# The Long-billed Curlew in the East Kootenay and Creston Valley.

by

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for

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and the Wings over the Rockies Festival Society

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## 1.0 INTRODUCTION

The Long-billed Curlew, *Numenius americanus*, is Blue-listed in British Columbia and designated as "Vulnerable" nationally (COSEWIC 2002, Conservation Data Centre 2002). This large shorebird (family: Scolopacidae) nests in open grasslands and numbers have decreased in the United States and Canada during the last century (De Smet 1992) due, in part, to conversion of grasslands to crops, and urban development. In British Columbia, Long-billed Curlews breed in the East Kootenay Trench, in the Chilcotin west of Williams Lake, near Kamloops, at McBride, and in the Nicola, Okanagan and lower Similkameen valleys (Fraser et al. 1999, Cannings 1999, Ohanjanian 1987). Although breeding has not been confirmed at Creston, adult pairs have been observed there during the nesting season (Ohanjanian and Beaucher 2002).

Nesting areas in the East Kootenay have been identified in a series of studies which began in 1985 (Ohanjanian 2001, 1992, 1985). Additional inventory work was carried out in 2002 (Ohanjanian and Beaucher 2002). During that project, reports of sightings of Long-billed Curlews were obtained from a variety of sources, including the Rocky Mountain Naturalists, the B. C. Forest Service, and provincial biologists. The focus of the current project was to examine those reports during the 2003 breeding season, and to continue to collect information on numbers and distribution of these birds in the East Kootenay and Creston. Land status of areas of use, as well as threats and recommendations for management, were also investigated.

# 2.0 STUDY AREA

This project took place in two study areas in southeastern British Columbia: the East Kootenay Trench and the Creston Valley. In the East Kootenay, Long-billed Curlews occupy benchlands and valley bottoms that are in the dry hot variant of the Ponderosa Pine Biogeoclimatic zone (PPdh2) (Braumandl and Curran 1992). Summers are very hot and dry, and snow accumulations are low in winter (Braumandl and Curran 1992). Annual precipitation is only 35 cm (14") with most of the rain falling in June (Kemper 1971). In winter, outbreaks of cold Arctic air from the sub-boreal regions of the province move down the Trench; winters may be cold and snowfall light (Demarchi 1996). Soils are comprised of deep deposits of soils and gravels of glacial origin with some eolian (wind-deposited) veneers (Braumandl and Curran 1992). Climax vegetation in this zone consists of stands of Bluebunch Wheatgrass (*Agropyron spicatum*). As cattle grazing has historically been intense, however, Junegrass (*Koeleria macrantha*) and Needle-and-thread Grass (*Stipa comata*) predominate on most sites. Common forbs include Yarrow (*Achillea millefolium*), Rosy Pussytoes (*Antennaria microphylla*) Narrow-leaved Desert Parsley (*Lomatium triternatum*) and Shaggy Fleabane (*Erigeron pumilus*). Ponderosa pine and Douglas fir stands occur as well which, in the absence of the natural fire cycle, have encroached and reduced the size of the grasslands in some locales. The elevation of the East Kootenay study area vaires from approximately 850 to 950 m.

The Creston study area is in the dry, warm variant of the Interior Cedar Hemlock Biogeoclimatic zone (ICHdw) (Braumandl and Curran 1992). Situated on the Kootenay River floodplain between the Selkirk Mountains to the west and the Purcell Mountains to the east, much of the Creston Valley has been highly modified for agricultural production by a major network of dykes. In some areas, cottonwood trees (*Populus trichocarpa*) can be found on the banks of the Kootenay River, however, most riparian and marsh vegetation has been largely

eliminated and replaced with cropland. The exceptions to this are in the Creston Valley Wildlife Management Area to the north of the study area, and the wetlands of the Lower Kootenay Band to the south. The elevation is approximately 530 m and the climate is characterized by moist, hot summers and relatively mild winters with a shallow snowpack.

# 3.0 METHODS

Surveys to detect Long-billed Curlew nesting areas were conducted between April 1 and July 31, 2003. In Creston, surveys were carried out by systematically driving roads on the flats between 7 a.m. and 12 p.m. In the East Kootenay, open grasslands and the shores of Lake Koocanusa were surveyed with spotting scopes. Areas included Wycliffe Prairie, three sites on Lake Koocanusa (Kerr Road, the Wardner Bridge, and Gold Creek), Cutts Road (south of Sheep Mountain), Bagley's seeding (crown land west of the Tobacco Plains Indian Reserve), Bummer's Flats and Skookumchuck/Wasa. At Skookumchuck, the grasslands were scanned using a spotting scope for a specified duration at 28 pre-determined stops along a transect developed in 1985 by Ohanjanian (1985) (see Appendix A). The starting point was staggered for each survey (n = 4). The number of birds, their sex, and activity were recorded. Males were distinguished from females by their shorter culmen length; bills may reach a length of up to 196 mm in females and 140 mm in males (Jenni et al. 1982).

Breeding territories were also located using the spot-mapping method (Kendeigh 1944; Redmond et al. 1981) in which aspects of curlew behavior, such as Undulating Flight Displays (UFD's), aerial pursuits, and displacement feeding at defended borders, indicate the presence of nesting territories. A nesting territory was considered to be occupied if a pair was observed in the same area twice on different dates, if seen copulating, making a nest scrape, or engaging in territorial defense. Undulating flight displays (UFDs) were noted, but because unmated males may continue to do these throughout the breeding season, these displays were not considered indicative of a breeding pair unless a female subsequently arrived on the territory. Weather conditions at the start of each survey were recorded and include percent cloud cover, temperature (degrees Celsius) and wind speed (Beaufort Scale). No surveys were carried out if visibility was likely to be obscured by rain or wind. The number of birds seen and their activities were recorded. The locations of nesting pairs are presented on 1:50,000 maps in the body of the report.

All sites were re-visited during the brood-rearing period. Long-billed Curlews engage in cooperative mobbing behavior. Males without chicks will take part, but only those females with broods will do so (Redmond et al.1981). If males are counted this may seriously overestimate the number of broods. Furthermore, females may leave the broods part way through brood-rearing, leaving the male to attend chicks. In the present study therefore, pairs were considered successful if a) females mobbed or b) chicks were seen with a single male. Productivity was measured as the percent of nesting pairs known to fledge $\geq$ 1 chick. Locations of broods are presented on 1:20,000 maps, along with the UTM coordinates (NAD 83) in Appendix B.

Habitat attributes of newly discovered occurrence sites were described and include range condition, the dominant grass species, a partial floristic list and percent bare ground. Land status of new sites was determined and a table summarizing the status of all known nesting areas has been included in the report. A photographic record of the rising water level of the reservoir is included, along with an assessment of its effects on nesting Long-billed Curlews. Potential

causes of poor productivity are examined, and recommendations for habitat management, access and future study have been made.

# 4.0 RESULTS

## 4.1 East Kootenay

### 4.1.1 New occurrences

In 2003, three new nesting areas were discovered in the East Kootenay. These were at the Wardner Bridge (Site WB), south of Cutts Road near the Elk River (Site CR) and on Porteous Road at Wycliffe (Site PO) (Fig. 1).

Wardner Bridge Curlew Nesting Area

The Wardner site (WB) is located on crown land on the Kootenay River floodplain, south of the bridge on Highway 3 (Fig. 2). It is affected by the manipulation of flows out of the Libby Dam downstream, and the site can flood. Three pairs established nesting territories and incubated nests (Fig. 2). Undulating flight displays (UFDs) were performed by at least one additional male; this male likely attracted a mate, however chicks were not produced.

Pre-copulatory behavior was observed on May 4 and May 6. On June 6, Pair A, the most northerly pair, were observed with 2 chicks. Two males were also seen near this brood in addition to the parents. When the site was next visited two days later, neither of these chicks were present. Pair B, the central pair, were observed with 3 chicks on June 6. On June 10, Pair B had only 2 young remaining. The last date on which the female was seen with the brood was on June 21, and the male alone guarded the young until both chicks fledged on July 9. The nest belonging to Pair C, the southernmost pair, was found on June 6, and the adults were regularly observed incubating until June 17 (Fig. 3). On June 21, egg fragments indicated that the chicks probably hatched. Subsequent observation, however, revealed no chicks nor adults, suggesting that the brood may have been lost within 24 – 48 hours. The cause of mortality is not known.

**Table 1. Long-billed Curlew broods at the Wardner Bridge nesting area**

| Brood | Location | Date hatched | No. fledged |
|---|---|---|---|
| Pair A | At north end of area, adjacent to bridge | June 3 to 5 | 0 |
| Pair B | Central area, between dugout and treed "island" | June 3 to 5 | 2 (July 9) |
| Pair C | At south end of tree "island" | June 18 - 20 | 0 |

Water levels rose shortly after the first two broods hatched, flooding much of the area as early as mid-June (See below: Threats). The land occupied by Pair B included a raised feature which became an island prior to the young fledging (Fig. 2). This "island" had a few scattered trees on it and became a refuge when all other land was under water. The third pair's nest was located at the south end of this feature, and the slightly raised elevation allowed them to continue to incubate (Fig. 3). The water reached to within 30 m of the nest.

Habitat in the Wardner Bridge nesting area consists of large areas of domestic grass, primarily couch grass (*Agropyron repens*). Kentucky bluegrass (*Poa pratensis*) is present and Canada bluegrass (*P. comperssa*), rose (*Rosa sp*), and needle-and-thread grass (*Stipa comata*) as well as scattered ponderosa pine trees (*Pinus ponderosa*) are found on the edge of the native grassland "island". The percentage of bare ground is highly variable, ranging from 30% to 70%.

