DRAFT NORTH COAST BASE CASE FOR CURRENT ENVIRONMENTAL, SOCIAL, CULTURAL AND ECONOMIC CONDITIONS AND TRENDS

Draft Number 2 **30 May 2012**

DIRECTIONS FOR REPORT USE

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MaPP Marine Planning Partnership for the North Pacific Coast

DRAFT NORTH COAST BASE CASE FOR CURRENT ENVIRONMENTAL, SOCIAL, CULTURAL AND ECONOMIC CONDITIONS AND TRENDS

EXECUTIVE SUMMARY

- A base case is a description, or profile, of current biophysical and socioeconomic conditions within a planning area relevant to a plan's goals. As it pertains to the Marine Planning Partnership for the North Pacific Coast (MaPP), four sub-regional base cases are under development to provide snapshots of the current conditions and trends within the MaPP planning area. The MaPP sub-regional base cases follow the Ecosystem-based Management (EBM) framework and address the three EBM Elements: Ecological Integrity, Human Wellbeing and Governance.
- The features selected for the base case provide essential information that support several MaPP outputs including characterise and analyse existing conditions and trends (regional and sub-regional MaPP outputs), analyses that support EBM outputs such as marine spatial plans (regional and sub-regional MaPP outputs) and cumulative effects (regional and sub-regional MaPP outputs).
- Draft 2 of the Sub-regional base case (30 May 2012) follows the draft Base Case Table of Contents (Appendix 2) and includes eight features that address EBM Ecological Integrity and EBM Human Wellbeing: human communities, eelgrass beds, deepwater corals and sponges, herring, eulachon, Federal Marine Protected Areas, Provincial Marine Protected Areas and shellfish aquaculture.

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INTRODUCTION AND PURPOSE

The Marine Planning Partnership for the North Pacific Coast (MaPP) uses an ecosystem-based management, or EBM, framework to develop marine plans that address ecosystem integrity, human wellbeing and governance goals for the North Pacific Coast. Characterising and identifying current conditions within the MaPP planning area is critical for evaluating the successful implementation of the MaPP plans in 2014 and beyond.

Four sub-regional base cases are under development to summarise environmental, social, cultural and economic conditions and trends. Each base case will advance sub-regional plan development, including marine spatial planning, cumulative effects and climate change adaptation strategies. A base case is a description, or profile, of current biophysical and socioeconomic conditions within a planning area relevant to a plan's goals. A base case provide a snapshot of conditions and trends within a planning area, including a determination of what information is important relative to the goals and intended outputs or products of a planning process. A base case can be used to identify important data gaps. It supports completion of other components of an EBM framework for marine planning such as resolving spatial conflicts, cumulative effects assessments and strategies for climate change adaptation. Finally, a base case's ultimate function is to assess a plan's success after implementation.

Each Sub-regional base case will:

- Use both qualitative and quantitative information;
- Use best available data from public, published or peer-reviewed data sources;
- Characterise existing current conditions and trends relevant to MaPP outputs;
- Facilitate the creation of relevant and achievable planning objectives by providing benchmarks for ecological, socio-economic, cultural and governance/management features;
- Provide the data to assess the effectiveness of regional and sub-regional planning outputs; and
- Be a living document. Base cases are typically revised throughout the planning process as additional knowledge becomes available and planning needs defined.

METHODS

The North Coast's base case was developed by reviewing existing marine, coastal and terrestrial plans, consulting Provincial and First Nation's governments and technical staff, reviewing MaPP outputs, and consulting international examples. Existing plans included BC Land and Resource Management Plans, terrestrial ecosystem-based management plans, and coastal plans such as the North Island Straits Coastal Plan. International examples consulted included the Massachusetts Ocean Management Plan and Baltic Sea Plan.

This draft base case was developed using environmental, social, cultural and economic features identified and reviewed by the Marine Coordination Team, Sub-regional Marine Technical Teams and Science Coordinator (Appendix 1). The draft Table of Contents for the base case contains at least 30 features and may be revised depending on data availability and MaPP discussions.

This report includes eight features from the draft Table of Contents with best available data from a variety of sources, including:

1. Public, published and peer-reviewed datasets;
2. Primary academic literature (i.e., peer-reviewed literature);
3. Discussions with taxonomic experts; and
4. Information provided by the Sub-regional Technical Teams.

Features for the base case were chosen using EBM principles that link human wellbeing, ecological integrity and governance. Each base case report begins with a brief description of the human communities within each sub-region. Marine uses and activities in the base case were included based on previous work of the Pacific North Coast Integrated Management Area (PNCIMA) Initiative to identify key marine uses and activities in the region. Ecological features were chosen based on an evaluation of the key habitats features, species and ecosystem structure and function for the sub-regions. Technical Teams from all sub-regions were given an opportunity to review and comment on the choice of features to be included within the base case.

All spatial data were compiled in ArcGIS 10 ArcEditor by Coastal Resource Mapping Ltd (CRMLTD). Spatial data were obtained from the same primary data sources that were used to develop the PNCIMA Atlas (PNCIMA 2011) and where additional data sources were used, they are noted on the relevant Table or Figure. Descriptions of the spatial data sources, spatial data layers, spatial statistics and spatial analyses

using ArcGIS are available from MaPP. Data quality assurance and quality control, or QA/QC, were done for all products developed by CRMLTD for the base case, including data layers previously peer-reviewed for the PNCIMA Atlas. If issues arose during QA/QC, the attribute table was examined for outliers or illogical values, for example, eelgrass beds located in depths greater than 100 metres. The outlier or illogical data were examined relative to ecological knowledge of the marine feature and where necessary, were removed and not spatially displayed or used in data summary tables. For example, data discrepancies resulted in removing less than one percent of the data points for deepwater corals and sponges and six percent of the occurrence data for eelgrass beds. Additional ecological, human wellbeing and governance features will be added to the base case, and available summer 2012 (Appendix 2)

ACRONYM DEFINITIONS

BC	British Columbia
BCMCA	British Columbia Marine Conservation Analysis
BCMEC	British Columbia Marine Ecological Classification
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
DFO	Department of Fisheries and Oceans
EBM	Ecosystem-based Management
e.g.	for example
EI	Employment assistance
ha	hectare
i.e.	that is
IA	Important Area
IR	Indian Reserve
km	kilometre
LHA	Local Health Area
MaPP	Marine Planning Partnership for the North Pacific Coast
MPA	Marine Protected Area
PNCIMA	Pacific North Coast Integrated Management Area
RD	Regional District
Rockfish Conservation Area	RCA
SARA	Species at Risk Act
VMEF	Valued Marine Environmental Features

MAPP PLANNING AREA

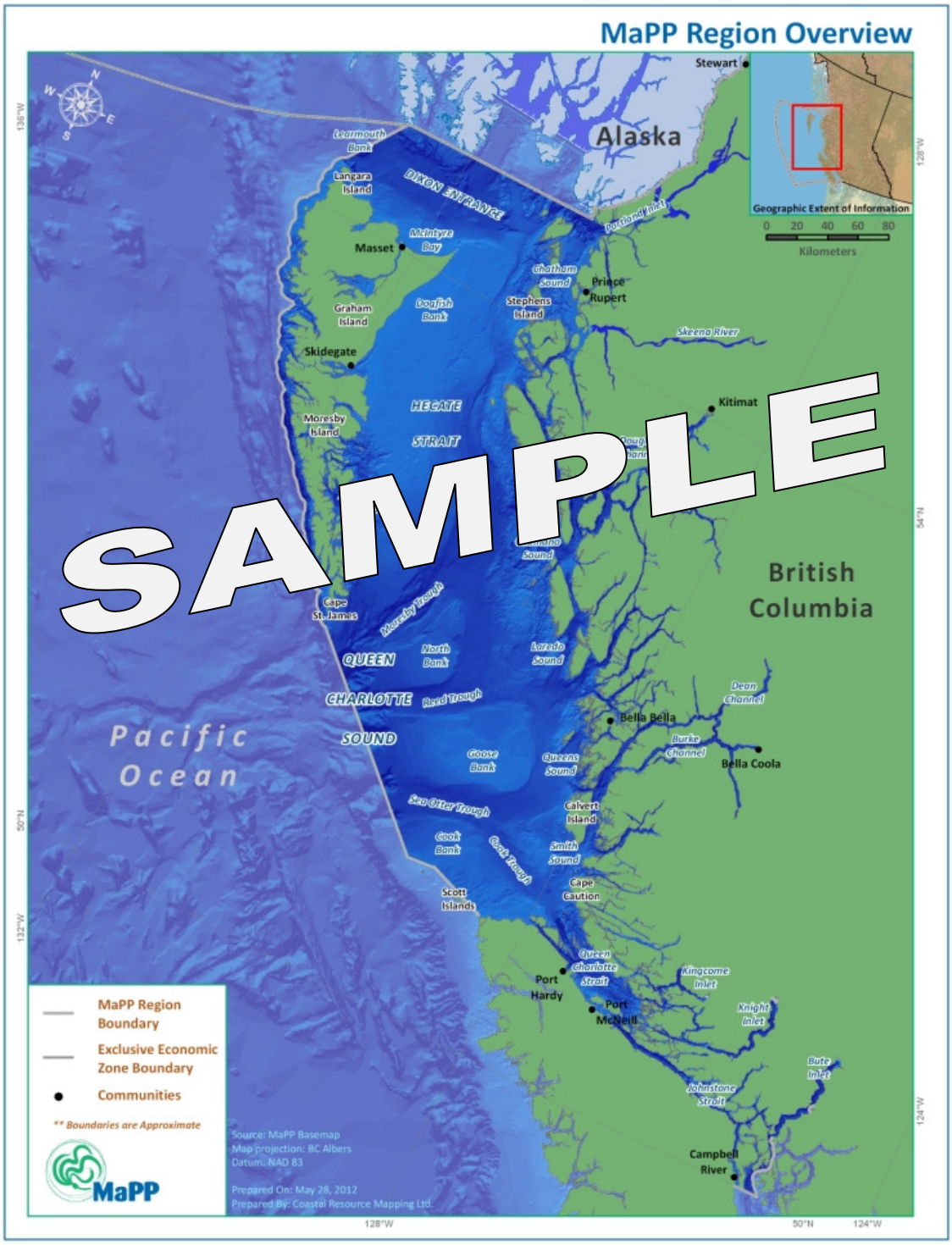

Figure 1: Overview of MaPP planning region including community names and select undersea and geographic features. Sub-regional boundaries are not finalised. All maps and data are approximate.

NORTH COAST SUB-REGIONAL PLANNING AREA

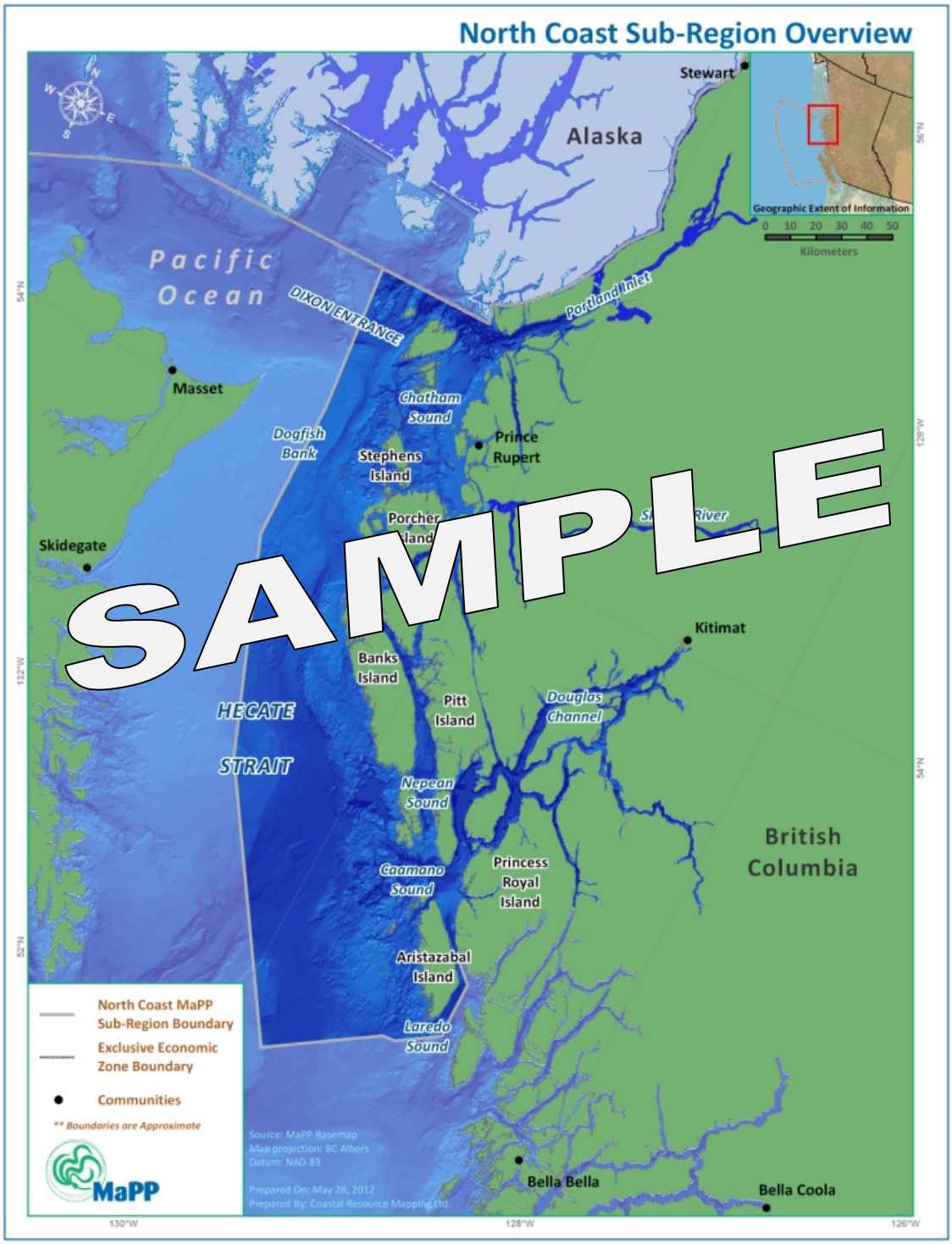

Figure 2: Overview of North Coast sub-region planning area including community names and select undersea and geographic features. Sub-regional boundaries are not finalised. All maps and data are approximate.

