implemented to curtail human disturbances of the whales by paddlers and boaters. Commercial salmon fishing, however, continues in this "hot spot" for Fraser River chinook. Strategies to improve the extent of representative MPAs in this region could include upgrading protection standards at Cormorant Channel Provincial Park, and adding additional protection measures to the Broughton Archipelago and Robson Bight areas.

5. Queen Charlotte Strait

Queen Charlotte Strait is a 90 km long, relatively shallow, island-strewn basin which makes up a major part of the navigable "inside passage" that separates Vancouver Island from the mainland coast. Here the steep-sided walls of Johnstone Strait are replaced by a broken, shoal-infested coastline.

This region is a confluence for the nearly homogeneous waters that move seaward through the basin and the more stratified oceanic waters that move inland from Queen Charlotte Sound. The high relief and currents in Queen Charlotte Strait renders it more "marine-like" than Johnstone Strait, while its shallowness distinguishes it from Queen Charlotte Sound. Further unique features of this ecosection are the fjord-like environments found within Seymour and Belize Inlet, which although not as deep as other BC fjords, still display the typical physical characteristics of a west coast inlet.

With its unique oceanographic and ecological processes, Queen Charlotte Strait is a high priority for protection. The area supports internationally and/or nationally significant populations of seabirds and marine mammals, sustains an abundance of diverse benthic communities, and provides critical habitat for a variety of fish species.

Designated protected areas with a marine component within the Queen Charlotte Strait region include God's Pocket Provincial Marine Park and Duke of Edinburgh Ecological Reserve (which supports more than 1% of the world's Cassin's and rhinoceros auklet population, as well as significant populations of other seabirds and marine mammals). A variety of other areas of interest, including

Exhibiting unique oceanographic and ecological processes, the Queen Charlotte Strait region of BC has been consistently identified by marine scientists as one of the most productive and diverse marine areas of Pacific Canada.

Browning Pass, Barry Islet, and a marine extension to the Duke of Edinburgh Ecological Reserve, have also been identified. Given the region's highly representative biophysical features, the establishment of a large, multi-zoned MPA would contribute measurably to an ecologically representative system of MPAs on the Pacific coast.

6. Queen Charlotte Sound

The Queen Charlotte Sound ecosection is physically delineated from other marine ecosections by several large banks and inter-bank channels. In this ecosection, ocean wave exposure and deep (usually over 200 metres) water combine to create a marine environment dominated by oceanographic intrusions, resulting in an area more "oceanic" than adjoining areas. The biological consequences of this are that a variety of diverse and productive communities are found, ranging from open water habitats to protected bays. Perhaps more than any other ecosection, Queen Charlotte Sound embraces a large variety of marine species and habitats.

With its large body of open ocean, Queen Charlotte Sound provides habitat for pelagic (freely roaming in water or air column) communities such as seabirds, marine mammals, fish and plankton. Major seabird nesting grounds are found at Calvert Island, Hunter Island, and the Goose Group, supporting thousands of breeding pairs of pelagic cormorants, gulls, pigeon guillemots, Cassin's aucklets and Rhinoceros auklets. Gray whales migrate through the region; killer whales, minke whales, dolphins and sea lions, occur throughout the year. Many areas in this region, particularly the Goose Group, with its many reefs and shoals, are characterized by the presence of kelp, and associated variable marine life, such as sea otters, urchins, fish and algae. Spawning grounds for herring occur throughout in Kwakshua Channel, Kildidt Sound and Burke Channel, and the entire region represents a major salmon migration corridor.

Existing protected areas within this ecosection include the **Hakai Recreation Area**, and a portion of the proposed **Gwaii Haanas NMCA Reserve**. There are very few other existing designations within this region, although a variety of marine areas of interest, including Oliver Cove and Spirit

Rockfish are sedentary and long-lived, making them highly susceptible to overfishing.

Bear, have been short-listed by the provincial Protected Areas Strategy team for consideration in the Central Coast Land and Resource Management Plan.

7. North Coast Fjords

The North Coast Fjords ecosection yields the longest total coastline of all marine ecosections. The unique physiography of BC's coastal fjords, with its many deep and narrow valleys cutting into high relief surroundings, yields well over ten thousand kilometres of coastline within this ecosection alone—more than a third of BC's total coastline.