**Figure 1. Long-billed Curlew nesting areas newly discovered in the East Kootenay in 2003**

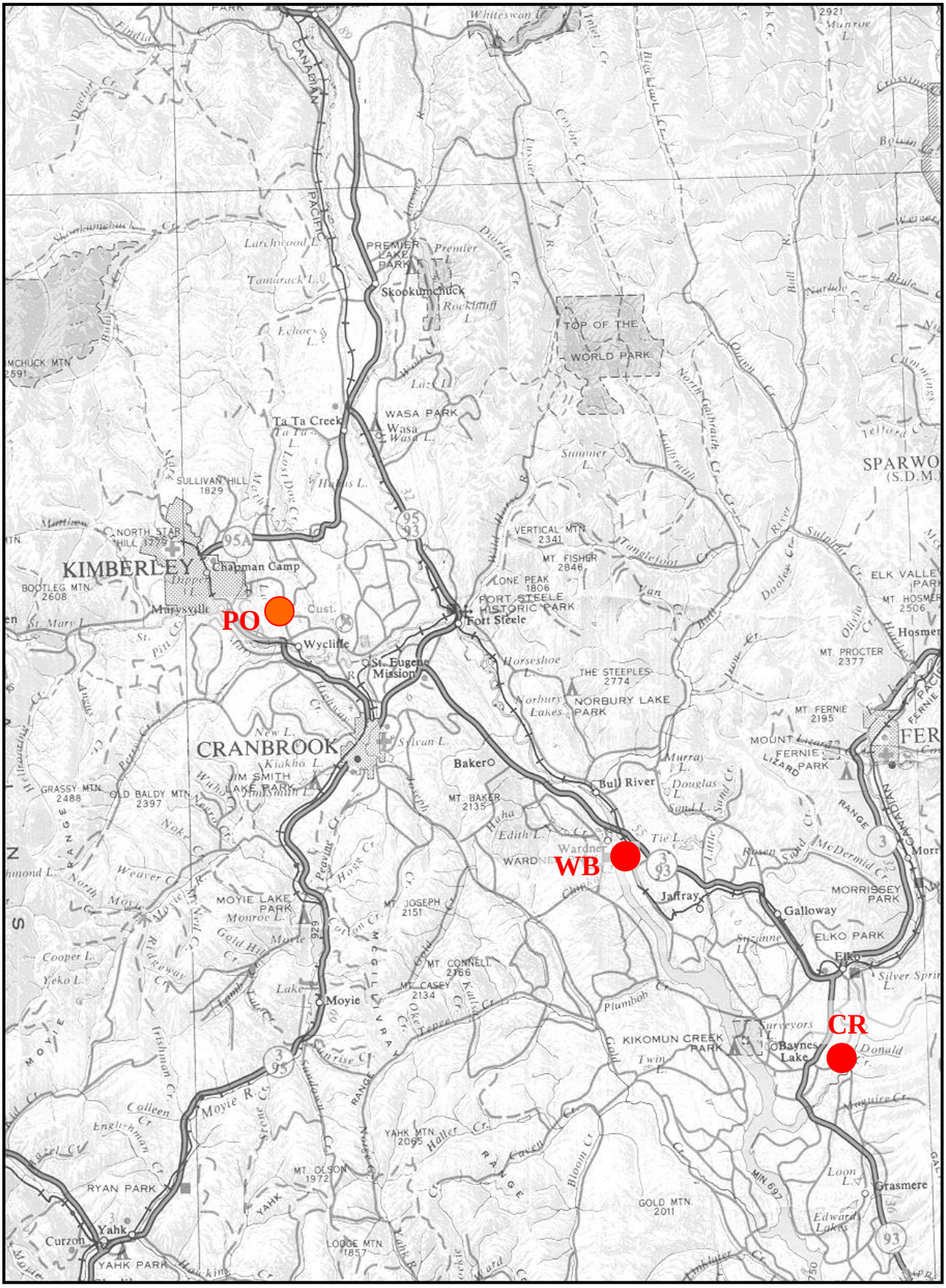


**Figure 2. Long-billed Curlew nesting area (Site WB) south of Wardner Bridge (2003)**

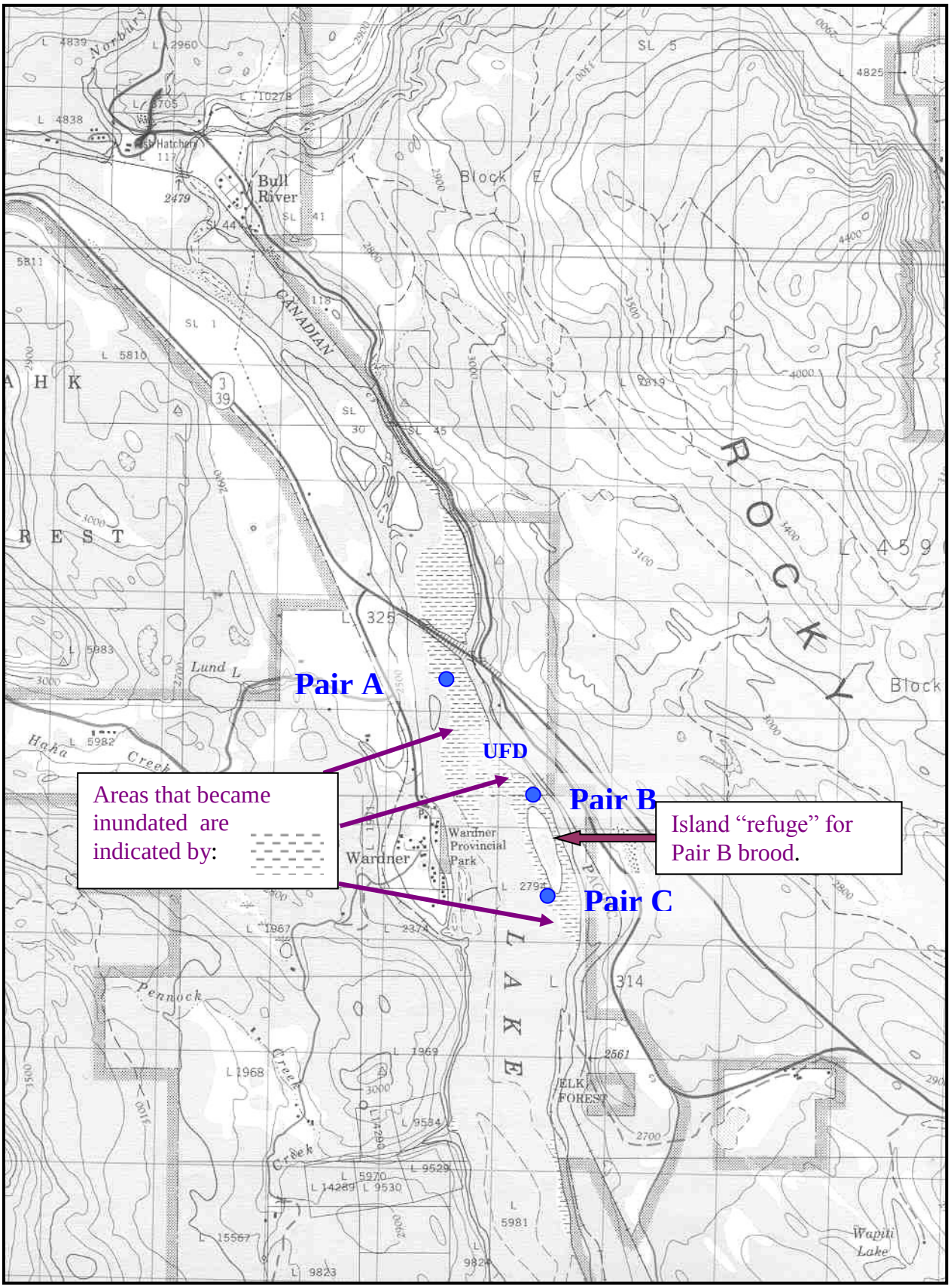


**Figure 3. Long-billed Curlew nest at Wardner Bridge nesting area, June 2, 2003**

Cutts Road Nesting Area (Site CR)

One pair of Long-billed Curlews (CR Pair A) nested successfully on a dry grassland bench off Highway 93, 2-3 km northeast of the Elk River bridge (Figs. 1 & 4). This nesting area was discovered after chicks had hatched; it is not known, therefore, how many pairs occupied the area initially. During the brood rearing period, a single, unmated male was present in addition to the parents. Two young fledged between July 4 and July 7. The female was no longer seen after June 22, and the male alone guarded the chicks until fledging.

The majority of land at this site is crown; a small area of private land impinges on the east side of the opening. The habitat consists of a large opening on a flat bench, with low profile, native grassland vegetation (Fig. 5). The dominant species is Canada bluegrass (*Poa compressa*) with needle-and-thread grass (*Stipa comata*), some spreading needlegrass (*Stipa richardsoni*), arnica (*Arnica fulgens*) and the occasional prairie rose (*Rosa woodsii*). Percent bare ground (including cryptogamic crust) was about 40%. To the west, the opening slopes downhill. There is a higher shrub component with bluebunch wheatgrass (*Agropyron spicatum*) on this slope; Long-billed Curlews appeared to confined their activities to the flat bench above.