HUMAN COMMUNITIES

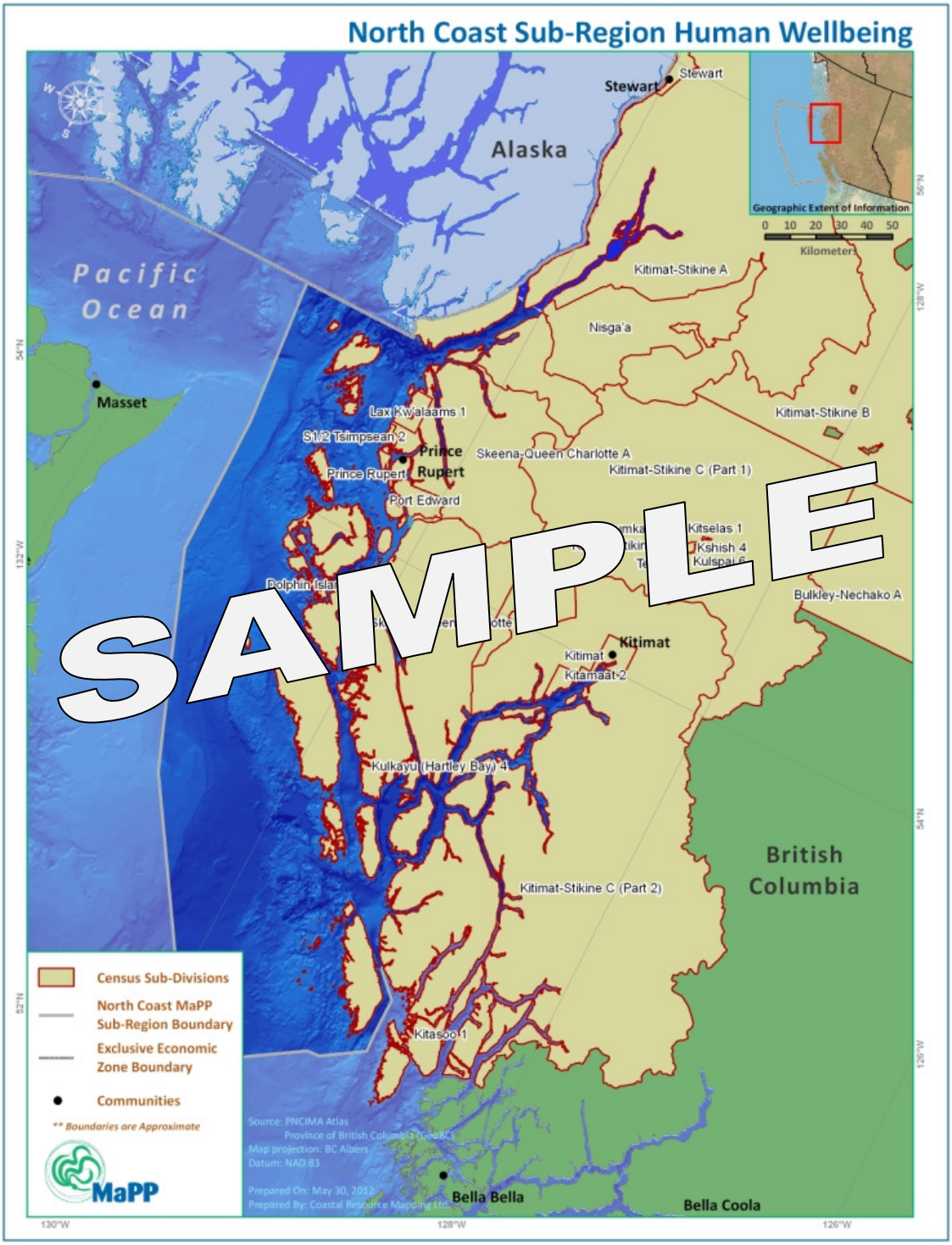

Figure 3: North Coast sub-region human communities. Sub-regional boundaries are not finalised. All maps and data are approximate. Source: Province of British Columbia 2011, PNCIMA Atlas 2011.

Description

The North Coast plan area is bounded by the Alaska panhandle and Yukon to the north, Haida Gwaii to the west and the Central Coast sub-region to the south. The area encompasses 27,000 kilometres of coastline and thousands of islands, with the Skeena River bisecting the mainland. The plan area includes the coastal watershed portions of Kitimat-Stikine and Skeena-Queen Charlotte Regional Districts (RD).

Terrace and other inland communities are linked by highway access to the coastal communities of Prince Rupert, Kitimat and Stewart. Prince Rupert and Kitimat also have rail links to the interior of the province. BC Ferries provides service from Prince Rupert to Haida Gwaii, central coast communities and Port Hardy. Prince Rupert is also linked to northern communities by Alaska State Ferries.

Marine Uses and Activities

Marine resources underpin cultural, social, sustenance and economic activities in North Coast communities. Residents of six north coast First Nations, when asked to indicate important values underlying their communities, most frequently cited access to clean water and seafood, access to traditional foods and cultural activities such as fishing and hunting, and proximity to family and friends. Communities along the north coast with larger port facilities (Prince Rupert, Kitimat and Stewart) have an economic base and culture extending over decades linked to processing and transport of natural resources (including seafood and wood products) and goods. Marine resources underpin cultural, social, sustenance and economic activities, including sustenance and commercial fishing; aquaculture; marine tourism; sport fishing; and marine transportation.

Current Population and Trends

Population of the area was 51,713 people in 2011. The area includes the Cities of Prince Rupert and Terrace and the Municipality of Kitimat with 62percent of the total population in the North Coast planning area. The other municipalities in the area are Port Edward and Stewart with populations in 2011 of 544 and 494, respectively. Registered populations of the Gitxaala, Haisla, Lax-kw'laams, Metlaktla, Gitga'at, Kitsumkalum and Kitselas Nations totalled 9,896 people in 2012. About 30 percent of this population live on-reserve.

Table 1: North Coast populations. Sub-regional boundaries are not finalised. All maps and data are approximate.

Community	Population
Kitimat (Municipality)	8,335
Stewart (Municipality)	494
Terrace (Municipality)	11,486
Port Edward (Municipality)	544
Prince Rupert (City)	12,508
Nisga'a Land	1,909
Kitamaat (IR)	514
Kitasoo (IR)	322
Kitsumkaylum (IR)	302
Kulspai (IR)	95
Tsimpsean (IR)	83

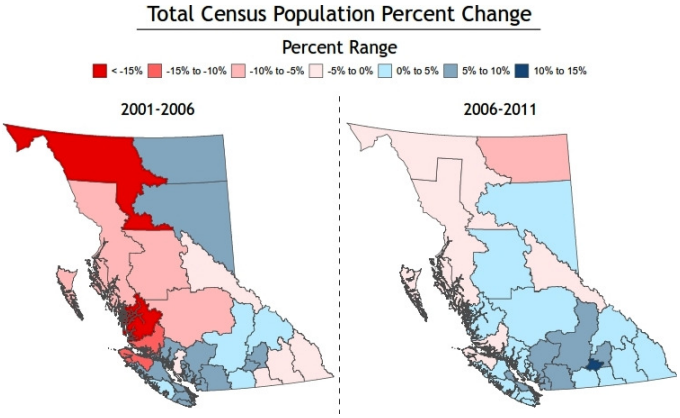

Figure 4: Population change over time. Sub-regional boundaries are not finalised. All maps and data are approximate. Source: British Columbia 2012.

Table 2: First Nations registered population. Sub-regional boundaries are not finalised. All maps and data are approximate.

Nation	Population
Gitxaala	1,850
Haisla	1,718
Lax-kw'alaams	3,488
Metlakatla	849
Gitga'at	720
Kitsumkalum	697
Kitselas	574

Education

About a fifth to a quarter of the area's adult population ages 25-64 do not have formal education to high school or equivalent level. This is about twice the provincial average of adults who do not hold a certificate, diploma or degree.

Employment

Based on 2008 reports and 2006 census data, the government sector is the largest employer for all communities in the North Coast except Prince Rupert. Occupations in sales and service are predominant in Prince Rupert, Port Edward and Metlakatla and occupations that are unique to primary industry, such as fisherman, and fish farm technician are dominant in Metlakatla, Kitkatla and Hartley Bay. The employment rate in North Coast communities ranged from 68percent in Hartley Bay to 31percent in Lax Kw'alaams. In Kincolith, Lax Kw'alaams and Kitkatla over 40 percent of the labour force is actively seeking employment. The percentage of the labour force collecting Employment Insurance (EI) ranged from 20-23 percent, with the exception of Port Edward at 29 percent. This rate is consistent with the Regional Districts in the area but about twice the provincial average of 11 percent.

Income

Median incomes by Regional District and in comparison to the provincial figures are shown in the table below. There are considerable differences in median incomes between communities however. For example, median male income in 2007 was $64,225 in Kitimat and $9,635 in the nearby community of Hartley Bay.

Table 3: Median income for males and females. Sub-regional boundaries are not finalised. All maps and data are approximate.

Median Income (2007)	Male	Female
Kitimat-Stikine RD	$37,730	$18,415
Skeena-Queen Charlotte RD	$28,850	$19,280
BC	$36,350	$23,005

Health and Wellbeing

BC Stats prepares and index of socio-economic indicators for all regions of British Columbia (BC). The index includes indicators related to economic hardship, crime, health problems, education concerns, children at risk and youth at risk.

The North Coast planning area encompasses a portion or all of the area of five Local Health Areas (LHAs) out of the 78 LHAs in the province. Detailed ranking and figures for Snow Country LHA (which includes the community of Stewart and the northern portion of the planning area) are not released by BC Stats due to statistical and confidentiality concerns. Figures for the Nisga'a Nation is also not included in the overall index. The remaining three LHAs–Terrace, Prince Rupert and Kitimat–all rank in or near the bottom quartile of the regional socio-economic index in 2010. Terrace and Prince Rupert are ranked 8th and 9th respectively in terms of "worst-off" regions in the province. Indices for economic hardship, children and youth, in particular, contributed to the low ranking. Kitimat LHA ranked 20th (out of 78).

A more limited compilation of community wellbeing indicators prepared by the Aboriginal Affairs and Northern Development Canada incorporates indicators related to education, labour force, income and housing shows a range of 0.40 to 0.77 for census divisions identified as Indian Reserves in the north coast. The community wellbeing score for other census subdivisions in the planning area ranged from 0.73 to 0.83. The provincial average is 0.70 for First Nation communities and 0.85 for non-First Nation communities.

