



Cowichan Shoreline Stewardship Project (CSSP)

Annual Report

2015

Volume I

Prepared For

**Cowichan Lake and River Stewardship Society
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March 2016

Report Background:

This report is a summary of the activities of the Cowichan Lake Shoreline Stewardship Program in 2015. The project began in 2014 under the direction of the Cowichan Lake and River Stewardship Society, with the overarching goal of sustaining a healthy lake shoreline.

We wish to thank the following (2015) funders: Eco Action Community Funding Program (Environment Canada), Recreational Fisheries Conservation Partnership Program (Fisheries and Oceans Canada), Habitat Conservation Trust Foundation, Pacific Salmon Foundation, Sidney Anglers, Youbou Nature and Habitat Fund (Cowichan Valley Regional District), Vancouver Island Real Estate Board, and Lake Cowichan First Nation.

We wish to acknowledge the contribution of the following organizations for their assistance and advice in making these projects a success: Cowichan Valley Naturalists, Cowichan Community Land Trust, Lake Cowichan School, BC Conservation Foundation (C. Wightman) and Dave Polster of Polster Environmental Services Ltd.

Finally, we wish to thank the landowners who allowed us to “restore” their shorelines to demonstrate the value of native riparian plants to others. In particular, we thank the Lake Cowichan First Nation for allowing us to work alongside them in healing their shoreline.

Dedication (in memoriam)

The 2015 report is dedicated to the memory of Gerald Thom, whose respect for nature and environmental stewardship will endure on Cowichan Lake for years to come. His energy, dedication and spirit will always be greatly missed!

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DISCLAIMER

The Cowichan Lake and River Stewardship Society and the 2015 report's authors should not be held responsible for errors of omission or interpretation, given best efforts were made to verify the accuracy and completeness of field data collected and presented in this technical document.

ABSTRACT

Cowichan Lake is the jewel of the Cowichan watershed. The area's economy depends on the lake's diverse habitats and ample supply of clean freshwater. For this reason, the local community has expressed a strong desire to preserve and protect natural capital that sustains the lake's health. To that end, the Cowichan Lake and River Stewardship Society (CLRSS) has been the "community lead" in implementing strategies directed at ensuring a healthy lake ecosystem.

In 2015, the CLRSS was successful in securing sufficient financial resources to continue a second year of the Cowichan Shoreline Stewardship Project (CSSP). The CSSP was organized into three sub-projects:

1. Landowner education;
2. Shoreline restoration and demonstration projects; and
3. Community engagement.

Between 2012 and 2015, volunteers visited shoreline properties and knocked on 674 doors to engage homeowners in a conversation about lake shoreline stewardship. The visit includes a request for homeowners to participate in an opinion survey about development issues on the lake. A total of 70 such surveys were completed in 2015.

Nine properties were subject to extensive site planning and restoration work in the summer of 2015. On average, twenty percent of the total time spent on each site was dedicated to the removal of invasive plants. A total of 1,131 potted plants were purchased from local native plant nurseries and successfully planted at or near the 164m elevation (average annual high water) contour of the lake. Plant survival for sites completed in 2014 indicate a 67 percent success rate. Monitoring is showing that certain woody stemmed plants, like Pacific Crabapple, is attracting ungulates and beavers to newly planted sites to browse.

In 2015, the CLRSS was active in community engagement activities, focusing on educating and involving local youth in shoreline restoration, while fostering closer stewardship ties to the broader Lake Cowichan community.

Recommendations flowing from the 2015 project include modifying restoration planting regimes in future years, based on outcomes of the 2014-15 shoreline site monitoring.

1.0 INTRODUCTION

Cowichan Lake is a ‘jewel’ of the Cowichan River watershed. The area’s economy depends on the lake’s diverse natural habitats, summer tourism and a continuing supply of clean freshwater. For this reason, many local residents have expressed a strong desire to preserve and protect the ecosystems that sustain the lake. The Cowichan Lake and River Stewardship Society (CLRSS) has been the “community lead” in implementing strategies directed at preserving healthy lake ecosystems (Law and Brophy 2015).

Starting in 2014, the CLRSS succeeded in acquiring funding from multiple sources, providing sufficient financial resources to implement the Cowichan Shoreline Stewardship Project (CSSP). The short-term objectives of CSSP are as follows:

By April 2017 the CLRSS will:

1. Restore over 1,000 linear meters of shoreline or 15,000 square meters of salmonid (riparian/aquatic) habitat, to reverse the current trend of habitat destruction and provide much needed public demonstration sites.
2. Conduct 300 lakeshore property visits/inspections to educate owners/occupants of the value of natural riparian zones and near-shore aquatic habitats.
3. Form partnerships with private lakefront landowners to encourage the permanent protection of 15 km of shoreline/riparian areas.
4. Engage youth and the broader community in stewardship efforts to create a ‘cultural shift’ required to protect shoreline ecological values.

The CSSP completed a second year of activities in the Lake Cowichan community in an effort to achieve these objectives. This report highlights recent achievements as well as challenges for the years ahead.

The report includes a **Volume 2**, (Appendix 6.9) which is a compilation of all site/property specific data, from the riparian restoration and planting portion of the project.

2.0 METHODS

The 2015 Cowichan Shoreline Stewardship Project was organized into three sub-projects:

1. Landowner education;
2. Shoreline restoration and demonstration projects; and
3. Community engagement.

Each of these sub-projects required a level of detailed planning and organization, coupled with a field component to accomplish the task. The following methods highlight “how” each of the projects was delivered successfully.

2.1 Landowner Education

Landowner education continued this year, with a number of activities organized and delivered by CLRSS volunteers.

2.1.1 Public Education Materials

In 2015, CLRSS volunteers recognized a need to develop new materials for keeping the community better informed. The following CLRSS brochures are fundamental to this communication strategy (Appendix. 6.1):

- A brochure entitled: ***Cowichan Lake & River Stewardship Society: Dedicated to the Protection and Health of the Cowichan Watershed.*** The brochure summarized the *Cowichan Shoreline Stewardship Project* and other Society activities like the annual river cleanup, fish habitat signage, and water quality monitoring on the lake.
- CLRSS members developed the “***Gerald Thom Environmental Studies Bursary***” brochure in 2015. In dedication to the CSSP founder, Gerald Thom, the document details the bursary’s objectives and encourages local youth interested in seeking an education in *environmental resource management* to apply for the bursary. Gerald frequently said, “Youth are our most important resource, and their environmental education is key to the preservation of our local watersheds.”
- The “**Riparian Insights**” brochure informs property owners of the ecological values of riparian vegetation and existing CVRD and Town of Lake Cowichan bylaws to protect same.

CLRSS members distributed these brochures to shoreline residents during landowner visits.

2.1.2. Landowner Visits

As in previous years, a team of volunteers continued the “landowner visit” project that began in 2012. These visits are an effective communication tool for educating shoreline property owners, and listening to their concerns. Volunteers followed a well-defined ‘playbook’ for ensuring all properties around the lake are contacted at least once during the life of the CSSP project.

- I. From Creekside to Youbou. Starting at 9246 Youbou Road, and proceeding west, visiting all developed (shoreline) properties, to 1062 Alder Cres. (last private house on the lake in Youbou).
- II. From Meades Creek Road to Town of Lake Cowichan. Starting from 9246 Youbou Road, (includes Sunset Road, Marble Bay, North Shore Road) to the Town of Cowichan Lake municipal boundary on North Shore Road.

- III. Town of Lake Cowichan, (From the municipal boundary on North Shore Road, to intersection of South Shore Road, then west to Point Ideal Drive.
- IV. From the municipal boundary on South Shore Road, west (includes Forestry Road and Walton Roads) to Gordon Bay Campsite.

In 2015, the volunteers followed the route (described above), starting from Creekside. If no one was home, then volunteers moved to the neighbouring property.

2.1.3. Landowner Opinion Survey

The opinion survey developed in 2014 was an important part of the landowner interview. The survey is used to capture a “snapshot of owner attitudes and knowledge” about the lake. The survey’s questions are designed to measure the behavioral change(s) of landowners over time (Appendix 6.2). In 2015, the volunteers focused on residences where nobody answered the door when visited in 2014.

The 10-question survey was organized into three parts:

1. Landowner **awareness** of local government regulations regarding the importance of riparian vegetation for fish and wildlife, water quality and erosion prevention.
2. Landowner **attitudes/preferences** towards different private property development patterns/models (common to Lake Cowichan shorelines).
3. Landowner **demographic data**: sex, age, length of ownership, permanent or part-time resident.

For the attitude and preference questions, a series of five photos, representing different shoreline residences and “treatments” of vegetation along the shoreline were demonstrated. These photos were used in last year’s survey and show local properties that have modified their shoreline from a natural condition, such as:

- Removal of riparian trees and shrubs;
- Building erosion protection (rip-rap wall);
- Beach creation (through clearing or sand deposition); and
- Construction of docks.

2.2 Shoreline Restoration Demonstration Projects

To support the project in this 2nd year, the CLRSS once again hired Christine Brophy as project manager, a student in her final year of Natural Resource Protection at Vancouver Island University (Nanaimo). Christine started in May 2015 and focused her attention on the planning and delivery of shoreline restoration projects. Beginning in July, four local students were hired from Lake Cowichan School to gain work experience in shoreline restoration practices.

2.2.1 Site Selection Process

Candidate properties for riparian restoration in 2015 were brought to the attention of the project manager as follows:

1. Through expression of interest during the lakeshore landowner visits and interviews;
2. Landowners contacting CLRSS after hearing about the project; and
3. By Cowichan Valley Regional District (CVRD) referral.

A ‘team approach’ was used to determine which of these sites should be short-listed for implementation. The team often included the project manager, a CLRSS volunteer, Peter Law (BCCF) and Dave Polster (Polster Environmental Services Ltd, Duncan).

Criteria used to select a potential restoration site included:

- the ecological function of the riparian area;
- impact of erosion on the shoreline;
- invasive species management;
- existing shoreline alterations (natural & anthropogenic);
- surrounding native riparian species (if any);
- annual water level fluctuations; and
- shoreline substrate composition.

