

# In the footsteps of J.A. Munro

Waterbirds and wetlands in the Cariboo parklands, British Columbia,  
A comparative study: 1938, 1958, 2001

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Technical Report Series Number 376,  
Pacific and Yukon Region 2003  
Canadian Wildlife Service

*This series may be cited as:*

Dawe, N.K., J.M. Cooper, A.C. Stewart and J.A. Young. 2003.  
In the footsteps of J.A. Munro. Waterbirds and wetlands in the  
Cariboo parklands, British Columbia, A comparative study: 1938, 1958, 2001  
Technical Report Series No. 376. Canadian Wildlife Service,  
Pacific and Yukon Region, British Columbia.

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Figure 40. Canada Goose with brood of 5 young at 100 Mile House marsh, 14 May 2001.

## Exeter Lake

Exeter Lake (Figure 41) is located within the municipal boundaries of 100 Mile House approximately 3 km west of the town centre. Its open water covers an area of approximately 46 ha and there are extensive wetland areas adjacent to the lake, particularly at its eastern end. In 1938, Munro described Exeter Lake as being

*situated in a wide open valley between timbered hills about 2 miles west of 100 Mile. The bottom is soft marl and hydrophytes limited to yellow pond lily Nuphar sp. and water milfoil, neither very abundant, with roundstem bulrush and sedges in a narrow belt along shore beyond the prevailing willow margin. Cattail is present at the east end and where boggy conditions prevail along the sides of a shallow creek, its outlet, and an adjacent narrow bay. A spruce swamp on the south side has the characteristic edge of sedges succeeded by roundstem bulrush.*

Table 32. Birds observed during breeding waterbird surveys at 100 Mile House marsh: 1958 and 2001.

Species <sup>1</sup>	100 Mile House marsh	
	18-Jun-58	17-Jun-01
PBGR	2	1
CAGO		16
CAGO-Y		28
MALL-♂ <sup>2</sup>		1
MALL-♀		2
MALL-Y		14
BWTE-PR	2	
CITE-PR		1
NOSL-♂		1
LESC-PR		2
LESC-♂		8
LESC-♀		1
BAGO-♀		1
BAGO-Y		9
RUDU-PR	2	5
AMCO	3	29
AMCO-Y	10	25
Sub-total	23	152
BLTE <sup>3</sup>		6
<b>TOTALS</b>	<b>23</b>	<b>158</b>

<sup>1</sup> For a key to species codes see Appendix I

<sup>2</sup> For a key to species code modifiers see Appendix II

<sup>3</sup> Munro (1958) mentions Black Terns nesting

In 1958, Munro noted that his 1938 description was applicable to what he was observing with the exception that the lake no longer contributed much to waterfowl production, which he attributed to the continuing disturbance caused by a concentration of the logging and milling industry near the lake and the attendant population growth in the area. Munro (1958) noted that traffic on the road to Exeter Station, which served 4 mills in 1958, was not "greatly less than that on the Cariboo Highway."

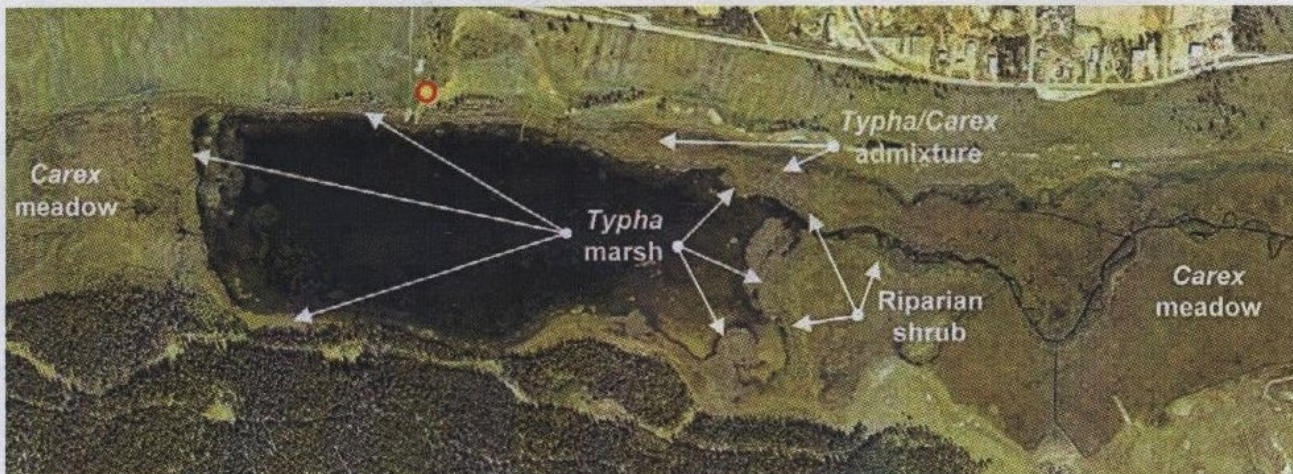


Figure 41. Exeter Lake showing some habitat characteristics and surrounding land use. Disc is location where archival photographs were taken.



