

The BC Coastal Eelgrass Stewardship Project

2002-2004 Report

Submitted by Nikki Wright, Chair Seagrass Conservation Working Group seachange@shaw.ca December, 2004

Preface

The *BC Coastal Eelgrass Stewardship Project* began in June, 2002 with the support of an Environment Canada EcoAction grant. Matching funds made it possible for eleven coastal community groups, from Port Clements, Haida Gwaii to Boundary Bay to be trained during that first year by Cynthia Durance of Precision Identification. Ms. Durance has designed a mapping and monitoring methodology that provides a standardized set of methods to map, classify and monitor eelgrass habitat on a local level. Nine more community groups joined in the mapping effort in the second year of the project. The purpose of the project is to protect and conserve valuable eelgrass meadows from further destruction along the coast. Mapping information is entered into the Community Mapping Network (http://cmnbc.ca) and used to influence land and water use policies in British Columbia communities. Following is a report describing the rationale and outcomes of the project's first two years.

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The success of the project is due to the hard work and committed dedication of the project coordinators:

Nancy Angermeyer, Ann Archibald, Bill Austin, Deb Cowper, Margaret Cuthbert, Michele Deakin, Kathy Dunster, Dennis Horwood, Carl Humchitt, Chris Marrs, Andrew McNaughton, Sabina Leader Mense, Rod Palm, Jamie Pepper, Kate Pinsonneault, Erika Rolston, Dianne Sanford, Andy Telfer, Edith Tobe, and Scott Toews



Volunteers restoring eelgrass, Tod Inlet

An excerpt on community eelgrass mapping by a project coordinator:

"I've had a chance to talk to many people. In fact, eelgrass has opened many doors....I've had my drywaller offer a free boat and camera time to map some subtidal areas in front of Qualicum – mostly because as a fisherman he is concerned that there is so little eelgrass out there. In five minutes of conversation he understood the importance of the mapping project and wanted to help.

Two multi-million dollar developments are going in and the councils do not seem to know that the eelgrass beds are to be cared for. Coming from a place where posters at the post office are a main form of public communication, this is a whole new exercise in meeingt my neighbour – actually its more like try to find my neighbour and then see if I can talk to them. I've met biologists, teachers, jewelers, and retired professionals. I've also met some nudibranchs, horseclams, and pipeworms that I've never seen before."

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1.0 Introduction

Estuaries containing eelgrass meadows along the coastline of British Columbia provide critical habitat and food for waterfowl, shellfish, fish and invertebrates. These important and richly diverse habitats are most vulnerable to loss and degradation because they are close to human activities. "Almost all, some 80%, of the environmental problems of the oceans start on land.¹

For example, in the Strait of Georgia, more than 540 sq. kilometers of inter-tidal gravel sand and mud habitat are closed for shellfish harvesting because of bacterial contamination due to faulty sewage systems. More than 32% of classified commercial shellfish growing areas in Puget Sound and Juan de Fuca Strait are either restricted or prohibited for harvesting due to water quality issues.²

The pressures to develop the foreshore for shellfish industry, finfish aquaculture, shoreline development and upland development are increasing at an alarming rate. In order to put into place policies that protect estuaries, municipalities, regional districts and local and federal governing agencies need to know the locations of eelgrass beds. For example, maps of the location of eelgrass habitats made by a community stewardship group on Cortes Island were provided to the provincial government for use in the Cortes Island Shellfish Aquaculture Action Plan; maps of eelgrass beds made by staff employed by the Snuneymuxw First Nation in the Nanaimo River Estuary provided information for the Estuary Management Plan.

Eelgrass *Zostera marina*, one of several types of seagrasses provides many ecosystem services, both locally and globally. Eelgrass meadows support a high biodiversity of species. It has been estimated that over 80% of all commercial fish and shellfish species depend on eelgrass habitat for at least part of their lifecycle. Eelgrass beds assist with coastal protection by providing a physical baffle (leaves) and reducing erosion (roots & rhizomes). The biomass produced by eelgrass nourishes virtually all marine habitats. It has been estimated that Puget Sound exports over 1.5 billion kilograms of eelgrass detritus each year to marine food webs.Tides and currents carry eelgrass detritus throughout the ocean; fragments have been found in an abyssal rattail fish at -30,000 feet. Seagrasses are believed to account for 34% of benthic global respiration.

