SPRING WATER BIRD MIGRATION AT ALKALI LAKE

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Abstract -- Water bird surveys were conducted weekly at Alkali Lake during the spring of 1991. Thirty species were encountered between 10 March and 16 June, six of which made up 81% of observations. These most common species were American Wigeon, Canada Goose, American Coot, Mallard, Lesser Scaup and Northern Pintail. Eight species were recorded on this lake during a period in which they are normally absent, scarce or uncommon in the Cariboo region. Peak migration occurred between 23 March and 27 April 1991. The highest numbers and greatest species diversity coincided on the 23 April survey. These results suggest that Alkali Lake is an important staging area in the Cariboo during spring migration and is one of the first areas of open water used by migrant water birds in this region.

Key words: Alkali Lake, Reidemann Wildlife Sanctuary, spring migration, water birds.

The Cariboo region, with its numerous ponds, sloughs and lakes, has the most concentrated waterfowl nesting habitat in British Columbia. Munro (1958) summarized and compared the status of waterfowl in this region between 1938 and 1958. He concluded that a decline was evident that could be attributed to human activities and encroachment. Recent studies by Savard (Butler and Savard 1985; Savard 1991) describe the distribution, abundance, spring migration and breeding chronologies of waterfowl in the Cariboo aspen parklands near Riske Creek.

The high waterfowl values of Alkali Lake resulted in this water body being designated by the province of British Columbia as a wildlife sanctuary. Alkali Lake was also recommended as a high priority area in the Cariboo region for development as a wildlife viewing area (Mol 1991). Although Munro (1945) and Campbell *et al.* (1990a) provided limited migration and breeding information for Alkali Lake, a systematic water bird survey had not been conducted previously on this water body during the spring migration period.

The purpose of this study was to measure the use of Alkali Lake by water birds during the spring migration period and to provide baseline data in support of potential development of this area for wildlife viewing.

STUDY AREA

Alkali Lake, located about 50 km. south of Williams Lake, is a shallow water body of about 77 ha. in area. The lake is approximately 1.6 km. long and ranges from 400 to 700 m. in width (Figure 1). It lies at an elevation of about 760 m. within the broad valley of Alkali Creek. Alkali Creek enters at the northeast end of the lake and exits at the southwest end, where it eventually drains into the Fraser River about 8 km. downstream.

The lower valley of Alkali Creek, which includes Alkali Lake, is in the very dry, warm subzone (xw) of the Bunchgrass Biogeoclimatic Zone (Meidinger and Pojar 1991) within the Fraser River Basin Ecosection (Demarchi 1995). The climate of this biogeoclimatic zone is characterized by warm to hot, dry summers and moderately cold winters with relatively little snowfall (Nicholson *et al.* 1991). A narrow fringe of emergent vegetation, consisting of cattail (*Typha latifolia*), bulrush (*Scirpus lacustris*) and sedges (*Carex* spp.) forms the lake perimeter (Munro 1945). This marsh vegetation is most extensive at the eastern, inlet, end of the lake.