Some properties were referred because of RAR Development Permit bylaw contraventions involving the CVRD. Many of these candidates were initially referred to qualified environmental professionals for development advice with respect to the RAR implications.

In June, a final list of candidate sites was selected. A tour of restoration sites was organized to orient the summer work crew and promote the project to local elected officials.

2.2.2. Developing Site Plans and Permitting

Restoration site plans and permitting adhered to the following steps:

Step 1. Initial visit to the shoreline property to identify impacts to riparian area and discuss with the owner their ideas and what could/should be in the plan.

Step 2. Project Manager develops a site restoration plan, identifying objectives, physical conditions of site, area to be restored, native species to be used and invasive plants to be removed (Appendix 6.4). Plans are then drawn to scale, using LIDAR satellite images supplied by the CVRD (if available). Sites on the Cowichan River used cadastral maps (supplied by CVRD). Both types of maps provided property boundary lines, mean high water mark and scale. The draft plans were hand-drawn onto enlarged (blueprint sized) maps, using planting codes and legends.

Step 3. Draft plans are reviewed by Restoration Ecologist, Dave Polster and re-drafted, as needed.

Step 4. A second visit with the property owner takes place, to discuss the final draft of the riparian restoration plan and confirm the scope of work to be performed.

Step 5. A **CSSP Property Riparian Area Restoration Agreement** form is signed-off by both parties, confirming the total number of riparian plants to be used, amount of time to perform restoration, and future monitoring needs for the site (Appendix 6.3).

Step 6. The landowner also signs an authorization form agreeing to the project within the shore zone of their property. This authorization forms part of a package of information submitted to **Front Counter BC** as a **Notification to do Works in or About a Stream** under “Section 9” of the *Water Act*. The Notification is a Provincial Permit, allowing work to proceed with specific/general conditions. The DFO Restoration Biologist for the South Island is also notified of the project’s details in early June.

Step 7. Upon project completion, “as-built” site measurements are recorded on Site Restoration Field Forms (Appendix 6.4). Site photos are taken before, during and after construction. They form the basis of a longer term “photo-point monitoring” system.

2.2.3 Plant Purchasing and Planting Protocol

Potted plants were purchased from Streamside Native Plants Nursery in Bowser and Green Thumb Nursery in Nanaimo. Botanical/scientific names were used when ordering stock to ensure the desired native species were correctly ordered. The Lake Cowichan Secondary School greenhouse was used extensively for storing plants for short periods during the months of July and August. Plant delivery to sites occurred in a number of ways, such as:

- transported direct by the nursery;
- transported from the LCS greenhouse by CSSP rental truck.

Planting protocols for each site were the same as those used in 2014. Planting density and species followed the Ministry of Environment *Riparian Restoration Guidelines* (Ministry of Environment 2008). *Plants of Coastal British Columbia* (Pojar and MacKinnon 2004) was the primary published reference used to understand the ecology of selected native riparian species. All riparian species used are common to the Cowichan Lake shoreline ecosystem.

Protection of plants from ungulate/beaver browse remained a problem in 2015, without easy solutions. There was general consensus that some ungulate browse was “unavoidable”, no matter what level of protection was deployed. The general approach followed in 2015 was to protect all the woody stemmed plants by enclosing the entire plant with stucco wire mesh,

supported with rebar. No snow fencing or perimeter fencing was used on any sites, as they require regular maintenance.

Live-staking of three riparian species, *Cornus stolonifera* (Red-osier dogwood), *Populus balsamifera* (Black cottonwood), and *Salix scouleriana* (Scouler's willow) was a new technique used in 2015. Sites identified as having erosion issues resulting from lack of root systems were prescribed for live-staking (D. Polster, pers. comm.). Live-cuttings were collected in TimberWest cut-blocks along Island Highway 18 and "soaked" in the Cowichan River for two days prior to planting. The cuttings were approximately 2 metres in length and "staked" into the ground following methods prescribed by Polster (2003). Public information signs were posted where this staking technique was used (Appendix 6.5).

2.2.4 Riparian Restoration Site Care and Maintenance

After completion of restoration planting, a degree of care and maintenance was necessary in order to ensure superior plant survival. Lessons learned from the 2014 "drought" conditions, meant soaker hoses were incorporated into planting procedures to provide a convenient method of daily watering. Soaker hoses provide a slow-deep watering to plants, maximizing their water intake. Stucco wire cages re-enforced with rebar were used at all sites containing woody stemmed native species.

A CSSP-sponsored *Care & Maintenance Brochure* was created for all 2015 property owners, detailing the ecology of the riparian species used, the amount of watering necessary, approximate time for species to "establish" themselves, and how to prune for growth & height (Appendix 6.6). Invasive plant management techniques were also included.

2.2.5 Plant Survivorship Monitoring

A quantitative method of assessing plant survivorship began in 2015. Monitoring of the perennial shrubs is conducted twice annually, first in late October (the beginning of dormancy) and then early May (peak of vegetative growth cycle). Plants were assessed using a standardized monitoring form (Appendix 6.7). 'Control' monitoring sites were also selected near all restoration project sites.

Estimating plant survivorship and related conditions employed the following steps:

1. Using the site-planting plan to identify the location of all plant species recorded in each shoreline restoration project.
2. Within each planting polygon, count each plant species and note condition, vigor and any observed herbivory.
3. Locate photo points and take photos that allow for repeated unobstructed views over time.

Photo-point monitoring is being implemented in the Spring of 2016, where GPS photo identification markers will be established at all CSSP riparian restoration sites.

2.3 Community Engagement

During the past year, the CLRSS Board continued efforts to engage the Lake Cowichan community as part of the 2013 Strategic Plan. To accomplish this ongoing task, there were a number of events, tours and meetings held in the area with a goal of “Keeping the Community Informed”. A workshop was hosted by CLRSS on December 11, 2015, for CVRD Planning Department staff and Area Planning Committee (APC) members for Electoral Areas I and F (Appendix 6.8), to discuss riparian habitat values and protection needs on the lake.

3.0 Results and Discussion

3.1 Landowner Education

3.1.1 Landowner Visits to Residences on the Lake

In 2015, a total of 263 doors of shoreline residences were “knocked” on by volunteers. Occupants who answered the door were greeted and a conversation about the lake’s health ensued. In 2015, occupants of seventy (70) residences were interviewed, representing 27% of doors “knocked” on. Over the past four years (since project inception) the total number of door “knocks” is 674 residences. CLRSS volunteers have “interviewed” 213 occupants (35% of residences), of the estimated 600 around the lake. The lead CLRSS volunteer on the landowner education contact program, has commented that she has not met the same occupant(s) (of residences) twice in the four years of door knocking (Jean Atkinson, pers. comm.).

3.1.2 Landowner Surveys

In 2015, a total of 71 occupants of shoreline residences took the opinion survey. The geographic distribution of residents who answered the survey is as follows:

- From Creekside to Youbou – 58,
- From Meades Creek Road, along the North Shore to Town of Lake Cowichan – 9,
- Town of Lake Cowichan, to Point Ideal – 4,
- Point Ideal to Gordon Bay Campsite – 0.

In 2015, volunteer time constraints resulted in no visits to residences on the south shore of the lake.

Since the inception of landowner surveys in 2014, data have been compiled on whether occupants are part-time (cottagers) versus full-time residents (principal residence). Of the 149 people interviewed, 58 percent are full-time while 42 percent are part-time residents on the lake (Figure 1).

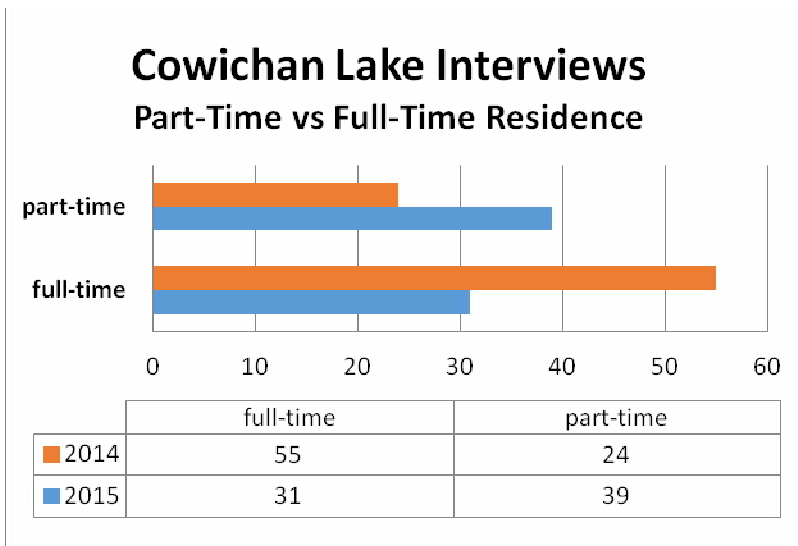


Figure 1. The Amount of Time at the Lake by Residents.

When asked how long they have owned the residence, respondents indicated that half are recent arrivals on the lake (<10 years), with the remainder having a longer tenure of residence (>20 years). Results show that less than a third of those surveyed in 2015 were longtime residents (>30 years), which could be an indication of the demographic change underway since the 1990's, i.e., from forestry-based, full-time residents to recreational/lifestyle residents (Figure 2).

