

A scenic sunset over a lake with mountains in the background and reeds in the foreground. The sun is low on the horizon, casting a warm glow over the water and sky. The mountains are silhouetted against the bright sky. The foreground is filled with tall, thin reeds or grasses, some of which are in focus.

Quamichan Lake Community Meeting

Moose Lodge

7:00 pm

Wednesday, June 4, 2008

What is the Problem?

- Increased nutrient levels as a result of:
 - ✓ Increased development of land surrounding the lake
 - ✓ Past and continued residential and agricultural practices
 - ✓ Removal and degradation of riparian areas
- Increased water temperatures, low oxygen levels, and record fish kills as a result of:
 - ✓ Dredging of the outflow stream
 - ✓ Shallow lake bed
 - ✓ Global warming
- Increased health hazards with high cyanobacteria levels
- Acceleration of downward spiral through invasive fish and vegetation species
- Eventual result of eutrophication is a swamp with dramatically lowered property values and negative impact on the local tax base

Activities Since May 16, 2006

Community Meeting

- Active Stewardship Committee formed.
- Regular e-mail updates to over 500 subscribers.
- Successful “Rediscover Quamichan” community awareness event with over 400 participants attending the environmental fair and taking boat tours.
- Completed Creek Outlet Study (December 2007).
- Completed Lake Nutrient Study (February 2007).
- Working with the Ministry of Agriculture, MoE, DFO, farmers and residents to install a Clemson device to alleviate issues due to beaver dam activity.

Meeting Purpose

1. To provide an update on the Quamichan Watershed Stewardship Committee's (QWSC) efforts, activities and findings over the past two years.
2. To continue to raise community awareness and garner community support for the continued efforts of the QWSC .

Meeting Agenda

■ Establishing the Baseline

- ✓ Phosphorus Loading Study –

Meara Crawford and Deb Epps: MoE

- ✓ Quamichan Creek Outlet Study –

David Vincent: D.G.V. Engineering Services

■ Taking Action

- ✓ Establishing the Stewardship Environment

- ✓ Aeration Testing

Florie Varga: resident

- ✓ Beaver Management –Clemson Devise

Tom Rutherford: DFO

■ Where To From Here?

■ Community Involvement

A photograph showing a body of water heavily infested with a thick, green algal bloom (scum). The water is a deep, opaque green color. In the background, there is a shoreline with tall, green reeds or grasses. A large, light-colored rock is visible in the water near the shore. The overall scene suggests a significant water quality issue, likely related to phosphorus loading.