**Figure 4. Location of nesting pair at Cutts Road nesting area in 2003**

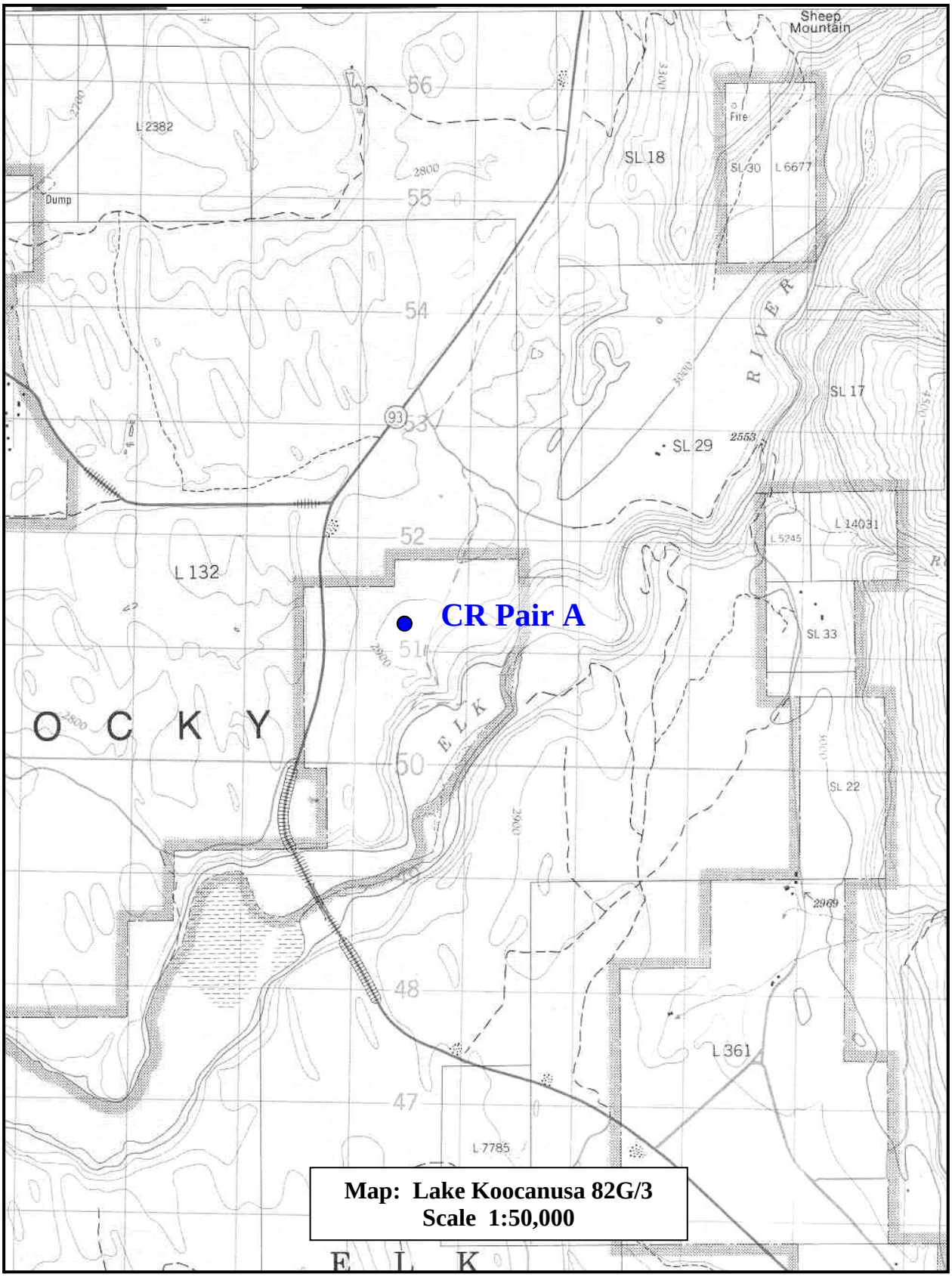


**Figure 5. Cutts Road Long-billed Curlew nesting area**

Wycliffe / Porteous Road Nesting Area (Site PO)

One Long-billed Curlew pair nested on private land on the south side of Porteous Road in Wycliffe (Fig. 6). No young were produced in 2003. A local resident reports that, in 2002, two pairs were present, and that adults dive-bombed intruders (Glen Stewart, pers. comm). This suggests that young were produced in that year. He also reports that the first year they were seen was 2001, indicating that this is a new nesting area into which Long-billed Curlews have recently expanded.

The Porteous Road site is on private land. The vegetation is a mixture of native and domestic species, of varying heights. Tall residual forbs dominate most of field, and the curlews were observed in an area of low profile grass. It is highly subject to disturbance as there are numerous small landholdings (ranchettes) in the area, and a dog were observed running 200 m from the nesting area during the incubation period. There were other reports of Long-billed Curlews flying over Wycliffe in 2003, most particularly over Clearview Acres (M. McPhail, U. Korb, pers. comm.), and of two pairs landing in hayfields at Pine Butte Ranch on April 15 (H. McLuckie, pers. comm.). There is some good potential habitat in a field on Pighin Road (Fig. 6). It is on private land adjacent to a Wildlife Corridor, and was surveyed three times in 2003. No curlews were seen.

Wycliffe Prairie is a large area, with numerous private land owners and rolling topography. It is possible that other nesting areas exist or may become established over the next few years. The "mystery" of the Wycliffe Long-billed Curlews could form the basis of a community stewardship initiative in which local land owners embark on a project to determine where the birds are and implement suitable management strategies to support them.

4.1.2 Established Nesting Areas

Skookumchuck and Wolf Creek Road

Seventeen Long-billed Curlew territories were found in the Skookumchuck / Wolf Creek Road Nesting area (Fig. 7). Seven were on Crown Land, five on private land and five encompassed both crown and private. One territory that had supported a nesting pair in 2001 and 2002 (Ohanjanian 2001, Ohanjanian and Beaucher 2002) was not occupied; it had been on private land, on the west side of Highway 93/95 (Fig. 7). Reed pasture (to the west in Fig. 7) had no pairs in 2000 (Ted Antifeau, pers. comm.) nor in 2001, but was re-occupied in 2002. A pair was again at this location in 2003.

Productivity in the Skookumchuck nesting area was very poor in 2003. Of the seventeen territories that were occupied only two broods are known to have hatched (11.8%) One of these broods (located on private land adjacent to Foster pasture) disappeared one to two days after hatching. The second brood, on crown land in Reed pasture, disappeared one week prior to fledging on July 2.

