



# **Somenos Management Plan**

*Prepared for:*

**The Somenos Steering Committee**

*by:*

**MADRONE CONSULTANTS LTD.  
1877 Herd Road  
Duncan, BC  
V9L 5W4**

*Report Prepared By:*

**Pamela Williams, Gillian Radcliffe**

**August 2001**


The development of the management plan for Somenos Plan Area is the result of the co-operation of the stakeholders indicated below. The signatories agree to work cooperatively in the future in the implementation of the recommendations of the Somenos Management Plan, August 2001




Les Bogdan  
Manager of Conservation Programs  
BC Coastal Eco-Region  
Ducks Unlimited Canada



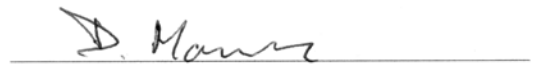
Tom Lester  
Executive Director  
The Nature Trust of BC



Dick Heath,  
Fish and Wildlife Manager,  
Vancouver Island Region,  
Ministry of Water, Land and Air Protection



Chris Kissinger  
Acting District Manager  
BC Parks  
South Vancouver Island District



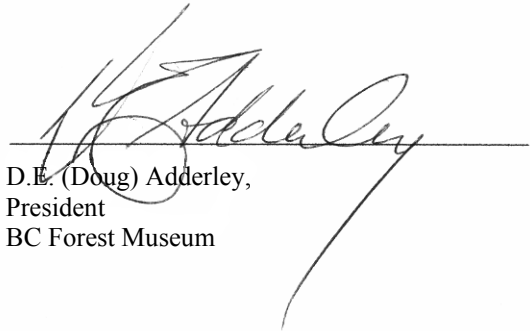
Derrick Marven  
Acting Representative  
The Somenos Marsh Wildlife Society



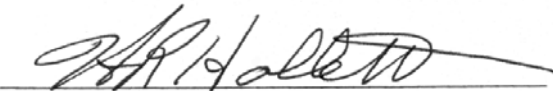
David Groves  
President  
The Cowichan Watershed Council



Cowichan Tribes  
Chief Harvey Alphonse



D.E. (Doug) Adderley,  
President  
BC Forest Museum



H. Rex Hollett  
Mayor  
The Corporation of the  
District of North Cowichan

**ACKNOWLEDGEMENTS**

Many people contributed to the development of this Management Plan. The members of the steering committee provided significant time and review throughout the planning process. Many thanks to Cheri Ayers, Les Bogden, Dan Buffett, Tim Clermont, Rick Duckles, David Groves, Chris Hall, Chris Kissinger, Peter Law, Derrick Marven, Anne Murray, Charles Poole, and Val Wilson.

Special thanks to Peter Law who contributed significantly to the fisheries section and to Rick Duckles for his contributions to the education section.

Paul Fletcher of the Somenos Marsh Wildlife Society provided much helpful feedback and information. Thanks goes to Bo Knuth, Wayne Haddow and Dave Tattum for information on Agriculture in the Somenos basin. Rick Nordin helped with the water quality section.

Special thanks to the staff at Madrone who helped put this report together. Tania Tripp for proposal writing, Julie Cowie for creating the maps and visual aids, Nicole Tiefert for formatting, Kate Miller for moral support and a sounding board. Also thanks to Sally Leigh Spencer and to Linda Veach-Sinclair.

## EXECUTIVE SUMMARY

Somenos Marsh, a wetland complex lying within the Cowichan Valley, is an area of exceptional wildlife, wetland, and fisheries values. Increasing pressures from human development has resulted in numerous impacts on this system. In response to increasing concerns, the Somenos Steering Committee was established to guide future management of the area and its resources. This Management Plan is one product resulting from this initiative; it was developed under contract to Ducks Unlimited Canada, acting on behalf of the Somenos Steering Committee.

The Management Plan Area is restricted to the lake and the surrounding adjacent land parcels that are owned by the province or one of the participating groups on the Steering Committee. The overriding Vision and primary goal of management of the area is *to protect the ecological values of Somenos Marsh and sensitive uplands while allowing human use which does not compromise these values.*

Some of the more significant natural values include overall high biodiversity, and important plant, fish and wildlife populations. Five rare (red-listed) and two threatened (blue listed) plants have been identified within the area, most within the relatively rare deep soil Garry oak ecosystem on the southeast side. Wildlife, especially waterfowl, populations are exceptional, and include an internationally significant population of wintering Trumpeter Swans, as well as high numbers of Great Blue Herons. Numerous other birds, including many waterfowl and a wide range of migratory songbirds, nest and feed in the marsh, and many waterfowl also overwinter. The site has received international recognition as an Important Bird Area. Other wildlife values are also high; for example, a number of relatively rare butterflies have been recorded at the marsh. The lake and marsh complex, including the seasonally flooded agricultural fields, also provide important coho and trout rearing and wintering habitats.

Despite the identified high values of this area, good existing baseline information for most of the natural values is lacking, inadequate, or contradictory. A priority over the next decade should be to clearly identify and establish the baseline parameters in order to chart an appropriate future course of action. We need to clarify the ranges of natural fluctuations of the values we seek to manipulate; the water, sediment, nutrients, and the associated biological resources. Only then can we set more objective and realistic goals and select the appropriate management actions required to achieve them. Maintenance of a sustainable ecological system is the overriding long-term goal, and where conflicts arise between different users, it is essential that the ecological considerations will be given precedence.

In the meantime this plan attempts to establish some broad goals and principles for management of the area, as well as recommend some more specific resource-based actions to move towards the overriding goals. For practical management purposes this plan proposes that the area be subdivided into five main management zones, based on their different ecological functions and sensitivities to management. The zones comprise:

- i. the lake
- ii. marsh areas
- iii. agricultural fields
- iv. forests and woodlands
- v. riparian areas.

Within each of the management zones, proposed management objectives and activities are identified for the different natural and human values that the marsh complex supports. Natural values considered for management actions were the water (quantity and quality), soils, vegetation (including plant communities, rare and threatened species, and invasive, non-native species), fish and wildlife. Human values in the form of cultural values, and also activities that bring some economic benefit, including agriculture, education and interpretation, recreation and tourism, were also considered.

The existing water levels and the quality of water, including increased flooding in spring and early summer, high nutrient levels, and associated low dissolved oxygen levels during warm summer temperatures, are the key water management issues. Low water flow in later summer is also an issue. These factors in turn are pivotal in effectively managing the vegetation communities, the agricultural productivity, and the fish and

wildlife values. Key recommendations include a nutrient and sediment input study (including checking nutrient status of the soils within the study area), and drainage improvements to lower water levels throughout the growing season starting in June. Specific suggestions to help improve early summer drainage include ditch improvements and clearing Somenos Creek of instream grassy vegetation to assist in improving flow. Beaver dam management is also recommended.

Several rare or threatened plant communities exist in the Management Area, and some significant populations of non-native, invasive plants also occur. Key threats to the vegetation are human development and recreation impacts and the associated invasions by non-native plant species. Direct threats to rare and endangered species are a key issue, especially in the area of the Somenos Garry Oak Protected Area. Key management recommendations involve improved mapping and inventory of the study area vegetation communities, annual monitoring and management of the invasive plant species, and protection plans for the rare and threatened species (which also would include regular inventory and monitoring). A number of site-specific restoration plans are also suggested. These include restoration work within the Somenos Garry Oak Protected Area, development of a mixed woodland on the old boatland property, possible forest development on a parcel at the south end, and enhancement of existing riparian zones with taller species like black cottonwood.

Key management issues for wildlife relate to possible declines in biodiversity due to increased human related impacts, and to maintenance of the high waterfowl values, especially for Trumpeter Swans and Great Blue Herons. Winter food management for these species is a key focus, and there are related issues of waterfowl nuisance on agricultural lands in the valley. A waterfowl management plan looking at the site as part of the broader complex of wetlands, including the Cowichan and Chemainus estuaries, is recommended. For raptors and many cavity nesters, provision of more perching, nesting and roosting structures are suggested, through improved upland forest and woodland habitat, with a nestbox program in the interim. Adequate visual buffering of sensitive areas (especially winter feeding, roosting areas and summer breeding areas), and establishing some areas as off-limits for human use at certain times, are appropriate management measures. Establishing population and targets for key species is an important step in guiding future management.

The lake and marsh are also very important coho and trout rearing areas, as well as providing excellent winter fish habitat. Most of the fish management issues related directly to water quality and quantity also, with cool, oxygenated rearing habitats being limiting in summer. The management actions recommended to improve the situation will also benefit fish populations. In addition, possible localized aeration is proposed, as well as planting of taller riparian vegetation on the south side of ditches and creeks to assist in shading water and providing cool refuges for fish in the summer.

The area also supports important human values, ranging from important First Nations cultural and historic values, to current economically beneficial activities. The latter include primarily agriculture and wildlife viewing, as well as recreational activities. It is recommended that agricultural management be continued, but with the primary goal of supporting the wildlife values, rather than being managed for economically viable agriculture *per se*. The educational and interpretive opportunities are substantial, but again must not compromise the integrity of the natural values that these activities build upon. Careful, planned and limited developments within the Management Area are essential, with adequate consideration of potential impacts at every step. Any First Nations sensitive sites and other identified values will be respected and adequately protected.

The plan recommends that a partnership represented by a ten member committee be established to see that the plan is implemented and reviewed periodically, and to act as data custodians. Representation is suggested to comprise two members from local naturalist/stewardship groups, one each from: the District of North Cowichan, Department of Fisheries and Oceans, Ministry of Environment Lands and Parks, the Nature Trust of BC/Ducks Unlimited, the Cowichan Tribes, the Cowichan Agricultural Society and one member-at-large. It is also proposed that the Somenos Management Plan should be formally reviewed every five years. In addition, the Management Committee should review the progress of plan implementation, evaluate management strategies, issues, and coordination activities of all levels of government on an annual basis.

## TABLE OF CONTENTS

1.0	INTRODUCTION AND BACKGROUND INFORMATION.....	1
1.1	Somenos Marsh: Values and Vision .....	1
1.2	Role of the Steering Committee .....	1
1.3	Development of the Management Plan .....	1
1.4	Organization of the Management Plan.....	3
1.5	Management Rationale.....	3
	1.5.1 Somenos as a Dynamic System.....	3
	1.5.2 Engineered versus Natural Wetlands .....	3
	1.5.3 Charting a Future Course of Action.....	5
1.6	Management Priorities .....	5
	1.6.1 Overall Priority.....	5
	1.6.2 Management Goals.....	5
	1.6.3 General Principles.....	6
2.0	MANAGEMENT BY ZONE .....	7
3.0	MANAGEMENT OF NATURAL VALUES.....	14
3.1	Water.....	14
	3.1.1 High Water Levels During the Growing Season.....	14
	3.1.2 Changes in the Water Balance .....	15
	3.1.3 Changes In Water Quality Due To Increased Nutrient Loading .....	15
	3.1.4 Sedimentation Rates .....	16
3.2	Soil.....	18
	3.2.1 Changes in soil fertility.....	18
3.3	Vegetation .....	18
	3.3.1 Loss of Diversity .....	20
	3.3.2 Invasive Non-native Species .....	20
	3.3.3 Management of Rare Plants .....	20
	3.3.4 Inventory.....	21
3.4	Fish.....	23
	3.4.1 Somenos Lake .....	23
	3.4.2 Somenos Creek .....	23
	3.4.3 Somenos Lake Tributaries .....	24
3.5	Wildlife .....	26
	3.5.1 General decline in biodiversity.....	26
	3.5.2 Maintenance of Great Blue Heron populations.....	26
	3.5.3 Maintenance of Trumpeter Swan Populations.....	26
	3.5.4 Maintenance of cavity nesters, raptors and bats .....	27
	3.5.5 Furbearer Management.....	27
	3.5.6 Potential increase in waterfowl nuisance.....	27
	3.5.7 Resident Canada Geese.....	27
4.0	MANAGEMENT OF HUMAN VALUES.....	31
4.1	Cultural Values .....	31
4.2	Agriculture .....	32
	4.2.1 Changes in Cultivated Areas .....	32
	4.2.2 Changes in Crop Quality.....	32
	4.2.3 Practical Management Issues.....	32
4.3	Education and Interpretation .....	34
4.4	Recreation and Tourism (Wildlife Viewing).....	36
	4.4.1 Wildlife Viewing and Nature Appreciation.....	36
	4.4.2 Walking/Hiking.....	36
	4.4.3 Dog Walking.....	36
	4.4.4 Cycling.....	36
	4.4.5 Internal Combustion Engines .....	37
	4.4.6 Boating .....	37
	4.4.7 Fishing.....	37

---

5.0 EXISTING AND PROPOSED FACILITIES AND ACCESS .....	39
5.1 Facilities and Access .....	39
5.2 Access and Parking Issues.....	40
5.3 Proposed Trails .....	40
5.4 Signage – Existing and Proposed .....	40
6.0 ADJACENT LANDS AND EXTERNAL ISSUES .....	42
6.1 Improving the Ecological Integrity of the Management Area.....	42
6.2 Management Needs Beyond the Scope of this Plan .....	42
6.3 Global and International Issues .....	42
6.3.1 Regional Issues.....	42
6.3.2 Local Issues .....	42
6.4 Management Actions: .....	43
7.0 PLAN IMPLEMENTATION AND ADMINISTRATION .....	44
7.1 Plan Adoption .....	44
7.2 Implementation & Review .....	44
7.3 Management Structure .....	44
7.4 Plan monitoring and amendment.....	45
7.5 Role of Volunteers .....	45
7.6 Funding, Partnerships and Revenue Generation Options .....	45
7.7 Somenos Garry Oak Protected Area .....	46
8.0 REFERENCES.....	47
<b>Appendix 1:</b> -Mandates of organizations on the steering committee.....	48
<b>Appendix 2:</b> -Terms of Reference for Development of the Management Plan .....	50
<b>Appendix 3:</b> -Larger Programs and Plans, Legislative Framework and Administrative Responsibility .....	51
<b>Appendix 4:</b> -Open House Summary.....	52
<b>Appendix 5:</b> -Water quality results.....	62
<b>Appendix 6:</b> -Restoration Projects and Research Activities .....	66

## LIST OF TABLES

<b>Table 1:</b> Organization of the Management Plan.....	4
<b>Table 2:</b> Summary of Management Zones .....	7
<b>Table 2-1:</b> Summary of Management for Zone 1-Somenos Lake .....	10
<b>Table 2-2:</b> Summary of Management for Zone 2- Marsh Areas.....	11
<b>Table 2-3:</b> Summary of Management for Zone 3 - Agricultural fields.....	11
<b>Table 2-4:</b> Summary of Management for Zone 4 - Forests and Woodlands.....	12
<b>Table 2-5:</b> Summary of Management for Zone 5 - Riparian .....	13
<b>Table 3:</b> Somenos Lake and Somenos Creek Water Levels in June.....	14
<b>Table 4:</b> Summary of Management for Water.....	16
<b>Table 5:</b> Summary of management for soil .....	18
<b>Table 6:</b> Summary of Management for Vegetation.....	21
<b>Table 7:</b> Summary of Management for Fish.....	24
<b>Table 8:</b> Summary of Management for Wildlife .....	28
<b>Table 9:</b> Summary of Management for Cultural Values .....	31
<b>Table 10:</b> Summary of Management for Agriculture .....	32
<b>Table 11:</b> Summary of Management for Education and Interpretation .....	34
<b>Table 12:</b> Summary of Management for Recreation and Tourism .....	37
<b>Table 13:</b> Existing Facilities and Access .....	39

## LIST OF FIGURES

<b>Figure 1</b> – The Management Area and Existing Tenure.....	2
<b>Figure 2</b> – Management Zones .....	9
<b>Figure 3</b> – Sensitive Ecosystem Inventory Mapping .....	19

## 1.0 INTRODUCTION AND BACKGROUND INFORMATION

### 1.1 Somenos Marsh: Values and Vision

Somenos Marsh is an area of exceptional wildlife, wetland, and fisheries values. It is located within the District of North Cowichan in the Cowichan Valley, immediately north of the urban center of Duncan. Somenos Lake and surrounding lands are part of the traditional territory of the Cowichan Tribes. This diverse and highly productive wetland system has come under increasing pressure from human use and development this century, and especially over the last 20 years.

In response to growing public and agency concerns about the condition and management of the marsh (including the lake and portions of the adjacent, associated uplands), the Somenos Steering Committee was established to guide the future management of the area and its resources. This multi-stakeholder group, comprised of representatives of a number of private landowners, First Nations, government agencies, and special interest groups, has provided the following Vision Statement as a common goal to direct future plans and activities for the marsh area:

#### Vision Statement

*“To protect the ecological values of Somenos Marsh and sensitive uplands while allowing human use which does not compromise these values”.*

For the Cowichan Tribes, ecological and cultural values are intertwined, with both being of equal importance. The Tribes participation and concurrence with the above vision statement is based on this connection between ecology and culture. It underscores the Cowichan Tribes concern that present-day activities not impair use of the land by future generations. As Somenos was historically an important area to the Cowichan Tribes there is a need to evaluate present and future activities on the lands within the management area with this in mind.

### 1.2 Role of the Steering Committee

To facilitate progression towards this Vision, the Steering Committee commissioned the development of a Management Plan for the area. Appendix 1 identifies the Steering Committee member groups and their representatives, and provides a brief summary of their mandates.

The Steering Committee has provided significant direction and input in the development of this Plan. The Committee developed the Vision Statement and the Terms of Reference for this plan and has guided its subsequent development through a series of meetings. Committee members have participated in numerous individual exchanges with the consultants.

### 1.3 Development of the Management Plan

This Management Plan covers issues that pertain to the natural, cultural, and heritage values of the lake, marsh, and associated uplands in the Management Area, including all associated developments, facilities, and access management issues. Terms of Reference for this Management Plan are provided in Appendix 2. The Management Area defined for purposes of this Plan is illustrated in Figure 1. It includes all of the lands under the direct control of one of the agencies represented on the Committee but explicitly excludes all of the adjacent lands that are under individual private ownership. Figure 1 also indicates existing tenure of the lands within the Management Area.

The Management Plan was developed through meetings, public consultation, and review under the guidance of the Somenos Steering Committee. The management planning process involved:

- A background literature and file review leading to the preparation of an annotated biography and background document. (Madrone Consultants Ltd., December 2000: *Somenos Lake and Wetland Complex Draft Annotated Bibliography* and Madrone Consultants Ltd., February 2001. *Somenos Lake and Wetland Complex Background Document*),



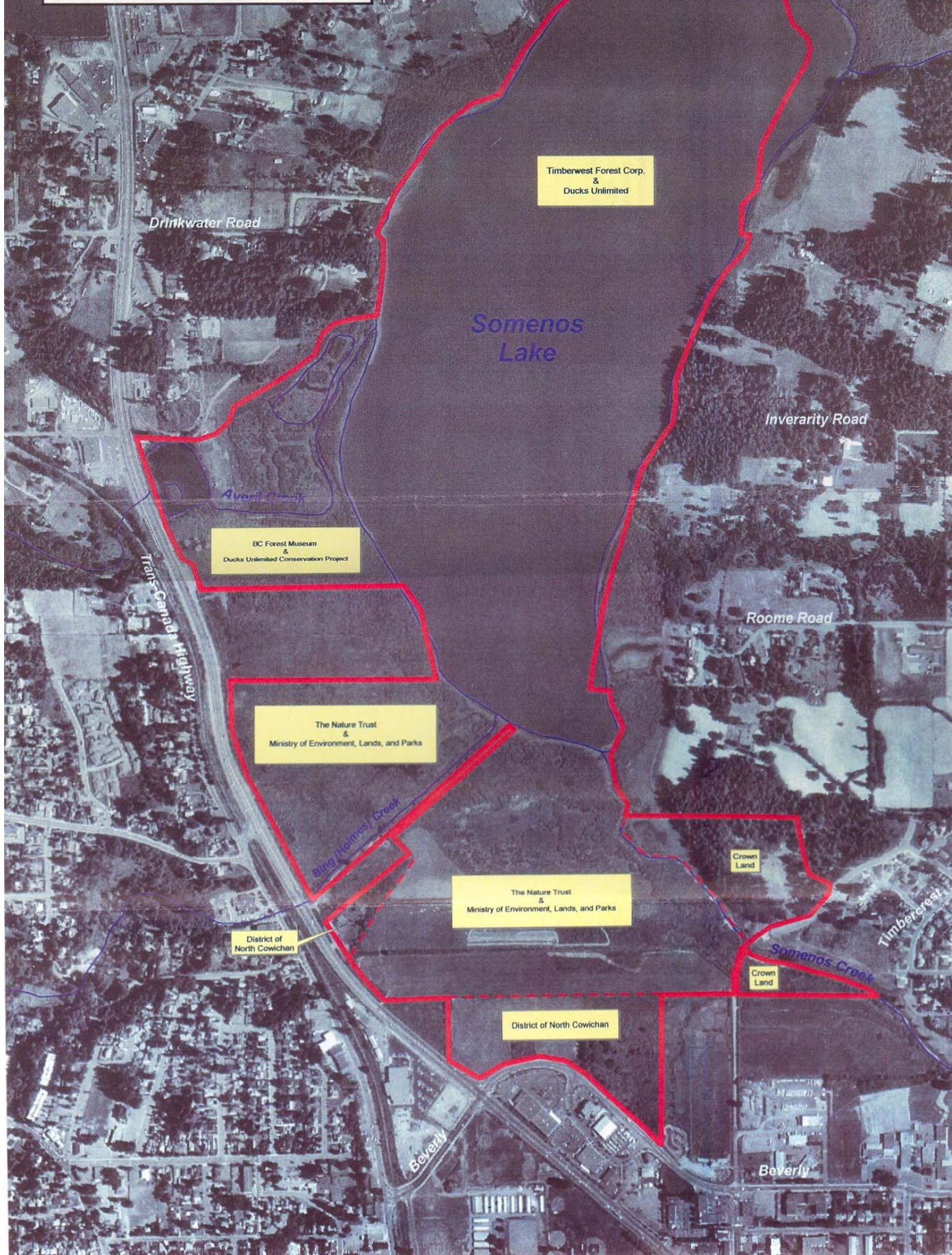
Figure 1:

The Management Area and Existing Tenure

- Management Area Boundary (Based on Cadastral Information)
- TRIM Water Features



Scale 1 : 8,000





- review of the existing legislative and administrative framework, including existing acts, land tenure and zoning regulations, in preparation for developing appropriate management objectives (Appendix 3)
- solicitation of public input through a Public Open House, December 6, 2000 (summarized in Appendix 4),
- interviews with resource specialists and Steering Committee members,
- a series of meetings between the consultant and the Steering Committee,
- solicitation of public input through a Public Meeting to present the draft plan, June 20, 2001.