**Table 33.** Some attributes of Exeter Lake.

Attributes	Exeter Lake
	31-May-01
UTM 10	614996
	5723056
Elevation (m)	919
pH	8.7
Temperature (°C)	15
Conductivity ( $\mu\text{mhos}\cdot\text{cm}^{-1}$ )	280
Depth (m)	4.5
Secchi Disk (m)	3.3
Area (ha)	159.2
Perimeter (m)	8076
Emergent marsh area (ha)	7.9
Open water or submergent vegetation area (ha)	44.5
Fish	Yes
Cattle access <sup>1</sup>	Yes
Nest boxes present	Yes
DU Project	Yes
Residences near wetland	No
Recreation Area near	No
Light Industry	Yes
Partially filled	No
Boat launch	No
Biogeoclimatic Unit	IDF dk3

<sup>1</sup> Cattle have only limited access to the lake.

Today, Exeter Lake is much the way Munro described it, with few exceptions. There are now agricultural fields northwest of the lake, where forage crops are grown. Cattle have access to much of the area northeast of the lake; however, through good stewardship practices, cattle access to the lake is now restricted by fencing, which also protects a riparian willow band that occurs along much of the north side of the lake. Another agricultural field lies at the southeast corner, adjacent to an extensive *Carex* meadow. There is a light industrial area near the lake to the north of Exeter Road.

The southern shore is backed by a coniferous forest; Douglas-fir and varying amounts of both



**Figure 43.** Common Loon nest location (top) and close-up of eggs, Exeter Lake, 31 May 2001. This was one of three nests found along the south shore of the lake; all nests held two eggs.

spruce and trembling aspen are the dominant species (141 - 250 yr with 56 - 65% crown closure and a Site Index range of 13 - 16).

A narrow *Typha* marsh occurs along most of the shoreline with sporadic stands of *Scirpus* at the outer margin of the *Typha*. In most areas, the *Typha* band



**Figure 42.** Exeter Lake looking southeast, 14 May 2001. In the foreground is an admixture of *Typha* and *Carex* and some riparian shrub habitat. The lake outlet (Little Bridge Creek) can be seen (left centre).



is 1 - 5 m wide (narrowest along the south shore), except where the marsh becomes more prominent at the west and particularly at the east end of the lake. *Carex* was usually found growing amongst the *Typha*. Shoreward of the *Typha* marsh where there are low moist areas, *Typha* grades into *Carex* meadows which are extensive, particularly at the west end of the lake. In some places, such as the northeast shoreline, admixtures of the *Typha* and *Carex* occur (Figure 42). Large mats of Canadian waterweed were noted, particularly at the west end and along the north side of lake; yellow waterlily occurs around the shore perimeter and was starting to bloom by mid-May. Snail and freshwater mussel shells were fairly common. Some other attributes of Exeter Lake can be found in Table 33.

Little Bridge Creek enters the lake at the west end with its outlet at the east end. The creek meanders through the extensive *Carex* meadow east of the lake; there, it is lined on both sides by a riparian willow band. Yellow waterlily and Canadian waterweed were also noted in the creek along with 2 active beaver dams. We did not wander through the meadow; however, we heard many ducks and rails as we paddled the creek. Our estimates of bird use in this area would have to be considered low (Table 34.).

At the end of May we paddled the lake perimeter checking for nests and also surveyed the eastern portion of Little Bridge Creek (Table 34). The declining bird use of Exeter Lake that Munro reported in 1958 appears to have reversed itself and bird numbers in 2001 were about half those reported in 1938 (Table 34). Species diversity was higher in 2001, with 6 additional species observed—Red-



Figure 44. Red-necked Grebe nest with four eggs, Exeter Lake, 31 May 2001. This nest was built on a floating bed of *Elodea*, and consisted primarily of *Nuphar* and *Elodea* stems and leaves and decaying aquatic vegetation.

Table 34. Birds observed during breeding waterbird surveys at Exeter Lake: 1938, 1958 and 2001.