With its unique physical environment comes similarly unique oceanographic features. The well protected waters here are restricted in their circulation, and become strongly stratified compared to the adjacent Queen Charlotte Sound and Hecate Strait regions. In turn, these poor water exchanges create an overall low species diversity and productivity in the region. But despite the low species diversity, coastal fjord environments display some of the most unique benthic species assemblages and plankton communities in BC. In these waters can be found rare deep-water gorgonian corals, more than a metre high, giant cloud sponges, and delicately fringed jellyfish, throbbing rhythmically in the calm

Measuring up to two metres in diameter and living for up to one hundred years, the cloud sponge provides shelter for a variety of fish species.

Estuaries

Estuaries and associated wetlands lie at the fringes of the marine environment—inlets, embayments, river mouths and lagoons—where seawater is measurably diluted by mixing with large quantities of river water. These ecosystems are characterized by a relatively low species diversity but provide critical essential habitat.

Estuaries act as nutrient traps, concentrating river-borne organic and inorganic materials, making them biologically productive areas supporting significant populations of seabirds and marine life, shorebirds, and river otters. Among the most important characteristics of these ecosystems is their role as nursery grounds for various species of coastal and oceanic fish and shellfish.

Two general types of estuaries can be found on the west coast: salt-wedge estuaries, where river runoff is large and very little mixing occurs between the fresh water above and salt water below (e.g. mouth of Fraser River); and partially-mixed estuaries, typical of most sounds and inlets, where there is enhanced mixing between the two layers due to greater tidal action and lower runoff.

With their shallow waters and restricted circulation, estuaries and associated deltas have long formed the nuclei for human settlement and industrialization, providing fertile agricultural land and convenient transportation routes. These ecosystems are highly susceptible to environmental degradation, threatened by overcrowding, wastes, channelization, and dams that alter natural river processes. The Fraser River delta is a prime example of a critical estuarine environment which must be further protected to not only halt the impacts of human activities, but also to restore the region to its characteristic diversity of species and functions.

Both the giant barnacle and the orange peel nudibranch are among the largest of their species worldwide.

waters typical of fjord coastal environments.

Marine mammals and fish are also very well represented in this ecosection. Besides having many salmon migration corridors, particularly the Nass and Skeena Rivers, most of the inlets and estuaries in this region, including Draney Estuary, Allard Bay, and Mussel Inlet, provide important spawning habitat for herring. With its many wetland complexes, the region is home to a variety of shorebirds. Pods of humpback whales and other cetaceans are not an infrequent sight in Rivers Inlet.

In the current system, only 3.21% of this ecosection is represented by some form of marine component to a provincial park, and for the most part, marine species protection in these areas—established largely for their recreational qualities—has been an afterthought to past terrestrial park planning. This points to the clear need in the North Coast Fjords ecosection to meet the challenge of establishing new MPAs representative of the many important marine features worthy of protection in this region, considering both the purely "oceanic" values requiring protection, and umbilical links to terrestrial areas.

8. Hecate Strait

Hecate Strait is a shallow, semi-protected marine ecosection lying between the Queen Charlotte Islands and the coastal lowlands of northern BC. Its shallowness, combined with strong tidal currents, promotes water mixing, making this region dominantly "marine" and biologically diverse compared to areas to the south.

The region has important spawning or nursery areas for salmon, herring, English sole, rockfish, Pacific halibut and walleye pollock. Breeding colonies, of pigeon guillemots, auklets, petrals, and a strictly maritime race of peregrine falcons, are found in the area, particularly along the eastern coast of the Queen Charlotte Islands. Killer whales, harbour porpoises and Dall's porpoises are regularly sighted throughout the year. Intertidal and subtidal benthic communities are highly diverse, dominated by kelp, mussels, barnacles, sponges, coralline algae, sea cucumbers and sea urchins.