Phosphorus Loading Study

Presented by:
Deborah Epps, EIA Biologist
MOE, Nanaimo

Topics for Discussion

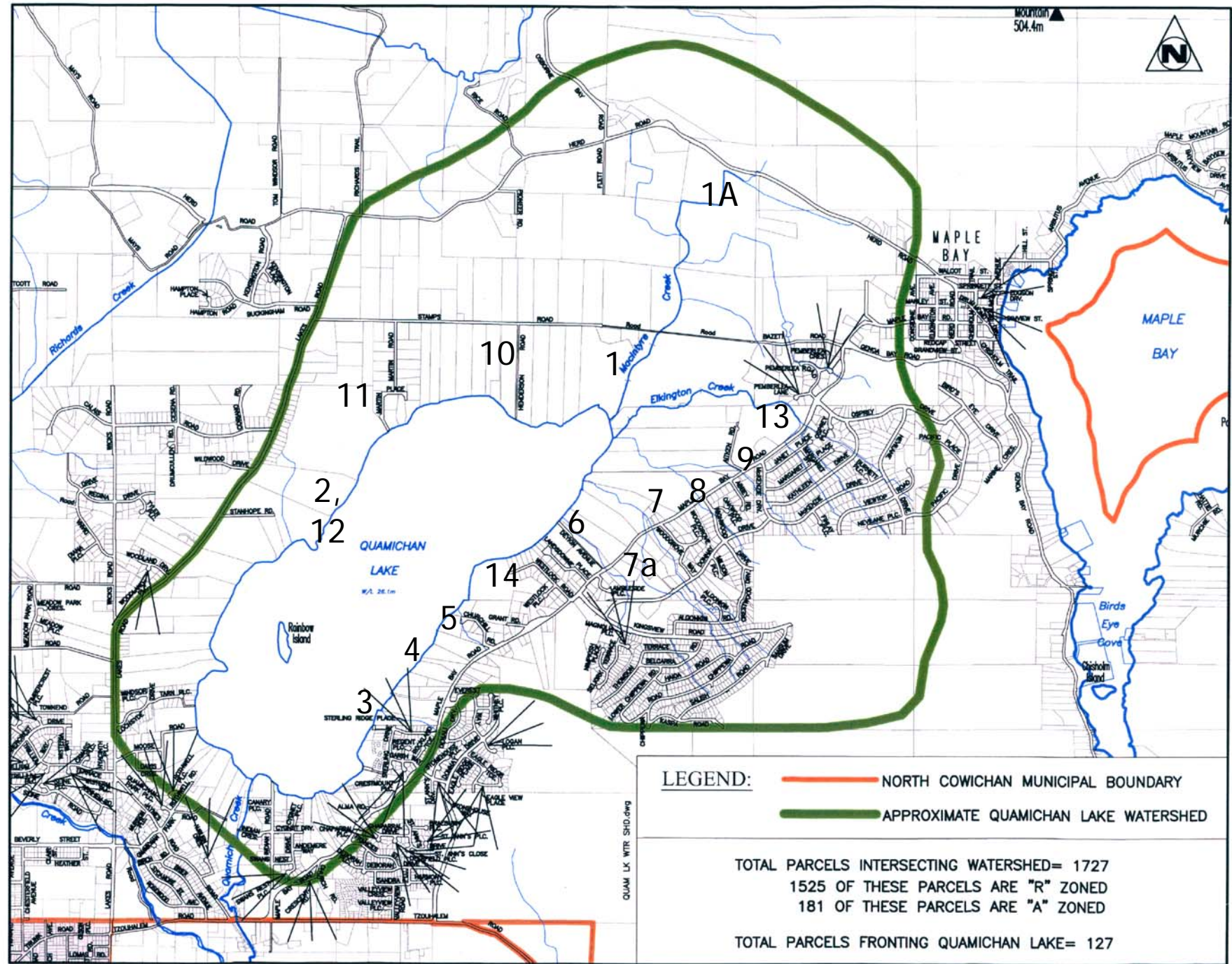
- Background – Limnology 101
- What is a P loading study?
- Collecting the data
- Results

Watershed Characteristics

- Small eutrophic (nutrient rich) lake
- Sampled on a semi-regular basis since 1988
- Area surrounding lake – rural residential, agricultural, with increasing development pressures
- Water uses – irrigation, water based recreation, and aquatic life sustenance

P Loading Study

- Identify and quantify sources of nutrients
- P – limiting nutrient for aquatic growth
- External sources
 - ✓ Surface run-off from agricultural lands, urban and rural residential areas, and cleared or disturbed areas.
 - ✓ Removal of riparian vegetation, seepage from failing or aging septic fields
- Internal – from the lake bottom sediments



Data Collection

- November 2006 – collected two sets of water samples 15 sites.
- Summer 2007 – Co-op student review data, need flow measurements, including outlet of lake
- Fall 2007 – Meara and lake volunteers collected samples (2 dates) and associated flow data