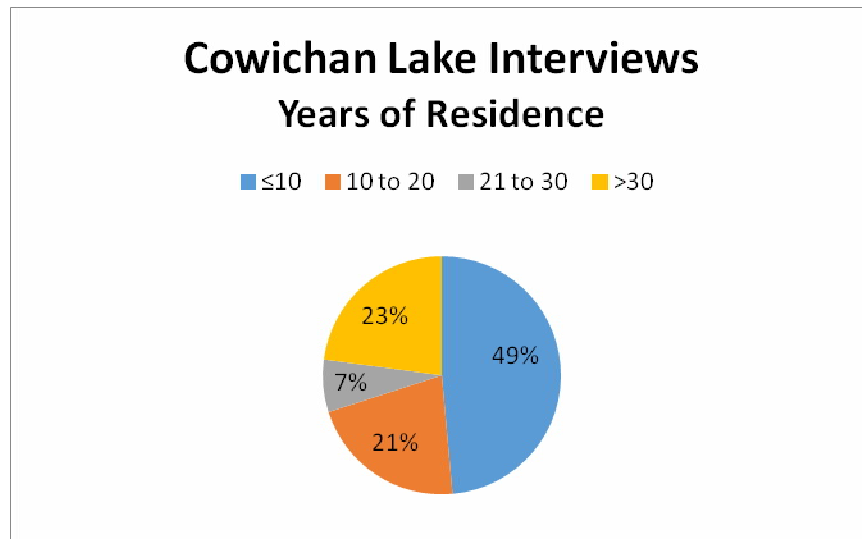


Figure 2. Grouped Years of Lake Residence.

Home ownership was another question asked during interviews, and it is surprising to note that 95 percent of occupants are owners of the residence (Figure 3). This fact is helpful in understanding whether the “landowner visit” program should continue, as it has only reached 35 percent of the lakeshore residences over the past four years. However, if the vast majority of

contacts are actual homeowners, then this is an important initiative to continue, as these people need to be well educated on shoreline preservation and protection issues.

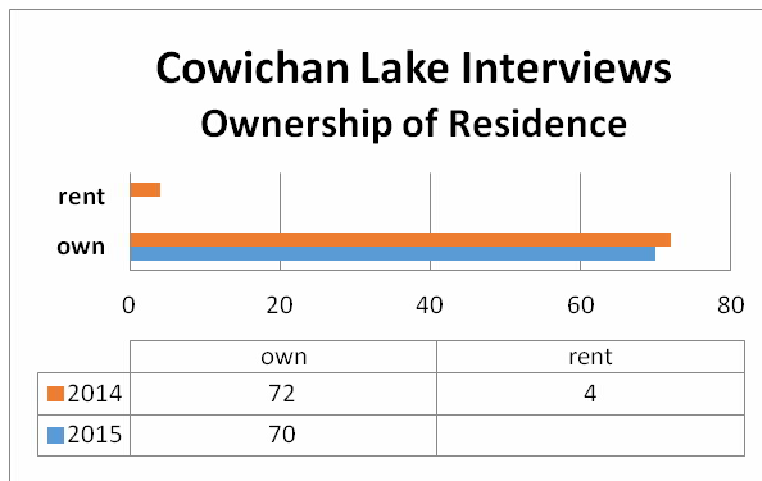


Figure 3. Number of People Surveyed Who Own/Rent the Residence.

The landowner opinion survey was divided into three categories for analysis:

- A. **Awareness** of the health of the lake.
- B. **Knowledge** of regulations concerning the clearing of shorelines.
- C. Landowner **Preferences** of (existing) shoreline development.

1. Awareness.

In 2015, over 90 percent of landowners were concerned about the health of the lake (i.e. water quality, fish populations, recreation), while less than 10 percent expressed the view that the lake is currently ‘fine’ (Table 1). When compared to the response from last year (75% concerned), the lake’s health continues to rate as a very high community concern. Heightened concern in 2015 may also reflect “high profile” protests involving residents of neighbouring Shawnigan Lake over the dumping of contaminated soils from Victoria in the upper Shawnigan watershed.

2. Knowledge

In 2015, over 80 percent of landowners responded with the correct answer about the regulatory requirements regarding shoreline protection of riparian conditions (Table 1). When compared to 2014 results, this continues to show area residents are very knowledgeable about current legal limitations on shoreline development.

3. Landowner Property Preferences

Social Preferences

There are three “social preference” questions that attempt to gauge the opinions of respondents to existing residential development around the lake. The social “values or preferences” were interpreted from landowner responses to a question of “which property would you prefer?”

...1) for privacy/

...2) best views/

...3) recreational values.

The photo that evoked a response of “I like those shoreline features reflected in photo X” would be the picture registered in the survey. Results for 2015 are consistent with responses in 2014 (Table 3).

In 2014, and again in 2015, the majority of survey respondents selected a property showing a shoreline residence with a moderate amount of riparian tree and shrub clearing (50% of natural condition), and moderate beach clearings (Photo #3).



Environmental Preferences

There were two “environmental protection” questions to gauge resident opinions. The environmental “values or preferences” were interpreted from landowner responses to the question “which property would you prefer?”

...1) for resisting erosion and preserving water quality/

....2) as best habitat for fish and wildlife.

Results for 2015 are consistent with the previous year (Table 4).

In both years, respondents preferred the highly vegetated residence with minimal disturbance to the shoreline and a small dock as having the best environmental features (Photo #5).



Economic Preferences

There were two questions focused on preferences regarding the economic costs and (property) values. Economic “preferences” were interpreted from landowner responses to the question “which property would you prefer?”

...1) for having lower maintenance costs/
....2) greatest resale \$\$ value.

The results of the 2015 survey are consistent to the previous year (Table 5).

Respondents in both years overwhelming selected the property with modified shoreline features (i.e. lawn, beach clearing) with high re-sale \$\$ value (Photo #3).



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Table 1. Awareness and Knowledge of Survey Respondents to Environmental Issues on Cowichan Lake.

Survey Questions	Q. Are You Concerned about the Health of the Lake?		Q. Are you allowed to remove vegetation and limb trees between your home and the water?	
	Yes	No	Yes	No
Responses	63	7	12	55

Table 2. Preferences for Shoreline Properties Based on Social Conditions.






Preferred Property					
Social Issues	#1	#2	#3	#4	#5
View and Sunlight	6	6	26	21	10
Privacy	1	3	25	12	29
Recreation	2	9	32	5	19

Table 3. Preferences for Shoreline Properties Based on Environmental Considerations.






Preferred Property					
Env. Issues	#1	#2	#3	#4	#5
Erosion/ Water Quality	0	12	3	15	37
Fish and Wildlife	1	1	3	13	50

Table 4. Preferences for Shoreline Properties based on Economic Considerations.

Preferred Property					
Economic Issues	#1	#2	#3	#4	#5
Maintenance Costs	7	0	5	24	32
Property Value	3	12	38	10	6

3.2 Shoreline Restoration

3.2.1 Site Planning to Implementation

A total of nine sites were subject to riparian planting in 2015 (Table 5). The sites included six private residences, one public park, one strata residence and one commercial business. It should be noted that planning work had been done in previous years for some sites. All site visits, maps and data forms for each property are located in **Volume 2** of this report (Appendix 6.9).

Four sites were located on the lake and five were located on upper reaches of the Cowichan River (Figure 4).

Table 5. Restoration Site "Must Do" Matrix.

Candidate Property	Restoration Plan Completed	Expert Site Assessment Completed	Section 9 Permitting Approved	Property Owner Agreement	Site Planting Completed 2015
377 Nelson Road	✓	✓	✓	✓	✓
10650 Lake Boulevard	✓	✓	✓	✓	✓
7990 Greendale Road	✓	✓	✓	✓	✓
Saywell Park (125C South Shore Road)	✓ 2013*	✓ 2013	✓ 2013	✓ 2013	✓
9254 Youbou Road	✓ 2014	✓ 2014	✓ 2014	✓	✓
87 North Nelson Road	✓	✓	✓	✓	✓
109 South Shore Road	✓	✓	✓	✓	✓
9188 Meades Creek Road	✓ 2014	✓ 2014	✓ 2014	✓	✓
10013 & 10015 March Road	✓ 2014	✓ 2014	✓ 2014	✓	✓

* year when site logistics were completed.

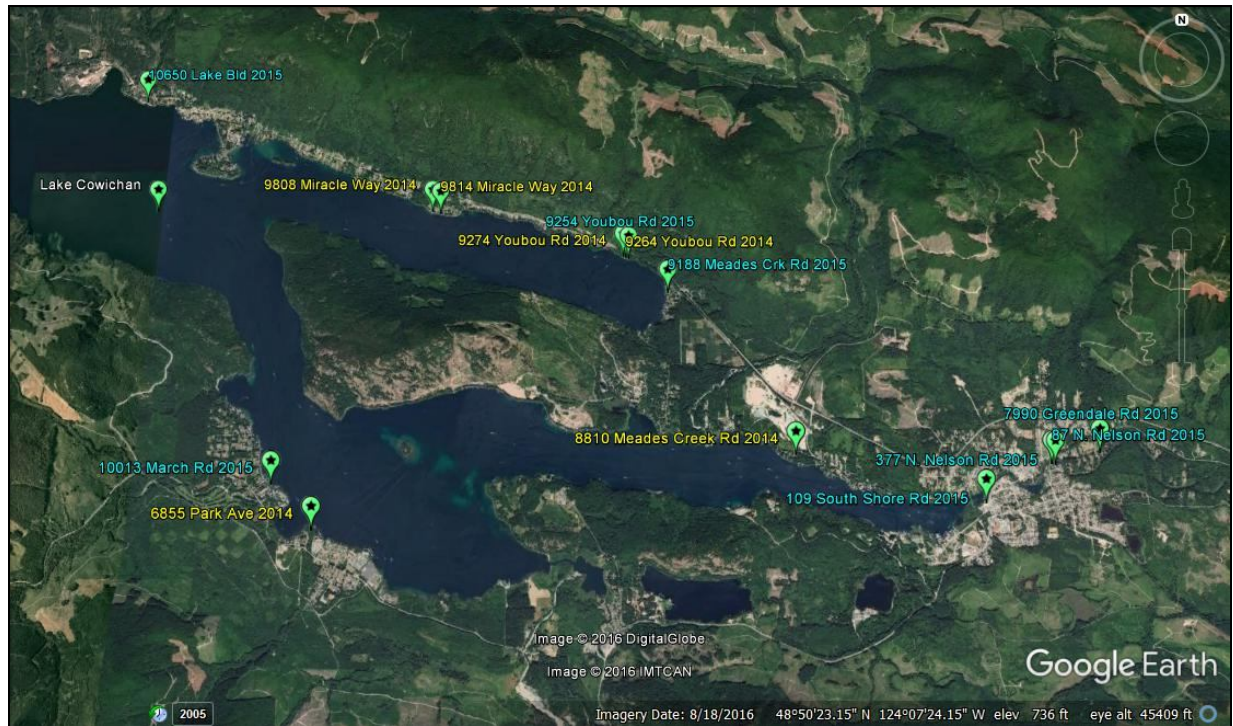


Figure 4. Location of Restoration Properties (2014 and 2015).