When it is finally given legal protection, the long promised marine component of the proposed **Gwaii Haanas NMCA Reserve** will provide for approximately 150,000 hectares of marine protection in this ecosection (about half of the proposed

marine area lies within this ecosection). This area could provide for a large, zoned MPA that not only seriously advances marine conservation on the BC coast, but also provides for a precedent-setting co-operative regime between the Haida Nation and government agencies. However, despite a federal–provincial agreement in 1988 to create a NMCA Reserve, the marine area still awaits designation. As a result, there is no protected area within this ecosection following the minimum criteria of CPAWS and WWF.

Other areas that may warrant further protection through new MPAs include the many important marine feeding areas north of Gwaii Haanas, including Skidegate Inlet, as well as the offshore groundfish spawning areas of Hecate Strait, which have been seasonally closed to fishing in the past, but not as part of a concerted and integrated marine management scheme which incorporates MPAs in fisheries management policy.

Like many other long-lived seabirds, pigeon guillemots are faithful both to previous nest sites and to mates.

9. Dixon Entrance

Adjacent to the low-lying coastal plains of the Georgia Depression lies the Dixon Entrance ecosection—the most northerly marine region in BC, characterized by an

Gorgonian Corals

Gorgonian corals (or seafans) are colonial, tree-shaped invertebrates that live in tropical, sub-tropical and temperate seas. Often found at great depths, gorgonians provide important habitat for fishes and invertebrates. They contain promising compounds for medicine and can serve as time machines—capturing sea temperature data over centuries.

Gorgonian aggregations are like groves or small forests in that they provide three-dimensional habitat for other species. Most gorgonians grow in water deeper than 10 metres—commonly seen on pebble-strewn rock bottoms of the continental shelf, or attached to the slopes of rocky ridges and seamounts. However, there are at least a few places in BC where the upper range of gorgonians overlaps with limits for divers, offering a fortunate few the spectacular sight of pink and white fans swaying in the current.

Mobile fishing gear like trawls and dredges are probably the most serious threat to gorgonians. In a 1997 study, in Dixon Entrance (between Alaska and BC), submersibles observed the path of a 1980 bottom trawl survey, and found that approximately 50% of the coral was removed or broken by the trawl gear. Given the important ecological function of gorgonian groves, their potential benefits to medicine, it is imperative that offshore areas of suitable size are set aside as protected, to help conserve these unique ecosystems.

Above: MPAs can help diversify the economic base of coastal communities.

Right: Rare subtidal gooseneck barnacles live 30m below the surface and grow stalks up to 12cm long that allow them to move with the water and obtain food.

across-shelf trough with depths generally less than 300 metres. This ecosection experiences strong freshwater influence from mainland river runoff which, in turn, drives north-westward flowing currents and estuarine-like circulation.

Aside from representing a key migratory corridor for Skeena and Nass River salmon, Dixon Entrance offers important productive, sheltered areas utilized for juvenile fish and invertebrate development. Important herring spawning areas are found at Naden Harbour and Masset Inlet, where the spawn is both the earliest, and latest, in BC.

The most notable marine values within Dixon Entrance are the many seabirds and shorebirds found along the coastal areas of northern Graham Island. The productive marine feeding areas near Langara Island supports tens of thousands of breeding pairs of seabirds, including Cassin's auklets, ancient murrelets and tufted puffins, while the nearby Wiah Point and Virago Sound are important areas for concentrations of marbled murrelets. Offshore, Learmonth Bank is suspected to be a key feeding and breeding area for migrant seabirds.

Because of the remoteness and inaccessibility of much of this region, there is

still much to learn about its marine features, particularly in the subtidal realm. Marine invertebrate scientists, in particular, believe that further inventories in regions such as Dixon Entrance would reveal many new and fascinating species.

The existing system of protected areas currently represents only 0.06% of the total marine area of this ecosection. This region, with its high level of undisturbed naturalness and lack of conflicting human activities (barring any future offshore oil, gas, or mineral production), would be an ideal area for an MPA established for scientific benchmark studies, thereby contributing to the overall MPA system plan and helping to bridge the gap between scientific knowledge and marine management coastwide.