In addition to the above, a separate background summary document was distributed to the Committee for review (Madrone Consultants Ltd., February 2001: Somenos Lake and Wetland Complex Background Document). It summarizes much of the existing information including the physical and ecological context of the marsh, existing and historic values and significance, as well as the social and cultural context. This information is not repeated here, but is briefly summarized in the appropriate management sections. Only information essential to support the Management Plan is repeated here.

#### **1.4 Organization of the Management Plan**

The Plan is organized into seven main sections with additional appendices, identified in Table 1, overleaf. After the introductory background, each main section briefly discusses key management issues and identifies relevant past activities, then sets out more detailed goals and objectives, and the main action items needed to achieve them. Section 7 covers the proposed implementation and administration of the Plan.

#### **1.5 Management Rationale**

##### ***1.5.1 Somenos as a Dynamic System***

Wetlands are, by nature, dynamic systems on the land base. Wetlands that occur in a basin, like Somenos, tend to fill in naturally over time, and portions of the area may eventually succeed to terrestrial ecosystems. Elsewhere on the land surface, a variety of geomorphic and biological processes combine to create new wetlands. However, in a human-managed land base, the opportunity for new wetland creation is constrained, and the natural process of wetland removal and replacement, which creates shifting vegetation patterns across the land surface, is dramatically modified.

At Somenos, the natural infilling of the lake may have been accelerated by human development in the watershed. We have no clear perspective on how rapidly or how slowly this system is changing. It is noteworthy that this issue was discussed at a North Cowichan Council meeting in 1944. At that point, government scientists are reported as stating that it was just a matter of time – some 200 years – before Somenos Lake would disappear (“Petition Municipality to Drain Somenos Lake”, *The Cowichan Leader*, November 16, 1944). However, based on the public concerns of flooding and the differences in Somenos Lake and Cowichan River levels at that time, the situation may not in reality have changed very much in the last five decades.

Going back further still, wetlands adjacent to Somenos Lake were initially drained around the turn of the century to create agricultural lands. The hayfields are a reflection of an already managed system and, if left undisturbed, these areas could be expected to return to various wetland or swamp conditions. Increased flooding levels perceived in recent years may be only a gradual return to the more natural system that existed prior to human settlement and agricultural development.

##### ***1.5.2 Engineered versus Natural Wetlands***

How much or how little management intervention is applied to Somenos is very much a question of time scale and human judgement. If our long-term goal is to maintain some specified form of lake/wetland/agriculture system, then some active management is essential. We have the technical capability to construct, at one end of the management spectrum, a highly engineered lake and wetland system that would permit very active management for wildlife, fish, and associated agricultural activities.

**Table 1: Organization of the Management Plan**

<p><b>PART 1 – INTRODUCTION AND BACKGROUND INFORMATION</b></p> <p>This Section (one) provides a brief introduction and outlines background information, discusses the rationale for management, and identifies the priorities and principles of management for the area.</p>	<ul style="list-style-type: none"> <li>• Background Information</li> <li>• Tenure and Legislation</li> <li>• Management Rationale</li> <li>• Management Priorities</li> </ul>
<p><b>PART 2 – MANAGEMENT BY ZONE</b></p> <p>Section two proposes Management Zones and prioritizes management objectives and actions within each. It is, in effect, a management summary of the subsequent individual sections</p>	<ul style="list-style-type: none"> <li>• Zone 1 - Somenos Lake</li> <li>• Zone 2 - Marsh Areas</li> <li>• Zone 3 - Agricultural fields</li> <li>• Zone 4 - Forests and Woodlands</li> <li>• Zone 5 - Riparian</li> </ul>
<p><b>PART 3 – MANAGEMENT OF NATURAL VALUES</b></p> <p>Together comprise the natural, functional ecosystems of the Management Area. Conservation and management of the abiotic components (water and soil) are pivotal, as together they support the vegetation, and all three components support the fish and wildlife resources.</p>	<ul style="list-style-type: none"> <li>• Water</li> <li>• Soil</li> <li>• Vegetation</li> <li>• Fish</li> <li>• Wildlife</li> </ul>
<p><b>PART 4 – MANAGEMENT OF HUMAN VALUES</b></p> <p>These are values associated with past and existing human uses and cultures. First Nations values are predominant, with important historic, archeological and cultural values in the Management Area. Non-native historic values are also relevant. Existing uses cover the ways humans currently utilize the natural values identified above. They are uses which directly or indirectly have important economic benefits to the broader community.</p>	<ul style="list-style-type: none"> <li>• Cultural Values</li> <li>• Agriculture</li> <li>• Education &amp; Interpretation</li> <li>• Recreation &amp; Tourism</li> </ul>
<p><b>PART 5 - EXISTING &amp; PROPOSED FACILITIES &amp; ACCESS</b></p> <p>This section identifies parking areas, structures, signage, trails and other facilities that already exist in, or are proposed for, the Management Area.</p>	<ul style="list-style-type: none"> <li>• Facilities &amp; Access</li> </ul>
<p><b>PART 6 - ADJACENT LANDS &amp; EXTERNAL ISSUES</b></p> <p>A wide variety of off-site issues both affect, and are affected by, activities and values of the Management Area. These may be international, provincial, regional or local in scope. They are generally not under direct control of the participating stakeholders, and are outside of the immediate mandate of this Management Plan. However, many of the proposed management activities cannot be viewed in isolation of this broader picture.</p>	<ul style="list-style-type: none"> <li>• Land Acquisition</li> <li>• Global Issues</li> <li>• Regional Issues</li> <li>• Local Issues</li> </ul>
<p><b>PART 7 - IMPLEMENTATION &amp; ADMINISTRATION</b></p>	<ul style="list-style-type: none"> <li>• Management Structure</li> <li>• Volunteer Involvement</li> <li>• Funding Sources</li> </ul>

Appendix 6 (Restoration Projects and Research Activities) provides a summary list of restoration projects and inventory, research and monitoring projects discussed under the appropriate sections of the report.

The Creston Valley Wildlife Management Area is an example of relatively intensive site management. Alternatively, we can leave the system alone and recognize that it can and will change over time and that eventually the lake and wetland system could be lost; certainly that the face of the marsh would change significantly.

The need for significant intervention is determined by the rate of sedimentation and change and, most significantly, by our own management goals. If sediment inputs dramatically exceed losses then filling will be relatively rapid. At this point in time there is no adequate information on rates of input to the system to clearly identify the need for, degree of, and urgency of intervention. The greater the interventions, the higher the costs of management are likely to be. No intervention, though less costly, may ultimately result in the loss of the high natural values that Somenos supports. The first values to be lost are likely to be those wildlife populations, especially the Trumpeter Swans and Great Blue Herons, that depend upon maintenance of the agricultural activities to provide the best winter feeding habitats.

### ***1.5.3 Charting a Future Course of Action***

In reality, we are likely to select a middle ground, conservative approach to management. A priority over the next decade to assist us should be to clearly identify and establish the baseline parameters in order to chart an appropriate future course of action. We therefore need to clarify the ranges of natural fluctuations of the values we seek to manage; the water, sediment, nutrients, and the associated biological values. Only then can we set more objective and realistic goals and select the appropriate management actions required to achieve them. Until baselines are set, we will inevitably continue to manage in a relatively reactive and ad hoc fashion to the various pressures that changes in the system – both natural and human – inevitably create.

## **1.6 Management Priorities**

### ***1.6.1 Overall Priority***

The Vision Statement provides the overriding direction for management within the designated Management Area. Within the context of the Vision Statement, a number of general goals and principles have been identified that give specific focus to the actions and programs to be undertaken. The overall management priority is to maintain an ecologically sound and functional lake and wetland system, together with associated upland habitats.

#### **Vision Statement**

*“To protect the ecological values of Somenos Marsh and sensitive uplands while allowing human use which does not compromise these values”.*

### ***1.6.2 Management Goals***

The following general goals support the Vision Statement:

- Manage all lands within the Management Area as one unit regardless of ownership.
- Work cooperatively to expand the management area and improve the ecological integrity of the Management Area boundaries, through land acquisitions, conservation covenants, stewardship agreements or management agreements on adjacent lands wherever possible.
- Restore damaged areas and system components, improve productivity for fish, wildlife and agriculture.
- Support Garry oak ecosystem restoration initiatives at the Somenos Garry oak Protected Area through collaboration with other groups such as the Garry Oak Ecosystem Recovery Team.
- Support the Important Bird Area (IBA) designation by maintaining habitat for Trumpeter Swans, other waterfowl, and Great Blue Herons.

- Provide educational and interpretive opportunities, including wildlife viewing, for public enjoyment and education, in so far as they do not negatively impact on the natural values.
- Provide opportunities for scientific inventory and research to establish baselines and further our understanding of the functional ecological relationships and the critical factors determining overall productivity and diversity of this system.
- Support the following activities in so far as they do not negatively compromise the natural values of the Management Area:
  - recreational activities
  - activities that benefit the local economy (including agriculture, tourism, recreation, and fishing).

### **1.6.3 General Principles**

In addition to the general goals identified above, there are some general principles that are recommended for application to the Management Area, as follows:

- Promote long-term benefits to the natural ecological systems and components over potential short-term gains by any particular agency, user group or individual.
- Develop sustainable goals that are dynamic upon the land area, rather than strictly static management to preserve the existing status quo.
- Continue to foster/facilitate cooperative management of the area, involving multiple agencies, community groups, First Nations and other stakeholders.
- Foster stewardship of the Somenos Wetlands and adjacent uplands among the local and provincial community through education and interpretation.
- Any dredging should be for habitat restoration purposes or to achieve fish, wildlife and agricultural objectives, or to reduce flooding damage to adjacent properties. Dredging should not be conducted to increase access or recreational opportunities.
- Given the close proximity of the management area to settlement and the recreational use of the site, hunting will not be permitted within the Management Area.
- Wildlife control of indigenous species (e.g. trapping of beaver) will only be considered where necessary to meet specific management objectives, and as a last resort.

Maintenance of a sustainable ecological system is the overriding long-term goal, and where conflicts arise between different resource users, it is essential that the ecological considerations will be given precedence.

## 2.0 MANAGEMENT BY ZONE

For practical management purposes, the Management Area has been subdivided into five separate zones based largely on their existing or intended structure, composition and functional role. This in turn reflects their (intended) role in providing habitat for plants, fish and wildlife, their sensitivity to damage, and the management actions needed to maintain the functional ecosystems within them. Figure 2 outlines the zones. The boundaries of these zones are not rigidly fixed, but should be reviewed periodically and may be modified to reflect new information or new management priorities.

The overall management objectives are indicated below, and proposed actions for each zone are provided in the following tables. This zone-by zone management effectively synthesizes many of the goals and actions discussed in subsequent sections, and are therefore somewhat repetitious. More background/discussion on the goals and objectives for each of the different values or value uses are given in the appropriate section of the Plan, cross referenced in the first column of the Tables.

**Table 2: Summary of Management Zones**

<b>Zone</b>	<b>Areas and Ecosystems Included</b>	<b>Management Priorities</b>
Zone 1 – Somenos Lake	Ducks Unlimited is currently negotiating a management agreement with TimberWest Forest Corp. for management of the lake bottom. Once this agreement is in place DU will be in a position to implement management actions affecting activities on the lake.  Facilities: boat launch area at the end of Drinkwater Road.	<ul style="list-style-type: none"> <li>• Provide winter roosting and feeding for Trumpeter Swans and other waterfowl.</li> <li>• Provide security habitat and brood rearing habitat for diving ducks and others.</li> <li>• Provide year round fish habitat.</li> <li>• Provide lake-based educational and recreational opportunities as long as they do not negatively impact on the above management priorities for this zone.</li> </ul>
Zone 2 – Marsh	This zone includes the Ducks Unlimited Wetland Conservation Area and a strip along the south shore of Somenos Lake and along Somenos Creek. The willow shrub provides habitat for many shrub dwelling birds and provides cover for waterfowl and habitat for fish.  Facilities: none	<ul style="list-style-type: none"> <li>• Conserve wildlife and fish habitat for breeding and non-breeding purposes.</li> <li>• Public access is minimal and not encouraged.</li> <li>• Maintain a mix of willow shrub wetland and open water habitat.</li> </ul>
Zone 3 – Agricultural Fields	The agricultural fields are dominated by Reed Canary grass that is well suited to the growing conditions of these wet soils.  Facilities: Existing dyke trail at the end of York Road Proposed seasonal trail connecting the Boatland Area to the dyke trail	<ul style="list-style-type: none"> <li>• Agricultural activities that support waterfowl are the main priority. Farm management activities should not impact on other natural values – i.e. fish habitat.</li> <li>• Manage fields to provide habitat for waterfowl to reduce grazing pressure on other farms in the valley where they can do significant damage.</li> <li>• Secondary priority is to provide habitat for other wildlife</li> </ul>

Zone	Areas and Ecosystems Included	Management Priorities
Zone 4 – Forest and Woodland	<p>This zone incorporates several diverse and physically separate parcels comprising a variety of terrestrial ecosystems in different current conditions. It can be effectively partitioned as follows:</p>	<ul style="list-style-type: none"> <li>• Provide complementary upland habitat for wildlife</li> <li>• Protect sensitive plant species</li> <li>• Support nature appreciation activities</li> </ul>
<i>4a Somenos Garry Oak Protected Area</i>	<p>The Somenos Garry Oak Protected Area contains a Douglas-fir and Garry oak forest complex with adjacent meadow areas. Several red and blue listed plant species grow in this area.</p> <p>Facilities: Existing informal trail network.</p>	<ul style="list-style-type: none"> <li>• Restore and maintain the mature, deep soil Garry oak ecosystem, and thus contribute to the Garry Oak Recovery Program. Collaborate with other groups such as the Cowichan Tribes and the Garry Oak Ecosystem Recovery Team on the restoration.</li> <li>• Public recreation in the form of hiking/walking and nature appreciation is permitted in this area as long as it does not negatively impact on these significant natural values.</li> <li>• Install fencing to define Protected Area boundaries, formalize trail network and restrict access for motorized vehicles.</li> </ul>
<i>4b Boatland</i>	<p>The former boatland property on the west side of Somenos Lake also provides an upland component.</p> <p>Facilities: boardwalk, trail, birdblind and viewing platforms.</p>	<ul style="list-style-type: none"> <li>• Provide wildlife viewing opportunities.</li> <li>• Provide upland habitat for wildlife by continuing restoration to a mixed woodland.</li> </ul>
<i>4c South End Proposed Forest Area</i>	<p>The property immediately west of the golf driving range at the south end of the Marsh, immediately north of Beverly Street, is proposed for consideration as a future forest site. Historic anecdotal accounts suggest that at one time a Sitka Spruce forest existed here.</p> <p>Facilities: none</p>	<ul style="list-style-type: none"> <li>• Investigate opportunities to restore to a forest ecosystem; the suitability of on-site conditions to support a spruce and/or cedar forest should be examined. If appropriate, a plan to return this area eventually to a representative forest ecosystem should be developed. If conditions are unsuitable, then incorporation into zone 2, with management for natural wetland values, is likely the most appropriate alternative. Could possibly be used as a demonstration and interpretation area for forest ecosystem restoration work.</li> </ul>
Zone 5 – Riparian (variable widths)	<p>The riparian zones along Averil Creek, Bings Creek, the ditches through the agricultural fields require special management to maintain and enhance habitat for fish and other species reliant upon healthy riparian ecosystems.</p> <p>Facilities: none</p>	<ul style="list-style-type: none"> <li>• Provide healthy riparian ecosystems to support fish and wildlife populations wildlife</li> </ul>








Figure 2:

**Proposed Management Zones Within the Somenos Lake and Wetland Complex**

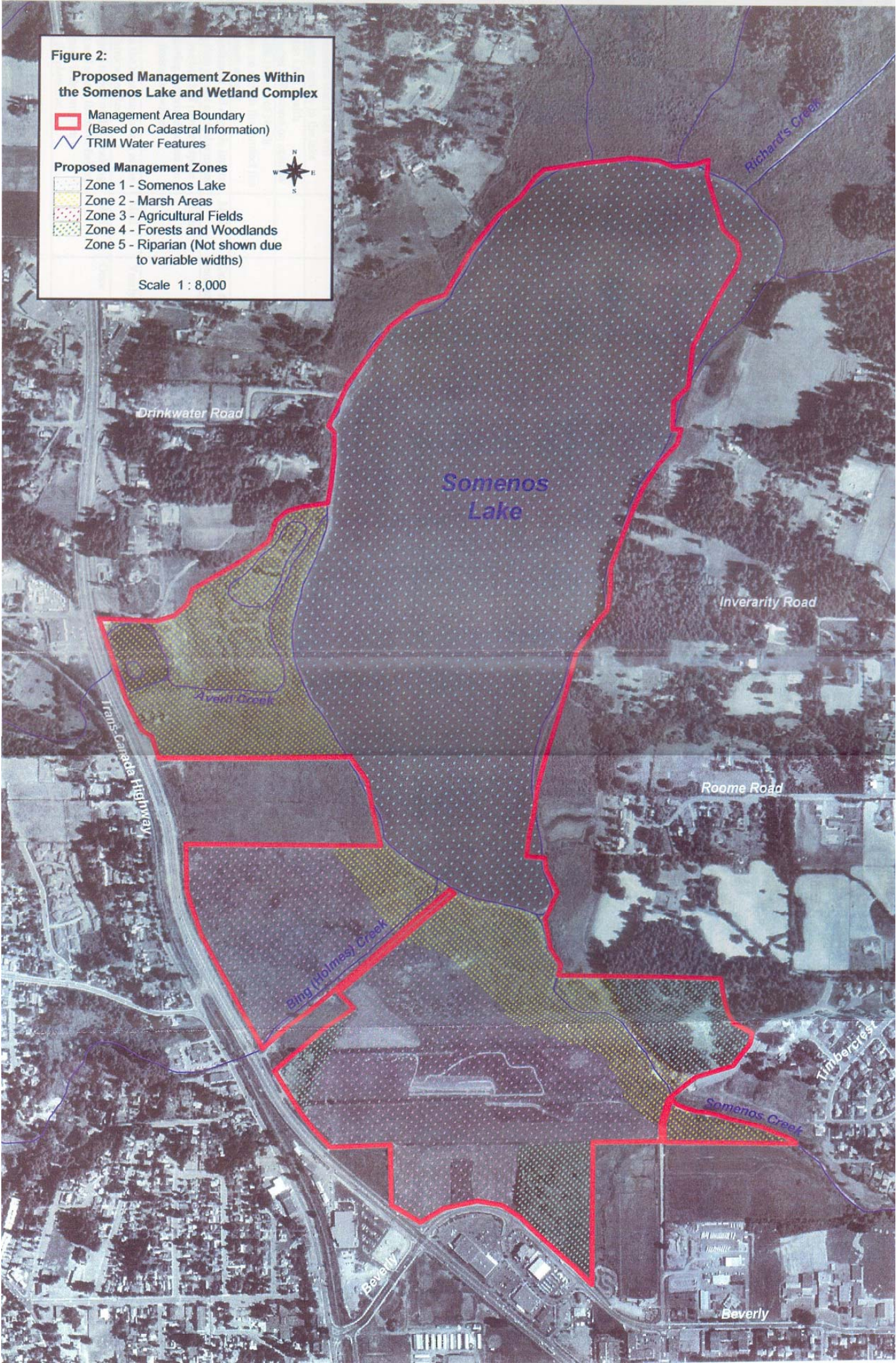
-  Management Area Boundary (Based on Cadastral Information)
-  TRIM Water Features

