EURASIAN WATER MILFOIL ALBERTA LAKE SURVEY 1983

Alberta
ENVIRONMENT
Pollution Control Division
Pesticide Chemicals Branch

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EURASIAN WATER MILFOIL

ALBERTA LAKE SURVEY

1983

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ABSTRACT

Forty-seven Alberta lakes and reservoirs were surveyed during 1983 to provide early detection of possible Eurasian water milfoil (Myriophyllum spicatum L.) infestations. Due to time and manpower limitations, only high priority sites (particularly boat launch areas) were surveyed. Descriptions of each survey site, including the aquatic plant species observed was documented.

Forty-two aquatic plant species belonging to 27 genera were identified. Wabamun Lake demonstrated the highest species diversity (21 spp.). No Eurasian water milfoil was found at any of the water bodies surveyed. Northern water milfoil (Myriophyllum exallescens Fern.) was the most commonly observed species, occurring in 38 of the 47 water bodies. Richardson's pond weed (Potamogeton richardsonii (Benn.) Rydb.) was observed at 37 water bodies.

Potamogeton richardsonii was dominant or most abundant at 15 water bodies while M. exallescens was dominant at 11 water bodies.

Each of the 47 lakes and reservoirs surveyed during 1983 contained a variety of habitats for aquatic macrophyte growth. Although the diversity and abundance of aquatic plant species varied considerably from one water body to the next, all possessed the basic habitat requirements necessary for the growth of Eurasian water milfoil.

 

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1.0 INTRODUCTION

Eurasian water milfoil (Myriophyllum spicatum L.) is a perennial submergent aquatic plant, originally endemic to Europe and Asia. The introduction of this nuisance weed to North America is believed to have first occurred in Chesapeake Bay, Maryland in the latter part of the 19th century (Bayley et al., 1968). Since its introduction to North America, Eurasian water milfoil has become a major nuisance in at least 22 States, including Washington (Stockerl and Kent, 1984). The presence of M. spicatum in Canadian waters was first recorded in Rondeau Provincial Park (Lake Erie) in 1961 (Wile, 1978). Its current distribution in Canada includes a number of water bodies in southern Ontario and Quebec, and in the Okanagan basin and Lower Mainland region of British Columbia. Most recently (the summer of 1981), Eurasian water milfoil had spread to Champion Lake near Trail, B.C. and to Shuswap Lake north of Vernon, B.C.

The highly adaptive nature and prolific growth rate of M. spicatum has resulted in serious problems in many valuable water systems throughout North America. Detrimental impacts which have resulted from M. spicatum infestations include: interference with boat navigation, reduced quality of water supplies, reduction of shore fish spawning habitat, and the decline of the recreational capability and aesthetic value of many water systems.

Although localized control measures may relieve the nuisance level and reduce further spread, mechanical and chemical controls are often costly and labour intensive. Also, attempts to control established Eurasian water milfoil infestations have shown that eradication is

difficult, and in most cases unrealistic (Anon., 1981). "Detecting and responding to early infestations of Eurasian water milfoil is necessary to avoid the high costs and intrinsic difficulties involved in having to deal with established weed populations" (Shea and O'Shea, 1981). This demonstrates the necessity to identify and control infestations while still in the pioneer stage.

The recent (1981) eastward spread of M. spicatum in British Columbia indicates that the threat of this weed entering Alberta waters is a real one. Eurasian water milfoil has the ability to tolerate and thrive in a wide range of habitats and environmental conditions. Therefore, it could survive in Alberta waters, if introduced (Stockerl and Kent, 1984). The eventual spread of Eurasian water milfoil into Alberta appears likely and may only be a matter of time. It threatens to jeopardize Alberta's already limited supply of high quality recreational lakes, as well as the extensive irrigation systems in the south.

In continuation of the 1981 and 1982 survey efforts (Shea and O'Shea, 1981; Stockerl et al., 1984), 47 selected lakes and reservoirs were surveyed during the summer of 1983 to provide the early detection of possible Eurasian water milfoil infestations. This report provides a summary of the 1983 survey results and provides an information base.

2.0 METHODS

Forty-seven Alberta lakes and reservoirs (Table 1) were surveyed for the presence of Eurasian water milfoil between June 27 and August 30, 1983. These lakes and reservoirs included 33 of the 34 water bodies sampled in 1982 (Stockerl et al., 1984). The Kananaskis Lakes

Table 1: Alberta Lakes and Reservoirs Surveyed for the Presence of Eurasian Water Milfoil in 1983.

Ref. #	Name of Lake or Reservoir	Location (Twp-Rge-WM)	General Location
1.	Lac La Biche*	(68-13-W4)	160 km NE - Edmonton
2.	Skeleton Lake	(65-18,19-W4)	5 km NE - Boyle
3.	Cross (Steele) Lake*	(65-26-W4)	130 km N - Edmonton
4.	Long Lake*	(63-18-W4)	110 km NE - Edmonton
5.	Cold Lake*	(64-1-W4)	45 km NE - Bonnyville
6.	Moose Lake*	(60-7-W4)	4 km W - Bonnyville
7.	Garner Lake*	(60-12-W4)	5 km N - Spedden
8.	Muriel Lake*	(59-5-W4)	11 km S - Bonnyville
9.	Thunder Lake*	(60-6-W5)	25 km W - Barrhead
10.	Lac La Nonne	(57-3-W5)	60 km NW - Edmonton
11.	Lac St. Anne	(54-3-W5)	60 km NW - Edmonton
12.	Isle Lake	(54-6-W5)	65 km W - Edmonton
13.	Wabamun Lake*	(52,54-5-W5)	40 km W - Edmonton
14.	Cooking Lake	(51-21-W4)	40 km SE - Edmonton
15.	Miquelon Lake*	(49-19-W4)	26 km N - Camrose
16.	Wizard Lake	(48-27-W4)	16 km S - Calmar
17.	Pigeon Lake*	(47-1-W5)	38 km W - Wetaskiwin
18.	Buck Lake	(46-6-W5)	70 km N - Rocky Mtn. House
19.	Gull Lake*	(41-28-W4)	14 km W - Lacombe
20.	Buffalo Lake*	(40-20-W4)	10 km SE - Bashaw
21.	Jack Fish Lake	(41-11-W5)	20 km E - Nordegg
22.	Crimson Lake*	(40-8-W5)	10 km NW - Rocky Mtn. House
23.	Twin Lakes*	(40-7-W5)	5 km NW - Rocky Mtn. House
24.	Sylvan Lake*	(39-1,2-W5)	19 km W - Red Deer
25.	Dillberry Lake*	(42-1-W4)	30 km NE - Provost
26.	Gooseberry Lake*	(36-5-W4)	15 km N - Consort
27.	Pine Lake	(36-24-W4)	24 km E - Penhold
28.	Little Fish Lake*	(28-16-W4)	40 km E - Drumheller
29.	Glenmore Reservoir	(23-1-W5)	S.W. Calgary
30.	Chestermere Lake	(24-28-W4)	12 km E - Calgary
31.	McGregor Reservoir	(16-21-W4)	28 km E - Vulcan
32.	Lake Newell Reservoir*	(17-15-W4)	14 km S - Brooks
33.	Chain Lake Reservoir*	(15-2-W5)	38 km SW - Nanton
34.	Travers Reservoir*	(14-20-W4)	16 km E - Champion
35.	Keho Lake Reservoir	(11,12-22,23-W4)	5 km SE - Barons
36.	Park Lake Reservoir*	(10-22-W4)	14 km NW - Lethbridge
37.	Chin Lakes Reservoir	(7-16,17-W4)	20 km S - Taber
38.	Elkwater Lake*	(8-3-W4)	58 km SE - Medicine Hat
39.	Spruce Coulee Reservoir*	(8-2-W4)	58 km SE - Medicine Hat
40.	Reesor Lake Reservoir*	(8-1-W4)	58 km SE - Medicine Hat
41.	Crowsnest Lake	(8-5-W5)	10 km W - Coleman
42.	Island Lake	(8-5-W5)	15 km W - Coleman
43.	Beauvais Lake*	(5-1-W5)	20 km SW - Pincher Creek
44.	Beaver Mines Lake	(5-2-W5)	25 km W - Pincher Creek
45.	Waterton Reservoir	(4-28-W4)	20 km SE - Pincher Creek
46.	St. Mary Reservoir	(5-24-W4)	8 km W - Spring Coulee
47.	Police (Outpost) Lake*	(1-26-W4)	29 km SW - Cardston

* Indicates presence of lakeside Provincial Park or Campground.

(surveyed as a single water body in 1982) were excluded from the 1983 survey schedule due to ~~lack~~ lack of available time and to the unlikelihood of the establishment of a pioneer infestation. The additional 13 water bodies surveyed in 1983 were selected primarily on the basis of recreational use by boaters, presence of lakeside provincial parks, and/or proximity to major highway routes leading to and from areas of British Columbia and Washington State, known to have Eurasian water milfoil infestations. The general location of the 47 water bodies surveyed during 1983 is indicated in Table 1 and Figures 1-3.

Due to constraints imposed by manpower limitations, weather conditions and the large number of water bodies included in the 1983 survey schedule, the spot check approach used in the 1981-82 surveys was again adopted. Rather than surveying the entire littoral zone, only certain areas considered to be priority sites were surveyed at each lake or reservoir. Exceptions were occasionally made when surveying small water bodies, such as Crimson Lake and Beauvais Lake. Since boater transport of weed material has been implicated with Eurasian water milfoil spread (Dove and Malcolm, 1980; Scales and Bryan, 1979), littoral areas surrounding boat launches and docks were considered priority sites. Public launches, particularly those at lakeside provincial parks were given the highest priority. Other areas of concern were: 1) beach areas frequented by boaters; 2) sheltered bays conducive to aquatic plant growth; 3) windward shores; 4) outflow channels and outflow regulating structures; and 5) areas known to be frequented by waterfowl (waterfowl also have been implicated in the spread of Eurasian water milfoil (Buchanan, 1976)). The description and location of survey sites is presented in Section 3.1 and Appendix 1 respectively.

Figure 1: Location of Alberta Lakes and Reservoirs Surveyed for Eurasian Water Milfoil in 1983. (See Table 1 for lake/reservoir names corresponding to reference numbers).

Figure 2: Location of Northern Alberta Lakes and Reservoirs Surveyed for Eurasian Water Milfoil in 1983. (See Table 1 for lake/reservoir names indicated by reference numbers above)

Figure 3: Location of Southern Alberta Lakes and Reservoirs Surveyed for Eurasian Water Milfoil in 1983. (See Table 1 for lake/reservoir names indicated by reference numbers above).

Sites having easy road access were visited by land. Sites or shore areas not readily accessible or sampled from shore were surveyed using a 3.9 m inflatable boat (Zodiac) powered by a 25 hp outboard motor. This craft was well suited for aquatic plant surveys due to its excellent stability, shallow draft, and ease of exit and re-entry from water by snorkellers. As in the 1982 lake survey, the survey of intended sites by boat was in a number of instances abandoned due to unfavorable weather conditions.

