



*Cowichan Estuary - Eelgrass Restoration Project*  
**Final Report**

**Cowichan Community Land Trust Society**  
May 2007

## Table of Contents

<b>EXECUTIVE SUMMARY .....</b>	<b>3</b>
<b>INTRODUCTION .....</b>	<b>4</b>
<b>METHODS.....</b>	<b>4</b>
<b>Information Gathering .....</b>	<b>5</b>
<i>Surveys .....</i>	<i>5</i>
<i>Interviews .....</i>	<i>5</i>
<b>Site selection .....</b>	<b>5</b>
<b>Outreach and Training.....</b>	<b>5</b>
<b>Test transplants.....</b>	<b>6</b>
<b>Transplants.....</b>	<b>6</b>
<b>Monitoring.....</b>	<b>7</b>
<b>RESULTS.....</b>	<b>7</b>
<b>Transplanting – Year 1.....</b>	<b>7</b>
<i>Outreach.....</i>	<i>7</i>
<i>Training .....</i>	<i>9</i>
<i>Site Selection .....</i>	<i>10</i>
<i>Test Transplants .....</i>	<i>10</i>
<i>Monitoring.....</i>	<i>11</i>
<b>Transplanting – Year 2.....</b>	<b>11</b>
<i>Outreach.....</i>	<i>11</i>
<i>Transplanting .....</i>	<i>13</i>
<i>Quality Assurance/Quality Control.....</i>	<i>14</i>
<i>Monitoring and Evaluation .....</i>	<i>15</i>
<i>Table 1: Project Deliverables and Achieved Results .....</i>	<i>16</i>
<b>Project Schedule.....</b>	<b>18</b>
<b>DISCUSSION.....</b>	<b>19</b>
<b>CONCLUSION .....</b>	<b>21</b>
<b>Recommendations .....</b>	<b>21</b>
<b>EXPENDITURES .....</b>	<b>22</b>
<b>APPENDIX I .....</b>	<b>24</b>
<b>Minutes of the Eelgrass Training Meeting .....</b>	<b>24</b>
<b>APPENDIX II.....</b>	<b>27</b>
<b>Eelgrass Interviews .....</b>	<b>27</b>
<b>APPENDIX III .....</b>	<b>33</b>
<b>Media Releases (Please see Interim Report – April 2006).....</b>	<b>33</b>
<b>APPENDIX IV .....</b>	<b>33</b>
<b>Newsletter (Please see Interim Report – April 2006).....</b>	<b>33</b>

<b>APPENDIX V</b> .....	<b>33</b>
<b>Wavelength Article (Please see Interim Report – April 2006)</b> .....	<b>33</b>
<b>APPENDIX VI</b> .....	<b>33</b>
<b>Brochures (Please see Interim Report – April 2006)</b> .....	<b>33</b>
<b>APPENDIX VII</b> .....	<b>33</b>
<b>Potential Transplant Sites – Assessment Index</b> .....	<b>33</b>
<b>APPENDIX VIII</b> .....	<b>43</b>
<b>Power Point Presentation (Please see Interim Report – April 2006)</b> .....	<b>43</b>
<b>APPENDIX IX</b> .....	<b>43</b>
<b>Planning Meeting with Volunteers</b> .....	<b>43</b>
<b>APPENDIX X</b> .....	<b>45</b>
<b>Call for volunteers: April transplant</b> .....	<b>45</b>
<b>APPENDIX XI</b> .....	<b>46</b>
<b>Sign up sheet: April and July transplant</b> .....	<b>46</b>
<b>APPENDIX XII</b> .....	<b>48</b>
<b>Media Info Sheet</b> .....	<b>48</b>
<b>APPENDIX XIII</b> .....	<b>49</b>
<b>Community Comments</b> .....	<b>49</b>
<b>APPENDIX XIV</b> .....	<b>52</b>
<b>Call for volunteers – July transplant</b> .....	<b>52</b>
<b>APPENDIX XV</b> .....	<b>53</b>
<b>Interpretive Signage – See enclosed CD</b> .....	<b>53</b>
<b>APPENDIX XVI</b> .....	<b>53</b>
<b>Eelgrass Restoration Methods; Australian Style – See enclosed CD</b> .....	<b>53</b>
<b>APPENDIX XVII</b> .....	<b>53</b>
<b>Streamtalk Article - See enclosed CD</b> .....	<b>53</b>
<b>APPENDIX XVIII</b> .....	<b>53</b>
<b>Activity-based Educational Presentation – See enclosed CD</b> .....	<b>53</b>
<b>APPENDIX XIX</b> .....	<b>53</b>
<b>Monitoring report – See enclosed CD</b> .....	<b>53</b>
<b>APPENDIX XX</b> .....	<b>53</b>
<b>Transplanting Data – See enclosed CD</b> .....	<b>53</b>
<b>APPENDIX XXI</b> .....	<b>53</b>
<b>Monitoring package – See enclosed CD</b> .....	<b>53</b>

**APPENDIX XXII..... 53**  
**HCTF Award Media Releases – See enclosed CD .....53**

## **EXECUTIVE SUMMARY**

The Eelgrass Restoration Project is a two-year project of the Cowichan Community Land Trust Society designed to engage the local community in restoring eelgrass in the Cowichan estuary.

The Cowichan Community Land Trust Society (CCLT) is a non-profit society that is committed to the conservation and protection of natural areas and biological diversity in the Cowichan Valley Regional District (CVRD). In partnership with Seachange Marine Conservation Society, the CCLT has worked to restore eelgrass habitat using available local knowledge and previous research to identify potential restoration sites and transplanting eelgrass in those sites deemed suitable.

Interviews with long-term residents and First Nations' elders, conducted during this project, identified the historical extent of eelgrass beds. This local knowledge added to existing survey data from 1982, 1996/97 and 2004 of existing eelgrass habitat. Surveys of the intertidal areas with local residents also helped to identify potential sites for eelgrass restoration where eelgrass used to thrive.

Potential transplant sites were assessed and approved by Cynthia Durance, a professional biologist specializing in eelgrass restoration. Test transplants were carried out under guidance of Ms. Durance of Precision Identification at three sites during the summer of 2005. These test transplants gave a good indication of the limiting factors and helped to determine the location for larger transplant plots for the subsequent year.

The transplants were monitored in March 2006, and the survival rate was encouraging. Two areas outside of the current log leases, where the test transplants were successful, were selected for transplanting events in April and July 2006. Donor stock for the transplant was collected from the south side of the estuary near the boat launch.

Both the April transplant and the July transplant had a great deal of support from the community who managed to harvest and transplant over 6000 eelgrass shoots over the two transplanting event weekends. The April transplant covered 270 m<sup>2</sup>, and an additional 32 m<sup>2</sup> slightly to the North was also planted in April. The second transplant in July covered 272m<sup>2</sup>. Several small patches of naturally re-establishing eelgrass were noted near these areas. The presence of these naturally occurring eelgrass patches combined with the success of the nearby test transplant indicated that this area was an ideal candidate for restoration.

Volunteers have been educated about eelgrass ecology to raise awareness of the loss of this essential habitat and were trained in proven eelgrass transplant methodology. Volunteer participation has increased the local capacity for community stewardship in the Cowichan Bay area and throughout the CVRD. Local organizations, schools, business, local government and agencies contributed time, energy and expertise throughout the project.

Data gathered through surveys, including locations of potential transplanting sites and transplants were entered on the Community Mapping Network. Further work with the staff at the Community Mapping Network is needed to increase our ability to make better use of the Eelgrass Mapping Atlas.

Monitoring of the eelgrass transplants will continue over the next two years with the help of community volunteers who are extremely interested in the outcomes of the eelgrass transplanting activities and are increasingly committed to the health of eelgrass habitat in the Cowichan estuary.

## INTRODUCTION

Estuaries are the gateway for pacific salmon but only make up approximately 10% of the BC coastline. It is estimated that 18% of coastal habitat in the Strait of Georgia, which includes the Cowichan estuary, has been destroyed.<sup>1</sup>

Over the past 100 years European settlement has impacted the Cowichan estuary through logging activity, eroding riverbanks, abraded mudflats and bark deposits on the intertidal substrate. Swales from log movement in the mudflats were still significant in the 1980s. Shading and hardening of the shoreline from development since the 1940s have affected plant and fish life. Water quality was also heavily affected by toxic leachate from wood waste piles and wood preservatives used during the 1970s and 80s at the mill located in the estuary.

Changes in booming activities, wood preservative use and water quality improvements in the past 20-30 years create opportunities to restore the intertidal habitat. Log booming activities that affect eelgrass habitat through smothering, compaction, scouring and shading have been reduced significantly. Wood preservative products and their usage has changed over the years, reducing their impact on water quality, and point-source pollution from the under-functioning Cowichan Bay village sewage treatment system has been bypassed, further improving water quality in the estuary.

Along with these positive developments, housing development pressures in and around Cowichan Bay village is increasing public awareness of environmental issues and offers a good opportunity to encourage stewardship activities that protect and enhance eelgrass habitat. Community interest in the ecology of the Cowichan estuary has grown from an initial workshop, held in September of 2003, to identify restoration priorities for the Cowichan estuary. The community clearly identified eelgrass restoration as a priority.<sup>2</sup>

Eelgrass mapping undertaken by the CCLT in 2004, in partnership with Seachange Marine Conservation Society, trained community volunteers in survey methods to contribute raw data to the Community Mapping Network. This provided information on the extent of current eelgrass beds as well as some indications of its vigor by measuring bed density, shoot dimensions and number of reproductive shoots. Completed surveys were used in conjunction with previous surveys conducted by Dr. Bill Austin of the Khoyotan Marine Ecology Center to delineate the extent of current eelgrass habitat. These surveys showed fairly stable eelgrass meadows are present through the southern shore and a distinct lack of eelgrass habitat in the mid to northern shore of the Cowichan estuary.

The Eelgrass Restoration Project is designed to re-introduce eelgrass (*Zostera marina*) habitat that is essential for pacific salmon and other marine life to areas of the Cowichan estuary. Eelgrass restoration activities will increase the extent of eelgrass habitat and reclaim salmon production opportunities to help achieve the Pacific Salmon Treaty's goal to "provide for optimum production"(Art. III, Principles). This will also serve to address the objectives of the Pacific Salmon Commission (PSC) of increasing estuarine habitat essential to the survival of southern Chinook salmon (*Oncorhynchus tshawytscha*) stock that originate from the Cowichan watershed as indicated in the June 2003 PSC Joint Technical Committee Report.

## METHODS

This eelgrass restoration project is designed to meet the following objectives:

1. Determine potential sites for eelgrass restoration within the Cowichan estuary.
2. Create site specific restoration plans including monitoring and assessment protocols necessary to encourage the net gain of fish populations within targeted sites.
3. Train community volunteers in transplanting, monitoring and assessment methods.

---

<sup>1</sup> British Columbia/Washington Marine Science Panel. 1984. op. cit. p. 63.

<sup>2</sup> Cowichan Community Land Trust. (2004). Ecological Strategies for the Cowichan Estuary. [www.island.net/~cclt/](http://www.island.net/~cclt/)

4. Transplant eelgrass at targeted sites with local stewardship group in place to carry out consistent monitoring.
5. Support local stewards to carry out consistent monitoring and assessment to ensure successful transplantation.

Activities undertaken to meet these five main objectives included Information Gathering, Site Selection, Outreach and Training, Test Transplants, Transplants and Monitoring.

## **Information Gathering**

### *Surveys*

Surveys of the estuary and the extent of eelgrass habitat completed in 2004 by CCLT were compiled and added to survey's done by Dr. Bill Austin from 1999 – 2001. Additional surveys of the estuary in areas lacking eelgrass were undertaken to determine the suitability of each site based on type of substrate, elevation, salinity, current and the sediment load effects of the Cowichan River inflow in various locations

### *Interviews*

Interviews and consultation with Cowichan Tribes elders and local long-term residents of Cowichan Bay were undertaken to determine the extent of eelgrass beds in the recent past. Introduction to the Cowichan Tribes elders was facilitated by members of the Environmental Department of Cowichan Tribes and by attendance at the regular elders' luncheon held in the Cowichan Tribes Hall. At the luncheon, project staff introduced themselves and the project and requested the elders' advice. The response was positive and many contacts were made as word of the project and our request spread amongst the Cowichan community. Each Cowichan Tribes member contacted was asked if they could recommend another elder that might also be familiar with the estuary and the eelgrass. In this way a network of contacts was developed while respecting the importance of this traditional resource to the Cowichan People.

Long-term local resident contacts were selected initially from the CCLT membership and stewards, shoreline residents, and from contacts made during the Cowichan Estuary workshop and other stewardship projects. Local organizations were also contacted for information. These contacts were informed about the project and asked to share their knowledge of the estuary or recommend someone who would have long-term knowledge of the estuary. Interviews were set up with these residents and each interviewee was asked to recollect the location of eelgrass and, if possible, mark the location on a map of the estuary supplied by project staff. Some residents offered to show project staff the estuary by boat where interviews were conducted while surveying suitable restoration sites.

Community meetings were also held to communicate the goals and objectives of this project as well as gather information from local residents.

## **Site selection**

Surveys and information gathered via interviews were used to select six potential restoration sites and reports were created using an Eelgrass Transplant Index. Potential sites were entered on the Community Mapping Network. Cynthia Durance, QA/QC expertise during this project, checked the potential sites and selected four sites for the transplanting activities. Transplant donor sites were identified and were approved by Ms. Durance based on the health and density of the eelgrass beds and the proximity and similar elevation to the proposed transplant sites. Fisheries and Oceans Canada were consulted prior to the transplanting activities.

## **Outreach and Training**

Communication about the project through the local media and agency publications, contact with local organizations, attendance at community events with a visual display board, and slide shows, power point presentations, and communication through list-serves increased the involvement of community members, volunteers and local schools. Volunteers for the harvesting and transplanting activities were recruited through these community outreach activities.

Community workshops for volunteers on eelgrass ecology, site-specific restoration techniques and monitoring and assessment protocols for eelgrass were held prior to the transplanting activities. Hands-on training workshops and community meetings on the benefits of eelgrass were held prior to transplanting activities and ongoing training for the land based crew and divers was undertaken during the transplanting events.

Volunteers for harvesting and transplanting were organized through an iterative process. Initial efforts for the first test transplanting events informed the subsequent transplanting activities for the larger transplants. Prior to the second transplanting feedback from volunteers was sought to improve the process and address some areas that posed a challenge in coordinating the activities.

Interpretive signage developed for installation at the boat launch location will serve as permanent recognition of the importance of healthy eelgrass habitat and the community's contribution to the health of eelgrass habitat.

### **Test transplants**

Test transplants in the first year of the project were planted and their progress monitored to determine what limiting factors were present in potential restoration sites. Four plots of 100 shoots each were transplanted and monitored. Monitoring results were then used to determine the appropriate locations of larger transplants. Test transplants were also used to engage the community in the activity early on in the project and was a learning process for the community, volunteers and project staff.

Volunteer divers harvested eelgrass shoots individually by gently loosening the surrounding substrate and being careful to gather a large amount of rhizome with the shoot. Divers were trained to ensure that they selected appropriate shoots while causing minimum disturbance to the eelgrass bed and its density. Divers collected eelgrass shoots in 'goody' bags and transferred them to volunteers in boats where they were placed in tubs of seawater for transport to shore.