3.2.2 Invasive Species Management

Invasive plant management was a significant component of time and effort on eight of the nine 2015 sites (Table 6). The magnitude of invasive plants within the various sites ranged from 90% to just 10% coverage of the shoreline. The primary method of removal was by hand and mattock-axe. In 2015, a total of 44 hours was spent on removing invasive plants, with the most time spent at a site on the Cowichan River where Yellow Flag Iris and English Ivy were choking-out native plant species. When comparing effort between years and between sites, it is worth noting that a range of 20 - 30% of the total effort in (site) restoration by CSSP is devoted to removing invasive plants.

Table 6. Invasive Plants Removed in 2015

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Property	Invasive Plant Species Present*	Percent of Area (m ²) Requiring Invasive Removal	Methods of Invasive Plant Removal	Time Spent Removing Invasive Plants
10650 Lake Boulevard Ave. Youbou	English Ivy Common Periwinkle	20%	Hand-pulling & Mattock-axe	4 Hours
109 South Shore Rd. Lake Cowichan	English Ivy Himalayan Blackberry Canary Reed Grass	80%	Hand-pulling & Mattock-axe	8 Hours
7990 Greendale Rd. Lake Cowichan	English Ivy Common Periwinkle	90%	Hand-pulling & Mattock-axe	8 Hours
377 North Nelson Rd. Lake Cowichan	English Ivy Yellow Flag Iris	60%	Hand-pulling, Mattock-axe, Shovel	12 Hours
10013 March Rd. Honeymoon Bay	Himalayan Blackberry	20%	Hand-pulling & Mattock-axe	4 Hours
87 Nelson Rd. Lake Cowichan	Canary Reed Grass Yellow Flag Iris	30%	Hand-pulling, Mattock-axe, Shovel	4 Hours
9188 Meades Creek Rd. Lake Cowichan	None Removed	0%		0 Hours
9254 Youbou Rd. Lake Cowichan	Canary Reed Grass	10%	Hand-pulling & Mattock-axe	2 Hours
125C South Shore Rd. Lake Cowichan	Himalayan Blackberry	20%	Hand-pulling & Mattock-axe	2 Hours
				Total: 44 Hours

* Invasive Plant Species Encountered:

Himalayan blackberry	(Rubus armeniacus)	Scotch broom	(Cytisus scoparius)
Daphne	(Daphne laureola)	English Ivy	(Hedera helix)
Fox glove	(Digitalis purpurea)	Yellow flag-iris	(Iris pseudacorus)
Cotoneaster	(Cotoneaster frigidus)	St. John's wort	(Hypericum perforatum)
Common periwinkle	(Littorina littorea)		

3.2.3 Riparian Planting

In 2015, there were 1,131 potted plants installed at nine restoration sites (Table 7). This is less than half the number of plants used in 2014. This difference came from the increase of average plant size (gallons) and its relation to the mean planting density/m² of each site. Larger (5 gal) potted plants were used in 2015 for three reasons:

1. Plant maturity (stored energy);
2. Increased survival rates; and
3. Ability to compete with invasive species.

Riparian planting was divided into “foreshore” and “upland” species based on species affinity for wet or dry soil. Of the 1,131 plants used, 55% used were foreshore species and 45% were upland species. Foreshore species were planted below 164 meters in elevation (the mean annual high water mark for the lake). The hypothesis is that these species can withstand periods of water inundation during winter months (D. Polster, pers. comm.). Planting densities averaged one plant/0.63 m².

In 2015, there was one site where 15 volunteers participated in restoration duties. For the remaining eight sites, a crew of four and site supervisor were able to complete an average site’s 253m² of restoration in approximately 27 hours.

Table 7. Number, Planting Density and Labour Expended in 2015.

Property	Riparian Planting (as built) Summary			Area (m ²) Restored	Mean Planting Density Plant/m ²	Total Hours Spent on Site Restoration
	Total Number Used	Foreshore Species (%)	Upland Species (%)			
10650 Lake Boulevard	175	66%	34%	235.3 m ²	0.74	32 Hours
109 South Shore Road	84	41%	59%	100.94 m ²	0.83	30 Hours
7990 Greendale Road	163	19%	80%	146.4 m ²	1.13	34 Hours
377 North Nelson Road,	117	47%	52%	329.12 m ²	0.35	38.5 Hours
10013 March Road	118	88%	12%	200 m ²	0.59	30 Hours
87 Nelson Road	69	60%	40%	100.8 m ²	0.68	15 Hours
9188 Meades Creek Road	154	42%	58%	242.5 m ²	0.63	32 Hours

Cowichan Shoreline Stewardship Project: 2015 Annual Report

9254 Youbou Rd	106	100%	0%	175 m ²	0.60	24 Hours
125C South Shore Rd	145	31%	69%	750 m ²	0.19	6 Hours
Total	1,131	592	533	2,280 m²		241.5
Average	125.7	55%	45%	253.34 m²	0.63	27 Hours

* Includes time spent on invasive species removal and additional volunteer efforts on site:

- Saywell Park - 15 volunteers participating for 1 day

Foreshore plants especially adapted to wet soil conditions were preferred in 2015 (Table 8). Species such as Sweet gale (*Myrica gale*) and Slough sedge (*Carex obnupta*) were planted at a majority of sites. The preference for these plants is due to their rhizome root systems. The lake shoreline environment allows them to send roots underground and create dense thickets in a relatively short amount of time, aiding greatly to treatment effectiveness. When compared to the plant price list in 2014, there was a significant price increase in many of the plants used in 2015, which may have influenced what species were ultimately purchased.

Table 8. Top Ten Riparian Species Used in 2015 Restoration.

RANK	Plant Name (Common)	Plant Name (Scientific)	Preferred Planting Conditions	Foreshore/Upland Species	Total Number of Plants Used	Number of Sites	Size of Plants	Cost /Plant
1	Sweet gale	<i>Myrica gale</i>	sun/wet foreshore	Foreshore	135	6	2	\$4.47
2	Slough sedge	<i>Carex obnupta</i>	sun/wet	Foreshore	120	8	2	\$4.47
3	<u>Kinnikinnick</u>	<i>Arctostaphylos uva-ursi</i>	sun/dry	Upland	95	4	1	\$5
4	Hardhack	<i>Spirea douglasii</i>	sun/wet	Foreshore	84	5	5	\$18
5	Oceanspray	<i>Holodiscus discolor</i>	sun/dry-moist	Upland	68	7	5	\$18
6	Nootka rose	<i>Rose nutkana</i>	sun/wet	Foreshore	67	8	5	\$18
7	Red-osier dogwood	<i>Cornus stolonifera</i>	shade/sun/moist/wet	Foreshore	52	3	5	\$18
8	Tall oregon grape	<i>Mahonia aquifolium</i>	sun/dry-moist	Upland	50	2	5	\$18

9	Sword fern	<i>Polystichum munitum</i>	shade/wet	Upland	41	3	5	\$17
10	Salmonberry/Red flowering currant	<i>Rubus spectabilis</i> <i>/Ribes sanguineum</i>	wet/sun sun/ moist	Foreshore/Upland	30 30	5 4	3 5	\$8.5 \$15

3.2.4 Site Maintenance Issues

In 2015, the CSSP crew had to ensure that plants survived the early months after planting, which can be the most stressful (D. Polster, pers. comm.). The two most common environmental stresses are:

- **Drought** and warm weather, and
- Ungulate (deer and elk) and beaver **browse**.

In 2015, the Lake Cowichan area was again subject to very low spring/summer rainfall, which resulted in the lake level dropping rapidly (Figure 5). The drought resulted in a critically low lake level in late August of 161.46 m elevation. For the CSSP, the majority of lakeshore planting locations were at or below 162.5 m in elevation. In the fall/ winter, these sites will be flooded for six months of the year. The use of “wet” foreshore plants should ensure that plant survivals are optimized in the long term.

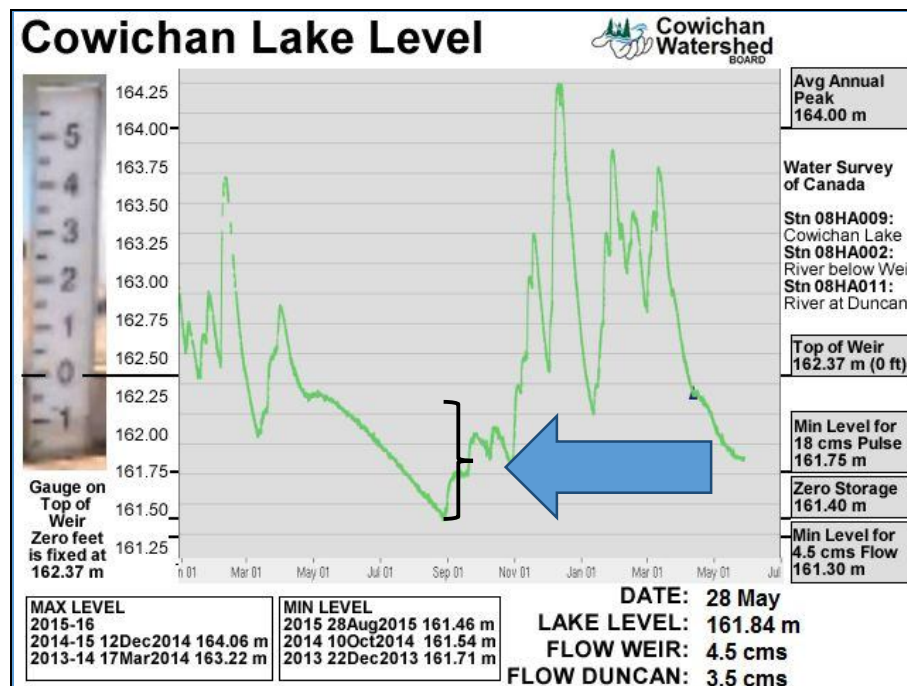


Figure 5. Cowichan Lake Water Levels in Summer of 2015.