**Figure 6. Location of Wycliffe – Porteous Road nesting pair (2003)**

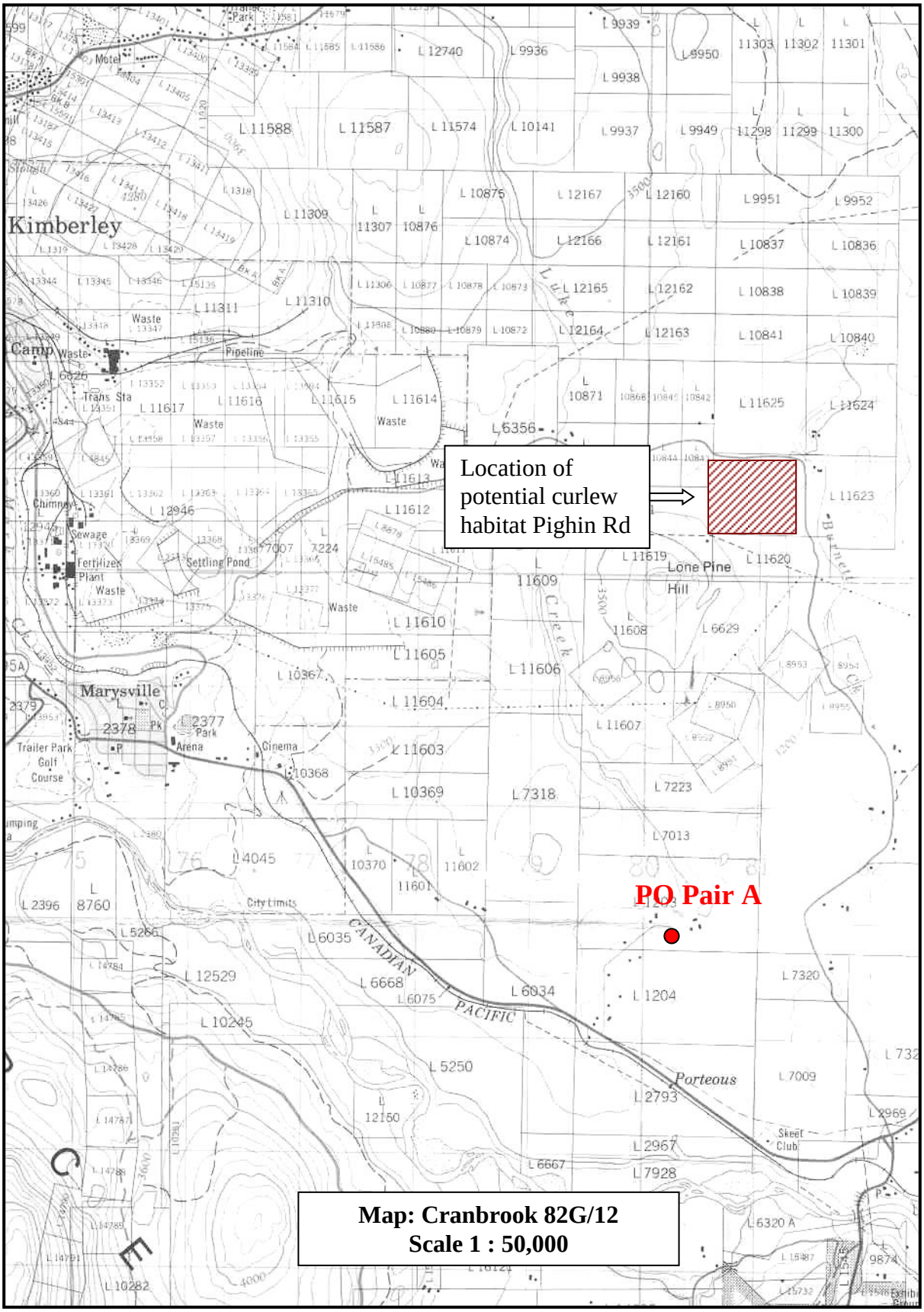
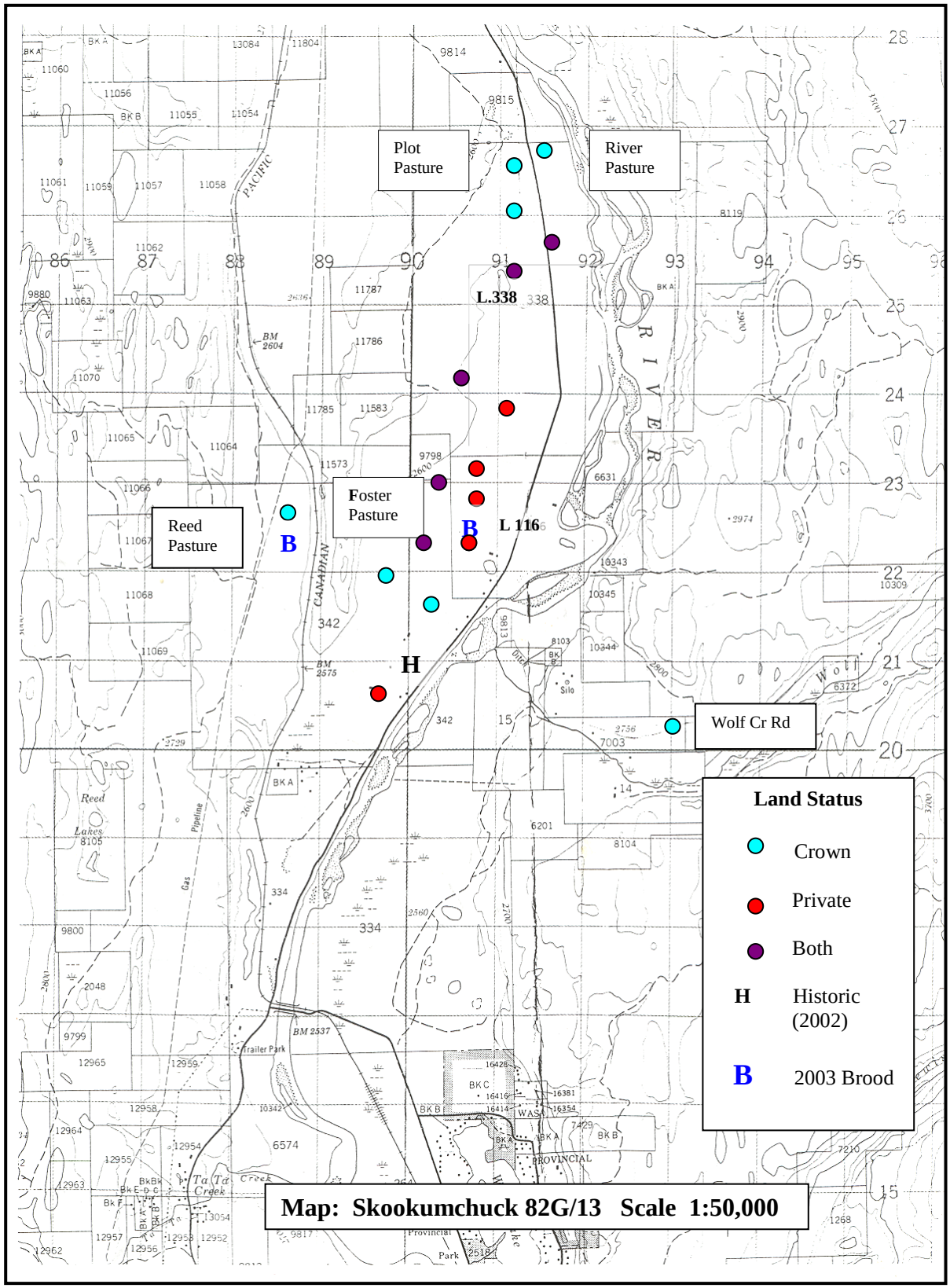


**Figure 7. Locations of Long-billed Curlew pairs at Skookumchuck Prairie and Wolf Creek Road**



Kerr Road (Baynes Lake)

The Kerr Road site is located near Baynes Lake on the east shore of Lake Koocanusa (Fig. 8). Although a large number of male birds were seen at this site (on May 20, ten males were observed, including four who were performing UFDs) the maximum number of females observed during all surveys (n = 16) was only four (Fig. 9). Four pairs are known to have incubated nests, three on crown land and one on private land. (A fifth territory may have been present, but could not be confirmed). On June 1, copulation and scrape building was observed at the southern end of the site (Pair A). By June 12 the water of the reservoir had risen and now covered the precise area in which the nest building had occurred (Fig. 10). Only Pair D (the northernmost pair) produced chicks. This pair's territory was on private pastureland and above the flood level. Although the exact locations of the nests of Pairs B and C were not pinpointed, their territories encompassed the land that subsequently became inundated. It is highly probable that these birds' nesting also failed due to flooding of eggs prior to hatching.

Pair D's chicks hatched on or near June 17, and three chicks were observed on July 7. The female departed the brood between July 4 and 7, leaving the male in attendance. All three chicks had fledged by July 26.