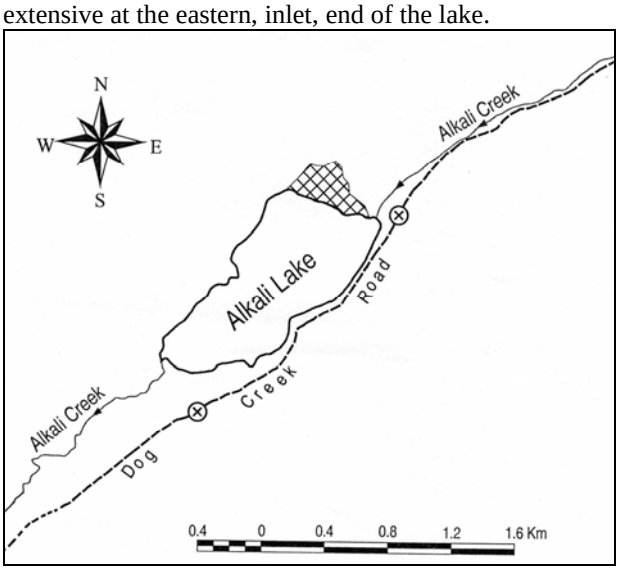

Figure 1: Alkali Lake (51^0 46' 32'' North, 122^0 16' 14'' West) and an adjacent flooded area (crosshatching) were surveyed for water birds from 10 March through 16 June 1991. Weekly surveys were made from two observation points ⊗ located along the Dog Creek Road. The crosshatched area indicates the approximate area of maximum flooding recorded in 1991.

Alkali Lake, also known as Reidemann Wildlife Sanctuary, is closed to hunting, trapping and the discharge of firearms. The sanctuary encompasses the surface area of the lake to its high water mark. A small, private float-plane base is on the north shore of this lake, where aircraft as large as the DeHavilland Beaver operate during the summer. The primary land use around Alkali Lake is cattle ranching and much of the valley bottom along the lower Alkali Creek valley is irrigated for the production of forage crops. Lands surrounding the lake are owned privately (Evans 1993).

METHODS

Alkali Lake was surveyed for water birds on 14 occasions at approximately one week intervals between 10 March and 16 June 1991. Surveys were conducted between 07:00 and 10:00 Pacific Standard Time and generally took about one hour to complete. The census area encompassed the lake surface and adjacent flooded areas. Surveys were conducted from a vehicle positioned at two primary observation points (Figure 1) along the Dog Creek Road. Water birds were censused using a variable 20 - 45X telescope on a window mount and 7 x 35 binoculars.

For the purposes of this study, water birds were defined as loons, grebes, pelicans, waterfowl (geese, swans, ducks and mergansers) and coots, but did not include waders, shorebirds, gulls, terns or marsh passerines. When conditions prevented counting (i.e. large aggregations, diving activity, etc.), numbers were estimated. Age and sex of water birds were not recorded. The amount of open water was estimated prior to ice leaving the lake.

RESULTS

Thirty species of migrant water birds used Alkali Lake for foraging and loafing during the 1991 spring. The highest species diversity (22 species) and highest total numbers (2,194 birds) coincided on 23 April (Table 1; Figure 2). Peak migration occurred between 23 March and 27 April.

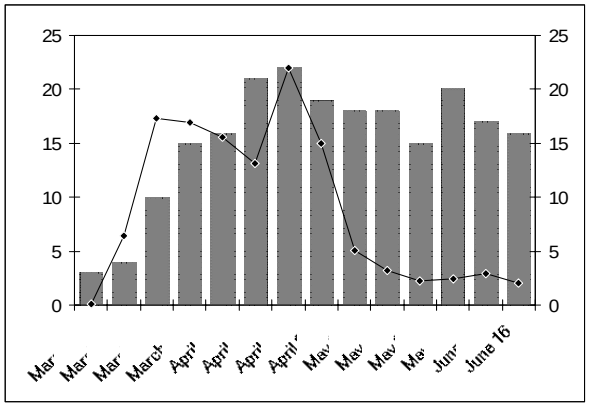

Figure 2: Comparison between the number of birds and number of species recorded by survey date. The highest count (line) and species diversity (bar) occurred on 23 April 1991.

The most abundant species, in descending order, were: American Wigeon (*Anas americana*), Canada Goose (*Branta canadensis*), American Coot (*Fulica americana*), Mallard (*Anas platyrhynchos*), Lesser Scaup (*Aythya affinis*) and Northern Pintail (*Anas acuta*) (Table 1), making up 81% of all water birds recorded on Alkali Lake during the spring of 1991. Of these species, only the Canada Goose was present throughout the census period, although Mallards, American Coots, American Wigeon and Northern Pintails were observed on nearly every count. Pied-billed Grebes (*Podilymbus podiceps*) and Greater White-fronted Geese (*Anser albifrons*) were recorded rarely.