Species <sup>1</sup>	Exeter Lake		Exeter Lake	Exeter Creek	Exeter Lake
	7-Jul-38	5-Jul-58	31-May-01	31-May-01	20-Jun-01
COLO	1		2		2
COLO-PR <sup>2</sup>		1			1
COLO-N			3		
COLO-Y		1			1
RNGR			1		1
RNGR-PR					1
RNGR-N			1		1
CAGO			1		
CAGO-PR			6		5
CAGO-Y			20		15
DABB-U				6	
GWTE-PR				2	
GWTE-♂	5		1		2
GWTE-♀	3				
GWTE-Y	19				
MALL-PR			1	1	
MALL-♂	50		5	1	5
MALL-♀	4				1
MALL-Y	28				4
BWTE-PR	1			1	
BWTE-♂	3		1	2	3
BWTE-♀	1				
CITE-PR			2		2
CITE-♂			2		1
NOSL-PR				1	
NOSL-♂				1	
GADW-PR			5	1	2
GADW-♂			3		2
GADW-♀			1		1
AMWI					13
AMWI-PR			1		4
AMWI-♂			5		
AMWI-♀	1				
AMWI-Y	12				
REDH-PR				1	
RNDU-PR					1
RNDU-♂		2	7		1
RNDU-♀	1		1		
RNDU-Y	15				
LESC-PR	1		2	9	
LESC-♂	15				2
COGO-J♂			1		
BAGO-♀	2				
BAGO-Y	15				
BUFF-J♀	1				
AMCO			11		5
Sub-total	180	5	100	42	92
VIRA			1	3	2
SORA			3	5	6
SORA-Y	1				
SHOR-U			1		
SPSA					2
KILL			1		1
WISN			1		1
HEGU			3		
BLTE			33	20	20
TOTALS	181	5	143	70	124

<sup>1</sup> For a key to species codes see Appendix I

<sup>2</sup> For a key to species code modifiers see Appendix II



necked Grebe (Figure 44), Canada Goose, Cinnamon Teal, Gadwall, Common Goldeneye, and American Coot—that were not reported by Munro in 1938. Two species, Barrow's Goldeneye and Bufflehead, were reported in 1938 but not in 2001. Our Mallard numbers, in particular, were considerably lower than Munro's 1938 counts. However, our latest count in June was about 2 weeks earlier than Munro's surveys and thus we likely missed a number of broods that had not yet appeared.

Bridge Creek Estate manages this breeding area and has worked together with the former Ministry of Environment, Lands and Parks; Canadian Wildlife Service, Environment Canada; and Ducks Unlimited Canada, as part of the Fraser River Action Plan, to ensure that the extensive wetlands and riparian habitat, important for many wildlife species, are maintained while still ensuring that the economic viability of the ranch was not compromised. In 2001, Bridge Creek Estate won an environmental award from the British Columbia Cattlemen's Association for their stewardship activities (Figure 46). According to Ranch and Property Manager, Don Savjord

(pers. comm.), it has turned out to be a win-win situation for both the cattle and the waterbirds that depend on these important nesting areas.

## 101 Mile Lake

This productive little wetland is located on the west side of Highway 97, a few kilometres north of 100 Mile House. Munro (1958) notes that the lake was:

*described in 1938 as a round-stem bulrush, cattail and Juncus marsh of 6 to 7 acres, the first chiefly in the centre and in the form of isolated clumps. Duckweed Lemna minor was noted as the most abundant food plant. In 1958 it may best be described as a marshy lake of approximately 20 acres of which about half is round-stem bulrush cut through by narrow channels. The nesting value is perhaps three times as great as in 1938.*

Today the approximately 6 ha slough appears to be much as it was in 1958; about 40% open water and 60% *Scirpus* marsh (Figure 43). Shoreward of the *Scirpus* is a band of rushes of varying widths. Further to



**Figure 45.** 101 Mile Lake showing some habitat characteristics and surrounding land use. Disc is location where archival photographs were taken.



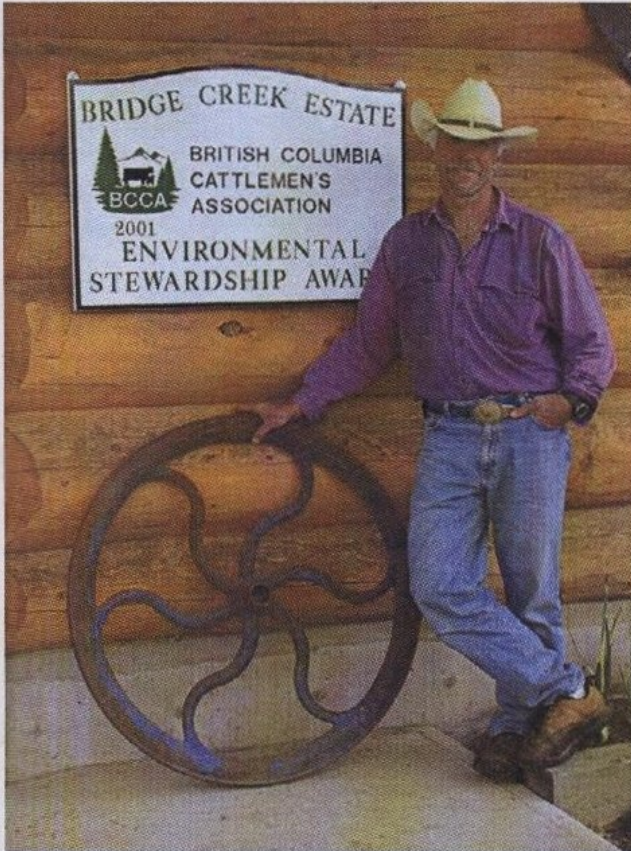


Figure 46. Don Savjord, Ranch and Property Manager and the newly acquired award given by the British Columbia Cattlemen's Association to Bridge Creek Estate for their Environmental Stewardship practices on Exeter Lake and 101 Mile Lake (20 June 2001).