Although the priority was to determine the presence of Eurasian water milfoil, overall aquatic plant species composition was documented at each site. Particular attention was given to Myriophyllum spp. The dominant or most abundant species also was recorded at each site. Minimal effort was directed at collecting and identifying marginal and emergent aquatic plants beyond the genus level.

Identification of aquatic plant species was achieved through visual observation from the water surface and by close scrutiny of collected samples. Aquatic vegetation beyond the field of clear view (i.e., deep or very turbid water) was sampled by dragging a weed rake along the bottom or by casting out and dragging a four prong grapnel anchor attached to a rope. Both methods were effective in retrieving aquatic plants, often complete with roots. A minimum of four sampling efforts were made at each site where this technique was utilized.

Accurate sampling at high priority sites having poor surface visibility was achieved by snorkelling to the bottom. This procedure afforded relatively accurate and thorough visual inspection. Collection of samples in such instances was done by hand. Final identification of collected plants was done on shore. Plant specimens which were in good condition and not previously collected at that water body were

appropriately labelled and preserved. The purpose of preserving collected plants was to add to the established collection of plant species representative of each water body surveyed.

In addition to identifying, documenting, and collecting aquatic plants, site descriptions and general resource folio data not noted during the 1982 survey was collected for each site. Pertinent information recorded included: location of major weed beds, dominant species, shoreline development, water use, recreational areas, underwater obstructions, location of major inflows and outflows, sediment type, water fluctuation, and direction of prevailing winds.

3.0 RESULTS AND DISCUSSION

Forty-two aquatic plant species belonging to 27 genera were identified during the 1983 survey of 47 Alberta lakes and reservoirs (see Table 2). Positive identification of several specimens to species level was not achieved. Incomplete identification was due to either poor specimen condition or immature stage of growth.

Six species noted in the 1982 survey were not observed during the 1983 survey period. These species (five not positively identified in 1982) were Elodea longivaginata St. John, Polygonum amphibium Muhl., Potamogeton berchtoldii Fieb., P. epihydrous Raf., Ranunculus aquatilis L. and Zannichellia palustris L. However, the list of species observed in 1983 included six species not noted in 1982. These new specimens (some only identified to genus level) were, Isoetes sp., Limosella aquatica L., Nymphaea sp., Potamogeton strictifolius Bennett, Spirodela polyrhiza (L.) Schleid and Vallisneria americana Michx.

Table 3 provides a list of the aquatic plant species observed and collected at each water body surveyed during 1983. The greatest

Table 2: Aquatic Plant Species Identified During 1983
Eurasian Water Milfoil Lake Survey. (N=42)

Scientific Name	Common Name
1. <u>Alisma gramineum</u> Gmel.	Narrowleaf waterplantain
2. <u>Callitriche hermaphroditica</u> L.	Autumnal starwort
3. <u>Callitriche heterophylla</u> Pursh.*	Water starwort
4. <u>Callitriche</u> sp.	Water starwort
5. <u>Ceratophyllum demersum</u> L.	Common coontail
6. <u>Chara</u> sp.	Stonewort
7. <u>Elodea canadensis</u> Michx.	Canada Waterweed
8. <u>Equisetum fluviatile</u> L.	Water horsetail
9. <u>E. palustre</u> L.	Marsh horsetail
10. <u>Hippuris vulgaris</u> L.	Mare's tail
11. <u>Isoetes</u> sp.	Quillwort
12. <u>Juncus</u> sp.	Rush
13. <u>Lemna minor</u> L.	Lesser duckweed
14. <u>L. trisulca</u> L.	Star duckweed
15. <u>Limosella aquatica</u> L.	Mudwort
16. <u>Myriophyllum exallescens</u> Fern.	Northern water milfoil
17. <u>Najas flexilis</u> (Willd.) R. & S.	Slender naiad
18. <u>Nuphar variegatum</u> Engelm.	Yellow water lily
19. <u>Nymphaea</u> sp.	Water-lily
20. <u>Phragmites communis</u> Trin.	Reed grass
21. <u>Polygonum natans</u> Eaton	Water smartweed
22. <u>P. friesii</u> Rupr.	Fries pondweed
23. <u>P. gramineus</u> L.	Variable pondweed
24. <u>P. natans</u> L.	Floating-leaf pondweed
25. <u>P. pectinatus</u> L.	Sago pondweed
26. <u>P. praelongus</u> Wulf.	Whitestem pondweed
27. <u>P. pusillus</u> L.	Small-leaf pondweed
28. <u>P. richardsonii</u> (Benn.) Rydb.	Richardson pondweed
29. <u>P. strictifolius</u> Bennett*	Narrowleaf pondweed
30. <u>P. vaginatus</u> Turcz.	Large-sheath pondweed
31. <u>P. zosteriformis</u> Fern.	Flat-stemmed pondweed
32. <u>Ranunculus circinatus</u> Sibth.	White waterbuttercup
33. <u>Ranunculus</u> sp.	
34. <u>Ruppia maritima</u> L.	Ditchgrass or Widgeongrass
35. <u>Sagittaria cuneata</u> Sheld.	Arrowhead
36. <u>S. latifolia</u> Willd.*	Broadleaf arrowhead
37. <u>Scirpus</u> sp.	Bulrush
38. <u>Sparganium eurycarpum</u> Engelm.	Giant bur-reed
39. <u>Spirodela polyrhiza</u> (L.) Schleid	Giant duckweed
40. <u>Typha latifolia</u> L.	Common cattail
41. <u>Utricularia vulgaris</u> L.	Common bladderwort
42. <u>Vallisneria americana</u> Michx.*	Vallisneria

* Identification not positive due to poor specimen or lack of reproductive structures.

Table 3: Aquatic Plant Species Observed at Each Lake or Reservoir During 1983 Eurasian Water Milfoil Lake Survey. (Brackets indicate species which were observed in 1982 but not in 1983).

Name of Lake or Reservoir	Aquatic Plant Species Observed ¹	
Beauvais Lake (N=18; where N is No. of spp. present)	<u>Ceratophyllum demersum</u> * <u>Chara</u> sp. <u>Elodea canadensis</u> <u>Equisetum fluviatile</u> * <u>Juncus</u> sp. <i>Myriophyllum exallescens</i> <u>Nuphar variegatum</u> <u>Polygonum natans</u> <u>Potamogeton natans</u> <u>P. pectinatus</u>	(<u>P. praelongus</u>) <u>P. pusillus</u> <u>P. richardsonii</u> <u>P. vaginatus</u> <u>P. zosteriformis</u> <u>Ranunculus circinatus</u> * <u>Scirpus</u> sp. * <u>Typha latifolia</u> <u>Utricularia vulgaris</u>
Beaver Mines Lake (N=6)	* <u>Juncus</u> sp. <i>Myriophyllum exallescens</i> * <u>Polygonum natans</u>	<u>Potamogeton richardsonii</u> <u>P. zosteriformis</u> * <u>Typha latifolia</u>
Buck Lake (N=3)	* <u>Nuphar</u> sp. * <u>Ranunculus</u> sp.	* <u>Sagittaria</u> sp.
Buffalo Lake (N=9)	* <u>Juncus</u> sp. <u>Lemna trisulca</u> <u>Myriophyllum exallescens</u> <u>Potamogeton pectinatus</u> * <u>P. pusillus</u>	<u>P. vaginatus</u> <i>Ruppia maritima</i> * <u>Scirpus</u> sp. * <u>Sparganium eurycarpum</u>
Chain Lakes (N=13)	<u>Alisma gramineum</u> (<u>Callitriche</u> sp.) <u>Ceratophyllum demersum</u> * <u>Chara</u> sp. <u>Hippuris vulgaris</u> * <u>Juncus</u> sp. <u>Myriophyllum exallescens</u>	<u>Potamogeton natans</u> <u>P. pectinatus</u> <u>P. pusillus</u> <u>P. richardsonii</u> <u>Ranunculus</u> sp. * <u>Sagittaria</u> sp. <u>Utricularia vulgaris</u>
Chestermere Lake (N=15)	<u>Alisma gramineum</u> <u>Ceratophyllum demersum</u> * <u>Chara</u> sp. <u>Lemna trisulca</u> <u>Myriophyllum exallescens</u> <u>Potamogeton friesii</u> <u>P. gramineus</u> * <u>P. pectinatus</u>	<u>P. praelongus</u> <u>P. richardsonii</u> <u>P. vaginatus</u> <u>P. zosteriformis</u> <u>Sagittaria</u> sp. * <u>S. cuneata</u> * <u>Typha latifolia</u>

¹ Dominant or most abundant species indicated by italics.

* Specimens which have not been collected.

Table 3 continued

Name of Lake or Reservoir	Aquatic Plant Species Observed ¹	
Chin Lakes Reservoir (N=10)	<u>Alisma gramineum</u> * <u>Chara</u> sp. <u>Elodea canadensis</u> * <u>Myriophyllum exalbescens</u> * <u>Potamogeton friesii</u>	* <u>P. pectinatus</u> <u>P. richardsonii</u> * <u>P. vaginatus</u> * <u>P. zosteriformis</u> <u>Ranunculus circinatus</u>
Cold Lake (N=14)	* <u>Chara</u> sp. <u>Ceratophyllum demersum</u> * <u>Lemna trisulca</u> <u>Myriophyllum exalbescens</u> * <u>Potamogeton natans</u> * <u>P. pectinatus</u> <u>P. pusillus</u>	<u>P. richardsonii</u> <u>P. vaginatus</u> <u>P. zosteriformis</u> <u>Ranunculus</u> sp. * <u>Sagittaria</u> sp. * <u>Scirpus</u> sp. * <u>Typha latifolia</u>
Cooking Lake (N=3)	* <u>Juncus</u> sp. * <u>Scirpus</u> sp.	* <u>Typha latifolia</u>
Crimson Lake (N=17)	<u>Chara</u> sp. <u>Equisetum fluviatile</u> <u>E. palustre</u> * <u>Juncus</u> sp. <u>Myriophyllum exalbescens</u> <u>Najas flexilis</u> <u>Nuphar</u> sp. * <u>Polygonum natans</u> <u>Potamogeton gramineus</u>	<u>P. natans</u> (<u>P. pectinatus</u>) <u>P. praelongus</u> <u>P. pusillus</u> <u>P. richardsonii</u> <u>P. zosteriformis</u> <u>Sagittaria</u> sp. * <u>Scirpus</u> sp. * <u>Typha latifolia</u>
Cross Lake (N=10)	* <u>Ceratophyllum demersum</u> * <u>Lemna minor</u> * <u>L. trisulca</u> * <u>Myriophyllum exalbescens</u> * <u>Nuphar</u> sp. * <u>Potamogeton richardsonii</u>	* <u>P. vaginatus</u> * <u>P. zosteriformis</u> *(<u>Ranunculus</u> sp.) * <u>Scirpus</u> sp. * <u>Typha latifolia</u>
Crowsnest Lake (N=0)	None	
Dillberry Lake (N=9)	* <u>Chara</u> sp. * <u>Juncus</u> sp. * <u>Myriophyllum exalbescens</u> * <u>Potamogeton pectinatus</u> * <u>P. praelongus</u>	* <u>P. richardsonii</u> <u>P. vaginatus</u> * <u>P. zosteriformis</u> * <u>Scirpus</u> sp.
Elkwater Lake (N=16)	+ (<u>Callitriche hermaphrodita</u>) <u>Ceratophyllum demersum</u> <u>Equisetum fluviatile</u> * <u>Juncus</u> sp. <u>Lemna minor</u> <u>L. trisulca</u> <u>Myriophyllum exalbescens</u> <u>Polygonum natans</u> + <u>Potamogeton friesii</u>	<u>P. pectinatus</u> <u>P. pusillus</u> <u>P. richardsonii</u> <u>P. vaginatus</u> *(<u>Ranunculus</u> sp.) <u>Sagittaria</u> sp. * <u>Scirpus</u> sp. * <u>Typha latifolia</u> <u>Utricularia vulgaris</u>

¹ Dominant or most abundant species indicated by italics.