The first spring migrants were observed on the initial 10 March survey and included Canada Goose, Northern Pintail and Common Goldeneye (*Bucephala clangula*). The first migration peak, dominated by Canada Goose, Northern Pintail, American Wigeon and Mallard, occurred on 23 March (Table 1; Figure 3). A second, larger, peak occurred on 23 April and was composed primarily of American Wigeon, American Coot, Lesser Scaup and Mallard.

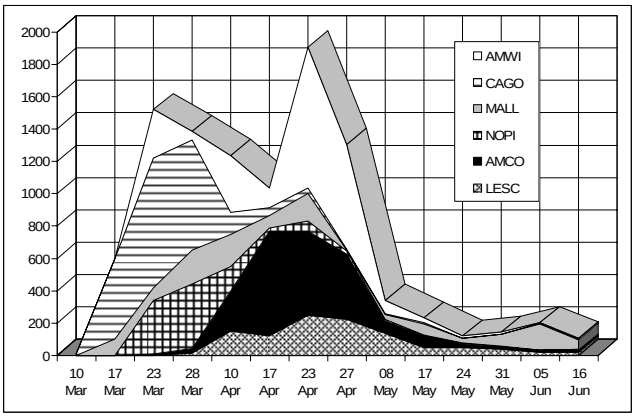

Figure 3: Migration chronology of the six most abundant water birds recorded at Alkali Lake during the spring of 1991.

Peak abundance for the six most common species occurred as follows: American Wigeon (23 March to 27 April), Canada Goose (17 March to 10 April), American Coot (10 to 27 April), Mallard (17 March to 23 April), Lesser Scaup (10 April to 8 May) and Northern Pintail (27 March to 10 April) (Table 1).

The arrival dates for most water birds (21 of 30 species) occurred between 23 March and 17 April, and averaged five new species per survey week during that period. Early arriving species, including Tundra Swan (*Cygnus columbianus*), Common Goldeneye, Hooded Merganser (*Lophodytes cucullatus*) and Common Merganser (*Mergus merganser*) were not recorded after 23 April. The latest arriving water birds were Horned Grebe (*Podiceps auritus*), American White Pelican (*Pelecanus erythro-rhynchos*), Blue-winged Teal (*Anas discors*) and Surf Scoter (*Melanitta perspicillata*), all of which appeared on or after 23 April. No new species were recorded after 24 May.

On the initial survey on 10 March, open water on Alkali Lake was confined to a small area at the outlet and was estimated to be less than 3 m. in diameter. From 17 to 23 March, open water of roughly 5 m. diameter was at both the lake inlet and outlet (Figure 4). By 28 March, spring run-off had raised water levels, creating a narrow fringe of