EELGRASS BEDS

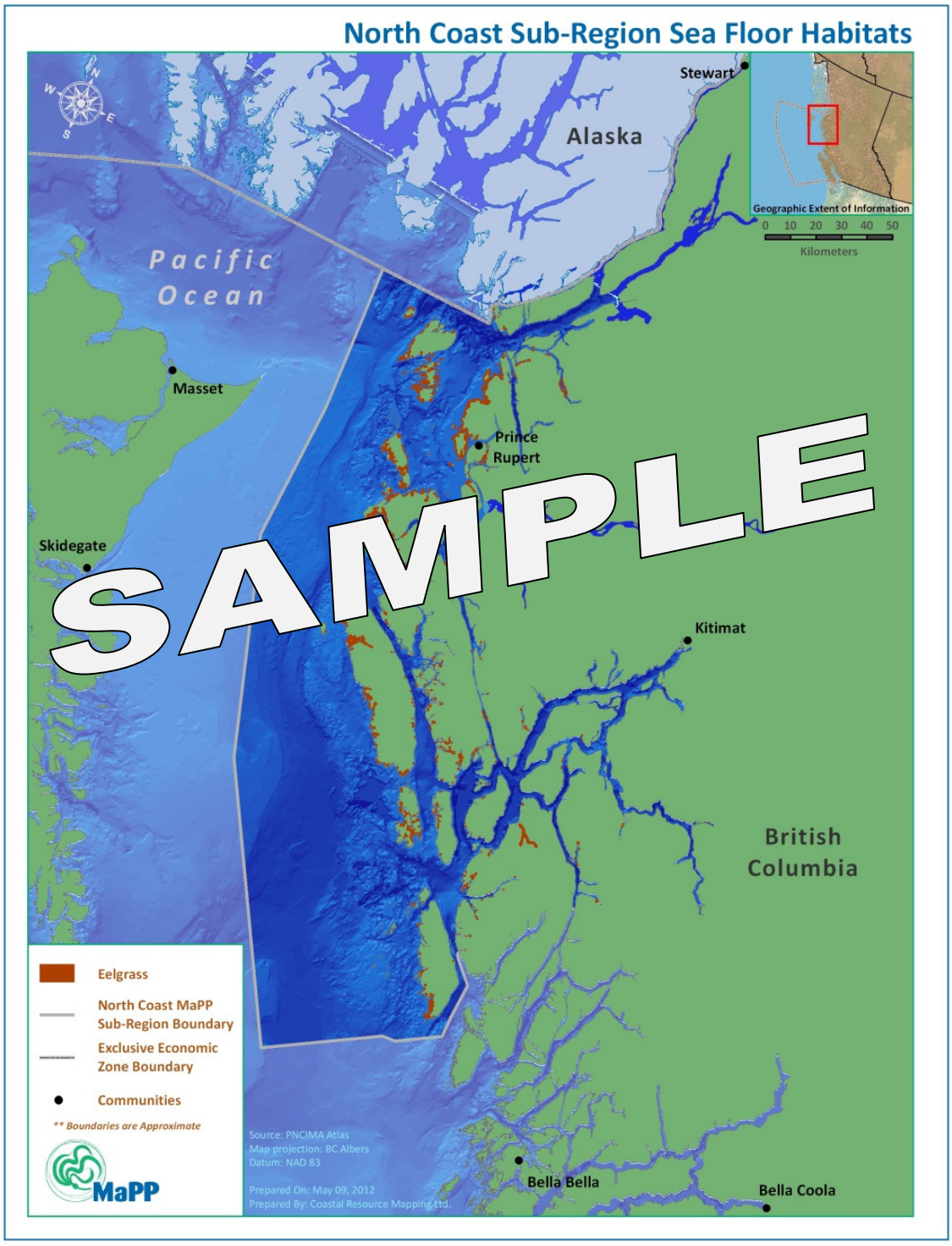

Figure 5: Distribution of eelgrass beds in the North Coast sub-region. Sub-regional boundaries are not finalised. All maps and data are approximate. Sources: Province of British Columbia 2008, BCMCA Atlas 2011, PNCIMA Atlas 2011.

Importance for MaPP

Eelgrass beds are natural nurseries and breeding areas for many species of commercial, cultural and social value such as crab, salmon, and herring. Eelgrass beds also act as natural stabilisers for nearshore sediments. Increasing protection for contiguous eelgrass beds is a possible MaPP strategy to manage for climate change effects and support populations of commercially and culturally valuable species.

Description

Eelgrass is a marine plant, an angiosperm, although it is often confused to be a seaweed or marine algae; it has roots, flowers and disperses seeds.

Eelgrass beds are found in all four sub-regions. Eelgrass beds are most often found along sheltered sediment shores, as compared to surfgrasses which prefer more exposed areas with strong wave action.

The native species is *Zostera marina*. Currently, the invasive species *Z. japonica* is restricted to the Salish Sea region, south of the MaPP region.

Social, Cultural, Economic Value

The total global economic value of seagrass beds is enormous, estimated at US $3,801 x 10^9 per year. Absolute values have not been estimated for eelgrass beds in BC however the same ecosystem services are provided that resulted in the total global economic value namely estuarine filters, shoreline protection from storm effects, wildlife corridors, especially for salmon, and a carbon sink. The ability of eelgrass to sequester atmospheric carbon may provide future revenue through the carbon credits.

Historically, eelgrass rhizomes were cooked in pits to help flavour meats such as deer and seal. They were also formed into cakes to be dried for winter. Eelgrass leaves were used to collect herring eggs.

Current Conditions and Trends

Table 4: Maximum, minimum and average depths of eelgrass beds and area covered within the N Coast sub-region. Sub-regional boundaries are not finalised. All maps and data are approximate.

Characteristic	Depth
Minimum Depth	intertidal
Maximum Depth	9.9 m
Average Depth	0.5 m
Area covered	1779.3 km

Eelgrass can grow in a variety of substrates and in the North Coast, and generally areas north of Campbell River, it is most commonly found growing in rocky substrates rather than soft substrates such as sand or mud as in other sub-regions.

Few long-term research studies haves been done on eelgrass in this sub-region and most of the mapping effort has focused on beds south of Campbell River. As a result, it is difficult to discern

Current Management Actions

Table 5: Percent of eelgrass bed distribution within the North Coast sub-region captured by existing marine protection. Sub-regional boundaries are not finalised. All maps and data are approximate.

Protection Type	Percent Coverage (%)
Federal	3.1
Provincial	0.7

Eelgrass beds are currently protected under Canada's Fisheries Act since 1986 as essential fish habitat.

long-term trends for the extent of eelgrass beds in the North Coast. To increase what is known about eelgrass beds in the North Coast, community groups have begun mapping eelgrass.	

Climate Change Impacts	Opportunities and Constraints
The long-term impacts of global warming on eelgrass are still relatively unknown. Climate change may also increase the intensity of storms, which could affect the amount of sediment entering rivers. An increase in sedimentation from terrestrial run off could cause higher turbidity, which could affect the ability of eelgrass to thrive.	Eelgrass beds are vulnerable to human disturbance. Mapping of eelgrass beds to identify their locations and marine planning to reduce the overlap between eelgrass and marine uses and activities will minimise disturbance to rhizomes, flowers and leaves and increase the value to ecosystem services. For example, coastal logging can reduce the amount of light reaching the eelgrass if sediment inputs increases to nearshore habitats. Log handling areas can cause scouring of eelgrass beds. Boat propeller wash can cause scouring and destroy roots of the eelgrass. Float homes and aquaculture sites can cause shading of the beds. Anchoring can physically uproot eelgrass plants. Upland activities can influence eelgrass beds with increased run off and nutrient loading. Coastal eutrophication results in decreased light availability, which leads to decreased health of eelgrass beds. As a result upland activities also need to be considered when examining potential impacts on eelgrass beds.

DEEP WATER CORALS AND SPONGES

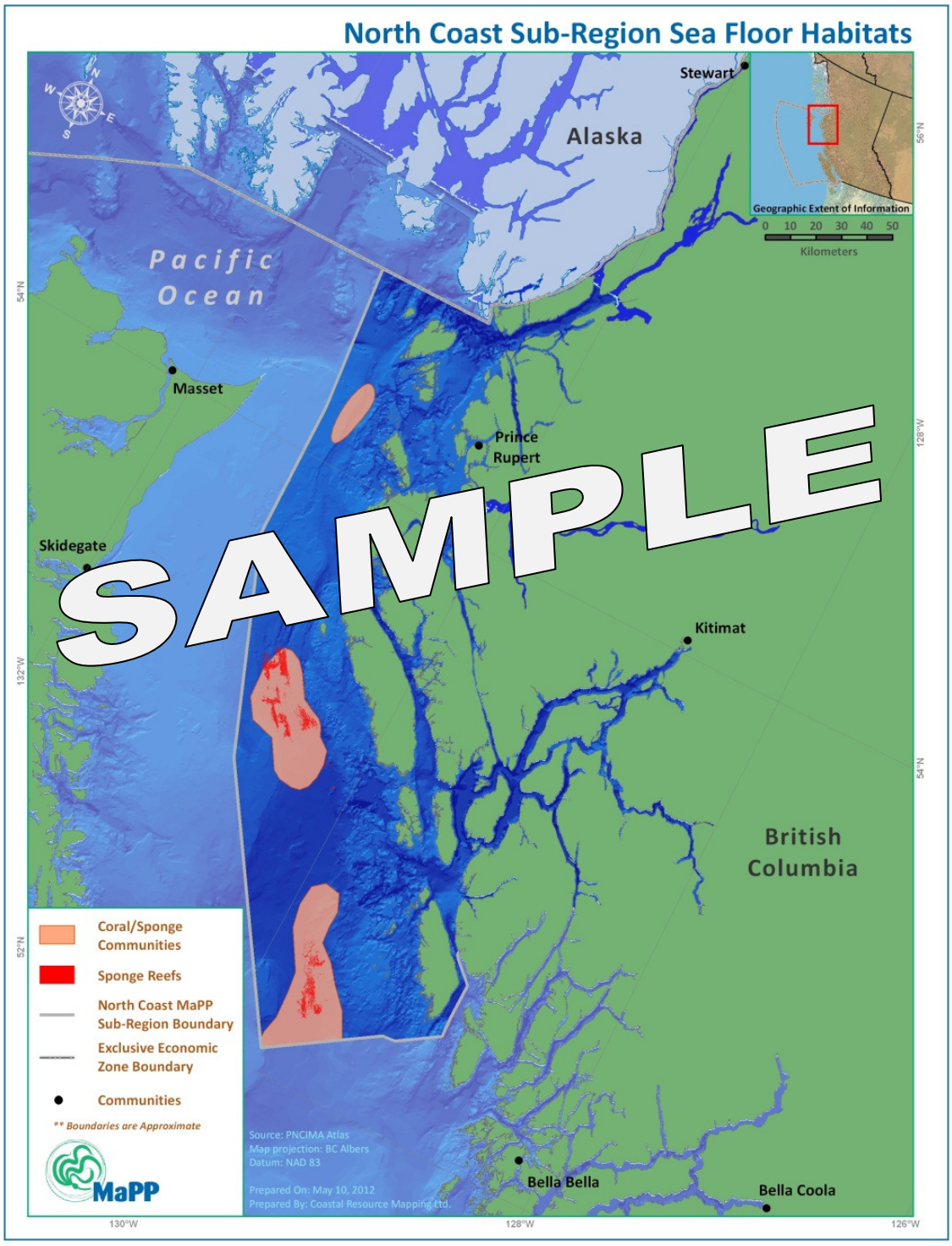

Figure 6: Distribution of coral and sponge communities and sponge reefs in the North Coast sub-region. Sub-regional boundaries are not finalised. All maps and data are approximate. Sources: Fisheries and Oceans Canada 2007, Natural Resources Canada 2008, BCMCA Atlas 2011, PNCIMA Atlas 2011.

Importance for MaPP

Deep water corals and sponges are often referred to as foundation species because they form diverse structures that promote high levels of biodiversity in areas with relatively low structural diversity.

Description

Deep water corals and sponges are found in all four sub-regions. Glass sponge reefs are formed by Hexactinellidae sponges and are only found in the North and Central Coast sub-regions within the MaPP planning area. They are long-lived, extremely fragile and easily destroyed by physical disturbance.

In BC, the glass sponge reefs are globally unique biogenic habitat. They were first mapped in 1987-88 in Queen Charlotte Sound and Hecate Strait. There are more than 250 species of sponges in the Canadian Pacific.

Social, Cultural, Economic Value

As with eelgrass beds, corals provide habits for a number of species including commercially and culturally valuable fish including rockfish and sablefish. As well, these biogenic structures provide habitat for up to 1300 species, many of which can act as prey species for mid-water species such as swordfish and turbot.

Current Conditions and Trends

Corals have been known to fishermen for many years and science began actively studying their distribution in the early 1980s. Due to increased awareness and interested, there have been several academic-lead surveys for corals. Currently most of the location data are obtained from Department of Fisheries and Oceans (DFO) groundfish bottom trawls.

There are currently no coral or sponge species listed under Species at Risk Act (SARA) legislation.

Table 6: Maximum, minimum and average depths and total area of coral and sponge communities and sponge reefs within the North Coast sub-region. Sub-regional boundaries are not finalised. All maps and data are approximate.

Description	Coral and sponges	Sponge Reefs
Min Depth (m)	68.9	130.9
Max Depth (m)	189.7	230.0
Average Depth (m)	136.1	195.4
Total area (km)	2301.2	186.6

Current Management Actions

Fisheries and Oceans Canada has developed fishery management closures to protect all currently known locations of sponge reefs, primarily from bottom contact fishing gear. Currently coral and sponges and sponge reefs are protected by Federally designated areas. There are no provincially designated protected areas that are designated for coral or sponge protection.

Table 7: Percent of coral and sponge communities and sponge reefs within the North Coast sub-region captured by existing marine protection. Sub-regional boundaries are not finalised. All maps and data are approximate.

Description	Coral and sponges (%)	Glass? Sponge Reefs (%)
Federal (%)	42.8	98.8
Provincial (%)	0	0

Climate Change Impacts	Opportunities and Constraints
Ocean acidification will be the most influential impact of climate change to affect corals and sponges as it will affect the ability of corals and sponges to produce and maintain their calcite or silicate structures. Other deepwater or oceanic impacts that corals and sponges may be sensitive to include: hypoxia due to the upwelling of deeper waters, increases in ocean temperatures, reduced oxygen levels, and increases in sedimentation	The primary source of mortality is from physical damage, such as contact with demersal trawl gear used in groundfish and shrimp fisheries. The recent fisheries closure of known locations of corals and sponge reefs is aimed to eliminate the physical disturbance to some of the largest aggregations in BC.