Tubs of harvested shoots were transferred to shore where Cynthia Durance checked over the each shoot to ensure that the divers were gathering suitable shoots. Tubs of eelgrass were then carried to the land-based volunteers trained in preparing eelgrass for transplanting. Each shoot was weighted with a 5/8" non-galvanized washer by threading each shoot into the center of the washer and fastening each shoot to the washer with a paper coated twist-tie. Volunteers were supervised to ensure that each shoot was positioned tightly against the inner edge of the washer and tied at the sheath above the rhizome.

Prepared eelgrass shoots were again checked for correct tying and their suitability for transplanting by Cynthia Durance. Numbers of prepared eelgrass shoots per tub were recorded before the tubs were transferred to the boats and divers for transplanting. Once cleared, tubs and divers were transported by boat to the transplanting sites where baskets of prepared shoots were submerged for them. Each test site received 100 transplants, planted in groups of ten.

### **Transplants**

Test transplants were monitored during the fall and again in spring to determine growth rates of each plot. This information was used to determine the appropriate sites for the larger transplants of 5000 shoots.

The process and methods used for the larger transplants remained the same as for the test transplants with small changes to the scheduling of volunteers and the assignment of tasks. Some changes were also made to



accommodate the feedback received from volunteers to make their work easier at the land-based tying site and for the divers and boat handlers out in the estuary.

Cynthia Durance was again on hand to provide QA/QC during each transplanting activity supervising the harvesting divers, the selection of transplants, the preparation of transplants and the planting team of divers. At each stage both experienced and new volunteers were trained and each step was explained by Cynthia and our project partners, Nikki and Sarah of SeaChange Marine Conservation Society.

Transplants were planted along a ten metre transect in groups of ten. The total number of transplanted shoots at each site were recorded as well as the locations of both transplant sites. These sites were entered on the Community Mapping Network.

## **Monitoring**

Test transplants and larger transplanted sites were monitored by boat, on foot and with divers depending on the tide conditions. Test transplants were monitored on presence or absence, shoot density, vigor and the diameter of the eelgrass bed as well as a count of remaining eelgrass shoots. In areas where eelgrass was absent monitoring teams searched for remaining washers. These results were recorded.

Voluntary monitoring groups were contacted to determine their capacity for monitoring on a regular basis and tools were developed to assist these monitoring groups.

Funding sought for ongoing support for these volunteer stewards and for Interpretive signage to educate the public user's of the boat launch area on eelgrass habitat and to recognize the community support for the project.

## **RESULTS**

### **Transplanting – Year 1**

#### *Outreach*

The first objective at the beginning of this project was to hold community meetings to communicate the goals of this project. Initial contact was made with local organizations such as the Cowichan Fish and Game Club, the Cowichan Valley Naturalists' Society, the Cowichan Estuary Preservation Society the Cowichan Bay Maritime Museum, the Duncan Dive Club, and the Cowichan Bay Kayak groups to reach knowledgeable community members and to encourage their membership and attendance at the planned meetings.

Project staff also received assistance and advice from agency representatives who are involved in the Cowichan estuary including the Nature Trust, the Ministry of Water, Land and Air, and Fisheries and Oceans Canada as well as the Environment Department of Cowichan Tribes. In this way we maintained a good working relationship with agency staff and our partners in this project.

Three community meetings have been held and were well attended by members of the community as well as members of local organizations. At the first meeting participants were encouraged to share their knowledge of the historical extent of eelgrass on large maps of the estuary as well as receiving a talk on the ecology of eelgrass meadows by Nikki Wright of Seachange Marine Conservation Society (SMCS). This initial meeting provided an opportunity to discover what knowledge of eelgrass ecology currently exists among community members and what information would need to be included in project publications. Notes of this meeting were taken to direct future communication plans. (Appendix I)

As Cowichan Bay is a relatively small area many participants at this initial meeting referred project staff to friends or neighbours and knowledgeable community members as people to contact for interviews and tours of the estuary. Throughout the project many contacts have been passed along from other community members, creating a network of knowledgeable individuals who are interested in the project and are willing to be interviewed.

Interviews were carried out through these referrals and some community members that were known to the CCLT through previous projects in the Cowichan Bay area. A transcript of these interviews is included for your reference. (Appendix II)

Project staff encouraged interviewees to recollect the extent of eelgrass and indicate the area on a small map, which was kept as a spatial reference of their interview. As well, these smaller maps and a larger orthophoto of the Cowichan estuary were used at all public appearances or community events that we attended to gather additional information on the Cowichan estuary. This allowed project staff to gather input from a broad range of people as well as generate interest in our current activities and marine life. Many people were uncertain what eelgrass was and many knew the plant but were not familiar with it being referred to as 'eelgrass'. Most were intrigued with the project's goal of restoring this habitat once they understood its role in the salmon life cycle and its role as habitat for other marine life.

Media releases were published in both local newspapers at the start of the project and again prior to and during the eelgrass test transplant. (Appendix III) The CCLT newsletter was also distributed with an update on the project to 200 members and stewards as well as 50 additional copies to agency staff, local government, community organizations and businesses and the general public. (Appendix IV) An article on Cowichan Bay and the eelgrass restoration work was written for 'Wavelength' a popular kayaking magazine in partnership with the Seagrass Conservation Working Group and was published in the February/March 2006 issue. (Appendix V) This article highlights the partnership developing with the kayaking tour operators who are willing to assist in monitoring the eelgrass transplants once planted.

Project staff have created two brochures in-house to communicate planned restoration activities. These have been distributed at locations throughout the Cowichan Bay community and also within the city of Duncan which forms the urban hub of the Cowichan Valley region. As well, a brochure created by the Seagrass Conservation Working Group has been distributed together with the more targeted Cowichan estuary brochure to compliment and add to the information on our restoration project. (Appendix VI)

Another public outreach tool that was used effectively by project staff has been underwater photography and video footage taken of eelgrass by local divers. Connecting with the local dive clubs for volunteer help during the transplants brought an additional benefit in the shared skills of these divers and our summer student who is a qualified diver. Dive Club members were more than willing to assist staff in improving their underwater photography skills with the loan of equipment and have donated their own photography as raffle items for our annual fundraiser centered around the Cowichan watershed. One diver donated a beautiful film of eelgrass set to music that we have used at public events to convey the beauty of this underwater habitat.

The CCLT display board that is used at every event or public presentation we attend has been updated regularly to demonstrate the progress of our project and to attract questions and comments from the public. A sandwich board has been a good addition to our regular display as it is placed in an area with maximum traffic while project staff is working in the field. This allows for greater visibility for our organization and the work we are undertaking. Permanent signage in the Cowichan estuary highlighting eelgrass ecology and the restoration project is in development with partial funding in place and in-kind installation from the Cowichan Valley Regional District Parks department.

Public presentations on the eelgrass project include regular presentations at the Cowichan River Restoration Roundtable where many of our partners and agency supporters contribute. Power-point presentation and video footage of eelgrass was displayed at the annual Cowichan River Splash event that was covered by local

television media. This presentation was also used to update members of the Seagrass Conservation Working Group (SCWG) on our progress at the SCWG Conference in February 2006.

Posters have been created using underwater photographs of marine life found in eelgrass beds and are used on our display board at weekly Farmer's Market in downtown Duncan in the summer months and throughout the year at various community events. The second poster is used at the Dive Shop in Cowichan Bay and includes a place for divers to list the marine life they have observed in eelgrass meadows while diving. This interactive aspect is designed to increase awareness of the importance of eelgrass meadows to many species (including divers).

Consultation with Cowichan Tribes elders for historical locations of eelgrass beds has been ongoing and based on individual contact with elders, contact with the Environment Department at Cowichan Tribes and attendance at an elders luncheon where project staff were able to introduce the project and seek input and referrals. Most Cowichan Tribes elders remember eelgrass growing throughout the estuary and one interviewee remembers when he was a young child, seeing an octopus in the eelgrass beds.

Consultation with Dr. Bill Austin of Khoyatan Marine Laboratory proved extremely useful as Dr. Austin has many years of experience in the Cowichan estuary and has undertaken eelgrass surveys over the years. This data helped to verify our eelgrass surveys and to identify sites appropriate for eelgrass restoration.

Local knowledge of eelgrass beds collected through interviews were ground-truthed using GPS during tours of the estuary lead by long term shoreline residents. An inventory of potential restoration sites was created through this effort. (Appendix VII) Potential sites entered on the Community Mapping Network with assistance from Brad Mason of Fisheries and Oceans Canada who is a member of the Advisory Committee with the Community Mapping Network. A separate digital layer in the Eelgrass Bed Mapping Atlas is proposed to display potential restoration sites as well as transplant sites to be used in future restoration and monitoring programs as well as providing community stewards with an interactive tool to track eelgrass restoration progress.

### ***Training***

Three training sessions were held prior to the test eelgrass transplants carried out in June 2005. The first training session was designed to share information on the ecology of eelgrass, its appearance and the marine life found in eelgrass beds as well as the project focus and methods used successfully to restore eelgrass. This meeting also asked for responses from the participants as to their own knowledge of eelgrass and the Cowichan estuary and the changes they have noted over time. In this way project staff were able to tailor the session around participants knowledge base and gain further insight into local factors affecting eelgrass habitat.

The second and third training sessions were held the week before the scheduled test transplant dates and the day before the transplant. As we needed SCUBA divers as well as land-based volunteers for the test transplants, a presentation was delivered at the regular meeting of the Duncan Divers Club where many divers offered their time and expertise to help our project. Training sessions for both the divers and land-based volunteers were more focused on relaying the methodology for transplanting and monitoring eelgrass restoration sites. The first intensive training meeting concluded with an afternoon in an eelgrass bed where an aquarium was set up on shore to collect the eelgrass shoots and marine life found at this location. This aquarium then became a miniature example to participants of the sediment, structure and interactions of this habitat.

By undertaking this eelgrass restoration project the CCLT has been able to connect with other stewardship training resources to broaden the project outreach, by successfully starting a Streamkeeper program focused on the Cowichan Bay area. In order to increase community awareness of the linkage between the health of the estuary and the rivers and waterways that form the estuary three Streamkeeper courses on streams that feed the Cowichan estuary will be held during 2005-2007.

The CCLT has hosted one Streamkeeper course in October 2005 with cooperation from the landholders along Treffery Creek in Cowichan Bay. Seventeen participants were trained during the two-day course based on the program developed by the Pacific Streamkeepers Federation. The response was so great that the course was over-enrolled above the preferred 15 participants and a waiting list was developed for the next course offering in May. Some of the participants were members of the Young Naturalist club, aged between 11 and 19, who have since adopted Treffery Creek to monitor water quality and quantity on a monthly basis.

### ***Site Selection***

Before undertaking the transplanting process project staff contacted Cynthia Durance of Precision Identification for professional assistance to ensure quality control as well as SeaChange Marine Conservation Society who is a project partner. Cynthia Durance and Nikki Wright of SeaChange were instrumental in training volunteers as well as verifying the suitability of the selected harvest and transplant sites. To ensure that a large transplant could succeed in the selected sites, a test transplant of four locations within two identified sites was planned and carried out during the first season of the project. This strategy and the sites selected were communicated to Rob Russell, Habitat Biologist with the Department of Fisheries and Oceans so he could grant the necessary permission to proceed with the restoration work.

### ***Test Transplants***

The test transplants were planted in July to maximize the growing season and attract the greatest community involvement. Community members, organizations and businesses were engaged in this process by project staff who spent time in the weeks prior to the transplant contacting and recruiting volunteers necessary to do the land-based work as well as divers to undertake the harvesting and planting work.

Two weekends were set aside for the site assessment and transplant work. On July 23<sup>rd</sup> project staff arranged a site assessment workshop led by Cynthia Durance. This workshop included a morning of classroom work and instruction by Cynthia on harvesting, transplanting and monitoring protocol for the upcoming transplant. Volunteers who planned to help during the transplant were encouraged to come to this training session. A total of 17 volunteers who attended this training session also attended the transplanting session on the following weekend and were much more effective volunteers because of this prior training.

On July 31<sup>st</sup> approximately 22 land-based volunteers and 10 SCUBA volunteer divers assisted project staff with the test transplants. Awnings set up at the Hecate Park boat launch location in Cowichan Bay provided a workspace for the volunteers and a set-up point for the divers. Two inflatable boats were used to transfer the eelgrass shoots from the harvest sites to the land-based volunteers. Eelgrass shoots were harvested as per Cynthia's instruction and collected in the divers 'goody bags' for transfer to buckets on the boats. These shoots were brought to the boat launch platform to be checked by Cynthia to for adequate rhizome length for transplanting. Harvested eelgrass shoots were then brought to the land-based volunteers to be individually tied with a 5/8" steel washer to weigh it and prepare it for transplanting. Prepared shoots were taken to divers at the transplant sites via large tubs on the inflatable boats. Photographs of these activities are included in the Powerpoint presentation on the enclosed CD. (Appendix VIII)

Four test sites of 100 shoots each were planted with eelgrass transplants. Many volunteers commented on how enjoyable the process was as the workstation was full of volunteers coming and going in shifts and it became a very social event. Diver volunteers found the day very long as their work continued on into the late afternoon but they did note that as soon as the plot was nearly complete they could see small fish moving in. GPS points were taken of the transplanted sites and monitoring dates were set up for volunteers to re-visit the test sites to see how the transplants had taken.

## ***Monitoring***

Transplant monitoring was completed in September where it was found that two sites were still doing well and two sites had been foraged by mute swans. Having prepared for a monitoring day with volunteers, project staff had marked the test plots earlier in the day with rudimentary buoys. On our approach to the 3<sup>rd</sup> and 4<sup>th</sup> site a group of twenty-seven mute swans were seen precisely within our pre-marked boundary. At the site we found shoots that had been obviously nibbled and some washers with only the rhizome still attached. Once at this site it was determined that the test plot was not located deep enough and a more advantageous site was identified closer to the drop-off to provide protection from swan forage. This deeper site location was communicated to Cynthia and Nikki and the strategy of planting in deeper water was approved as a potential solution to swan forage of future transplants.

Monitoring of test sites was resumed in March when low tides once again correspond with daylight hours. On March 4<sup>th</sup> Cynthia Durance and Nikki Wright assisted in a thorough count of test sites to determine the survival rate of transplanted shoots. Sites 1 and 2 were easily located and showed a significant survival and growth rate with 172 shoots counted in site 1 and 183 counted in site 2. While these test sites are in close proximity to one another which may result in some overlap in the totals, these transplants have not only survived but have reproduced additional shoots at a growth rate of between 70%-80%. The growth of additional shoots in these sites during the fall and winter months, which is not the growth season for eelgrass, indicates that these sites can support a subsequent eelgrass transplant.

No surviving eelgrass shoots of the 200 planted were found at sites 3 and 4 near the north shore. While the monitoring team looked for remnant washers to indicate that the site had been identified correctly as the test transplant site, none were found. At that time it was decided that another search for the test transplants during the next phase of transplanting would be undertaken to confirm its absence.

Test transplant sites 3 and 4 were shallow and in an area that was somewhat peripheral to the areas initially identified by local First Nations peoples as well as long-term residents of shoreline properties along the north shore. Deeper sites identified in this area that have more uniform substrate may be better candidates for transplanting to provide better growth opportunities and to discourage mute swan forage in the deeper locations. Mute swans have been seen to be a limiting factor in this area, at sites 3 and 4, where it does not seem to be a factor in the other two test sites, sites 1 and 2.