10. Continental Slope / 11. Transitional Pacific / 12. Subarctic Pacific

The three largest marine ecosections in BC are those furthest offshore: the Subarctic Pacific, Transitional Pacific, and Continental Slope. The Subarctic Pacific ecosection includes the abyssal plain (the deep sea) and continental rise (the more gentle slopes of the seaward edge of the continental margin), as well as a seamount chain trending northwest and southeast. The Transitional Pacific ecosection also includes the abyssal plain and continental rise, as well as spreading ridges and plate subduction zones. The Continental Slope ecosection is more of a transitional area between the abyssal plane and shallower regions, comprised of a steep-sloping shelf, with strong turbidity currents and upwellings.

The Subarctic Pacific ecosection represents the summer feeding ground for Pacific salmon stocks, and includes populations of Pacific saury, tuna, and jack

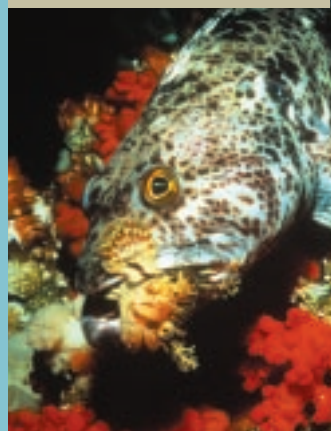
The green sea urchin has a wide distribution in northern waters. They have a complex ecological interrelationship with sea otters—their main predator—and kelp—their predominant food source.

Offshore Seamounts

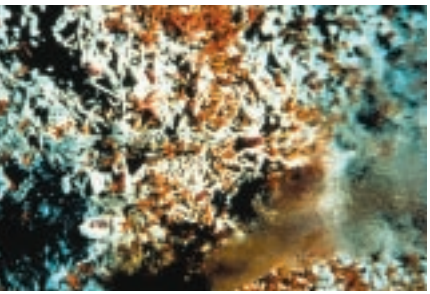
Seamounts are underwater volcanic peaks that rise more than 1000 metres above the neighboring ocean floor. Oceanographers estimate there may be as many as 14,000 seamounts in the Pacific basin alone, most of them stretched out in chains similar to the continental volcanic areas along the Pacific Rim. They are linked to the formation of a variety of oceanic features. Those which penetrate the ocean surface become oceanic islands, such as the Hawaiian Islands chain.

Prominent undersea volcanoes in British Columbian waters include Bowie, Union, Heck, Springfield, Dellwood and Explorer seamounts. Bowie seamount is approximately 220 km west of the Queen Charlotte Islands and rises to within 40 m of the surface from depths of over 3000 m. This unique area is now being considered as an MPA under the Oceans Act.

These and other seamounts are tremendously important to migratory seabirds which feed on the rockfish, perch and other species which gather in these shallow, sunlit waters. In fact, many marine scientist believe the rockfish in these regions form distinct populations. Commercial species in these areas are thus particularly vulnerable to the loss of genetic diversity from overharvesting. This highlights the importance of protecting such areas in order to avoid changes to levels of marine biological diversity and to acquire knowledge about the population genetics of exploited species.



In the diffuse vent flows associated with hydrothermal vents, animal abundances can range up to half a million animals per square metre.



mackerel, to name only a few. The Transitional Pacific ecosection region between southerly and northerly plankton communities, with mixing of oceanic and coastal plankton communities adjacent to the coastal shelf. With its many upwelling areas, the Continental Slope region is characterized by productive coastal plankton communities and unique assemblages of benthic species. Significant biological features within the Subarctic Pacific and Transitional Pacific ecosections include Heck, Explorer, Union and Bowie Seamounts, as well as hydrothermal vents such as Juan de Fuca and Explorer Ridge.

Unique and biologically productive areas in these ecosections such as offshore seamounts, steep, rocky shelves and hydrothermal vents, are critical features whose protection can be addressed through MPA establishment. Their protection would complement several MPA objectives, including the protection of essential habitats and the establishment of central areas for estimating fish stock parameters. Bowie Seamount and the Endeavour Hot Vents are being considered by Fisheries and Oceans Canada as MPAs under the Ocean Act.