the east lies a *Distichlis-Puccinellia* meadow and Highway 97. The wetland is bordered on the south by a *Distichlis-Puccinellia* meadow and rangeland, and on the west and north by the *Distichlis-Puccinellia* meadow which grades into a band of rangeland of varying width and then to a mixed forest of Douglas-fir, lodgepole pine and trembling aspen. Around the slough there are scattered open patches of highly saline, bare ground, occasionally with Seablite eking out an existence. Some attributes of the slough are shown in Table 35.

Despite Munro's (1958) comments that the nesting value in 1958 was 3 times as great as in 1938, his waterbird numbers don't reflect that. Bird numbers in 2001, however, were significantly higher than in either of Munro's years (Table 36). <sup>1938/58</sup>

There was also greater bird diversity in 2001 with 10 species reported that were not found during Munro's earlier surveys. These included Pied-billed Grebe (Figure 47), Eared Grebe, Canada Goose, Northern Pintail, Cinnamon Teal, Northern

Table 35. Some attributes of 101 Mile Lake.

Attributes	101 Mile Lake	
	11-May-01	
UTM 10	618025	5725450
Elevation (m)	961	
pH	8.6	
Temperature (°C)	11	
Conductivity ( $\mu\text{mhos}\cdot\text{cm}^{-1}$ )	1800	
Depth (m)	1.5	
Secchi Disk (m)	1.5	
Area (ha)	5.7	
Perimeter (m)	988	
Emergent marsh area (ha)	3.5	
Open water or submergent vegetation area (ha)	2.2	
Fish	No	
Cattle access <sup>1</sup>	Yes	
Nest boxes present	Yes	
DJ Project	Yes	
Residences near wetland	No	
Recreation Area near	No	
Light Industry	No	
Partially filled	No	
Boat launch	No	
Power boats allowed	No	
Biogeoclimatic Unit	IDF dk3	

<sup>1</sup> Cattle have limited access to wetland (see text).

Shoveler, Gadwall, Redhead, Lesser Scaup and Common Goldeneye. In this study, Mallard and Barrow's Goldeneye numbers were down from previous



Figure 47. Pied-billed Grebe chick at 101 Mile Lake, 20 June 2001.



**Table 36.** Birds observed during breeding waterbird surveys at 101 Mile Lake: 1938, 1958 and 2001.

Species <sup>1</sup>	101 Mile Lake			
	7-Jul-38	19-Jun-58	30-May-01	20-Jun-01
PBGR			1	1
PBGR-N <sup>2</sup>				1
PBGR-PR				1
EAGR			1	2
CAGO			15	1
CAGO-PR			2	
CAGO-Y			7	
GWTE-♂		1		4
GWTE-F				1
MALL-PR			1	2
MALL-♂			1	1
MALL-♀	3	1		4
MALL-Y	12			
NOPI-♂				1
BWTE-PR		1		
BWTE-♂	4	1	1	3
BWTE-♀	3			4
CITE-♂				1
NOSL				5
NOSL-♂				5
NOSL-♀				1
GADW-PR			1	
GADW-♂			1	4
AMWI-PR			1	1
AMWI-♂		1		1
AMWI-Y			5	
REDH-PR				1
REDH-♂			1	
REDH-♀				2
REDH-N				2
LESC-PR			2	2
LESC-♂			1	2
LESC-N				1
COGO-♀			1	3
BAGO-♂			1	
BAGO-♀	1	1		1
BAGO-J♀	1			
BAGO-Y	5			
BUFF-♂			3	
BUFF-J♂			1	
BUFF-♀		1		1
RUDU	6			
RUDU-PR		1		6
RUDU-♂			4	3
RUDU-♀			3	
RUDU-N				1
AMCO			10	14
AMCO-PR		3		
AMCO-♀	3			8
AMCO-N			1	
AMCO-Y	4			16
Sub-total	42	13	72	120
SORA			3	
SORA-PR				1
SPSA			1	1
GRYE-PR		1		
KILL			1	2
WISN			1	
BLTE			28	20
BLTE-N				20
BLTE-Y				9
TOTALS	42	15	106	174