For sites 1 and 2, the vigorous growth of additional shoots in these sites during the fall and winter months, which is not the growth season for eelgrass, indicates that these two sites can support eelgrass transplants. This area is chosen for the larger transplants.

## **Transplanting – Year 2**

### ***Outreach***

Plans for two large transplants were underway after the March monitoring and included gathering responses from volunteers who had been involved in the 2005 test transplanting work. A planning meeting was held on April 19<sup>th</sup> to review the upcoming transplanting work schedule to find out what the volunteer's experience had been and how to improve on the experience and make the transplanting days go more smoothly.

Planning for the transplant nicely coincided with National Volunteer week. This gave project staff a good opportunity to show appreciation and contact volunteers to include their names on a list published in a special edition of the local print media. As well, they were invited to the upcoming planning meeting for the upcoming transplanting work.

During the meeting volunteers made suggestions to improve the work schedule and areas that presented a challenge or needed greater co-ordination. (Appendix IX) A lot of response came from the divers' experiences as their work was more isolated from project staff and the constantly changing conditions in the estuary affected them much more than it affected the land crew. Strategies to reduce the amount of sediment stirred up during the transplant and increase the diver's visibility were suggested. It also became clear that communication between the boat handlers and the divers is needed before the work commences so that the divers and boat handlers can understand the process and when they were needed.

Many volunteers also found the tubs used to transport the eelgrass from the dock to the tying location were too awkward and heavy. It was decided that our stronger volunteers could be assigned this task exclusively to avoid any injuries or strains from lifting these tubs.

This planning meeting was a very important exercise for the project, and also for the volunteers so that they could see the value of their input to the successful implementation of the project. The feedback gathered from the volunteers made it much easier to plan and carry out a much larger transplant with a target of 2500 eelgrass shoots planted over one weekend.

Having previously trained volunteers willing to share their experience helped a great deal with the planning and implementation of the large transplant. Recruiting volunteers for this subsequent transplanting weekend was quite successful via the email contacts we gathered from the previous year's activities and sign-up sheets. Since the initial test transplants proved to be an enjoyable experience for the volunteers and the successful growth rate piqued people's interest, volunteers from last year were a ready and willing workforce. This also helped to encourage and train new volunteers and get more community members involved. An email announcing the upcoming transplant sent to over 100 volunteers, groups, including the local media, and was forwarded to many list-serves bringing a wide network of community members to the project. (Appendix X)

Volunteers were asked to choose a shift from the schedule attached to the email and RSVP promptly so that project staff could ensure that there were enough people throughout the day and that each could be accommodated with an appropriate task. (Appendix XI) While this schedule was quickly filled by volunteers there were many volunteers who just showed up at the work site to help so that we had a much greater response than expected.

After the success of the first large transplanting event, project staff made careful note of the areas that needed better co-ordination and took many suggestions from our land based crew and divers that so that we could improve upon the procedure and flow of work for the subsequent transplant. This learning curve was experienced by all involved where our expertise and consultants as well as supporting organizations and community volunteers could see the development and improvement in how efficiently subsequent planting was carried out.

Co-ordination with the local schools also had a much greater effect on the level of outreach and contact with new volunteers. The Shawnigan Lake School was very involved in the planning process as well as the Environment Club at Frances Kelsey Secondary School. Project staff arranged for both schools to borrow an educational video from Nikki Wright of SeaChange Conservation Society on their eelgrass transplant in Tod Inlet in 2000 to show students at their respective meetings the week before the transplant to get everyone enthused about the project. Cowichan High School, Queen Margaret's School and Sunrise Waldorf School had a few students who volunteered for the transplant but were unable to co-ordinate similar meetings for their students.

Local government including municipal and regional districts' staff and elected committee members were included in the call for volunteers and came out to help during the transplant. Much of this increased outreach arose from co-ordination with CVRD Parks and the Cowichan Bay Area Director over the use of Hecate Park and boat launch for the project work site and promotional displays.

## ***Transplanting***

Because of the 70-80% success rate of test sites 1 and 2, it was decided that the larger transplants should focus on these areas. Plans for a small transplant at the more northerly test sites 3 & 4 could be undertaken at a deeper location if time allowed.

Transplanting occurred over April 28 to April 30 with volunteers attending for the diving and land based work on the Saturday and Sunday. Eelgrass shoots were harvested on the Friday, in preparation for the volunteers, by the WCB team with our project partners, SeaChange Conservation Society and our expert, Cindy Durance of Precision Identification. Over 60 volunteers joined in, to help transplant 3128 eelgrass shoots over this April weekend. Divers included a team from Cowichan Tribes who assisted both days in transplanting and appreciated the opportunity to help restore the health of their traditional resources.

Many volunteers were new to the project and many familiar faces came out to help again with the work. Project staff ensured that the divers and land-based crews were well looked after and Cindy Durance and Nikki Wright helped to instruct them on the methodology and techniques employed in this restoration process. Volunteers who had helped at the previous year's transplant were assigned the task of overseeing each tying tub where the eelgrass was prepared for transplant with a 5/8" non-galvanized washer. This assistance was very important as the project staff were overseeing the work to ensure quality control and could not necessarily be at all tubs at all times.

In kind support was gratefully received from many local businesses including a boat from the local charter company, coffee from the local café, and promotion and free fills from the local dive shop as well as support from the kayak shop and the local Area Director (see list of community support and linkages below).

Project staff contacted the local media and requested some coverage of the transplanting event. A fact sheet was provided for their use in developing the story. (Appendix XII) On the first day of the transplant, Shaw Cable arrived to film a small segment for 'the Daily' program and the two local newspapers also arrived to capture a photo of the divers and land crew. Unfortunately, this was also the worst weather day of all the transplants which is perhaps why the media focused on the divers in the water. Updates on the eelgrass planning, transplanting notices and a photo album of eelgrass and marine life found in eelgrass beds were posted on our web-site at [www.island.net/~cclt/](http://www.island.net/~cclt/) so that interested volunteers could learn more about the project and its progress.

After this first large transplanting activity, we had quite a bit of responses from volunteers and community members. All the comments were positive and some included very thoughtful suggestions for improving the process. (Appendix XIII)

The July 14th, 15th and 16th transplant followed the same organized process and saw approximately 60 volunteers come out to help on Saturday and Sunday with many new faces participating. This transplant involved fewer students because of the summer break but many more volunteers from the community responded to the call for volunteers and came out to fill their place. (Appendix XIV) Our dive team changed as well as the availability for divers from the Dive Club during the summer was more limited. We still managed to elicit seven dive volunteers and were able to secure the use of a boat and operator experienced with divers with the help of the Cowichan Bay Coast Guard Auxiliary. The local boom-towing operator was invited to join the transplanting activities and volunteered to help if the transplanted areas needed marking. Just over 2700 shoots were harvested and transplanted.

During the July transplant Cynthia Durance asked the land crew to put aside all reproductive shoots. These reproductive shoots are the seeding heads of the eelgrass and there is some interest in attempting to 'seed' a bed with these seeding shoots. Rob Russell of Fisheries and Oceans Canada who has guided this project suggested suspending these seeding shoots in net bags over areas of suitable substrate during the growing season to see if they will spread to the substrate and germinate. Future monitoring will determine if this strategy is successful.

The larger transplants in April and July covered 270 m<sup>2</sup> and 272 m<sup>2</sup> respectively as well as an additional 32 m<sup>2</sup> that was planted slightly to the North in April.

An elder was on hand at both events to witness the transplanting. Project staff visited with this elder as he recounted his memory of the eelgrass growing all over the estuary when he was young and told stories of fishing and gathering with his father in the estuary. He also emphasized that he hoped the eelgrass would come back from our transplanting work since it was an important part of the natural system.

An eelgrass Interpretive sign has been created for the Hecate Park boat launch location where the land-based tying crew worked as this area has high pedestrians and boaters using this area. (Appendix XV) Funding proposals have been successful and approval from the Pacific Salmon Commission to re-allocate unused equipment rental funds towards the sign has been granted. This will be a permanent recognition of the community's efforts and serve as a valuable educational tool. A community event is planned around the sign unveiling later this summer once the CVRD has had an opportunity to complete the re-design and landscaping work at the Hecate Park location. The CVRD have offered the installation as an in-kind donation to the project and will be working the new signage into their new design.

Project staff has reported on the eelgrass project at the Seagrass Conservation Working Group meeting where they received information on Australian eelgrass restoration that uses a massive two-section vehicle that rolls up the eelgrass (like sod) and for replanting. Apparently there is a poor success rate for transplants and this method costs \$20K/sq meter of transplants. (Appendix XVI)

An article on the eelgrass restoration work in the Cowichan estuary written for the spring edition of 'Streamtalk' published by Fisheries and Oceans Canada has been published and distributed. (Appendix XVII) As well, Shaw Cable coverage of the transplanting activities and monitoring has been created from activities in 2005, 2006 and 2007 and was aired in April. A link to this Shaw Cable footage is available and will be posted on the CCLT website in the near future.

A power-point presentation with additional educational activities linked to the presentation was created for the Young Naturalists' Streamkeepers who have been monitoring one of the creeks flowing into the estuary. (Appendix XVIII) The presentation material led the participants through the steps leading up to the restoration project and involved the participants in an activity along each step of the process. This included looking at their stream monitoring work and their creek's proximity to the estuary as well as understanding the importance of local knowledge to this project. The participants also mapped eelgrass habitat, learned about and identified the species that rely on eelgrass habitat and worked together to create an 'eelgrass bed' with green ribbon tied to a grid to replicate a 'quadrat' along a transect. They then had an opportunity to 'monitor' their eelgrass bed using a modified data sheet. We received many positive comments and plans are underway to continue outreach with this activity-based eelgrass presentation.

### ***Quality Assurance/Quality Control***

Partners in this project that are responsible for supplying expertise and Q/A and Q/C are Cynthia Durance of Precision Identification and Nikki Wright of SeaChange Conservation Society. This partnership has worked very well in producing results that meet and exceed proposed objectives.

Nikki Wright led two information and training sessions and one hands-on session for our volunteers prior to the transplanting activities and ensured that the land-based crew were supervised in their tying activities. Cynthia Durance also held a training session on eelgrass ecology and ensured that the volunteers were trained prior to the transplanting activities and trained the land-based crew and supervised the divers on the transplanting days.



Harvesting sites were approved by Cynthia Durance based on the health and the density of shoots in the donor eelgrass bed. Transplanting sites were also chosen by Cynthia Durance after consultation with project staff to determine the locations surveyed that showed potential for eelgrass restoration. The test transplant sites were chosen based on local accounts of eelgrass habitat and also for the proximity to existing beds. Sites for the larger transplants were chosen based on the success of the test transplants.

Each shoot harvested was checked to ensure the harvesting methods were appropriate and the divers were gathering shoots that would be suitable for transplanting. The preparation of each transplant shoot was supervised and followed Cynthia's instructions for tying and frequent demonstrations were given to new volunteers or ones starting their volunteer shift by Nikki Wright and project staff. Each prepared shoot was then re-checked by Cynthia Durance prior to being taken out to the divers transplanting the shoots.

There was a high level of communication and co-operation with our project partners and a complete understanding of project objectives throughout project development and implementation. All arrangements, schedules and timing of the project has been easily agreed upon and careful attention is given to the safety of workers and volunteers with thorough training provided prior to work being undertaken.

The quality of work by our project partners and expertise has been exceptional with a great deal of time given freely to help co-ordinate, support and ensure that the project succeeds within the allotted time and funding.

It has been a pleasure to work with, and learn from these professionals during this project and I believe that this close working relationship as well as our participation in the Seagrass Conservation Working Group and the Cowichan River Stewardship Roundtable is a large factor in the project's achievements.

### ***Monitoring and Evaluation***

Monitoring reports compiled over the course of the project showed an initial success rate for two of the four test plots of between 70% to 80% growth rate. Larger transplants have not shown these success rates despite their close proximity to the successful test plots. Heavy sedimentation was visible at the early spring monitoring and more recent monitoring has shown reduced numbers of eelgrass transplants in a patchy distribution. Samples of eelgrass taken from these newly transplanted areas show vigorous rhizomatous growth and multiple shoots. (Appendix XIX)

This gives hope for the upcoming growing season as the shoots' current state is based on over-wintering without the benefit of establishing during a complete growing season. Heavy traffic from booming activities is also a factor in the larger transplant results. Contact and encouragement must continue with the booming operators to improve the conditions for eelgrass transplanting activities and to establish a good working relationship and increase eelgrass awareness.

Locations of the transplant plots were entered into the Community Mapping Network at <http://www.shim.bc.ca/atlas/es/eelgrass/main.htm>. (Appendix XX) Project staff is continuing to work with the Community Mapping Network staff to add more layers of data to the existing maps and we hope to include monitoring information as attributes that are easily viewed at each location. This will create a wonderful interactive tool for the volunteer monitors and will offer a more current layer of information for decision-makers.

Project staff has completed an easily used reference for monitors that is part of a monitoring package to use in the field by our kayaking volunteer monitors and the Dragon Divas dragon boat club. As well the recording sheets have been simplified so that volunteers may choose the level of monitoring and the monitoring kit can be adapted for each group's needs and abilities. For example we have adapted a monitoring sheet developed by Ramona DeGraff, of the Seagrass Conservation Working Group, so that kayakers can readily participate in monitoring. (Appendix XXI)

Ongoing monitoring will be supported over the next two years through our most recent project; the Stewardship Support Project. This project is designed to support stewardship groups that the CCLT has helped create through our ongoing environmental outreach and education.