HERRING

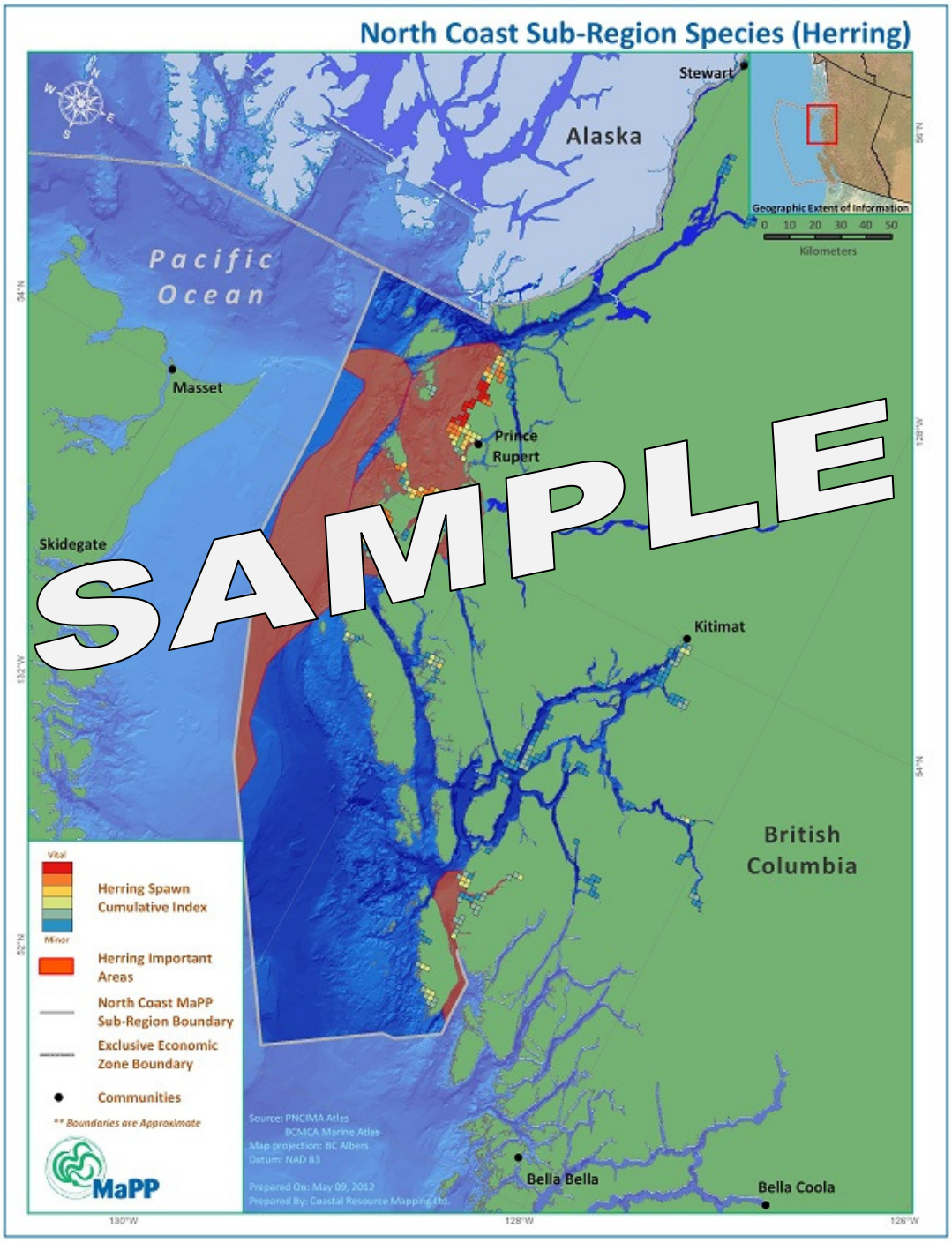

Figure 7: Herring spawn and Herring Important Areas. Sub-*regional boundaries are not finalised. All maps and data are approximate. Sources: Fisheries and Oceans Canada 2005, BCMCA Atlas 2011, PNCIMA Atlas 2011.*

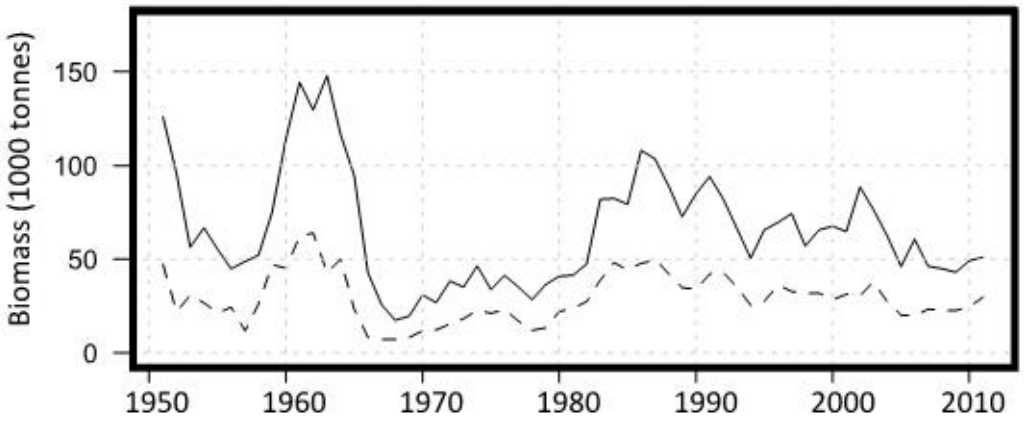

Figure 8: Estimates of total biomass at the start of the year (solid line) and post-fishery spawning stock biomass (dashed line) for the north coast herring stock. Sub-regional boundaries are not finalised. All maps and data are approximate. Source: Fisheries and Oceans Canada 2011.

Importance for MaPP

Herring are an important food source for hundreds of marine species and an important cultural, social and economic species for First Nations and coastal communities. Increasing the percentage of Herring Important Areas (IAs) in designated MPAs and developing strategies to improve the resilience of herring spawning habitats in the north coast are possible outcomes of the North Coast Marine Plan.

Description

Pacific herring, *Clupea pallasii*, is a pelagic species that inhabits the inshore and offshore waters of the Northeast Pacific Ocean. Ninety percent of herring return to spawn in the same general areas in subsequent years. Five major and two minor herring stocks are managed in BC. The north coast contains one major stock, the Prince Rupert stock, and any north coast management recommendations intended to influence herring could target this stock. Herring are an important food source for a variety of species, including Pacific hake, halibut, Arrowtooth flounder, and dogfish as well as Steller sea lions, harbour seals, harbour porpoises, Pacific white-sided dolphins and humpback whales. Herring annually migrate between feeding and spawning areas.

Social, Cultural, Economic Value

There are four Pacific herring commercial fisheries: roe, spawn-on-kelp, special use, and food and bait. As of 2007, herring fisheries in the MaPP planning area accounted for 30 to 50 percent of the coast-wide catch, and, on an economic basis, were one of the most important fisheries in BC. The landed value of BC's commercial herring fishery in 2010 was $11.8 million, which accounted for 3.6 percent of the total landed value of the provincial capture fishery for that year. The value and catch level of the Province's commercial herring fishery has fluctuated over time (Figure 9).

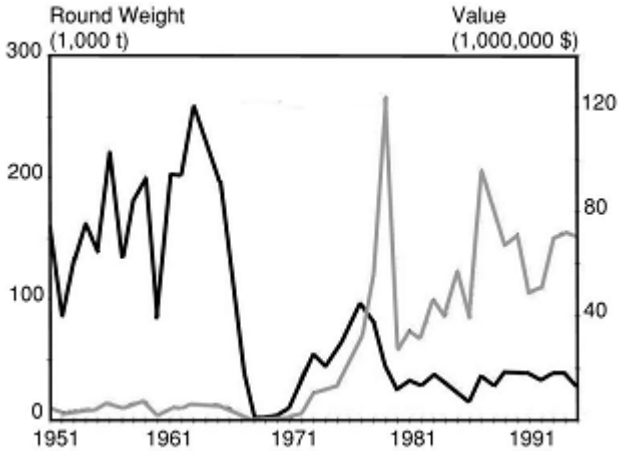

Figure 9: Commercial herring landings in BC from 1951-1995 (Black line indicates weight, gray line indicates value). Source: Fisheries and Oceans Canada 2008.

Current Conditions and Trends	Current Management Actions
Dramatic population fluctuations are common in all stocks of herring (Figure 9). In the mid 1960s, BC's herring stocks collapsed in response to poor environmental conditions and overfishing. The herring fishery was essentially closed from 1967-1971 and many stocks rapidly rebuilt. For 2012, north coast herring recruitment is anticipated to be average. An estimated 27,492 t of mature stock biomass are forecast for the year and the potential commercial harvest has been set at 5,498 t. Abundance estimates for the Prince Rupert stock have been biased high in recent years, resulting in overforecasting. Caution is advised when making fishery management decisions related to harvest levels.	Approximately 5.3 percent and 0.01 percent of herring IAs are within federal and provincial protected areas, respectively. If not already in place, specific objectives for herring IAs would be needed within existing management plans to provide eulachon populations significant protection within the existing protected areas. Management efforts could potentially address the level and amount of protection afforded herring in the North Coast sub-region.
Climate Change Impacts	**Opportunities and Constraints**
The coast of BC is experiencing an outburst of pelagic species abundance as current ecosystem conditions in BC seem to favour small pelagics. The synchronous change in a range of pelagic species across ecosystems indicates that a large-scale force is likely involved. Changes in herring spawning patterns coincide with changes in sea-surface temperature and other indices of climate change. Although climate change may be involved in the province's 'pelagic outburst', it is difficult to demonstrate because a range of mechanisms are likely involved.	Overfishing within the commercial fishery has historically led to fishery collapse (see above). The use of best management practices within marine activities that have the potential to degrade sensitive spawning and rearing herring habitat, such as shoreline development, log handling and uses that produce coastal or marine pollution, can reduce or prevent adverse impacts and protect herring resilience. When log handling sites are deactivated, foreshore riprap and other fill can be left in place so as to provide important habitat for herring. As herring produce sounds that may facilitate communication within the species, noise pollution from marine activities such as marine transportation may have consequences for herring behaviour.

EULACHON

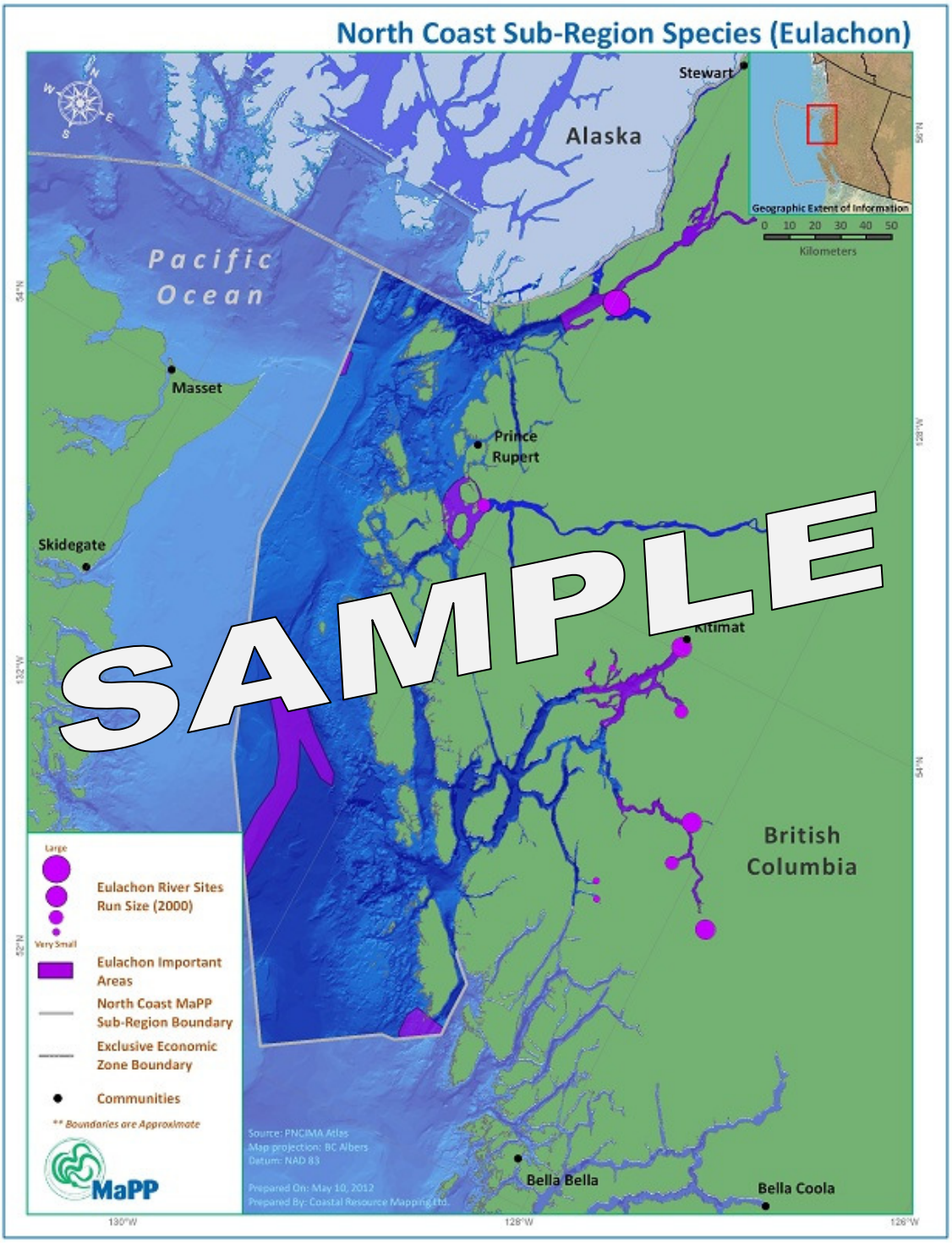

Figure 10: Eulachon river sites, run sizes and eulachon Important Areas. Sub-regional boundaries are not finalised. All maps and data are approximate. Sources: Fisheries and Oceans Canada 2005 and PNCIMA Atlas 2011.