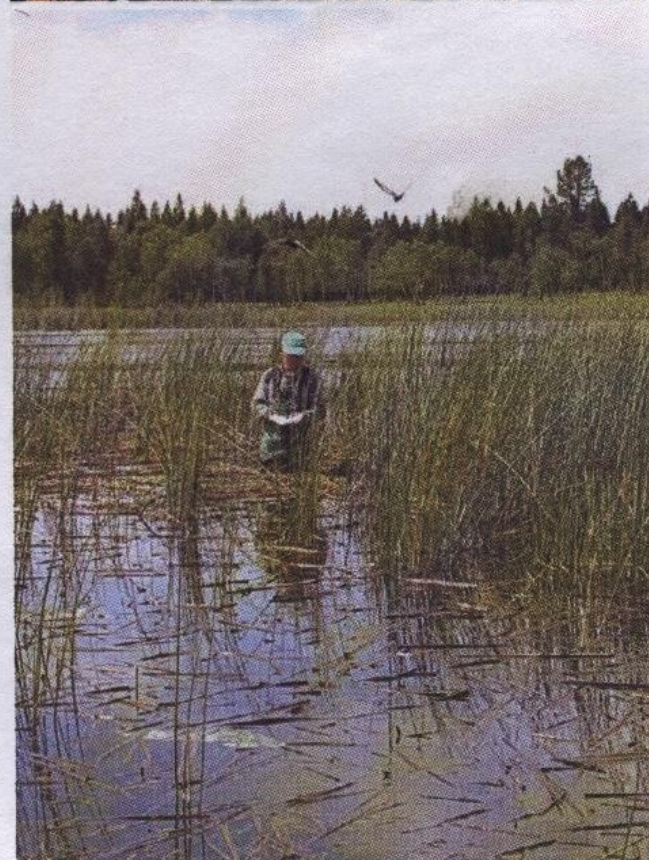
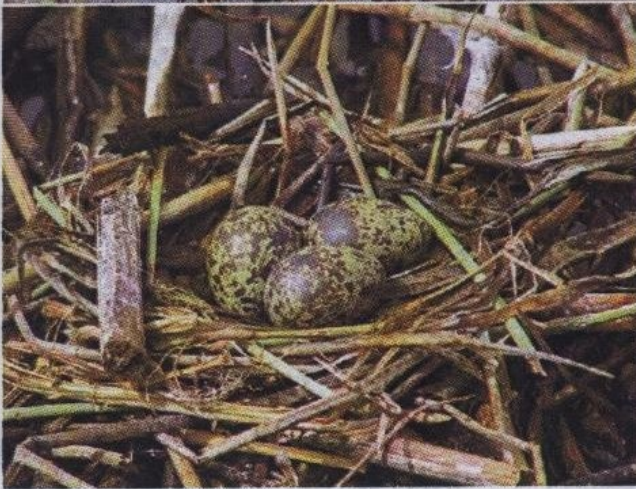
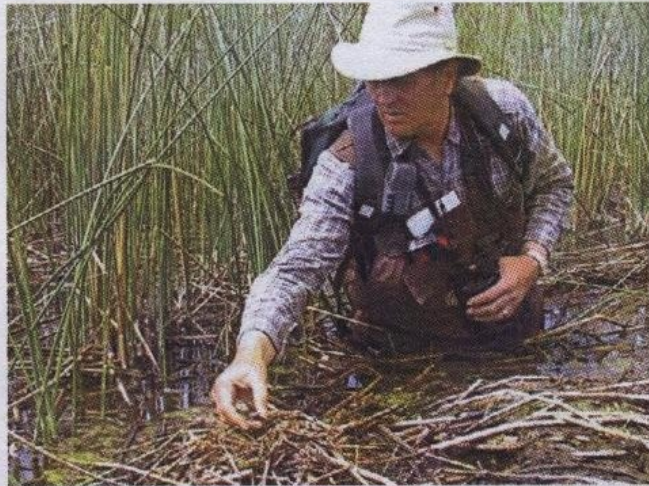
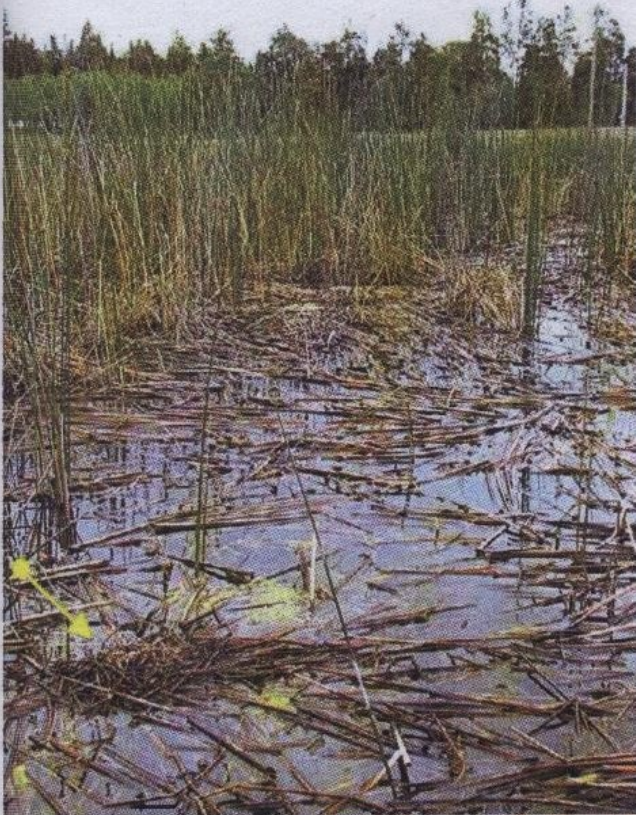
<sup>1</sup> For a key to species codes see Appendix I<sup>2</sup> For a key to species code modifiers see Appendix II**Figure 48.** American Coot nest with eggs (note two are pipping) and chick at 101 Mile Lake, 1 June 2001. Twenty-seven coot nests (8 still containing eggs or young) were found in the lake.