Habitat Conservation Trust Fund have awarded us with a Stewardship Silver Award (created to mark HCTF’s 25<sup>th</sup> Anniversary) for the quality of the proposal, reporting and level of community partnerships created through this project. (Appendix XXII)

**Table1: Project Deliverables and Achieved Results**

<i>Project Deliverables</i>	<i>Achieved Results</i>
<b>Objective #1 - Determine potential sites for eelgrass restoration within the Cowichan estuary.</b>	
<ul style="list-style-type: none"> <li>▪ Consult with Cowichan Tribes elders to determine historical extent of eelgrass beds.</li> <li>▪ Consult with local community members to help identify potential restoration areas based on current usage.</li> <li>▪ Hold community meetings designed to communicate the goals and objectives of this project.</li> <li>▪ Compile inventory of potential restoration sites with GPS/GIS.</li> <li>▪ Determine limiting factors such as salinity, sediment type, current velocity and light availability.</li> <li>▪ Produce reports for each site including web based maps of sites.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Consultation with Cowichan Tribes elders ongoing. Most elders remember eelgrass everywhere in the estuary. Additional meetings in development to request advice of elders on restoration plans and monitoring systems.</li> <li>▪ 3 interviews with Cowichan Tribes members.</li> <li>▪ 23 interviews with long-term local residents including mapping of historical extent of eelgrass.</li> <li>▪ 5 community events attended and 1 workshop to communicate the goals of the project and raise public awareness of eelgrass ecology and restoration plans.</li> <li>▪ 3 extensive sites identified by GPS survey of estuary for potential transplant sites.</li> <li>▪ Limiting factors at each site being determined through 4 small test plots.</li> <li>▪ Reports for each test site complete – web based maps in progress.</li> <li>▪ Attended meeting at boat launch with CVRD, MOE and DFO to answer questions re: eelgrass and restoration work.</li> <li>▪ Further contact with Cowichan Tribes to discuss harvesting practices and link to monitoring eelgrass.</li> <li>▪ Power Point presentation of eelgrass transplant at Cowichan River Restoration Roundtable</li> <li>▪ Meeting held with volunteers involved in the test transplants to determine areas for improvement in process and planning</li> <li>▪ Attended South Vancouver Island Community Partners Day put on by DFO – presented Power Point on the eelgrass project.</li> <li>▪ Additional site information added to potential transplant site log based on further surveys of the estuary substrate.</li> <li>▪ Sediment load and effect on eelgrass transplant sites observations.</li> <li>▪ Attended Low Tide Day with display board on May 27th and handed out eelgrass and CCLT brochures to all participants.</li> </ul>

	<ul style="list-style-type: none"> <li>▪ Contact and with local booming contractor to develop marking system for transplant areas.</li> <li>▪ Attended SGCW meeting to report on progress and get comments from group.</li> <li>▪ Presentation to members of the Cowichan River Stewardship Roundtable on project to date.</li> </ul>
<p><b>Objective #2 - Create site specific restoration plans including monitoring and assessment protocols necessary to encourage the net gain of fish populations within targeted sites.</b></p>	
<ul style="list-style-type: none"> <li>▪ Create preliminary restoration plans in consultation with appropriate agencies, community organizations and professional expertise.</li> <li>▪ Identify suitable sources of eelgrass shoots for transplanting (donor populations) for each site.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Restoration plans in consultation with First Nations, community groups, local community members, local government agencies, and professional expertise.</li> <li>▪ 2 suitable harvest sites identified for harvest transplants.</li> <li>▪ 1 harvest site used in test transplanting produced healthy, thriving transplants.</li> </ul>
<p><b>Objective #3 - Train community volunteers in transplanting, monitoring and assessment methods.</b></p>	
<ul style="list-style-type: none"> <li>▪ Host training workshops by Seachange Marine Conservation Society on site specific restoration techniques for eelgrass re-vegetation.</li> <li>▪ Organize training workshops for volunteers on monitoring and assessment protocols for eelgrass.</li> </ul>	<ul style="list-style-type: none"> <li>▪ 4 training workshops held in conjunction with SeaChange Marine Conservation Society and Cynthia Durance on eelgrass ecology, transplanting and monitoring methodology.</li> <li>▪ Additional training provided for volunteers during transplanting.</li> <li>▪ monitoring package produced.</li> </ul>
<p><b>Objective #4 - Transplant eelgrass at targeted sites with local stewardship group in place to carry out consistent monitoring.</b></p>	
<ul style="list-style-type: none"> <li>▪ Retain professional assistance for restoration work to ensure quality control.</li> <li>▪ Organize volunteers to harvest and transplant shoots.</li> <li>▪ Maintain detailed reports on restoration work.</li> <li>▪ Enter restoration sites into the Community Mapping Network.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Professional assistance obtained from Cynthia Durance of Precision Identification, Nikki Wright of SeaChange Marine Conservation Society and Rob Russell, Habitat Biologist with Fisheries and Oceans Canada.</li> <li>▪ 4 test sites planted with 100 eelgrass shoots per site.</li> <li>▪ Volunteer divers and land volunteers trained and organized for harvest and transplant</li> <li>▪ Complete records maintained on restoration and community outreach work.</li> <li>▪ Working with Brad Mason of the Community Mapping Network to display restoration sites on distinct layer of map with attributes.</li> <li>▪ Monitoring test sites completed and showing 70-80% increase in 2 of the 4 plots - 172 shoots counted in site 1 and 183 counted in site 2.</li> <li>▪ Held successful transplanting weekend April 28th to 30th. 63 volunteers participated on Saturday and Sunday planting 3128 shoots over the two days (our target was 2500).</li> <li>▪ Cowichan Tribes divers helped both days with the harvesting and transplanting, and local merchants donated boats, coffee and SCUBA air.</li> </ul>

	<ul style="list-style-type: none"> <li>▪ Student volunteers from Shawnigan Lake School, Frances Kelsey, Cowichan High School, Queen Margaret’s School, and Sunrise Waldorf School as well as many returning volunteers from last year.</li> <li>▪ Transplant July 14th, 15th and 16th with 57 volunteers Saturday and Sunday. 2700 shoots harvested and transplanted.</li> <li>▪ Approx. 600 square metres of new eelgrass habitat created.</li> </ul>
<p><b>Objective #5 - Support local stewards to carry out consistent monitoring and assessment to ensure successful transplantation.</b></p>	
<ul style="list-style-type: none"> <li>▪ Hold community meetings designed to exemplify the benefits to end-users.</li> <li>▪ Monitor and assess sites utilizing web based mapping of habitat change pre and post restoration.</li> <li>▪ Produce monitoring and assessment reports.</li> <li>▪ Provide organizational support to voluntary stewards for ongoing consistent monitoring.</li> <li>▪ Create catalogue of future restoration sites.</li> </ul>	<ul style="list-style-type: none"> <li>▪ In addition to the 4 training workshops held attendance at 9 community events including Low Tide Day, 4 Market Days, the Summer Festival and presentations to local groups.</li> <li>▪ 5 monitoring assessments of test transplant sites completed and GPS points taken for verification before mapping.</li> <li>▪ Funds raised from Pacific Salmon Foundation and Cowichan Bay Electoral Area for Interpretive eelgrass signage at boat launch location.</li> <li>▪ Monitoring program developed.</li> <li>▪ Sites identified for future restoration</li> <li>▪ Monitoring completed with Cindy and Nikki</li> <li>▪ Shaw Cable coverage in a longer segment which we can also link to our website.</li> <li>▪ Stewardship Support project successfully funded for continuity for these monitoring efforts.</li> <li>▪ Report from Cindy on Australian eelgrass restoration that rolls up the eelgrass (like sod) and replants. Poor success rates for transplants - costs \$20K/sq meter.</li> <li>▪ Article on eelgrass project in DFO ‘Streamtalk’ publication</li> </ul>

**Project Schedule**

The project schedule changed somewhat from the schedule proposed due to the nature of the project and the seasonality of the transplanting work. While eelgrass can be transplanted at any time during the year, our heavy reliance on community volunteer participation meant that the majority of the transplanting work was done during the spring, summer and early fall.

Changes to the project schedule included the decision to undertake test transplants during the first year of the project. Having gathered information from the community on the extent of eelgrass habitat and surveyed the intertidal area with some long-term residents it was decided that the best way to understand the limiting factors would be to monitor small transplant plots. In this way unknown or undetermined factors could be identified without jeopardizing large numbers of transplants. This would also serve as a training exercise, motivation and encouragement for the community as successes of the test transplants could be easily communicated and volunteers would become more involved in the planning and problem solving aspect of the project and, therefore, more committed to the outcomes.

**April '05 – Oct '05**

- Hold community meetings to communicate the goals and objectives of this project.
- Consult Cowichan Tribes elders for historical location of eelgrass beds and ground-truth.
- Consult with Dr. Bill Austin, Khoyatan Marine Laboratory.
- Consult community members for local knowledge and ground-truth.
- Compile inventory of potential restoration sites with GPS/GIS.
- Determine limiting factors such as salinity, sediment type, current velocity and light availability for each site.
- Identify appropriate donor beds.
- Create and distribute brochures to communicate planned restoration sites and activities to the community.
- Organize training workshops on site specific restoration techniques for eelgrass re-vegetation.
- Organize training workshops for volunteers on monitoring and assessment protocols for eelgrass.
- Retain professional assistance for restoration work to ensure quality control.
- Organize volunteers to harvest and transplant shoots. (*Eelgrass can be transplanted at any time of the year, however, exposure from low tides during summer months may exacerbate the stress of the transplanting process.*)
- Maintain detailed reports on restoration work.

**Dec '06 – Sept '06**

- Enter restoration sites into the Community Mapping Network.
- Monitor and assess sites utilizing web based mapping of habitat change pre and post restoration.
- Organize training workshops on site specific restoration techniques for eelgrass re-vegetation.
- Retain professional assistance for restoration work to ensure quality control.
- Organize volunteers to harvest and transplant shoots.
- Maintain detailed reports on restoration work.

**Oct '06 – March '07**

- Produce monitoring and assessment reports.
- Hold community meetings to communicate successes of project and need for continued stewardship.
- Provide organizational support to voluntary stewards for ongoing consistent monitoring.
- Produce final report of this two year project.
- Create catalogue of future restoration sites.

**DISCUSSION**

Restoring eelgrass habitat to areas of the Cowichan estuary that have historically supported expansive eelgrass meadows increases essential habitat for juvenile salmon, shellfish and other marine life.

Test sites have enabled project staff to assess potential restoration sites and choose an area that will support the large eelgrass transplant volumes planted during the spring and summer of 2006. Over 6000 eelgrass shoots have been transplanted and comprehensive monitoring counts with our project partners and expertise will give a good account of the amount of eelgrass habitat restored. At present approximately 620 m<sup>2</sup> new eelgrass habitat has been created in sites that experienced 70-80% growth during the same period in 2005/2006. It is hoped that this will create a large enough eelgrass meadow to provide a 'critical mass' for continued expansion.

This project has used a combination of quantitative and qualitative data to identify potential eelgrass restoration sites and to carry out these transplants using proven transplanting methodology. By developing mapping strategies to convey this information in an accessible format community members involved in the work of the transplant can continue to be involved stewards through monitoring or oversight using the interactive Community Mapping Network tools.

This project is also building capacity through the transfer of skills and knowledge to volunteers undertaking the physical work but also includes the broader community. Community meetings optimize the sharing of knowledge between project staff, consultants, volunteers, end users of the resource and interested community

members. Every effort has been made by project staff to encourage an iterative process with community members sharing ideas and suggestions for improvement.

A positive effect of this project is a closer relationship with the locally based log boom operators who were invited to participate in the transplanting events. Communication with these individuals is essential as eelgrass is affected by these activities and awareness and interest at the level of the booming operators will help to increase the care taken of eelgrass beds close to active traffic areas.

Future activities will include ongoing monitoring and assessment of eelgrass transplants to determine the survival rate. Volunteer community groups who become involved with the eelgrass restoration project provide a core group of informed citizens able to discern future threats to the ecology of the Cowichan estuary.

Public reaction to the project objectives or activities has been very positive with a lot of community members discovering what eelgrass is from our information booths at community events and farmer's market. Setting up near the boat launch to do the actual work of the transplant and having signs set up during the events and introducing permanent interpretive signage allows a lot of people using the boat launch to become aware of the project and eelgrass habitat.

Many of our volunteers at the beginning of the project were already familiar with the Cowichan estuary and the role eelgrass plays in marine ecosystem health. Now project staff has found that more often our volunteers are learning about this habitat through work and involvement with the project.

We have been approached as well to give opinion on CVRD plans to increase the capacity of the boat launch as this will have an impact the eelgrass beds near the boat launch. This has given us the opportunity to share what we have learned and contribute to the decision making process along with the Ministry of Environment representatives and Fisheries and Oceans Canada. Throughout this process, the CCLT has maintained excellent relations with the community, agencies and the CVRD. As a matter of policy the CCLT does not express opinions on matters of government regulation or planning and, therefore contributes only the knowledge gained through this project.

The CCLT has the best response from those who have come out to help during our transplanting activities. Every report reiterates not only the importance they place on the objectives of the project, but also the pleasure they feel from being able to help in this work. (Appendix XX)

The many organizations, agencies and businesses providing Community Support includes the following:

Cowichan Valley Naturalists' Society (CVNS)  
Young Naturalists' Streamkeeper's  
Duncan Divers  
Canadian Coast Guard Auxiliary, Cowichan Bay  
Cowichan Bay Maritime Centre  
Queen Margaret School Streamkeepers  
Koksilah School Streamkeepers  
Sunrise Waldorf School  
Island Oak High School  
Environmental Club, Frances Kelsey High School  
Environmental Club, Shawnigan Lake School  
Seagrass Conservation Working Group  
Volunteer Cowichan  
Cowichan Bay Improvement Association  
Cowichan Estuary Preservation Society  
Freshwater Fisheries Society  
Excalibur Charter

Cowichan Bay Kayak and Paddlesports  
WeGo Kayaking  
Pacific Water Sports, Cowichan Bay  
Mellowside Café  
Tom Rutherford, Community Advisor, DFO  
Rob Russell, Habitat Biologist, DFO  
Cowichan Tribes  
Cowichan River Restoration Roundtable  
Pete Law, Ecosystem Biologist, MoE  
Public Conservation Assistance Fund  
Area D (Cowichan Bay) Parks and Recreation Commission  
Cowichan Valley Regional District

## **CONCLUSION**

### **Recommendations**

The success of this project was in large part due to the approach taken during the proposal writing stage of the project. During this preliminary stage the project had a great deal of local support from the community, agencies and the work of other non-profit societies such as the Cowichan Estuary Preservation Society, Cowichan Fish and Game Association and the Marine Ecology Station headed by Dr. Bill Austin. The work done prior to the start of the project included a workshop and mapping project that established strong partnerships and set priorities that came from community input at the initial Cowichan Estuary workshop held in 2003.

Partnerships with SeaChange Marine Conservation Society and participation in the Seagrass Conservation Working Group as well as the Cowichan River Stewardship Roundtable created a strong support network for project staff and established a forum in which to discuss project progress, challenges and adaptive solutions.

One of the most significant changes to the original work plan was the decision to attempt test transplants in the first year of the project based on the local knowledge gained from interviews and survey data. These test transplants during the first year proved to be a good indicator for the potential success of the larger transplants and helped to engage the community with interest in the outcomes of the test transplants.

Careful training and supervision of volunteers with the help of our consultants created a knowledgeable group of volunteers who formed a core group that assisted in each transplanting activity. It was very important to these community volunteers that the consultants kept them well informed of the progress and the reasons for each activity undertaken at each stage of the transplant.

Close communication and partnerships created during the project with community members and those working in the estuary is an area that can continue to be a focus for the monitoring period over the next two years. With the successful funding of the two-year Stewardship Support Project we will be able to offer support and encouragement to these volunteer stewards and monitors to ensure that the connections created during this project are maintained and nurtured.

Ongoing education through monitoring activities and the creation of an Interpretive sign that will be installed at the boat launch area in Hecate Park, Cowichan Bay will continue to increase awareness of eelgrass habitat and interest within the community in preserving and restoring this valuable habitat.

**EXPENDITURES**

<b>Financial Statement of Expenditures</b>		
Eelgrass Restoration Project		
April 1, 2005 to March 31, 2007		
	Total	PSC Funds
<b>REVENUES</b>		
Grants	\$ 101,328	\$ 53,174
Donations	1,422	
	102,750	53,174
<b>EXPENSES</b>		
<b>Human Resources</b>		
Project Coordinator	44,151	26,500
Project Assistant	7,680	0
MERC's	5,701	3,180
Consultants	21,588	8,100
<b>Site Costs</b>		
Travel	1,490	800
Site Supplies	1,155	300
Equipment Rental	3,446	1,600
Repairs	0	0
Technical	143	700
Other	817	1,700
<b>Overhead</b>		
Office Space	5,781	3,216
Insurance	2,660	1,000
Office Supplies	725	680
Telephone	2,119	1,000
Photo & Printing	372	800
Internet	1,001	598
Accountant	1,602	1,000
Administration	2,500	2,000
	102,931	53,174
<b>EXCESS OF EXPENSES OVER REVENUE</b>	(181)	0

Variiances in the budget allowed for each item from the PSC funding and the total expenditures include the approved reallocation of \$1,500 Equipment Rental funds to help cover the cost of the Interpretive signage produced for the Hecate Park boat launch in Cowichan Bay.