Table 8: Known and probable north coast spawning areas (Spawning indicates whether a spawn is regular and occurs most years (R), irregular (I), or unknown (-); 'Fishing Effort' identifies rivers fished by First Nations (FN). Sub-regional boundaries are not finalised. All maps and data are approximate.

Spawning Area	Spawning	Fishing Effort	Marine Area	Stock
Nass	R	FN	Portland Inlet	Portland Inlet
Skeena	R	FN	Chatham Sound	Chatham Sound
Kitimat River	R	FN	Douglas Channel – Kitimat Arm	Douglas Channel
Kildala River	R	FN	Douglas Channel – Kitimat Arm	Douglas Channel
Giltoyees Inlet	I		Douglas Channel	Douglas Channel
Foch Lagoon	I		Douglas Channel	Douglas Channel
Kitlope River	R	FN	Gardner Canal – head	Gardner Canal
Kowesas River	R	FN	Gardner Canal – Chief Matthew's Bay	Gardner Canal
Kemano/Wahoo River	R	FN	Gardner Canal – Kemano Bay	Gardner Canal
Khutze River	-		Princess Royal Channel – Khutze Inlet	N/A
Aaltanhash River	-		Princess Royal Channel – Aaltanhash Inlet	N/A

Note: In Kitimat, eulachons sometimes spawn, unpredictably, in small streams close to the Kitimaat Village.

Importance for MaPP

Eulachon are a vital cultural, social and health component of First Nations communities in the North Coast. Strategies to increase the percentage of Eulachon IAs in protected areas, reduce or eliminate fisheries bycatch or increase catch rates for First Nations are possible measureable outcomes of the North Coast Marine Plan.

Description

Eulachon, *Thaleichthys pacificus*, are a small, anadromous fish ranging from the southern Bering Sea to northern California. They are an important part of First Nations diet and known as candlefish because of their high oil content. As of 2000, eulachon spawned in 33 rivers along the BC coast, 11 of which are on the north coast (Table 8). Management recommendations intended to influence eulachon could target these rivers and the marine waters they directly enter.

After spawning, eulachon often, but not always, die and provide important nutrients to freshwater habitats and to scavenger species.

Eulachon are a valuable prey species for terrestrial and marine birds because of their high fat content. Seals, sea lions, fish and whales also prey on eulachons.

Social, Cultural, Economic Value

Eulachon play a vital role to First Nations in BC due to their high nutritional value and cultural significance. They are a valued source of fresh protein in the spring and are dried for consumption during the rest of the year. The fish are rendered for their grease, historically and currently a highly valued trading item along the coast and in the interior, the so-named grease trails.

Catch rates of adult eulachon by First Nations vary with season. Harvest on the Nass and Skeena occurs in the winter and early spring.

Eulachon IAs are areas worthy of enhanced protection as determined by eulachon and eulachon habitat uniqueness, aggregation, fitness consequences, naturalness and resilience (see Clarke and Jamieson 2006).

Current Conditions and Trends	Current Management Actions
Nearly all eulachon spawning runs have declined from California to south-eastern Alaska in the past 30 years. Runs on the Kitimat River have been virtually non-existent since 1998, likely due to long-term industry impacts from effluents that chemically tainted spawning fish. Fisheries and Oceans Canada reported that that the Nass is the only location in Canada with normal or near-normal runs, but COSEWIC reports that Nass and Skeena runs are ~10 percent of their 1800s levels.	The Province has listed BC's eulachon as a species of 'special concern' (i.e., eulachon are blue listed). Eulachon Important Area (IAs) are areas worthy of enhanced protection as determined by eulachon and eulachon habitat uniqueness, aggregation, fitness consequences, naturalness and resilience (see Clarke and Jamieson 2006). Approximately 16.5 percent and 1.6 percent of eulachon Important Areas on the north coast are within existing federal or provincial protected areas, respectively. If not already in place, specific objectives for eulachon IAs would be needed within existing management plans to provide eulachon populations significant protection within the existing protected areas. Management recommendations could potentially address the level and amount of protection afforded eulachon on the north coast.
Climate Change Impacts	**Opportunities and Constraints**
Climate change effects that are likely to negatively affect eulachon are changes to their marine or terrestrial food supplies and changes to their predator populations, for example Pacific hake (*Merluccius productus*). In addition, changes to sea surface temperatures are weakly associated with eulachon declines.	Effluent released on the Kitimat River in the late 1900s chemically tainted spawning eulachon, likely diminishing runs and leaving the fish unpalatable, while a diversion in place on the Kemano River since the 1950s altered discharge volumes, affecting eulachon runs. Preventing or minimising dredging and using best management practices in forestry proximate to and during spawning will increase survival of in-river eulachon adults and eggs by limiting changes to river volume, flow rate, sediment level and discharge pattern. Logging-related marine activities in estuaries can minimise debris deposition to prevent anoxic water conditions that lead to juvenile and adult mortality. Shrimp and hake catches, seal and sea lion abundance and increased water temperatures are weakly associated with eulachon declines.

FEDERAL MARINE PROTECTED AREAS

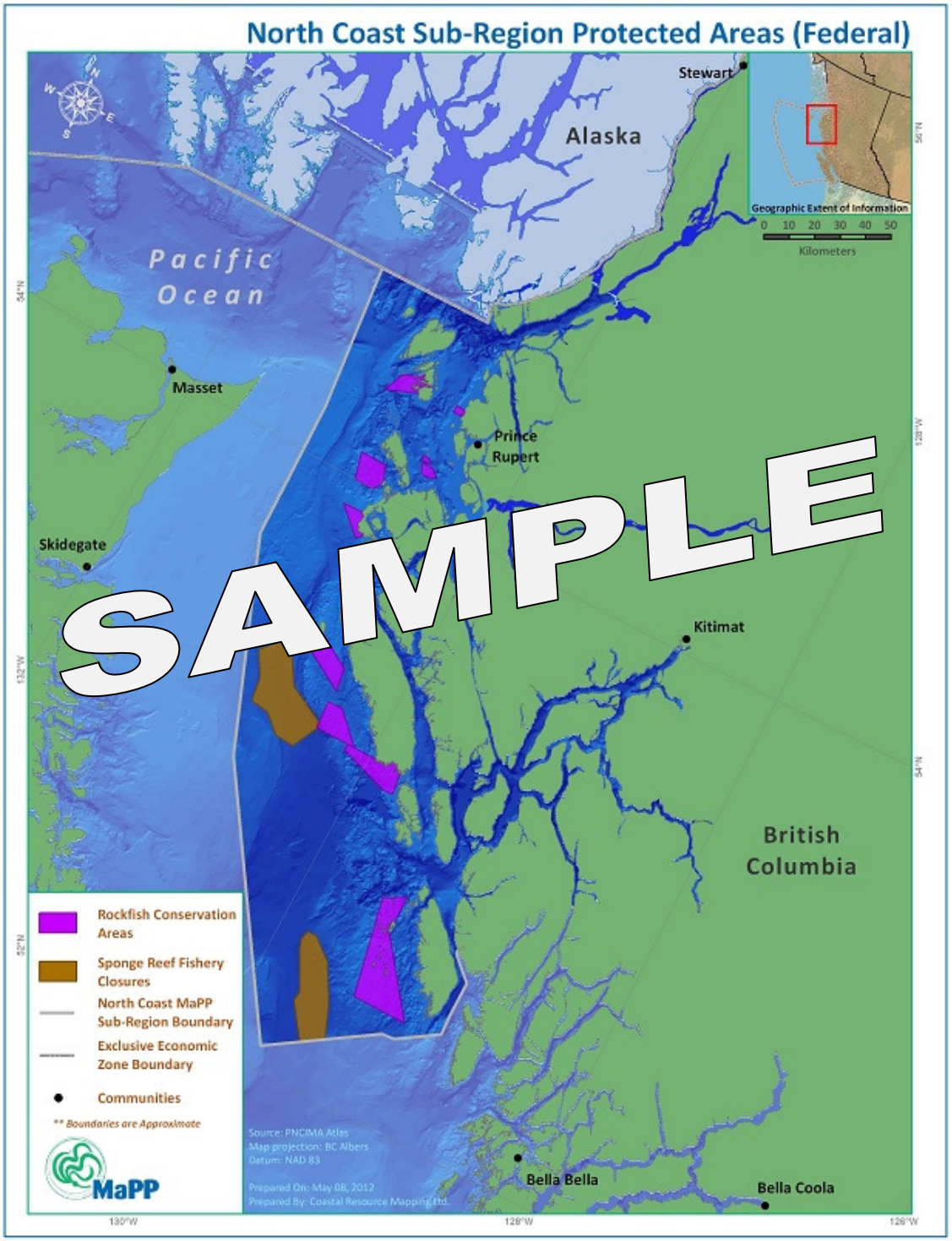

Figure 11: Federal MPAs in the North Coast sub-region. Sub-regional boundaries are not finalised. All maps and data are approximate. Sources: Fisheries and Oceans Canada 2007, Parks Canada 2010, PNCIMA Atlas 2011.

Importance for MaPP

The *National Framework for Canada's Network of Marine Protected Areas* contains 13 ecologically defined bioregions within the nation's oceans and Great Lakes. The MaPP planning area is located within the Northern Shelf bioregion. The Government of Canada recognises a range of benefits associated with well-designed and effectively implemented marine protection strategies, including the extension of the protection afforded by terrestrial protection; enhancement of fish recruitment, including commercially valuable species; achievement of sustainable fisheries management objectives; reduction of the effects of local catastrophes through the protection of multiple ecosystems and regions that provide buffers against local environmental change; support for First Nations traditional activities; provision of social and economic benefits, such as enhanced opportunities for recreation, promotion of cultural heritage and enhanced planning and coordination of ocean activities; and protection of unique, endemic, rare and threatened species.

Description

MPAs are established to protect a portion of the sea's surface, water column and/or seabed. They may be designated to protect specific plants, animals or commercial, recreational, scientific, cultural and/or historic features. The three core elements of Canada's federal MPA network include Fisheries and Oceans Canada's MPAs, Environment Canada's Marine Wildlife Areas and Parks Canada's National Marine Conservation Areas. Other federal MPAs within the network include Environment Canada's migratory bird sanctuaries and national wildlife areas as well as and Parks Canada's national parks.

Social, Cultural, Economic Value

MPAs can provide social, cultural and economic benefits both within and proximate to their boundaries by improving habitat and species wellbeing and abundance. No-take MPAs, which prohibit resource extraction, have been linked to increased density, biomass, size and reproductive potential of individuals as well as increased species richness. Partial protection MPAs that regulate instead of prohibit resource use within their boundaries have also been connected to a range of benefits relative to open access areas, including higher biomass, organism density, species richness and individual organism size. As marine protection can lead to spillover, which is the export of individuals such as adults or larvae from protected areas to adjacent waters, the benefits MPAs often extend past their boundaries.

Current Conditions and Trends

The North Coast sub-region currently contains two types of Federal MPAs: Rockfish Conservation Areas (RCAs) and Sponge Reef Fishery Closures (Table 9).

Table 9: Type, number and coverage of federal protected areas in the North Coast sub-region. Sub-regional boundaries are not finalised. All maps and data are approximate.

MPA Type	Count	Total Area (km^2)	% of Sub-region Covered (%)
Rockfish Conservation Area	8	1,249	2.0
Sponge Reef Fishery Closure	2	1,042	1.7

Climate Change Effects

Marine protection contributes to climate change mitigation and adaptation by protecting habitats that capture and store carbon, such as coastal salt marshes, sea grasses and kelp forests; conserving multiple ecosystem types and special ecological features, such as underwater canyons or critical habitats, as insurance against catastrophic events; and protecting coastal barrier ecosystems, such as wetlands, that buffer ecosystems and human developments against extreme weather events.

Current Management Actions

Federal and provincial MPAs, including provincial conservancies designated to address First Nations interests, cover an area equal to 21 percent of the North Coast sub-region, while federal MPAs alone cover an area equal to 3.8 percent of the North Coast sub-region. Fisheries and Oceans Canada is currently implementing its *Federal Marine Protected Areas Strategy*. While RCAs and Sponge Reef Fishery Closures serve different purposes, they are both administered by Fisheries and Oceans Canada under the *Fisheries Act* (Table 10).

Table 10: Administration and purposes of federal protected areas. Sub-regional boundaries are not finalised. All maps and data are approximate.

MPA Type	Agency and Act	Purpose
Rockfish Conservation Area	Fisheries and Oceans Canada *Fisheries Act*	To preserve rockfish biomass
Sponge Reef Fishery Closure	Fisheries and Oceans Canada *Fisheries Act*	To conserve and protect fish and fish habitat; to manage inland fisheries (among other purposes)

Within the federal protected areas on the north coast, a range of activities are permitted, restricted or prohibited. Within RCAs, the permissible recreational fisheries are invertebrates by hand picking or dive, crab by trap, shrimp/prawn by trap and smelt by gillnet, while the permissible commercial fisheries are invertebrates by hand picking or dive, crab or prawn by trap, scallops by trawl, salmon by seine or gillnet, herring by gillnet, seine and spawn-on-kelp, sardine by gillnet, seine and trap, smelt by gillnet, euphausiid (krill) by mid-water trawl, opal squid by seine and groundfish by mid-water trawl. Within the Sponge Reef Fisheries Closure, bottom trawling is prohibited and mid-water trawling, prawn and shrimp fishing by trap and bottom longline fishing are permitted. In federal protected areas, Aboriginal rights for food, social and ceremonial purposes are not impacted by protected areas unless conservation issues arise.