Hydrothermal Vents: A View into Marine Evolution

In 1977 the first animal community not dependent on plant photosynthesis for energy was discovered near deep-sea hydrothermal vents off the Galapagos Islands. Instead of obtaining energy from the sun, species that live near the vents derive energy from carbon-generating bacteria. The bacteria make carbon compounds using energy from sulfur compounds in fluid issuing from fissures and chimneys on the seafloor. These bacteria live as mutualists inside their hosts' cells and provide their hosts with food.

Two major ventfields—along portions of the Juan de Fuca and Explorer Ridges—have been recently discovered in BC waters. These and other similar discoveries illustrate how a major marine ecosystem can go unnoticed due to inaccessibility. Of the 236 vent species collected, 223 were new to science. These belong to upward of 100 new genera and at least 22 new families. The animals of hydrothermal vents are also highly endemic, with some species having evolved in isolation since the Mesozoic Era (65 – 225 million years ago), providing an intriguing glimpse into ancient marine adaptations.

Although relatively inaccessible, hydrothermal vents have not remained unnoticed by companies interested in their potential for mineral development. Proposals have in fact been made by American groups to dredge vents in the northern Atlantic. Such plans have met with stiff opposition from scientists and conservationists concerned about impacts on the unique and unusual habitats surrounding venting ridges. Researchers have already determined that dredging, drilling and submersible activities around hydrothermal vents are very intrusive. Given the clear threat from mineral development on ventfield biology, and the importance of these areas to science, the protection of offshore hydrothermal vents should be included in an overall MPA strategy for BC.

CPAWS-BC has been working since 1993 to advance MPAs in Pacific Canada. During the early stages, our work focused on ensuring the development of a policy framework for MPAs. As well, we catalogued, mapped, and reviewed potential MPA candidates. While continuing to work on the policy framework, CPAWS began to focus on a number of specific sites which contained significant marine values requiring protection, and which were large areas that could be promoted as candidates for large, zoned MPAs. We conducted in depth research on each of these sites using available information to document important marine values and current uses of these areas.

We also initiated projects aimed at developing community awareness and support for our campaign sites. The 1997 Southern Gulf Islands MPA Workshop, hosted by CPAWS, brought together over 180 interested and directly affected individuals. In 1998, through the Wilderness of Sea workshops hosted by CPAWS in various coastal communities in BC, we explored the past 20 years of experience of managing the Great Barrier Reef Marine Park in Australia, with a specific focus on involving the fishing sector in MPA establishment and management.

Building partnerships within the non-governmental community has been a major priority of the Marine Spaces Campaign, at both a national and local level. Since the spring of 1995, CPAWS-BC has been coordinating the west coast marine protected areas component of World Wildlife Fund Canada's Endangered Spaces Campaign. The objective of this marine campaign is the establishment of a representative system of marine protected areas by the year 2010. Locally, we have developed constructive partnerships with a variety of grassroots organizations in BC interested in MPAs, assisting such groups in advancing the protection of sites and in educating the public about the need for MPAs.

Reintroduced in BC after being decimated from the coast, sea otters are a keystone species, critical to the health of coastal kelp forests, which are more productive than tropical rain forests.

CPAWS-BC is committed to working with local community groups, fishers and other stakeholders, interested in MPAs. We will continue our outreach with First Nations to help build support for MPAs and to advance cooperative management regimes for MPAs.

As well, we will continue to focus our efforts in developing public awareness about MPAs and building wider community support for their establishment. Encouraging government action, developing a policy framework, and providing recommendations on an MPA strategy for BC, remain ongoing campaign priorities.

CPAWS' MPA Initiatives in BC

Southern Gulf Islands

In this marine region, strong tidal currents within narrow island channels produce upwellings, rips and whirlpools, creating a nutrient-rich marine environment which supports over 230 species of algae, sponges, mollusks, sea stars, crustaceans, fish, seabirds and marine mammals. CPAWS is working with several community groups, stakeholders and First Nations in the Southern Gulf Islands, to advance the establishment of MPAs. In cooperation with Parks Canada, we are advancing a proposed NMCA in this area.

Tidal passages like Active Pass, in the southern Gulf Islands, are highly productive environments critical to the life histories of many fish, invertebrates, seabirds and marine mammals.