TABLE 1

NUMBERS OF EACH WATER BIRD SPECIES BY SURVEY DATE RECORDED AT ALKALI LAKE FROM 10 MARCH TO 16 JUNE 1991

Species Code [1]	March				April				May				June		Total
	10	17	23	28	10	17	23	27	8	17	24	31	5	16	
COLO	0	0	0	0	0	10	1	1	0	0	3	2	2	4	23
PBGR	0	0	0	1	0	0	0	0	0	1	0	0	0	0	2
HOGR	0	0	0	0	0	0	5	5	2	0	0	0	0	0	12
RNGR	0	0	0	0	0	20	70	20	29	28	26	24	26	38	281
EAGR	0	0	0	0	0	2	4	0	0	4	0	4	0	0	14
AWPE	0	0	0	0	0	0	1	1	0	0	2	10	11	6	31
GWFG	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
CAGO	6	500	800	680	136	50	38	2	2	9	1	3	2	5	2,234
TUSW	0	10	132	115	32	0	1	0	0	0	0	0	0	0	290
GADW	0	0	0	0	0	6	12	7	15	13	0	8	3	5	69
EUWI	0	0	0	1	1	0	1	2	0	0	0	0	0	0	5
AMWI	0	0	300	50	350	120	870	650	84	28	12	11	4	7	2,486
MALL	0	100	80	210	200	75	170	8	30	68	30	73	160	60	1,264
BWTE	0	0	0	0	0	0	0	2	1	0	15	15	15	0	48
CITE	0	0	0	0	0	1	5	2	6	3	14	5	6	6	48
NOSL	0	0	0	0	1	0	10	19	20	18	10	7	10	9	104
NOPI	2	0	330	400	150	20	60	20	9	2	3	5	3	0	1,004
GWTE	0	0	30	150	0	2	40	60	43	2	0	16	6	11	360
CANV	0	0	1	9	63	35	4	0	0	2	0	1	0	0	115
REDH	0	0	0	0	6	20	0	0	2	0	0	0	0	3	31
RNDU	0	0	14	0	130	20	70	20	12	4	11	2	7	4	294
LESC	0	0	0	14	150	120	250	225	135	49	47	38	20	21	1,069
SUSC	0	0	0	0	0	0	0	0	0	0	21	2	2	0	25
BUFF	0	0	0	11	30	60	10	19	11	4	1	0	0	0	146
BAGO	0	0	0	0	0	10	2	0	2	1	0	2	0	1	18
COGO	2	30	32	22	30	10	0	0	0	0	0	0	0	0	126
HOME	0	0	0	2	13	6	0	0	0	0	0	0	0	0	21
COME	0	0	0	0	20	15	0	0	0	0	0	0	0	0	35
RUDU	0	0	0	0	0	60	50	37	23	14	3	4	6	11	208
AMCO	0	0	10	30	250	650	520	400	80	75	27	14	13	16	2,085
Total Birds	10	640	1,729	1,696	1,562	1,312	2,194	1,500	506	325	226	246	296	207	**12,449**
Number of Species	3	4	10	15	16	21	22	19	18	18	16	20	17	16	**30**

[1]AMCO = American Coot
AMWI = American Wigeon
AWPE = American White Pelican
BAGO = Barrow's Goldeneye
BUFF = Bufflehead
BWTE = Blue-winged Teal
CAGO = Canada Goose
CANV = Canvasback
CITE = Cinnamon Teal
COGO = Common Goldeneye
COLO = Common Loon
COME = Common Merganser
EAGR = Eared Grebe
EUWI = Eurasian Wigeon
GADW = Gadwall
GWFG = Gtr. White-fronted Goose
GWTE = Green-winged Teal
HOGR = Horned Grebe
HOME = Hooded Merganser
LESC = Lesser Scaup
MALL = Mallard
NOPI = Northern Pintail
NOSL = Northern Shoveler
PBGR = Pied-billed Grebe
REDH = Redhead
RNDU = Ring-necked Duck
RNGR = Red-necked Grebe
RUDU = Ruddy Duck
SUSC = Surf Scoter
TUSW = Tundra Swan

open water around the lake perimeter and flooding an adjacent field at the inlet of the lake. By 10 April, open water at the inlet and outlet had increased to about 3 ha. and 4 ha. in size respectively. The lake was open and free of ice by 17 April.

Figure 4: Small areas of open water were the focal points of all water bird activity during the early spring of 1991 (Alkali Lake inlet, 23 March 1991).

DISCUSSION

Early Migrant Observations

Eared Grebe (*Podiceps nigricollis*), Northern Pintail, Blue-winged Teal and American Coot were all observed earlier than they normally occur in the Cariboo region (Roberts and Gebauer 1992). Two Blue-winged Teal observed on 27 April were recorded one day earlier than any prior record for the Cariboo. Eurasian Wigeon (*Anas penelope*), considered scarce during any time of year in this region, were observed on four occasions between 28 March and 27 April. Northern Shovelers (*Anas clypeata*), Green-winged Teal (*Anas crecca*), Canvasbacks (*Aythya valisineria*), Redheads (*Aythya americana*) and Ring-necked Ducks (*Aythya collaris*) were all observed during the period in which they are considered *uncommon* in the Cariboo.