The federal and provincial governments are working together to coordinate marine protection efforts off the coast of BC as demonstrated by the development of the *Draft Canada – British Columbia Marine Protected Area Network Strategy* in 2011.

Opportunities and Constraints

MPAs can influence activities within their boundaries by affecting what uses are permitted, including allowing, restricting or prohibiting activities; how activities can be conducted, such as requiring specific gear types or gear modifications; when activities are acceptable, including seasonal closures; and who may conduct activities, such as commercial or recreational users. While MPAs can affect resource use, they can lead to benefits within their boundaries as well as spillover effects that combine to create net gains for marine resource users.

PROVINCIAL MARINE PROTECTED AREAS

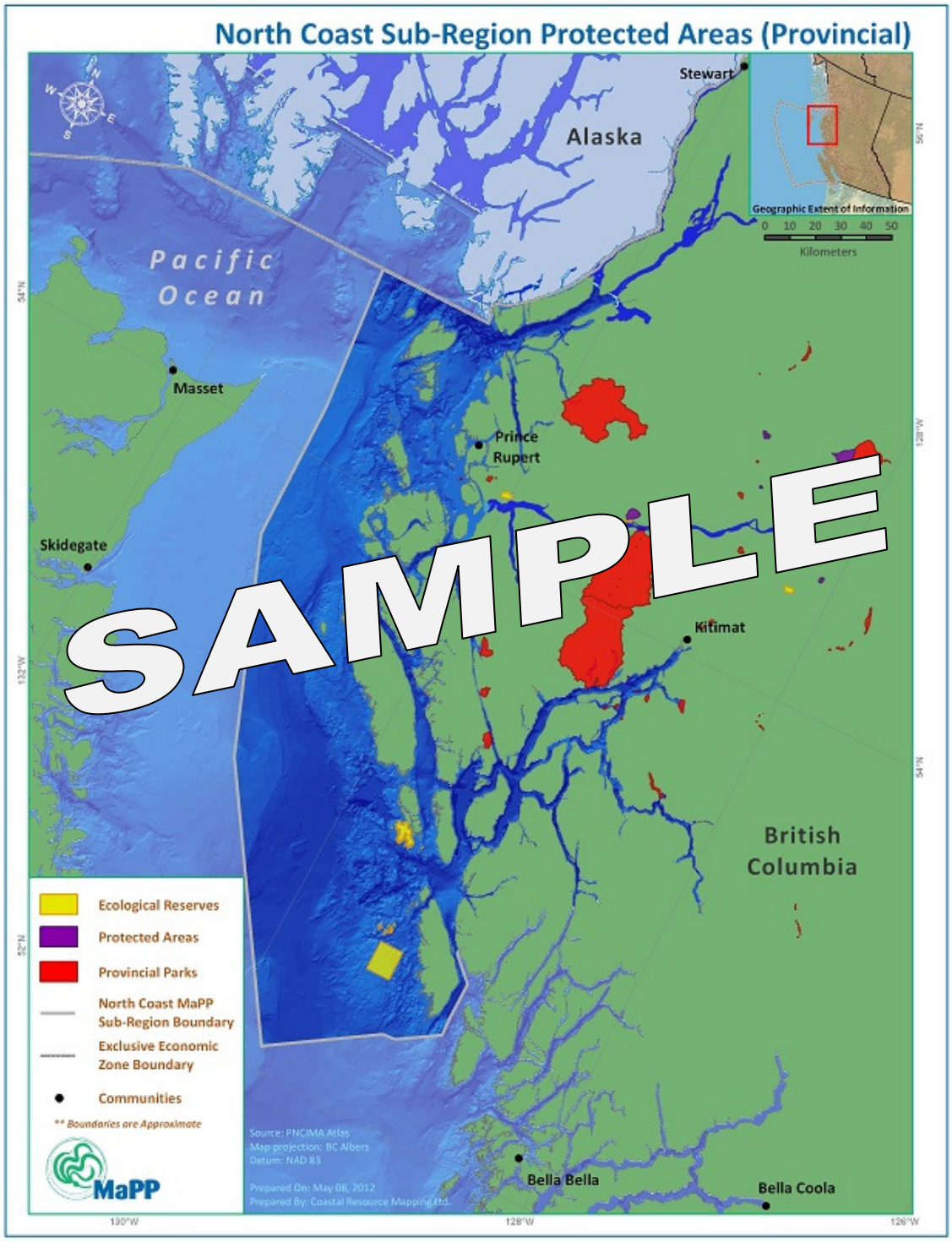

Figure 12: Provincial MPAs in the North Coast sub-region. Sub-regional boundaries are not finalised. All maps and data are approximate. Sources: PNCIMA Atlas 2011, Province of British Columbia 2011.

Importance for MaPP

The Province of BC recognises that MPAs are a vital part of its commitment to viable coastal communities, sustainable economies and a healthy, diverse marine environment. The Province has committed to protecting and conserving the natural beauty and richness of BC's marine areas, maintaining ecological diversity and preserving the province's marine recreational, natural and cultural features for all time through the creation and maintenance of provincial MPAs.

Description

MPAs provide legally binding protection of the sea surface, water column, seabed and/or associated flora, fauna and recreational, scientific, cultural and historical features within their boundaries. The MPAs within BC include Ecological Reserves, Provincial Parks, Protected Areas, Conservancies, Recreation Areas and Wildlife Management Areas.

Social, Cultural, Economic Value

MPAs have social, cultural and economic value as they provide benefits (see the Federal MPAs section above for further detail) that support a range of marine uses, including, but not limited to, commercial fisheries, recreational activities and the collection of species by First Nations for food, social and ceremonial purposes. As MPAs conserve historic and archeological sites in addition to ecological sites, they contribute to the long-term preservation of the diverse identities of BC's inhabitants.

Current Conditions and Trends

Federal and provincial MPAs, including provincial conservancies designated to address First Nations interests, cover an area equal to 21.0 percent of the North Coast sub-region, while provincial MPAs alone (not including First Nations-related conservancies) cover an area equal to 3.5 percent of the North Coast sub-region. The North Coast sub-region currently contains six Ecological Reserves, nine Provincial Parks and eight Provincial Protected Areas (Table 11).

Table 11: Type, number and coverage of provincial MPAs in the North Coast sub-region. Sub-regional boundaries are not finalised. All maps and data are approximate.

MPA Type	Count	Total Area (km^2)	Percent of sub-region Covered (%)
Ecological Reserve	6	178	0.3
Provincial Park	9	75	0.1
Provincial Protected Area	31	1,881	3.0

Climate Change Effects

As noted above in the Federal MPAs section, marine protection efforts can contribute to climate change mitigation and adaptation. MPAs can support carbon sequestration by conserving marine habitats, contribute to the ongoing delivery of ecosystem goods and services, such as habitat, food and nutrient cycling, by safeguarding replicate ecosystem types and ecological features, and shelter coastal ecosystems and human settlements during extreme weather events by buffering impacts.

Current Management Actions

The Province is developing planning products to support the establishment of MPAs as well as management in existing MPAs. These products include the British Columbia Marine Ecological Classification (BCMEC); a preliminary list of Valued Marine Environmental Features (VMEF), which are key conservation, recreation and cultural-heritage elements of marine environments such as kelp beds, abandoned canneries and archaeological sites; and a MPA gap analysis based on the BCMEC, VMEFs and identification of biophysical and human use values within existing MPAs. The gap analysis work will be used to identify potential candidate areas for provincial conservation as well as existing provincial protected areas that might benefit from federal fisheries closures.

The MPAs types currently within the North Coast sub-region serve different purposes, are administered under different provincial Acts and manage marine uses to different degrees (Table 12). Aboriginal rights for food, social and ceremonial purposes are not impacted by protected areas unless conservation issues arise.

Table 12: Administration and purposes of BC Provincial protected areas. Sub-regional boundaries are not finalised. All maps and data are approximate.

MPA Type	Agency Act	Purpose
Ecological Reserve	BC Ministry of Environment *Ecological Reserves Act*	To reserve Crown land for ecological purposes, including areas suitable for research and education, that are representative of natural ecosystems in BC that are examples of modified environments that can be studied for their recovery, and that are habitats of rare, endangered or unique species
Provincial Park	BC Ministry of Environment *Park Act*	To protect representative ecosystems and special natural, cultural and recreation features, and to provide outdoor recreation in natural environments for the inspiration, use and enjoyment of the public
Provincial Protected Area	BC Ministry of Environment *Environment and Land Use Act*	To protect representative examples of ecosystems, recreational and cultural heritage, and special natural, cultural heritage and recreational features

Opportunities and Constraints

As noted above in the Federal MPAs section, MPAs can influence activities within their boundaries by affecting what uses are permitted, how activities can be conducted, when activities are acceptable and who may conduct activities. At the same time, MPAs contribute to ecosystem resilience and productivity and can provide spillover effects that lead to overall gains for marine resource users (see above).

SHELLFISH AQUACULTURE

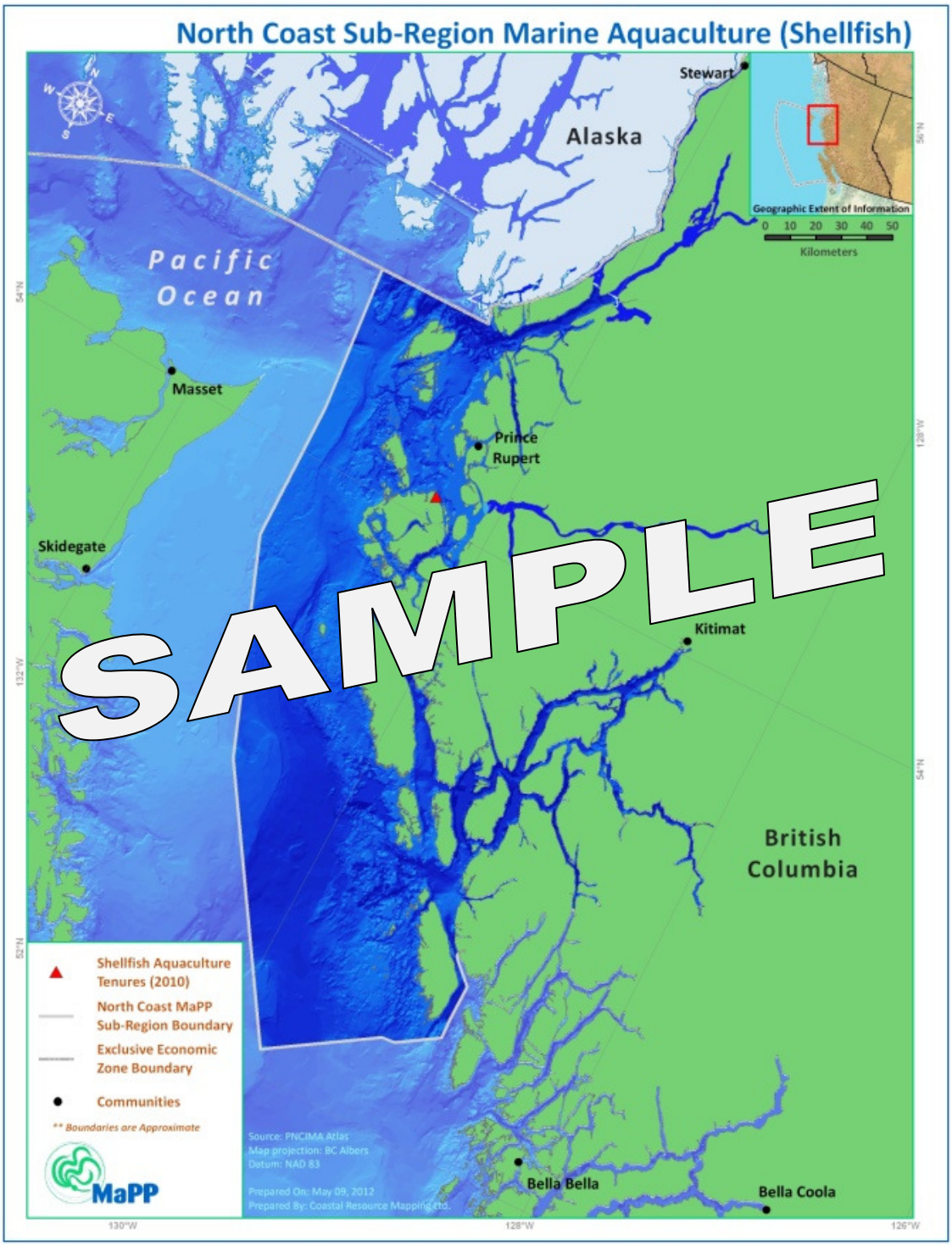

Figure 13: North Coast Sub-Region Marine Aquaculture (Shellfish) Tenures and Applications. Sub-regional boundaries are not finalised. All maps and data are approximate. Sources: PNCIMA Atlas 2011, Province of British Columbia.