¹ Toepfer, Klaus, United Nations Environmental Programme (UNEP) Executive Director, 2001. ² Levings, C.C. and Thom, R.M. 1994. Habitat changes in the Georgia Basin: Implications for resource management and restoration. Fisheries & Oceans Canada, West Vancouver, B.C. & Battelle Marine Sciences Laboratory, Sequim, Watshington. P. 337.

The United Nations recently estimated a 15% loss in seagrass habitat over the last decade. Recent reports by the United Nations Environmental Protection Department demonstrate the value and urgency of seagrass conservation:

"We are becoming aware of the role that seagrasses plays in the climatic and oceanic carbon cycles and in coastal protection. The true economic value is difficult to measure, but work suggests it is immense. Seagrass beds have been overlooked by conservationists and coastal development planners throughout their range. Biosphere restoration must include seagrass conservation & restoration."³

2.0 Eelgrass Habitats in British Columbia

Since 1986, eelgrass beds in British Columbia have been protected as fish habitats by the Department of Fisheries and Oceans (DFO) under the Canadian Federal Fisheries Act. The Department's long term policy objective is the achievement of an overall net gain of the productive capacity of fish habitats. The Fisheries Act's no net loss principle guides the Department to balance unavoidable habitat losses with habitat replacement on a project-by-project basis.⁴

However, to date, government agency mapping of eelgrass bed locations along the coast of British Columbia is spotty and is not easily accessible to local community stewardship groups. To be more effective in preventing the cumulative loss of sensitive marine habitats such as eelgrass beds near populated coastal areas, it is necessary that these sites be identified and mapped. Conservation groups along the BC coast are mapping and monitoring these habitats so that the Department of Fisheries and Oceans can exercise its legal obligation to protect them.

2.1 Mapping and Monitoring

Seagrasses, including eelgrass, have been used as indicators of water quality in many areas of the world (Sewell et al., 2002).⁵ In some areas of the United States, for example, submerged vegetation monitoring programs (eelgrass and freshwater vascular plants) identified a link between decreased productivity within estuaries and protected bays, and degraded water quality from upland watershed activities (Orth & Moore, 1983).⁶

Eelgrass is dependent on good water quality to increase its depth range; if water quality is becoming degraded in a bay, the eelgrass will tend to grow in

³ Dr. Mark Collins, Director, United Nations Environmental Protection

⁴ Fisheries and Oceans Canada. 1986. Policy for the management of fish habitat. Communications Directorate, Ottawa, Ontario. P. 10-12.

⁵ Sewell, A.T., J.G. Norris, S. Wyllie-Echeverria, and J. Skalski, 2002. Eelgrass Monitoring in Puget Sound: Overview of the Submerged Vegetation Monitoring Project. Washington State Department of Natural Resources.

⁶ Evans, N.T., Short, F.T., Eelgrass Characteristics and Sediment Elevation using the

SET method in the Great Bay Estuary, Abstract, Estuarine Research Federation, 2002.

shallower waters, as it cannot obtain the light needed for photosynthesis in turbid deeper waters. Conversely, if the water quality is improving, the depth range increases. Thus, the plant can serve as an easily accessible indicator of water quality near communities, as it lives in very shallow water depths (0 to minus 10m) in British Columbia.

Eelgrass can help improve water quality as well. Eelgrass (*Zostera marina*) is recognized for its potential to trap particles in the water column and promote sediment deposition in estuarine environments⁷. Thus, shoreline landowners who help protect the eelgrass beds near the shore are actually helping to protect their beachfront homes by decreasing erosion, as well as providing habitats for crabs, fish and shellfish.

A dramatic example of water quality improvement and eelgrass productivity is the increase of eelgrass beds in the Roberts Bank area in the Strait of Georgia. When the Coal Port was expanded in 1982-3 in Roberts Bank, both species of eelgrass (*Zostera marina and Z. japonica*) increased in area. The construction of causeways across a broad intertidal zone directed the turbid Fraser River water offshore, improving the light regime and initiating higher productivity in the eelgrass beds.

Specific reasons to map & monitor eelgrass include⁸:

- 1. to set up measures to protect it.
- 2. to design restoration projects for areas that historically had eelgrass or have physical potential for eelgrass.
- 3. to monitor climate change
- 4. to monitor impacts of human disturbance from a. tenures: finfish, shellfish, log handling/storage, sport lodge, marinas, float houses
 - b .foreshore structures: docks, floats, seawalls, jetties, dykes
 - c. point source pollution: outfalls
 - d. non-point source pollution: runoff, septic
 - e. changes in hydrology: removal of backshore vegetation, stream diversions
 - f. sedimentation from human activities
 - g dredging
- 5. monitor changes from other stresses such as alien species (*Spartina desiflora*) or wildlife (Canada Geese)

⁷ Orth, R.J. & K.A. Moore. 1983. Chesapeake Bay: An unprecedented decline in submerged aquatic vegetation. Science 22:51-52.