**Proposed Management Zones**

-  Zone 1 - Somenos Lake
-  Zone 2 - Marsh Areas
-  Zone 3 - Agricultural Fields
-  Zone 4 - Forests and Woodlands
-  Zone 5 - Riparian (Not shown due to variable widths)



Scale 1 : 8,000





The following tables (Tables 2-1 through 2-5) indicate the proposed actions for each zone, and provisionally suggest participants. Key participants are indicated in the tables by the following abbreviations:

BC Parks, CDC = Conservation Data Centre, CT = Cowichan Tribes, CVNS = Cowichan Valley Naturalist Society, CWC = Cowichan Watershed Council, DFO = Department of Fisheries and Oceans, DNC = District of North Cowichan, DU = Ducks Unlimited, MAFF = Ministry of Agriculture, Food and Fisheries, MWLAP = Ministry of Water, Land and Air Protection, GOERT = Garry Oak Ecosystem Recovery Team, PECP = Pacific Estuary Conservation Program, SMWS = Somenos Marsh Wildlife Society, TNT = The Nature Trust of BC

**Table 2-1: Summary of Management for Zone 1, Somenos Lake**

Action	Priority	Frequency	Key Participants*	Reference
Work towards water levels of 4.6m or less during the growing season starting in June	High		All members of the management committee plus MAFF, the local community	Water Quantity (3.1.1)
Monitor water quality at spring overturn	Mod	Yearly	MWLAP, Rick Nordin (Limnologist with MWLAP), volunteers	Water Quality (3.1.3)
Monitor dissolved oxygen levels in Somenos Lake as per Lew Carswell data	Mod	Weekly June to October	SMWS	Water Quality (3.1.3)
Increase DO by lowering water temperature by creating shade	High	Ongoing	all	(3.1.3)
Increase DO summer levels through artificial means	Mod			(3.1.3)
Undertake a nutrient input management study. The study will need to identify nutrient sources and develop a plan to reduce nutrient inputs into system, and/or to remove excess nutrients from system	High	Once	CWC or other agency	(3.1.3)
Liaise with District of North Cowichan on zoning, storm-water management and development plans in the Somenos Basin that will impact water quality in the lake	High	Ongoing	DNC	(3.1.3)
Investigate Lake Health Management & Restoration options				(3.1.3)
Liaise with District of North Cowichan on actions that protect the groundwater supply			DNC	(3.1.3)
Ensure sediment and organic inputs to the system do not exceed removal	Mod	Once then monitoring		(3.1.4)
Provide undisturbed roosting space by prohibiting motorized access on the lake during the winter	High			Wildlife (3.5), Recreation (4.4)
Maintain the boat launch area at the end of Drinkwater Road	Mod	Yearly	SMWS, Cowichan Fish and Game	Recreation (4.4)
Encourage a review of this stocking program and assess the sport fishery to determine if the program is meeting the objective.	Mod	Once	MWLAP	Fish (3.4)

**Table 2-2: Summary of Management for Zone 2, Marsh Areas**

Action	Priority	Frequency	Key Participants*	Reference
Determine extent of purple loosestrife, yellow flag iris and other invasives	High	Once	DU, SMWS, MWLAP, TNT, volunteers	Vegetation Inventory (3.3.4)
Develop and implement a plan to control purple loosestrife, yellow flag iris and other invasives	High	Once followed by yearly monitoring	DU, SMWS, MWLAP, TNT	Invasive non-native species (3.3.2)
Provide winter/migratory habitat for waterfowl	High		DU	
Provide for breeding and molt habitat for waterfowl and migratory songbirds; include some small water openings with islands within dense shrub areas	Mod			
Maintain smartweed production for waterfowl	High	Ongoing		
Develop recovery plan for red-listed plant species <i>Psilocarphus elatior</i> (occurs in the seasonally flooded area on Somenos Creek) Inventory and establish minimum acceptable numbers or area of individual rare plant species	Mod		SMWS, CVNS, GOERT, CDC	Management of rare plants (3.3.3)

**Table 2-3: Summary of Management for Zone 3 – Agricultural fields**

Action	Priority	Frequency	Key Participants*	Reference
Find a farmer to work the fields	High	Once	TNT	Agriculture (4.2)
Sign a licence agreement between TNT as the landowner, MWLAP as the leaseholder and the farmer	High	Once (requires completion of previous action)	TNT, MWLAP, farmer	Agriculture (4.2)
Work towards water levels of 4.6m or less during the growing season (4.4m in June if possible)	High		All members of the management committee plus MAFF, the local community	Water (3.1)
Restore agricultural land on the north side of Bings Creek by improving drainage, removing willow & cutting hay	Mod	Once	TNT, MWLAP, E-Team	Agriculture (4.2)
Maintain soil fertility without increasing nutrification of Somenos Lake	Mod	Yearly	TNT, MWLAP, farmer	Soil (3.2)
Leave strips of unmowed grass adjacent to hedgerows to enhance habitat for small mammals, raptors, bitterns and Great Blue Herons	Mod	Yearly	Farmer	
Improve/replace the drainage ditches in the agricultural fields	High	Once	TNT, PECP, CCLT, CWC	

Table 2-3 (con't): Summary of Management for Zone 3 – Agricultural fields

Action	Priority	Frequency	Key Participants*	Reference
Plant groupings of shrubs and trees along the western edge by the Trans Canada Highway to enhance structural diversity and provide habitat for birds	Mod	Ongoing	SMWS, volunteers	
Maintain the dyke trail at the end of York Road	Mod	Yearly	SMWS, CVNS, volunteers	

Table2-4: Summary of Management for Zone 4 – Forests and Woodlands

Action	Priority	Frequency	Key Participants*	Reference
<b>SOMENOS GARRY OAK PROTECTED AREA</b>				
In partnership with the Garry Oak Ecosystem Recovery Team explore management options for the Somenos Garry Oak Protected Area.		Ongoing	BC Parks, SMWS, CT	
Fence the Somenos Garry Oak Protected Area along York road to limit human access and destructive uses	High	Once then yearly maintenance	BC Parks, SMWS	
Conduct monitoring for invasive species, (include broom, English ivy, holly, Himalayan blackberry; gorse and daphne) track changes and implement control where feasible/desirable		yearly	BC Parks, SMWS, volunteers, CVNS, GOERT	
Broom control	High	Ongoing	BC Parks, volunteers, SMWS, CVNS, GOERT	
Develop and implement recovery plan for red-listed plant species <i>Viola praemorsa var praemorsa</i>	High		BC Parks, SMWS, volunteers, CVNS, GOERT, CDC	
Formalize trail network	High		SMWS	
<b>BOATLAND</b>				
Maintain the boardwalk and birdblind	Mod	Yearly	SMWS	
Continue restoration of this area to forest to provide upland habitat for wildlife	Mod	Ongoing	SMWS	
Maintain some Himalayan blackberry along the boardwalk as it does provide winter cover for many small birds. Do not let the blackberry spread.	High	Yearly	SMWS, DNC	
<b>SOUTH END PROPOSED FOREST AREA</b>				
Investigate feasibility of restoring the property west of Fun Pacific to a forest	Low			Vegetation (3.3.1)

**Table 2-5: Summary of Management for Zone 5 - Riparian**

<b>Action</b>	<b>Priority</b>	<b>Frequency</b>	<b>Key Participants*</b>	<b>Reference</b>
Create cool water refuges for fish by establishing healthy riparian vegetation along creeks and ditches	High	Ongoing	TNT, MWLAP, SMWS, volunteers, in kind donations	Section 3.1.3
Remove reed canary grass along Somenos Creek to facilitate water flow	Mod	Yearly	SMWS, volunteers, TNT	Section 3.1.2
Bings Creek: Control Reed Canary grass and riparian restoration project. Ensure trees/shrubs thrive within the Bings Creek Habitat Restoration Zone	High		E-Team, TNT, MWLAP	
Averil Creek: Assess potential enhancement opportunities			DU, stewardship group	

### 3.0 MANAGEMENT OF NATURAL VALUES

#### 3.1 Water

The basins draining into Somenos Lake together occupy over 7000 ha. This watershed has experienced considerable land development and clearing in recent years, including dyking, forest harvesting, road construction, residential and commercial development and agricultural practices. Land use in the greater watershed has affected both water levels and water quality.

##### 3.1.1 High Water Levels During the Growing Season

High water levels in the lower Somenos Basin have been an issue for over 50 years and likely since settlers began farming the area (see discussion in section 1.5.1). Several projects have been undertaken to increase drainage in the Somenos Basin. The most recent major drainage project was undertaken in the 1980's and involved dredging and straightening Richards Creek and Somenos Creek. High water levels during the growing season are of concern in the Somenos Management Area as they have lead to decreased area under cultivation and poor crop yields both of which have implications for waterfowl.

In a 1982 report "Richards Creek/Somenos Creek Agricultural Drainage Improvements, Wildlife Mitigation Plan" authors N. van der Gugten and J.F. Blanchet stated that "The annual fluctuation in water levels experienced on Somenos Lake during recent years is considered by Fish & Wildlife to be ideal for waterfowl." They go on to state that "The present lake level fluctuations permit harvesting of the hay in late June. This regenerates new growth and is attractive to migrating waterfowl once the area floods again in the fall." Normal summer lake level at this time was approximately 4.6m geodetic (Willis et al. 1981).

Since the 1982 report, water levels during the growing season have risen. High water levels that remain well into the growing season are currently of particular concern in the Somenos Management Area. Saturated soils late into the growing season prohibit use of equipment on the fields until later in the year. The farmer who has cut the hay fields owned by The Nature Trust of BC for nearly the past decade notes that hay cannot be cut until mid-July, as water levels in Somenos Lake have been too high (Knuth, 2001). The Nature Trust of BC field north of Bings Creek has not been cut since 1992 as water from Bings Creek has been flowing northward onto the field. Work was undertaken in the fall of 2000 to correct this problem.

Lake levels have been measured and recorded by the District of North Cowichan. Measurements have been taken in various months, but June was chosen as a reference month for our purposes, because if water levels are not down by June a first grass cut is not possible before the reed canary grass becomes overmature. Though slightly outside the Management Area, Somenos Creek at Lakes Road is the closest reference point to Somenos Lake with the most years of data. Table 1 presents water level data recorded for the Lakes Road site for 1979 to 2000 (there is no June data for the period from 1982 to 1990).

**Table 3: Somenos Lake and Somenos Creek Water Levels in June (Elevations are geodetic)**

Date	Somenos Creek at Lakes Road
June 26/79	4.51m
June 16/80	4.58m
June 16/81	4.67m
<i>June 1982-1990</i>	<i>No data</i>
June 21/91	4.30m
June 29/92	4.87m
June 27/93	4.80m
June 20/94	4.80m
<i>June 1995</i>	<i>No data</i>
June 13/96	4.93m
June 16/97	4.8m
June 21/98	4.6m
June 24/99	5.2m
June 19/2000	4.83m

Based on this data and the report by N. van der Gugten and J.F. Blanchet, average June water level in Somenos Creek at Lakes Road was 4.59m from 1979 to 1981. For the period 1991 to 2000, the average was 4.79m, an increase of 20cm over the earlier levels. Based on this data, the preferred water level for the Somenos Management Area by June 15 and through the growing season until the second crop of hay is harvested in early September, is 4.6m geodetic or less. It is unknown at this time if it is possible to achieve this level under existing physical conditions.

### **3.1.2 Changes in the Water Balance**

Low summer flows from all the creeks that drain into the lake directly affect the water quality. Flow brings cooling water, and movement of water increases DO<sup>1</sup>. Factors affecting flows include: changing climate, water licence withdrawals, interruption of groundwater by development, compaction of groundwater aquifers by landfill, removal of canopy cover in the watershed, and increases in non-permeable surfaces in the watershed.

Given that the gradient on Somenos Creek is minimal, small changes can make a significant impact on flow. Removing reed canary grass from Somenos Creek and managing the beaver dams on Somenos Creek will likely lead to some increase in flow which in this low gradient system may create the balance needed to sustain fish. See section 3.1.3 on increased nutrient loading, and section 3.4 on fish, for further discussion.

### **3.1.3 Changes In Water Quality Due To Increased Nutrient Loading**

Somenos Lake is a eutrophic lake<sup>2</sup> and has been for at least the last 15 years. Analysis of a water sample taken in April of 2001 from the centre of Somenos Lake recorded total nitrogen at 0.71mg/L. This level is indicative of a highly productive environment. Full results of the analysis appear in Appendix 5. Yaworski (1986) points out that “water chemistry results show very high levels of phosphorus and nitrogen...”.

Anecdotal evidence suggests that Somenos Lake was not always as nutrient rich as it is today. In the seventies and earlier, Somenos Lake was a popular swimming spot. Today, high nutrient levels have given rise to abundant algal growth making the lake unpopular for swimming.

Somenos Lake receives nutrients from many sources. These include waterfowl excrement, decomposition of vegetation, runoff from uplands which includes septic systems and agricultural fields, and from all the creeks that drain into the lake (Richards Creek, Averil Creek, Bings Creek, several unnamed creeks, drainage ditches and storm drains). The need for a study to determine the sources of nutrients has been previously identified by various groups and individuals, including the Somenos Basin Project, the Cowichan Watershed Council, and by Rick Nordin, Senior Limnologist, Watershed Management Unit (pers. comm.), MWLAP and Patrick Warrington, Senior Assessment and Remediation Biologist, Water Quality Section, MWLAP (pers. comm.).

Dissolved oxygen (DO) levels are an important and commonly employed measurement of water quality. DO levels indicate a water body’s ability to support desirable aquatic life. Levels above 5 mg/L are considered optimal and most fish cannot survive for prolonged periods below 3mg/L (Water on the Web, 2001). Summertime DO levels in Somenos Lake have been measured below 5mg/L throughout the water column.

Dissolved oxygen levels in Somenos Lake are influenced in two ways. Firstly, shallow lakes, like Somenos, heat up quickly and to higher temperatures than deeper lakes. As water temperature rises the amount of dissolved oxygen the water can hold decreases. Surface temperatures in Somenos Lake have been recorded as high as 32.3 degrees Celsius on July 29, 1998 (Lanarc, 1999). Secondly, the shallow depth means that

---

<sup>1</sup> DO – Dissolved oxygen

<sup>2</sup> Eutrophic lake - A very *biologically productive* type of lake due to relatively high rates of nutrient input.

the water column is more susceptible to mixing by wind. Wind blowing across the surface of the lake mixes the entire water column. Consequently pockets of water with sufficient DO to support fish are reduced when mixed with surrounding anoxic<sup>3</sup> water.

Furthermore, warmer temperatures favour algae growth. The warm temperatures combined with high nutrient levels lead to abundant growth of algae in Somenos Lake. In the fall, light levels begin to drop as days get shorter and the sun sinks lower on the horizon. When light levels drop, algae dies. Bacteria decompose the algae and in the decomposition process reduces the DO in the water column. When DO levels drop below life supporting levels fish kills have and will occur in Somenos Lake.

### 3.1.4 Sedimentation Rates

Wetlands are, by nature, dynamic systems on the land base. They tend to fill in naturally over time, and eventually may succeed to terrestrial ecosystems. At Somenos, infilling of the lake and eutrophication may have been accelerated by human development in the watershed. To maintain the lake/wetland system in a range of wetland/open water types to support the goal of providing wildlife and fish habitat, intervention may be required. Sediment accumulation in a number of the creeks in the floodplain area has been an issue and at various times the ditches and creeks have been variously dredged/cleared of sediment (see section 4.2).

**Table 4: Summary of Management for Water**

Issue	Goal/Objective	Actions
High water levels in early summer (section 3.1.1)	<ul style="list-style-type: none"> <li>Reach target growing season water level of 4.6m geodetic or less by June 15 and maintain this level throughout the growing season until a second hay crop can be harvested in early September.</li> </ul>	<p>Within the Management Area:</p> <ul style="list-style-type: none"> <li>Improve/replace the drainage ditches in the agricultural fields</li> <li>Remove vegetation along Somenos Creek during low water to facilitate water flow</li> </ul> <p>In the greater Somenos basin:</p> <ul style="list-style-type: none"> <li>Encourage reinstatement of the Somenos Basin Technical Committee to resolve water level issues</li> <li>Install flow devices on beaver dams on Somenos Creek</li> <li>Examine alternative ways of lowering lake level by June 15<sup>th</sup> (pump water out of the lake and store or use for irrigation purposes)</li> </ul>
Changes in the Water Balance (section 3.1.2)	<ul style="list-style-type: none"> <li>Reduce impact on summer flows into Somenos Lake</li> <li>Reduce impact on groundwater regimes</li> <li>Improve flow out of Somenos Lake</li> </ul>	<ul style="list-style-type: none"> <li>Educate residents of the Somenos Basin on the importance of permeable surfaces, tree canopy, riparian vegetation</li> <li>Encourage agencies to protect groundwater resources within the Somenos watershed.</li> <li>Remove Reed Canary Grass from Somenos Creek</li> <li>Manage beaver dams on lower Somenos Creek</li> </ul>

<sup>3</sup> Anoxic – completely lacking in oxygen

Issue	Goal/Objective	Actions
Changes in lake water quality due to increased nutrient loading (section 3.1.3)	<ul style="list-style-type: none"> <li>• Increase DO by lowering water temperature</li> <li>• Increase DO summer levels through artificial means</li> <li>• Manage nutrient inputs to minimise eutrophication</li> </ul>	<ul style="list-style-type: none"> <li>• Create cool water refuges for fish by establishing healthy riparian vegetation along creeks</li> <li>• Aerate localised sites around the lake and creeks on a trial basis. Monitor efforts to improve DO levels</li> <li>• Investigate Lake Health Management and Restoration options</li> <li>• Encourage Cowichan Watershed Council or other agency to undertake a nutrient input management study. The study will need to identify nutrient sources and develop a plan to reduce nutrient inputs into system, and/or to remove excess nutrients from system</li> <li>• Liaise with District of North Cowichan on zoning, storm-water management and development plans in the Somenos Basin that will impact water quality in the lake</li> <li>• Ongoing water quality monitoring</li> <li>• Investigate Lake Health Management and Restoration options</li> </ul>
Sedimentation Rates (section 3.1.4)	Ensure sediment and organic inputs to the system do not exceed removal	<ul style="list-style-type: none"> <li>• Encourage land management authorities in the Somenos Basin (DNC and MAFF) to implement an awareness program to promote best management practices for soil conservation: agriculture - sediment and erosion control; DNC – land development practices.</li> </ul>



## 3.2 Soil

### 3.2.1 Changes in soil fertility

The farmer who has been haying The Nature Trust of BC fields at Somenos has experienced decreasing crop yields over the past approximately five years he has been involved at Somenos, and attributes this to declining soil fertility. Production has decreased from roughly 12,000 bales to 7000 bales per year (Knuth, pers. comm.). Results of soil tests conducted in 1991 (Haddow, 1991) indicated the soils on The Nature Trust of BC properties at Somenos Lake have low levels of nitrogen, phosphorus and potassium. There is no current data on soil fertility. Maintaining soil fertility will improve nutrient content of the grass for waterfowl as well as for the farmer (Haddow, 1991).

Decreases in crop yields could also be due to higher water levels.

**Table 5: Summary of management for Soil**

Issue	Goal/objective	Action
Possible declines in soil fertility	<ul style="list-style-type: none"> <li>Maintain soil fertility of the agricultural fields in the Somenos Management Area without adding to the nutrification of Somenos Lake</li> </ul>	<ul style="list-style-type: none"> <li>Undertake a soil nutrient study. If added nutrients are needed employ methods that will increase soil fertility without adding to the nutrification of Somenos Lake</li> </ul>

## 3.3 Vegetation

The vegetation complex in the management plan area provides a diverse mix of different wetland types, ranging from tree and shrub dominated riparian areas, through extensive willow-dominated shrub areas, to seasonally flooded agricultural fields dominated by coarse grasses. In addition, the upland areas are dominated by a mixture of mature second growth coniferous forests, mixed Garry oak woodland, and dry pasture/meadows. A certain amount of spatial change can be expected over time.






Many of these ecosystems, and especially the Somenos Garry Oak Protected Area, support rare plant populations. However, over the years much of the area around the lake has been altered, and the current condition of some of the natural ecosystems is far from pristine. No detailed mapping of the vegetation has ever been completed. Sketch maps and broad descriptions of the communities were provided in the "Somenos Marsh Implementation and Interpretation Plan" (1991) and in the "Timbercrest Developments Environmental Review" (1993). Since then, the sensitive ecosystem inventory provided mapping of selected natural ecosystem categories only; the mapping was at the 1:20,000 scale. The ecosystems mapped through that process are presented in Figure 3. Much more detailed mapping would provide a better basis for future management and monitoring.