**Figure 8. Baynes Lake nesting area on May 20, 2003, prior to inundation**

**Figure 9. Locations of nesting pairs at Kerr Road (Baynes Lake) nesting area in 2003.**

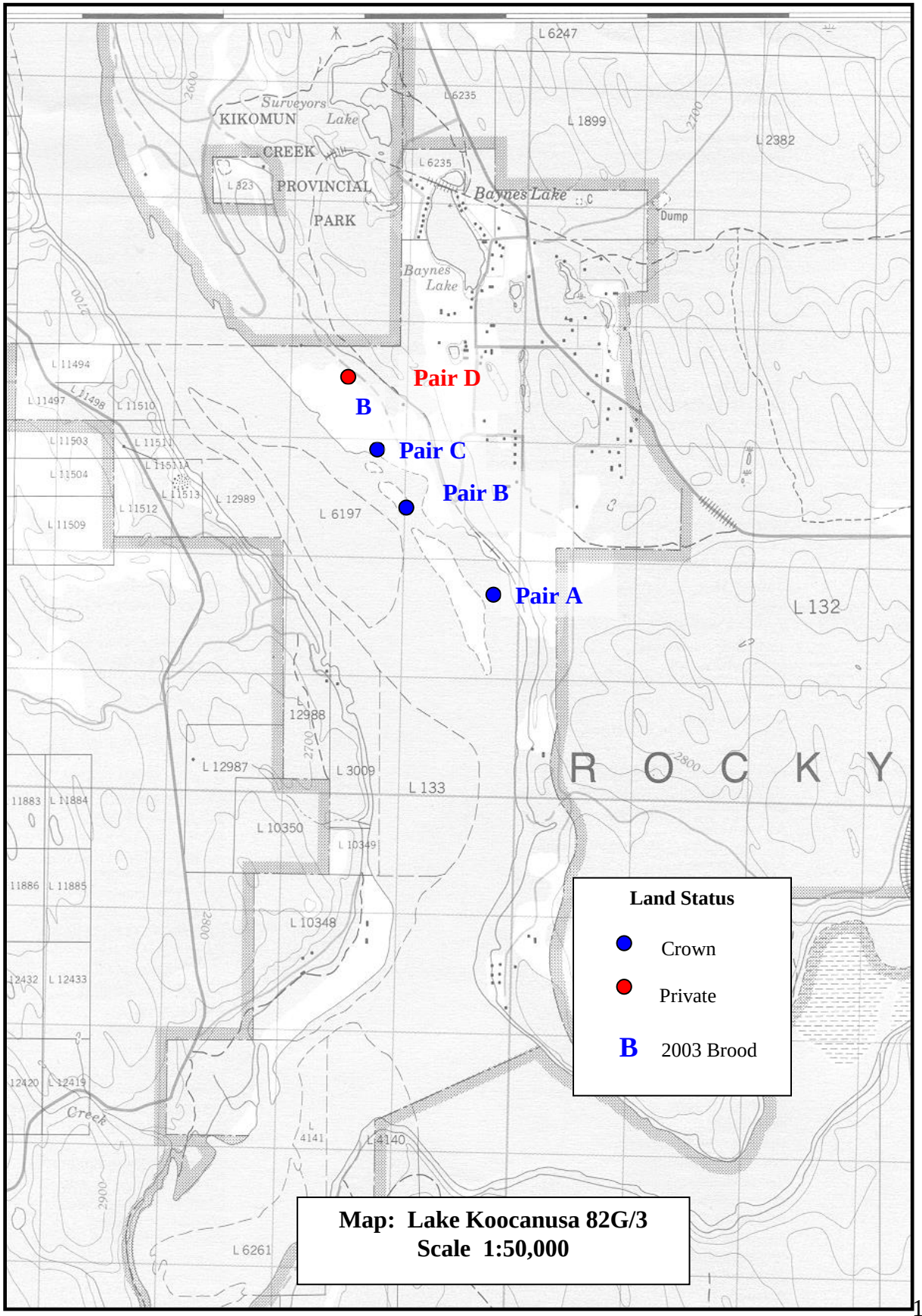
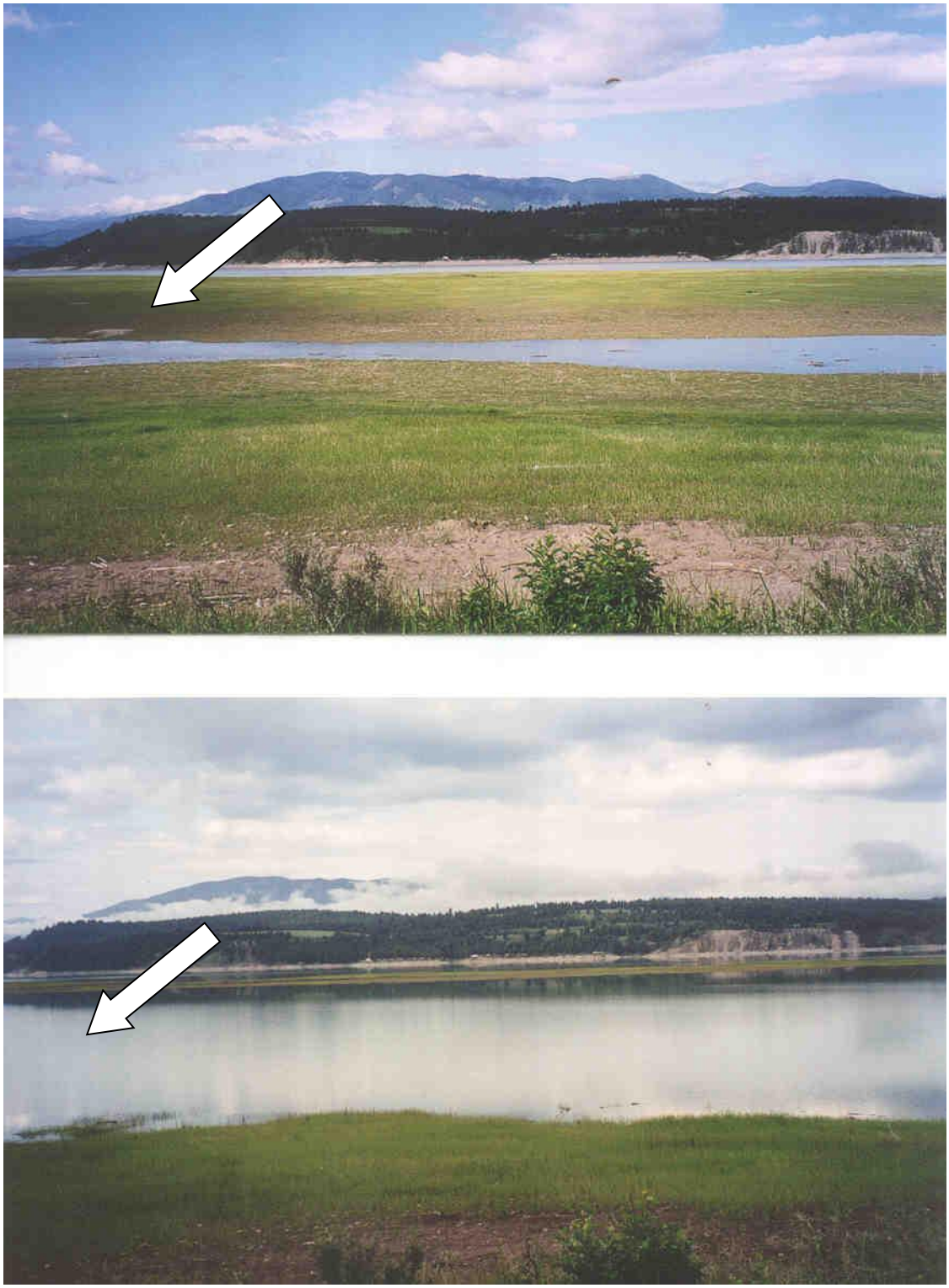


**Figure 10. Baynes Lake Long-billed Curlew nesting area on June 1 (above) June 12 (below)**
Location of scrapes (Pair A) indicated by arrow



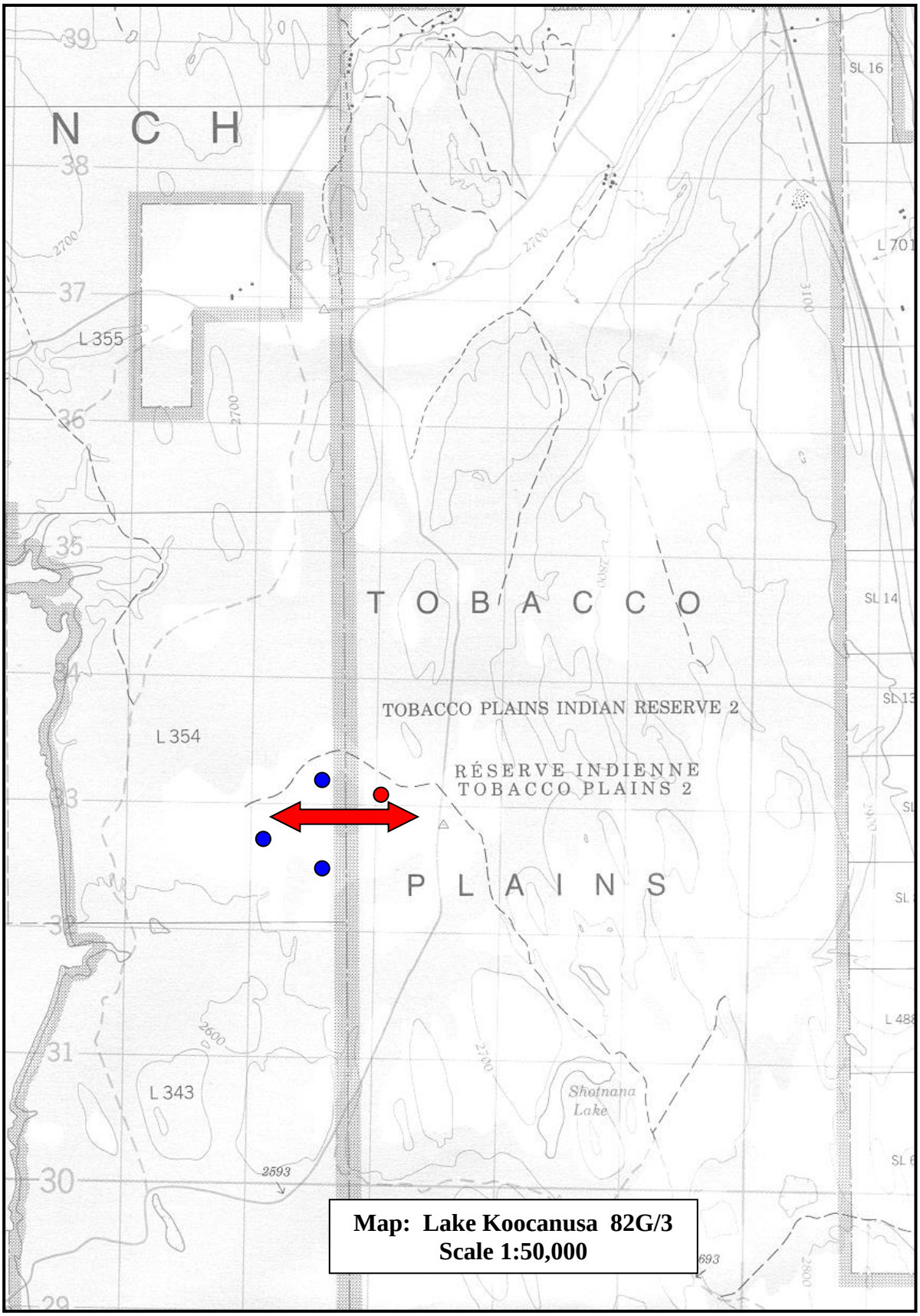
Bagley's Seeding (Grasmere)

In 2003, four pairs established nesting territories on Bagley's seeding and on the western edge of the Tobacco Plains Reserve, adjacent to Bagley's (Fig. 12). Only one brood was observed (25%). This brood moved west from the reserve onto the Crown Land and back again. On June 30, the brood (which consisted of two chicks that were about 7/8 full size) was attended by the male only. On July 9, the male was present and one chick was fully fledged. It is possible that the second chick was present but not observed.

Habitat on the reserve consists of native range that was is poor to fair condition. There is also a dirt bike track nearby. The dominant species is needle-and-thread grass (*S. comata*), with some junegrass (*Koeleria macrantha*), brown-eyed Susan (*Gaillardia aristata*), sulphur buckwheat (*Eriogonum umbellatum*)and rosy pussytoes (*Antennaria microphylla*). There is much exposed ground (varying from 60-75% including cryptogamic crust) (Fig. 11). On Bagley's seeding, there is also some crested wheatgrass (*Agropyron cristatum*). This grass, which is avoided by Long-billed Curlews in Idaho (Jenni et al. 1982), is not a monoculture at Bagley's, nor does it become overly dense – a characteristic of some seedings that is detrimental to curlews.