* Specimens which have not been collected.

+ Identification not positive.

Table 3 continued

Name of Lake or Reservoir	Aquatic Plant Species Observed ¹	
Garner Lake (N=10)	<u>Chara</u> sp. * <u>Lemna trisulca</u> <u>Myriophyllum exalbescens</u> <u>Phragmites communis</u> <u>Potamogeton pectinatus</u>	<u>P. richardsonii</u> <u>P. vaginatus</u> * <u>Ruppia</u> sp. * <u>Scirpus</u> sp. * <u>Typha latifolia</u>
Glenmore Reservoir (N=8)	<u>Elodea canadensis</u> <u>Hippuris vulgaris</u> <u>Myriophyllum exalbescens</u> <u>Potamogeton pectinatus</u>	<u>P. praelongus</u> * <u>P. pusillus</u> <u>P. richardsonii</u> <u>P. vaginatus</u>
Gooseberry Lake (N=2)	* <u>Potamogeton pectinatus</u> * <u>P. vaginatus</u>	
Gull Lake (N=6)	* <u>Juncus</u> sp. <u>Myriophyllum exalbescens</u> <u>Potamogeton pectinatus</u>	<u>P. vaginatus</u> * <u>Scirpus</u> sp. * <u>Typha latifolia</u>
Island Lake (N=2)	* <u>Equisetum palustre</u> * <u>Juncus</u> sp.	
Isle Lake (N=14)	* <u>Ceratophyllum demersum</u> * <u>Lemna minor</u> * <u>L. trisulca</u> <u>Myriophyllum exalbescens</u> * <u>Nuphar variegatum</u> * <u>Potamogeton pectinatus</u> * <u>P. pusillus</u>	* <u>P. richardsonii</u> * <u>P. zosteriformis</u> * <u>Ranunculus circinatus</u> * <u>Sagittaria</u> sp. * <u>Scirpus</u> sp. <u>Spirodela polyrhiza</u> * <u>Typha latifolia</u>
Jack Fish Lake (N=4)	* <u>Myriophyllum exalbescens</u> * <u>Nuphar</u> sp.	* <u>P. richardsonii</u> * <u>P. zosteriformis</u>
Keho Lake (N=8)	* <u>Alisma gramineum</u> * <u>Equisetum palustre</u> * <u>Juncus</u> sp. <u>Myriophyllum exalbescens</u> * <u>(Potamogeton pectinatus)</u> * <u>(P. praelongus)</u>	<u>P. richardsonii</u> <u>P. vaginatus</u> * <u>Ranunculus</u> sp. * <u>Sagittaria</u> sp. * <u>(Zannichellia palustris)</u>
Lac La Biche (N=13)	* <u>Ceratophyllum demersum</u> * <u>Elodea canadensis</u> * <u>Equisetum palustre</u> * <u>Lemna minor</u> * <u>Myriophyllum exalbescens</u> * <u>Potamogeton pectinatus</u> * <u>P. richardsonii</u>	* <u>P. vaginatus</u> * <u>Ranunculus</u> sp. * <u>Scirpus</u> sp. * <u>Sparganium</u> sp. * <u>Spirodela polyrhiza</u> * <u>Typha latifolia</u>
Lac La Nonne (N=13)	<u>Ceratophyllum demersum</u> <u>Lemna minor</u> <u>L. trisulca</u> <u>Myriophyllum exalbescens</u> <u>Phragmites communis</u> <u>Potamogeton pectinatus</u> <u>P. richardsonii</u>	<u>P. vaginatus</u> <u>P. zosteriformis</u> + <u>Sagittaria latifolia</u> * <u>Scirpus</u> sp. <u>Spirodela polyrhiza</u> * <u>Typha latifolia</u>

¹ Dominant or most abundant species indicated by italics.

* Specimens which have not been collected.

+ Identification not positive.

Table 3 continued

Name of Lake or Reservoir	Aquatic Plant Species Observed ¹	
Lac Ste. Anne (N=15)	<u>Ceratophyllum demersum</u> * <u>Juncus</u> sp. * <u>Lemna minor</u> <u>L. trisulca</u> <u>Myriophyllum exalbescentis</u> <u>Potamogeton pectinatus</u> <u>P. pusillus</u> <u>P. richardsonii</u>	<u>P. vaginatus</u> * <u>Ranunculus</u> sp. <u>Sagittaria</u> sp. * <u>Scirpus</u> sp. * <u>Sparganium</u> sp. <u>Spirodela polyrrhiza</u> * <u>Typha latifolia</u>
Lake Newell (N=17)	<u>Alisma gramineum</u> <u>Ceratophyllum demersum</u> * <u>Chara</u> sp. <u>Elodea canadensis</u> * <u>Juncus</u> sp. <u>Lemna trisulca</u> <u>Myriophyllum exalbescentis</u> <u>Polygonum natans</u> + <u>Potamogeton friesii</u> (<u>P. gramineus</u>)	* <u>P. pectinatus</u> <u>P. pusillus</u> <u>P. richardsonii</u> <u>P. vaginatus</u> <u>P. zosteriformis</u> <u>Ranunculus</u> sp. *(<u>Sagittaria</u> sp.) * <u>Scirpus</u> sp. * <u>Typha latifolia</u>
Little Fish Lake (N=1)	* <u>Potamogeton vaginatus</u>	
Long Lake (N=18)	<u>Ceratophyllum demersum</u> * <u>Chara</u> sp. * <u>Equisetum fluviatile</u> <u>E. palustre</u> * <u>Lemna minor</u> <u>L. trisulca</u> <u>Myriophyllum exalbescentis</u> <u>Polygonum natans</u> + <u>Potamogeton natans</u>	* <u>P. pusillus</u> <u>P. richardsonii</u> <u>P. vaginatus</u> * <u>P. zosteriformis</u> * <u>Ranunculus</u> sp. + <u>Sagittaria latifolia</u> * <u>Scirpus</u> sp. +* <u>Ruppia</u> sp. * <u>Typha latifolia</u>
McGregor Reservoir (N=14)	* <u>Alisma gramineum</u> <u>Ceratophyllum demersum</u> <u>Elodea canadensis</u> * <u>Juncus</u> sp. <u>Myriophyllum exalbescentis</u> <u>Polygonum natans</u> <u>Potamogeton crispus</u>	* <u>P. pectinatus</u> <u>P. richardsonii</u> <u>P. zosteriformis</u> <i>Ranunculus circinatus</i> * <u>Sagittaria</u> sp. * <u>Scirpus</u> sp. * <u>Typha latifolia</u>
Miquelon Lake (N=5)	<u>Juncus</u> sp. <u>Potamogeton pectinatus</u> + <u>Ruppia maritima</u>	* <u>Scirpus</u> sp. * <u>Typha latifolia</u>
Moose Lake (N=12)	<u>Ceratophyllum demersum</u> * <u>Chara</u> sp. <u>Lemna minor</u> <u>L. trisulca</u> <u>Myriophyllum exalbescentis</u> <u>Potamogeton pectinatus</u>	<u>P. richardsonii</u> <u>P. vaginatus</u> + <u>Ruppia maritima</u> <u>Sagittaria</u> sp. * <u>Scirpus</u> sp. * <u>Typha latifolia</u>

¹ Dominant or most abundant species indicated by italics.

* Specimens which have not been collected.

+ Identification not positive.

Table 3 continued

Name of Lake or Reservoir	Aquatic Plant Species Observed ¹	
Muriel Lake (N=16)	<u>Ceratophyllum demersum</u> * <u>Chara</u> sp. <u>Hippuris vulgaris</u> <u>Lemna minor</u> <u>L. trisulca</u> <u>Myriophyllum exalbenscens</u> <u>Polygonum natans</u> *(<u>Potamogeton pectinatus</u>) <u>P. pusillus</u>	<u>*P. richardsonii</u> <u>P. vaginatus</u> <u>Ruppia</u> sp. <u>Sagittaria</u> sp. <u>*Scirpus</u> sp. <u>*Typha latifolia</u> <u>Utricularia vulgaris</u> <u>+Vallisneria americana</u>
Park Lake (N=12)	<u>Ceratophyllum demersum</u> * <u>Chara</u> sp. * <u>Juncus</u> sp. <u>Myriophyllum exalbenscens</u> <u>Najas flexilis</u> <u>Potamogeton pectinatus</u> <u>P. praelongus</u>	<u>P. pusillus</u> <u>P. richardsonii</u> <u>*P. vaginatus</u> <u>P. zosteriformis</u> <u>*(Sagittaria</u> sp.) <u>*Typha latifolia</u>
Pigeon Lake (N=13)	<u>Ceratophyllum demersum</u> * <u>Juncus</u> sp. * <u>Lemna minor</u> * <u>L. trisulca</u> <u>Myriophyllum exalbenscens</u> * <u>Najas flexilis</u> <u>Potamogeton gramineus</u>	<u>P. pectinatus</u> <u>P. richardsonii</u> <u>P. vaginatus</u> <u>Sagittaria</u> sp. <u>*Scirpus</u> sp. <u>Utricularia vulgaris</u>
Pine Lake (N=7)	<u>Ceratophyllum demersum</u> * <u>(Elodea canadensis)</u> <u>Lemna trisulca</u> <u>Myriophyllum exalbenscens</u> <u>(Potamogeton pectinatus)</u>	<u>P. richardsonii</u> <u>P. vaginatus</u> <u>*Scirpus</u> sp. <u>*Typha latifolia</u>
Police Lake (N=9)	* <u>Chara</u> sp. <u>Myriophyllum exalbenscens</u> * <u>Polygonum natans</u> <u>Potamogeton pectinatus</u> <u>P. pusillus</u>	<u>P. richardsonii</u> <u>P. vaginatus</u> <u>P. zosteriformis</u> <u>*Scirpus</u> sp.
Reesor Reservoir (N=14)	+ <u>Callitriche heterophylla</u> * <u>C. hermaphroditica</u> <u>Ceratophyllum demersum</u> <u>(Elodea</u> sp.) * <u>Lemna minor</u> <u>Limosella aquatica</u> * <u>Myriophyllum exalbenscens</u> * <u>Polygonum natans</u>	+* <u>Potamogeton friesii</u> * <u>(P. natans)</u> <u>P. pectinatus</u> <u>P. pusillus</u> * <u>P. richardsonii</u> * <u>Ranunculus circinatus</u> <u>Sagittaria</u> sp. * <u>Typha latifolia</u>
St. Mary Reservoir (N=6)	* <u>Chara</u> sp. * <u>Juncus</u> sp. <u>Myriophyllum exalbenscens</u>	<u>Potamogeton pectinatus</u> <u>P. pusillus</u> <u>P. richardsonii</u>

¹ Dominant or most abundant species indicated by italics.