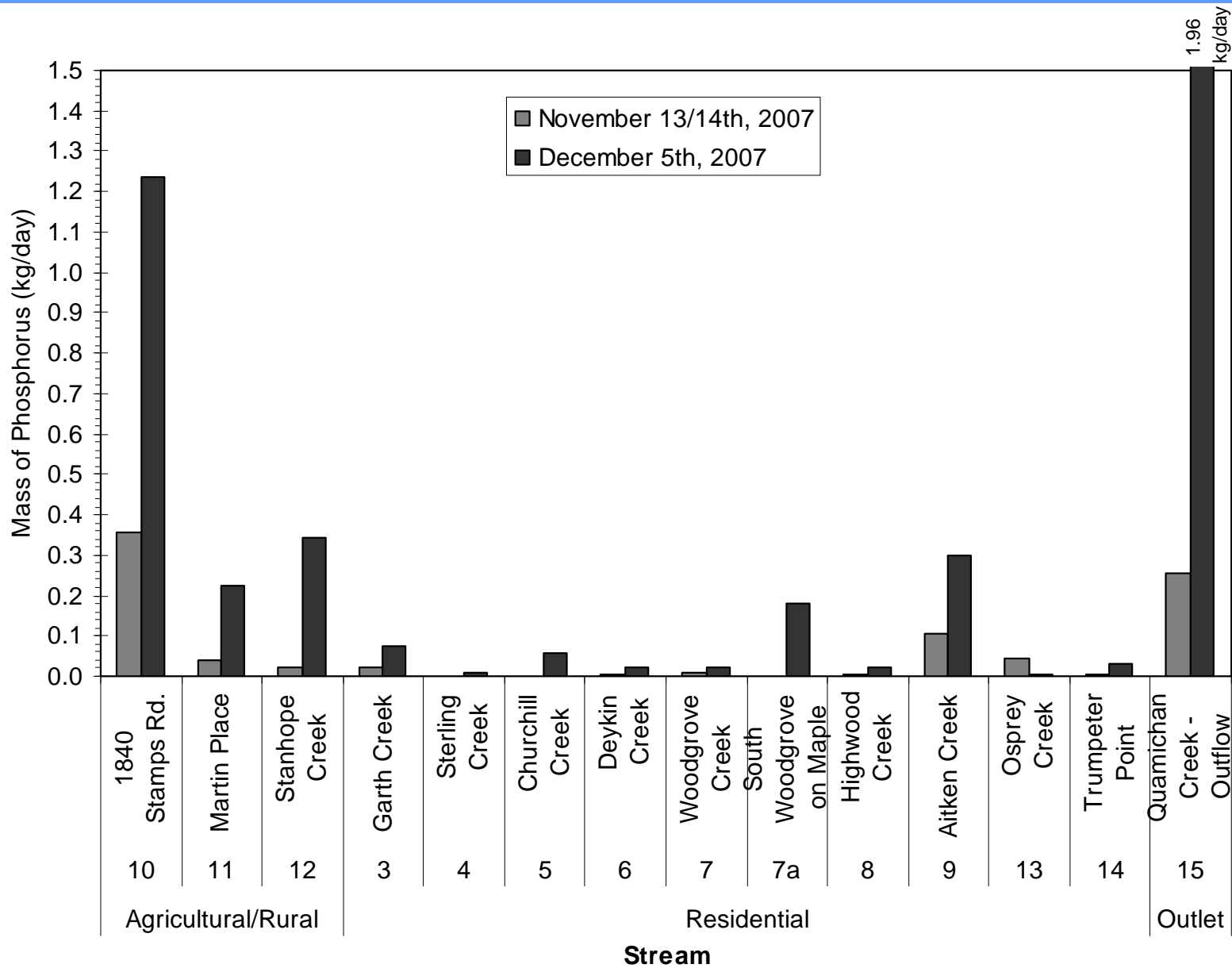
Phosphorus Results 2006-2007

	Site #	Site Description	Total Phosphorus (mg/L) (RDL = 0.002)			
			2006-11-05	2006-11-16	2007-11-13&14	2007-12-05
Quamichan Lake Inflows	1	Macintyre Creek	1.56	0.002	not sampled	not sampled
	2	1950 Stanhope Rd.	0.087	0.061	not sampled	not sampled
	3	Garth Creek Pumphouse	0.012	0.004	0.039	0.03
	4	Sterling Creek	0.01	<0.002	0.017	0.02
	5	Churchill Creek	0.011	0.003	0.04	0.022
	6	Deykin Creek	0.05	0.003	0.017	0.02
	7	Woodgrove Creek	0.009	<0.002	0.007	0.007
	7a	South Woodgrove Creek			not sampled	0.018
	8	Highwood Creek	0.029	<0.002	0.009	0.008
	9	Aitken Creek	0.015	<0.002	0.014	0.02
	10	1840 Stamps Rd	0.205	0.201	0.78	1.26
	11	Martin Place	0.097	0.004	0.096	0.125
	12	Stanhope Creek	<0.002	0.004	0.049	0.071
	13	Osprey Creek	0.015	0.003	0.018	0.011
	14	Trumpeter			0.016	0.023
Sum of Inflows			2.101	0.293	1.102	1.635
Quamichan Lake Outflow	15	Quamichan Creek			0.145	0.059

Loading Calculations

- Run-off coefficients
 - ✓ Includes evaporation, precipitation
- Geology and surficial bedrock type
- Lake volume
- Water residence time in lake - 1.02 years

P Loading (kg/day) from Inflows



Internal Loading Calculations

- Look at P levels in the lake
- Surface (epilimnion) and bottom (hypolimnion) P values in summer
- Compare to fall P values in the lake after the lake mixes (November)

Summary of Results

- 30% of P is generated internally – released from the lake bottom back into the water column
- 55% from external stream flows
 - ✓ 40% from agricultural/rural lands
 - ✓ 15% from residential areas
- 15% aerial deposition

Internal Loading

- Approximately 27% of the total P input to the lake flows out of the lake annually
- The remaining 73% stays in the lake, and is deposited in the sediments
- Over time internal loading will increase
- Need to implement a nutrient reduction program

Questions?