Warm average monthly temperatures were common in the summer of 2015 (Figure 6). There has only been one summer (2009) over the past 10 years that was warmer. The CSSP

implemented a watering strategy in 2015 that used “soaker hoses” to keep the young plants’ root systems moist, which should improve overall survivals over 2014.

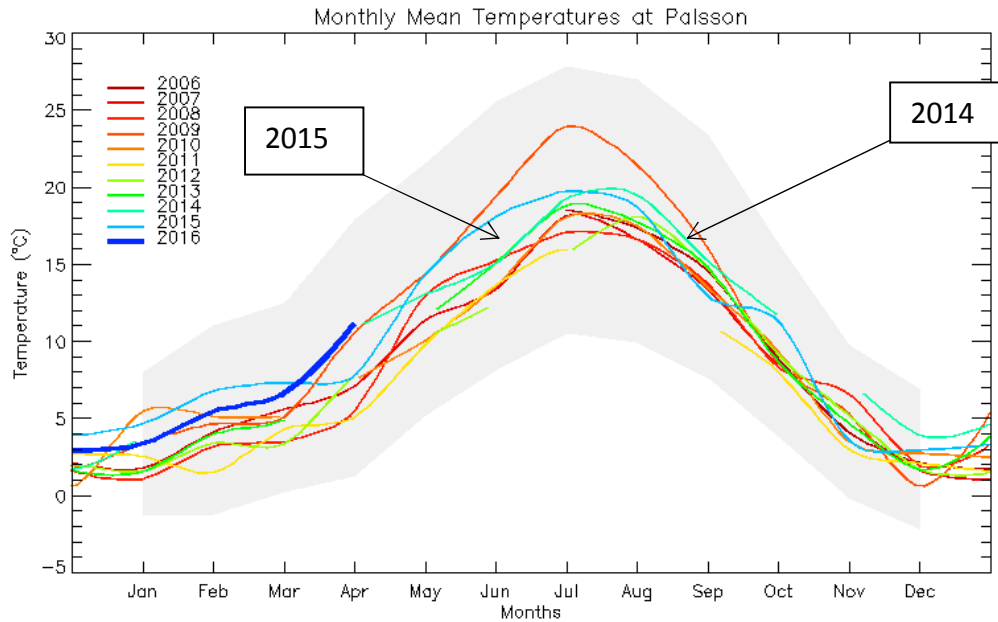


Figure 6. Monthly Average Ambient Temperatures Recorded at Palsson Elementary School in Lake Cowichan (2006 to 2016).

Four of the nine sites restored in 2015 were lakeshore properties where gravel shorelines had an average of 10% vegetation coverage below the mean annual high water mark (Figure 7). Efforts to introduce foreshore plants capable of withstanding lake inundation should prove successful in stabilizing the shore and creating habitat for rearing salmonids (Law 2012).



Figure 7. Site Conditions Subject to Flooding – (Before and After Planting).

3.2.5 2014 & 2015 Riparian Restoration Site Monitoring

Plant survival for sites completed in 2014 is 67 percent (Figure 8). Preliminary monitoring of the nine (2015) sites took place in October 2015. These results showed a survival rate average of 91 percent over a two to three month period (Figure 9). This higher survival rate during the critical first two months after planting suggests a better plant survival outcome in 2015 compared to 2014. This is likely due to the extensive use of soaker hoses and strategic herbivore fencing. A more quantitative comparison of survival rates between 2014 and 2015 will be conducted in the fall of 2016.

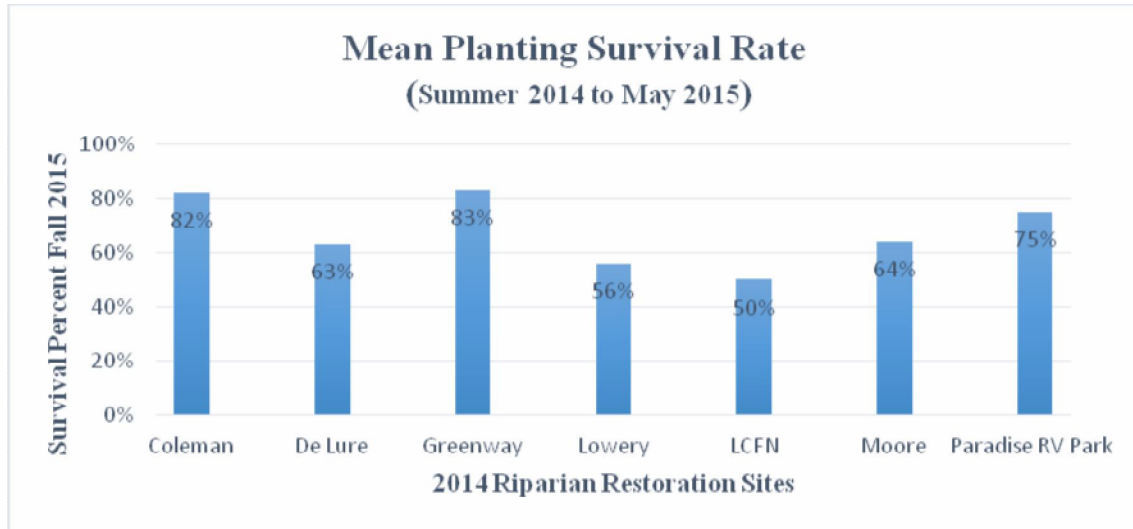


Figure 8. CSSP Riparian Plant Survival Rates for 2014 Sites.

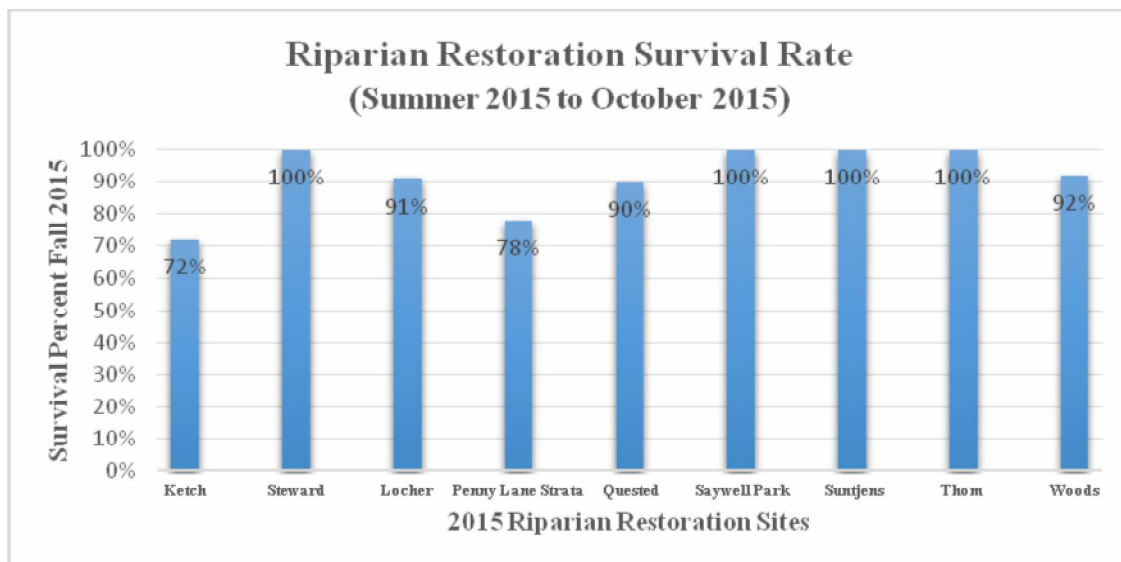


Figure 9. CSSP Riparian Plant Survival Rates for 2015 Sites.

Wildlife browsing of newly installed riparian plants indicate a preference for certain species over others by both ungulates and beavers. Browsed plants were counted by species and compared to planting totals (for 2014 and 2015) on site field forms. This generated an approximate percent of browse per riparian species/ungulates/beavers (Figure 9). Pacific Crabapple was the most preferred plant species by both ungulates and beavers. Red Elderberry and Saskatoon Berry were most preferred by ungulates, while beaver most prefer Vine Maple. Future use of these plants must include a robust fencing program to ensure plant survival.