Underspending in the 'Technical' and 'Other' categories resulted as the Technical costs were generally represented in the Consulting fees. Costs under 'Other' included volunteer appreciation such as providing refreshments and lunches during the training and transplanting events. Donations from local businesses of coffee and refreshments reduced our costs for these items and the excess funds in 'Other' were used to offset other categories.



A spreadsheet cashflow is included for your review and includes detailed monthly expenditures and total funding for each category.

This Financial Statement has been reviewed and approved by Tracy Fleming, President of the CCLT in the absence of Charles Poole, our Treasurer.

I have reviewed the Financial Statement and the Cashflow and find them to be accurate and complete.

---

Tracy Fleming, President

**APPENDIX I****Minutes of the Eelgrass Training Meeting****Cowichan Bay - June 26, 2005**

Led by Nikki Wright of Seachange Marine Conservation Society

**Present:** Nikki Wright, Jennifer Paton, Bob Vey, Bob Nation, Helen Nation, Joann Leitch, Barbara Dowd, Tom McGaw, Roger Hunter, Will McKay, Heather Barnfield, Ann Archibald.

**Introductions:**

Attendees were asked to introduce themselves and what their interest was in the project. Most attendees were from the Cowichan Valley Naturalists or had an interest in the project due to long term residence in area. Points raised included:

- Sewage influence on eelgrass now reduced with the new system
- Some scouring of eelgrass beds noticed
- In late 1970s lots of eelgrass but now fish no longer hang out
- Used to see ling cod, grilse, trout, skate, salmon, dogfish and ratfish
- Ratfish gone for 25 years and hardly any rock cod worth catching for years
- First heard of eelgrass because of interest in Brant geese and know eelgrass as habitat and ‘fuel’ stops
- Came to learn more about it as completely new to eelgrass
- Interested in Brant geese and have lived 4 years on this coast having lived on the Arabian gulf
- Wondering if seagrass in Arabian gulf related to local eelgrass

**Eelgrass - Questions to address:**

1. **What does it look like?**
2. **Where does it grow?**
3. **What relationship to other species?**
4. **What value?**
5. **Reasons for decline?**
6. **What limits its growth?**
7. **How to regenerate?**
8. **Why would it grow now?**
9. **Who is accountable?**

**1. What does it look like?**

Characteristics of eelgrass:

- Has roots
- Evolved vascular plant to marine environment
- Matting properties of roots
- Sugars stored in rhizome
- Dense beds increase flowering
- Sparser edges more rhizome spread
- Relationship between shellfish and eelgrass
- Seaweed/kelp growth in rocky substrate – eelgrass in sandy/muddy areas
- Seaweed/kelp shade out eelgrass
- Occurs in all temperate zones

**2. Where does it grow?**

- Grows in intertidal zone; upper, mid and sub zones have different species.
- Needs firm sandy/muddy substrate, light, gentle current, periods of fresh water, temperatures of 10° C to 20° C, water temperatures of –6° C to 40.5° C and pH of between 7.3 and 9.0.

**3. What relationship to other species?**

- Turnover 7 times a year therefore feeds even deep ocean species from such a large biomass.
- Eelgrass provides a 3 dimensional environment from a two dimensional environment.
- Epiphytes growing on eelgrass acts as sunscreen, fish food.
- In September, March and April when eelgrass needs maximum light and the sun is not as hot it exudes chemical to prevent epiphyte growth.
- Japanese eelgrass is thinner than *Z. marina* and is seen as threat in some places but found to be non-competitive in Boundary Bay.

#### 4. What value?

- Carbon absorption
- Produces oxygen
- Nursery and feeding grounds for 80% of commercial fish
- Brant geese and Grey whales feeding grounds (ghost shrimp)
- Herring lay eggs on eelgrass beds – lack of herring in Cowichan estuary due to lack of eelgrass?
- Research on ling cod and pipefish and whether have specific genetic makeup to eelgrass bed
- Squid eggs
- Crabs

#### 5. Reasons for decline?

- Dredging,
- Log booming
- Turbidity
- Light penetration
- Fetch (wave action)

#### 6. What limits its growth?

- Water depth and periods of fresh or salty water
- Suspended particles/clay can compromise light availability
- Water quality affects bed densities and spread
  - Stormwater runoff,
  - dredging,
  - agricultural activities,
  - pesticide/herbicide runoff,
  - erosion that increases suspended solids

Example of Todd Inlet where water quality is a large issue from boater's sewage and grey water.

#### 7. How to regenerate?

- Suggested that natural spread of eelgrass during calm years
- Need early spring plantings to establish root system before winter storms occur.

#### 8. Why would it grow now?

- Log booming activities ceased for 20 years
- Previously present, healthy and thriving from long-term resident recollections

#### 9. Who is accountable?

- Have potential for increasing effectiveness of on-site compensation funds
- Restoration areas prioritized.
- Off-site as well to compensate for productivity loss

Viewed some slides of eelgrass and animals that live in eelgrass.

Hands-on identification of eelgrass samples.

**Break for lunch (delicious!)**

Viewed video of eelgrass transplanting.

Went out to Kil-pah-las beach at low tide to look at eelgrass beds there and test for *Z. marina* or *Z. japonica*.

**Meeting ended 2:30.**

## APPENDIX II

### Eelgrass Interviews

May 19, 2005

From Conversation with **Ray Demarchi**  
Biologist, 934 Khneipson Rd, Ph: 746-4067

Keen interest in the Estuary Project. Lives on the North Site of the Cowichan Bay. Suggested I talk with a few others including; Charlie and Trudy Stroulger. Charlie remembers eelgrass on the North side of the Bay although Ray has not seen any the whole time he has lived there (since '97). Use to dive the area annually for crabs. He also suggested I speak with Roger Hunter who is working on the plan for the estuary, and he has done a little mapping of the eelgrass in the bay. Other VIPs in the project should be

Bob and Ann Holden, the president of CEPS. Ray says they think that the eelgrass disappeared all at once. Several theories; pollution, the log booms, or a process of siltation and gravel movement from the river. Ariel photos from 47, 97, 03 suggest channel movement, which implies possible evidence of siltation.

Ray stresses the importance of vegetation (any kind) as all the Chum are coming down the river right now, and have no where to hide from predators. Ray spoke about the rising river bed since the dyking and the possibility of flushing out Somenos marsh with a hydraulic dam. He believes that the Bay could have possibly “filled in”. He suggests a Baseline Study of the Bay before any plans of planting vegetation to ensure that the Bay can support vegetation. Ray and Carol, have the only boat launch and access on the North side and are willing to let use it if needed

May 20, 2005

Phoned **Charlie Stroulger**, long term resident of the North side of the Cowichan Bay. He was not feeling great today and would like to talk at some later date. Did say that he figured the eelgrass all disappeared in about two years, but couldn't remember when. Perhaps next week we can go have a visit. He lives at 916 Khenipsen Rd. Ph: 746 4884.

Phoned **Bob Holden** (748-8944) Bob described two things that decreased eelgrass beds in the Bay. In the area west of the pilings the tug boats and booms dragged and devastated the bottom. This led to a slow decline in eelgrass beds in the area. Another factor concerning the north side of the bay was the dyking that took place. This caused the North fork of the river mouth to move large quantities of gravel into the bay, changing the bottom composition and smothering the eelgrass beds. He does not figure that wave action on the North side is responsible for the lack of eelgrass beds but rather the change in substrate and topography.

Bob is not terribly well these days and would like to be kept up to date although he may not be able to attend meetings. No email address.

He also informed me that he has been passing on the estuary files to John Scull. He has the tail end of them still to be passed on.

May 20, 2005

Spoke briefly with **David Thompson** (743 5617) as I was informed by the CEPS office that he has done some transplants of eelgrass in the Cowichan Bay. Unfortunately this is not true but he will call back to discuss his involvement with the Cowichan Bay and Eelgrass.

May 25, 2005

Went to go speak with **Charlie Stroulger** at his home. 916 Khenipsen Rd on the north side of Cowichan Bay. He is an elderly man that has lived on the property since '41. He remembers lush eelgrass beds, all the way from his property, across the bay to the wharf. Presently there is no eelgrass on the north side of the bay. He noticed that it disappeared in 1985, and feels that the log booms are responsible. Says that it might have disappeared in a matter of two weeks due to smothering of the beds by the log booms. Also claimed that the swans were responsible for eating up the roots of the remaining eelgrass, but commented that the swans do not come to the bay any longer. Charlie emphasized the difference in quality of eelgrass

when he first noticed it declining. It was lush and thick to the point of having to drag the boats out through it, and turned sparse and brown.

Charlie gave us the name of the past owner of the Mast Head in Cowichan Bay. This mans name is Joe Feumento and he lives on Maple Bay Rd. He used to rent boats in the area, and would have a good idea of the condition of the Bay on the past. Joe also worked with BC forest products and was responsible for bringing in the log booms, sometime in the 50's.

May 25, 2005

From the **Elders Lunch** at the Cowichan Tribes Complex. We sat with Mary Ellen Jo, the MC of the lunch, Abner Thorne, and another fellow named Ross. Ann made a little announcement about what we are doing and what eelgrass is. There were more questions about eelgrass than memories of where it grew. Abner was curious about whether or not there was eelgrass around Green Point. Something to check out by kayak.

After the lunch we went to the environmental advisor office at the Cowichan Tribes complex and spoke with Tracy, Ron, and met Doug August. He and his father might be good consultants to come out on a boat and point out where eelgrass was, and how it might be different. Doug can be reached at the Cowichan Tribes office and his home number 715-0231.

**May 31, 2005**

Spoke with **Stafford Reid**, a biologist for the Ministry of Water, Land, and Air Protection. Stafford suggested I take a look at aerial photos to provide some sort of historical reference point. The ones I have seen in the past do not show vegetation well. He also mentioned that the sustainable resource management has videotaped the whole coast at low tide. He said these will be difficult to find, but he may be able to get his hands on the video for the area. He said there was really no way of telling whether dock shading is responsible for loss of eelgrass due to lack of available history. He does think that I need to get my hands on the Cowichan Estuary Plan to use as reference points. This may have reference for the changes in log boom leases and even some reference of where eelgrass is in the bay.

Found this of interest after speaking to Stafford  
<http://srmwww.gov.bc.ca/dss/coastal/mris/resource.htm>

June 8, 2005

After reading an article about our project in the News Leader **Jim Green** called. About ten to fifteen years ago he, Alan Stone, and an independent marine biologist named Ted Burns planted some eelgrass in the Cowichan Bay. They did this on a low tide, taking rhizomes from a healthy plot of eelgrass towards Cherry Point, transferring by boat, and planting in the SE side of the West Can Terminal. At the time he was president of the Salmon Enhancement Society based out of Duncan. Jim would be happy to go out in a boat and point out where he planted the eelgrass to see how it has done.

June 9, 2005

Received a call from **George Croy** (748-9317, 1200 Kneipsen Rd.), who is a resident on the North side of the bay for the last 30 years. He gave me the name of a neighbour who was always in the eelgrass crabbing. He thinks that this would be a good person to contact about the history. His name is Herb Hlady (246-3769). George also described a plant that has moved into the bay in recent years. It stands up in the water at high tide and then lies on the gravel beds when the tide goes out. It is quite fast growing, attaching itself to little pebbles, and at some point it is able to lift the pebble that it attaches itself to and float around the bay. He thinks this growth is a result of the sewage lagoons and could be responsible for starving the eelgrass by taking oxygen or nutrients out of the water coming down the river. It does not grow in the same place as the eelgrass beds but its abundance might play a role in the lack of eelgrass. I will go to visit with George on his property on Mon. June 13<sup>th</sup> at 2pm to see what he is talking about and take a sample of the plant to investigate.

June 9, 2005

Received a call from **Robert Vey** who knows the bay quite well. He used to operate the log booms in the past. He says that the boats did do damage to the eelgrass beds but that it used to grow back quite quickly. He believes it's the sewage that is more responsible for the decline in grass. We have made a plan to go out on his boat on Monday to look at where the eelgrass used to grow, and check his crab traps. I will try to get Jim Green to come out as well, and go find the site where he planted eelgrass in the past.

June 9, 2005

Spoke to **Roger Hunter** on the telephone. Ray Demarchi thought that he would be the best place to find a copy of the biophysical capability map of '81. Unfortunately he did not have one but had lots of suggestions about the project. He is working on the estuary plan at the present moment and knows quite a bit about estuaries in general. He suggested we plant a whole bunch of eelgrass. He remembers in '78 there was patches behind the dolphins. His observation of the Cowichan Bay is that it is very muddy. He has seen eelgrass the most in mud/sand bottoms. He also passed on a few names of people I should talk to; Neil Dawe, who was with the Canadian Wildlife services in the 70's, Allison Campbell Prentice, and Bruce Hilaby. Roger recommends I try to get my hands on the LGL study (Lewis, Livingston and Gun.), the latest version 2004, 2005. It is the best, most comprehensive, up-to-date study of the bay. He suggests that Peter Law might be a possible source of this, as well as the orthophoto. Roger also thinks that I should talk to Brian Tutty at DFO. He recommends I call the headquarters in Nanaimo to find him.

June 13, 2005

Spoke with **Syd Watts** on the telephone to inquire about where eelgrass used to grow. He said there used to be some where the river came in, referring to the Koksilah River. That has mostly disappeared due to log booms. The Cowichan River on the other hand does not seem to have the topography to support eelgrass. It is constantly changing as sediment moves down the river and the path of water changes. He can't remember if there was ever any on the north side. He recommended we look in the bay off green point to see if there is any there. The water pools there and it might be deep enough to support growth. Describing the conditions that eelgrass needs, not too exposed, but not too deep, Syd is not sure if the North side of the bay could support it. The depth drops off steeply, once it does. He recommends we look around Mariners Island, and past the old dykes, near where the plane crashed during the war. The pools might be deep enough for eelgrass.

June 13, 2005

Spoke to **Ted Burns** on the telephone. He was involved with the 2<sup>nd</sup> task force evaluating the estuary management plan. He is also the man that Jim Green suggests is the marine biologist who helped them decide where to plant eelgrass in the bay. He seemed to remember that it was the mute swan grazing that created a limiting factor in the expansion of eelgrass. The swans dug pits in the mud, possibly digging for invertebrates. He said eelgrass was all across the bay, the west side being a little patchy. The north side (along Kneipson Rd) was where it was thickest. He suggests that the logging company could perhaps string some boom sticks if it is wave action that is the limiting factor in that area. Ted thinks that the lack of eelgrass is curious, as it will easily expand itself if the habitat is right. He thinks the substrate is perhaps too organic, there is not enough sand to create the proper habitat. Roberts Bay in Sydney is a good example of the right conditions for eelgrass. There was/is so much bark in the Cowichan Bay that it was perfect for amphipods, and this could have smothered any eelgrass that was there. Ted has done many biological and physical surveys for various aquatic environments and would be a good person to contact for a site evaluation.