* Specimens which have not been collected.

+ Identification not positive.

Table 3 continued

Name of Lake or Reservoir	Aquatic Plant Species Observed ¹	
Skeleton Lake (N=14)	<u>Ceratophyllum demersum</u> * <u>Chara</u> sp. * <u>Lemna minor</u> <u>L. trisulca</u> <i>Myriophyllum exallescens</i> <u>Potamogeton pectinatus</u> * <u>P. praelongus</u>	<u>P. pusillus</u> * <u>P. richardsonii</u> <u>P. zosteriformis</u> <u>Ranunculus</u> sp. <u>Ruppia maritima</u> <u>Sagittaria cuneata</u> * <u>Scirpus</u> sp.
Spruce Coulee Reservoir (N=16)	* <u>Alisma gramineum</u> * <u>Callitriche</u> sp. * <u>Chara</u> sp. * <u>Equisetum fluviatile</u> <u>E. palustre</u> <u>Hippuris vulgaris</u> * <u>Isoetes</u> sp. * <u>Juncus</u> sp. * <u>Lemna minor</u>	* <u>Myriophyllum exallescens</u> * <u>Polygonum natans</u> *(<u>Potamogeton pectinatus</u>) * <u>P. richardsonii</u> <i>Ranunculus circinatus</i> * <u>Sagittaria</u> sp. * <u>Typha latifolia</u> +* <u>Vallisneria americana</u>
Sylvan Lake (N=9)	* <u>Chara</u> sp. <u>Hippuris vulgaris</u> (<u>Lemna minor</u>) <u>Myriophyllum exallescens</u> <u>Potamogeton pectinatus</u>	<i>P. richardsonii</i> <u>P. vaginatus</u> <u>Sagittaria</u> sp. * <u>Scirpus</u> sp. * <u>Typha latifolia</u>
Thunder Lake (N=20)	* <u>Ceratophyllum demersum</u> * <u>Chara</u> sp. <u>Equisetum fluviatile</u> <u>E. palustre</u> * <u>Juncus</u> sp. * <u>Lemna minor</u> <u>Myriophyllum exallescens</u> <u>Nuphar variegatum</u> <u>Polygonum natans</u> + <u>Potamogeton friesii</u>	<u>P. pectinatus</u> <u>P. pusillus</u> <u>P. richardsonii</u> * <u>P. vaginatus</u> <u>P. zosteriformis</u> <u>Sagittaria</u> sp. * <u>Scirpus</u> sp. <u>Spirodela polyrhiza</u> * <u>Typha latifolia</u> <u>Utricularia vulgaris</u>
Travers Reservoir (N=9)	*(<u>Alisma gramineum</u>) <u>Ceratophyllum demersum</u> * <u>Chara</u> sp. <u>Elodea canadensis</u> <u>Myriophyllum exallescens</u>	* <u>Potamogeton pectinatus</u> <i>P. richardsonii</i> * <u>P. zosteriformis</u> * <u>Ranunculus circinatus</u> * <u>Typha latifolia</u>
Twin Lakes (N=15)	* <u>Chara</u> sp. <u>Equisetum fluviatile</u> <u>Hippuris vulgaris</u> <u>Myriophyllum exallescens</u> <i>Nuphar variegatum</i> <u>Polygonum natans</u> <u>Potamogeton gramineus</u> <u>P. natans</u>	<u>P. praelongus</u> (<u>P. pusillus</u>) <u>P. richardsonii</u> <u>Sagittaria</u> sp. * <u>Scirpus</u> sp. <u>Sparganium</u> sp. * <u>Typha latifolia</u> <u>Utricularia vulgaris</u>

¹ Dominant or most abundant species indicated by italics.

* Specimens which have not been collected.

+ Identification not positive.

Table 3 continued

Name of Lake or Reservoir	Aquatic Plant Species Observed ¹	
Wabamun Lake (N=21)	<u>Ceratophyllum demersum</u> * <u>Chara</u> sp. <u>Elodea canadensis</u> <u>Hippuris vulgaris</u> <u>Lemna trisulca</u> <i>Myriophyllum exalbescens</i> <u>Najas flexilis</u> * <u>Nuphar</u> sp. + <u>Potamogeton friesii</u> (<u>Potamogeton natans</u>) <u>P. pectinatus</u>	* <u>P. praelongus</u> <u>P. pusillus</u> <i>P. richardsonii</i> <u>P. vaginatus</u> <u>P. zosteriformis</u> <u>Ranunculus circinatus</u> + <u>Ruppia</u> sp. <u>Sagittaria</u> sp. * <u>Scirpus</u> sp. * <u>Typha latifolia</u> <u>Utricularia vulgaris</u>
Waterton Reservoir (N=2)	*(<u>Juncus</u> sp.) *(<u>Scirpus</u> sp.)	
Wizard Lake (N=18)	<u>Ceratophyllum demersum</u> * <u>Juncus</u> sp. <u>Lemna trisulca</u> <i>Myriophyllum exalbescens</i> <i>Nuphar variegatum</i> <u>Nymphaea</u> sp. * <u>Phragmites communis</u> <u>Potamogeton friesii</u> <u>P. pectinatus</u>	<u>P. praelongus</u> <u>P. richardsonii</u> +* <u>P. strictifolius</u> <u>P. vaginatus</u> <u>P. zosteriformis</u> <u>Sagittaria</u> sp. * <u>Scirpus</u> sp. * <u>Sparganium eurycarpum</u> * <u>Typha latifolia</u>

¹ Dominant or most abundant species indicated by italics.

* Specimens which have not been collected.

+ Identification not positive.

diversity of species (21) was observed at Wabamun Lake. Potamogeton richardsonii (Benn.) Rydb. and Myriophyllum exallescens Fern. were the most abundant species in this lake. Other lakes which demonstrated high species diversity were Thunder Lake (20 spp.), Beauvais Lake (18 spp.), Long Lake (18 spp.), Wizard Lake (18 spp.), Crimson Lake (17 spp.), and Lake Newell (17 spp.).

The lowest species diversity (zero spp.) was noted at Crowsnest Lake. The absence of observed aquatic plant growth in Crowsnest Lake may be attributed to its rocky substrate and rapid drop offs, neither characteristic being conducive to aquatic plant growth. Serious weed infestations within this lake are unlikely. Island Lake, just upstream of Crowsnest Lake also demonstrated low species diversity (two spp.). Boating activity in Island Lake is common. This activity, coupled with the lake's proximity to British Columbia and its location along a major east-west highway route make it a likely site for the accidental introduction of Myriophyllum spicatum L. An introduction of M. spicatum, to Island Lake, could result in its spread (by plant fragments) throughout most of the Oldman River system.

The dominant or most abundant species within each water body also is indicated in Table 3. Potamogeton richardsonii was dominant or most abundant in 15 water bodies while Myriophyllum exallescens was dominant in 11 water bodies. Despite being present in 31 water bodies, Potamogeton pectinatus L. only was considered dominant in three.

The occurrence of aquatic plant species in Alberta lakes and reservoirs surveyed during 1983 is summarized in Table 4. Eurasian water milfoil was not found within any of the water bodies surveyed. However, the genus Myriophyllum (water milfoil) was represented by M. exallescens Fern. at 38 of the 47 water bodies surveyed. Potamogeton

Table 4: Occurrence of Aquatic Plants in Alberta Lakes and Reservoirs Surveyed During 1983. (N=47).¹

Species ² or Genus	Number of Lakes and Reservoirs in Which Species or Genus Occurred																
	1	3	5	7	9	13	15	17	19	21	23	28	30	--	38		
	2	4	6	8	--	14	16	18	20	22	--	29	31	37			
<u>M. exalbenscens</u>																	*(38)
<u>P. richardsonii</u>																	*(37)
<u>P. pectinatus</u>																	*(31)
<u>T. latifolia</u>																	*(30)
<u>Scirpus sp.</u>																	*(29)
<u>P. vaginatus</u>																	*(28)
<u>C. demersum</u>																	*(23)
<u>Sagittaria sp.</u>																	*(23)
<u>Juncus sp.</u>																	*(22)
<u>P. zosteriformis</u>																	*(21)
<u>Chara sp.</u>																	*(21)
<u>P. pusillus</u>																	*(19)
<u>L. trisulca</u>																	*(17)
<u>Ranunculus sp.</u>																	*(16)
<u>L. minor</u>																	*(14)
<u>Polygonum natans</u>																	*(13)
<u>Potamogeton praelongus</u>																	*(9)
<u>E. canadensis</u>																	*(8)
<u>Nuphar sp.</u>																	*(8)
<u>Utricularia vulgaris</u>																	*(8)
<u>E. palustre</u>																	*(7)
<u>H. vulgaris</u>																	*(7)
<u>P. friesii</u>																	*(7)
<u>A. gramineum</u>																	*(6)
<u>E. fluviatile</u>																	*(6)
<u>Ruppia sp.</u>																	*(6)
<u>Potamogeton natans</u>																	*(6)
<u>Sparganium sp.</u>																	*(5)
<u>N. flexilis</u>																	*(4)
<u>S. polyrhiza</u>																	*(4)
<u>Phragmites communis</u>																	*(3)
<u>P. gramineus</u>																	*(3)
<u>Callitriche sp.</u>																	*(2)
<u>V. americana</u>																	*(2)
<u>Isoetes sp.</u>																	*(1)
<u>L. aquatica</u>																	*(1)
<u>Nymphaea sp.</u>																	*(1)
<u>P. strictifolius</u>																	*(1)

¹ Total number of lakes and reservoirs surveyed.

² Refer to Table 2 for complete genus name.

richardsonii was found in 37 lakes and reservoirs. Other submergent species commonly observed were Potamogeton pectinatus (31), P. vaginatus Turcz. (28) and Ceratophyllum demersum L. (23). The most abundant emergent species were Typha latifolia L., Scirpus sp., and Sagittaria sp. which were observed in 30, 29 and 23 water bodies respectively.

Further details regarding survey results and descriptions of survey sites is discussed for each water body in Section 3.1.

3.1 SITE DESCRIPTIONS

1. LAC LA BICHE (Figure 4)

Date: August 25, 1983

- * Site 1. East end of the lake, Sir Winston Churchill Provincial Park boat launch and adjacent shore area. Launch - four cement slabs wide. A few small "clumps" of Myriophyllum exalbescens Fern. and Potamogeton pectinatus L. were growing around launch area and dock, but no plants were surfacing. Most other species were observed in the form of fragments. A heavy algal bloom was occurring; water visibility was approximately 20 cm (foul odor prevalent).

2. SKELETON LAKE (Figure 5)

Date: August 26, 1983

- Site 1. South-east corner of the lake. Boat launches, docks and pier present at Skeleton Lake Resort. Many dense "clumps" of M. exalbescens were growing around the pier and throughout most of bay area. Ranunculus circinatus Sibth. also was abundant (more than observed in the 1982 survey). Other species present include Potamogeton pectinatus L. and Ruppia maritima L. The Resort operator stated that the aquatic weed growth was considerably worse this year than in the past.