Importance for MaPP

Shellfish aquaculture is a significant component of BC's coastal economy with significant and consistent increases in production and value in recent years, as well as potential for increased production. Activities associated with shellfish production and processing have potential to provide employment and income in coastal communities. MaPP provides an opportunity to identify and address related ecosystem integrity, human wellbeing and governance considerations.

Description

Shellfish aquaculture is the production of farmed marine invertebrates in an aquatic environment or human-made container of water for commercial purposes, including the cultivation of shellfish on, in or under the foreshore or in open water.

Types of shellfish farming:

- *Off-beach* from rafts or buoys, generally higher productivity than on-beach methods.
- *On or near seabed* in the intertidal zone, may conflict with wild shellfish stocks.
- *Closed containment,* no commercial operations at present.

Conditions and Trends

As of December 2010, one active shellfish aquaculture licence holder was registered in the North Coast planning area.

As of December 2010, two active shellfish aquaculture licence holders and one application were registered in the North Coast planning area. Shellfish species of interest for farming in BC include:

- Pacific oyster (*Crassostrea gigas*), Manila clam (*Venerupis philippinarum*) with 89percent of total cultured shellfish harvest in 2010.
- Japanese scallop (*Patinopecten yessoensis*), giant rock scallop (*Crassadoma gigantea*) and blue and Gallo mussel (*Mytilus spp*.) with 11 percent of 201 harvest.
- Giant Californian sea cucumber (*Parastichopus californicus*), sea urchins (*Strongylocentrotus spp*.), geoduck clam (*Panopea abrupta*), spot prawn (*Pandalus platyceros*). Limited or no cultured production presently.
- Abalone (*Haliotis kamtschatkana*). Potential if population recovery, protection and tracking concerns addressed.

Social, Cultural, Economic Value

First Nations have tended clam gardens along the BC coast over many centuries and shellfish are an important component of the seafood diet for north coast populations. Oyster seed was introduced to BC in 1903. Clam farming began in the mid-1980s and in recent years the farmed harvest of clams has exceeded the wild harvest. Recent production and value of shellfish harvest in BC is shown below (Table 13).

Table 13: BC Shellfish Production – Harvest and Landed Value 2008-2010. Sub-regional boundaries are not finalised. All maps and data are approximate.

	BC–HARVEST ('000 Tonnes)				BC–LANDED VALUE ($ Millions)			
	2008	**2009**	**2010**	**Percent Change (09/10)**	**2008**	**2009**	**2010**	**Percent Change (09/10)**
Clams	1.3	1.3	1.5	+15.4%	7.2	7.2	8.1	+12.5%
Oysters	5.6	5.7	7.4	+29.8%	6.5	7.1	8.8	+23.9%
Scallops & Mussels	0.6	0.7	1.1	+57.1%	2.5	3.0	4.8	+60.0%
TOTAL	**7.5**	**7.7**	**10.0**	**+29.9%**	**16.2**	**17.3**	**21.7**	**+25.4%**

Climate Change Impacts

Ocean acidification has been linked to the collapse of oyster seed production in Washington and Oregon and is a concern for BC.

The water along the Pacific Coast is layered. During certain weather events, deep layers are brought to the surface, bringing old water that has absorbed carbon dioxide and carbonic acid, a process of ocean acidification to describe waters with a lower pH than fresher, oxygen-rich surface waters. The acidic water dissolves the calcium carbonate in the shells of oyster larvae faster than they can produce it, resulting in mortality and thus failure in seed production.

Monitoring sea water at existing or proposed shellfish aquaculture hatchery locations for pH and other factors, such as temperature, salinity and bacteria, can support hatchery operators and shellfish farmers in identifying and adapting to periods of low pH.

Current Management Actions

All commercial marine, freshwater and land-based finfish and shellfish aquaculture operations are licensed under the Pacific Aquaculture Regulation of the federal *Fisheries Act*. The Province remains responsible for the administration of Crown land for aquaculture and issuance of *Fisheries Act* aquaculture business licenses.

In December 2011the Department of Fisheries and Oceans released an interim plan for discussion addressing integrated management of shellfish aquaculture.

The Coastal First Nations and North Coast Skeena First Nations Stewardship Society have been working with federal and provincial agencies and partners over the past decade in a coordinated effort to establish commercial shellfish aquaculture hatchery and farming operations.

Opportunities and Constraints

Ecosystem Integrity: Potential to impact beaches and/or sites supporting wild shellfish stocks or other marine species. Potential for introduction of invasive and/or exotic species. Shellfish can affect food supply of adjacent or nearby species. Vulnerable to contamination from shore or water-based activities. Off-beach farming has lower impacts than on-bottom farming with potential for further reduction of impacts if closed containment used.

Human Wellbeing: Capital investment needs, risk of harvest failures and cash flow requirements can limit participation in this sector. Investment in hatchery and/or processing operations can provide additional revenue and employment opportunities. Potential to provide year round and seasonal employment. Wages and return on effort/investment are not assured. Requires training and experience involving business and practical skill sets. Transportation costs and access to processing facilities and/or markets may limit viability.

Governance: DFO is in the process of developing a new regulatory and management regime. At present the regulatory approval process is lengthly and uncertain.

Species-specific Considerations

Scallops: Grow well in cool, nutrient rich waters. Capital intensive, with limited seed sources. Established demand in BC with potential to increase market to the US and Asia.

Oysters: Most are currently grown in southern waters of the province where markets are established and transportation costs are low. Shucking and packing is labour intensive but unshucked oysters have a lower value for weight than shucked. Background cadmium levels may limit exports to China.

Clams: On-beach farming competes with wild stocks and other uses. Established markets and low transportation costs.

Other Species: Opportunities for high economic and cultural value species such as geoduck clams, abalone and sea cucumbers.

ACKNOWLEDGEMENTS

Report developed by the Marine Planning Partnership for the North Pacific Coast, a partnership between the Province of B.C., represented by the Ministry of Forests, Lands and Natural Resource Operations, and the Coastal First Nations, the North Coast – Skeena First Nations Stewardship Society and the Nanwakolas Council, which include 20 member First Nations.

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APPENDIX 1: SUB-REGIONAL BASE CASE TABLE OF CONTENTS (DRAFT- MAY 2012)

1 The North Coast

Human Communities x

2 Coastal and Benthic Habitats

Eelgrass beds x
Kelp forest x
Estuaries x
Rocky reefs x
Deep water corals and sponges x
Deep water canyons x
Continental shelf break & slope x

2 Marine Species

Zooplankton x
Herring x
Eulachon x
Abalone x
Salmon x
Groundfish x
Seabirds x
Cetaceans x
Species Guilds x

4 Ecosystem Structure and Function

Gyres, eddies, seasonal flows and general currents x
Coastal upwelling x
Areas of high tidal flow x
Hypoxia x
Degraded areas x
Freshwater inputs x

5 Existing Marine protected areas

Federal Marine protected areas x
Provincial Marine protected areas x
Provincially Designated First Nations sites x

6 Marine Uses and Activities

Fisheries and Seafood Processing, Marketing and Branding x
Marine Pollution .....
Shellfish, Seaweed and Finfish Aquaculture and Processing x
Marine Recreation and Tourism x
Marine Transportation and Vessel Safety x
Logging-related Marine Activities x
Marine and Coastal Infrastructure x
Shore-based Marine Tenures .....

Renewable Ocean Energy .....

7 Governance and Collaborative Management

Information Sharing x
Monitoring, Compliance and Enforcement x
Collaborative Management Agreements x
Integrated Economic Development .....
Marine Policies and Regulations x
Legislation x

APPENDIX 2: NORTH COAST BASE CASE OVERVIEW (DRAFT- MAY 2012)

Overview

This is a project description and Executive Summary for deliverables produced for the Marine Planning Partnership.

Executive Summary:

- A base case is a description, or profile, of current biophysical and socioeconomic conditions within a planning area relevant to a plan's goals. As it pertains to the Marine Planning Partnership for the North Pacific Coast (MaPP), four sub-regional base cases are under development to provide snapshots of the current conditions and trends within the MaPP planning area. The MaPP sub-regional base cases follow the EBM framework and address the three EBM Elements: Ecological Integrity, Human Wellbeing and Governance.
- The features selected for the base case provide essential information that support several MaPP outputs including characterise and analyse existing conditions and trends (regional and sub-regional MaPP outputs), analyses that support EBM outputs such as marine spatial plans (regional and sub-regional MaPP outputs) and cumulative effects (regional and sub-regional MaPP outputs).
- Draft 1 of the Sub-regional base case (May 2012) follows the Base Case Table of Contents (Appendix 1) and includes eight features that address EBM Ecological Integrity and EBM Human Wellbeing: human communities, eelgrass beds, deepwater corals and sponges, herring, eulachon, Federal Marine Protected Areas, Provincial Marine Protected Areas and shellfish aquaculture.

Date first draft of report was completed: 14 May 2012

Date report was finalised: TBD

Prepared for: Marine Coordination Team, North Coast Marine Tech Team

Prepared by: MaPP Contracted Support

Roles of other Parties: Review by MCT, Sub-regional Marine Technical Teams, Science Coordinator and Science Advisory Committee.

Constraints, Risks and Dependencies: Completion of all the features in the base case Table of Contents is constrained by data availability and QA/QC for relevant data layers.

Resources (human, $, other): Coast Resources Mapping Ltd for developing all maps and tabulated data outputs.

Timelines, Outputs and Responsibilities:

Timeline	Output	Who is responsible for this

14 May 2012	Completion of the first drafts of the sub-regional base cases	Contracted Support
14-25 May 2012	Review of the first drafts of the sub-regional base cases	Marine Coordination Team, Sub-regional Technical Teams, Science Coordinator
26-29 May 2012	Incorporate edits and update sub-regional base cases	Contracted support
30 May 2012	Distribution of the draft sub-regional base cases to Sub-regional Marine Plan Advisory Committee (MPaC) members	Sub-Regional Technical Team Co-leads
June 2012	Next draft of the sub-regional base cases	Contracted Support
June-July 2012	Review of the final drafts of the sub-regional base cases. Distribution to MPAC.	Marine Coordination Team, Sub-regional Technical Teams, Science Coordinator, Science Advisory Committee
Summer 2012	Completion of base case project (final edits)	Contracted Support

NORTH COAST BASE CASE

Colin Rankin

MAPP CONTRACTED SUPPORT

OBJECTIVES

- The objectives of this presentation are to:
  - Explain what a base case is and how it can be used within the North Coast's marine planning process
  - Present the Draft North Coast Base Case for your review
  - Obtain your feedback on the Draft North Coast Base Case

OUTLINE

- What is a base case?
- Where does information come from?
- How is it used?
- Who is responsible for it?
- When will it be finished?
- Base case walk through

WHAT IS A BASE CASE: DEFINITION

A base case is a description, or snapshot, of current biophysical and socioeconomic conditions within a planning area relevant to its goals

WHERE DOES INFORMATION COME FROM

- Best available data
- Published sources
- Traditional and local knowledge

WHERE DOES INFORMATION COME FROM

- Information Quality
  - Reliable and transparent sources
- Information Type
  - Ecological value
  - Human value
  - MaPP value
- Information Scale
  - Sub-regional, regional, provincial, federal

HOW IS A BASE CASE USED: APPLICATION IN MAPP

- **Provides an initial picture of the planning area**
  - What indicators do we want to track?
- **Supports analysis and plan development leading to completion of MaPP outputs**
  - How can we influence indicators in a positive way?
- **Supports assessment of plan success**
  - How have indicators changed? Did we accomplish what we set out to do?

WHO IS RESPONSIBLE:
BASE CASE DEVELOPMENT

- Development: MaPP Contracted Support
- Information: You and your sub-region
  - Tell us what information is needed
  - Be an information source
  - Help direct us to other information sources

WHEN WILL THE BASE CASE BE FINISHED: TIMELINE

- The first draft of the North Coast Base Case will be completed for Summer 2012

- Base cases are living documents and information will be added throughout the planning process

BASE CASE REVIEW

- Please consider the following questions during our review of the Draft North Coast Base Case:
  - Are there any errors or obvious omissions in the information presented?
  - Is there information included that requires clarification?
  - Are there any additional sources or reports that should be included in the North Coast Base Case?