**Figure 11. Range condition on the west end of the Tobacco Plains Reserve**

**Figure 12. Locations of nesting pairs at Grasmere – Bagley's Seeding (2003)**



#### 4.1.3 Historic and Potential Nesting Areas

Wasa / Bummer's Flats

No birds were observed on Bummer's Flats, although a pair had been present in both 2001 and 2002. In 2001 this pair produced a brood. Reports of Long-billed Curlews on the small grassland on a bench above the Wasa refuse transfer station were investigated in 2003. The area was surveyed on April 21 and May 22, 2003. As in 2002, no curlews were observed.

West side of Koocanusa Reservoir

Long-billed Curlews were seen by Ministry of Water, Land and Air Protection biologists in May of 2002 (T. Antifeau, I. Teske, pers. comm.) on the west side of the Koocanusa Reservoir near Gold Creek. In 2003, a single bird was observed doing an undulating flight display on May 1. When the site was re-visited in late May, no birds were seen. By early June, the area had become inundated - if breeding had occurred, it is highly improbable that young were produced.

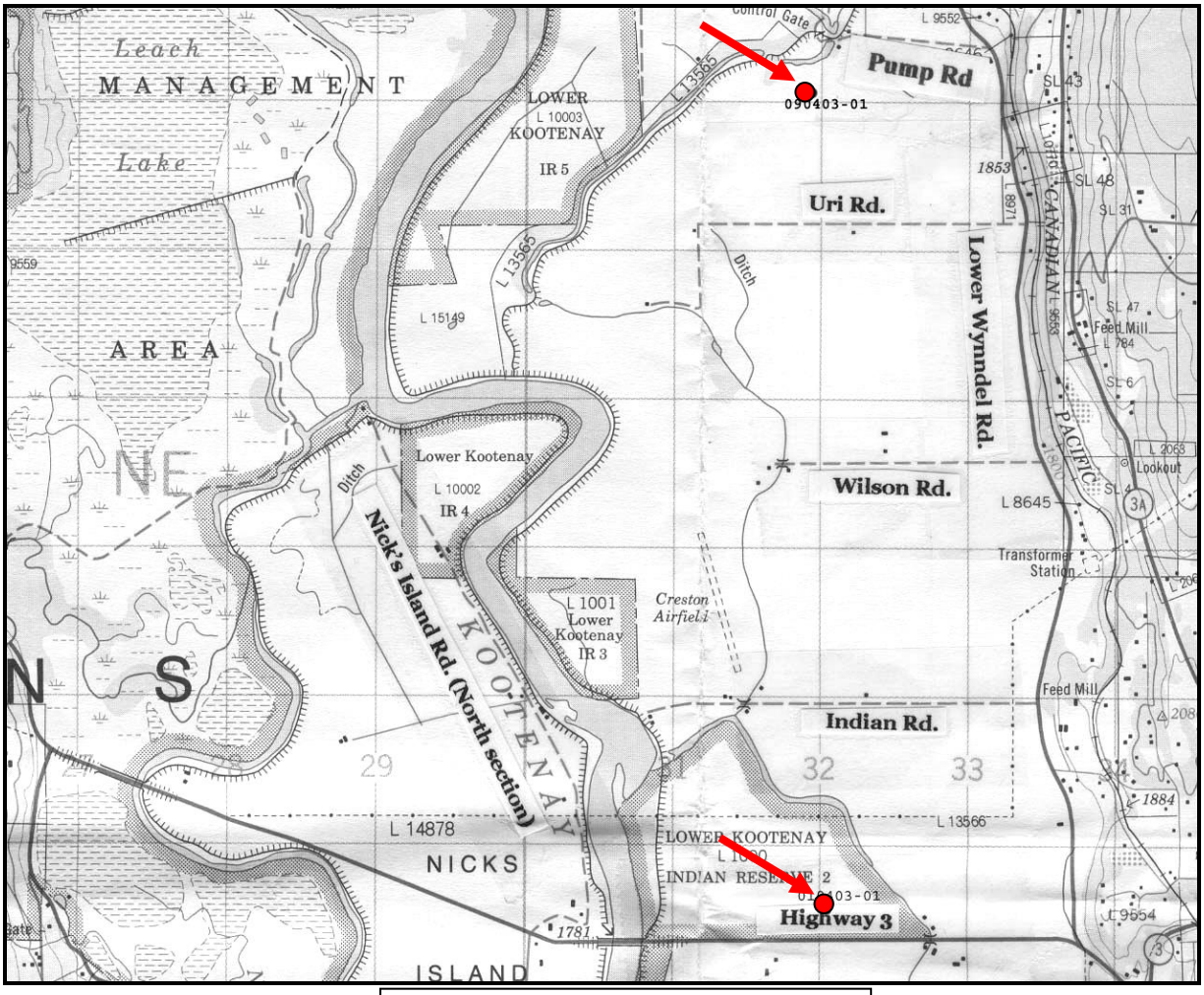
### 4.2 Creston Valley

In Creston, Long-billed Curlews are confined to agricultural fields, since open, native grasslands do not exist. Although the majority of land is dedicated to agricultural crops, some large open fields are used to graze livestock and these have the potential to support nesting curlews.

#### 4.2.1 North of Highway 3

The first Long-billed Curlew was observed on April 1, foraging among a flock of Ring-billed Gulls immediately north of Highway 3 to the east of the Kootenay River (Fig 13). On April 11 2002, three curlews had been observed in very close proximity to that location. In both years, no subsequent sightings took place there, indicating that the area is likely an early foraging spot, rather than a nesting area. On April 9, 2003, a single male was observed again foraging with a flock of gulls at the west end of Pump road (Fig. 13). This location was re-visited on four occasions, but no curlews were seen there again. Similarly, no curlews were observed north of this site, along the Duck Lake access road, which was surveyed on three occasions (April 7, April 21 and May 2).