years; however, Ruddy Duck and American Coot (Figure 48) numbers were up.

We conducted a complete nest survey of the slough and found nests with either eggs or young of 8 species of waterbirds, including Black Tern (Figures 49 and 50b). We noted an Eared Grebe nest platform amongst the *Scirpus*; however, the water was too deep to enable us to reach the nest in our waders, so we could not check its contents. We also located a number of Yellow-headed and Red-winged blackbird nests (Figures 50c, 52 and 53). A total of 113 Yellow-headed Blackbird nests were found which included 22 nests with eggs (1E=4; 2E=3; 3E=11; 4E=4), 24 nests with nestlings (1Y=13; 2Y=7; 3Y=4), 2 nests each containing 1 egg and 2 young, 52 nests with evidence of having successfully fledged young (Figure 54), 6 newly constructed nests; and the remaining 9 nests had either been preyed upon or we could not determine their outcome. Eight infertile eggs and 10 dead young were found either in the nest or in the water below a nest. This is one of only a few Yellow-headed Blackbird colonies reported from the province with over 100 nests (Campbell et al. 2001).

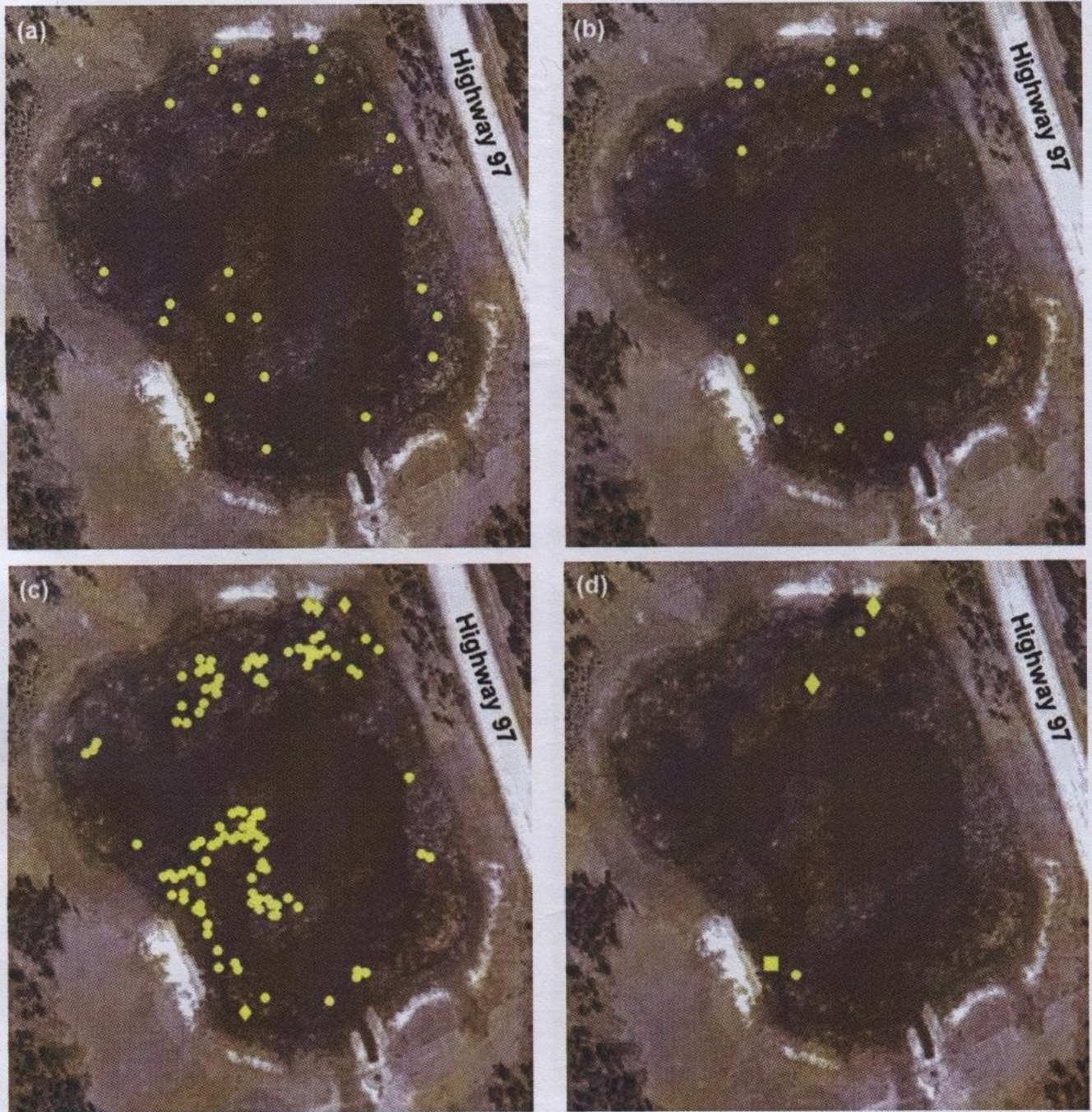
Bridge Creek Estate also worked with partners, such as Ducks Unlimited Canada and the Canadian Wildlife Service, on this project. The Estate manages the area for both waterbirds and cattle. The slough has been entirely fenced; water for the cattle is pumped from the slough to a trough outside the fenced area (Figure 54). Cattle have access to the slough once a year for 5 or 6 days in late summer after the waterbirds are off their nests (Don Savjord,