- Site 2. East end, gravel boat launch at public access near golf course. The launch and picnic facilities were well maintained. M. exalbescens was very abundant; a dense band was along the shore perimeter. Sagittaria sp. also was abundant. A Scirpus sp. bed was observed west of the launch. Weed growth was at nuisance levels.

* See Maps (Appendix 1) for site locations.

3. CROSS LAKE (Figure 6)

Date: August 23, 1983

- * Site 1. West shore, provincial park boat launch and beach area. A single Potamogeton richardsonii (Benn.) Rydb. plant was found growing at the launch site. Lemna trisulca L. also was present. Numerous fragments were on the shore, including M. exalbenscens and Ceratophyllum demersum L. The inshore substrate was sand-gravel; sand-silt was further off shore. Absence of significant weed beds possibly due to presence of dense filamentous algal growth.

Site 2. West end outflow channel area near bridge crossing. M. exalbenscens and C. demersum were abundant. Substrate was mud.

4. LONG LAKE (Figure 7)

Date: August 26, 1983

Site 1. West shore, provincial park boat launch and picnicking area, has two double cement slab width launches. A large bed of Sagittaria sp. was surfacing on the south side of the launch. Other rooted species present include Equisetum palustre L., Potamogeton zosteriformis Fern., P. richardsonii and M. exalbenscens. Large Scirpus sp. beds were observed south of the launch. Weed growth at launches was below nuisance levels.

Site 2. West shore, day use and bay area south of site 1. A small inflow stream (very cold) was present adjacent to the small beach. Although weed growth was not particularly dense, species diversity was relatively high. Species present included M. exalbenscens, Ranunculus sp., Equisetum fluviatile L., Polygonum natans Eaton and Ceratophyllum demersum.

Site 3. West shore, provincial park boat rental service and day use area (was site #2 in 1982 survey). Aquatic weed growth in the bay and dock area was sparse. Species present included M. exalbenscens, P. vaginatus Turcz., P. richardsonii, and Sagittaria sp.

No clearly dominant species was observed at any of the three sites.

5. COLD LAKE (Figure 8)

Date: August 25, 1983

- * See Maps (Appendix 1) for site locations.

5. COLD LAKE (Figure 8) continued....

- * Site 1. South-west shore, Cold Lake Provincial Park boat launch and wharf area. The launch is a double width cement slab with a portable wharf on each side. A dense bed of Ranunculus sp. and Potamogeton richardsonii was observed on west side of the launch area. Very sparse growth was observed off shore of the launch itself. P. richardsonii also was abundant on the east side of the launch. Other species included M. exalbenscens (very few), Potamogeton pusillus L., P. zosteriformis and Sagittaria sp. Substrate was rock and gravel.
- Site 2. Town of Cold Lake, boat launch and large pier area with breakwater. Dense weed growth (many plants were surfacing) in the sheltered side of the breakwater. P. richardsonii was most abundant. Other species observed included M. exalbenscens, P. pusillus, P. vaginatus and Ranunculus sp. Launch area was weed free. Substrate was sand-gravel.
- Site 3. West shore, provincial park campground boat launch at English Bay. With the exception of Chara sp., only a few fragments were visible. A sandy beach was located on the north side of the launch, rocky shore to the south.

6. MOOSE LAKE (Figure 9)

Date: August 24, 1983

- Site 1. North shore, provincial park car-topper and canoe launch. Water was very shallow around the launch. Very sparse growth was inshore which included Potamogeton pectinatus, P. richardsonii, C. demersum, Sagittaria sp. and M. exalbenscens. Substrate was sand-silt.
- Site 2. Provincial park, main boat launch (double width). Well protected bay. Very dense band of M. exalbenscens was observed (approx. 15 m wide) along the shore on both sides of the launch. Many M. exalbenscens plants were surfacing and flowering - some were growing in water as shallow as 20 cm. Many rooted plants were observed throughout the bay area, including Potamogeton pectinatus and Ceratophyllum demersum. Potamogeton richardsonii was not observed (it was noted at this site in 1982). Substrate was composed of silt and organic mud.
- Site 3. North end, bridge crossing Moose Lake River outflow channel. Water was shallow and turbid. Aquatic weed growth was dense. Species present included M. exalbenscens, Potamogeton pectinatus and P. richardsonii.

* See Maps (Appendix 1) for site locations.

6. MOOSE LAKE (Figure 9) continued....

- * Site 4. Provincial park campground at south-east corner of lake. Boat launch (cement slab) is in poor condition. Private cottages are on both sides of the launch. Sparse aquatic plant growth which included M. exalbenscens, P. pectinatus and P. richardsonii. Many M. exalbenscens fragments were observed on the shore. Clear water and sand-gravel substrate.

7. GARNER LAKE (Figure 10)

Date: August 23, 1983

- Site 1. South-east corner, Garner Lake Provincial Park main boat launch. Sparse to moderate aquatic plant growth was observed around the launch and wharf area. Species present included M. exalbenscens, P. pectinatus and P. richardsonii.
- Site 2. West side of provincial park beach. Large bed of Potamogeton vaginatus (approx. 20 m wide) was extending along the shore. Large clumps of filamentous algae were floating on the surface. Dense mats of filamentous algae were found covering the substrate. Sparse P. pectinatus and Lemna trisulca also were present.
- Site 3. Boat launch and dock area at the north end of Garner Lake Provincial Park. Sparse growth included M. exalbenscens, P. pectinatus, P. richardsonii, P. vaginatus and Ruppia sp. Substrate was silt-mud.
- Site 4. Large bay on south-west shore. Very dense bed of M. exalbenscens was observed throughout almost the entire bay area. Potamogeton pectinatus and P. vaginatus also were present.
- Site 5. Large bay midway along west shore. Large beds of Scirpus sp. and Phragmites communis were observed along the shore. Dense beds of M. exalbenscens were seen throughout most of inner bay area.
- Site 6. East shore (windward shore). Very little filamentous algae growth was observed compared with sites on the west shore (probably due to exposure to wave action). Aquatic plant growth sparse. Potamogeton vaginatus is most abundant. Substrate was rock-gravel-sand.

8. MURIEL LAKE (Figure 11)

Date: August 24, 1983

- * See Maps (Appendix 1) for site locations.

8. MURIEL LAKE (Figure 11) continued....

- * Site 1. South-east corner, public beach and stream inflow channel. Only Chara sp. and sparse growth of Ruppia sp. was observed along the beach area. Large diversity of growth was within the stream inflow channel. Plants observed included Hippuris vulgaris, Ceratophyllum demersum, Polygonum natans and Utricularia vulgaris.
- Site 2. South-west corner, public boat launch and beach area. Many private cottages are present just above beach. No rooted aquatic plants were visible (only Chara sp. was observed). Substrate was sand-gravel and stone.
- Site 3. Provincial park campground and boat launch north of Gurneyville. No rooted aquatic plants were visible (fragments of P. vaginatus and Ruppia sp. were observed on shore). Substrate was sand-gravel-rock.

9. THUNDER LAKE (Figure 12)

Date: August 18, 1983

- Site 1. South shore, provincial park boat launch. Moderate weed growth. Species observed included M. exalbescentis, Ceratophyllum demersum, Potamogeton pectinatus and P. zosteriformis. Weed growth here was not considered a nuisance to boating activity.
- Site 2. Provincial park beach and boat mooring area. Dense weed growth was present in protected boat mooring bay. Species observed included Nuphar variegatum, Potamogeton pusillus and P. zosteriformis. Aquatic weed growth presents a potential nuisance to boating activity.
- Site 3. South-east shore, small bay at Lakeview campsite. Aquatic weed growth was not particularly abundant, but a high diversity of species was present. Species included Equisetum fluviatile, E. palustre, M. exalbescentis, Polygonum natans, Potamogeton pusillus, Utricularia vulgaris and Spirodela polyrrhiza.

10. LAC LA NONNE (Figure 13)

Date: August 30, 1983

- Site 1. South-east shore, public boat launch at county operated campground. Water was shallow and aquatic weed growth was sparse. Lemna trisulca was most abundant. Substrate was silt-mud.

* See Maps (Appendix 1) for site locations.

10. LAC LA NONNE (Figure 13) continued....

- * Site 2. South side of lake, shoreline areas adjacent to Kildeer Beach Resort. Large weedbeds were on both sides of the resort (predominantly M. exalbenscens on the south side and Potamogeton richardsonii on the north side). Potamogeton vaginatus also was abundant in both areas. Most M. exalbenscens plants were surfacing, many were in flower and had adventitious roots.
- Site 3. Public boat launch at S.W. corner. Large bed of Potamogeton richardsonii observed; some plants were surfacing. Lemna minor and L. trisulca also were abundant. Water was green with algae.
- Site 4. North shore, public access and boat launch. Water visibility was very poor; only sparse aquatic weed growth. Lemna trisulca was very dense along almost the entire shoreline, particularly the north shore.
- Phragmites communis was the dominant emergent species.
 - Potamogeton richardsonii appeared to be the dominant submergent species.
- In addition to these sites, almost the entire perimeter of the lake was surveyed.

11. LAC STE. ANNE (Figure 14)

Date: August 17, 1983

- Site 1. East shore, wooden pier off beach at Alberta Beach townsite. Water depth is very shallow, weed growth sparse. Potamogeton pectinatus was the only rooted species observed.
- Site 2. East shore, cement-landfill pier and boat launch at Alberta Beach townsite. Sparse growth on sheltered side, elsewhere - weed free. Rooted species in sheltered included M. exalbenscens, P. pectinatus, P. pusillus, P. richardsonii and Sagittaria sp. Many drifting M. exalbenscens fragments, almost all with adventitious roots.
- Site 3. North-east corner, outflow channel. Sparse but diverse growth within outflow channel. Species included M. exalbenscens, Ceratophyllum demersum, Potamogeton pectinatus, P. richardsonii, Sagittaria sp. and Typha latifolia. Current slow.

12. ISLE LAKE (Figure 15)

Date: August 17, 1983

- * See Maps (Appendix 1) for site locations.

12. ISLE LAKE (Figure 15) continued....

- * Site 1. North-east end, bridge crossing and public boat launch area near Sunny Side Estates. Cement slab launch. Ceratophyllum demersum (dominant) and Lemna minor very abundant. Other species present included Lemna trisulca, Spirodela polyrhiza, Ranunculus circinatus and Potamogeton richardsonii. Only a single M. exalbenscens plant was observed at this site.
- Site 2. North shore, public boat launch at summer village of South View. Launch (cement slab) well maintained, inshore weed growth was very sparse.
- Site 3. North shore, public boat launch near Jones Beach. Appears to see little use, no dock. Very dense aquatic weed growth present, including M. exalbenscens, Ceratophyllum demersum, Sagittaria sp., Lemna trisulca and Nuphar sp.
- Site 4. North-west end of lake, public boat launch (double width cement slab). Extensive aquatic weed growth on and adjacent to the launch ramp (indicates that launch sees little use). Same species present as noted at Site 3. Very large and expansive bed of M. exalbenscens (surfacing) at west end of lake. This weed bed is a serious nuisance with respect to boating activity and navigation.
- Site 5. South-west shore of lake, public boat launch at Alberta Transportation maintained campground. Gravel launch appears to see moderate use. Few aquatic plants were observed inshore. Species noted were M. exalbenscens and Potamogeton pectinatus. Inshore substrate was composed of sand-gravel. This site is exposed to winds from the west.