Scott Islands

CPAWS is working with the Canadian Wildlife Service to designate the Scott Islands as the first National Marine Wildlife Area on the BC coast. A highly productive marine region off the northern tip of Vancouver Island, the Scott Islands are home to an estimated 70% of the world's population of Cassin's auklet. Other migratory seabirds, including petrals, albatross and shearwaters, utilize the area for critical breeding, nesting, and marine foraging habitat. The three Steller sea lion rookeries in the Scott Islands are of critical importance to this resident BC species.

Gwaii Haanas

The donation in 1997 by four oil companies of the exploration rights offshore of the Gwaii Haanas National Park Reserve/Haida Heritage Site has helped to pave the way for the final legal designation of the proposed NMCA Reserve by Parks Canada. The future NMCA in one of the most diverse and productive marine environments in BC, will be jointly planned and managed by Parks Canada, Fisheries and Oceans Canada and The Council of the Haida Nation. CPAWS and WWF Canada are continuing their long effort to see the protected marine component come to fruition.

Queen Charlotte Strait

The marine environment of Queen Charlotte Strait, located between northern Vancouver Island and the mainland coast around Cape Caution, has been identified as an ideal candidate for a large, multi-zoned MPA. This region is important for its internationally and nationally significant populations of seabirds and marine mammals, as well as its many "hotspots" of biodiversity, where high plankton production and a proliferation of bull kelp forests provide a nutrient rich environment which supports a complex web of marine life.

The Baja to Bering Sea Initiative

The goal of the Baja to Bering Sea Initiative is to ensure the long-term health of the rich and diverse marine environment on the Pacific coast of North America. The region shares many ecological linkages. Pacific gray whales make their way up the coast on the longest migration of any mammal in the world—a total of 20,000 kilometres—from their calving grounds in the warm waters off Baja, Mexico to their rich summer feeding grounds off the British Columbian and Alaskan coasts. Transient killer whales and sea otters also populate the Baja to Bering area. However, the biodiversity of Baja to Bering is severely threatened. We must act now to stem the tide of destruction.

CPAWS will engage a strong and mobilized constituency of conservation organizations, scientists, fishers and communities in the United States, Mexico and Canada to drive the Baja to Bering Sea Initiative forward.

Using a conservation biology methodology, the Baja to Bering Sea initiative will:

- establish a representative network of large core marine protected areas, with a high level of protection, including substantial no-take areas;
- ensure the maintenance of ecological linkages and functional marine connections between these core protected areas; and
- protect the habitat requirements of keystone species in the marine environment.

WANT TO HELP?

1. Contact CPAWS-BC for more information on MPAs in Pacific Canada. We can help assist interested individuals and organizations in a variety of ways, including:

- educating others in your community about the rationale, purpose and opportunities for MPAs
- organizing community meetings, workshops or slideshows
- gathering information about the marine environment near your community
- talking to local members of the fishing community and other marine user groups

2. Join our email network to receive important updated information on various issues related to MPAs in BC. Send your email address to marine@cpawsbc.org

3. Become a CPAWS-BC volunteer. Lending your talents to our MPA campaign is a great way to learn about new and interesting issues, meet new people, and to participate in your local community.

CPAWS-BC encourages you to visit the following websites for more information related to marine protected areas:

http://mypage.direct.ca/c/cpawsbc
Canadian Parks and Wilderness Society - BC Chapter

www.luco.gov.bc.ca/coastmrn.htm
Province of BC's MPA initiatives

www.oceansconservation.com
Fisheries and Oceans Canada's MPA initiatives

www.parkscanada.gc.ca/nmca/nmp_e.htm
Parks Canada's National Marine Conservation Areas program

www.gulfofmaine.org/library/mpas/mpa.htm
MPA Bibliographies

www.gbrmpa.gov.au • *Great Barrier Reef Marine Park Authority*

www.hmu.auckland.ac.nz:8001/sanctuary/
New Zealand marine reserves

www.wwfcanada.org • *World Wildlife Fund of Canada*

www.ovi.ca • *Ocean Voice International*

www.mcbi.org • *Marine Conservation Biology Institute*

www.racerocks.com
Race Rocks pilot MPA and interactive broadcasts

SUPPORT MARINE PROTECTED AREAS IN BC

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