Quamichan Lake Outlet Study

Prepared for:
David Vincent
D.G.V. Engineering Services Ltd.

Study Terms of Reference

To review the existing conditions that impact the water level and outflow of Quamichan Creek.

Community Issue

There is a need for informed discussions around the need for and nature of the management of the lake water levels:

- Agriculture interests are best served by lower lake level in spring and early summer – enabling access to low lying productive land areas.
- Higher lake levels in summer to provide storage to improve summer stream flows best serve fisheries and wildlife concerns.

Existing Creek Channel

- Creek Channel is an excavated channel that is founded on bedrock.
- There is essentially no slope from the outlet for at least 300m to where the stream begins to lose elevation.

Findings – Channel Capacity

- Considerable woody debris and overhanging material limit water flow.
- Primary limiting factor to channel capacity is the shallow slope of the creek.
- Significant lowering of summer lake levels after simple clearing would involve deepening of the channel in bedrock (over 300 m in length).

Findings – Current Conditions

Beaver dams in the outlet stream:

- eliminates effective creek flows,
- eliminates access to the low lying farm lands,
and
- prevents fish passage.

Recommendations

- On-going hand clearing of debris from creek and general maintenance.
- Long-term monitoring of both the lake level and creek discharge.
- Install a flume structure with sliding gates be constructed to manage the lake discharge.
- Provide the means to control the lake levels to accommodate the needs of local stakeholders.

A scenic view of a forest with tall, thin trees reflected in a calm body of water. The text "Questions?" is overlaid in the center.

Questions?

Break – 10 Minutes

Enjoy a Quamichan Cookie

- ❖ Meet your neighbours
- ❖ Talk with Committee Members



Meeting Agenda

■ Taking Action

- ✓ Establishing the Stewardship Environment

- ✓ Aeration Testing

 - Florie Varga: resident

- ✓ Beaver Management –Clemson Devise

 - Tom Rutherford: DFO

■ Where To From Here?

■ Community Involvement

A photograph of a white swan on a body of water. The swan is captured in a dynamic pose, with its wings fully extended to the left. Its head is turned back, and its long, orange beak is pointed towards its wing. The water is a calm, greyish-blue, and the background shows a distant, hazy shoreline. The entire image is framed by a black border.

Establishing the Stewardship
Environment

Establishing the Stewardship Environment

Vision Statement

“To restore and maintain the health of the Quamichan Watershed so that it can once again serve its historical role as an important fish and wildlife habitat and recreation area.”

QWSC Guiding Principles

- Foster stewardship and work cooperatively with all stakeholders to improve the ecological integrity of the watershed.
- Treat all lands within the watershed as one unit, while recognizing the diversity of land use activities, ownership needs and their influence on the watershed.
- Promote long-term strategies that will benefit the overall ecological system.
- Strike a balance between ecological preservation and recreational diversity.

Building Relationships: Authority Holders

- Timber West
- Municipality of North Cowichan
- Department of Fisheries and Oceans
- Ministry of Environment
- Waterfront Property Owners
- Covenant Holders

Building Relationships: Primary Influencers

- Ministry of Agriculture
- CVRD
- Watershed Residents
- Hul`Qumi`Num Treaty Group
- Nature Conservancy of Canada
- Cowichan Tribes
- Recreational Users
- Other Stewardship /Conservation Groups
- Others.....

A photograph of a wooden pier extending into a calm lake at sunset. The sky is a warm orange and yellow, reflecting on the water. The pier is made of wooden planks and leads towards the horizon. The word "Questions?" is written in a yellow, serif font across the middle of the pier.

Questions?

Aeration Testing

The image shows a large, circular aeration tank in a wastewater treatment plant. The water surface is highly turbulent, with numerous white, frothy bubbles being churned up by a central aeration system. The tank's concrete walls are visible in the background, and the overall scene is dimly lit, with the primary light source highlighting the white foam of the aeration process.

Aeration

- Aeration is the process of adding oxygen to water systems to augment the natural process of oxygen replacement.
- Added oxygen during summer, improves water quality and/or fish habitat, reduces sediment nutrient release, and reduces algal blooms.