13. WABAMUN LAKE (Figure 16)

Date: August 16, 1983

- Site 1. Wabamun Lake Provincial Park boat launch and dock area. Aquatic plant growth was very similar to that observed in 1982. Abundant M. exalbenscens growth was present between the two piers. Lemna trisulca, Elodea canadensis and Potamogeton zosteriformis also were abundant. Growth of submergent species extends throughout littoral area; sand silt substrate.

* See Maps (Appendix 1) for site locations.

13. WABAMUN LAKE (Figure 16) continued....

- * Site 2. Public pier and boat launch at town of Wabamun. Well maintained launch, water shallow; silt-mud substrate. Aquatic plant growth on west side of pier was quite dense. No clearly dominant species. M. exalbenscens and Potamogeton richardsonii were most abundant. Other species present included Potamogeton zosteriformis, P. praelongus, P. pectinatus and Utricularia vulgaris.
- Site 3. Channel on west side of Point Alison leading to Power Generating Plant west of Wabamun townsite. Sparse growth included Hippuris vulgaris and M. exalbenscens.
- Site 4. West end, Seba Beach public pier and private dock facilities. Potamogeton richardsonii (dominant) and P. pectinatus abundant along both sides of pier. Many P. pectinatus plants with seeds present, some extending into water as shallow as 0.3 metres. Ceratophyllum demersum, Najas flexilis and M. exalbenscens were also present in small quantities. Dense growth of P. pectinatus and Ranunculus circinatus at private dock facilities.

14. COOKING LAKE (Figure 17)

Date: August 3, 1983

- Site 1. South-west shore, public boat launch at town of Cooking Lake. Water was extremely turbid due to heavy algal bloom. No surfacing weed beds were noted. Extremely limited visibility made it difficult to locate submergent species. Emergent growth included Juncus sp., Typha latifolia and Scirpus sp. Recreational use of lake is very minimal.

15. MIQUELON LAKE (Figure 18)

Date: August 3, 1983

- Site 1. East shore, provincial park boat launch. Although weed growth was not dense, Ruppia sp. (dominant) and Potamogeton pectinatus are present throughout littoral area in scattered clumps. No surfacing or nuisance growth observed.
- Site 2. South shore, provincial park boat launch. Dense bed of Ruppia sp. were observed throughout inshore areas to depths of 3 m. No surfacing or nuisance growth present. Water very alkaline, very few submergent aquatic plant species were present.

* See Maps (Appendix 1) for site locations.

16. WIZARD LAKE (Figure 19)

Date: July 19, 1983

- * Site 1. North-east shore, packed gravel boat launch at Jubilee Park. No rooted aquatic plants were observed, only a few fragments on shore. Coarse gravel-rock substrate.
- Site 2. North shore, cottage area west of Site 1. Silt-mud sediment close to shore. Dense aquatic weed growth in bands approximately 10 m wide along shoreline (M. exalbenscens dominant). Other species present included Potamogeton richardsonii, P. praelongus and P. zosteriformis.
Weed growth is at nuisance levels.
- Site 3. North shore, shoreline adjacent to small farm. Cattle and livestock stalls extend down embankment to waters edge. Large Nuphar variegatum bed (in flower) just off shore. M. exalbenscens growth was also very dense.
- Site 4. North-west corner of lake, public boat launch. Appears to see only limited use. Large beds of Nuphar variegatum and Typha latifolia throughout west end. Sparse submergent weed growth at launch included M. exalbenscens, Ceratophyllum demersum and Lemna trisulca.
- Site 5. South-west corner of lake, public boat launch. Composition and distribution of aquatic plant species quite different than sites on north shore. A dense band of Nuphar variegatum (5-10 m wide) extends along virtually the entire south shore.
- Site 6. South-east shore, adjacent to cottage area. A very large and dense bed of M. exalbenscens was observed here. Most plants were flowering and had pink stems. The weed bed was surfacing and had formed dense floating mats, resulting in a considerable nuisance to boat navigation.

17. PIGEON LAKE (Figure 20)

Date: August 3, 1983

- Site 1. East shore, Mulhurst public boat launch and lake access area. Launch has been upgraded since 1982, approach is no longer as steep. No rooted aquatic plants were observed. Fragments present included Potamogeton richardsonii, Najas flexilis and M. exalbenscens.
Substrate consists of rock-gravel.

* See Maps (Appendix 1) for site locations.

17. PIGEON LAKE (Figure 20) continued....

- * Site 2. Ma-Me-O Beach, public beach and cement-lined pier area. Very sparse aquatic plant growth. Only a few fragments on shore, including M. exalbescons. Water is shallow, sand substrate.
- Site 3. West shore, Pigeon Lake Provincial Park, boat launch and pier area. Water visibility was poor due to exposure to wave action. Few rooted plants. Aquatic vegetation consisted of Potamogeton gramineus and P. richardsonii. Fragments of M. exalbescons were observed on shore and drifting in the water.
- Site 4. North-west corner, bridge crossing small inflow channel near Fisher Home. Large quantities of Lemna minor. Other aquatic macrophyte species present included Nuphar sp., Utricularia vulgaris, M. exalbescons and Sagittaria sp.
- Site 5. North-west corner, Zeiner Park. Boat launch was closed due to disrepair. Water was very shallow, sand-silt substrate. Abundant aquatic vegetation included Potamogeton richardsonii (dominant), P. pectinatus, Ceratophyllum demersum and M. exalbescons. Large Scirpus sp. bed north-east of launch area.

18. BUCK LAKE (Figure 21)

Date: August 8, 1983

- Site 1. South-west corner, Alberta Transportation operated campsite and boat launch area. A large bed of Ranunculus sp., Sagittaria sp. and Nuphar sp. was observed just south of the boat launch. Abundant aquatic plant growth occurred throughout much of the lake's south end; water shallow.
Area appears to receive moderate recreational use.

19. GULL LAKE (Figure 22)

Date: August 10, 1983

- Site 1. North-west shore, Birch Bay boat launch and dock area. No problem weed beds. Sparse aquatic plant growth included Potamogeton pectinatus, P. vaginatus and Typha latifolia. Silt-clay substrate.

* See Maps (Appendix 1) for site locations.

19. GULL LAKE (Figure 22) continued....

- * Site 2. South end, Aspen Beach Provincial Park boat launch and swimming area. Water shallow, poor visibility. Sparse growth around the launch area and wharf. Potamogeton vaginatus most abundant, M. exalbenscens present in isolated clumps (some with adventitious roots). Other species present included P. pectinatus and Elodea canadensis.
A very dense and expansive bed of M. exalbenscens was noted in small bay west of the boat launch. Most plants were surfacing and some in flower.
On a return visit (October 24, 1983) this weed bed was still surfacing and winter turions had formed.

20. BUFFALO LAKE (Figure 23)

Date: August 11, 1983

- Site 1. West end, narrows campground. Dense aquatic plant growth throughout much of the narrows. Lemna trisulca and M. exalbenscens were very abundant. Potamogeton pusillus and P. vaginatus also present.
- Site 2. South shore, Rochon Sands Provincial Park boat launch and privately operated marina. Water is very shallow, aquatic plant growth was abundant throughout bay (approaching nuisance levels), none surfacing. Aquatic vegetation consisted of Potamogeton pectinatus, P. vaginatus and Ruppia sp. Silt-mud substrate.
- Site 3. North shore, Pelican Point public boat launch and adjacent private marina and boat launch facility. Abundant aquatic plant growth around dock areas included Ruppia maritima, Potamogeton pectinatus and P. vaginatus. Plants were not surfacing nor considered a nuisance.
- Site 4. East shore, public campground and day use facilities. No rooted aquatic plants were noted. Many fragments of Ruppia sp. and Potamogeton vaginatus. Sand substrate. Area is exposed to wind and wave action from the west.

21. JACK FISH LAKE (Figure 24)

Date: August 9, 1983

- Site 1. East end, Alberta Forestry Service operated campground and boat launch facility. Many aquatic plants were present including Potamogeton richardsonii, P. zosteriformis, Nuphar sp. and M. exalbenscens.
Despite small size of lake and campground area, this lake warrants surveys due to its close proximity to B.C. and its location along a major east-west highway route.

* See Maps (Appendix 1) for site locations.

22. CRIMSON LAKE (Figure 25)

Date: August 9, 1983

- * Site 1. South shore, provincial park main boat launch and dock area. Flocculent silt-mud substrate. Sparse aquatic plant growth adjacent to launch. M. exalbenscens and Potamogeton pusillus were most abundant. M. exalbenscens plants were small and clustered. No nuisance growth was observed.
- Site 2. South shore, provincial park car-topper and canoe launch. Water is very shallow, visibility was poor. Sparse aquatic plant growth consisted of M. exalbenscens and Potamogeton richardsonii. In addition to the main sites above, the total perimeter of the lake was surveyed. Almost the entire lake is littoral allowing both abundant and diverse aquatic macrophyte growth. Potamogeton natans and M. exalbenscens are particularly abundant and widespread. In many areas M. exalbenscens is present in dense clumps, indicating pioneer infestations and potential for further increase and spread. Potamogeton praelongus was abundant in deeper waters.

23. TWIN LAKES (Figure 26)

Date: August 9, 1983

- Site 1. East shore, provincial park boat launch and dock area. Substrate was very flocculent (white ash-like). Yellow waterlily (Nuphar variegatum) abundant, growth of other aquatic plant species was sparse at this site. Species consisted of Potamogeton gramineus, P. richardsonii and P. praelongus. Water is shallow but very clear.
- Site 2. North shore, small point. Water depth increases quickly off shore. Aquatic plant growth was diverse but sparse. Species present included Potamogeton natans, P. gramineus, P. praelongus, Polygonum natans, Utricularia vulgaris and Equisetum fluviatile. M. exalbenscens was NOT noted (was observed in 1982).
- Site 3. South shore, abundant weed growth in small bay with intermittent inflow stream. Hippuris vulgaris was dominant. Other species included Utricularia vulgaris and M. exalbenscens.

24. SYLVAN LAKE (Figure 27)

Date: August 10, 1983

- * See Maps (Appendix 1) for site locations.

24. SYLVAN LAKE (Figure 27) continued....

- * Site 1. South shore, Willies Marine. Water was very turbid due to boating activity. Sparse rooted growth consisted of Potamogeton pectinatus and P. richardsonii. Mud substrate.
- Site 2. South shore, Sylvan Lake Provincial Park boat launch, pier and surrounding beach area. Water clear, only sparse rooted plant growth of P. pectinatus and P. richardsonii was observed. Fragments of M. exalbescons common.
- Site 3. North end, Sunhaven day use park boat launch at Glen's Cove. Large Scirpus sp. and Typha latifolia bed on north side of launch. Growth of submergent species was sparse; species present consisted of Potamogeton richardsonii, P. vaginatus, Hippuris vulgaris and Sagittaria sp.
 - A very large number of M. exalbescons fragments (many with adventitious roots) were observed lying on substrate. May indicate a major increase in M. exalbescons in 1984.