The major issues pertaining to vegetation are concerns regarding the overall loss of wetlands, of the Garry oak woodlands, and of biodiversity in general, including invasion by non-indigenous species and the impact they have on native plants. Related to this is the potential loss of the relatively rare plant communities that exist.



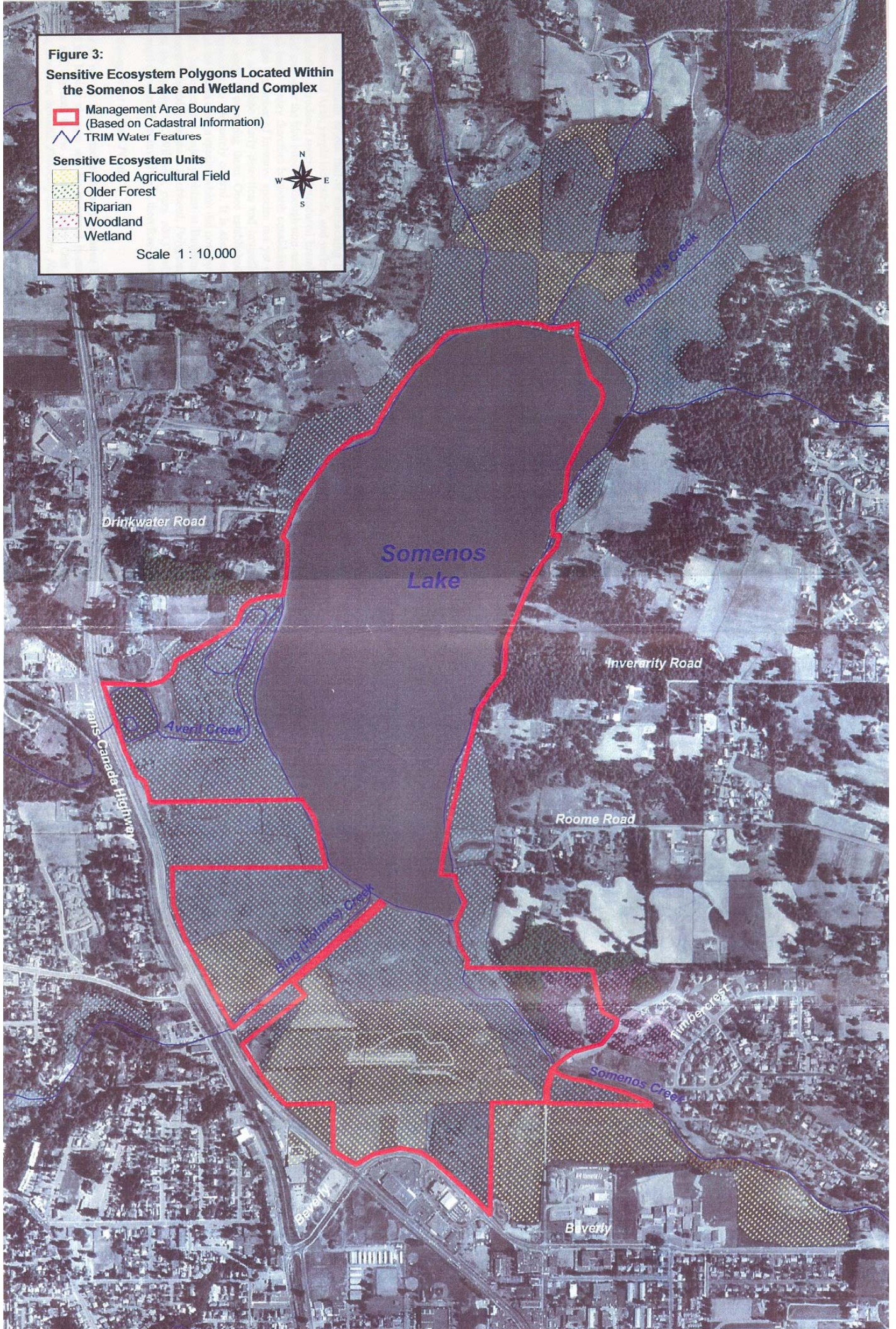
**Figure 3:**  
**Sensitive Ecosystem Polygons Located Within**  
**the Somenos Lake and Wetland Complex**

-  Management Area Boundary  
 (Based on Cadastral Information)
-  TRIM Water Features

- Sensitive Ecosystem Units**
-  Flooded Agricultural Field
  -  Older Forest
  -  Riparian
  -  Woodland
  -  Wetland



Scale 1 : 10,000





### 3.3.1 Loss of Diversity

Over the last decade, increased levels of human activity, especially in the Somenos Garry Oak Protected Area, have occurred with associated negative impacts on the vegetation. Substantial surface disturbance within the meadow area and adjacent to it occurred during the development of the Timbercrest area and the initial work on the York Road right-of-way. The disturbed areas are heavily infested with broom, which is also encroaching into adjacent less disturbed meadows. Increased human impacts in the form of mountain bike trails and human trampling is clearly visible in a number of areas, providing further purchase for broom and other invasives to establish (G. Radcliffe, *pers. obs.*). The *Viola praemorsa var praemorsa* community in particular has been substantially impacted by the non-native broom, as well as by more natural succession to snowberry/Douglas-fir. Young firs are appearing, and it is likely that the oak/meadow systems have been maintained in the past through active or natural burning (e.g. for camas production). Active management may be required to maintain the woodland at this site.

The willow-dominated wetlands are relatively resilient and if anything have expanded in area around the lake. The hayfields appear to be reduced in extent, due to late summer season water levels – areas not actively hayed are gradually succeeding to willow shrub types. Natural succession in the wetlands, due to high water levels that prevent fields from being hayed, is increasing the shrub-dominated areas at the expense of the agricultural fields. This is progressively reducing the carrying capacity for Great Blue Herons, wintering swans, geese and other waterfowl, all of which seem to find the best feeding in the flooded fields.

Historic anecdotal accounts indicate there was at one time a substantial area of large stature old-growth spruce forest at the south end of the marsh. Most of the area is now developed, however one parcel immediately west of Fun Pacific, while still wet and mapped as a wetland, has more terrestrial conditions than the surrounding wetlands and may afford an opportunity for restoring to a forest. This option should be investigated. For the present time this area is considered part of Management Zone 4 (Forest and Woodland), with the intent it be restored eventually to forest. The old boatland property, no longer a natural wetland due to the placement of fill, affords the option of developing a mixed woodland area.

One challenge in managing the vegetation will be in maintaining a suitable spatial representation and interspersed of different vegetation types and structures to support the wildlife objectives.

### 3.3.2 Invasive Non-native Species

Invasive species include broom that is encroaching heavily in some places, especially in the Somenos Garry Oak Protected Area; purple loosestrife, and yellow flag iris which have appeared in the wetlands; and a variety of other introduced species. Introduced brambles (Himalayan blackberry) form dense thickets in the boatland area near the bird blind. Although non-native, they do provide some excellent winter cover for many small birds. It may therefore be worth considering retaining some patches to provide this protection. There are also a number of invasive species not yet observed in the Management Area but are present nearby, such as Daphne. Early detection and immediate removal of invasive plants is by far the most effective strategy in managing them. Once established they are often extremely difficult, in some cases almost impossible, to adequately control. It is also very disturbing to note the extent of yellow flag iris currently in the marsh area, a species which did not appear to be present in 1991 (Gill Radcliffe, *pers. obs.*). This species has become a major problem at Buttertubs Marsh in the Nanaimo area. Another potential problem recently noted is Japanese knotweed, *Polygonum cuspidatum*, which is present near the DU pond adjacent to the highway (P. Williams, *pers. obs.*) and areas upstream of Somenos Lake along Richards Creek. Annual monitoring for invasives is therefore strongly advised.

### 3.3.3 Management of Rare Plants

A number of red or blue listed plant species have been recorded in the area, which are potentially threatened by habitat changes and by increased human disturbance. The red-listed plant species occur mostly in and adjacent to the Somenos Garry Oak Protected Area. They are *Viola praemorsa var praemorsa*, *Brodiaea howellii*, *Psilocarphus elatior*, *Navarretia intertexta*, and *Cyperus erythrozoides*. The

blue-listed plant species occurring in the same area are *Polygonum hydropipersoides*, and *Bidens amplissima*.

It will be important to liaise with the Garry Oak Ecosystem Recovery Team over efforts to manage, restore and/or enhance the Somenos Garry Oak Protected Area and the rare plant populations within it.

### 3.3.4 Inventory

Some key inventory work that needs to be conducted includes detailed, site-specific mapping at a scale of at least 1:5000 (possibly 1:2,000) of the vegetation communities. It should also include careful description and documentation of the different wetland vegetation communities present and their current extent. An assessment of the populations of the invasive species should also be conducted, including accurate locational mapping wherever possible, to establish baselines for future management and monitoring. The establishment of a limited number of permanent vegetation plots (for future monitoring purposes at regular intervals, e.g. every 3 years) should be considered. The establishment of fixed photography points around the marsh with regular photography at set times each year would be a relatively effective and inexpensive approach to assist with ongoing documentation and monitoring.

This work should include specific identification of the existing distribution and extent of all of the rare plant occurrences. These should be very accurately located on maps and population estimates should be made. An assessment of the threats to, and of the protection measures likely to be required for, each species should be conducted as part of this work. Seed collection of a small proportion of the seed (e.g. a maximum of 10%) from the rare plants could also be considered, followed by nursery propagation to establish a source of these plants for future restoration efforts and to provide a source for any initiatives to expand the colonies to meet sustainable viable population targets.

**Table 6: Summary of Management for Vegetation**

Issue	Goal/Objective	Actions
General Decline In Diversity (section 3.3.1)	<ul style="list-style-type: none"> <li>Maintain or enhance overall levels of native species diversity</li> <li>Maintain habitat diversity</li> <li>Maintain/enhance structural diversity</li> </ul>	<ul style="list-style-type: none"> <li>Set ecosystem targets by zone and identify acceptable ranges to permit some change through time</li> <li>Develop habitat restoration plan to replace loss of associated upland structure</li> <li>Riparian plantings of trees and tall shrubs along creeks</li> <li>Continue restoration of the boatland property to woodland/forest using native plants. The SMWS has permission from the District of North Cowichan to develop a memorial garden at this site.</li> <li>Investigate feasibility and desirability of restoring the property west of Fun Pacific to a forest</li> <li>In partnership with the Garry Oak Ecosystem Recovery Team explore management options for the Somenos Garry Oak Protected Area.</li> <li>Fence the Somenos Garry Oak Protected Area along York road to limit human access and destructive uses</li> </ul>

Issue	Goal/Objective	Actions
Invasive Non-native Species (section 3.3.2)	<ul style="list-style-type: none"> <li>• Actively avoid/discourage any enhancements that may favour non-native species over the natives.</li> <li>• No further introductions or releases of non-native species in area (e.g. planting by public)</li> <li>• Minimise invasion by non-native species</li> </ul>	<ul style="list-style-type: none"> <li>• Develop plan for managing invasive species; initial review of current techniques/best practices for the most insidious species to start the process</li> <li>• Inventory invasive species (see section 3.3.4)</li> <li>• Conduct annual monitoring for invasive species (train local volunteers). Include purple loosestrife, yellow flag iris, broom, English ivy, holly, Himalayan blackberry; Japanese knotweed and others.</li> <li>• Track changes and implement controls as needed</li> <li>• Educate public on dangers and problems of invasive species and discourage public from introducing non-native species through planting</li> </ul>
Potential loss of rare plants (section 3.3.3)	<ul style="list-style-type: none"> <li>• Maintain, and if possible enhance, existing populations of red-listed species <i>Viola praemorsa var praemorsa</i> (Ryan and Douglas), <i>Brodiaea howellii</i>, <i>Psilocarphus elatior</i> (Douglas et al. 2001), <i>Navarretia intertexta</i>, <i>Cyperus erythrorhizos</i> and blue-listed species <i>Polygonum hydropiperoides</i>, <i>Bidens amplissima</i>.</li> </ul>	<ul style="list-style-type: none"> <li>• Liaise with the Garry Oak Ecosystem Recovery Team and COSEWIC</li> <li>• Inventory and establish minimum acceptable numbers or areas of individual rare plant species (see section 3.3.4).</li> <li>• Develop restoration projects as required</li> <li>• Protect from disturbance</li> <li>• Monitor rare plant communities annually (in conjunction with invasive species); train local volunteers</li> </ul>
Inventory (section 3.3.4)	<ul style="list-style-type: none"> <li>• Inventory of existing ecosystems</li> <li>• Inventory of invasive species</li> <li>• Inventory of rare plants</li> </ul>	<ul style="list-style-type: none"> <li>• Establish appropriate baseline to manage towards – quantify habitat areas. Conduct detailed baseline mapping at 1:5000 scale or larger. (Baseline inventory to include documentation of extent and numbers of rare plants and invasive species)</li> <li>• Inventory current status invasive species. Include purple loosestrife, yellow flag iris, broom, English ivy, holly, Himalayan blackberry; Japanese knotweed and others.</li> <li>• Inventory rare plants</li> <li>• Historic review of air photos, plus interviews, to assist in establishing changes in areal representation of different types</li> <li>• Establish permanent vegetation plots in representative vegetation types and reassess every 3 years</li> <li>• Establish permanent photo points for annual seasonal visual documentation</li> </ul>

### 3.4 Fish

The Somenos Creek watershed is an extremely important rearing area for coho salmon and trout populations that migrate into the Cowichan River (Simpson, pers. com. 2001). Wild coho, trout and char production in the Somenos system stem from two sources:

- 1) fish which are the result of coho and trout which return to spawn in the Somenos basin tributary creeks and
- 2) Coho pre-smolts and trout from other parts of the Cowichan River system which migrate into the Somenos Basin for winter habitat (Groves 2001)

A trout stocking program is operated by the Province of BC to satisfy the sport fishery in the lake. This activity is not seen as being contrary to the development of a diversified management plan for the Marsh.

For the purpose of our analysis of the fisheries issues associated with the Management Plan, we have organized this section by habitat type:

- 1) Somenos Lake
- 2) Somenos Creek
- 3) Somenos Lake tributaries (lower reaches)

#### 3.4.1 *Somenos Lake*

The Somenos Lake and tributaries that flow into the lake are extremely productive rearing environments for fish due to the preferred habitats and eutrophic water conditions. However, the nutrient-rich waters coupled with the lake's shallow bathymetry can cause the lake to change from a productive environment to a death-trap within hours on warm sunny days. Algae blooms are a regular occurrence in the lake starting in May, and can cause the water column to become anoxic for short periods of time (Law, 2001). Water temperatures rise above 20 degrees starting in May, which are well above preferred temperatures for salmonids (Carswell, 1996). Lake conditions in the fall/winter months are thought to be attractive to fish that migrate from the Cowichan River to the calmer waters that annually flood the properties surrounding the lake. Coho smolts migrate from the lake in April and May, and the remaining coho fry and trout seek refuge during the summer months in cool portions of the lake or in nearby cool tributaries.

The limiting factor for fish in Somenos Lake is the available rearing space from May to October, when a combination of water quality and temperature can severely limit production. Water levels of the lake during the summer months would not appear to be a critical limiting factor, however there is a concern that "dramatic" manipulation of the water level may cause a change in the water quality/temperature balance. Suitable cool water refuge areas in the lake or in tributaries need to be identified and enhanced as part of any management action that calls for the lowering of the summer water levels of the lake.

A potential conflict may exist in the future management of the properties as it pertains to agricultural hay production. The questions of ditch maintenance, and "setback distance" from fish sensitive areas needs to be determined on site.

#### 3.4.2 *Somenos Creek*

Somenos Creek has been subject to significant channel alteration to improve drainage in the watershed during the past 50 years. The most recent channelization project was in 1982. The drainage projects have reduced the suitability of this watercourse to act as year round rearing habitat for fish. Lethal water temperatures during the summer months, and poor channel complexity have limited the Somenos Creek as a "migratory corridor" between the Somenos watershed and Cowichan River. This does not mean the Somenos Creek is not a high value stream for fish, however there is not a high likelihood that a program to re-establish in-stream complexity would be approved over the equally important issue of improved drainage. Efforts to reduce water temperatures during the summer months should be encouraged.

During the Somenos Basin Project the Fisheries sub-committee determined improved flow in Somenos Creek was desirable and recommended improving the flow by removing beaver dams on the creek. To date this has not been completed, as there has not been a clear understanding of what the possible implications would be to fish in the lake, and whether a reduction in the water level in the summer would be harmful to rearing fish.

The numbers of fry of Somenos Basin origin which survive to become out-migrating smolts is not established (Groves, 2001). Lack of quantifiable data on the fisheries resource hampers the development of a common vision on fish production in Somenos.

**3.4.3 Somenos Lake Tributaries**

Averil Creek, Bings Creek and Richards Creek all discharge into Somenos Lake within the study area. Richards Creek (outside of the current Management Area but discharging into it at the north end of the lake) is the most extensive stream and accessible to coho salmon. Bings provides an important spawning area, and cool water refuge for fish from Somenos Lake. Averil Creek has limited opportunities for coho to access. There are several habitat protection and potential restoration issues that have been identified for all of these tributaries (Lanarc and Burns, 1999). A fish habitat restoration project on lower Bings Creek was completed in the fall of 2000, with an objective of lowering the stream channel so that flows could be confined during winter flows through the low elevation fields and fish could easily access the stream from the lake.

From the file review completed for this project, it can be stated that the tributaries are the backbone of salmonid fry production in the watershed, and these streams offer an important refuge for rearing fish during the warm water spring/ summer periods. From the perspective of the Management Plan, we believe that efforts to understand fish utilization of these sites during the warm water periods is essential.

**Table 7: Summary of Management for Fish**

<b>Issue</b>	<b>Goal/Objective</b>	<b>Actions</b>
Poor understanding of the issues that lead to deteriorating water quality conditions in the lake which limit fisheries production (see also section 3.1)	<ul style="list-style-type: none"> <li>• Determine what the nutrient loading is from the watersheds that lead into the lake.</li> <li>• Identify what technical opportunities exist that will lead to better in-lake water quality conditions during the summer months.</li> </ul>	<ul style="list-style-type: none"> <li>• Support initiating a water quality program that would identify sources of nutrients that degrade water quality, and seek measures to control eliminate non-point pollution within the watershed.</li> <li>• Engage fisheries specialists in a one day workshop to discuss what technical opportunities could be used to improve summer period in-lake conditions for fish.</li> <li>• Develop a water quality assessment methodology and encourage water quality monitoring and fish population assessments in the Somenos watershed using local stewardship groups where possible.</li> <li>• Encourage a regular exchange of information on fish and fish habitat in the watershed between agencies, tribe and local fish stewardship groups.</li> </ul>
Agricultural Conflicts	<ul style="list-style-type: none"> <li>• Ensure that agricultural activities on the property will not harm fish habitat</li> </ul>	<ul style="list-style-type: none"> <li>• Ditch placement and maintenance must recognise fish habitat issues.</li> <li>• Crop/field management must consider that flooding during winter high water will attract fish.</li> </ul>

Issue	Goal/Objective	Actions
Trout stocking program	<ul style="list-style-type: none"> <li>• Sustain the catch in a small lake sport fishery for local anglers</li> </ul>	<ul style="list-style-type: none"> <li>• Encourage a review of this stocking program and assess the sport fishery to determine if the program meets the objectives of this Management Plan.</li> </ul>
Lack of scientific information to link the lake water levels during the spring/summer period to the needs of fish.	<ul style="list-style-type: none"> <li>• Clearly identify the influence that lake water levels have on fish production during the spring/summer period.</li> </ul>	<ul style="list-style-type: none"> <li>• Engage fisheries specialists in a one day workshop to discuss and develop a method for assessing in-lake fish production during the spring/summer period (based on the historic water levels in the lower basin).</li> <li>• Encourage a local stewardship group to support the data requirements of this initiative.</li> </ul>
Lack of scientific information to link the importance of the lower reaches of the tributaries as refuges during the warm water spring/summer period to the needs of fish.	<ul style="list-style-type: none"> <li>• Determine fish use of lower reaches of tributaries during the warm water periods</li> </ul>	<ul style="list-style-type: none"> <li>• Engage fisheries specialists in a one day workshop to discuss and develop a method for assessing tributary fish production during the spring/summer period (based on the historic water levels in the lower basin).</li> </ul>



### 3.5 Wildlife

#### 3.5.1 General decline in biodiversity

Somenos Lake, the fields and the forests around it provide valuable habitat for many species of birds. In particular, they provide valuable feeding and roosting sites for wintering waterfowl. As areas around become more developed and habitat availability and diversity is reduced, the significance of the marsh area for a variety of species further increases. Past habitat management efforts have included the construction of several small open water areas with islands for nesting waterfowl in the early 1980's, by Ducks Unlimited, as well as construction of the Wetland Conservation Area at the BC Forest Discovery Center. They also include the restoration of the boatland property to woodland. Some shrub planting, intended more for fish habitat purposes, has occurred recently along Bings Creek.