June 13, 2005

Went to visit **George Croy** at his house at 1200 Kneipson. He has a lovely property there overlooking the Cowichan River and Bay. He showed me around and pointed out how the river course had changed, where the eelgrass beds used to be, and a kind of plant or algae that he thought might be responsible for the lack of eelgrass presently. I took a sample from his yard and will look into what it is, and what sort of conditions allow it to grow. This is the same algae or plant that I have seen SCUBA diving in Maple Bay. There is also a lot of eelgrass in Maple Bay suggesting that perhaps the two types of vegetation can co-exist.

June 13, 2005

Went to Cowichan Bay to meet **Robert Vey** at Pier 66 for a boat ride. He gave me a whole tour of the bay, pointing out where he remembered eelgrass grew (he called it "the weed"). Robert used to drive the tugs that brought in the log booms. It was interesting to speak to him as he represents a very different party than others inclined to get involved with the project. He said that the propellers of the tug used to scour the bottom, but the eelgrass grew back quite well. We started at the pier 66 dock and made our way around the marina. He said there was more eelgrass in the past than there is now. It was always patchy in the marina, but there used to be much more. He said there was a thick strip of eelgrass from the boat launch all the way across to the terminal. This is still the case today. He said there was also a long finger running almost parallel to the storage area (see map). When we went around to the other side of the terminal we did find some behind the dock. It was

very patchy and sparse. From this point all the way to the North shore we did not see any. This area, Bob says, used to have “the weed” but it was never quite as thick as the other side. In the past the eelgrass stretched the length of the Bay from the dolphins to the drop off point (where the bottom contour drops steeply). We could see some sort of vegetation growing underwater, but I was not able to reach down and grab any. I am curious to see if it is the same algae or plant that coat the Cowichan river mouth. If this is the case it is actually growing in eelgrass territory. We then zoomed across the bay and found a very thick patch just on the open ocean side of the breakwater. In my opinion this is the healthiest patch of eelgrass in the bay.

Bob has lived on the bay since 1945 and is an active fisherman. He told a story about catching a 100 lb. skate. He says that there are no longer skates in the bay, or squid, or rattfish. He holds the sewage plant responsible. Just for the record Bob informed me of a few dates regarding the lumber industry in the Bay. In 1985 the dry sort was created and in 1963 or '64 dredging was done to create the pool.

**Jim Green** was going to come out on the boat with us to revisit where he planted eelgrass in the past. Unfortunately, he was not able to make it.

June 14, 2005

Spoke to **Herb Hlady** on the telephone. He used to be a big crabber in the eelgrass back in the 70's and 80's. He remembers the mouth of the Cowichan River had lots of eelgrass and so did the end of Tzouhalem Rd. He told me a story about going crabbing in the early morning, in dense fog, and feeling something large swim by his foot. He was surprised to find six seals using the same fishing grounds. He told me another story about a friend of his who did quite a bit of snorkeling in the bay. John Mullond, who has since deceased, hooked himself a basking shark (20 ft) one day, and got a tow around the harbor. This same fellow once wrestled a 60 pound octopus out of the eelgrass beds, with the help of one other, and sold it to the local Chinese grocer. Herb remembers that the eelgrass began to disappear in the mid 1980's, and by the end of the 1980's it was all gone. It extended along the North coast down to the last house, and out towards the terminal for a quarter of a mile. Herb does not care to go to any meetings or workshops.

June 20, 2005

Ann and I went to visit **George Croy** and go for a canoe ride around the North side of Cowichan Bay. We paddled all over, behind the booms, up a newer river channel, all around the pilings and dolphins, and up towards the old saw mill. It was good to see what is under the water in all of those different places. There was some disgusting stagnant cobweb looking algae patches behind and around the log booms. Quite a bit of algae in patches all over the area, maybe up to three different kinds of algae. The most common was the vegetation George alerted us to earlier, and I was surprised to see that it makes a habitat that is visually very similar to eelgrass. We made a few GPS points and descriptions for potential transplant sites.

June 22, 2005

Went to see **Herb Rice** in Cowichan Bay at the maritime museum. He was not able to tell me about eelgrass in the bay, as he has only been in the area for six years. He did tell me about a project that he did in the past with the Land Trust Alliance of BC involving a story he recorded on CD that went along with a carving he did. It was a lovely carving that gave a visual to look at while the story played. It would be nice to incorporate something similar into our project. He gave me a few names to look up, Abner Thorne, the Johnnie family, and Gus Joe.

June 23, 2005

I Spoke to **Alex Johnnie** on the phone briefly. He lives on Kneipson Road around Green Point. The sense I get from the community is that his family has been there at least a couple of generations. He said that eelgrass used to grow around the pilings to the drop off and out towards the big boats. He used to do quite a bit of crabbing out there but does not anymore, as he says that they don't taste good anymore. He blames the bark from all the logs for the funny taste in the crabs. Alex said that he would come to our eelgrass ecology meeting on Sunday.

June 24, 2005

I went to visit **Arvid Charlie** at his office in Duncan where he filled out a map of where eelgrass grew in the Bay. The highlighted area on his map illustrates this. It grew a bit above the pilings and down to the drop off, around the mouth of the river where the current was not too strong, and everywhere in this area where there was sand and mud. There were patches



of gravel and rocks in the zones as well, and this area was not covered in eelgrass because it is not a suitable area. Arvid grew up on the South coast, past Cowichan Bay, and used to collect clams from that beach. He stopped around the 70's, and said that the eelgrass was getting thin then. In the 40's and 50's the eelgrass by the marina was diminishing. He also collected crabs and flounder from the North side. Arvid suggested I speak with his mother, by phoning his niece Paula at 748-1135 (not the right number). He also recommends Bernard Joe, a 68 year old man that might be able to help. He also told me his cousin Timothy Qualchilsky is a SCUBA diver who might be interested in the project. Calling the fisheries department at the Cowichan Tribes Office should be able to locate him.

June 28, 2005

I went to go visit **Alex Johnnie**, who lives at Green Point. There are just two houses out there on reserve land and he and his son Alex Jr. own the houses. Alex Sr. has spent his whole life on the property overlooking the mouth of the river (a beautiful view). He says that eelgrass grew all the way across the Bay, from the edge of the pilings to the drop off. The eelgrass disappeared in the early 70's, starting on the shore, and moving into the middle of the Bay. He saw the loss coincide with the log booms. Alex says that there has been a lot of change, not just the eelgrass. The Chinooks used to come down the river in the spring for a couple of weeks, not a couple of days. There are just fewer and fewer each year. The clams, oysters, and crabs used to be tasty, and the blue herons used to be much more plentiful, all the way down the river. He also described a little black duck he called a mud hen that doesn't come to the bay anymore. The crabs coming out of Cowichan Bay are no longer palatable. He told a story from a while ago where he was called to his Aunts, who lived up the river a bit. She had spotted an octopus in the river outside her house, which they speared and ate. That was the only time he ever saw an octopus. His memory recalls the river being much deeper that it is now. They used to be able to paddle all the way up to the church. Now the water is so silty, and carries so much stuff down, including the sewage, Alex doesn't allow his kids to go swimming in the river anymore. The river actually stinks sometimes from the sewage lagoons. Alex still eats quite a bit of food from the ocean, as he told me stories of collecting sea cucumbers and sea urchins. He used to collect sea cucumbers from the eelgrass beds on the other side of the Bay. He is interested in future workshops, and would like to be contacted for reminders.

July 8, 2005

Spoke with **Nick Prowse** after receiving an email describing his efforts to reestablish eelgrass in the Cowichan Bay in the past. He was a member of the Cowichan Bay Preservation Society at the time, and says that a group tried to transplant eelgrass all over the Bay. He mentions Bob Holden as the one responsible for getting rid of the log booms. Nick used to live on Khneipson Rd, and said that there were usually 10 to 12 log booms stored there. There are fewer now, but from what he says there was actually a time where there wasn't any. The Cowichan Estuary Preservation Society did quite a bit of research into eelgrass. Bill Austin mainly did this part. At this time in the Society Boon Collins was president, Nick recommends I speak to him. Although the details are faint, Nick does remember planting eelgrass all over the Bay, and the only area it took to was the NE side of the terminal. He thinks this was done in the late 80's and early 90's. He and his wife are very interested in getting involved with the project.

July 8, 2005

Spoke to **Boon Collins** who was president of the Cowichan Estuary Preservation Society at the time of the eelgrass planting. He didn't really remember too much about the event, as he has been involved with so many different things in the estuary over the years. He did think that the planting might have taken place in 1994 or 1995. He believes it was the log booms that destroyed the area on the North side of the Bay, previously referred to as "the garden". When the boom leases were reduced the group planted individual plants in little wooded boxes with the assistance of divers. Boon said there was quite a bit of cedar bark from the booms, which he understands to be toxic. The divers sort of brushed this away as they planted the little eelgrass shoots. He said that the group monitored the transplants for a while but they never really took. CEPS were working with another group on the project and Boon seemed to think it was Greenpeace, specifically a German woman named Renada Crotchett. When I asked him if it could have been the same eelgrass planting effort that Jim Green was involved with he said that sounded familiar.

August 15, 2005

**Joe Feumento** called the office after seeing an article in the paper about eelgrass. He used to live in the Cowichan Bay back when there was only 18 or so residents. He was the original purchaser of the log booming areas in the Cowichan Bay. This was about 30 years (or so) ago. When the pilings and dolphins were first put in Joe says there was quite a bit of distance between them and the edge of the eelgrass beds. Joe is an old friend of Charlie Strouglers, and about 10 to 12 years

ago Charlie alerted him to the eelgrass problem off Green Point. Joe went to go see it, and he said it looked very sick, sparse and covered with something. It was definitely dying at that time, but there was still some remaining.

I asked Joe if he noticed a difference in the marine life in Cowichan Bay. He exclaimed that there certainly was, as Cowichan Bay used to be known as, “the fishing capital of the world”. There used to be all sorts of herring and Coho salmon. Joe told me a story about going out with his brother and two visitors. Joe’s family owned the boat house in Cowichan Bay and it sounds like they sometimes acted as tour guides of the Bay. On October 15, several years before the war, the four of them went out in two row boats at 7am and returned in the early afternoon with 55 Coho salmon. Joe thinks there are several reasons for the decline in fish, one being sonar fishing outside of the Bay, another the fishing practices of herring netting, and also the simple fact there is nothing in the Bay for the fish to eat anymore.

August 22, 2005

**John Dunbar** stopped into the office after reading an article in the paper. He used to live on Gore-Langton Rd and spent quite a bit of time fishing in the North side of the Bay from 1952 to 1956. He described how he used to fish in the area, what he called “mooching”, or drifting in a boat they would go back and forth over the drop off and towards the dolphins. This was in the opposite direction that the trawlers did who went back and forth the length of the Bay from Strouglers dock to the terminal. It seemed there was a little politics about the two different styles, as there was sometimes 300 boats, all wanting to fish in the same spot. He said the best area was right at the edge of the drop off. He knew where to find this spot because it was also where the eelgrass stopped growing. John once caught a 10 lb. Spring salmon by hooking it on the tail, and had quite a feat to reel it in. He also fished for trout in the area, and caught lots of crabs. There were so many crabs that no traps were necessary. In the eelgrass beds there were patches, and he would put a potato fork in the water. The crabs would immediately come towards it with pinchers up and attack the fork. All John had to do at that point was pull the fork up with the crab.

Joe filled out a map while he was in the office. He has recently moved back to the Bay, building a house on the other side in Cowichan Bay. He also commented on watching the Bay at low tide, and thinking that the waves were breaking right at the drop off, meaning that the habitat for eelgrass might have disappeared due to siltation or gravel movement. John said he figured the eelgrass beds were about 100 ft from drop off back. He also described a small patch of eelgrass in a pool off green point. There was a dip in the in the area that always held water, making it suitable habitat. John is going to come out to revisit our eelgrass transplants, and he might be able to remember more being out there.

**APPENDIX III****Media Releases (Please see Interim Report – April 2006)****APPENDIX IV****Newsletter (Please see Interim Report – April 2006)****APPENDIX V****Wavelength Article (Please see Interim Report – April 2006)****APPENDIX VI****Brochures (Please see Interim Report – April 2006)****APPENDIX VII****Potential Transplant Sites – Assessment Index****Potential Restoration Sites - Evaluation**

Eelgrass Transplant Index (Adapted from “Communities Connecting to Place: A Strategy for Eelgrass Restoration in British Columbia” by Nikki Wright)

Site #1

<b>Bearings</b>	<b>Description</b>
10 454336E, 5400050N	First site closest to the terminal. Line up dolphins that stretch the length of the Bay, and carry this line to the GPS point.

Assessment of Physical Characteristics

<b>Parameters</b>	<b>Range</b>	<b>Assessment Method</b>	<b>Rating Score</b>	<b>Site #1 Rating</b>
Substrate Type	Firm sand to soft mud to boulder/cobble	Direct observation	2: entirely fine (sand and/or mud) 1: mixed (gravel of cobble with sand or mud) 0: entirely coarse (boulders, cobble etc.)	2
Elevation	0.0 m to –10 m	Direct observation	2: Within range of ecotype 0: Beyond range	2
Salinity	Freshwater to 42ppt	Hydrometer	2: 10 to 30ppt 1: Freshwater year round	2
Current velocity	Waves to stagnant water	Local knowledge	2: Little wave action 0: Steady fetch	1 seasonal
Light	1.8 m above MLLW to – 30 m (this is depth, the plants need	Local knowledge	Ranges to be determined	Some turbidity in summer – much

	about 20% of surface light			more in winter
--	----------------------------	--	--	----------------

## Assessment of Site History

Parameters	Range	Assessment Method	Rating Score	Site #1 Rating
Reference site	Close to potential restoration site to non-existent	Maps of subtidal area	2: Close to potential restoration site 1: not available	2
Donor site	100 m to non-existent	Maps, observation	2: Available 0: within 100 m	2
Historical records	Accessible and accurate to none	Government agencies	2: Accessible 1: Not accessible or non-existent	1
Local knowledge	Accessible and accurate to none available	Communications with community members	2: Accessible & accurate 1: Not available	2

\* if a site is less than 100 m from a natural eelgrass meadow, it is considered within the range of natural revegetation and receives a rating of 0.