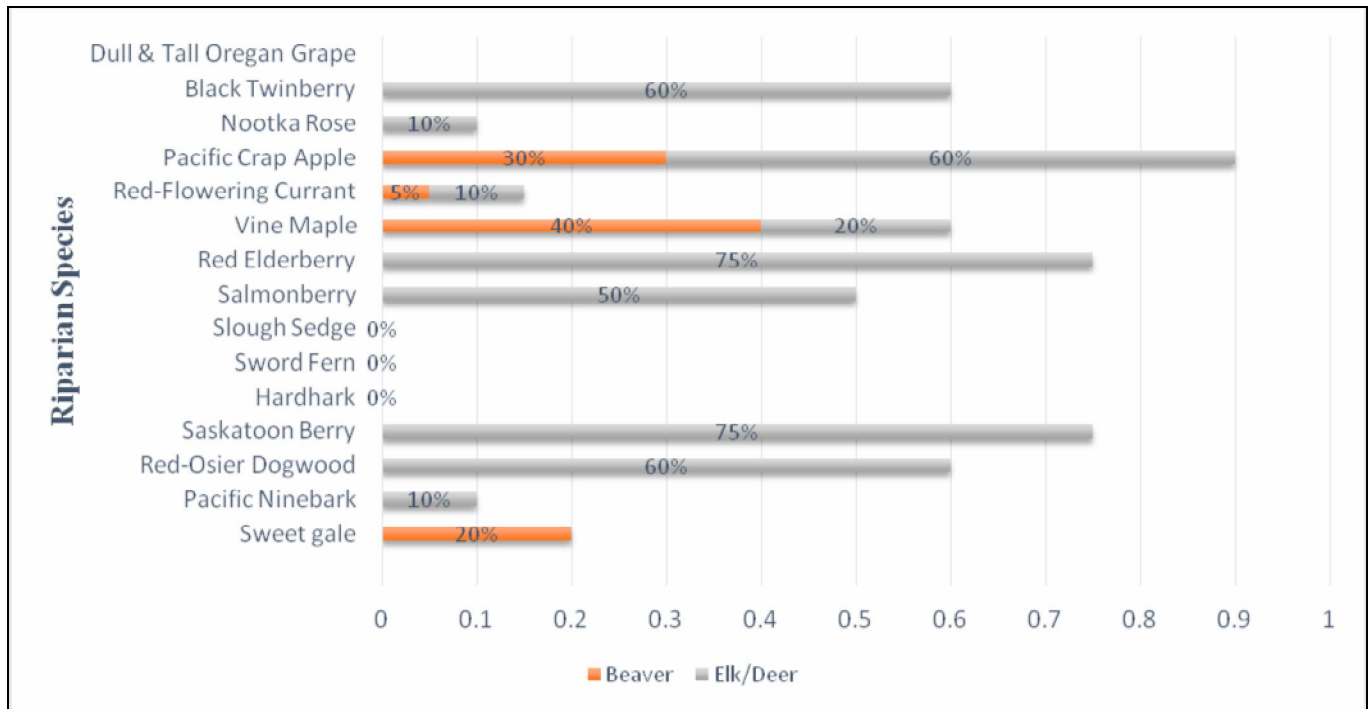


Figure 10. Percent of Plants Showing Browse and by What Herbivore Source.

3.3 Community Engagement

In 2015, there were continuing efforts to target CLRSS volunteer time on educating and involving local youth in lake-based activities, and educating the broader Lake Cowichan Community about the philosophy and practices of lake stewardship (Table 9).

Table 9. CLRSS Community Stewardship Activities in 2015.

	CLRSS Community Stewardship Activities 2015
Youth Lake Cowichan School	Hire students as paid workers on CSSP site restoration projects
	Summer students from 2015 lead a workshop for intermediate and senior grades about summer work experience
	LCS students visit Saywell Park (Town of Lake Cowichan) as part of riparian workshop
	CSSP works in partnership with LCS to use the school's new greenhouse as a local storage facility for plants purchased from the nursery in Bowser
	Established a greenhouse for growing native riparian plants
Community Engagement	Keep local governments and politicians informed of CSSP
	Attend monthly Cowichan Stewardship Roundtable meetings. Presentation to the Technical Advisory Committee of the Cowichan Watershed Board
	CSSP signs posted at all shoreline restoration sites
	Year-round promotion of CSSP at Cowichan Lake community events and in the local media
	Enhanced CLRSS website as "Source of Information" about the lake's environmental values and challenges
	Encourage partnerships with local businesses and private forest companies
	Provide a CSSP presentation to a CVRD Area Planning Committee Workshop on the value(s) of Cowichan Lake shoreline preservation

In 2015, CLRSS continued efforts to maintain an important partnership with teaching staff and students of Lake Cowichan (Secondary) School (LCS). The school is integral to the delivery of the CSSP project, with support coming in many forms including:

- Students annually hired to form the core of the CSSP summer restoration crew;
- The school's new greenhouse provides a vital plant storage and education facility; &
- Intermediate and senior classes learn about riparian restoration on the lake from their own peers (i.e., the 2015 summer field crew).

Community engagement activities in 2015 were numerous (Table 9). Of special note was the hosting of a full-day (December 11, 2015) workshop for local politicians, Area Planning Committee members and CVRD Planning staff (Figure 11). This event was a joint effort by the CVRD, CLRSS and BCCF staff, who provided information and background on the environmental health of lake shorelines, and highlighted restoration work completed to date.

The primary goal of the workshop was to provide Area Planning Committee members and CVRD staff with a summary of Lake Cowichan shoreline ecological facts, to assist in future sustainable development decisions (i.e., residential sub-division proposals).

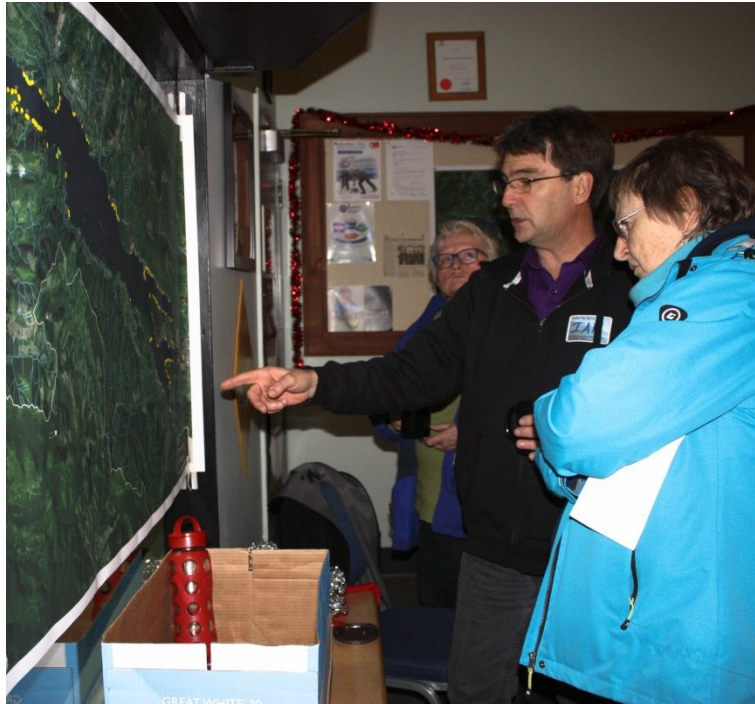


Figure 11. Lake Cowichan APC Workshop Participants.

4.0 Recommendations

1. **Continue the ‘landowner opinion survey’ with more CLRSS volunteers to assist in interviewing summer lake residents.**

The current interview and survey process is an important educational tool for lakeshore residents. Efforts to increase the number of interviews/surveys during the peak summer season should be considered by the CLRSS.

2. **Use results of on-going site monitoring to improve native plant survivals.**

An increase in riparian species that are drought tolerant, like *Mahonia nervosa* (Dull Oregon grape), should be incorporated in treating upland shore areas in response to climate change concerns (i.e., drier summer months in the future). Species that are unappealing or resistant to ungulates and beavers should also help improve the survival rate of future riparian plantings.

3. **Phase planting over two or more seasons.**

Successional planting over two or more planting seasons could help minimize the impact of herbivore browse. Successional planting would start with lower densities of early seral stage riparian species like red alder & willow spp., that should become established within the first year, and then allow for later seral stage species (like coniferous trees) in the

second or later years. Planting in stages could lower the impact of herbivore browse (i.e., less vegetation as attractants), improve soils through nitrogen fixation (alders), add to shade, lower watering requirements, and allow CSSP to increase the number of restoration sites undertaken per year (lower labour time/costs per site).

3. A proper (ungulate) fencing protocol must be developed for future shoreline restoration sites.

Since 2014, all shoreline restoration sites have attracted ungulates and beaver browse. Solutions to this problem are complex, as the lake is a dynamic environment where wire fencing materials can be rendered useless after seasonal storm events. Using a natural style of perimeter fence, called a “living-fence” may be a solution, helping to lower the impact of ungulate browse and fencing material costs.

Cuttings from *Cornus stolonifera* (Red-osier dogwood), *Populus balsamifera* (Black cottonwood), and *Salix scouleriana* (Scouler’s willow) can be used to create a living perimeter capable of absorbing browse due to the high density of new shoots produced. The primary cost in living-fences is labor, eliminating the material cost of stucco wire and rebar. A “test” or pilot living-fence should be installed/monitored in 2016 at one lake site.

4. Encourage property owners to implement routine invasive plant controls.

Selected property owners will be given the *Native Plant Maintenance Manual* that was developed by the CSSP Project Manager and Assistant Manager. This should be followed by a local workshop that will educate owners to conduct routine invasive species control on their shoreline properties.

5. Introduce emergent and submergent aquatic plants at some sites.

Given the current low summer water levels, consideration should be given to planting aquatic macrophyte species at some sites. In addition to providing habitat complexity, these plants will help protect against waves, stabilizing shores and reducing erosion.

6. Continue photo-point monitoring of treated shoreline sites.

Sites should be monitored past the current three-year time horizon of CSSP. Repeat photos of each planting from the same GPS waypoints are envisioned. Plants will be ordered with tags so they can be readily distinguished from Year 1 and Year 2 plantings.

7. The CLRSS website should be regularly up-dated to ensure that information/data from CSSP and related studies on the lake’s ‘health’ are readily accessible to the public.

The goal is to ensure easy access to maps, brochures and other local information.

5.0 References

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6.0 Appendices


Appendix 6.1 Education Materials:

Cowichan Lake & River Stewardship Society Brochure




Safe Boating Practices

The Cowichan Lake and River Stewardship Society has a mandate to promote respectful and safe boating practices on our lake and river. We have produced a "Welcome Boater" brochure that is distributed to marinas and to boat ramps. A printable version is available at our website www.cowichan-lake-stewards.ca.



Water Quality Monitoring


Regular monitoring provides baseline data which will be used to detect change over time. The information is shared with the Province and the BC Lake Stewardship Society to compare our lake with others in the province. Of 110 monitored lakes in BC we are currently ranked second for clarity. For more information on BC lakes visit: www.bclss.org/



Committees

There are several committees in the CLRSS focusing on various aspects of our work. To learn more or volunteer, please see our website www.cowichan-lake-stewards.ca.