There is a concern over potential general losses of biodiversity due mainly to:

- a) Simplification of habitats through reduction of spatial and structural diversity (see vegetation section 3.3).
- b) Impacts by non-native species (through predation, competition). Invasive non-native species include increases and introductions of many species, some of which are likely to have significant impacts. In many cases, adequate control, once a species has gained a foothold, is likely to be difficult and expensive; or effectively impossible, as incursions from outside the Management Area are inevitable. This includes, for example, grey (black variety) squirrel and eastern cottontail in the uplands; American bullfrog, Green Frog, European Starling, House Sparrow and many others.
- c) Declines in migratory songbird populations due to influences elsewhere. This is an International issue – see section 6.0.
- d) Displacement and other disturbance effects from human and pet activities. Increased residential development adjacent to the marsh, as well as a general human population increase in the area, has resulted in greatly increased use of portions of the site in recent years. Recreational activities such as mountain biking, dirt biking, hiking, and possibly boating appear to have increased. Repeated use of these areas displaces some species and/or reduces breeding success. The impact of domestic pets, particularly uncontrolled dogs and cats, on breeding waterfowl and songbirds is also likely to be significant.

#### 3.5.2 Maintenance of Great Blue Heron populations

Just over 1% (25 pairs) of the Canadian population of the nationally vulnerable *fannini* subspecies of the Great Blue Heron breed and winter in the immediate vicinity. Although the Management Area is not used for breeding, the lake and wetlands provide the herons with a very high quality winter feeding resource. It is partly in recognition of this value that Somenos was designated in October 2000 as an Important Bird Area (IBA), giving it increased international status and recognition. Long-term maintenance of good quality feeding habitat for the herons is considered an important issue. Reduction of shallow feeding areas through the encroachment of shrubs into the agricultural fields will eventually reduce feeding habitat quality.

#### 3.5.3 Maintenance of Trumpeter Swan Populations

The value of Somenos as wintering habitat for large numbers of Trumpeter Swans was another reason it was designated an IBA. This site is known for the high number of Trumpeter Swans that overwinter here each year. Christmas Bird Count data show that 1,000 or more Trumpeter Swans can be present in the lake and marsh. This represents as much as 5% of the world population of Trumpeter Swans, and is the second largest population of this species overwintering on Vancouver Island. The numbers have increased substantially in the past ten years, from around 300 to 400 in the early 90's. Maintenance of adequate quality winter and early spring feeding habitat for Trumpeters (until early April when they depart) in the face of hydrological and other changes in the Basin is an important wildlife issue.

### **3.5.4 Maintenance of cavity nesters, raptors and bats**

Due to continued urban expansion there will be a potential decline in bird populations in the Cowichan Valley due to loss of nesting, perching and roosting habitats. The upland forest adjacent to the lake is critical for providing nesting, perching and roosting for many bird species and roosting habitat for a number of bat species. Bird species include a number of birds of prey that feed over the lake and wetlands.

### **3.5.5 Furbearer Management**

Healthy populations of several furbearing species occur in and around Somenos wetlands, including beaver, muskrat, mink and river otter.

Beavers regularly dam some of the creeks causing increases in localised flooding. Management of beavers will factor significantly in the maintenance of water levels. Beavers may also hamper restoration projects. For example, the beavers in Bings Creek have cut down some of the shrubs that were planted along the creek last fall. In the past, relatively regular trapping of beavers has occurred. In recent years, trappers have experienced vandalism of their traps as trapping is losing acceptability with some people. Trapping will not eliminate the beaver as there is a bountiful supply in the Cowichan River. Removing beaver dams has not proven to be particularly effective as beavers quickly rebuild the dams. Beaver damage will be a maintenance issues that needs to be continually monitored.

Muskrats occupy grassy areas around the marsh, especially the areas around the DU Wetland Conservation Area at the north end of the Management Area, just south of the Forest Discovery Centre. At present this is not a significant issue as water levels are so high that the dyke is not effectively functional. If water levels decline and burrowing by muskrats undermines the integrity and damming capacity of the constructed DU dyke, then management may be required. In the past, muskrats have been trapped in the area to control their numbers.

Mink occur around the marsh and may have a significant impact on nesting birds. However, they are a part of the natural fauna, and their impact is likely a much lesser issue than the impact of domestic cats and dogs on local songbird and waterfowl populations.

### **3.5.6 Potential increase in waterfowl nuisance**

Waterfowl (in particular Canada Geese and Trumpeter swans) can cause considerable damage to farmers' fields, school grounds, golf courses, urban parks and residential lawns. Increased local Trumpeter Swan populations and a strong resident Canada Goose population, combined with decreasing winter forage opportunities at Somenos, concentrates these species and results in increased damage to neighbouring farm fields. Any waterfowl management needs to be considered within the context of the Cowichan Valley, including the Cowichan and Chemainus estuaries and the farmers' fields where the birds go to feed.

### **3.5.7 Resident Canada Geese**

A resident population of Canada Geese was introduced to the Cowichan Valley. In a recent unpublished survey of farmers by the Ministry of Agriculture, Food and Fisheries, Canada Geese are cited as the number one pest species causing considerable damage to agricultural crops. The Canadian Wildlife Service is responsible for the management of Canada Geese. In the past few years, management efforts towards the control of resident Canada Geese populations, has been focussed on addling of eggs in nests to reduce production of young, and issuance of permits to farmers to shoot or scare geese from their fields (Cooper, 2000). The 2000 and 2001 Cowichan Valley Canada Goose egg addling program has been coordinated by The Nature Trust of British Columbia with help from volunteer naturalists and District of North Cowichan staff.

The Steering Committee supports the development of a resident Canada Goose management plan; this may be as part of a waterfowl management plan for the entire Valley, incorporating the Cowichan and Chemainus estuaries also.

**Table 8: Summary of Management for Wildlife**

Issue	Goal/Objective	Actions
General Decline In Diversity (section 3.5.1)	<ul style="list-style-type: none"> <li>• Maintain or enhance overall levels of native species diversity</li> <li>• Maintain habitat diversity</li> <li>• Maintain/enhance structural diversity</li> <li>• Provide habitat for wintering waterfowl and small passerines</li> <li>• Provide for breeding and molt habitat for waterfowl and migratory songbirds; include some small water openings with islands within dense shrub areas</li> </ul>	<ul style="list-style-type: none"> <li>• Establish appropriate baseline to manage towards – quantify species numbers (seasonally) and establish expected annual fluctuations (i.e. acceptable ranges). Studies should include enumeration of:               <ol style="list-style-type: none"> <li>(a) Wintering waterfowl numbers, especially Trumpeter Swans, Great Blue Herons</li> <li>(b) Breeding pairs of waterfowl; productivity for some species – e.g. Canada Geese</li> <li>(c) Other breeding birds, migratory songbirds</li> <li>(d) Amphibian populations</li> <li>(e) Consider using a subset of carefully selected species for special, relatively detailed attention, rather than attempt to inventory everything. The group might include for example an amphibian, several waterfowl, a raptor, a few migratory songbirds, and possibly a couple of mammals.</li> </ol> </li> <li>• Quantify habitats and set targets (see vegetation table)</li> <li>• Set population targets for selected species as part of a more detailed wildlife management program</li> <li>• Develop habitat restoration plan to replace loss of associated upland structure, including options of:               <ol style="list-style-type: none"> <li>(a) Riparian plantings of trees and tall shrubs</li> <li>(b) Continue boatland property restoration to woodland/forest</li> <li>(c) South end site – explore option of restoring a spruce or cedar stand to the DNC property adjacent to Fun Pacific</li> <li>(d) Create habitat structural elements – possible snags, addition of suitable nesting structures in and around marsh (nest boxes, platforms)</li> <li>(e) Acquisition of adjacent upland forested habitats through purchase or conservation covenants</li> </ol> </li> </ul>

Issue	Goal/Objective	Actions
General Decline In Diversity (section 3.5.1) continued	<ul style="list-style-type: none"> <li>• Minimise invasion by non-native species</li> <li>• Actively avoid/discourage any enhancements that may favour non-native species over the natives.</li> <li>• No further introductions or releases of non-native species in area (e.g. tadpoles, turtles)</li> <li>• Reduce and minimise disturbance and displacement effects by human activities and pets</li> </ul>	<ul style="list-style-type: none"> <li>• Conduct monitoring for invasive species, track changes and implement control where feasible/desirable</li> <li>• Discourage non-native species where possible, e.g. ensure nestboxes for swallows, small passerines are unsuitable for starlings.</li> <li>• Educate public on dangers and problems of invasive species.</li> <li>• Install signs instructing visitors to keep dogs under control and on a leash</li> </ul>
Maintenance Of Great Blue Heron Population (section 3.5.2)	<ul style="list-style-type: none"> <li>• Maintain habitat for Great Blue Heron to support the international recognition as an IBA</li> </ul>	<ul style="list-style-type: none"> <li>• Maintain forage opportunities by limiting willow growth in the fields north of the birdblind and maintaining agricultural fields for forage</li> <li>• Consider buffering/visual screening of high value feeding areas with plantings of native shrubs</li> </ul>
Maintenance Of Trumpeter Swan Population (section 3.5.3)	<ul style="list-style-type: none"> <li>• Maintain overwintering habitat for Trumpeter Swans to support the international recognition as an IBA</li> </ul>	<ul style="list-style-type: none"> <li>• Provide undisturbed roosting space by prohibiting motorized access on the lake during the winter</li> <li>• Maintain forage opportunities by limiting willow growth in the fields north of the birdblind</li> <li>• Co-operate with other agencies to develop a Trumpeter Swan management plan as part of an overall waterfowl management plan for the valley (see section 3.5.6)</li> </ul>
Maintenance Of Cavity Nesters and Raptors (section 3.5.4)	<ul style="list-style-type: none"> <li>• Maintain viable bird populations by providing alternate nesting habitat</li> <li>• Provide alternate nesting sites for cavity nesters</li> <li>• Provide some areas of long grass for small mammals and raptors, American bittern</li> </ul>	<ul style="list-style-type: none"> <li>• Short term - Maintain nest boxes for swallows. Ensure the design discourages starlings</li> <li>• Provide nest boxes for cavity nesters including tree-nesting ducks as well as owls, chickadees, woodpeckers and raptors</li> <li>• Increase perching structures (see structural diversity)</li> <li>• Longer term – provide adequate natural cavities through increased large snags and wildlife trees surrounding wetlands</li> <li>• Plant shrubs and trees – riparian plantings, boatland property, possibly south end property.</li> <li>• Involve local organisations such as scout troops with a nest box program that includes ongoing maintenance of boxes (see also education and interpretation)</li> <li>• Maintain the existing nesting platform for osprey</li> </ul>

Issue	Goal/Objective	Actions
		<ul style="list-style-type: none"> <li>Maintain some areas of long grass for small mammal cover/raptor hunting.</li> <li>Cut on alternate hay crops</li> </ul>
Control of Furbearers (section 3.5.5)	<ul style="list-style-type: none"> <li>Permit beaver populations but prevent increased flooding resulting from beaver activity</li> <li>Permit muskrat activity as long as it does not undermine functionality of the constructed dykes.</li> </ul>	<ul style="list-style-type: none"> <li>Explore ways to co-exist with beavers. E.g. install pipes in dams to fool beavers re: their effectiveness, place heavy wire mesh around the base of trees.</li> <li>Trap muskrats only if damage to dykes becomes a renewed issue and other alternatives are not viable</li> </ul>
Potential Increase In Waterfowl Nuisance (section 3.5.6)	<ul style="list-style-type: none"> <li>Minimise nuisance caused by wildlife to surrounding areas.</li> <li>Maintain (provide) or enhance winter and spring forage for waterfowl within the Management Area</li> <li>Manage lands for luring waterfowl from adjacent farms</li> <li>Work in co-operation with local government agencies (MWLAP, MAFF, Canadian Wildlife Service) and organizations (Cowichan Agriculture Society)</li> </ul>	<ul style="list-style-type: none"> <li>Work with the local farming community and other government agencies to develop a waterfowl management plan for the valley. The plan should include a) waterfowl, b) Canada Geese and c) Trumpeter Swans. This is a need that has been previously identified by the Somenos Basin Project and others</li> <li>See agriculture section 5.1</li> <li>cooperate with Canadian Wildlife Service to control resident Canada Goose population (volunteers from the Cowichan Valley Naturalists currently conduct the egg addling)</li> </ul>
Resident Canada Geese (section 3.5.7)	<ul style="list-style-type: none"> <li>Attract Canada Geese to Somenos and away from farms, school yards, golf courses, public beaches to reduce damage by resident Canada Geese</li> </ul>	<ul style="list-style-type: none"> <li>Support the development of a Canada Goose management plan as part of a waterfowl plan for the valley (see also 3.5.6)</li> <li>Provide grazing sites on agricultural lands within the Somenos Management Area to provide habitat for grazing wildlife species (e.g. geese) that will reduce grazing pressure on adjacent farm fields, schoolyards and golf courses.</li> </ul>

## 4.0 MANAGEMENT OF HUMAN VALUES

### 4.1 Cultural Values

The Management Area is part of the traditional territory of the Cowichan Tribes. The steering committee has been advised that the Somenos Garry Oak Protected Area is subject to treaty negotiations as it is crown land. Cowichan oral history and archaeological discoveries help us to understand the significance of this area to the First Nations living here. Archaeological investigations show evidence of occupation dating back over 4000 years.

Settlement by non-First Nations groups began roughly 150 years ago. Farming, a schoolhouse, and a lumber mill are some of the activities that took place within the Management Area.

**Table 9: Summary of Management for Cultural Values**

Issue	Goal/Objective	Actions
Potential to negatively impact cultural values	<ul style="list-style-type: none"> <li data-bbox="516 690 898 718">• Protect cultural sites</li> <li data-bbox="516 1115 898 1142">• Restore cultural sites</li> <li data-bbox="516 1241 898 1293">• Protect traditional food and medicine sources</li> <li data-bbox="516 1482 898 1585">• Maintain historic First Nations transportation corridor to traditional hunting areas and village sites</li> </ul>	<ul style="list-style-type: none"> <li data-bbox="922 690 1356 772">• Inventory cultural sites. Build upon previous archaeological investigations</li> <li data-bbox="922 783 1356 835">• Plan facilities such as trails to avoid impacting cultural sites</li> <li data-bbox="922 846 1356 949">• Respect the sensitivity of First Nations archaeological sites and values, and do not promote the location of significant sites</li> <li data-bbox="922 959 1356 1012">• Investigate historic use of the site by First Nations.</li> <li data-bbox="922 1022 1356 1104">• Liaise with Cowichan First Nations over future developments and activities</li> <li data-bbox="922 1115 1356 1218">• Consider traditional First Nations Management Practices for the management of the Somenos Garry Oak Protected Area</li> <li data-bbox="922 1228 1356 1352">• Conduct a survey to determine what foods were historically gathered within the Somenos Management Plan Area by First Nations</li> <li data-bbox="922 1362 1356 1486">• Conduct survey of medicinal plants gathered within the Somenos Management Plan Area by First Nations</li> <li data-bbox="922 1497 1356 1549">• Consider historic First Nations access when planning</li> </ul>

## 4.2 Agriculture

Since The Nature Trust of BC bought the first parcel of land at Somenos in 1976 the focus of agriculture has been to support wildlife and in particular wintering waterfowl. Four pastures were fenced at that time for livestock grazing. At that time typical lake levels were 4.6m geodetic (Willis et al. 1981) which permitted two harvests of hay: one in late June and the other in early September. Since that time lake levels have risen (see section 3.1) putting agricultural land out of production and decreasing the value of the first crop.

In addition to high lake levels, Bings Creek started flowing northward across the field. This happened as a result of sedimentation. Remedial steps were taken in the fall of 2000 and the field north of the creek may be dry enough this year (2001) to permit access by farm equipment. Willows that have grown in will have to be cut back before haying of the entire field is possible.

The District of North Cowichan cuts roughly two thirds of the 7.9 hectare parcel that it holds south of Somenos Lake and bordering on Beverly Street. This land is higher and has not been as severely impacted by high water levels.

### 4.2.1 Changes in Cultivated Areas

The amount of agricultural land under production on the flatlands by Somenos Lake has been decreasing in recent years. Decreases are a consequence of high water levels due to either high lake levels or diverted flow (as was the case with Bings Creek). Haying is done to maintain winter habitat for waterfowl in general and in particular Trumpeter Swans and Great Blue Heron. In the fall of 2000 improvements were made to the Bings Creek channel to prevent the creek from flowing north onto the field. This action will likely mean about 5 acres on the north side of the creek will be sufficiently dry to facilitate harvesting. Historically, Somenos Creek was dredged in 1980's under the ARDSA program. Improvements to drainage are no longer seen due to changes in the system. Also see section 3.1 for more on water levels.

### 4.2.2 Changes in Crop Quality

Due to high water levels that remain late into the growing season the field cannot be hayed before the grass is overmature. Consequently, the first cut of reed canary grass is of poor quality. Overmature reed canary grass has a lower protein content and is not easily marketed for livestock feed.

### 4.2.3 Practical Management Issues

The farmer who for the last few years has hayed the fields at Somenos has retired. No one has yet been found to take his place. The Nature Trust of BC is taking the lead to locate a suitable farmer. A formal license agreement will be developed involving The Nature Trust of BC, Ministry of Water, Land and Air Protection and the farmer.

**Table 10: Summary of Management for Agriculture**

Issue	Goal & Objective	Actions
Changes in Cultivated Areas - Decreased area under cultivation due to high water levels that persist late into the growing season (section 4.2.1)	<ul style="list-style-type: none"> <li>Restore the amount of area that can be hayed to 1981 levels (main concern is to maintain open fields for winter habitat for Trumpeter Swans, Great Blue Heron and other wintering waterfowl)</li> </ul>	<ul style="list-style-type: none"> <li>See section 3.1.1</li> <li>Investigate ways to improve drainage of agricultural fields.</li> </ul>

Issue	Goal & Objective	Actions
<p>Changes in crop quality - Poor quality reed canary grass crop due to high water levels that persist late into the growing season which prevent harvest before the grass is overmature (section 4.2.2).</p>	<ul style="list-style-type: none"> <li>• Reach target growing season water level of 4.6m geodetic or less by June 15 and maintain this level throughout the growing season until a second hay crop can be harvested in early September.</li> </ul>	<ul style="list-style-type: none"> <li>• See section 3.1.1</li> <li>• Until the target water levels are achieved research alternative markets for reed canary grass that do not require high quality – e.g. Sell to gardeners as a mulch for gardens to reduce water consumption; research alternative crops such as reed canary grass seed production</li> <li>• cultivate native sedges and other crops which have higher value for waterfowl</li> <li>• Investigate alternative crops to hay that are higher value for waterfowl</li> <li>• Work closely with Ministry of Agriculture, Food and Fisheries</li> </ul>
<p>Practical Management Issues -Lack of a farmer to work the fields at Somenos. The farmer who for the last few years has hayed the fields at Somenos has retired (section 4.2.3).</p>	<ul style="list-style-type: none"> <li>• Find a farmer</li> </ul>	<ul style="list-style-type: none"> <li>• Advertise within the farming community.</li> <li>• Investigate options – ex. Willing Workers on Organic Farms program</li> </ul>



### 4.3 Education and Interpretation

Interpretation is an important service to visitors and the local community. It greatly supports the vision of the Management Plan. As stated on the web-site of the SMWS:

*“It is generally fair to assume that people will not safeguard that which they do not know, let alone that which they do not understand. They are not motivated to protect and value that which they do not appreciate.” (SMWS web-site)*

The collective opportunity for all interested agencies and community groups to develop a wide variety of educational and interpretive programs is enormous. Although it must be recognized that many of these programs may have to take place outside the Management Area, this plan encourages the ongoing discussion and exploration of possible future initiatives. While beyond the limits of the contract to develop this Management Plan, discussion of possible future education and programming options has consistently generated considerable excitement. The importance of maintaining an open attitude to exploring controlled access educational options in balance with a recognition that some areas of the site are highly sensitive during certain times of the year, may be critical to the long-term success of this Management Plan.

There are no interpretive signs on site at present, and issues such as maintenance, repairs and vandalism will make the development of interpretive signage a challenge. Creative partnerships that build on the common interests of existing organizations should be explored and encouraged. While signage and other interpretive and educational programming will obviously need to be developed for key access areas, the challenge of communicating all the *dos and don'ts* along with the *why's and wherefores* is daunting.

Prior to the implementation of recommendations for interpretive signage (both within and outside the Management Area) a set of design guidelines should be established to ensure that consistent quality and maintenance standards can be maintained, and that the public is not confused by too wide a variety of interpretive themes and styles. Improvements to existing viewing sites (e.g. the current MOTH site) should seek to improve all aspects of the site ranging from highway access to garbage, rather than be seen as the simple introduction of new elements.

Existing interpretive resources include a video entitled “Somenos Marsh: The Resting Place” and a slide show on stream stewardship, both developed by the SMWS. Two interpretation plans have been completed for Somenos Marsh namely “Wildlife Viewing in the Somenos Marsh: A Plan for Facilities and Services” (Edwards and Greig, 1988) and “Somenos Marsh Implementation and Interpretation Plan” (Radcliffe, 1991).