⁸ Durance, Cynthia. 2004. Vancouver: Next Steps in Mapping and Monitoring Eelgrass Habitats in British Columbia: A Summary Report of a Meeting held in Vancouver, March 24, 2004, pg. 4.



Museum display on Cortes Island

3.0 The BC Coastal Eelgrass Stewardship Project

The B.C. Coastal Eelgrass Stewardship Project was implemented in 2002 to conserve and protect approximately 1,000 hectares of critical coastal habitat for migratory water birds, salmon, herring and other important fish stocks, shellfish and invertebrates in twenty areas along the coast of British Columbia. This goal has been accomplished through mapping and monitoring eelgrass sites, and through the establishment of a network of conservation stewards. The conservation stewards have developed education and stewardship programs to raise awareness of the high value of this coastal resource, and they have used their maps of eelgrass habitats to create or change local land use policies that affect the nearshore. For example, Parksville and Bowen Island have coastal development plans that may impact eelgrass habitats. Community stewards in those communities are gathering information and using their eelgrass survey maps to ensure these impacts are minimal or compensated for. (See Site map for a listing of the coastal conservation groups participating in this project)

The chronic loss of eelgrass along the B.C. coastline has occurred to a large extent because of a lack of knowledge and understanding about its location and life history. This project is providing the information needed to protect eelgrass by providing accurate mapping for land and water use planning purposes. The project participants are also aiding the enforcement of legislation, and identifying eelgrass sites requiring enhancement and restoration.

3.1 Project Objectives

The goal of the *B.C. Coastal Eelgrass Stewardship Project* is to protect and conserve eelgrass beds near twenty B.C. coastal communities, from the Canadian/U.S. border to North Graham Island in the Queen Charlotte Islands.

The objectives of the project to achieve this goal were to:

- Establish protocols for the collection of near shore marine data by volunteers.
- Establish the area and map the location of known eelgrass beds.

• Conserve approximately 1,000 hectares of high value habitat through community stewardship agreements, best practices, and protection under the no net loss policy of the Federal Fisheries Act.

• Establish a network of near shore stewards in three coastal regions.

• Reduce non-point source contaminates originating from shoreline residences that threaten to reduce eelgrass meadow ecosystems.

 Promote the results of the project and make the project data and information available through the Community Mapping Network web site (http://www.shim.bc.ca).



Seining on the Sunshine Coast

3.2 **Project Activities**

These objectives have been accomplished through the following activities:

Mapping:

- > Provision of funds to map and steward eelgrass habitats.
- > Establishment of a Project Advisory Committee (comprised of representatives from each participating group, Administrator and CWS project officer) that consults participating groups and provides direction and support.
- > Consultation with Fisheries and Oceans scientists and consultants ("Technical Advisors") on mapping and monitoring protocols.

- Provision of training in mapping and monitoring techniques to project participants.
- > Provision of equipment (GPS unit and underwater camera) for mapping eelgrass sites to each participating group that needs it.
- > Assistance with the collection and entry of mapping data into the Community Mapping Network.

Stewardship:

- > Provision of support to develop near shore stewardship programs in each community.
- > Assistance with the development of education programs on eelgrass ecology for presentations to schools and the public.
- > Assistance to groups working with local governments to modify by-laws and Official Community Plans (OCP's) to protect foreshores.
- > Make available eelgrass mapping information to organizations working towards the establishment of marine protected areas.

3.3 Project Outcomes

This project is a success. Over 12,634 hectares of eelgrass have been mapped; 1,000 volunteers have come out; over 2,900 brochures and nearly 800 flyers about this highly valuable plant have been distributed throughout coastal communities; 69 creative displays, 80 events, 29 presentations and 47 news articles on eelgrass ecology and stewardship have occurred. Moreover, one of the most important aspects of this project is the development of awareness and skills of the project participants.