Roberts and Gebauer (1992) consider the Greater White-fronted Goose to be a *casual* species in the Cariboo, having been observed on only five occasions previous to this survey. One of these records was of seven birds recorded on Alkali Lake on 19 May 1946 (Campbell *et al.* 1990a). However, the single Greater White-fronted Goose recorded on the 28 March survey was earlier than any prior record for the Cariboo.

Ice Melt Chronology

Lakes and streams within the Bunchgrass Biogeoclimatic Zone are among the first areas in the southern and central interior to have open water in spring (Nicholson *et al.* 1991) and thus are important for migrating waterfowl. Savard (1991) observed that the lakes in his study area nearest to the Bunchgrass zone were the first to become ice-free. He also noted that waterfowl concentrated on these lakes prior to other water bodies becoming free of ice. In the spring of 1991, Alkali Lake was one of the first water bodies in the Cariboo with open water and to be used by migrant water birds (personal observation).

During the initial, 10 March, survey, a small area of open water was observed near the lake outlet. On the 17 and 23 March surveys, small areas of open water were noted at both the inlet (Figure 4) and outlet of the lake. A similar melt pattern was recorded during the spring of 1977, when Redheads, Ring-necked Ducks, Buffleheads (*Bucephala albeola*) and Common Goldeneyes were observed on 2 April in small ice-free areas at each end of Alkali Lake (Campbell *et al.* 1990a). During the spring of 1991, these small ice-free areas were the focus of all water bird activity and remained so until about 28 March, when the lake level rose. At that time, a fringe of open water opened around the marshy perimeter of the lake and flooded into a field at the northeast end (Figure 1) offering significantly more areas for water bird use. At that time, I noted that Canada Geese, Tundra Swans and dabbling ducks favoured these shallow flooded areas, whereas loons, grebes, diving ducks, mergansers and coots remained in the deeper, open areas of the lake.

The early snow melt of the Alkali Creek valley and subsequent open water on Alkali Lake appeared to be important to spring migrants, in particular early migrants, such as Canada Goose, Tundra Swan, Mallard, Northern Pintail and Common Goldeneye. Several spring migrants, notably Mallards and Northern Pintails, are known to exploit the first areas of open water in early spring (Bellrose 1978; Butler and Savard 1985). Throughout March, Canada Geese appeared to use this lake primarily for loafing, whereas they foraged mainly on the snow-free agricultural fields that were adjacent to the lake.

Timing of Spring Migration

Savard (1991) found that spring migrants had usually left his study area in the Riske Creek area by mid-May, but noted that migration and breeding chronology varied among years, depending on weather and spring thaw conditions. The results of this survey indicate that most migrants also leave Alkali Lake by the mid-May period. The large numbers of Mallards recorded on 5 June (Table 1) was attributable to a pre-moult aggregation of males and was not considered to be part of the spring movement.

The nearest climate station to Alkali Lake is at Winegrass Ranch, located nearby on the lower Chilcotin River. A comparison of the 1991 spring with long-term records from this station show that mean monthly temperatures were below normal for March, but near normal for April through June (Figure 5). The month of February preceding this survey was considerably milder than normal and may have initiated an early migration for some early spring migrants. However, in general these

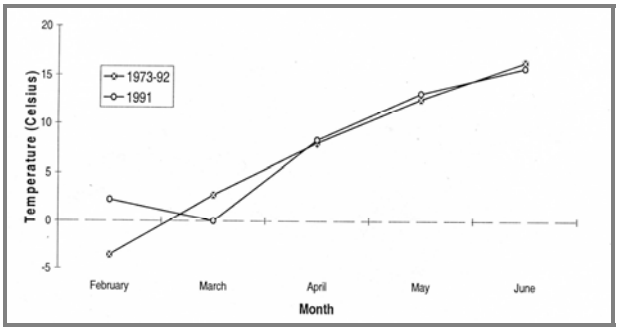

Figure 5: Comparison of the mean monthly temperatures (February - June) for Winegrass Ranch weather station for 1991 and the period 1973-1992.

data suggest that typical spring weather occurred in 1991. Therefore, the timing of spring migration was also presumably near normal.