**Figure 13. Long-billed Curlew sightings in Creston – north of Highway 3**

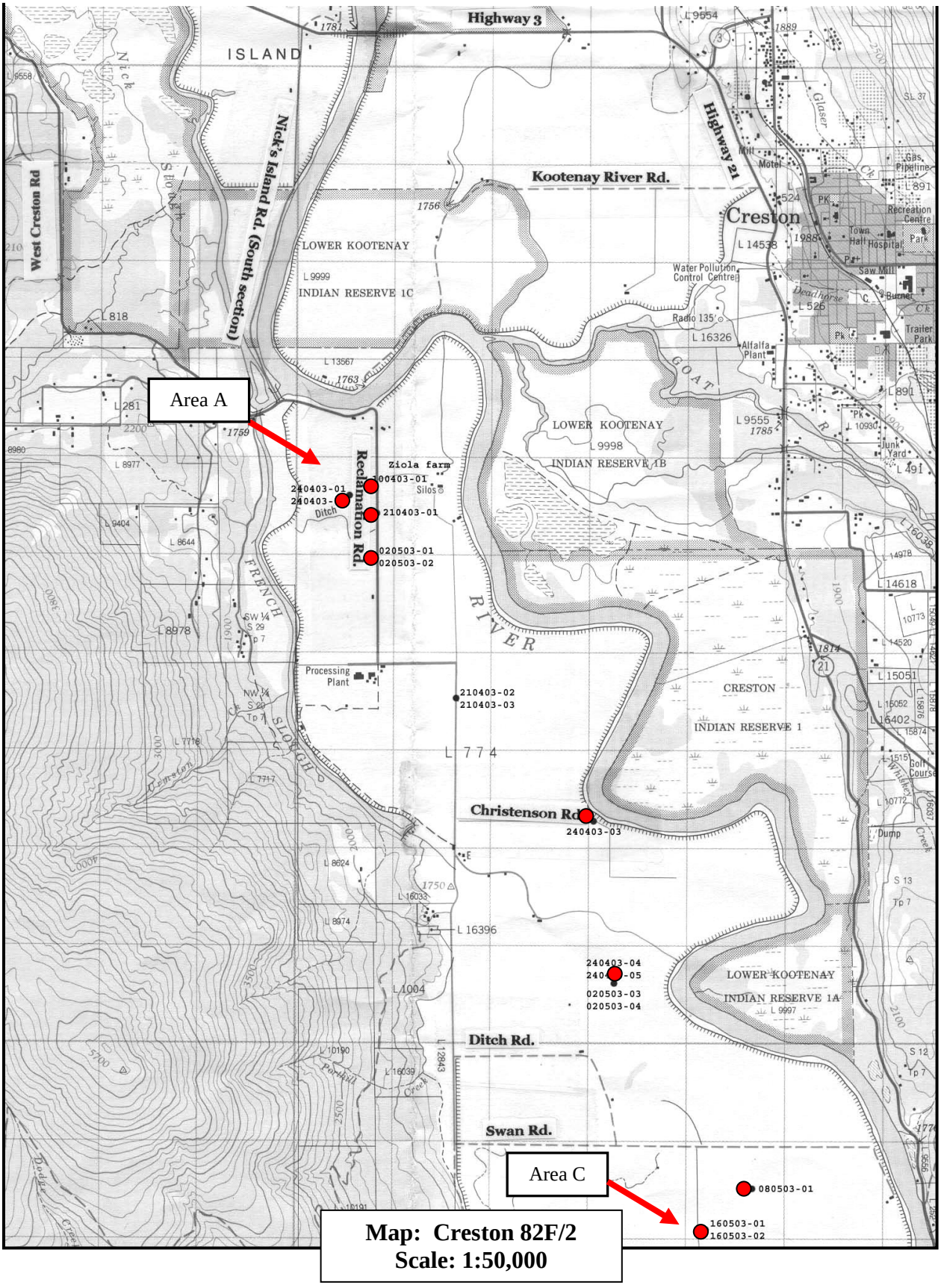



**Map: Creston 82F/2**
**Scale: 1:50,000**

4.2.1 South of Highway 3

The majority of Long-billed Curlew sightings at Creston were on the flats between Highway 3 and the U.S. border (Fig. 14). There were three main centers of activity: Area 1: Reclamation Road, Area B: Ditch Road and Area C: Swan Road. In Area A, one pair was observed copulating on April 24, 2003. Although this area was subsequently re-visited three times, no curlews were seen again. A pair of curlews were seen near Ditch Road on April 24 and May 2, but subsequent visits on May 8 and 16 revealed no curlews. During the first week of May, a farmer, Mr. Roy Lawrence, reported seeing a curlew nest while spraying his field. The nest contained three eggs, and was placed between rows of winter wheat. Although the area was thoroughly searched on May 8, no nest was found. By May 16, the wheat was already becoming tall and detectability was poor. Four to six adults, however, were seen foraging in adjacent fields on that day. It is unknown if chicks hatched at any site in Creston.

**Figure 14. Long-billed Curlew sightings in Creston – south of Highway 3**



### 4.3 Productivity

Although three new nesting areas were discovered in the East Kootenay in 2003, Long-billed Curlew productivity was very poor overall. Pairs which had reared chicks to fledging regularly in the past (for example, the Wolf Creek Road pair (Ohanjanian 1985, 1992, 2001, 2002) failed to do so in 2003. Of the 29 nesting pairs observed in the current project[1], only 4 (13.8%) reared one or more chick to fledging (Table 2). In Creston, production of chicks in the agricultural fields could not be confirmed in 2003.

**Table 2. Summary Table of Long-billed Curlew Productivity in 2003**

| Location | No. of Territories | No. of Pairs with $\geq$ 1 fledged chick | % of total |
|---|---|---|---|
| **East Kootenay** | | | |
| Skookumchuck: | 17 | 0 | 0% |
| Baynes Lake | 4 | 1 | 25% |
| Wardner | 3 | 1 | 33% |
| Grasmere (Bagley's only) | 4 | 1 | 25% |
| Sheep Mountain* (Cutts Road) | 1 (minimum)* | 1 | no data |
| Total : | 29 | 4 | 13.8% |
| **Creston** | | | |
| Reclamation Road | 1 | no data | no data |
| Swan Road | 1 | 0 | 0% |

*Area discovered late so data on number of attempted nestings was not acquired

[1] Work carried out in a concurrent project on the St. Mary's Indian Reserve supported this finding; of nine nesting pairs, only one (11.1%) fledged chicks in 2003.

# 5.0 DISCUSSION

## 5.1 Land status of Long-billed Curlew nesting areas

The discovery of three new Long-billed Curlew breeding areas in 2003 adds significantly to our knowledge of this species' distribution in the Koootenays. Two of the three new sites are on crown land, the third is on private land. The land status of the East Kootenay Long-billed Curlew population is shown in Table 3. Thirty seven percent of the current known population occupy crown land only and thirty seven percent occupy private or private **and** crown. Twenty seven percent are on Indian Reserve Land.

**Table 3.** Land status of Long-billed Curlew nesting territories in East Kootenay

| Area | Estimat. No. Pairs | No. on Crown | No. on Private | No. on Crown & Private | No. on IR | No. on Crown & IR |
|---|---|---|---|---|---|---|
| Invermere* | 6 | 0 | 4 | 0 | 2 | 0 |
| Skookumchuck & Wasa | 17 | 7 | 5 | 5 | 0 | 0 |
| Wycliffe*** | 2 | 0 | 2 | 0 | 0 | 0 |
| St Mary's** | 9 | 0 | 0 | 0 | 9 | 0 |
| Wardner Bridge | 4 | 4 | 0 | 0 | 0 | 0 |
| Cutts' road | 1 | 1 | 0 | 0 | 0 | 0 |
| Baynes Lake (Kerr Rd) | 4 | 3 | 1 | 0 | 0 | 0 |
| Grasmere*** | 6 | 3 | 1 | 0 | 2 | 1 |
| **Total** | **49 (100%)** | **18 (37%)** | **13 (27%)** | **5 (10%)** | **13 (27%)** | **1 (2%)** |

* see Ohanjanian and Beaucher 2002 (includes two unconfirmed pairs on IR)
** see Ohanjanian 2003
*** data for Wycliffe and Grasmere incomplete

These numbers are minimums only, as current data are lacking for the Wycliffe area and Tobacco Plains Indian Reserve. It is likely that there are more pairs on private land at Wycliffe and on the Tobacco Plains Reserve. In Creston, 100% of the Long-billed Curlew sightings were on private land.

## 5.2 Productivity

Long-billed Curlew productivity was very poor overall in 2003. The reason for this could not be confirmed in all cases, but several factors have been identified as contributing to the lower productivity, including starvation, agricultural activities, predation, and flooding.

### 5.2.1 Starvation

Grasshoppers are the principal food source for the precocial, self-feeding Long-billed Curlew chicks (Redmond and Jenni 1985). In 2003, grasshoppers were late and fewer than predicted. M. Malmberg, retired District Agrologist with the B.C. Min. of Agriculture and Foods, stated that the "spring of 2003 was cold and late; following the cold spell, however, grasshopper beds with individuals in the 1st and 2nd instar stages of development were numerous, and the hot, dry conditions should have resulted in abundant grasshoppers. Grasshoppers were not abundant, however, suggesting that a natural grasshopper population regulator, such as a fungus or disease, controlled their numbers". The main prey of curlew chicks, therefore, was unavailable early on, and unless an individual brood hatched during the short window when grasshoppers were small but numerous at their particular locale, starvation could have occurred.

### 5.2.2 Agricultural practices

Another factor that could influence Long-billed Curlew productivity is agricultural activity. Production of chicks in Creston could not be confirmed. The nest off Swan Road could not be relocated; it is presumed, therefore, that it was lost. It is not known if the pair copulating off Reclamation Road produced chicks, as the vegetation of the farmland quickly grew extremely high, making it impossible to see if curlews were present. It was also not possible to perform a thorough search on foot to evoke alarm calls (and thus locate chicks) because the land is private and walking on it damages the crop. Although production of chicks in the agricultural fields in Creston could not be confirmed in 2003, it is likely that, in some years, young are produced. Alfalfa fields grow too thick and dense for chicks to move easily (Jenni et al. 1982), and chicks could hatch during the last week of May, when mowing and baling begins. Loss of chicks and/ or destruction of nests likely occurs. Grain farming, however, could be compatible with successful Long-billed Curlew incubation and brood-rearing in those cases when crops such as winter wheat are planted in widely spaced rows and harvested in August, well after fledging. The cover provided by the plants may also provide the chicks with good protection from aerial predators. Spraying activity, however, may have an impact on the curlews or their prey base in the Creston Valley. This and the potential physical damage caused by tractors makes Long-billed Curlew production in agricultural environments a haphazard process; in some years, incubation and brood rearing could be accomplished – in other years not.

### 5.2.3 Predation

It is difficult to quantify levels of predation and its effect (or lack thereof) on production. Although ravens can be driven off by curlew mobbing behavior, the author observed a raven with a chick in its beak being mobbed by 3 curlews in 1986. It is possible that in areas where Long-billed Curlews are disturbed by humans, or distracted by an abundance of other predators, ravens may be a significant predator of young. There was a higher diversity of potential aerial predators observed at sites on the shores of Lake Koocanusa than is typically seen on the native grasslands. The Wardner site in particular, was rich in potential predators. On one occasion, a pair of curlews and some ravens repeatedly dive-bombed a red-tailed hawk that was sitting on

the ground in their territory. When the hawk left, the curlews immediately had to defend their chicks from the ravens who had shifted their attention to the curlew brood. When the ravens left, a vulture appeared which, although not a real threat to the curlews, was perceived as a threat. This vulture elicited more mobbing behaviour from the parents. A bald eagle and a small flock of ring-billed gulls also flew through the area within five minutes of the vulture leaving. The need to defend chicks from aerial predators increases the amount of energy expended in brood defense. In addition, the alarm calls that the curlews emit while mobbing a human, a Bald Eagle or a Turkey Vulture can alert ravens to the fact that the chicks may be unattended. The Baynes Lake site is also situated on the shores of the reservoir. It is likely that a higher percentage of chicks could be lost over time at these sites than on native grasslands.

Although not quantified, there appeared to the researcher to be a large number of satellite males flying around Skookumchuck and at the Kerr Road (Baynes Lake) site in 2003. These may represent the return of males born at this site in the relatively productive year of 2001 (or earlier). Unpaired males are commonly seen in and around the territories of established pairs, and banding work carried out in Idaho indicated that males go back to their natal areas (Redmond 1984). Single males are commonly seen assisting the established pair in activities such as group mobbing of predators (pers. obs.). If they are the offspring of these pairs, they are helping ensure the survivorship of their kin.