**Figure 49.** Black Tern colony at 101 Mile Lake, 20 June 2001. Clockwise from directly above: Black Tern nest with eggs (photograph taken on 31 May 2001); Black Tern nesting habitat (arrow points to nest); Neil Dawe checking Black Tern nest (Photo: J.M. Cooper); Black Tern nest with chicks (Photo: J.M. Cooper); and John Cooper being harassed by a pair of Black Terns as he checks their nest.



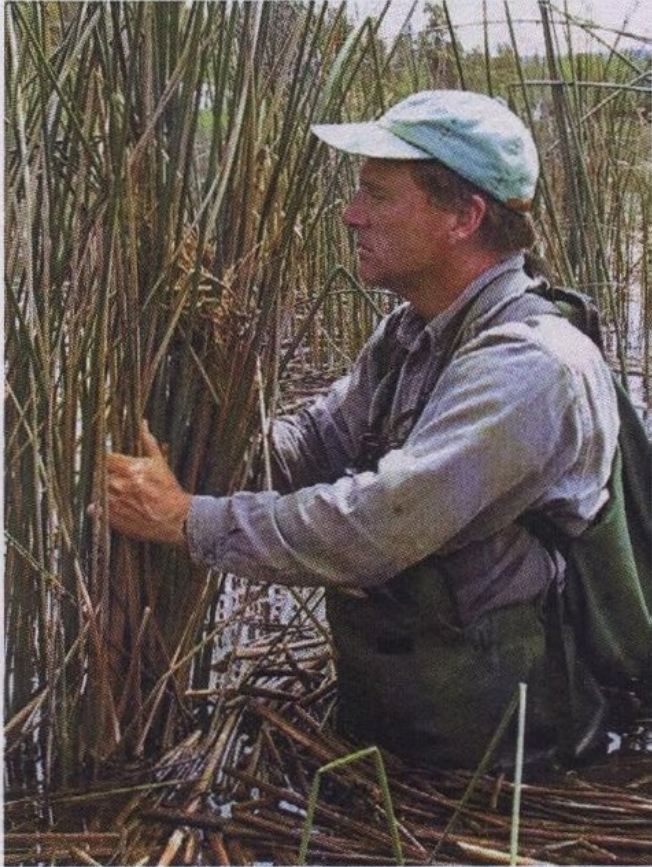


**Figure 50.** Nest distributions of 8 species on 101 Mile Lake, 20 June 2001. Nest locations were geo-referenced with a hand-held GPS unit. Species include (a) American Coot, (b) Black Tern, (c) Yellow-headed Blackbird (circles) and Red-winged Blackbird (diamonds), and (d) Pied-billed Grebe (circles), Redhead (diamonds), and Lesser Scaup (square). A Ruddy Duck egg was found in the one scaup nest.