- Water Traffic Committee
- Education Committee
- Membership Committee
- Retail Sales Committee
- Annual River Clean-up Committee
- Executive/Finance Committee
- Water Monitoring Committee
- Cowichan Shoreline Stewardship Committee



Cowichan Lake and River Stewardship Society


Dedicated to the Protection and Health of the Cowichan Watershed

Cowichan Lake and River Stewardship Society
PO Box #907
Lake Cowichan, BC
V0R 2G0

For current information visit our webpage
www.cowichan-lake-stewards.ca


email enquiries
webmaster@cowichan-lake-stewards.ca

President Leroy Van Wieren
Phone 250-709-7308
email lwane@shaw.ca




Annual River Cleanup

The third weekend in August is reserved for our annual river cleanup. This two-day event sees volunteers working in teams to rid our river of any foreign objects that have accumulated over the year. Saturday is the upper river cleanup organized by the CLRSS and Sunday is the lower river cleanup organized by Cowichan Tribes. Every year we remove tons of garbage and hundreds of dollars in recyclable bottles from our river. After the work we all enjoy a barbecue and social event where we share stories about our day.




Fish Habitat Signs

CLRSS volunteers have spent the past few years installing these signs on roadways where they cross streams that are utilized by salmon and trout. These signs help improve community awareness of sensitive habitat and promote the health of our aquatic ecosystems.



Saywell Park Restoration

In fall 2013 the CLRSS completed the Saywell Park riparian restoration by removing invasive plants and planting over 1,000 native riparian plants in their place. Interpretive signs were installed. This project serves as a demonstration of the value of riparian restoration being done in the Shoreline Stewardship Project.



Cowichan Shoreline Stewardship Project

The Cowichan Lake and River Stewardship Society has set the goal of protecting 35% and restoring 3% of the Cowichan Lake shoreline by 2020. This process was started in the spring of 2014 when we received funding from several donors and all levels of government to begin the Shoreline Stewardship Project. By September we had completed restoration on seven lakefront properties by removing invasive plants and planting over 2,500 native riparian plants in their place. We hired a crew of four secondary school students and a VIU Environmental Studies student to supervise the restorations.

Work was done in July at Paradise Village RV Park where our students and 34 volunteers planted 556 riparian plants. We then moved on to the Lake Cowichan First Nation lands where we planted 853 plants over 2 days. As well, in July and August the student team completed significant restorations at five private lakeshore residences. Funding is secured for the next two years and the Cowichan Shoreline Stewardship Program will be expanding to include new properties for 2015 and beyond. We hope to continue the CSSP indefinitely.

Gerald Thom Bursary Brochure:

The Gerald Thom Bursary

\$1,000

Conditions

One annual bursary is awarded in the name of Gerald Thom to honour his substantial contributions to ecological restoration, environmental education and advocacy.

Eligibility

Priority will be given to LCS applicants planning to enrol in post-secondary environmental studies related courses.

Criteria

Preference for this Bursary will be awarded to a Lake Cowichan School student who:

- Has successfully completed the Lake Studies Program.
- Has demonstrated commitment and service to improving or restoring the local environment. (Actions include effort towards water testing, record keeping, clean-up activity, planting, article writing and nursery management.
- Has demonstrated a willingness to educate others regarding environmental stewardship.

Applications

1. Application forms are available from the Lake Cowichan School Office.
2. Applications will be reviewed and recipients selected by the LCS and CLESS Education Committee.

Donations

If you would like to donate to the Gerald Thom Environmental Studies Bursary Program please send contributions to:

CLESS, PO Box 607
Lake Cowichan BC V0P 2Z0

or

Lake Cowichan School, 1811 South Shore Rd.
PO Box 40, Lake Cowichan, BC V0P 2G9



Cowichan Lake and River Stewardship Society
www.cowichan-lake-steward.ca

Gerald's Legacy:

Encouraging Environmental Study and Action for Generations to Come

Our Youth is our most important resource. They hold the future of our community in their hands. Gerald Thom always emphasized the importance of engaging our youth in the stewardship of our watershed. The Cowichan Lake and River Stewardship Society is working hard to preserve and protect our watershed. We want to follow Gerald's lead by encouraging our young people to become aware of and directly involved in the protection and preservation of our precious watershed ecosystems. We are pleased to provide some financial assistance to deserving LCS students that want to learn more about environmental protection and preservation.



The Cowichan Lake and River Stewardship Society

PO Box 6907
Lake Cowichan, BC
V0P 2G9
President: Larry Van Wieren
250-709-708
cleo.quadson@gmail.com
www.cowichan-lake-steward.ca

Announces

The
**Gerald Thom
Environmental
Studies Bursary**



www.cowichan-lake-steward.ca

Riparian Insights Brochure:

Who are we?

The Cowichan Lake & River Stewardship Society (CLRSS) is a volunteer group of caring neighbours dedicated to the protection and enhancement of the Cowichan Lake Watershed. The CLRSS Riparian Education Project promotes a "stewardship first" culture and act in cooperation with landowners to protect and enhance riparian areas on private land.

Did you Know?


- 92% of the lake shoreline (including forest land) is privately owned. Owners of ecologically important habitat are responsible to preserve publicly owned resources, the fish and the water, now and for future generations.
- 70% of shoreline of Cowichan Lake is still in an undisturbed state and needs protection. This land and vegetation adjacent to watercourses (the riparian zone) is essential for water quality, fish stocks and wildlife, as well as flood and erosion control.
- The shoreline of Cowichan Lake is a nursery for up to 300,000 wild coho salmon annually. It also contains self-sustaining populations of cutthroat, rainbow, dolly varden and kokanee.

How can CLRSS support you?


- Visit our riparian webpage www.cowichan-lake-stewards/riparian.htm to learn more about the importance, protection, enhancement and regulation of riparian areas.
- Request a riparian visit to evaluate your riparian area.
- Visit healthy riparian shorelines that are recreation friendly.
- Become a member! Meetings are held locally in Lake Cowichan. For details call us or visit our website:

President Leroy Van Wieren
250-709-7308



www.cowichan-lake-stewards.ca



Join us as we work together for the healthy future of Cowichan Lake and the Cowichan River.



Riparian Insights



Oxford the otter says: "The healthy future of Cowichan Lake is in our hands!"


www.cowichan-lake-stewards.ca

This brochure has been supported by the Pacific Salmon foundation

What can we do?


- 1. Leave our riparian areas intact.**

Prevention is easier than restoration. Common changes that can damage riparian health include:

 - Clearing vegetation to create beaches, lawns or enhanced views.
 - Adding fill, rock or sand to create beaches and extend property.
 - Building docks and boat launches for recreation.
 - Introducing non-native plants for aesthetics.
 - Removing woody debris and aquatic "weeds" for water sports.
- 2. Minimize impact when accessing the water.**
 - Use only one point of access, build docks, frame views and use gravel pathways.
- 3. Restore damaged riparian areas.**

Let natural re-vegetation take its course or re-establish native plants. A native plant is one that occurs naturally in a particular region, ecosystem or habitat and occurred prior to European contact.

Native Plants:

 - Are beautiful & low maintenance.
 - provide wildlife with food, shelter and places to reproduce.
 - Help regulate climate, prevent erosion, improve water quality and much more.

Do NOT collect native plants from the wild. Propagated native plants are readily available.

To learn more about native plants and local sources, visit our riparian webpage: www.cowichan-lake-stewards.ca/
- 4. Respect Riparian Area Regulations (RAR) and avoid fines.**

Leave riparian areas intact for erosion control, water quality, habitat protection, coho production and flood prevention. Any disturbance within 30 metres of the high water mark of lakes and streams requires contact with local government:

Riparian Habitat Contacts


CVRD Development Services
250-746-2620

Town of Lake Cowichan 250-749-6681

Provincial Government (Environment)
250-751-3100

Fisheries and Ocean Canada (Habitat Enquiries) 1-866-845-6776

For online contacts or more riparian habitat information, visit our riparian webpage.



Appendix 6.2 Landowner/Riparian Survey

CSSP SURVEY

NAME:

ADDRESS:

LENGTH OF OWNERSHIP

YEARS

F.M

AGE: 18-25/25-35/35-45/55-65/75+

OWN/RENT

SUMMER/FULL TIME

LAKEFRONT/RIVER FRONT

DATE:

PHONE:

EMAIL:

1. Are you concerned about the health of Cowichan Lake?

YES/NO

Comments

View and Sunlight

2. Which property has the best view?

Photo 1 2 3 4 5

Comments:

Vegetation Control

3. Are you allowed to remove vegetation and limb trees between your home and the water?

Yes/No

Comments:

Privacy

4. Which Property would you prefer for privacy?

Photo 1 2 3 4 5

*tree topping/limbing/arborist/law

Comments:

Erosion/Water Quality

5. Which property would be best at resisting erosion and protecting water quality?

Photos 1 2 3 4 5

*roots/natural filtration/wave suppression/septic

Comments:

Fish & Wildlife

6. Which property provides the best habitat for fish and wildlife?

Photos 1 2 3 4 5

*Coho/Cutthroat/Waterfowl/Aquatic/Mammals/Ungulates

Comments:

Recreation

7. Which property has the most recreation value?

Photos 1 2 3 4 5

Comments:

Maintenance Costs

8. Which property would require the least maintenance effort and cost?

Photos 1 2 3 4 5

*Water/Fertilizer/Time/Weed Control/Relaxing

Comments:

Property Value

9. Excluding the house in each photo, which property do you think has the greatest resale value?

Photo 1 2 3 4 5

*natural landscape: time/money/gaining beach/privacy/wildlife

Comments:

10. Are you interested in receiving advice on riparian restoration on your property?

YES/ NO

*what CSSP is offering

Comments:



#1



#4



#2



#5



#3

Pictures of Cowichan Lake Properties used for Opinion Survey.

1. Shoreline Cleared of all Native vegetation and unobstructed view
2. Shoreline mostly cleared with retaining wall.
3. Shoreline partially cleared with beach.
4. Shoreline vegetation intact with small trail to beach and small dock.
5. Shoreline vegetation intact with ramp

Appendix 6.3 (CSSP) Riparian Restoration Agreement



Cowichan Shoreline Stewardship Project (CSSP) Property Riparian Area Restoration Agreement:

The riparian zone refers to the terrestrial area along bodies of fresh water that has a significant influence on processes occurring within the fresh water ecosystem. The riparian area is the interface between land and a lake, river or stream.

This agreement is to ensure that both the CLRSS & the land owner(s) are aware of the details of the planned riparian restoration, the financial contributions, and the post restoration maintenance and monitoring procedure.