### 5.2.4 Flooding

The loss of Long-billed Curlew nesting habitat to rising water levels of the Koocanusa reservoir was documented in 2003. Although no nest was detected prior to inundation, scrapes were being made at the Kerr Road site in a location that became flooded within 2 weeks (Fig. x). A sequence of photos clearly delineate the pattern of water level increase in the Long-billed Curlew nesting area at Wardner (Fig. 15). This may impact not only nests and chicks which can become flooded out or stranded, but it also reduces the available foraging area. The effects of this on productivity are clear: productivity at the Kerr Road site was very low in 2003.

It is possible that the two nesting sites on the east shores of Lake Koocanusa are reproductive sinks – breeding areas that are not viable over the long term. Although long-term data are not yet available, it is the opinion of the author that, although annual variability will be high, breeding will be very successful in some years given proper management. In 2001 at least 16 chicks were present on June 11. Two pairs had nested on private land and four pairs on crown, and incubation was already taking place on May 22, when the site was first visited. Similarly in 2002, water levels were not too high even as late as June 24, and fledged chicks were observed. In 2003, two factors can be identified that led to poor productivity. These were: late nesting (first copulation observed on June 1) and early high water levels (the area was inundated by June 18). It is likely, therefore, that in those years when clutches are initiated early, AND Koocanusa water levels are not raised in mid-June, Long-billed Curlews will succeed at this site. The same is probably true for the Wardner Bridge nesting area.

**Figure 15. Water levels at Wardner Long-billed Curlew nesting area from June 2 to June 21, 2003**


June 2


June 12


June 17


June 21

## 5.3 Recommendations for habitat management and future study

The implementation of the following recommendations for management are an important step in ensuring the persistence of the Long-billed Curlew in the Kootenays.

- The highest priority action is **to purchase the privately-owned grasslands** that are currently for sale on the west side of Hwy 93/95 at Skookumchuck (portions of Lots 116, 338). Not only will the birds currently nesting on this private land be at risk, but also those occupying adjacent crown land to the north and south of this piece.

- Maintain restricted human access to the Kerr Road nesting area during the breeding season. This is particularly crucial now that it is known that the production of chicks in those years when water levels are lower is vitally important to offset the loss of nests during high water years.

- Grazing has been identified as beneficial to Long-billed Curlews, in that it lowers vegetation profile (Bicak et al. 1982). Use grazing (preferably in late summer or fall) as a tool to create low-profile vegetation during the nest-site selection period. Crested wheatgrass seedings in Idaho were avoided because their vertical coverage values were too high (Jenni et al. 1982). It is recommended that Bagley's seeding be grazed to prevent this. Institute grazing on Middle Bummer's Flats to reduce vegetation height; the site was unoccupied in 2003 when the vegetation was tall

- Develop outreach and stewardship agreements with landowners who have nesting curlews on their land; incentives to alter land use (for example, grazing instead of hay production) could be provided. Information brochures indicating the ways in which Long-billed Curlews are beneficial to their operations should be developed: for example, the main prey of Long-billed Curlew chicks is grasshoppers. The mystery of Long-billed Curlew distribution on Wycliffe prairie could become the focus of a community-based project to determine where and how many there are.

- Examine the possibility of land acquisition in the southwestern section of the Creston Valley. This land could be managed for Long-billed Curlew and other species-at-risk such as the bobolink (B.C. Red-list).

- Continue discussions with the U.S. Army Corps of Engineers regarding management of water levels upstream from the Libby dam. Communicate and coordinate with Recovery Teams of other species, including the white sturgeon team.

- Research: An interesting field of inquiry would be to try to integrate grasshopper prediction models with Long-billed Curlew nesting chronology and reproductive success. Do Long-billed Curlews cue in to grasshopper productivity and alter the onset of nesting accordingly?

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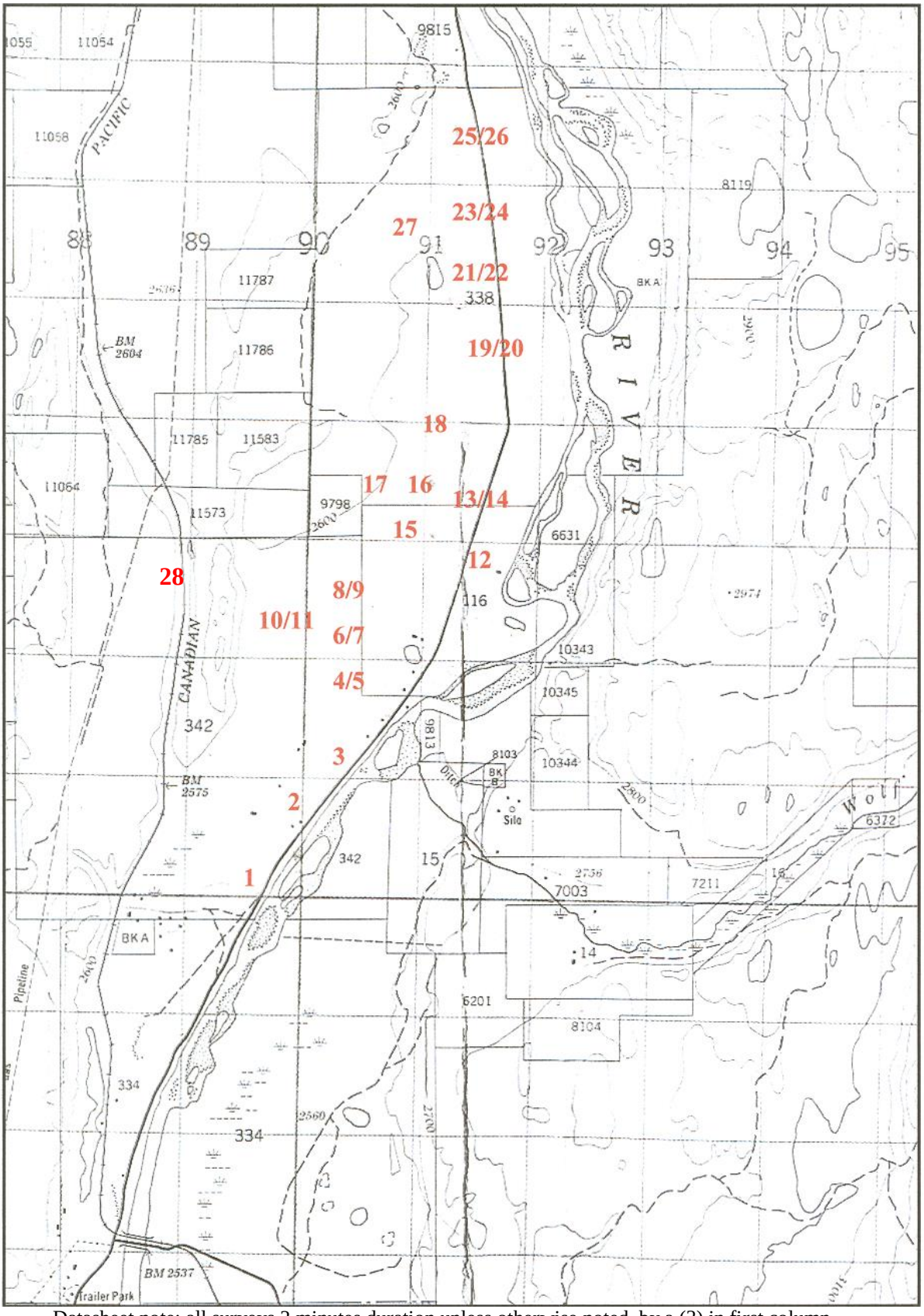
APPENDIX A **Locations of Skookumchuck survey route stops and accompanying datasheet**




Datasheet note: all surveys 2 minutes duration unless otherwise noted by a (3) in first column

**Long-billed Curlew Standard Survey Route – Skookumchuck – 2003** **Date_____**

**Start Time_____Weather_____Temp (ºC)_____Cloud cover (%)_____Wind (Beau)_____Surveyors_____**

| Stop | Location | Direct. | Birds seen/Activity | Stop | Location | Direct. | Birds seen/Activity |
|---|---|---|---|---|---|---|---|
| 1 | Echo S | west | | 17 (3) | Doghead past | 360 | |
| 2 | Echo N | west | | 18 | mid. o.g | 360 | |
| 3 | Walkeys | west | | 19 | o.g. hwy gate | north | |
| 4 (3) | Crown/CW gate | south | | 20 | o.g. hwy gate | alfalfa | |
| 5 (3) | Crown/CW gate | north | | 21 (3) | River s. end | east | |
| 6 | Pine tree | east | | 22 (3) | Plot s. end | west | |
| 7 (3) | Pine tree | west | | 23 (3) | Pole 23 – 3 | east | |
| 8 (3) | N. of Pine tree | east | | 24 (3) | Pole 23 – 3 | west | |
| 9 (3) | N. of Pine tree | west | | 25 (3) | Broken snag | east | |
| 10 (3) | Foster hill top | east | | 26 (3) | Broken snag | west | |
| 11 (3) | Foster hill top | west | | 27 (3) | Behind plot | s. & e | |
| 12 | Pole 20 – 16 | alfalfa | | 28 (3) | Reed Pasture | 360 | |
| 13 | Mardis jct | n & s | | **Comments** | | | |
| 14 | Mardis jct | alfalfa | | | | | |
| 15 | o.g.gate | south | | | | | |
| 16 | o.g. walk 50 m | 360 | | | | | |