**Table 11: Summary of Management for Education and Interpretation**

Issue	Goal/objective	Actions
Opportunity to educate the public on: <ul style="list-style-type: none"> <li>• natural values: water, soil, vegetation, fish and wildlife</li> <li>• values management issues and techniques</li> <li>• cultural values</li> <li>• stewardship</li> </ul>	<ul style="list-style-type: none"> <li>• Provide current, accurate and comprehensive information to visitors in order to help them understand and enjoy the Somenos Marsh</li> <li>• Elevate ecological awareness through educational and public involvement programs aimed at promoting the appreciation of flora and fauna and their habitat</li> </ul>	<ul style="list-style-type: none"> <li>• Produce a brochure for the Somenos Lake and Wetland Complex</li> <li>• Form partnerships with other groups and organizations involved in public education. E.g. SMWS, Cowichan Valley Naturalists, Freshwater Ecocentre, CWC, Cowichan Community Land Trust</li> <li>• Run a series of articles in the local papers on the values and status of Somenos</li> </ul>

<b>Issue</b>	<b>Goal/objective</b>	<b>Actions</b>
Continued	<ul style="list-style-type: none"> <li>• Educate and inform the public about the significance of the Garry Oak ecosystem</li>   <li>• Educate and inform the public on good watershed stewardship</li> </ul>	<ul style="list-style-type: none"> <li>• Develop information packages for schools</li> <li>• Develop a web-site on Somenos or enhance SMWS existing web-site</li> <li>• Establish educational program on watershed stewardship. Education for private landowners on nutrients, septic, lawns, fertilizers and nutrient budget</li> <li>• Educate public on dangers and problems of invasive species and discourage public from introducing non-native plant and animal species</li> </ul>
Opportunity to build broad community support	Develop broad community support	<ul style="list-style-type: none"> <li>• involve local groups in the building, installation and maintenance of bird houses and bat boxes</li> <li>• involve volunteers in the collection of data</li> <li>• involve volunteers in Garry Oak recovery initiative within the Somenos Garry Oak Protected Area</li> </ul>

#### 4.4 Recreation and Tourism (Wildlife Viewing)

Recreational activities within the Management Plan area must be consistent with the priority to protect, and maintain/enhance existing natural values, including fully functional ecosystem and all its components.

- Provide for appropriate recreational activities where they do not negatively impact upon the natural resources.

The Management Plan supports appropriate recreational activities defined as follows:

- dependent upon the natural environment
- having minimal impact on the natural environment
- encouraging an appreciation for, and understanding and enjoyment of, the natural environment
- compatible with other management priorities

In future the suitability of recreational activities not addressed in the Management Plan will be judged using the vision and goals for the area.

##### 4.4.1 *Wildlife Viewing and Nature Appreciation*

The main recreational activity supported by the Management Plan is wildlife viewing and nature appreciation. Of course this overlaps substantially with education and interpretation, see above. The area has long been identified as one of the best wildlife viewing locations for waterfowl and songbirds in BC (Ethos, 1988). The pullout on the highway was constructed to facilitate wildlife viewing. Other wildlife viewing infrastructure includes the boardwalk and bird blind on the old boatland property plus the raised trail at the south end.

Future viewing facilities and developments should only occur where the species to be viewed are already well habituated to humans or are relatively insensitive to disturbance, or where adequate protection for the species is in place to prevent negative impacts. Alternatively, trails need to be closed during nesting season to prevent disturbance. (SMIIP, 1990)

##### 4.4.2 *Walking/Hiking*

The main walking/hiking area is the Somenos Garry Oak Protected Area. The current trail system has evolved by human use with no thought for sensitive areas or purpose in mind. Trails wander through the site with several accesses coming on to the property from adjoining private lands. The use of these trails has been increasing in recent years due to the sub-division and development of surrounding lands. The vegetation is being negatively impacted by uncontrolled access. The area receives a high level of use from the local community and measures need to be taken to restrict access points, clearly mark trails, eliminate the use of motorized access, and provide on-site informational and directional signage.

##### 4.4.3 *Dog Walking*

Somenos supports wildlife species that are potentially at risk from dogs. To support the vision for the Management Area dogs must be under control at all times.

##### 4.4.4 *Cycling*

Due to the sensitivity of the Somenos Garry Oak Protected Area cycling is prohibited within this site. Within the rest of the Management Area, though not actively encouraged, cycling is not prohibited at the present time. This situation needs to be monitored and if conflicts arise it may be necessary to prohibit cycling.

#### 4.4.5 *Internal Combustion Engines*

Tire tracks provide evidence that the site receives some use by dirt bikes and ATV's. Dirt bikes and ATV's can tear up the ground surface disturbing plants and exposing soil to erosion and invasion by non-native plant species. Motorized boats and float planes on the lake are likely to cause considerable disturbance both to breeding birds, to brood rearing, and to winter feeding and roosting birds. Motorized activities such as these are not compatible with the vision for the Management Area. Use of internal combustion engines for other than management activities should be phased out.

#### 4.4.6 *Boating*

Canoeing is a seemingly appropriate low-impact way to explore the lake area, provided nesting areas and emergent vegetation are avoided during the breeding season. Forcing the birds off the nests during hot/cold weather, and keeping them off for any length of time, may result in overheating or cooling of the eggs. The eggs and chicks are also left exposed to predators such as crows and ravens. Other natural predators, such as mink and otter may exact a heavy toll in some years. It is recommended that canoeing be permitted in the area, but use levels and areas should be monitored over time so controls can be implemented if necessary to protect biological resources.

Disturbance of waterfowl during winter may also flush birds to agricultural fields elsewhere. Repeated disturbance could have significant impacts not only in this regard, but also in subsequent breeding success for some species. Restrictions such as zoning some area off-limits seasonally may be an option.

#### 4.4.7 *Fishing*

The lake is stocked with rainbow and cutthroat trout every year to support a recreational fishery. Stocking levels for 2000 were 1000 cutthroat trout and 6000 rainbow trout. There is no current data on the number of angling days for Somenos Lake. A 1986 study, estimated angler days at 1000 for the lake (Yaworski, 1986). See section 3.4 on fish.

**Table 12: Summary of Management for Recreation and Tourism**

<b>Issue</b>	<b>Goal/objective</b>	<b>Actions</b>
Wildlife viewing – opportunity to provide provincially significant wildlife viewing	<ul style="list-style-type: none"> <li>expand viewing opportunities</li> </ul>	<ul style="list-style-type: none"> <li>maintain the birdblind at boatland</li> <li>maintain the trail at the southend off York Road</li> <li>formalize and maintain the trail system in the Somenos Garry Oak protected area</li> </ul>
Walking/hiking	<ul style="list-style-type: none"> <li>A network of trails that provide wildlife viewing and walking opportunities without compromising the natural values of the Management Area</li> </ul>	<ul style="list-style-type: none"> <li>In the Somenos Garry Oak Protected Area, decommission trail links to private lands and consolidate the trail system into a single interpretive loop trail for hikers and walkers</li> <li>Locate the rare plant communities and other sensitive areas. Reroute trails as needed to avoid impacting these areas (Contact local specialists: including Derrick Marven, Syd Watts and Dave Polster)</li> </ul>

Issue	Goal/objective	Actions
	<ul style="list-style-type: none"> <li>• To be part of a network of trails in the Cowichan Valley</li> </ul>	<ul style="list-style-type: none"> <li>• Solicit and encourage local community groups to participate in the construction and maintenance of the trail system and the installation of a perimeter fence in the Somenos Garry Oak Protected Area</li> <li>• Work with local agencies to create a network of trails through the Cowichan Valley</li> </ul>
Disruption of wildlife by dogs	<ul style="list-style-type: none"> <li>• Dogs must be on a leash in all portions of the Management Area.</li> <li>• Dog handlers are required to pick up and pack out fecal material deposited by the dog they are handling</li> </ul>	<ul style="list-style-type: none"> <li>• ensure visitors are informed of policies on dogs in the Management Area by placing signs at trailheads (Boatland, York Road, Somenos Garry Oak Protected Area)</li> </ul>
Cycling	<ul style="list-style-type: none"> <li>• Prohibit cycling within the Somenos Garry Oak Protected Area</li> </ul>	<ul style="list-style-type: none"> <li>• ensure visitors are informed of policies on cycling in the Somenos Garry Oak Protected Area by placing signs at trailheads</li> </ul>
Internal Combustion Engines	<ul style="list-style-type: none"> <li>• Phase out use of internal combustion engines within the management area for non-management related activities</li> </ul>	<ul style="list-style-type: none"> <li>• Install fencing on the York Road side of the Somenos Garry Oak Protected Area to prevent access by ATV's and motorbikes</li> </ul>
Boating	<ul style="list-style-type: none"> <li>• management committee to develop boating guidelines and restrictions</li> </ul>	<ul style="list-style-type: none"> <li>• Permit but do not encourage canoeing; monitor and implement zoning controls only if necessitated</li> </ul>
Water activities - fishing	<ul style="list-style-type: none"> <li>• See section 3.4</li> </ul>	<ul style="list-style-type: none"> <li>• See section 3.4</li> </ul>

## 5.0 EXISTING AND PROPOSED FACILITIES AND ACCESS

### 5.1 Facilities and Access

Basic facilities existing and proposed within the area include:

- parking areas, kiosks at the entrances
- gates and strategically placed posts and boulders to prevent access by unauthorized vehicles
- signs to provide information on natural and human history and environmental sensitivities
- signs to inform visitors of Management Area regulations and security and safety concerns
- signs to mark designated trails and provide directions to specific locations
- bridges over watercourses
- trails with adequate drainage and erosion controls

**Table 13: Existing Facilities and Access**

Existing facility or access	Objective	Action
A. The boat launch at the eastern end of Drinkwater Road.	<ul style="list-style-type: none"> <li>• Provide limited access for non-motorized boats or boats with electric motors.</li> </ul>	<ul style="list-style-type: none"> <li>• Contact the Cowichan Fish and Game Club and develop a plan for maintaining the boat launch.</li> </ul>
<p>B. The BC Forest Discovery Centre</p> <p>This Centre functions as a museum, and interpretive centre and a tourist attraction. The area inside the Management Plan is under a partnership agreement with DU, and includes a wetland conservation area.</p> <p>There is an existing nature trail that passes by the DU pond and includes part of the Management Area</p>	<ul style="list-style-type: none"> <li>• Promote wildlife viewing</li> <li>• Develop viewing opportunities overlooking the Management Area.</li> <li>• Develop further interpretive signage and education programs</li> <li>• Explore early morning and evening access options to Discovery Centre site.</li> <li>• Develop programs which make interpretive connections between forest ecology themes and riparian zones</li> </ul>	<ul style="list-style-type: none"> <li>• Explore creative partnerships with other community non-profit agencies.</li> <li>• Consider multi-agency fundraising and joint development proposals for educational programming.</li> </ul>
C. Short trail on the south side of the Ducks Unlimited WCA next to the Trans Canada Highway	<ul style="list-style-type: none"> <li>• Maintain nesting waterfowl habitat from April to June</li> </ul>	<ul style="list-style-type: none"> <li>• No action. As there is no parking at the trail head and no means to monitor visitor use it is suggested that this area not be developed</li> </ul>
D. The Ministry of Transportation and Highways rest stop and wildlife viewing area on the Trans Canada Highway	<ul style="list-style-type: none"> <li>• Promote wildlife viewing</li> </ul>	<ul style="list-style-type: none"> <li>• recommend the relocation of garbage cans to enhance viewing experience.</li> <li>• Provide interpretive signs on waterfowl. Panels will need to be low so as not to disrupt viewing opportunities (liaise with MOTH to determine if they are supportive of this action)</li> </ul>

Existing facility or access	Objective	Action
E. The Boatland property – informal parking, trails and boardwalk to the bird blind, and a bird observation platform Though current plans from MOTH show this access will remain open in the immediate future this is not a favourable access point for cars due to safety concerns	<ul style="list-style-type: none"> <li>Promote wildlife viewing that is accessible to people in wheelchairs</li> <li>Resolve safe access and egress to highway</li> </ul>	<ul style="list-style-type: none"> <li>Maintain the boardwalk, trails, birdblind and viewing platform in wheelchair accessible condition</li> <li>actively seek out alternative access and parking areas</li> </ul>
F. Raised dyke trail departing from York Road	<ul style="list-style-type: none"> <li>Promote wildlife viewing</li> </ul>	<ul style="list-style-type: none"> <li>Maintain the trail</li> </ul>
G. Somenos Garry Oak Protected Area	<ul style="list-style-type: none"> <li>Promote nature appreciation</li> <li>Provide trails for nature appreciation</li> <li>Education on Garry Oak Ecosystems and rare/threatened species</li> </ul>	<ul style="list-style-type: none"> <li>consolidate trail system</li> <li>install fencing at strategic locations along the north, south and east boundaries of the property to limit access</li> <li>install interpretive and directional signage</li> </ul>
H. Road access at the end of Roome Road		<ul style="list-style-type: none"> <li>No action. Do not develop this access.</li> </ul>

## 5.2 Access and Parking Issues

Current access and parking at the site is limited. For the most part parking is along roadsides. Possibilities for parking within the Management Area boundaries are minimal, as fill on the wetland is not an option. Future parking options will have to look outside the boundaries of the Management Area and will take some creativity. Action: to develop an access plan, which will involve exploring parking options off-site. Some possibilities to explore include: an agreement with Fun Pacific or the School Board, DNC lands at the corner of Lakes Road and Beverly Street or at the corner of York Road and Beverly, purchase of Timbercrest Lands.

## 5.3 Proposed Trails

Trails are to be kept to a minimum. Trails must avoid sensitive wildlife areas and rare plants. There is a proposed project to improve drainage on The Nature Trust of BC land on the south side of the lake by digging new ditches on the north side of three existing ditches (DFO does not want the existing ditches disturbed). It is proposed that a trail be developed along the southernmost ditch for summer season use only.

## 5.4 Signage – Existing and Proposed

The area is not very large and signs should be kept to a minimum. Currently there are large signs at Boatland and at the end of York Road. Both signs are deteriorating and need to be replaced. This management initiative provides an opportunity to unify a look to signs that would introduce the visitor to the Somenos Management Area.

Action: That four kiosk type signs be developed as gateways to this area. They would be located at: the Somenos Garry Oak Protected Area, the end of York Road, the boatland property and the boatlaunch. Development of a kiosk at the boatlaunch will need to wait until DU signs a management agreement with Timberwest. Due to the limited visibility of this site a sign may be subject to vandalism. Consultation with BC Parks and others is recommended before proceeding with the design and placement of this kiosk.

It is suggested that kiosks have common information such as the name of the site, a map of the area, and the organizations involved. The kiosks would also have panels tailored to the needs of each site. For example the Somenos Garry Oak Protected Area could have information on Garry oak ecosystems and first nations use of the area whereas the Boatland site would focus on waterfowl.

Additional signs would include the symbol for dogs on leash to be placed at trailheads (i.e. York Road, Boatland and the Somenos Garry Oak Protected Area).



## 6.0 ADJACENT LANDS AND EXTERNAL ISSUES

### 6.1 Improving the Ecological Integrity of the Management Area

Improving the ecological integrity of the management area will be achieved by influencing management of surrounding lands through a combination of conservation tools. These tools include but are not limited to:

- a) Land Acquisition
- b) Conservation Covenants
- c) Management Agreements
- d) Stewardship through education.

### 6.2 Management Needs Beyond the Scope of this Plan

Inevitably, there are many broader issues that both affect, and are affected by, human activities on many of the adjacent parcels, and elsewhere in the watershed. While beyond the direct scope of this Plan, some of the uncontrolled factors are pivotal in the maintenance of a functional wetland ecosystem. In particular, the issues of water quantity and water quality are integral to the ecological sustainability of this important area, and as such these factors are discussed further in section 3.1 of the plan. Other factors, which extend well beyond the Management Area boundaries, include cross-boundary uses by wildlife, the increased human and domestic pet use of the site brought by changes in adjacent land uses, the introduction of contaminants, and the introduction of non-native plant and animal species. Many of these factors have significant impacts upon the values in the Management Area, but are beyond the direct control of the participating stakeholders.

The Management Area is in a receiving position in relation to the rest of the Somenos Basin. Activities upstream in the watershed will impact the Management Area. Consequently, it will be important to work closely with people and organizations beyond the boundaries of the Management Area to ensure that negative impacts are minimized and positive impacts are encouraged.

Another issue that passes beyond the boundary of this plan is the management of waterfowl (section 3.5.6). Since waterfowl spend only part of their time within the boundaries of the plan it is important to include the greater valley and to plan in context with continental populations.

### 6.3 Global and International Issues

- Air quality
- Migratory Bird Populations (especially breeding birds that winter in the south or breed in the north)
- Climate change

#### 6.3.1 Regional Issues

- Development activities (e.g. logging, land clearing) in the watershed that increase runoff, reduced natural hydrological buffering, reduced recharge of groundwater, increased impermeable surfaces such as pavement and buildings, which increase quantity of water and rapidity of fluctuations
- Introduction of nutrients, especially agricultural runoff and faulty septic fields (and consequent changes in water quality)
- Increased rates of sedimentation (accelerating the natural infilling of the lake and wetlands through eutrophication, sediment input)
- Introduction of chemicals, toxins, such as herbicides, pesticides, roadsalts, fertilizers etc.
- Introduction of species into lake, wetlands and woodlands
- Clearing of riparian vegetation in the greater watershed

#### 6.3.2 Local Issues

- York Road extension and York Road Bridge over Somenos Creek
- Immediately adjacent developments and activities – increased human use, dirt bikes, vandalism, noise and disturbance,
- Increased domestic pet activity

- Unsuitable adjacent activities
- Introduction of chemicals toxins, herbicides
- Increased traffic (vehicle, pedestrian, boat and float plane)
- Local upland clearing leading to reduced perching and breeding habitats for many species that forage in lake/wetland complex
- Further subdivision of properties bordering the management area

**6.4 Management Actions:**

- encourage and assist in the development of community watershed and lake stewardship programs
- encourage watershed stewardship that promotes effective stormwater management, reducing the use of non-permeable surfaces in the development of upland areas and implementation of best management practices
- whenever possible, cooperate with all levels of government, public individuals and groups and other stakeholders to implement programs aimed at improving environmental conditions beyond the boundaries of this plan but likely to impact upon the Management Area
- encourage the District to circulate for comment any land use change application for adjacent properties that may affect the Management Area.
- work closely with other government regarding overlapping management jurisdictions

## 7.0 PLAN IMPLEMENTATION AND ADMINISTRATION

The following section is to provide guidance on implementation of the Management Plan and offer direction on the administrative process. Many agencies, organizations and public interest groups over the past 20 years have been involved in conservation efforts within the Somenos Management Area. This plan and background document have documented and acknowledged these past and ongoing accomplishments and goals. This section contains recommendations to see these efforts continue to move forward.

### 7.1 Plan Adoption

The Somenos Marsh Management Plan should be “signed-off” by each member of the Steering Committee before implementation of the plan can move forward. The Steering Committee should meet to review the final plan and come to formal agreement on the content and the implementation process. Each member of the committee should then have their respective agency or organization review the plan and endorse the plan and the policies presented.

### 7.2 Implementation & Review

The extent and timing of the implementation of this Management Plan will be affected by funding and partnership agreements. Approval of the management plan is not an indication that funding is available to implement management actions. Funding will need to be found during the implementation of the plan.

The implementation of the Management Plan will involve:

- The participation of all members of the Steering Committee and their respective agencies and organizations.
- The establishment of a Management Committee (see below)
- The provision of resources necessary for the achievement of the targets outlined in the operational plans and the specific allocation of resources to these objectives.
- The ongoing monitoring and evaluation of results by the Management Committee.
- The establishment of ongoing consultation and feedback both externally and internally.
- The review of objectives and operational plans on an annual basis by Management Committee

### 7.3 Management Structure

The Management Plan for Somenos Marsh has incorporated a broad range of issues, objectives and actions that lie outside the jurisdiction and scope of any one agency or group. The implementation of the plan requires the establishment of a Management Committee. The Steering Committee reviewed several management structures to determine the most effective method to oversee the implementation of the Management Plan. The following alternatives were explored:

- a body comprised of landholders and leaseholders within the Somenos Management Area;
- a partnership of landowners/lease holders, government agencies and interest groups;
- continuation of the existing steering committee;
- an authority created by an Order-in-Council.