## Assessment of Environmental Conditions

Parameters	Range	Assessment Method	Rating Score	Site #1 Rating
Availability of suitable ecotype	Typical/phillipsi/latifolia	Direct observation of plant and distribution range	2: Available 1: Not available	2
Near by land use	None to heavy use	Observation, local knowledge	2: Best practice management 0: Heavy run-off	1
Activities on the water	None to intense activities (ex: boat anchoring area)	Observation, local knowledge	2: Minimum impact from boats 1: Area of heavy boat traffic	1
Protection status	None to marine protected area	Government agencies	2: Protected status 1: No protection in place	1.5 (CEEMP)
Type of freshwater inputs	None to heavy flows (ex: heavy flow from storm-water discharges)	Observation Maps	2: Natural 1: Storm-water discharge	1

## Site # 2

Bearings	Description
10 454239E,	Just offshore of the last dolphin in the line of dolphins stretching the length of

5400298N	the Bay.
----------	----------

## Assessment of Physical Characteristics

Parameters	Range	Assessment Method	Rating Score	Site #1 Rating
Substrate Type	Firm sand to soft mud to boulder/cobble	Direct observation	2: entirely fine (sand and/or mud) 1: mixed (gravel of cobble with sand or mud) 0: entirely coarse (boulders, cobble etc.)	2
Elevation	0.0 m to –10 m	Direct observation	2: Within range of ecotype 0: Beyond range	2
Salinity	Freshwater to 42ppt	Hydrometer	2: 10 to 30ppt 1: Freshwater year round	2
Current velocity	Waves to stagnant water	Local knowledge	2: Little wave action 0: Steady fetch	1 seasonal
Light	1.8 m above MLLW to – 30 m (this is depth, the plants need about 20% of surface light)	Local knowledge	Ranges to be determined	Some turbidity in summer – much more in winter

## Assessment of Site History

Parameters	Range	Assessment Method	Rating Score	Site #1 Rating
Reference site	Close to potential restoration site to non-existent	Maps of subtidal area	2: Close to potential restoration site 1: not available	2
Donor site	100 m to non-existent	Maps, observation	2: Available 0: within 100 m	2
Historical records	Accessible and accurate to none	Government agencies	2: Accessible 1: Not accessible or non-existent	1
Local knowledge	Accessible and accurate to none available	Communications with community members	2: Accessible & accurate 1: Not available	2

\* if a site is less than 100 m from a natural eelgrass meadow, it is considered within the range of natural revegetation and receives a rating of 0.

## Assessment of Environmental Conditions

Parameters	Range	Assessment Method	Rating Score	Site #1 Rating
------------	-------	-------------------	--------------	----------------

Availability of suitable ecotype	Typica/phillipsi/latifolia	Direct observation of plant and distribution range	2: Available 1: Not available	2
Near by land use	None to heavy use	Observation, local knowledge	2: Best practice management 0: Heavy run-off	1
Activities on the water	None to intense activities (ex: boat anchoring area)	Observation, local knowledge	2: Minimum impact from boats 1: Area of heavy boat traffic	1
Protection status	None to marine protected area	Government agencies	2: Protected status 1: No protection in place	1.5 (CEEMP)
Type of freshwater inputs	None to heavy flows (ex: heavy flow from storm-water discharges)	Observation Maps	2: Natural 1: Storm-water discharge	1

## Site # 3

Bearings	Description
10 454633E, 5400598N	Closer to Kneipson Rd. Line up dolphins that run the length of the estuary and this is about 10 meters off shore past this line.

## Assessment of Physical Characteristics

Parameters	Range	Assessment Method	Rating Score	Site #1 Rating
Substrate Type	Firm sand to soft mud to boulder/cobble	Direct observation	2: entirely fine (sand and/or mud) 1: mixed (gravel of cobble with sand or mud) 0: entirely coarse (boulders, cobble etc.)	2
Elevation	0.0 m to –10 m	Direct observation	2: Within range of ecotype 0: Beyond range	2
Salinity	Freshwater to 42ppt	Hydrometer	2: 10 to 30ppt 1: Freshwater year round (Measured on a monthly basis would be recommended)	2
Current velocity	Waves to stagnant water	Local knowledge	2: Little wave action 0: Steady fetch	1
Light	1.8 m above MLLW to – 30 m (this is depth, the plants need about 20% of surface light)	Local knowledge	Ranges to be determined	Some turbidity in summer – much more in winter

## Assessment of Site History

Parameters	Range	Assessment Method	Rating Score	Site #1 Rating
Reference site	Close to potential restoration site to non-existent	Maps of subtidal area	2: Close to potential restoration site 1: not available	2 on other side of estuary at same elevation
Donor site	100 m to non-existent	Maps, observation	2: Available 0: within 100 m	2
Historical records	Accessible and accurate to none	Government agencies	2: Accessible 1: Not accessible or non-existent	1
Local knowledge	Accessible and accurate to none available	Communications with community members	2: Accessible & accurate 1: Not available	2

\* if a site is less than 100 m from a natural eelgrass meadow, it is considered within the range of natural revegetation and receives a rating of 0.

## Assessment of Environmental Conditions

Parameters	Range	Assessment Method	Rating Score	Site #1 Rating
Availability of suitable ecotype	Typical/phillipsii/latifolia	Direct observation of plant and distribution range	2: Available 1: Not available	2
Near by land use	None to heavy use	Observation, local knowledge	2: Best practice management 0: Heavy run-off	2
Activities on the water	None to intense activities (ex: boat anchoring area)	Observation, local knowledge	2: Minimum impact from boats 1: Area of heavy boat traffic	2
Protection status	None to marine protected area	Government agencies	2: Protected status 1: No protection in place	1.5 (CEEMP)
Type of freshwater inputs	None to heavy flows (ex: heavy flow from storm-water discharges)	Observation Maps	2: Natural 1: Storm-water discharge	2

## Site # 4

Bearings	Description
10 454634E, 5400599N	Same line as above (site 3), follow this line down towards the drop off.

## Assessment of Physical Characteristics

Parameters	Range	Assessment Method	Rating Score	Site #1 Rating
Substrate Type	Firm sand to soft mud to boulder/cobble	Direct observation	2: entirely fine (sand and/or mud) 1: mixed (gravel of cobble with sand or mud) 0: entirely coarse (boulders, cobble etc.)	2
Elevation	0.0 m to –10 m	Direct observation	2: Within range of ecotype 0: Beyond range	2
Salinity	Freshwater to 42ppt	Hydrometer	2: 10 to 30ppt 1: Freshwater year round (Measured on a monthly basis would be recommended)	2
Current velocity	Waves to stagnant water	Local knowledge	2: Little wave action 0: Steady fetch	1
Light	1.8 m above MLLW to – 30 m (this is depth, the plants need about 20% of surface light)	Local knowledge	Ranges to be determined	Some turbidity in summer – much more in winter

## Assessment of Site History

Parameters	Range	Assessment Method	Rating Score	Site #1 Rating
Reference site	Close to potential restoration site to non-existent	Maps of subtidal area	2: Close to potential restoration site 1: not available	2 on other side of estuary at same elevation
Donor site	100 m to non-existent	Maps, observation	2: Available 0: within 100 m	2
Historical records	Accessible and accurate to none	Government agencies	2: Accessible 1: Not accessible or non-existent	1
Local knowledge	Accessible and accurate to none available	Communications with community members	2: Accessible & accurate 1: Not available	2

\* if a site is less than 100 m from a natural eelgrass meadow, it is considered within the range of natural revegetation and receives a rating of 0.



## Assessment of Environmental Conditions

Parameters	Range	Assessment Method	Rating Score	Site #1 Rating
Availability of suitable ecotype	Typica/phillipsi/latifolia	Direct observation of plant and distribution range	2: Available 1: Not available	2
Near by land use	None to heavy use	Observation, local knowledge	2: Best practice management 0: Heavy run-off	2
Activities on the water	None to intense activities (ex: boat anchoring area)	Observation, local knowledge	2: Minimum impact from boats 1: Area of heavy boat traffic	2
Protection status	None to marine protected area	Government agencies	2: Protected status 1: No protection in place	1.5 (CEEMP)
Type of freshwater inputs	None to heavy flows (ex: heavy flow from storm-water discharges)	Observation Maps	2: Natural 1: Storm-water discharge	2

## Site # 5

Bearings	Description
10 454760, 5400909	Good muddy bottom, sparse vegetation.

## Assessment of Physical Characteristics

Parameters	Range	Assessment Method	Rating Score	Site #1 Rating
Substrate Type	Firm sand to soft mud to boulder/cobble	Direct observation	2: entirely fine (sand and/or mud) 1: mixed (gravel of cobble with sand or mud) 0: entirely coarse (boulders, cobble etc.)	2
Elevation	0.0 m to –10 m	Direct observation	2: Within range of ecotype 0: Beyond range	2
Salinity	Freshwater to 42ppt	Hydrometer	2: 10 to 30ppt 1: Freshwater year round (Measured on a monthly basis would be recommended)	2
Current velocity	Waves to stagnant water	Local knowledge	2: Little wave action 0: Steady fetch	1
Light	1.8 m above MLLW to – 30 m (this is depth,	Local knowledge	Ranges to be determined	Some turbidity in summer

	the plants need about 20% of surface light			– much more in winter
--	--	--	--	-----------------------

### Assessment of Site History

Parameters	Range	Assessment Method	Rating Score	Site #1 Rating
Reference site	Close to potential restoration site to non-existent	Maps of subtidal area	2: Close to potential restoration site 1: not available	2 on other side of estuary at same elevation
Donor site	100 m to non-existent	Maps, observation	2: Available 0: within 100 m	2
Historical records	Accessible and accurate to none	Government agencies	2: Accessible 1: Not accessible or non-existent	1
Local knowledge	Accessible and accurate to none available	Communications with community members	2: Accessible & accurate 1: Not available	2

\* if a site is less than 100 m from a natural eelgrass meadow, it is considered within the range of natural revegetation and receives a rating of 0.

### Assessment of Environmental Conditions

Parameters	Range	Assessment Method	Rating Score	Site #1 Rating
Availability of suitable ecotype	Typica/phillipsi/latifolia	Direct observation of plant and distribution range	2: Available 1: Not available	2
Near by land use	None to heavy use	Observation, local knowledge	2: Best practice management 0: Heavy run-off	2
Activities on the water	None to intense activities (ex: boat anchoring area)	Observation, local knowledge	2: Minimum impact from boats 1: Area of heavy boat traffic	2
Protection status	None to marine protected area	Government agencies	2: Protected status 1: No protection in place	1.5 (CEEMP)
Type of freshwater inputs	None to heavy flows (ex: heavy flow from storm-water discharges)	Observation Maps	2: Natural 1: Storm-water discharge	2

Site # 6

<b>Bearings</b>	<b>Description</b>
10 454665, 5401095	Between balconied, white homes. Nice muddy bottom

## Assessment of Physical Characteristics

<b>Parameters</b>	<b>Range</b>	<b>Assessment Method</b>	<b>Rating Score</b>	<b>Site #1 Rating</b>
Substrate Type	Firm sand to soft mud to boulder/cobble	Direct observation	2: entirely fine (sand and/or mud) 1: mixed (gravel or cobble with sand or mud) 0: entirely coarse (boulders, cobble etc.)	2
Elevation	0.0 m to –10 m	Direct observation	2: Within range of ecotype 0: Beyond range	1
Salinity	Freshwater to 42ppt	Hydrometer	2: 10 to 30ppt 1: Freshwater year round (Measured on a monthly basis would be recommended)	1
Current velocity	Waves to stagnant water	Local knowledge	2: Little wave action 0: Steady fetch	1
Light	1.8 m above MLLW to – 30 m (this is depth, the plants need about 20% of surface light)	Local knowledge	Ranges to be determined	Some turbidity in summer – much more in winter

## Assessment of Site History

<b>Parameters</b>	<b>Range</b>	<b>Assessment Method</b>	<b>Rating Score</b>	<b>Site #1 Rating</b>
Reference site	Close to potential restoration site to non-existent	Maps of subtidal area	2: Close to potential restoration site 1: not available	2
Donor site	100 m to non-existent	Maps, observation	2: Available 0: within 100 m	2
Historical records	Accessible and accurate to none	Government agencies	2: Accessible 1: Not accessible or non-existent	1
Local knowledge	Accessible and accurate to none available	Communications with community members	2: Accessible & accurate 1: Not available	2

\* if a site is less than 100 m from a natural eelgrass meadow, it is considered within the range of natural revegetation and receives a rating of 0.

## Assessment of Environmental Conditions

<b>Parameters</b>	<b>Range</b>	<b>Assessment Method</b>	<b>Rating Score</b>	<b>Site #1 Rating</b>
Availability of suitable ecotype	Typica/phillipsi/latifolia	Direct observation of plant and distribution range	2: Available 1: Not available	2
Near by land use	None to heavy use	Observation, local knowledge	2: Best practice management 0: Heavy run-off	2
Activities on the water	None to intense activities (ex: boat anchoring area)	Observation, local knowledge	2: Minimum impact from boats 1: Area of heavy boat traffic	2
Protection status	None to marine protected area	Government agencies	2: Protected status 1: No protection in place	1.5 (CEEMP)
Type of freshwater inputs	None to heavy flows (ex: heavy flow from storm-water discharges)	Observation Maps	2: Natural 1: Storm-water discharge	2

**APPENDIX VIII****Power Point Presentation (Please see Interim Report – April 2006)****APPENDIX IX****Planning Meeting with Volunteers**

Hello all;

Good news! Our Eelgrass transplants from last year are surviving and multiplying! We were out in March checking on their progress and have found that 2 sites have increased by 70-80% which is a great success. The other 2 sites weren't found but in September they were being used as forage by the swans. I think we planted a buffet for them in that area!

Now we have confirmed that eelgrass will thrive in the selected sites we are starting up another round of eelgrass restoration.

We are looking at the last weekend in April - the 29th and 30th for the transplant dates - divers will be harvesting shoots on Friday in preparation for the Saturday land volunteers. We will need many hands on land to tie the shoots with their weights and 2-3 buddy pairs of divers for harvesting and planting on both days.

To help us organize this larger transplant I hope to meet with our volunteers from last year to get some suggestions as to how to make this transplant more efficient. As well, I would like to invite anyone who wasn't available last year but is interested in helping out with this transplant to join us in the planning stage.

The planning meeting is set for Wednesday, April 19th at 7pm. Please RSVP so I know whether we can meet at the CCLT office or if a larger space is needed.

Thanks to all for your continued support - we couldn't do it without you. Please pass this on to anyone you think might be interested.

Ann Archibald

Cowichan Community Land Trust Society

#6 - 55 Station Street

Duncan, BC

V9L 1M2

Phone: (250) 746-0227

Fax: (250) 746-9608

[www.island.net/~cclt/](http://www.island.net/~cclt/)

**Eelgrass Planning Meeting - Wednesday, April 19<sup>th</sup>****Friday, April 28<sup>th</sup>**

Will leave the details to you and Cindy – unless you can let me know what you need done.

**Start:** 9:00 am

**Divers:**

**Harvesting Location:** the Breakwater – approx. 1000 shoots

**Boat:**

**Storage of Eelgrass:** Harvested shoots are stored in tubs overnight in a sub-tidal location, most probably near the boat launch area.

**Accommodation**

**Saturday, April 29<sup>th</sup>****Land**

**Start:** 9:00 with training ongoing as people arrive.

**Location:** Ann - have permission to use Hecate Park a bit back from where we set up before to accommodate ramp traffic.

**Site equipment:**

Washers – Scott Noble from Shawnigan Lake School will bring 2500 pre-tied  
 Tubs - SeaChange and Cindy will have enough tubs and containers.  
 Hand washing – Ann – bring towels, soap and tubs (water tap is at location)  
 Tarps – Ann bring 2 small. Nikki bring a large tarp.  
 Awning – Ann bring one. SeaChange bring one.  
 Chairs – volunteers will bring small stools or chairs. Seachange bring 2.  
 Buckets- Seachange will bring buckets.

*Vols suggested we use wheelbarrows to take tubs and buckets – mine is too big for my vehicle so I will try to find a vol to bring one.*

Tiers and bucket/tub brigade – Scheduling vols in progress.  
 Refreshments – Ann – will set up breakfast snack and lunch.