25. DILLBERRY LAKE (Figure 28)

Date: June 27, 1983

- Site 1. West shore, Dillberry Lake Provincial Park boat launch and beach area. Fine sand beach on west side of boat launch, many private cottages adjacent to beach area. Sparse submergent growth consisted of Potamogeton pectinatus (most abundant), P. richardsonii and P. zosteriformis. Fragments of P. praelongus and M. exalbescons also were present. No nuisance weed beds were observed.
 - Park appears to be utilized heavily by Saskatchewan residents. In the event of an Eurasian water milfoil infestation, this lake would be a prime site for its dispersal into Saskatchewan waters.

26. GOOSEBERRY LAKE (Figure 29)

Date: June 27, 1983

- Site 1. North-west shore, Gooseberry Lake Provincial Park boat launch and dock facilities. Two launch areas (both sand-gravel) present, each has small pier. Aquatic vegetation consisted of Potamogeton pectinatus and P. vaginatus. Many fragments on shore. Water is very shallow. Sand-mud substrate.

* See Maps (Appendix 1) for site locations.

27. PINE LAKE (Figure 30)

Date: August 12, 1983

- * Site 1. North end, Leisure Campground Resort area and adjacent public day use and boat launch facility. Lemna trisulca was very abundant. Rooted aquatic vegetation included M. exalbenscens, Potamogeton richardsonii, P. vaginatus and Ceratophyllum demersum. Many fragments on day use beach area. No surfacing or nuisance growth was observed. Water visibility was poor at resort docks due to boating activity.
- Site 2. West shore, Sandy Cove Resort boat launch and dock area. Area almost void of aquatic vegetation. A few small P. richardsonii plants were growing adjacent to launch. Fragments of P. vaginatus and M. exalbenscens were abundant. Beach area was free of fragments (apparently due to periodic cleanup by resort staff).
- Site 3. West shore, Millers Landing Resort boat launch and dock. Water is very shallow, dense growth of P. richardsonii present throughout most of bay area. Silt-mud substrate.

28. LITTLE FISH LAKE (Figure 31)

Date: June 28, 1983

- Site 1. East shore, Little Fish Lake Provincial Park boat launch, beach and adjacent shore areas. Very few rooted aquatic plants inshore, many fragments on shore (P. vaginatus). Water is very shallow, greatest depth approximately 5 m. Filamentous green algae abundant. Gravel-stone substrate.

29. GLENMORE RESERVOIR (Figure 32)

Date: July 15, 1983

- Site 1. South shore, Glenmore Yacht Club boat launch and dock facilities. Water was very clear. Only sparse aquatic macrophyte growth in vicinity of yacht club. Potamogeton richardsonii was only rooted species noted. Numerous fragments of P. vaginatus, Elodea canadensis and Hippuris vulgaris were observed on shore and drifting in the water.
- Site 2. East shore, Heritage Park Marina boat launch and dock facilities. Dense submergent growth around inner dock area. M. exalbenscens (not present at Site 1) was most abundant. Other rooted species included Hippuris vulgaris, Potamogeton pectinatus, P. praelongus, P. pusillus and P. richardsonii. No surfacing weeds observed. Sand-silt substrate.

* See Maps (Appendix 1) for site locations.

29. GLENMORE RESERVOIR (Figure 32) continued....

NOTE: Swimming and the use of power boats within Glenmore Reservoir is strictly prohibited.

30. CHESTERMERE LAKE (Figure 33)

Date: July 25, 1983

- * Site 1. North end, boat launch and wharf area. Dense aquatic macrophyte growth throughout almost entire area north of causeway. Potamogeton richardsonii dominant and Ceratophyllum demersum also was abundant. Other species included Potamogeton zosteriformis and P. vaginatus. No M. exalbesens was observed.
- Site 2. East shore, just south of causeway. Dense beds of P. richardsonii and C. demersum. Some plants were surfacing.
- Site 3. South-east corner, small spillway and flow control structure. Strong current towards spillway, P. vaginatus abundant here. P. richardsonii dominant further out. Many plants were surfacing.

31. MCGREGOR RESERVOIR (Figure 34)

Date: June 21, 1983

- Site 1. North end, Milo Memorial Park gravel boat launch area. No pier, docks or wharf present, launch area void of aquatic plant growth. Water shallow, muddy shoreline. Large bed of Ranunculus circinatus (surfacing and in flower) and Potamogeton crispus just north of launch area. Other aquatic plant species present included Elodea canadensis and P. pectinatus. With exception of R. circinatus, most plants were immature. Many shorebirds were present in this area.
- Site 2. North and south shore of causeway (highway #531 crossing). Aquatic plant growth dense in almost all inshore areas. Ranunculus circinatus was dominant. Most R. circinatus plants were surfacing and in flower, many with long adventitious roots. Other aquatic plant species present included Elodea canadensis, Ceratophyllum demersum, Potamogeton richardsonii, P. zosteriformis and M. exalbesens. No P. crispus was noted at this site.

32. LAKE NEWELL RESERVOIR (Figure 35)

Date: July 26, 1983

* See Maps (Appendix 1) for site locations.

32. LAKE NEWELL RESERVOIR (Figure 35) continued....

- * Site 1. Boat launch and bay area on west side of Kinbrook Island Provincial Park. Elodea canadensis and Potamogeton pusillus were abundant in sheltered areas. Very sparse growth in areas exposed to wave action. Potamogeton gramineus and Sagittaria sp. (both observed in 1982) were not noted during this survey. Distribution and density of aquatic plant species otherwise was very similar to that observed in 1982.
- Site 2. Shallow bay and marsh area on east side of Kinbrook Island. Polygonum natans (terrestrial form) abundant on shore. Dense aquatic macrophyte growth throughout the bay area, Ceratophyllum demersum and Ranunculus sp. (dominant) were very dense. Many Ranunculus sp. plants were surfacing and in flower. Lemna trisulca also was very abundant (completely covering substrate). Other species included Elodea canadensis and M. exalbenscens.

33. CHAIN LAKE RESERVOIR (Figure 36)

Date: July 11, 1983

- Site 1. South-east end of reservoir, north of provincial park boat launch and dock. Only sparse aquatic plant growth present composed of Potamogeton pectinatus and P. richardsonii.
- Site 2. Small bay on south side of provincial park boat launch and dock. Dense bed of P. richardsonii (dominant), P. pectinatus and Ceratophyllum demersum were also present.
- Site 3. South end, sheltered bay near outflow channel. Sparse aquatic plant growth but high species diversity. Aquatic plant species present included Hippuris vulgaris, Potamogeton pectinatus, P. pusillus, P. richardsonii, Ceratophyllum demersum, M. exalbenscens, Sagittaria sp. and Utricularia vulgaris.
- Site 4. Large bay at south-west end of lake. Dense weed growth was present throughout most of bay area. P. pusillus (dominant), P. richardsonii and P. natans were very abundant. Many plants were surfacing, making boat navigation difficult. Other species present included Alisma gramineum, M. exalbenscens and Ranunculus sp.
- Observation of Site 5 (surveyed in 1982) was discontinued due to sparse aquatic plant growth.

34. TRAVERS RESERVOIR (Figure 37)

Date: June 21, 1983

- * See Maps (Appendix 1) for site locations.

34. TRAVERS RESERVOIR (Figure 37) continued....

- * Site 1. East end, bottom of spillway below dam. Water was very clear; aquatic plant growth was dense. Species present included M. exalbenscens, Ranunculus circinatus, Ceratophyllum demersum and Potamogeton pectinatus. Heavy cover of periphyton on most plants, none surfacing.
- Site 2. Downstream side of control gate on north end of dam structure. Water visibility good, strong back current. R. circinatus, P. pectinatus, P. richardsonii and M. exalbenscens were observed in back waters.
- Site 3. North shore, east end, Alberta Transportation campsite and boat launch (cement). Sand-gravel substrate near boat launch, rocky further offshore. No aquatic plant growth was observed.
- Site 4. West end, Little Bow Provincial Park boat launch and dock. Sparse growth of P. richardsonii and R. circinatus at boat launch. Dense but immature growth in area of docks. Most plants were about a metre tall growing in approximately 3-4 m of water. Rooted vegetation was not visible from the surface. Other species present included C. demersum, P. zosteriformis, Elodea canadensis and M. exalbenscens.

35. KEHO RESERVOIR (Figure 38)

Date: June 22, 1983

- Site 1. East end of lake, south of canal. Shore of large boulders. Many drifting fragments including Potamogeton richardsonii and P. vaginatus. No rooted growth was visible near shore. Large bed of P. richardsonii (not surfacing) approximately 50 m offshore.
- Site 2. East end of lake, mouth of outlet canal. Very dense surfacing weed growth extending from edge of shore outwards about 6-8 m along both shores of canal. Only the central portion of the canal was free of surfacing plants. P. richardsonii was most abundant, small amounts of Ranunculus sp. and M. exalbenscens (immature) were also present. Water level in canal appeared low.
- Site 3. Short distance down canal, just above control structure. Aquatic plants extending down both sides of canal, centre of channel open. P. richardsonii was dominant, with M. exalbenscens, P. vaginatus, Alisma gramineum and Sagittaria sp. also present.

* See Maps (Appendix 1) for site locations.

35. KEHO RESERVOIR (Figure 38) continued....

- * Site 4. North-west corner of reservoir, inlet canal and adjacent wetland-mud flats area. Dense beds of P. richardsonii (approximately 2 m wide) extending along both shores of inflow channel. Very sparse aquatic plant growth in centre of channel. Sagittaria sp. and Juncus sp. also present.
- Site 5. South-east shore at boat launch near Keho Park. Cement slab boat launch is in disrepair. Edge of shore is very rocky (have been brought in to stabilize shore area). Sand-mud substrate. No rooted aquatic plant growth was observed, fragments of P. richardsonii, P. vaginatus and M. exalbescons on shore.

36. PARK LAKE RESERVOIR (Figure 39)

Date: June 21, 1983

- Site 1. North end of lake, Park Lake Provincial Park boat launch and dock. High species diversity at this site with Potamogeton richardsonii being the most abundant species. Boat launch ramp was free of weed growth, most plants were on north side of dock and further offshore of launch ramp. Other abundant species included P. zosteriformis, P. pectinatus, P. pusillus, M. exalbescons, Najas flexilis and Typha latifolia. None surfacing or flowering, heavy periphyton cover on most plants.
- Site 2. North end of lake, bay and dike area west of provincial park boat launch (Site 1). Large bed of Potamogeton praelongus (surfacing) extending throughout most of bay. M. exalbescons, Ceratophyllum demersum and P. vaginatus also present. Water visibility poor. Aquatic plant growth in this area is a nuisance to boat navigation and swimming.