The plan recommends the partnership model with a ten member committee with representation as follows:

- two members from naturalist/stewardship groups. It is anticipated that one of these seats will normally be held by the Somenos Marsh Wildlife Society
- District of North Cowichan
- Department of Fisheries and Oceans
- Ministry of Water, Land and Air Protection at the regional level to provide technical expertise
- The Nature Trust of BC
- Ducks Unlimited
- Cowichan Tribes
- Representative from the Agricultural Community
- One member-at-large

It is suggested that the Management Committee and the committee functions be established as a bylaw by the District of North Cowichan. The functions should include:

- Co-ordinate and gather information on the Management Area's natural functions
- To be data custodians of information collected on the Management Area
- To manage decisions in accordance with the Management Plan
- Facilitation of agreements

#### **7.4 Plan monitoring and amendment**

In this Management Plan we have attempted to set some general goals and direction, and have identified some potential management actions. However, the Plan itself must be dynamic, and responsive to changes in our knowledge base and in our directions as a society. There are no permanent solutions, and the Plan must be reviewed and modified periodically. It is thus proposed that the Somenos Management Plan should be formally reviewed every five years. In addition, the Management Committee should review the progress of plan implementation, issues, and coordination activities of all levels of government on an annual basis.

#### **7.5 Role of Volunteers**

The Somenos Marsh Wildlife Society has been the main volunteer group involved in Somenos since their inception in 1989. A strong community based initiative involves volunteers to build strategic support in the community. Volunteers have been and will continue to be important in the stewardship of the Management Area and the success of this plan. There are many ways to involve volunteers. They can act as ambassadors, provide natural and cultural history information to visitors, patrol the area, monitor natural values, conduct research, remove invasive species, etc.

Under direction of the management committee volunteers will assist with all aspects of the Management Plan.

The Guardian Program is a volunteer program run by MWLAP. It was initiated in 1989 and was designed to assist MWLAP in managing TNT properties on Vancouver Island. Premise of the program – to involve dedicated members (volunteers) of the community (preferably living near the Management Area) to act as “eyes and ears” for a designated portion of the area. Currently there is no guardian program for the Somenos Management Area.

There are several Stewardship Programs that would dovetail well with the stewardship work already done by the Somenos Marsh Wildlife Society. These include Streamkeepers, Wetlandkeepers and soon to be released Lakekeepers. Other valuable sources of stewardship information include the Living by Water Project, BC Lake Stewardship Society, Cowichan Community Land Trust and BC Parks.

Vegetation and wildlife surveys. Local volunteers could be trained to conduct an annual survey for invasive species and would then be able to follow up where applicable. They could also be trained to monitor the status of the rare plant populations. Bird counts and water quality monitoring are areas where volunteers have provided extensive valuable information and their knowledge could be organized and co-ordinated to conduct effective projects.

#### **7.6 Funding, Partnerships and Revenue Generation Options**

Some of the actions will require little, if any funding and can be accomplished by local individuals, interest groups and organizations. Often donated time or materials from local individuals, organizations, businesses or industry can accomplish an action goal. There is a need to explore creative options of assistance as the SMWS has been doing.

It should be stressed that access to major funding from government, foundations and the private/corporate sector increasingly requires demonstrated broad based community support. The many agencies, stakeholders and community organizations with overlapping interests in the ongoing protection and interpretation of this Management Area could present the opportunity to access significant funding for joint initiatives and partnered projects.

Many funding sources are available. The District of North Cowichan has some funds available through its Green Fund. Other sources are well documented in reports such as “The Somenos Basin Project” and the “Recovery Strategy for Garry Oak and Associated Ecosystems and their Associated Species at Risk in Canada”. Another source of funding ideas is other wetland projects such as The Creston Valley Wildlife Management Area (CVWMA).

Building partnerships with the local community and further afield is another way of developing support for this Management Plan.

In the future, if lower water levels are achieved during the growing season then agricultural operations may generate funds that could be used in managing the Somenos Management Area.

### **7.7 Somenos Garry Oak Protected Area**

BC Parks is temporarily looking after the Crown land that is the Somenos Garry Oak Protected Area. BC Parks will devolve itself of responsibility for managing this parcel and will make appropriate arrangements for a group or organization or other level of Government to manage this parcel of land in accordance with this Management Plan.

## 8.0 REFERENCES

- Chislett Lattey Manson Architecture and Engineering Inc. 1993. **Timbercrest Developments Environmental Review, Duncan, BC, Project No. 478**, Prepared for: Ministry of Environment, Lands, Parks and Timbercrest Developments.
- Cooper, J.M. 2000. **Canada Goose Addling Program in the Cowichan Valley – 2000**. Manning, Cooper and Associates, Unpublished paper, Brentwood Bay, B.C.
- Douglas, G., J. Gould and J. Illingworth. 2001. **DRAFT COSEWIC Status Report on Tall Woolly-heads (*Psilocarphus elatior*)**. Prepared for COSEWIC.
- Ethos Consulting Land Sense Ltd. and Youds Planning Consultants. 1988. **Wildlife Viewing in British Columbia: the Tourism Potential**, Queen's Printer, Victoria, BC.
- Garry Oak Ecosystems Recovery Team. 2001. **Recovery Strategy for Garry Oak and Associated Ecosystems and their Associated Species at Risk in Canada**. DRAFT. Unpublished paper.
- Groves, David, 2001. **The Dynamics of Salmonid Production in the Somenos Basin in Relation to Water Quality and Nutrient Balance**. Unpublished paper.
- Haddow, Wayne. 1991. **Forage Management Plan, Natures Trust, Somenos Lake**. Unpublished report. Ministry of Agriculture and Fisheries, Duncan, BC.
- Knuth, Bo. April, 2001. Personal communication.
- Lanarc Consultants Ltd. and T. Burns. 1999. **The Somenos-Quamichan Basin Watershed Atlas and Fish Production Plan** (Draft First Edition, April 26, 1999)
- Law, Peter. May 2001. Personal communication.
- Radcliffe, G. 1991. **Somenos Marsh Implementation and Interpretation Plan**. Report to the Somenos Marsh Wildlife Society. Madrone Consultants Ltd. 50 pp.
- Ryan, M. and G. Douglas. **Status Report on the Yellow Montane Violet *Viola Praemorsa* ssp. *Praemorsa* in Canada**. Prepared for The Committee on the Status of Endangered Wildlife in Canada.
- Simpson, Kent, personal communication, May, 2001
- van der Gugten, N. and J.F. Blanchet. 1982. **Richards Creek / Somenos Creek Agricultural Drainage Improvements, Wildlife Mitigation Plan**. For the Corporation of the District of North Cowichan. Willis, Cunliffe, Tait/DeLCan. 7 pp.
- Willis, Cunliffe, Tait/DeLCan. 1981. **Agricultural Drainage Feasibility Study. Somenos Creek and Richards Creek Area**. For Ministry of Agriculture and Food. DRAFT COPY.
- Yaworski, B.A. (1986). **Small Lake Enhancement Feasibility Study, Vancouver Island, M.U. 1-4, Somenos Lake**. Unpublished report. Fisheries Branch, Ministry of Environment, Victoria.

**Appendix 1 – Mandates of organizations on the steering committee**

Adapted from “Somenos Basin Project – Phase One Restoration Feasibility Report”, January 1999

**Ducks Unlimited’s** (DU) is a private non-profit charitable organization dedicated to the conservation of wetlands for the benefit of North America’s waterfowl, wildlife and people. DU’s mission is to fulfill the annual life cycle needs of North American waterfowl by protecting, enhancing, restoring and managing important wetland and associated uplands. Ducks Unlimited has a management agreement with the BC Forest Discovery Centre. The purpose of Ducks Unlimited’s project beside Somenos Lake is to provide wintering waterfowl habitat. In particular the focus of the project is to produce smartweed.

*Represented by Dan Buffett and Les Bogdan*

**The Nature Trust of BC** (TNT) is a charitable corporation dedicated to conserving areas of ecological significance in BC. TNT bought land around Somenos Lake to provide winter habitat for waterfowl. Their involvement is through the Vancouver Island Wetlands Management Program. The main objectives of this program are conservation and management of important coastal wetlands.

*Represented by Tim Clermont*

**The Ministry of Water, Land and Air Protection** (MWLAP) is responsible for managing The Nature Trust of BC’s lands under a 99 year lease agreement. MWLAP’s goals for the area are:

- to preserve and enhance waterfowl habitat;
- to increase public wildlife viewing opportunities;
- to increase the public’s knowledge of wildlife management; and
- to restore the land’s capability for agriculture, and fish and wildlife production

MWLAP also manages water through the provisions of the Water Act and is responsible for habitat protection (under the Wildlife Act) through their Habitat Branch, and for resident native fish populations through their Fisheries Branch.

*Represented by Peter Law*

**The Somenos Marsh Wildlife Society** is a non-profit organization incorporated in 1989. The purposes of the society are threefold: to preserve Somenos Marsh in its natural state; to protect and conserve wildlife habitat; and to promote public education and information. Volunteers with the Society have been extremely active in many projects around Somenos Lake including: collecting water quality data, conducting bird surveys, egg addling programs, public education, etc.

*Represented by Derrick Marven*

**The District of North Cowichan** (DNC) sets land use policies, through its’ Official Community Plan and zoning processes. DNC is responsible for ongoing drainage maintenance of Somenos and Richards Creeks, through the Agriculture Rural Development Subsidiary Agreement (ARCSA). DNC also works in conjunction with other government agencies and organizations to address stormwater management within the Municipality

*Represented by Chris Hall*

**The Cowichan Watershed Council** is a non-profit organization with a board of community representatives from industry to environmental groups. The Council acts as a facilitating body for issues in the Cowichan Valley and is working towards a healthy Cowichan River Watershed from source to sea.

*Represented by Anne Murray*

**The Cowichan Tribes** have historic rights to resources within their traditional territories and under treaty negotiations are working towards integrated management of these resources. Limits on land use, under ordinary land ownership are generally controlled by zoning, bylaws and other provincial and municipal regulations and legislation. Under aboriginal title, present-day activities must not impair traditional use of the land by future generations. Therefore, there is a need to evaluate present and future activities on lands within traditional territories, such as in Somenos. The Cowichan Tribes Environment Department works to protect environmental features both on and off reserve within Cowichan Traditional Territory. Environment staff provide technical expertise on fish, forestry and marine related issues.

*Represented by Cheri Ayers*

**BC Parks** is temporarily looking after the Crown land that is the Somenos Garry Oak Protected Area until the recommendations of this plan are implemented.

*Represented by Chris Kissinger*

**BC Forest Discovery Centre** is a museum, interpretive centre and tourist attraction operated by the BC Forest Museum, a non-profit society and federally registered charity. The portion the BC Forest Museum property that is included in this management plan is subject to a partnership agreement with Ducks Unlimited and includes a Wetland Conservation Area. An interpretive kiosk and trail provide some viewing and interpretive options for visitors to the Centre related to the Management Area, and represent a significant area of future development for the organization.

*Represented by Rick Duckles*



**Appendix 2 – Terms of Reference for Development of the Management Plan**

In order to meet the criteria of the vision statement, the Steering Committee commissioned a management plan to accomplish the following:

- Provide guidance to habitat restoration and protection, wildlife viewing and agricultural activity within the Somenos Management Area;
- Lay a framework for on-going co-ordinated management at the local level;
- Define the roles and responsibilities of all parties (landowners, local stewardship groups, local government and agencies) in managing the Management Area;
- Establish a baseline measure from which monitoring of ecosystem health can be undertaken. It is expected that this will include water flows, water quality, fish habitat and wildlife/bird diversity;
- Produce an up to date consolidation of information on issues within the Somenos Basin that have or will influence the future management of the Management Area.

## Appendix 3 – Larger Programs and Plans, Legislative Framework and Administrative Responsibility

PLAN OR ACT	RESPONSIBLE AGENCY	COMMENTS
Official Community Plan	District of North Cowichan	
Bylaw No. 2950 Bylaw to Divide the Municipality into Zones and to Regulate the Uses in such Zones	District of North Cowichan	
Trail Network and Cycling Plan	District of North Cowichan	
Groundwater Management Plan	District of North Cowichan	This information announced April 14, 2001
Restrictive covenants		
Waste Management Act	Ministry of Water, Land and Air Protection	
Water Act	Ministry of Water, Land and Air Protection	
Fisheries Protection Act	Ministry of Water, Land and Air Protection	
A Freshwater Strategy for British Columbia	Ministry of Water, Land and Air Protection	
Streamside Protection Act	Ministry of Water, Land and Air Protection	
BC Treaty Negotiations	BC Treaty Commission	
Fisheries Act	Department of Fisheries and Oceans	
Migratory Birds Convention Act	Canadian Wildlife Service	
Important Bird Area	Birdlife International	
The North American Waterfowl Management Plan	Program to secure, enhance, restore and manage important areas for the benefit of North America's Migratory Waterfowl and other wildlife species	
Strategic Conservation Plan for the East Coast of Vancouver Island	Ducks Unlimited	This plan is to be started in the fall of 2001 and completed by 2002



**Somenos Lake and Wetland Complex**

**Summary of Open House**  
December 6, 2000

*for:*

**Ducks Unlimited Canada**

**MADRONE CONSULTANTS LTD.**

**December, 2000**

**Somenos Lake and Wetland Complex Management Plan****SUMMARY OF PUBLIC OPEN HOUSE**

December 6, 2000

At the Freshwater Ecocentre on December 6<sup>th</sup>, a public open house was held from 3:00 p.m. to 7:00 p.m. The open house was followed by a special session from 7:00 p.m. to 8:00 p.m. for landowners with property adjacent to the study area. Promotion for the open house included articles in both of the local papers, public service announcements on the local radio station 89.7 FM and posters placed in public venues in the community. Invitations to the session between 7 and 8 p.m. were mailed to landowners with property adjacent to the study area.

Thirty nine comment forms were received during the open house and by mail. The comments are tabulated on the following pages.

Fifty four people (54) signed in at the open house. Seven landowners attended the session from 7:00 p.m to 8:00 p.m. Some landowners attended the open house earlier in the day. The following is a summary of the sign-in sheet.

**No affiliation specified 16****Environmental organizations and community groups**

Council of Canadians: 2  
Cowichan Community Land Trust: 2  
Cowichan Fly Fishers: 3  
Cowichan Valley Naturalists Society: 10  
Cowichan Watershed Council: 3  
Somenos Marsh Wildlife Society: 6  
Sierra Club: 1

**Neighbouring Land owner: 4****First Nations**

Penelakut F.N. Member: 1

**Government**

BC Fisheries: 1  
CVRD: 1

**Other**

Nelson Environmental Inc.  
Ptarmigan Biological Services  
Fish First:2

**Comment Form Responses  
Somenos Lake and Wetland Complex  
Open House December 6, 2000**

The following is a compilation of the responses on the comment form from the open house held December 6, 2000 at the Freshwater Ecocentre.

**1. What activities have you pursued within the study area?**

Birdwatching, wildlife viewing: 34

Fishing: 10

Picnicking: 4

Canoeing, boating: 14

Painting/photography: 10

Nature studies: 16

*Other:*

Ice skating

Walking (with a dog) x 2

Walking x 2

Biking

Hiking

Giving nature walks to school and youth groups

Botanizing x 2

Hunting (prior to 1960)

Meditating

Stream keeper on Somenos Creek

Swimming (in the past)

I feel no need to utilize the area for myself. I do feel a strong need to conserve/protect it for the community and the future

Wildlife life data collecting

Walking the trail from Lakes Road along the east side of the creek to the northern boundary. Peaceful and quiet. Great place to take visitors

Have lake access currently to paddle with horses off shale beach area

**2. What activities would you support within the study area?**

Birdwatching, wildlife viewing: 36

Fishing: 24

Agriculture: 18 Three responses with qualifying statements 1) hay only, 2) restricted 3) only where appropriate

*Other:*

Non-motorized boating

Tourism

Swimming

Hiking trails that do not interfere with wildlife and birds

Hiking/walking

Walks in certain areas

Natural history interpretation/botanical study

Limited haying to support migrating wildfowl

Canoeing x 2

Canoeing and non-motorized boating x 2.

Artistic and naturalists visits and school group educational uses  
 Dog walking  
 Painting  
 Photography  
 Nature studies  
 Education  
 Interpretive walks, wildlife/wetlands research

**3. Currently, are there activities within the study area that you feel are inappropriate?**

Motorized boating (if occurring presently)  
 Outboard motors  
 Hunting  
 Hunting (peripheral)  
 Not sure  
 Not to my knowledge  
 Dogs allowed into water where there is wildlife. All dogs should be under control  
 Dogs allowed in the water disturbing birds and wildlife  
 Infilling that occurred along highway  
 Slurry spreading along Somenos Creek behind Alexander School  
 Dirt biking – garry oak meadow area  
 Dirt biking x 2  
 No motor vehicles on water or land  
 No motorized vehicle/boat use  
 Landfills  
 Landfilling on private property between the lake and T.C.H.  
 The operation of gas boat motors  
 Use of the lake by float planes  
 I suspect there are but am not sure what or by whom  
 Commercial development  
 Dumping of refuse  
 Development  
 Fishing  
 Agriculture  
 Agriculture - sewage  
 Not sure of the agriculture – hay cutting. What do the experts say?  
 Dumping, drainage of septic fields, washing of manure spreaders, cattle having access, hunting  
 Hunting x 3  
 Cattle  
 No x 2  
 yes  
 Water airport for floatplanes  
 Canoeing/boating/fishing  
 Landfill, illegal hunting, trapping, helicopters, power boats, floatplanes, unleashed dogs, mountain and trail bikes  
 The proposal to extend York Road by way of a bridge would diminish the integrity of the area. Would encourage increased traffic, noise and pollution. A foot bridge would be okay.  
 Dog walking, bikes, gas outboard motors, float planes, and four barrels at the highway wildlife viewing area  
 Chemical fertilizers (if being used) on adjacent lands motorized boating (not sure if this is presently allowed)  
 Development and inadequate septic fields/ over populated by the Canada Goose

#### 4. How would you like to see wildlife viewing supported within the management plan area?

Trails (probably elevated), wildlife viewing platforms  
 Very aggressively, the wildlife values are paramount to all others of course this is a conundrum as wildlife is not a normally recognized “land owner”

Yes  
 Absolutely  
 Well defined paths  
 Trails and viewing areas on the margins  
 Set up discrete viewing sites and make information available  
 A series of trails around the perimeter. Maybe some limited access into the marsh area  
 Please make it a priority vis a vis motorized vehicle trails which is totally inappropriate. Maybe an information kiosk with bird and other wildlife photos/descriptions/migration patterns  
 No suggestions. Access is available but not taken advantage of. I would hate to see it become the whale watching mecca for birdwatchers.  
 Boardwalks, nature trails and nature house shelter. Also important to remember plant viewing – not just wildlife, in terms of montane violets, garry oaks, etc.  
 Boardwalks and viewing platforms  
 Boardwalk for viewing on westside. Footpaths for viewing and walking on the east side.  
 Hunters and fishermen already contribute through habitat conservation programs. Non-consumptive user’s should start paying!! Their way!  
 Carefully manage narrow trails with attractive and appropriate signage  
 Provision of look-outs, picnic tables in suitable places. Bird blinds etc. for people and photography  
 Restricted access  
 Bird watching blinds. Interpretive centre for tourists, school parties, etc.  
 A wildlife viewing interpretive centre would be a great tourist attraction and at same time hopefully concentrate human interference to this area.  
 Informatively – controlled spaces, well marked boundaries with an engages and pro-active educational component.  
 Development of low impact/disturbance viewing sites. Not at critical or sensitive sites  
 As it presently is  
 More trails, wheelchair access viewing areas  
 Move the forestry look out tower on the BC Forest Discovery Centre property to a position where it over looks the lake and marsh  
 Wheel chair access. Winter access  
 Bird blinds – if vandalism controlled  
 Walks  
 Trails and blinds provided conservation values are maintained  
 Low key – less people the better  
 Through provincial and local governments, Ducks Unlimited  
 Financially? Provincial government i.e. Hunting and Fishing licences  
 Easier public access; pull overs on TCHwy are busy, small and noisy not peaceful  
 Small nature house/interpretive centre. Raised board walks with bird watching towers and permanent interpretive signs. Public access dock for non-motorized boating activities. Public access to be limited to non-intrusive activities. Must be controlled to prevent acts of vandalism – i.e. locked gates after hours, etc.