MAPP BASE CASE: TABLE OF CONTENTS

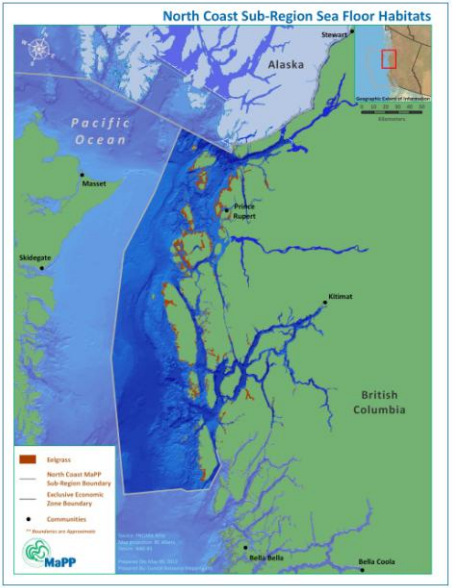
- North Coast
  - Human Communities
- Ecological Integrity
  - Marine Species
  - Coastal and Benthic Habitats
  - Ecosystem Structure and Function
  - Existing Marine Protected Areas
- Human Well-being
  - Marine Uses and Activities
- Governance and Collaborative Management

NORTH COAST

Human Communities

- Description
- Current Population and Trends
- Marine Uses and Activities
- Education
- Employment
- Health and Wellbeing
- Income

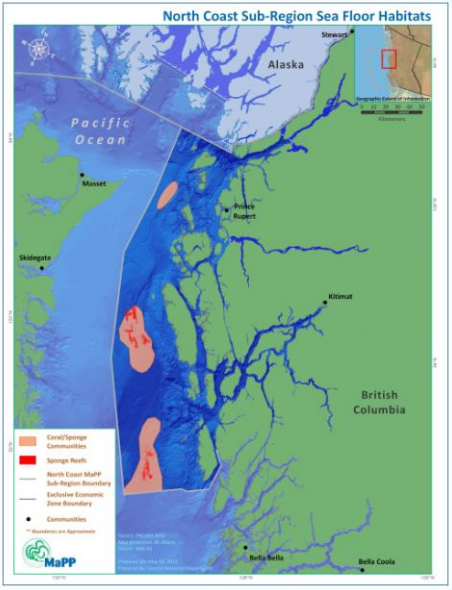
ECOLOGICAL INTEGRITY: HABITAT



Eelgrass Beds

- Importance for MaPP
- Description
- Current Conditions and Trends
- Social, Cultural, Economic Value
- Current Management Actions
- Climate Change Impacts
- Opportunities and Constraints

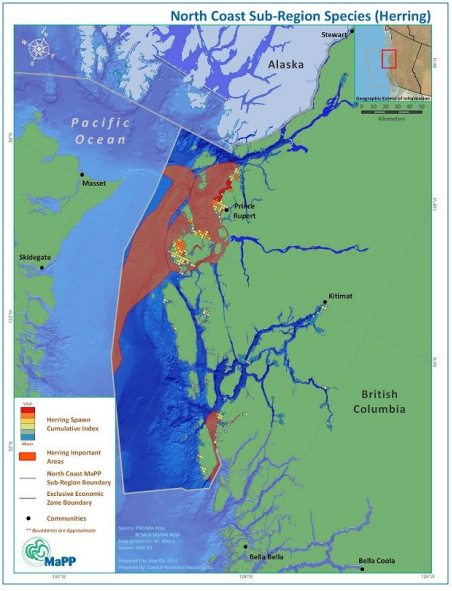
ECOLOGICAL INTEGRITY: HABITAT



Deep Water Corals and Sponges

- Importance for MaPP
- Description
- Current Conditions and Trends
- Social, Cultural, Economic Value
- Current Management Actions
- Climate Change Impacts
- Opportunities and Constraints

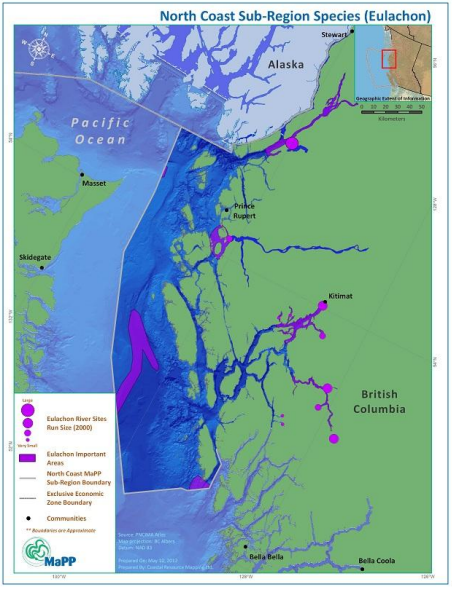
ECOLOGICAL INTEGRITY: SPECIES



Herring

- Importance for MaPP
- Description
- Current Conditions and Trends
- Social, Cultural, Economic Value
- Current Management Actions
- Climate Change Impacts
- Opportunities and Constraints

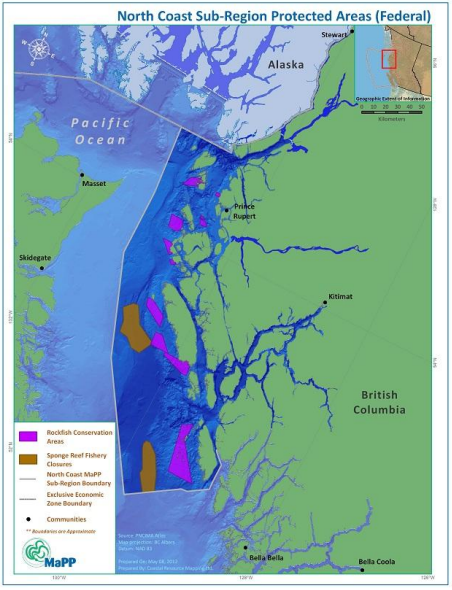
ECOLOGICAL INTEGRITY: SPECIES



Eulachon

- Importance for MaPP
- Description
- Current Conditions and Trends
- Social, Cultural, Economic Value
- Current Management Actions
- Climate Change Impacts
- Opportunities and Constraints

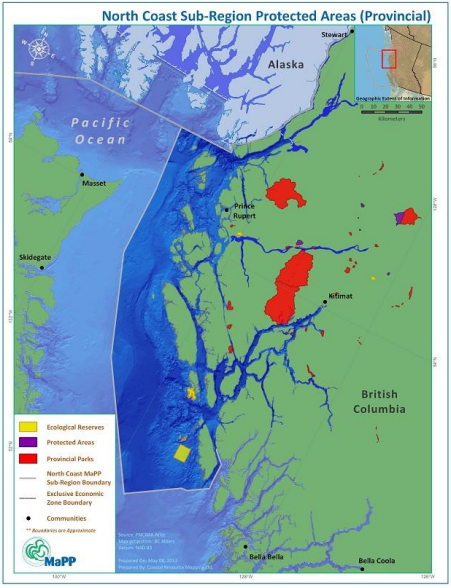
ECOLOGICAL INTEGRITY: EXISTING MARINE PROTECTED AREAS



Federal Marine Protected Areas

- Importance for MaPP
- Description
- Current Conditions and Trends
- Social, Cultural, Economic Value
- Current Management Actions
- Climate Change Impacts
- Opportunities and Constraints

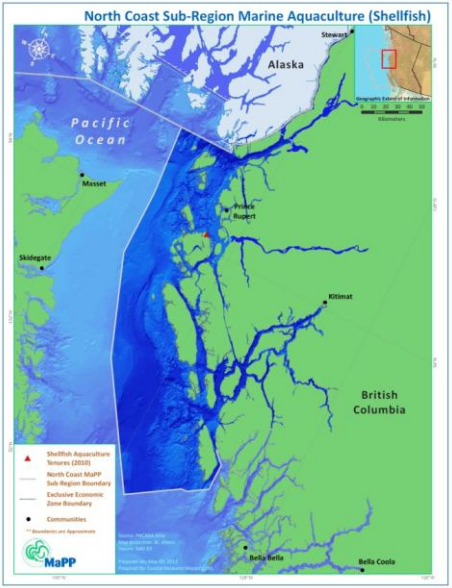
ECOLOGICAL INTEGRITY: EXISTING MARINE PROTECTED AREAS



Provincial Marine Protected Areas

- Importance for MaPP
- Description
- Current Conditions and Trends
- Social, Cultural, Economic Value
- Current Management Actions
- Climate Change Impacts
- Opportunities and Constraints

HUMAN WELLBEING: MARINE USE



Shellfish Aquaculture

- Importance for MaPP
- Description
- Current Conditions and Trends
- Social, Cultural, Economic Value
- Current Management Actions
- Climate Change Impacts
- Opportunities and Constraints

FEEDBACK

- Are there any errors or obvious omissions in the information presented?
- Is there information included that requires clarification?
- Are there any additional sources or reports that should be included in the North Coast Base Case?

THANK YOU! QUESTIONS?

North Coast Base Case Resources

To: North Coast Marine Technical Team
From: Marine Contracted Support
Date: 30 May 2012

CONTEXT

This document provides (1) the resources used to create the maps and text of the Draft North Coast Base Case as well as (2) a compilation of the ecological integrity and human wellbeing resources collected to date by MaPP Contracted Support for use in ongoing base case development. Individual resources are included within all the topic areas to which they apply and, as a result, may be listed more than once.

The intent of the document is to:

- Facilitate the identification of text resources that MPAC members feel are currently missing and that they would like to see included in future iterations of the North Coast Base Case.
- Clearly outline the dates and sources of spatial data so that MPAC members can indicate if they are aware of different or more up-to-date spatial data resources.

SPATIAL DATA RESOURCES

Human Communities

- PNCIMA Atlas (2011)
- Province of British Columbia (2011) – Census Subdivisions

Eelgrass Beds

- BCMCA Atlas (2011)
- BCMCA Project Team (2010)
- Community Mapping Network – Eelgrass Surveys
- Fisheries and Oceans Canada – Eelgrass Surveys
- Living Oceans Society – Merged Eelgrass Datasets
- Parks Canada – North Coast Marine Plants
- PNCIMA Atlas (2011)
- Province of British Columbia – Eelgrass Surveys

- Province of British Columbia (2008) – Shorezone Mapping System, Bioband

Deep Water Corals and Sponges

- BCMCA Atlas (2011) – Bathymetry
- Fisheries and Oceans Canada (2007) – Sponge/Coral Important Areas
- Natural Resources Canada (2008) – Sponge Reefs
- PNCIMA Atlas (2011)

Herring

- BCMCA Atlas (2011) – Herring Spawn
- Fisheries and Oceans Canada (2005) – Herring Important Areas
- PNCIMA Atlas (2011)

Eulachon

- Fisheries and Oceans Canada (2005) – Eulachon Important Areas
- PNCIMA Atlas (2011) – Eulachon run

Existing Federal Protected Areas

- Fisheries and Oceans Canada (2007) – Sponge Reef Closures, Rockfish Conservation Areas
- Parks Canada (2010) – National Parks
- PNCIMA Atlas (2011)

Existing Provincial Protected Areas

- PNCIMA Atlas (2011)
- Province of British Columbia (2011) – Provincial Parks, Ecological Reserves and Protected Areas

First Nations Protected Areas

- PNCIMA Atlas (2011)
- Province of British Columbia (2011) – Conservancies

Shellfish Aquaculture

- PNCIMA Atlas (2011) - Aquaculture
- Province of British Columbia – Tantalis, Crown Tenures

TEXT RESOURCES

Human Communities

British Columbia. 2010. Overall Regional Socio-economic Index. BC Stats. Links to data and methodology reports available from BC Stats at:http://www.bcstats.gov.bc.ca/StatisticsBySubject/SocialStatistics/SocioEconomicProfilesIndices/SocioEconomicIndices/LHAReports.aspx

British Columbia. 2011. Census Subdivisions.

British Columbia. 2012. Community Facts. BC Stats.
Links to reports for Regional Districts and communities available from BC Stats at:http://www.bcstats.gov.bc.ca/StatisticsBySubject/SocialStatistics/CommunityFacts.aspx

British Columbia. 2012. 2011 Sub-Provincial Population Estimates. BC Stats.

Ference Weicker & Company. 2009. Social and Economic Assessment and Analysis of First Nation Communities and Territorial Natural Resources for Integrated Marine Use Planning in the Pacific North Coast Integrated Management Area. Report can be accessed from: http://ccira.ca/media/documents/pdf/marine-sector-report-f-w.pdf

Government of Canada. 2009. 2006 Aboriginal Community Data Initiative. Statistics Canada.
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Government of Canada. 2010. First Nation and Inuit Community Well-Being : Describing Historical Trends (1981-2006). Department of Indian Affairs and Northern Development.

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Sheltair Group. 2009. Ecosystem Based Management Human Wellbeing Indicators 2006 Baseline Report – Final. Prepared for Ecosystem Based Management Working Group for the North and Central Coast. Report can be accessed from: http://archive.ilmb.gov.bc.ca/slrp/lrmp/nanaimo/cencoast/ebmwg_docs/hw02_baseline_final_report.pdf

Eelgrass Beds

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British Columbia Marine Conservation Analysis. 2011. Marine Atlas of Pacific Canada: a product of the British Columbia Marine Conservation Analysis (BCMCA), British Columbia Marine Conservation Analysis, 2011.

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Pacific North Coast Integrated Management Area Initiative. 2011. Atlas of the Pacific North Coast Integrated Management Area. Available at www.pncima.org

Seagrass Conservation Working Group. 2004. The BC Coastal Eelgrass Stewardship Project. Accessed at: http://www.stewardshipcentre.bc.ca/static/eelgrass/eelgrassfinalreport12_04.pdf

Seagrass Conservation Working Group. 2005. Communities connecting to place: A strategy for eelgrass restoration in British Columbia. Accessed at: http://www.stewardshipcentre.bc.ca/static/eelgrass/communities_connecting_2.pdf.

Sloan, N.A., and P.M. Bartier. 2000. Living Marine Legacy of Gwaii Haanas I: Marine Plant Baseline to 1999 and Plant-related Management Issues. Technical Reports in Ecosystem Science; no. 27.

Deepwater Corals and Sponges

Ardron, J.A. 2005. Protecting British Columbia's Corals and Sponges from Bottom Trawling. A report by Living Oceans Society (v. 1.0). Box 320, Sointula, BC, V0N 3E0.

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