American White Pelican

The American White Pelican, first observed on 23 April, was the only B.C. Red-listed (endangered or threatened) species recorded during these surveys (Fraser *et al.* 1999). The earliest spring record for Alkali Lake is 14 April 1958, when 55 pelicans were observed (Campbell *et al.* 1990a). Wood (1990) also reports that pelicans first arrive at this lake in mid-April, but provides no specific records or dates.

Wood (1990) suggests that Alkali Lake is used as a spring stop-over point for pelicans migrating to their breeding colony on Stum Lake. This seems probable, as the lake is situated along their migration route through the southern interior and April observations coincide with the spring migration period of this species.

Piscivorous Water Birds and Fish

Wood (1990) has documented the importance of Alkali Lake for summer foraging of the American White Pelican. Other piscivorous water birds recorded during my 1991 survey included Common Loon (*Gavia immer*), Red-necked Grebe (*Podiceps grisegena*), Hooded Merganser and Common Merganser. The presence of all these species suggests that Alkali Lake is important for piscivorous migrants.

Munro (1945) noted that "lake shiners and probably other fishes" were present in Alkali Lake. Although her surveys were not exhaustive, Wood (1990) reported Redside Shiners (*Richardsonius balteatus*), Lake Chubs (*Couesius plumbeus*) and Rainbow Trout (*Salmo gairdneri*) in this lake. A thorough inventory is still required to document fully the fish species community and productivity in this lake.

Other Noteworthy Species

Other noteworthy species during these surveys include American Bittern (*Botaurus lengitinosus*), Bald Eagle, (*Haliaeetus leucocephalus*), Ring-necked Pheasant (*Phasianus colchicus*), Black-necked Stilt (*Himantopus mexicanus*), Long-eared Owl (*Asio otus*) and River Otter (*Lontra canadensis*) (Stewart 1991). Campbell *et al.* (1990b) describe the Black-necked Stilt as a *very rare* spring migrant in British Columbia. At the time of this survey the lone stilt observed on 31 May was the latest record for this species in British Columbia. On 10 April, six Bald Eagles were observed around the lake. The behaviour of these eagles, as well as the presence of "feather piles" on the ice, suggested that they were preying upon or scavenging water birds.

Spring Wildlife Viewing Opportunities

Mol (1991) ranked Alkali Lake as one of the highest priority areas for the development of Wildlife Viewing in the Cariboo region. She determined that the feature attraction at this readily accessible lake was the American White Pelican, which forages here from late June through July. At the time of her work very little specific water bird information was recorded for this water body, as reflected in her sparse inventory data. Evans (1993) outlined a preliminary wildlife viewing development plan and noted a variety of viewing opportunities, including such spring migrants as Tundra Swan and Canada Goose.

The results of this survey demonstrate that Alkali Lake provides excellent opportunities for observing water birds. Early records suggest that this is one of the first locations in the Cariboo used by early spring migrants. Impressive numbers of water birds concentrated into small areas of open water, such as at the lake inlet, can be expected during mid- to late March. The viewing site recommended by Evans (1993) near the eastern end of the lake provides one of the best vantages for viewing spring migrants (Figure 4). Though not the most numerous, the Tundra Swan is never-the-less one of the most impressive spring migrants found on this lake. Opportunities to view regionally scarce species, such as Greater White-fronted Goose and Eurasian Wigeon, also appear to be excellent.

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