#### 5. Agriculture has been an ongoing activity around the Somenos Lake. How would you like to see this area supported?

Small areas of hay cutting and feed crops ie. Corn  
 Should be organic. No pesticides, herbicides and strict control of chemicals. This also applies to the watershed.  
 I wouldn’t. They get too much support already, grow crops for wildlife  
 ALR maintained

Terminate any expansion  
 Haying OK if no chemicals applied. No animals, because of manure  
 Feed crops for migrating bird flocks. X 2  
 Feed crops for migrating waterfowl etc. Make sure all lands bordering the water have riparian zones  
 Sound barrier from highway  
 Perhaps not at all if not compatible with wildlife use  
 This can continue and be done in a wildlife friendly manner. DU and MELP must help more  
 No fertilizers or runoff. Practise traditional sustainable ag.  
 Support in so far as use of pesticides, clearing of ditches etc. do not affect wildlife  
 Education of farmers to co-operate in maintaining the wetland  
 Only as is complementary to the wildlife  
 Leased to local farmer's and planted with lure crops for waterfowl  
 Ditching to reduce flooding- clean out Somenos Creek and improve the flow from the creek into the  
     Cowichan River  
 Hay fields to support winter waterfowl and suppress succession  
 Not sure  
 It has been marginal at best except at north end of lake. Concerned about slurry and fertilizers  
 Agriculture should be limited to unfertilized crops eg. Hay  
 Community based garden plots if appropriate  
 Evaluate if nearby agriculture is resulting in any pollution or chemical input into the lake or its  
     watershed  
 Could we do without it eventually? The current haying operation has apparent minimal bad impact  
 Anything non-destructive on a long-term basis is fine  
 Minimize pesticide use  
 ?  
 In a sustainable environmentally friendly way  
 Agriculture is not exclusive to healthy wildlife. Both are permissible and possible  
 Haying is a benign agricultural use that benefits raptors. Therefore continued agriculture in some areas  
     is a good thing  
 Organic methods should be encouraged. Keeping animal manure out of the lake by appropriate  
     drainage/fencing techniques  
 Protect the ALR. No further development of lakefront properties

**6. What issues within the Somenos Basin do you see will influence/impact the future of the study area?**

Development of the privately owned properties that surround the lake and streams that enter it  
 The proposal to extend York Road by way of a bridge would diminish the integrity of the area. Would  
     encourage increased traffic, noise and pollution. A foot bridge would be okay. (same as in #3)  
 Vehicle road and bridge. Destruction of habitat in surrounding areas housing, tree cutting etc  
 Urban growth  
 Sewage  
 Continual residential/commercial development. Water-supply affected by logging (silting, debris)  
 Population growth. Destruction of watershed  
 Drainage both into and out of will be affected by development, increased population of area  
 Residential development  
 Possibly other development – if allowed industrial or residential  
 Residential development, loss of large trees, water quality  
 Growth, traffic  
 Need to see that activities within whole basin do not have adverse effects  
 Pollution, tree-felling, broom encroachment  
 Pressure to put in York Road extension. Gravel buildup at junction with Cowichan River due to  
     Cowichan channelization  
 Uncontrolled development



Water quality (i.e.) 1) irrigation. Demands for crops. 2) water degradation from pollution such as a) livestock, b) industrial  
 Improvement of water quality – temperature and oxygenation  
 Control (removal) of willows from N.W. side of lake  
 Urban growth! Nutrient additions  
 Concerned about outside the basin, creeks flowing smoothly  
 Division amongst property owner on future  
 Housing – please no  
 Keep the bridge out  
 Adjacent housing developments  
 Rampant broom growth  
 Pressure for housing development  
 Watercourse/waterflow issues for watercourses entering and leaving the lake  
 Water quality  
 Further housing development in Timbercrest – bridge  
 The possibility of the York Road Bridge would be a negative influence.  
 Encroaching residential/commercial areas  
 Changes in hydrology drainage area  
 The highway – noise, runoff, car/animal collisions. Encroachment on surrounding lands by development. Chemical fertilizer/animal manure runoff  
 Drainage “into” lake needs improvement. Development on west side of TCHwy has had a major impact on proper water flow into the lake

**7. Have you observed changes in the study area: What are the nature of the changes and over what time frame have they occurred? Do you view these changes for better or worse?**

Development of surrounding ie. Parking lot run-off. Sub-divisions ie. Tree removal along Somenos Creek  
 I came here in 1940 – small population – you could walk the edge of Somenos Creek down to the Cowichan River. We need to retain as much undisturbed creek area as is possible.  
 Too recently in area (5 years) to comment  
 Rising water levels  
 For the last 2 decades, continual increase of algae from additional fertilizers and sewage  
 Yes I've observed changes – having lived on the east shore of Somenos Lake some 49 years – the children swam in Somenos Lake in the very early days and skated  
 Yes. Used to swim regularly in clear lake water (in 1960s)  
 Removal of trees along the creek. Manicured lawns should be left wild  
 Encroachment by infilling (Bradshaw) siltation in Somenos Creek. Reed canary grass gradually plugging the creek.  
 Encroachment by infilling, silting from development  
 Yew. Removal of “boatland” or was it outside? Some dredging of Somenos Creek. Less agricultural use. Wouldn't say whether better or worse. 28 years  
 Over the past 9 years the willows have taken over half of nature trust property. There appears to be a better public awareness of what we actually have here  
 Both  
 No comment – live too far away and am a relative newcomer to the area  
 Encroachment of industrial and urban sprawl over a 40 year period. This development must end  
 A worsening of water quality  
 Rise in water level – increased flooding  
 Landfill  
 Growth of willows  
 Successional advancement of old fields  
 Increase of broom in Timbercrest – change for worse  
 Not really in the last 10 years. Geese population is better controlled. Algae blooms occur during the summer depending upon temperature

Only present the past 6 months  
I am pleased that more land has been secured for preservation  
New to the area  
The influence of the Cowichan River is becoming problematic and may be the overriding or dominant influence  
Encroaching commercial/residential development in area that was taken for granted for many years.  
Effect is neutral at best and probably negative  
As area developed – Timbercrest- lake gets disgusting algae growth not like it was 15-20 years ago.  
One would swim then but not now.

#### 8. What would you like to see for the study area for the future?

No more housing  
Improve gravel walk at York Road  
Replace wooden board walk and look-out blind with gravel walk and natural hedge blinds  
Lower summer water levels  
More study and inventories. More wildlife viewing sites  
Boardwalks  
Trails in the area. Bird blinds (bomb proof)  
Removal of introduced plants and fauna. Trail around the lake  
Limited or no development. Perhaps wildlife reserve  
Community involvement, connectedness  
Active, informative, thorough educational displays  
Continue acquisition of adjacent lands especially riparian areas of the creeks flowing into, out of Somenos Lake  
The recognition that Somenos Marsh is an integral part of a larger wildlife management unit  
See info given to Sally by Hylton McAlister  
No more housing  
Little development  
Improved water flows/ water quality preservation of a precious wetland for wild residents and migrants – of a non-human variety!  
Good controlled public access  
More public involvement  
Keep it as is with very natural and undeveloped area. Maybe a fence to delineate it  
Can aeration improve the quality of lake water  
To enhance the natural history of the area  
Increase public ownership  
Note special management for garry oak stand – reverse succession, reintroduce fire  
A prime coho rearing habitat  
Wildfowl viewing  
Conducted nature walks  
Conducted canoe viewing  
To a least cut all encroaching willows on the arable land. Bring back the meadows for shallow water feeding waterfowl  
I would like to see it developed as an attraction to visitors and able to educate visitors on looking after wildlife  
Land use policies consistent with the science required to support the health of the watershed  
Bird viewing hides. Artificial nesting sites, boxes, etc.  
Better viewing facilities, the purchase of Silva and Bradshaw lands is imperative to the establishment of this area  
Enhancement of opportunities for non-consumptive educational and recreational activities.  
Management strategies to enhance wildlife habitat  
Improve flow into and out of the lake, keep water moving, not stagnant

### 9. What concerns do you have for the future of Somenos Lake and Wetland Complex?

Somenos should be left as natural as possible, no buildings, no fences, block roads, and SMALL signs at trail heads

Everything that goes with an increase in population – more stress

I believe it is essential this area – including that visible from TCH be conserved for present generations and tourist enjoyment, but especially for future generations

More and more people in the area

The area generally becoming more polluted

Inroad of roads and subdivisions

Control of and respect for Cowichan River and all creeks feeding the wetland

Development

Infringing development, contamination from the highway, nearby farms and urban development

That it be “locked up” for single use as opposed to many recreational uses

Stormwater runoff, loosestrife, willow encroachment

Ag runoff, too many boaters, disruptive drainage patterns

Complacency, apathy, a lack of people working together, hunting. Different groups doing their own thing without consultation with others, lack of proper managers

Need to maintain area as attractive to wildlife

Pollution

Loss of habitat for migratory birds, loss of fish habitat

Lack of control of development and loss of a wildlife area of inestimable value

Too many interest groups are involved in the decisions on what should happen here. Our provincial government should have final say.

Political: the internal squabbling among the stakeholders has delayed action for too long – it is to be hoped that at long last we can put this behind us and get on with the job of managing the marsh for all residents not just the few with vested interests

Need to look at successional directions and base management on restoring appropriate seral stage

That all the stakeholders can put aside personal and political

Geese and nutrients in the lake are impacting water quality

Concerned that population pressures for housing or more development in the park will change area usage

Pollution run-off from pesticides and herbicides. Acid rain from Crofton and vehicles and outdoor burning

Changes in drainage – chemical input due to past and future housing development

That we hold fast to our resolve to preserve it. Wetlands are complex. The more we can set aside and not tinker with, the better

Survival of fish

That we will not complete this process and let this opportunity slip through our fingers

Changes in watershed hydrology

Pollution

Commercial and residential development on floodplains and riparian zones

Further loss of surrounding buffer areas. Vandalism of any developments re: nature trails.

Eutrophication. Effects of highway noise on wildlife.

If nothing done, further pollution of lake and deteriorating ecosystem

### 10. Who do you think should manage the Somenos Lake and Wetland Complex?

Provincial government: 15

Local Government: 8

Non-profit society: 14

Other:

They are all stakeholders with varying interests. At this moment I don't know

Or a coalition of N.P. societies

BC Parks plus CVNS (Nature Trust also)

All of the above as joint stakeholders  
 Group with most power! Therefore probably provincial government  
 Stakeholders group (overseers) with Somenos Marsh Wildlife Society as managers  
 Non-profit society with cooperation of local and provincial government  
 This is a difficult one. With our past record of internal conflict, it may be difficult to nominate one group or organization. Perhaps with the completion of the management plan, the interested stakeholders can form a management committee – but I'm not holding my breath  
 CVNS with support from Provincial government  
 Good question. Whoever will decrease the division amongst stakeholders  
 Local government might have other priorities than maintaining study area as it is  
 All must be involved to satisfy the need for "checks and balances"  
 A provincial/local partnership. This would provide a level of expertise and funding to protect a local area of provincial significance. Both levels of government could work with existing non profit societies.

#### 11. Additional comments:

Why does this study not include the Somenos Creek?  
 There seems to be an effort to exclude the proposed York Road extension bridge from the study. As it would have a negative impact on the area, getting worse in the future, a critical discussion of it must take place.  
 Joining SMWS was one of my family's first actions on moving to Chemainus. Although we do not boat or otherwise visit the "wild" areas, we are anxious they be protected (and added to where possible). Knowing the marsh is "there" rather than "using" it pleases us greatly.  
 No hunting in the lower watershed  
 Form "Friends of Somenos Wetland"  
 Somenos Lake has a reputation as being "stagnant". Is this a "natural" problem or is it due to some change in the hydrology in this watershed?  
 Address the flooding issues. Get natives and fisheries to sit down and do something before it's too late.  
 This is an asset to the community and is little appreciated  
 Use the expertise of Ducks Unlimited to manage the overall plan  
 Will need to develop sophisticated management strategy for area – look at ecological integrity  
 Concerned that Somenos Creek, Averill Creek, Richards, Bings Creek are not included in study area  
 We are fortunate to own a piece of this wetland area and are constantly surprised by the few people who take advantage of it  
 A fence delineating BC Parks area on east side of study area would be a good idea and requiring dogs to be on leash beside the water. The rest of areas could be off leash to dogs.  
 Birdwatching could be an economic benefit to the community. It would be helpful if there was more detailed information available. It would make it easier to make an informed answer to your questionnaire  
 I am very pleased to see that a broad-based committee has commissioned this plan. Good luck!!  
 The many NGO and particularly the ENGO's are all watching and will be there for the long term... that's a promise.  
 Somenos Marsh is an as yet untapped economic draw to the area. The speed limit of the highway should be reduced to 50-60 kmh and appropriate signs should be placed to advertise future facilities. An interpretive centre and parking area could be built on previously filled land adjacent to the highway. A network of trails and boardwalks could be built. Bird watching is a rapidly growing past time and could provide significant tourist dollars to the local economy.



2645 Dollarton Highway  
North Vancouver, BC, Canada V7H - 1B1  
Phone (604) 924-2500 Fax (604) 924-2555



Wednesday May 16, 2001 At 4:46PM

Page 1

## Final Analytical Results

**PESC FOLDER # : 200102118**

**Requisition #: 50055094**

EMS Site ID: E243577  
Location: SOMENOS LAKE AT CENTRE  
Type of Sample: Fresh Water/General  
Submitted By: Rick Nordin  
Ministry of Environment, Lands and Parks  
2nd Floor  
2975 Jutland Road  
Victoria, BC  
Canada V8T 5J9  
Logged In: Tuesday April 24, 2001  
Completed: Tuesday May 15, 2001 (51 results)  
Client Code: SP  
7017-57 EPD-WQB-SPRING OVERTURN  
Sample Priority: Normal

Authorized by: Richard Strub  
QA Officer

Notes:

Location: SOMENOS LAKE AT CENTRE

PESC FOLDER #: 200102118

Requisition #: 50055094 EMS Site ID: E243577

TEST DESCRIPTION	MATRIX	RESULT	MDL	UNITS
------------------	--------	--------	-----	-------

Order No: 45236

Start Date: 4/23/2001 12:00:00AM Upper Depth: 0.1 m

**General****Alkalinity Tot-pH4.5**

Alkalinity to pH 4.5 FWGE 37.4 0.5 mg CaCO3 / L

**Color True**

Colour, True FWGE 45 2.5 Col. unit

**ICA (Cl F SO4)**

Chloride (Cl) FWGE 11.7 0.5 mg/L

Fluoride (F) FWGE 0.04 0.01 mg/L

Sulphate (SO4) FWGE 9.6 0.5 mg/L

**ICA (NO2 NO3 PO4 Br)**

Bromide (Br) FWGE &lt; 0.05 0.05 mg/L

Nitrogen, Nitrate as N FWGE 0.146 0.002 mg/L

Nitrogen, Nitrite as N FWGE &lt; 0.005 0.005 mg/L

Phosphorus as P FWGE &lt; 0.05 0.05 mg/L

**pH**

pH FWGE 7.63 0.01 pH Units

**Residue: Total**

Residue, Total FWGE 110 10 mg/L

**Specific Conductance**

Conductivity FWGE 133 2 uS/cm

**Turbidity**

Turbidity FWGE 1.74 0.05 NTU

**Metals****ICP Total**

Aluminum (Al) FWGE &lt; 0.06 0.06 mg/L

Antimony (Sb) FWGE &lt; 0.06 0.06 mg/L

Arsenic (As) FWGE &lt; 0.06 0.06 mg/L

Barium (Ba) FWGE 0.009 0.001 mg/L

Beryllium (Be) FWGE &lt; 0.001 0.001 mg/L

Boron (B) FWGE 0.01 0.01 mg/L

Cadmium (Cd) FWGE &lt; 0.006 0.006 mg/L

Calcium (Ca) FWGE 11.9 0.1 mg/L

Chromium (Cr) FWGE &lt; 0.006 0.006 mg/L

Cobalt (Co) FWGE &lt; 0.006 0.006 mg/L

Copper (Cu) FWGE &lt; 0.006 0.006 mg/L

Iron (Fe) FWGE 0.301 0.006 mg/L

Lead (Pb) FWGE &lt; 0.06 0.06 mg/L

Magnesium (Mg) FWGE 3.3 0.1 mg/L

Manganese (Mn) FWGE 0.039 0.001 mg/L

Molybdenum (Mo) FWGE &lt; 0.01 0.01 mg/L

Nickel (Ni) FWGE 0.02 0.02 mg/L

Printed On: 16-May-2001

Location: SOMENOS LAKE AT CENTRE

PESC FOLDER #: 200102118

Requisition #: 50055094 EMS Site ID: E243577

<b>TEST DESCRIPTION</b>	<b>MATRIX</b>	<b>RESULT</b>	<b>MDL</b>	<b>UNITS</b>
Phosphorus (P)	FWGE	< 0.1	0.1	mg/L
Potassium (K)	FWGE	1.1	0.1	mg/L
Selenium (Se)	FWGE	< 0.06	0.06	mg/L
Silicon (Si)	FWGE	3.30	0.06	mg/L
Silver (Ag)	FWGE	< 0.01	0.01	mg/L
Sodium (Na)	FWGE	7.2	0.1	mg/L
Strontium (Sr)	FWGE	0.078	0.001	mg/L
Sulfur (S)	FWGE	3.40	0.06	mg/L
Tin (Sn)	FWGE	< 0.06	0.06	mg/L
Titanium (Ti)	FWGE	0.002	0.002	mg/L
Vanadium (V)	FWGE	< 0.01	0.01	mg/L
Zinc (Zn)	FWGE	0.005	0.002	mg/L
<b>Non-Halogenated</b>				
<b>TIC</b>				
Carbon, Total Inorganic	FWGE	8.7	0.5	mg/L
<b>TOC</b>				
Carbon, Total Organic	FWGE	8.1	0.5	mg/L
<b>Nutrients</b>				
<b>NH3</b>				
Nitrogen, Ammonia as N	FWGE	0.026	0.005	mg/L
<b>Nitrogen Total</b>				
Nitrogen, Total as N	FWGE	0.71	0.02	mg/L
<b>SIO2</b>				
Silica (SiO2), Reactive	FWGE	8.1	0.1	mg/L
<b>Total DissPhosphorus</b>				
Phosphorus, Total Dissolved as P	FWGE	0.031	0.002	mg/L
<b>Total Phosphorus</b>				
Phosphorus, Total as P	FWGE	0.064	0.002	mg/L

**Appendix 6 - Restoration Projects and Research Activities**

Restoration and research activities identified here are identified and discussed under the relevant sections elsewhere in the report. This section serves simply as a brief summary of proposed activities for quick reference only.

**RESTORATION****Riparian Zone Improvements**

Plantings of tall shrubs and trees along riparian zones, within 2 to 5 m of the creek banks, and especially on the south and west sides of creeks. These are intended to provide for fish habitat, keeping creeks cooler and less prone to become clogged with dense herbaceous vegetation in the summer. In conjunction with other channel work this is intended primarily to improve fish habitats in summer. Although plantings of black cottonwood and hybrid poplar have been suggested for fish habitat purposes, in keeping with other goals the use of the native species only (i.e. omitting hybrid poplar) is recommended. In addition, red alder and possibly some big-leaf maple could also be planted near creeks. However, the taller trees permitted to develop- especially native cottonwoods – will also serve the function of providing additional tall structure for perching raptors and, eventually, potential cavity nesting sites for a variety of species. In the interim years they can be used for mounting nestboxes suitable for larger raptors and cavity nesting ducks.

**Boatload Property Restoration**

Some initial work planting this area has been carried out by SMWS. Originally the area was part of the wetland but has been dramatically altered by fill and (in the past) buildings on site. At this point the development of a terrestrial ecosystem for this site is by far the most inexpensive option. Restoration to fully functional wetland would be extremely expensive and, in the short term, would be very disruptive to wildlife. As upland forests have been extensively cleared around the general area, replacement of wetland with some good mixed woodland habitat is the proposed alternative option. A detailed site-specific visual plan should be drafted to direct this work.

**Somenos Garry Oak Protected Area**

A Management Direction Statement was prepared for the Somenos Garry Oak Protected Area by the Somenos Garry Oak Sanctuary Committee. A detailed restoration plan for this area should be developed in conjunction with the Garry Oak Ecosystems Recovery Team. Components of the plan would include the detailed identification of rare plant populations, site specific threats and short and long term management actions to protect these species. Components of the plan should include broom removal and control, a review of controlled, localized burning as a management tool, consideration of whether snowberry and Douglas-fir should be controlled. The collection of a portion of seeds for propagation to supply restoration efforts is also suggested as an option.

**Other Restoration Projects**

General cleaning up of old rubbish, debris wherever applicable is necessary periodically. General invasive species control throughout the entire Management Area. If additional areas are added to the Management Area in future they should be initially assessed for condition and any remediation/restoration needs should be identified.



**RESEARCH AND MONITORING**

A range of projects to inventory and conduct research and monitoring on the natural resources have been suggested in different sections of the report. They include:

<p>Vegetation Inventories (section 3.3.4)</p>	<ul style="list-style-type: none"> <li>• Inventory of existing ecosystems</li> <li>• Inventory of invasive species</li> <li>• Inventory of rare plants</li> </ul>	<ul style="list-style-type: none"> <li>• Establish appropriate baseline to manage towards – quantify habitat areas. Conduct detailed baseline mapping at 1:5000 scale or larger. (Baseline inventory to include documentation of extent and numbers of rare plants and invasive species)</li> <li>• Inventory current status invasive species. Include purple loosestrife, yellow flag iris, broom, English ivy, holly, Himalayan blackberry; Japanese knotweed and others.</li> <li>• Inventory rare plants. Work with the Conservation Data Centre and the Garry Oak Ecosystems Recovery Team</li> <li>• Historic review of air photos, plus interviews, to assist in establishing changes in areal representation of different types</li> <li>• Establish permanent vegetation plots in representative vegetation types and reassess every 3 years</li> <li>• Establish permanent photo points for annual seasonal visual documentation</li> </ul>
<p>Water quality (section 3.1.3)</p>	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Establish water quality monitoring program. Develop monitoring program in conjunction with Rick Nordin, MWLAP</li> </ul>