37. CHIN LAKES RESERVOIR (Figure 40)

Date: Site 1 - July 18, 1983
Site 2 - August 19, 1983
Site 3 - August 2, 1983

- Site 1. North shore, west of bridge. Dense bed of Potamogeton richardsonii (healthy and many in flower) growing parallel to shoreline. Weed bed extends several hundred metres along shore both east and west of bridge. Other aquatic macrophyte species present included P. vaginatus, P. zosteriformis, P. pectinatus, Elodea canadensis, Alisma gramineum and Ranunculus circinatus. Substrate of sand and mud.

* See Maps (Appendix 1) for site locations.

37. CHIN LAKES RESERVOIR (Figure 40) continued....

- * Site 2. South shore, west of bridge at Alberta Transportation operated campsite. Water shallow, sand-mud substrate. P. richardsonii, Elodea canadensis and Ranunculus circinatus abundant. Sparse growth of Potamogeton zosteriformis and M. exalbens also present. Chara sp. abundant in deeper waters.
- Site 3. South shore, east of bridge at boat launch. Boat ramp constructed of cement, adjacent shoreline consisted of very coarse gravel and rocks. Sand-gravel and rock substrate. Aquatic plant growth sparse in vicinity of boat launching area, was more dense between launch and bridge. P. richardsonii and R. circinatus were the most abundant species. Other species present included Potamogeton friesii, P. zosteriformis and Elodea canadensis.

38. ELKWATER LAKE (Figure 41)

Date: July 27, 1983

- Site 1. East end of lake, water shallow, large beds of Typha latifolia and Scirpus sp. bordering shoreline of almost entire bay.
- Site 2. South shore, provincial park boat launch and docks. Dock facilities large and well maintained. Aquatic plants at launch site limited to very sparse Potamogeton richardsonii growth. Considerable growth in dock area, but not as dense or mature as that noted in 1982. P. richardsonii was dominant, other species present included Ceratophyllum demersum, M. exalbens, P. pusillus and P. vaginatus. Expansive bed of T. latifolia west of launch area. Equisetum fluviatile was also present here.
- Site 3. South shore, canoe launch and day use area west of Site 2. Very sparse growth including P. richardsonii, M. exalbens and Sagittaria sp. Large beds of Typha latifolia and P. richardsonii were observed along shore between Sites 3 and 2. Other species present in this area included Polygonum natans and Utricularia vulgaris.

39. SPRUCE COULEE RESERVOIR (Figure 42)

Date: July 27, 1983

- * See Maps (Appendix 1) for site locations.

39. SPRUCE COULEE RESERVOIR (Figure 42) continued....

- * Site 1. North end and west shore of reservoir. No power boats allowed in reservoir but popular with canoeists. Abundant aquatic plant growth around most of lake shore, species diversity high. Ranunculus circinatus is most abundant species (many surfacing and in flower). Potamogeton richardsonii, M. exalbens and Hippuris vulgaris also were abundant. Water visibility good; silt-mud substrate.

40. REESOR LAKE RESERVOIR (Figure 43)

Date: July 28, 1983

Site 1. North shore, day use and pier area. Dense aquatic plant growth throughout most of littoral area, some surfacing. Ranunculus circinatus dominant (some flowering). Other abundant species included Ceratophyllum demersum, Potamogeton richardsonii and Myriophyllum exalbens. Aquatic macrophytes here are a nuisance to shore fishermen.

Site 2. South end of lake, boat launch and adjacent shoreline. Scattered growth at launch site, growth more dense north of launch and further offshore. Very few plants surfacing. R. circinatus was dominant, C. demersum also was abundant. High species diversity along west shore. Shore fisherman complained about the weed growth.

41. CROWSNEST LAKE (Figure 44)

Date: July 12, 1983

This was a visual survey. No boat launching facilities were observed. Water very clear, depth drops off quickly, stone-rock substrate. No aquatic macrophytes were observed. This lake does not warrant surveys.

42. ISLAND LAKE (Figure 45)

Date: July 12, 1983

Site 1. North shore, Alberta Transportation operated campground and boat launches. Two boat launches (gravel) appear to be used only occasionally. No aquatic plant growth at launch sites. Gravel-stone substrate, rapid drop off. Equisetum palustre and Juncus sp. observed at east end near outflow.

- Due to location along major east-west highway route and proximity to B.C., this lake is a likely site for introduction of Eurasian water milfoil.

* See Maps (Appendix 1) for site locations.

43. BEAUVAIS LAKE (Figure 46)

Date: July 13, 1983

- Site 1. North-west end of lake, provincial park boat launch and dock area. Dense aquatic weed growth throughout area (some surfacing), dominated by Potamogeton pusillus, P. zosteriformis and Ceratophyllum demersum. P. richardsonii, P. pectinatus (sparse), Myriophyllum exalbesens, Ranunculus circinatus and Elodea canadensis also present. Moderate periphyton cover on lower portions of plants.
- Site 2. North shore, cottage and beach area. Abundant weed growth throughout most of littoral zone. R. circinatus (many surfacing and in flower) abundant close to shore. Dense but narrow beds of M. exalbesens (some surfacing) growing along shore at an average distance of 2.5 m from shore. C. demersum, E. canadensis and P. richardsonii abundant in deeper waters. Aquatic weed growth in beach area is at nuisance levels; interferes with swimming and shore fishing.
- Site 3. East end of lake, bay east of beach and narrow outflow arm. Very dense aquatic plant growth, M. exalbesens dominant. Polygonum natans abundant in patches. Potamogeton pusillus, P. natans, P. zosteriformis and Nuphar variegatum also present. Water is shallow, silt-organic mud substrate. Aquatic plant growth in this area seriously hinders boat navigation. Only sparse weed growth was observed along south shore, water depth drops off more quickly than on north shore. No cottages are present on south shore.

44. BEAVER MINES LAKE (Figure 47)

Date: July 12, 1983

- Site 1. South-east shore, Forestry Service maintained campground and gravel boat launch. Myriophyllum exalbesens (dominant), Potamogeton richardsonii and P. zosteriformis very abundant on north side of boat launch. Polygonum natans, Typha latifolia and Juncus sp. were also present. Water visibility was approximately 3 m, silt-organic mud substrate. Very strong winds prevented use of boat for survey. This lake is a likely site for introduction of Eurasian water milfoil.

45. WATERTON RESERVOIR (Figure 48)

Date: July 13, 1983

- Site 1. North-west tip of reservoir, gravel-mud boat launch area. No dock or mooring facilities present. No aquatic vegetation was observed, probably due to considerable seasonal fluctuations in reservoir water levels. Strong winds and wave action common here. The development of a serious aquatic weed infestation in this reservoir is unlikely.

46. ST. MARY RESERVOIR (Figure 49)

Date: July 14, 1983

- Site 1. North-east end of reservoir, Cardston Boat Club launch and dock facilities (private). This is the main recreational area on the reservoir. A small but dense bed of Potamogeton richardsonii was observed offshore of docks. Plants were about 2 m tall (not surfacing). Sparse growth of Potamogeton pusillus was also present.
- Site 2. North-east corner of reservoir, public use boat launch and pier. Very sparse aquatic plant growth. Species present were P. pusillus, Equisetum fluviatile and Chara sp.
- Site 3. North-east end of reservoir, public boat launch on north shore. No dock or mooring facilities. No aquatic plant growth observed. Gravel-stone substrate.
- Site 4. Pond and channel draining into St. Mary River at bottom of spillway. Popular fishing spot. A few very small Myriophyllum exalbescens plants growing among rocks and boulders where channel enters St. Mary River. Other species present included Potamogeton pectinatus, P. pusillus and P. richardsonii.
- Potamogeton richardsonii was the most abundant species within the reservoir.

47. POLICE (OUTPOST) LAKE (Figure 50)

Date: July 14, 1983

- Site 1. South end, provincial park boat launch and dock. Moderate to dense weed growth in all littoral regions, Myriophyllum exalbescens was most abundant. Other species present included Polygonum natans, Potamogeton vaginatus, P. pusillus, P. richardsonii (sparse), and P. pectinatus. Heavy cover of periphyton on lower portions of most plants. Some plants in shallow areas were surfacing.

47. POLICE (OUTPOST) LAKE (Figure 50) continued....

Site 2. South-east end of island, popular fishing area. Moderate to dense weed growth, high species diversity. Species present included Potamogeton zosteriformis and all species noted at Site 1. Potamogeton vaginatus was most abundant.

Site 3. North side of island. Dense submergent growth throughout littoral areas. Species present included P. vaginatus (dominant), P. richardsonii, P. pusillus, P. zosteriformis, M. exalbescens and Polygonum natans. Scirpus sp. was also abundant. Most submergent species were in immature growth stages, none were surfacing or flowering.

Site 4. Sheltered bay on north shore, cattle grazing to waters edge. Sparse to moderate aquatic plant growth including M. exalbescens, P. vaginatus (most abundant), P. richardsonii and Scirpus sp. P. richardsonii plants were most common in shallow water, plants very small. M. exalbescens plants also were very small. No surfacing growth was observed. Many large stones along shore extending to a water depth of approximately one m, silt-mud substrate further offshore.

- Aquatic macrophyte growth and distribution at all sites was very similar to that observed during the 1982 survey (Stockerl, et al., 1983).
- P. vaginatus was dominant at most sites.
- M. exalbescens was abundant at all sites but plants were generally short, occupying the area beneath the canopy of taller plants such as P. vaginatus.
- Heavy cover of periphyton on lower portions of plants was common at all sites.

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A P P E N D I X * I

Maps of Lakes and Reservoirs Surveyed for
Eurasian Water Milfoil During 1983.

Rg. 19
Rg. 18

**SKELETON
LAKE**

wharf

Boy
Scout
Camp

Golf
Course

2

1

campsite

← Boyle
Tp. 65
Tp. 64

W/4th Mer.

Tp. 60 Rg. 12 W/4th Mer.

0 1 km
SCALE

W/4th Mer.

0 0.5 1 km
SCALE

CRIMSON LAKE PROVINCIAL PARK

W/5th Mer.

Alberta
4th Meridian
Saskatchewan

Dillberry Lake

Provincial Park

Tp. 42

Tp. 41

DILLBERRY

LAKE.

wharves

17

0 0.25 0.50 km
SCALE

T.P. 36 Rg. 5
T.P. 36 Rg. 4

W/4th Mer.

0 1 km

W/4th Mer.

0 0.5 1 km
SCALE
Tp. 24 Rg. 28 W/4th Mer.

W/4th Mer.

Tp. 18
Tp. 17

Tp. 17
Tp. 16

Tp. 15	Rg. 2
Tp. 14	Rg. 2

W/5th Mer. 0 1 km
SCALE

Tp. 10 Rg. 22 W/4th Mer.

W/4th Mer.
SCALE
0 0.5 1 km

Tp. 8 Rg. 2 W/4th Mer.

Tp. 8 Rg. 5 W/5th Mer.

Tp. 8 Rg. 6
Tp. 8 Rg. 5

w/ 5th Mer.

Tp. 5 Rg. 1 W/5th Mer.

Tp. 5 Rg. 3 W/5th Mer.

0 0.25 0.50 km
SCALE

Tp. 1 Rg. 26 W/4th Mer.

N.L.C. - B.N.C.

3 3286 10193008 5