The Land Owner agrees:

To the restoration as discussed:

- Timing: _____
- Approximate number of plants: _____

That the restoration plan is based on a set budget and that additional planting will require an owner contribution;

To allow CLRSS to access their property to perform the work;

That the CLRSS is responsible and liable for their staff and directors while they are on the owner's property;

That the CLRSS will take photos of the restoration work (before, during and after) at agreed times and with prior permission;

To allow the CLRSS to visit the site, at agreed times and with prior permission, to demonstrate the work and to monitor progress, and for research purposes;

That the restoration is a one-time effort, and that the CLRSS is not required to continually monitor, repair or replace initial plantings;

That the CLRSS will provide the owner with instructions for follow-up care and maintenance of the riparian restoration site.

Additional comments
and considerations:

Signature (owner): _____

Address: _____

Signature (CLRSS): _____

Date: _____


Appendix 6.4 Site Restoration Field Form

Property Owner Name				Location on Lake:			
Start and End Date of Restoration (yyyy-mm-dd)				Time to Complete Project (24hrs)		Crew	
Enviro/Lake Conditions	Air Temp			Precipitation	<input type="checkbox"/> None	<input type="checkbox"/> Light	<input type="checkbox"/> Moderate
	Cloud Cover	<input type="checkbox"/> 0-25%	<input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75%	<input type="checkbox"/> 75-100%		
	Water Temp			Lake Elevation (m)			Site Aspect
Site Information	FIM Reach #			Total Area (m ²) below 164m			Area (m ²) actually planted
	GPS Coordinates (UTM)						
	Site Comments						
Shoreline Characteristics							
Substrate	%Bdrk		%Bldr		%Cbbl		%Grvl
Slope (%)						%Snd	
Existing Emergent Veg	<input type="checkbox"/> Sparse or _____%			Submergent Veg		<input type="checkbox"/> Sparse or _____%	
Dominant Species:				Dominant Species:			
_____				_____			
_____				_____			
_____				_____			
Restoration Planning							
Plan Compiled by: <input type="checkbox"/> G. Thom <input type="checkbox"/> D. Polster <input type="checkbox"/> Christine Brophy							
Site Restoration Objectives							
Riparian Plant Species							
ID	Plant Name (Scientific)	Plant name (Common)		Size (Gallons)	Number of Plants	Price	Total Cost
Comments about the Site Planting and Equipment Used: _____							

Appendix 6.6 CSSP Riparian Planting Care and Maintenance Brochure

Care & Maintenance

Knowing how to care for your native riparian species is key to the success and survival of these plants in their first few years of establishment. This pamphlet will guide you on how to do this, and give you information on how to identify, care, monitor, and maintain your riparian species.



Sweet gale



Hard Hack



Salmonberry



Black Twinberry

summer months requires the following care after planting:

- Leave soaker hoses on for 2hrs or hand water during the permitted watering times (morning/evening) 3 days per week minimum
- Mulch with leaf litter around the "well" created at each plant base to retain moisture

If the following summer season is a drought, plants will need continued watering. One season of root growth may not have established the plant enough to survive harsh environmental stressors such as drought.



Plant Maturity & Maintenance

The riparian restoration completed on your property was designed with the long-term concept of how each plant will mature and co-exist with its neighboring plants. On average, each plant has 1-2 metres spacing between each plant, and will grow into this space in the proceeding years. Undisturbed riparian areas are naturally dense thickets in wetlands, however, if you prefer to not have your riparian species grow too thick or tall, **pruning** is an option available to all plants. Pruning in the riparian area is considered acceptable. Cutting just above the nodes on stems allows new growth to sprout at the place of cutting.

Appendix 6.7 Riparian Area Restoration Monitoring Form

Riparian Restoration Monitoring Field Form				Date					
				Time					
				Crew					
Property name & location on Lake/River:				Site History				Management or restoration since last visit	
				Year of Completed Restoration					
Enviro/Lake Contions	Air Temp		Season	<input type="checkbox"/> Spring	<input type="checkbox"/> Summer	<input type="checkbox"/> Fall	<input type="checkbox"/> Winter		
	Cloud Cover	<input type="checkbox"/> 0-25%	<input type="checkbox"/> 25-50%	<input type="checkbox"/> 50-75%	<input type="checkbox"/> 75-100%				
	Water Temp		Foreshore Elevation (m)			Site Aspect			
Site Information	Lake Level		River Flow			Weather			
	GPS Coordinates Lat/Long								
	Site Comments								
Observations									
Substrate	%Bdrk		%BlDr		%Cbbl		%Grvl		%Snd
Slope (%)									
Approximate survival or mortality rate		_____ %		Vigour (High, Moderate, Low)		_____			
Competing Vegetation/Invasive				Native Riparian Seedling Abundance					
Disturbance indicators									

Upland/Foreshore Riparian Species Count

Appendix 6.8 CVRD APC Workshop Agenda – December 12, 2015



Cowichan Lake Shorelines Workshop For APC Members of Electoral Areas I and F

Objectives of the workshop:

1. To inform the Area I and F Area Planning Committees, local elected officials and CVRD planners of the wealth of Cowichan Lake biophysical data they could reference in their reviews of potential development, including:
 - a. FIM inventory of Shoreline's Bio/Physical Characteristics -2010;
 - b. Fish Inventory of shorelines (seasonal) 2010, 2011, 2012;
 - c. Stream inventory – small inlets assessment – 2010;
 - d. Shoreline Video (Community Mapping Network);
 - e. Shoreline Erosion Assessment - KWL (2011);
 - f. Herpetofauna Assessment (2012);
 - g. Vancouver (aka Cowichan) Lamprey Survey (2012);
 - h. FIM Mapping Resources;
 - i. LIDAR of shoreline, showing elevations, and shoreline conditions; and
 - j. Bathymetric mapping recently completed on the lake.
2. To show the utility in applying the above datasets to a site development review.
3. To confirm existing weaknesses in the bio-physical dataset for the lake:
 - a. Erosion hazard mapping for shoreline sites;
 - b. Kokanee spawning habitat assessment; and
 - c. Freshwater mussel beds.
4. To inform participants of the education and restoration initiatives underway to promote shoreline stewardship among local property owners.

Methods for the Workshop:

- Use of PowerPoint presentations to inform;
- to use Digital Mapping to highlight shoreline features

Workshop Agenda – Cowichan Lake Shorelines

- 9:00 – 9:20 **Introduction:** Why are we here today? M. Tippet and C. Tompkins
- 9:20 – 9:30 Pete Law
- resumes of speakers – w/ relevant experience on Cowichan Lake (Peter Law and Craig Wightman)

- how the workshop is structured,
- Workshop objectives.

Part 1: Cowichan Lake Shorelines – Are they Productive?

9:30 – 9:40 Craig Wightman

- Description of the Cowichan Lake Watershed:** physical and biological (high level)
 - highlight the biophysical attributes of the lake - Use the Cowichan Basin Water Management Plan (2007)
- Why shorelines and their management are key to Cowichan Lake's health** ('30,000 foot' view)?
 - highlight the biological attributes of shorelines – Use the Intro of the FIM report. Note that Large Lake Shoreline Development has been identified as a provincial problem.

9:40 -9:50 Pete

- Recent land development trends** (past 20 years) and noted changes to the lake's shorelines.
 - Showcase development trends from resource use to residential
- Modifications to the Shoreline:** What are the natural physical processes that influence shoreline stability
 - highlight the KWL report's findings

9:50 – 10:10 Craig

- Biological productivity of Cowichan Lake shorelines** (General):
 - Fish;
 - Lamprey;
 - Herpetofauna

10:10 – 10:20 Pete

- Foreshore Inventory Methodology (FIM):** Field Survey of Cowichan Lake shorelines (2010)
 - Brief description of how the lake's shorelines were assessed/rated.

Coffee Break 10:20 – 10:35

Part 2: FIM on Cowichan Lake - Results

10:40 – 11:20 Pete

- Cowichan Lake's Shoreline Characteristics** (FIM summary)
 - The field assessment results and what does it mean for the lake's shorelines going forward.
- Measuring Rates of "Shoreline Change" on Cowichan Lake Shorelines:** How we tried to measure the rate of change (shoreline conversion) as a result of development. A Comparison of Lake Shoreline Development between 2006 and 2010.
- Important lake info that was not Part of the FIM**
 - Tributary streams** to the lake – the pitfalls of our maps
 - highlight the limitations of existing mapping for inlet streams
 - Fluctuating Natural Water levels of the Lake** – LIDAR – what does it tell us about shorelines?
 - highlight the subject of varying natural water levels and how LIDAR and possibly bathymetric mapping can assist.

- Short Stretch Break -

Part 3: Biological Sampling of Cowichan Lake Shores - Results

11:30 – 12:15 Craig

- a) **Fish Sampling** to date (2010 and 2012)
- b) **Are all Shorelines Important?** Relative importance of shoreline type by species - maps
- c) **Herpetofauna Sampling** (2012) results and map
- d) **Kokanee Spawning** – Our Best Guess

12:15 – 12:30 (all – led by Pete and Craig)

- a) **Discussion** – Interpreting the Results – What does it all mean to the “Health” of the Lake?

12:30 – 1:15 Lunch Break

Part 4: Cowichan Lake “Establish a Future Vision for the Lake”

1:15 - 1:30 Craig

- a) **Summarize outcomes of the April 2013 Lake Workshop** discussions/directions/setting of targets/role of the community

1:30 – 1:45 Christine Brophy (CLRSS)

- a) **Summarize progress to-date on implementing the Cowichan Lake Shoreline Stewardship Project (2014 and 2015)**

1:45 – 2:15 Pete

- b) **Is the answer more regulation, or is it incentives?**
 - i. RAR – A regulation that was supposed to protect fish habitat. How it is currently applied?
 - ii. Green Shores - a method being developed/applied for “rating” shoreline development.

Part 5: Questions and Answers

2:15 – 3:00 Katy & Mike to lead - then wrap up.

P.D. Law (Oct. 7/15)