Management Recommendations

Estuary management plans need to Integrate actions for the benefit of Fish, Wildlife and Plant communities. They must involve stakeholders in the surveys, reviews and plans. Below are recommendations that summarize the conclusions of each section of this report.

1.) Invasive Species

Establish an invasive species plan for the estuary. Identify each species including specific goals for management - acceptance, control or eradication. Refer to the annotated invasive species list that forms a part of this report. Work with neighbouring land owners on the estuary to establish buffers for cooperative control of invasive species around the estuary. For example;

- Control the Canada Goose population before it controls itself (by exceeding its carrying capacity and simplifying the estuary, thereby lowering the ability of the estuary to produce food for Canada Geese). Openly involve the public in the information and decision making process from the outset of the debate. Also include at the discussion table the interests of the migratory Canada Geese and all the other species of waterfowl that would soon find no food available at the Englishman River estuary if the non-migratory population Canada Goose continues on its current path.
- Use a poster or brochure with photographs to inform the public about what species are invasive and what the problems of invasive species are. Describe invasive species method of entry and exactly how anyone can help to prevent it. Many neighbouring people chose their house because they care about their estuary and they want to help.
- Remove all Birch (*Betula spp*) from the estuary. The goal is complete eradication near Mills Road.
- Remove all Periwinkle (*Vinca minor*) from the estuary. The goal is complete eradication near Plummer Road.
- Start broom removal in areas of highest ecological benefit and highest chance of success. This report concludes that Broom Management Zones A, B and C satisfy these two conditions.
- Nearshore management of invasive Sargassum

2.) Public Awareness

- Encourage continued volunteerism and stewardship with the project with regularly scheduled activities. Continued opportunities for stewardship and monitoring should be offered. Topics could include alternatives to pesticides, herbicides and fertilizers; continued monitoring of the estuary and nearshore elements of this study such as vegetation, fish distribution, water flow monitoring, etc
- Establish training courses on estuarine surveys for the volunteers.
- The careful approach that was taken when removing broom from the spit area adjacent to San Pareil Lagoon should be continued in all management planning of that area to protect the thin layer of bryophytes and forbs there. Ideally there could be signs or some other technique to let neighbours know that this area represents the rarest of the ecosystems in the Regional District of Nanaimo that were mapped in the Sensitive Ecosystems Inventory (McPhee et al. 2000).

- Ask an MVIHES representative to sit again on the Parksville - Qualicum Beach Wildlife Management Area (PQBWMA) steering committee. Help to resurrect the PQBWMA committee as an important voice for the river and the estuary.
- We need to educate the public, developers, real estate agents, landscape architects, elected officials and property owners about alternatives to armouring a shoreline.
- Re-new partnerships with groups already involved in this shoreline work.
- A series of workshops and other tools should be developed for the audience groups, by building on what has already been accomplished (Healthy Shorelines workshop).
- Keep the database of people contacted in the project. Facilitate neighbourhood meetings where all the landowners in and around the estuary can explain their situations and maintain contact with one another. Use a brochure or a card to maintain contact. Record the time spent on this to see if it is cost effective over not staying in contact and fixing fencing instead.
- Build trust with the public by aiming for broad public involvement in every issue, even those issues like the Canada Goose, where the situations are sometimes awkward. Offer training for staff and volunteers in effective interpersonal communication such as Non-violent Communication (Rosenberg, 2003).
- Continue to work with the Arrowsmith Naturalists at developing some clearly defined projects for volunteers, such as mapping Robert Geranium distribution (using the methods that were developed in this study), pulling up Lesser Periwinkle on Plummer Road with the help of school children, or recording the timings of the onset, peak and closure of the ecological events listed in the Mapping Special Places section of this report.