**End:** last shift booked for 2 - 3 pm.

## Divers

*At the meeting it was suggested that the boat handlers get some instruction on how to work well with the divers as the divers had to swim to the boat which tired them more than necessary. Also they mentioned that there was too much silt to see the baskets coming down and their location. Suggested that we attach a float to the baskets so the diver can surface and then locate the basket by following the line attached to the visible float. I have 4 pop bottles that we painted inside a bright orange attached to nylon rope – I can bring these if they are useful.*

**Start:** 9:00

**Harvesting Location & timing** – at boat launch or will need transport to the breakwater location.

**Transplanting Location & timing?** At site 1 & 2 (second transplant at drop off location?)

**Numbers** – 2-3 buddy pairs from our volunteers? Have phoned and emailed all the divers and no luck on divers as yet for Saturday – have 2 for Sunday...

**Dive Master** – will try to get volunteer to coordinate.

**Equipment** – dive equipment needed by volunteers who don't own can be rented from our budget.

**Boat** – One of the volunteers - Roger Southern who manned one of the boats last year is available on Saturday and can borrow a rigid hull inflatable to help out transporting divers etc. on the 29th, Saturday. Possibly available on Sunday, but I don't know for sure he is getting back to me. If he can be available Sunday, that would be great! The WCB boat is dedicated to the WCB team.

Cynthia's boat is small. If Roger is not available on Sunday, we will use Cindy's as well as the Lifetimer.

**Refreshments** – Ann

**End** – I have broken the day into 2 shifts for the divers – 10am-1pm and 1-4pm.

## Sunday, April 30th

The same as Saturday but a shorter day for the land volunteers ending at 1pm.

The general idea is that tiers will be busy all day Saturday and also Sunday morning with the goal of 2,500 shoots ready by mid-day on Sunday. The divers will be needed to harvest on Saturday, perhaps plant on Saturday afternoon. Sunday the divers will hopefully be taking turns planting. It depends on how the harvest goes.

There will be more transplanting and most probably no harvesting on Sunday, dependent on weather and substrate (how easy it is to remove plants from the ground). We also have Monday set aside for the WCB dive team to work, in case we can't complete the work on Sunday.

## APPENDIX X

### Call for volunteers: April transplant

Hello all;

We are all gearing up for more Eelgrass restoration in the Cowichan Estuary - this time **we will be planting 2500 eelgrass shoots!!** As you can see we will need all our wonderful volunteers from last year as well as some new faces. Get your friends, neighbours or staff members to come out and join in!

We will be meeting at the boat launch in Hecate Park, which is off the Cowichan Bay Rd. on Saturday, April 29th and Sunday, April 30th starting at 9am. At least 15 Land based volunteers will be needed per shift to tie eelgrass shoots with their weights (washers and twist ties) before they are taken out by dive teams for planting. Others will be needed transport the tubs and buckets of eelgrass shoots to and from the harvesting and transplanting boats. This really is enjoyable group work so **please choose a shift on the attached schedule and RSVP** so we can fit everyone in at the tying tubs.

It is highly recommended to bring a small stool or pad for kneeling - there will be room for a few small chairs too if needed.

**For our Divers** - please let me know when you can help out by signing up on the Divers schedule that is attached.

Thanks to everyone for their support in this project - we can't do it without you and it promises to be a great weekend! Plus, lunch is provided!!

Ann Archibald

Cowichan Community Land Trust Society

#6 - 55 Station Street

Duncan, BC

V9L 1M2

Phone: (250) 746-0227

Fax: (250) 746-9608

[www.island.net/~cclt/](http://www.island.net/~cclt/)

**APPENDIX XI**

**Sign up sheet: April and July transplant**

**Land Volunteer Sign-up for Saturday, July 15<sup>th</sup>**

	<i>9am</i>	<i>10am</i>	<i>11am</i>	<i>12 noon</i>	<i>1pm</i>	<i>2pm</i>
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						

**Land Volunteer Sign-up for Sunday, July 16<sup>th</sup>**

	<i>9am</i>	<i>10am</i>	<i>11am</i>	<i>12 noon</i>
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				



**Volunteer Diver Sign-up for Saturday, July 15th**

Buddy Pairs	10am – 1pm	1 – 4pm
1		
2		
3		

**Volunteer Diver Sign-up for Sunday, July 16th**

Buddy Pairs	10am – 1pm	1 – 4pm
1		
2		
3		

**APPENDIX XII**  
**Media Info Sheet**

*Transplanting Event, Hecate Park, Cowichan Bay, April 29<sup>th</sup> & 30<sup>th</sup> - 9:00am –2:00pm*

**Eelgrass Restoration Project  
of the Cowichan Community Land Trust**

- ❑ 80% of commercial fish and shellfish stocks, frequent eelgrass beds at some point in their lifecycle.
- ❑ Beds of eelgrass provide shelter, feeding grounds, and a hatchery for many forms of ocean life.
- ❑ This habitat is on the decline due to development, industry, and environmental changes.
- ❑ The Cowichan Community Land Trust Society (CCLT) is working on an eelgrass restoration project in the Cowichan Bay with the support of The Pacific Salmon Commission, and The Habitat Conservation Trust Fund and compensation funds from the Small Craft Harbor breakwater project in Cowichan Bay.
- ❑ We will be transplanting 5000 shoots in total – 2500 this weekend and 2500 in June or July.
- ❑ The transplanting will take shoots from healthy eelgrass beds in the area, move them, and root them in a new location.
- ❑ This method of habitat restoration has been successfully carried out in other Vancouver Island locations by CCLT’s partners in this project: SeaChange Marine Conservation Society and Precision Identification.
- ❑ Eelgrass is harvested by volunteer divers and transferred to the land-based volunteers by boat.
- ❑ Volunteers tie weights on to each individual eelgrass shoot that has been harvested to prepare them for transplanting.
- ❑ Weighted eelgrass shoots are then taken by boat to the transplant location.
- ❑ Volunteer divers then plant the shoots in bundles for greater stability.
- ❑ Two transplanted sites from last year’s test eelgrass transplant increased 70-80%.
- ❑ Anyone interested in hearing more about the project or getting involved contact the Cowichan Community Land Trust Society. Phone: (250) 746-0227, Email: cclt@island.net.

## APPENDIX XIII Community Comments

----- Original Message -----

From: "Carly Sawatzky" <[c-s-a-w-a-t-z-k-y@hotmail.com](mailto:c-s-a-w-a-t-z-k-y@hotmail.com)>

To: <[cclt@island.net](mailto:cclt@island.net)>

Sent: Tuesday, May 02, 2006 9:13 PM

Subject: ~just a reminder!~

> Hello!!! How are things going? I am doing very well and I was just wondering  
> about the StreamKeepers thing. Do you think I could get some more  
> information? There was something else I was supposed to remind you of.....  
> hmmm...I remember!, it was about the little eco-village type thing in  
> Shawnigan Lake. That about it for now...  
>  
> thanks t h a n k s T H A N K S T H A N K S T H A  
> N K S!  
> a lot!  
>  
> p.s- I had a really, really super awesome time on the weekend!  
Thanks..once  
> again. It was really well organized. Thanks for making it so much fun! :)

----- Original Message -----

**From:** [Gordon Allen](#)

**To:** [Cowichan Community Land Trust](#)

**Sent:** Sunday, April 30, 2006 11:24 AM

**Subject:** Re: Eelgrass Transplant 29th and 30th

Hi Ann,

Thanks for all your efforts. The project appears to have been a great success. Let us know if there are any other programs needing volunteers. Its good to be a part of it all.

Gord

----- Original Message -----

From: "Shirley Imada" <[usanimada@hotmail.com](mailto:usanimada@hotmail.com)>

To: <[cclt@island.net](mailto:cclt@island.net)>

Sent: Sunday, April 30, 2006 12:35 PM

Subject: RE: eel grass

> Hi Ann, sure was a successful weekend despite the less than perfect  
> weather  
> on Saturday. But that didn't hold anything back now did it. Its very  
> gratifying to see the young involved with this project. I was despairing  
> that all the environmental good work in schools of the 60's and 70's  
> seemed  
> to have died off. Nice to know that these clubs are alive and booming  
> blooming.  
>  
> A couple of ideas have come to mind.

> With all the good help and the tide being so low perhaps some people could  
 > actually walk and plant ? Like rice patties. Would that be possible or too  
 > unpredictable.  
 > The oily washers are everyone's concern. Certainly the stuff washes out to  
 > sea somewhere but what kind of oil is it. Vegetable?  
 > I was thinking that the divers are very brave to be able to deal with the  
 > tangle of washers and grass. Gord thought the groups of ten were easier to  
 > handle but I don't know if you grouped them after the tides were through  
 > with them.  
 > New idea: would cost a bit I guess. Cement installers use a grid of rebar  
 > for floors. I had always thought they wired the rebar rods into a grid but  
 > Gord thinks that the grids may be pre welded. If we had small sections  
 > that  
 > 10 or 20 plants can be tied to then these grids can be laid down faster  
 > and  
 > more orderly. Perhaps they may even be retrievable after a year, naw, I  
 > can  
 > see the rhizomes growing over the grid as well as under and they would  
 > rust.  
 >  
 > Graeme appreciated the doughnut, thanks

Original Message -----

From: "John Scull" <[jscull@shaw.ca](mailto:jscull@shaw.ca)>

To: "Cowichan Community Land Trust" <[cclt@island.net](mailto:cclt@island.net)>; "Jim (Malaspina)  
 Ayers" <[ayers@mala.bc.ca](mailto:ayers@mala.bc.ca)>; "Charles Poole" <[cepoole@shaw.ca](mailto:cepoole@shaw.ca)>; "Jim Moir"  
 <[jtmoir5@hotmail.com](mailto:jtmoir5@hotmail.com)>; "Pamela Williams" <[steplite@telus.net](mailto:steplite@telus.net)>; "Jim (home)  
 Ayers" <[sturdyayers@shaw.ca](mailto:sturdyayers@shaw.ca)>; "Tracy (home) Fleming"  
 <[robert\\_lawrance@yahoo.com](mailto:robert_lawrance@yahoo.com)>

Sent: Tuesday, May 02, 2006 9:14 PM

Subject: Super Ann

> I was unfortunately out of town for the Eelgrass planting, but I heard a  
 > great  
 > deal about it in Duncan today. Three separate people told me what a  
 > fabulous  
 > event it was and attributed the success to Ann's organization and  
 > leadership.  
 >  
 > Thanks for this effort, Ann, and congratulations on a very successful  
 > event that  
 > is improving CCLT's standing in the community, attracting volunteers, and  
 > benefitting the critters that depend on the eelgrass.  
 >  
 > John

----- Original Message -----

**From:** [RutherfordT@pac.dfo-mpo.gc.ca](mailto:RutherfordT@pac.dfo-mpo.gc.ca)

**To:** [cclt@island.net](mailto:cclt@island.net)

**Sent:** Wednesday, May 03, 2006 9:02 AM

**Subject:** RE: Eelgrass Transplant 29th and 30th

Ann,

Jason (my son) was tied up with Victoria Children's Choir activities this weekend so we were not able to attend the eelgrass restoration event. I have heard glowing reports from a couple of people who did though - congratulations on a very successful program!

Tom

----- Original Message -----

From: <[steplite@telus.net](mailto:steplite@telus.net)>

To: "John Scull" <[jscull@shaw.ca](mailto:jscull@shaw.ca)>

Cc: "Cowichan Community Land Trust" <[cclt@island.net](mailto:cclt@island.net)>; "Jim (Malaspina) Ayers" <[ayers@mala.bc.ca](mailto:ayers@mala.bc.ca)>; "Charles Poole" <[cepoole@shaw.ca](mailto:cepoole@shaw.ca)>; "Jim Moir" <[jtmoir5@hotmail.com](mailto:jtmoir5@hotmail.com)>; "Jim (home) Ayers" <[sturdyayers@shaw.ca](mailto:sturdyayers@shaw.ca)>; "Tracy (home) Fleming" <[robert\\_lawrance@yahoo.com](mailto:robert_lawrance@yahoo.com)>

Sent: Tuesday, May 09, 2006 11:05 AM

Subject: Re: Super Ann

> I was out of town as well and am out of town again. I was in town long enough

> to read the local paper that a friend had saved for me and saw the photographs

> in the paper. I echo John in his sentiments.

>

> Pamela

>

> Selon John Scull <[jscull@shaw.ca](mailto:jscull@shaw.ca)>:

>

>> I was unfortunately out of town for the Eelgrass planting, but I heard a

>> great

>> deal about it in Duncan today. Three separate people told me what a fabulous

>> event it was and attributed the success to Ann's organization and

>> leadership.

>>

>> Thanks for this effort, Ann, and congratulations on a very successful event

>> that

>> is improving CCLT's standing in the community, attracting volunteers, and

>> benefitting the critters that depend on the eelgrass.

>>

>> John

**APPENDIX XIV**

**Call for volunteers – July transplant**

Could you forward this on to all those you think might be interested - Thanks (Apologies for cross posting)

\*\*\*\*\*

We are again gearing up for another large **Eelgrass transplant** in the Cowichan Estuary **on Saturday, July 15th and Sunday, July 16th**. We will once again be aiming for **2500** eelgrass shoots transplanted!! If you have been out with us before, you know the drill, but we welcome newcomers too as it is a good way to get involved, meet interesting people and restore essential habitat for salmon and marine life.

We will be meeting at the boat launch in Hecate Park, which is off the Cowichan Bay Road on Saturday and Sunday starting at 9am. At least 12 Land based volunteers will be needed for one or two hour shifts to tie eelgrass shoots with their weights (washers and twist ties) before they are taken out by dive teams for planting. Others will be needed transport the tubs and buckets of eelgrass shoots to and from the harvesting and transplanting boats.

**Please choose a shift on the attached schedule and RSVP** so we can fit everyone in at the tying tubs.

It is highly recommended to bring a small stool or pad - there will be room for a few small folding chairs too if needed. **Get your friends, neighbours or staff members to come out and join in!**

**For our Divers** - please let me know when you can help out by signing up on the Divers schedule that is attached.

Thanks to everyone for their support - our fantastic volunteers, the Pacific Salmon Commission, the Habitat Conservation Trust Fund, and the BC Conservation Foundation. With their help we have transplanted over 3000 eelgrass shoots and been able to re-introduce the rare and locally extirpated Free lunch (*Luncheon gratis*) for our volunteers.

See you there!!

\*\*\*\*\*

Ann Archibald  
Cowichan Community Land Trust Society  
#6 - 55 Station Street  
Duncan, BC  
V9L 1M2  
Phone: (250) 746-0227  
Fax: (250) 746-9608  
[www.island.net/~cclt/](http://www.island.net/~cclt/)

**APPENDIX XV**

**Interpretive Signage – See enclosed CD**

**APPENDIX XVI**

**Eelgrass Restoration Methods; Australian Style – See enclosed CD**

**APPENDIX XVII**

**Streamtalk Article - See enclosed CD**

**APPENDIX XVIII**

**Activity-based Educational Presentation – See enclosed CD**

**APPENDIX XIX**

**Monitoring report – See enclosed CD**

**APPENDIX XX**

**Transplanting Data – See enclosed CD**

**APPENDIX XXI**

**Monitoring package – See enclosed CD**

**APPENDIX XXII**

**HCTF Award Media Releases – See enclosed CD**