An example is the project coordinator for Boundary Bay in the Lower Mainland. She was new to marine ecology, mapping techniques and ways to approach local politicians. Yet, in two years, she has enlisted 310 volunteers, organized over 25 events, created 34 displays, put out 18 media communications, created 65 partnerships, including local governments and Washington State, made over 15 presentations, and included eelgrass inventories for the Fraser River Estuary Management Plan and the Habitat Atlas of Boundary Bay.

The capacity for these project coordinators has grown immensely over the first two years of the project. Our philosophy is eelgrass is easily conserved if people are restored to a sense of empowerment and wonder of the riches of coastal resources. The most challenging facet of this project is the work it takes to keep money flowing. The project has had its ups and downs with twenty coastal groups feeling the funding crunch of the last few years in the conservation/stewardship sector. Some project coordinators have had to leave; others have replaced them. Learning new skills, such as using GPS tools and data entry takes time and support. Overall the quality and quantity of outcomes has been much more than expected. Over 12,000 hectares of eelgrass have been mapped. The value of eelgrass meadows is being recognized throughout the culture of our coast, from First Nations and other government agencies to drywall carpenters and naturalists to university research departments.

There is a developed support system in place capable of assisting groups with mapping and monitoring, funding to support the actual work is diminishing. The third year will be a challenge. However, the network of committed stewards is well established and capable of expanding into monitoring and restoration of this highly valuable coastal resource.

3.3 Future Projects

The management of the *BC Coastal Eelgrass Stewardship Project* (training, sharing of resources, monitoring and data management) is shifting to a regionalized structure. Coordinators in five coastal areas will be managing the project under the umbrella of the Seagrass Conservation Working Group and the Community Mapping Network. (see p. 11). A management and work schedule for the regional coordination are in the preliminary planning stages.

The five coastal areas are:

- 1. Southern Strait of Georgia, and southern Gulf Islands
- 2. Southwestern Vancouver Island
- 3. Northern Strait of Georgia
- 4. Central coast
- 5. North coast

Plans are underway to continue mapping the coast and to monitor sites that could be used as indicators of environmental near shore health. The *Coast and Marine Environment: 2005 Report* to be published by the Ministry of Water, Land and Air Protection will include information on eelgrass habitats.

Maps of eelgrass beds might be used for the conservation of the Pacific Great Blue Heron (*Ardea herodias fannini*) through a collaboration with the Heron Working Group, a US/Canadian trans-boundary consortium of individuals from university, government and conservation organizations. Eelgrass habitats serve as foraging areas for these threatened birds. Eelgrass sites that support one hundred or more of the Great Blue Herons are of interest to the Heron Working Group. Restoration of eelgrass habitats is of interest to many of the project participants, especially those living near former log storage areas. Research on the feasibility of restoring these sites is of great interest to these groups. A catalogue of potential restoration sites is being compiled and assessed, and a discussion paper will be produced in February 2005 and posted on the Community Mapping Network web site. The paper will describe the describe the values of economic and ecological functions of the habitat and how conservation groups can be appropriately prepared to take on the responsibility of participating in restoring and monitoring estuaries.

Three estuarine sites in the southern Strait of Georgia may be part of a project that will include restoration of riparian, marsh and eelgrass vegetation. If funding is successful, this project will begin in April of 2005. The project will create the protocol for training community groups so that they can be active participants in bringing back our natural riches to the BC coast.

3.4 Outcomes of the BC Coastal Eelgrass Stewardship Project 2002 - 2004

Human Resources Partnerships # of Volunteers # of youth groups involved	148 1,004 22
In-Kind Contributions In-Kind Labour Cash	\$177,372 \$13,753
Materials, Supplies & Equipment In-Kind Equipment	\$85,945
Maps Eelgrass Area Mapped (hectares) Maps posted on CMN Eelgrass Area Monitored (sq.m) Community use of Maps Watershed Management Plans OCP's Shellfish Aquaculture Action Plan Treaty Negotiations (AIP) City Council Planning Meetings Habitat Atlases Marine Conservation Plans Public Education Forums	12,634 hectares 5 5,403.56 sq. m 5 7 10 1 1 1 2 2 1
Outreach Home site visits Events Communications Brochures Flyers Shoreline Action Lists Displays Presentations Signage Tours	69 80 47 2,966 798 77 69 29 15 10

Educational Resources

Games	3
Educational binders	6
Booklet	2
Video	1
Cards/Posters	1
School Program	10
Summer Camp Programs	
Research	

Research Projects	5
Restoration projects	1



4.0 The Seagrass Conservation Working Group

History

The Seagrass Conservation Working Group (SCWG) is a consortium of conservation groups, scientists, consultants, and public agencies concerned with the conservation and protection of seagrass meadows in British Columbia. We convened in October, 2001. Though we meet every other month in locations in the Georgia Basin, there is an open door policy for anyone interested in seagrass conservation worldwide. We have had visitors from Quebec, New Zealand and Puget Sound so far attend our meetings.