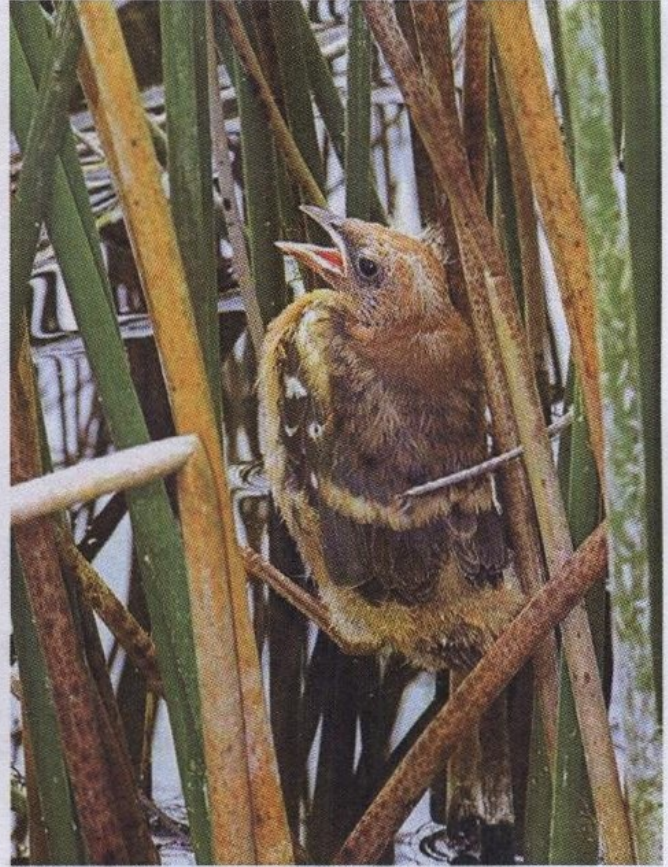


**Figure 51.** 101 Mile Lake looking northwest, 30 May 2001.





**Figure 52.** John Cooper checking contents of Yellow-headed Blackbird nest at 101 Mile Lake, 20 June 2001.



**Figure 53.** Yellow-headed Blackbird fledgling at 101 Mile Lake, 20 June 2001.

(pers. comm.). This project, similar to the one at Exeter Lake, is another example of good wetland stewardship that helps to maintain the ecosystem services that wetlands such as 101 Mile Lake provide. The value of this type of management can not be overemphasized.



**Figure 54.** Exclusion fencing and cattle trough at 101 Mile Lake, 1 June 2001.





Figure 38. 100 Mile House marsh showing some habitat characteristics and surrounding land use. Disc is location where archival photographs were taken.

### 100 Mile House marsh

This approximately 12 ha marsh is situated near the centre of 100 Mile House (Figure 38). It is bounded on the east by the Highway 97 and the town, to the north by the airport, to the west by municipal buildings and to the south by light industry. A nature trail runs along the south shore. Munro (1958) describes this breeding area as

~ A 25 acre slough, of which the central four-fifths is roundstem bulrush marsh, on the margin of 100 Mile village. In 1938 and thereabouts the slough was mostly dry and hay was cut there. It was considered to be of no value as nesting habitat. It does have value now [1958] but appears to be little used. On June 18, 1958, a pair of pied-billed grebe, black terns, yellow-headed blackbirds and red-winged blackbirds were nesting.

The emergent vegetation has changed from Munro's 1958 description to a continuous *Typha* marsh, with varying amounts of *Scirpus*, around the perimeter of the water body (Figure 39). The *Typha* band is thickest on the south shore, which has a forested edge. Nest boxes have been placed along the south shore. Much of the north and west shoreline has been planted to lawn. Some attributes of the breeding area are shown in Table 31.

DUC has undertaken management activities on 100 Mile House marsh to improve water levels and regime, increase depth and improve aquatic vegetation growth. Some nesting islands were constructed.

~ Waterbird use is now up over 600% since Munro's 1958 visit (Table 32). Canada Goose (Figure 40), Mallard, Barrow's Goldeneye and American Coot all had broods on the wetland and we also recorded Yellow-headed and Red-winged blackbirds nesting in the marsh.

Table 31. Some attributes of 100 Mile House marsh.

Attributes	100 Mile House marsh
	14-May-01
UTM 10	618015 5722458
Elevation (m)	928
pH	8.7
Temperature (°C)	12
Conductivity ( $\mu\text{mhos}\cdot\text{cm}^{-1}$ )	820
Depth (m)	1.0
Secchi Disk (m)	1.0
Area (ha)	11.1
Perimeter (m)	1304
Emergent marsh area (ha)	3.6
Open water or submergent vegetation area (ha)	7.5
Fish	No
Cattle access	No
Nest boxes present	Yes
DU Project	Yes
Residences near wetland	Yes
Recreation Area near	Yes
Light Industry	Yes
Partially filled	Yes
Boat launch	No
Biogeoclimatic Unit	IDF dk3

~ This marsh is now a productive breeding area and is particularly important, especially from a wildlife viewing and educational perspective, because it is situated within the community of 100 Mile House close to public, schools, and the Tourist Information Centre. It is an excellent example of wetland habitat with significant breeding waterbird numbers being maintained in a highly populated area. Where birds are not directly harassed and their habitat is in good shape, many acclimatise to the people and traffic. That would not apply to all species, of course; many need wild habitats and it's unlikely, for example, that Sandhill Cranes would nest under such circumstances.



Figure 39. *Typha* marsh along the north side of 100 Mile House marsh, 14 May 2001.