2006 Workshop

Five experts gathered: Rick Nordin, Ken Ashley, Allan Tweten, David Groves, and David Vincent.

- Experts concluded that action is required to respond to the steadily increasing levels of nutrient in the lake.
- Opinion of the group was that fine-bubble aeration may be suitable for Quamichan Lake.

Fine Bubble Aeration Test Site

A lake resident created a fine bubble aeration test site with the support of Aqua Tech Systems.

- A 300 ft. frontage on the north side of Quamichan Lake.
- Installed 2,000 ft. fine bubble aeration line and a compressor in spring of 2007 and operated system all summer.
- Operating costs: approx. \$100 per month, with no maintenance issues. Installation costs = approx. \$10,000.

Test Site Results

- Less accumulation of algae - occurred when wind was onshore and cleared quite quickly.
- Schools of little fish and other organisms appeared at various times in the summer - -much to the delight of the land owners' granddaughter, the kingfishers and the herons.

Prior to Aeration

Experts Recommended:

- ✓ Conduct/confirm nutrient budget (Crawford/Epps Study)
- ✓ Determine if hypolimnion exists during summer
- Explore flushing options
- Implement watershed nutrient reduction program
- All this within the context of a Water Management Plan

A close-up photograph of a green frog perched on a weathered wooden post. The frog is facing right, with its head slightly tilted. The background is a soft, out-of-focus natural setting with green and brown tones. The word "Questions?" is overlaid in a white, serif font in the center of the image.

Questions?

Two bald eagles are shown in flight against a clear blue sky. The eagle on the left is in a more dynamic, banking position, while the one on the right is in a more level glide. Both birds have their wings fully extended, showing the dark feathers and the characteristic white head and neck. The text "Where To From Here" is overlaid in a yellow, serif font across the center of the image.

Where To From Here

Stewardship Actions/Options

Outreach and Education

- Living in a watershed program
- American Bull Frog program
- Residential Stewardship Agreements
- Lake clean-up
- Catfish fishing derby
- Web-site development
- Volunteer Program

Water Quality Improvement and Nutrient Reduction

- Creek mouth treatment
- Riparian protection and re-vegetation
- Agriculture Farm Plans
- Septic System repair/replace
- Storm water management
- Trout restocking
- Stream settling pond development

Other Stewardship Activities

- Water level control protocol
- Aeration
- Beaver management
- Lake bottom delegation
- Salmon Introduction
- Recreational covenants

Quamichan Lake Management Plan

- Confirm Vision Statement
- Guiding Principles
- Critical Success Factors
- Goals, Objectives and Actions
- Measures and Indicators

Implementation Strategy

- Prioritization and Sequencing of Water Quality Improvement Actions
- Water Control Strategy and Structure Protocol
- Responsibility Matrix
- Monitoring and Evaluation Strategy

Impact of the Quamichan Lake Management Plan

- Provide continuity and a context for future activities within this watershed.
- Provide an annual retrospective in which the plan, and its objectives and actions can be objectively evaluated and improvements can be made in a systematic and timely fashion.
- Result in the Stewardship Committee becoming a more effective partner in Quamichan Watershed Environment.

A close-up photograph of a pink lotus flower in full bloom, with a bright yellow center. The flower is surrounded by large, green lily pads. The background is a soft, out-of-focus green. The word "Questions?" is written in a white, serif font across the middle of the flower.

Questions?

Two bald eagles are shown in flight against a clear blue sky. The eagle on the left is in a more dynamic, banking position, while the one on the right is in a more level, gliding posture. Both birds have their wings fully extended, showing the dark feathers and the characteristic white heads and necks. The text "Conclusion of Meeting" is overlaid in a yellow, serif font across the center of the image.

Conclusion of Meeting

Community Involvement - Volunteer

- Community Events
- Education Program
- Lake Work Projects
- Routine Water Testing / Lake Monitoring
- Fund Raising
- Contribution of Professional Services

Community Involvement - Funding

Resorting Quamichan Lake Costs Money!

- Administrative costs:
maps , surveys, printing, photocopying, URL/domain licenses, etc.
- Capital costs:
geodetic measuring tool; clemson devise; production of education material; limestone; oyster shell, plant material, etc.
- Implementation costs:
machinery, gasoline; expert services, surveys, etc.
- Legal costs:
licenses, insurance, etc.

Community Involvement

Next Community Meeting
scheduled for:
November 2008



Discussion