Achievements

Since 2001, the SCWG has:

- Created a training manual to assist community groups in mapping and monitoring eelgrass beds,
- Distributed a discussion paper informing others through the Community Mapping Network (<u>www.shim.b.ca</u>) of the importance of eelgrass habitats,
- Mapped over 10,000 hectares of eelgrass beds near 20 coastal communities. Some groups have entered their mapping data into the Community Mapping network.
- Created an inventory of mapping techniques used to map eelgrass communities on a large scale,
- Made an inventory of eelgrass maps in BC, past and present,
- Created opportunities for researchers to present their findings, and
- Created the *T'aanu* eelgrass newsletter for distribution.

If you would like to become involved in the activities of the eelgrass mapping project and / or the Seagrass Conservation Working Group, please contact <u>seachange@shaw.ca</u>

5.0 The Community Mapping Network

The Community Mapping Network (CMN) was created to share a wealth of natural resource information and maps with communities in British Columbia, Canada. The CMN integrates data from many sources and makes it accessible through a user friendly mapping system. There are many uses of the information including community planning, storm water management, emergency response, habitat restoration and enhancement, watershed planning, coastal planning, development referrals, impact assessment, research, education and awareness. You may also learn about community mapping projects in other parts of the world including Japan, Mexico, Nepal and Indonesia using a map-based Project Directory. The main objective of the CMN is to promote planning sustainable communities.

Many sensitive habitats such as urban and smaller rural watercourses, eelgrass beds, riparian areas and wetlands remain unknown, poorly understood, and suffer from impacts of human development. Methods provided through CMN reflect a novel set of tools to explore and promote awareness of these habitats by mapping their location and inventorying their attributes. The awareness and commitment to local watercourses and other sensitive habitats is an important process created through co-operation of local communities, First Nations, municipalities, planners, and managers. Community mapping methods comprise a set of tools and methods that can be used to help conserve fisheries, wildlife and aquatic habitat resources throughout British Columbia.

Selected information and thematic maps are available at a scale of 1:5,000 for the Georgia Basin and Central Okanagan. Province-wide coverage is available for watercourses, fish distribution, coastal resources and other themes.

The Community Mapping Network integrates community and government natural resource information using an interactive geographical information system called Autodesk Mapguide. A series of servers are utilized to share the workload of serving province-wide base maps, high resolution orthophotography and selected resource information. Maps and natural resource information are "web-served" to assist communities and local governments with landuse planning, to promote conservation and protection of sensitive habitats and to raise awareness and respect for ecological values. Many types of information are provided through the CMN such as fish and wildlife distribution, streams and wetlands, eagles and herons, rare and endangered species, and possible restoration sites.

On-line digitizing tools can be used to update and edit existing resource information and to delineate the location of community mapping projects in British Columbia, Canada and around the world.

The Community Mapping Network is made up of a number of community groups,

organizations and individuals that collect and map natural resource information. A steering committee is responsible for managing CMN that includes representatives from the BC Conservation Foundation, Fisheries and Oceans Canada, Canadian Wildlife Service, Ministry of Agriculture, Food and Fisheries, Fraser Valley Regional District, Greater Vancouver Regional District, local governments, and community groups. The Steering committee:

Rob Knight Ministry of Water T and and Air Protection

- Rob Knight, Ministry of Water, Land and Air Protection
- Brad Mason, Fisheries and Oceans Canada, Habitat and Enhancement Branch
- Kathleen Moore, Environment Canada, Canadian Wildlife Service
- Sretchen Harlow, Environment Canada, Canadian Wildlife Service
- Melinda Coleman, BC Conservation Foundation
- Trina Nair, Greater Vancouver Regional District
- Marina Stejpovic, Langley Environmental Partners
- Shannon Sigurdson, Fraser Valley Regional District
- Ted VanderGulik, Ministry of Agriculture, Food and Fisheries
- Don Chamberlain, Project Watershed
- Mike Berry, Inner Coast Natural Resource Centre
- Stacy Meech, Ministry of Agriculture, Food and Fisheries
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