3.) Property and People Management

- Limit human access to Big Island with no bridges and no new trails.
- Maintain fencing and gates to block access for motor vehicles, especially quads and motorcycles access at Shelly Road.
- Continue posting "no camping/no garbage" signs, especially up high on trees in Plummer Road Forest and at edges of Big Island.
- Post a sign that lets marijuana growers know that they are under observation and, as a result, they might lose their crop. Let burl cutters know that they can be prosecuted.
- Establish a procedure for reporting incidents and let the public know. Determine reporting protocols.
- Leave the fire hydrants intact and operational. Low pressure for fighting fires is probably better than no water at all, in the face of global warming and increased use by humans who start many forest fires, brush fires and grass fires, accidentally or otherwise.
- Allow people to use the estuary lands in an non-consumptive way. Develop methods to shift liability to the individual user and away from the land owner or manager. Find a lawyer with the expertise to create "wild lands" status so that the land owner is not liable for anyone who enters their land
- Put up a permanent sign post that allows easy-to-change signs. Change the signs to inform people about issues like the snail from Port Alberni estuary and how to prevent its spread.
- Secure wildlife corridors in river and along riparian zones using covenants and purchase if necessary, especially so that predators can become

inexpensive labour to help with the Canada Goose problem. Calculate the cost of the program and the value of the effects.

- Move systematically towards breaching of the San Pareil dyke and "reclaiming" the alienated lands for use by wildlife including fish, and by native plants. Follow the recommendation of the report on breaching the San Pareil Dyke, if they meet with public approval at regular public meetings.
- Consider the entire estuary community from the condominiums of the solitary bees to the nest in the eagle trees when looking at suggestions for side channel opportunities, habitat enhancement or restoration. The estuary landscape seems to be packed with many experiments at enhancement that are difficult to distinguish from the industrial uses and alterations of the generation before.
- Acknowledgement of the value of the local nearshore to the herring and the many food chains dependent on herring, needs to occur. This information should be included in a variety of education programs.

4.) Advocacy

- Lobby as individuals and groups to change the laws about what are invasive species at the federal and provincial levels. Use the wording of laws in nearby jurisdictions like Washington, USA to make it illegal for people to wholesale, retail or cultivate plants like Scotch Broom, English Ivy, Lesser Periwinkle and Yellow Lamium (*Lamiastrum galeobdolon*).
- Lobby as individuals and groups to change the laws of accretion and flood plains. Crown should claim any land that is accreted. Floodplain needs more mapping and development covenants pursued by all levels of government.
- We need to review our shoreline variances in order to understand how shoreline modifications are approved and then develop tools and/or a revised process to assist in better decisions regarding nearshore health.
- Lobby as individuals or groups to protect water quantity and quality for nature. Estuaries need fresh water; less fresh water would likely mean a smaller, more saline estuary. Impinging effects of climate change would need to be considered in any discussion of water allocation. Dam construction and water withdrawal have the potential for great harm to the river flow and estuary environment.
- We need to have laws to protect our nearshore including local bylaws and enforcement of the Fisheries Act. Monitoring of the fishery vs. the habitat should continue, and a forage fish policy pursued similar to that in the State of Washington.
- Given the value placed on the estuary by the community, it is important that upcoming OCP reviews consider these values. Bylaws protecting estuary and nearshore areas should be reviewed

5.) Monitoring and Research

- Continued fish population and species monitoring is needed to determine if the fish are on an upward or downward trend. It is recommended that another study be done within 5 years (or sooner if significant alteration occurs on the estuary).
- Water quality monitoring must continue annually, this is vital as several sites had toxic levels entering the estuary. Both field and laboratory analysis at storm drain outlets and the river. Annual funding (est. $10k minimum) needs to be secured through grants or government partners picking up the costs.
- A more complete study of the marine riparian area should be conducted.

- A study of the marine riparian vegetation that is not in existence but should be needs to be completed. Information from such a study should be shared through education programs, and incentives given to plant and restore the riparian zone.
- A study of the marine riparian vegetation that is important to First Nations should be completed. Information from such a study should be used to help restore function to the estuary and nearshore, but also create partnerships with First Nations communities. Consideration should be given to re-establishing estuary gardens, and designing protection and restoration projects for important native plants.
- Key marine plant species such as Eelgrass require studies with respect to gravel bars, diatoms, copepods, water quality, disease and invasives.
- Mapping of forage fish presence and habitat should continue.
- Shellfish surveys of population and habitat.

6.) Restoration

- Storm Water management plan. Control at source, treat and detain along system. Work with government to initiate immediate plans.
- Fish habitat improvements – riparian planting, stream bank planting
- We need to review the possibilities for restoration of softshores within the study area.
- Eelgrass planting after studies identify appropriate areas.