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REMOVAL, EXAMINATION AND TRANSFER OF WHOOPING CRANE EGGS FROM WOOD
BUFFALO NATIONAL PARK, 29-30 MAY 1989

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Preliminary data, not for publication

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1. INTRODUCTION AND PRE-PICKUP PLANNING

With the assistance of Wood Buffalo National Park (WBNP) Warden J. Saquet (on 6 May) and T. Lewis (Patuxent Wildlife Research Center, on 28 May), the author carried out whooping crane breeding pair surveys on 30 April 1989 and on 6, 9, 13, 22 and 28 May 1989. The six surveys varied from 3.5-5.7 hrs in duration and averaged 4.5 hrs.

In 1988, 31 whooping crane pairs are known to have nested, one less than the record of 32 pairs in 1987. Thirty nests were located and a 31st pair obviously nested in an unknown location as both banded adults arrived at the Aransas National Wildlife Refuge (ANWR) with an unbanded chick. The female of this 31st breeding pair was killed by a hunter near ANWR during January 1989. Breeding pair 3/88 containing a banded male failed to arrive at ANWR and two additional breeding adults (female from pair 15/88 and probably the male from pair 4/88) were lost at ANWR during winter. There was therefore a potential of four fewer breeding pairs in 1989 and a maximum of 27 pairs was expected to return from 1988. Several novice breeding pairs may well make up the losses in 1989. In 1988 I indicated that there was a potential for 6-7 new breeding pairs in 1989 (Kuyt, E. Report on aerial search for nonbreeding and novice breeding whooping cranes - 1988, unpub. CWS Report, 25 p.). One of these pairs failed to arrive at ANWR in fall 1988.

A comparison of laying dates by 26 pairs nesting in 1988 and 1989 indicates that three pairs laid eggs from 1 to 4 days earlier in 1989, 16 pairs laid an average of 3.7 days later than in 1989 and seven pairs laid eggs on the same days in 1989 as they did in 1988.

First eggs in 1989 were noted on 6 May in six nests. Five additional nests already had the full clutch of two eggs. Egg laying in these nests thus began on or about 3 May, an average of five days later than in 1988. A peeping egg on 29 May (nest 2/89) during the pickup indicated that egg could hatch about 31 May. Pair 2/89 is a traditionally early (sometimes the earliest) nesting pair.

During breeding pair counts in 1989 I located 29 nests, two less than existed in 1988 (but see below). The possibility remains that at least two additional pairs may have nests. One of these pairs consists of B/B-Yellow, the widowed 1983 male originally paired with the female BWSP-BWSP (shot in January 1989 by a hunter near ANWR) and Yellow-Red, a 1985 female. This female (with 1985 male Green-Green) was seen in the Upper Seton Creek area last year and again in 1989. Evidently B/B-Yellow (a proven breeder) was able to entice Yellow-Red to join him, leaving her companion Green-Green and YBY-Green (B/B-Yellow's companion of 6 May 1989, a 1987 bird of unknown sex) together in the Upper Seton area. B/B-Yellow and its new mate then disappeared, no doubt to nest in the same (unknown) place where the male and his former mate nested in 1988.

The second possibly unlocated nest may have been produced by last year's pair 12/88 (North Sass). We saw the pair on 6 May (both birds are banded), one of the pair in the morning of 13 May and the other bird in the afternoon of 22 May. The suggestion is that since both cranes incubate eggs (but at different times of the day), the observation of different birds indicates that the unseen bird was on a nest. We failed to find the nest, even after thorough searches of 12/88's territory.

T. Stehn (pers. commun.) suggested two additional possible novice breeding pairs for 1989 (Blue-RWR and WBW-BYB; BYB-BYB and unbanded) but I have been unable to find them.

The Hippo Lake pair (which did not nest in 1988) was observed on 30 April, 6, 9 and 13 May but not on 22 May, and on 13 May I considered it unlikely that the pair would nest. (A nest, numbered 30/89 and containing a single egg was found after the egg pick up on 6 June in the extreme west portion of the Hippo Lake pair's nesting area. I have not been able to determine if this is indeed the Hippo Lake pair or a new pair). Similarly, last year's nesting pair 18/88 in the SE Sass was observed on 30 April, 6, 9, and 13 May and most likely on 22 May as well. We have not found a nest in the pair's territory.

Three new nesting pairs were discovered in 1989. Nest 27/89 (one adult may have a metal or a 40 mm tan-coloured plastic band above the right tibio-tarsus) is in a new location. Nest 28/89 is located in the northern part of the Nyarling marshes where in 1987 and 1988 I recorded an unbanded pair. The third nest (29/89) is located in the South Sass. In the 1988 report on aerial search for nonbreeding whooping cranes I suggested the latter two pairs would breed for the first time in 1989.

Last year's banded male from pair 15/88, although losing his mate in ANWR the past winter, apparently has found a new mate because he was seen with an unbanded bird in his 1988 territory and the birds had a nest with two eggs on 13 May within 150 m of the male's 1986, 1987 and 1988 nests. An unusual situation occurred with last year's pair 19/88. The birds nested in 1988 for the first time but the nest was destroyed before

the 1988 egg pickup. The two birds (both banded) became disassociated during winter 1988/89 (T. Stehn, pers. commun.). On 13 May I found the two reunited birds at nest 22/89 with two eggs, about 3 km west of last year's nest.

Of the minimum of 55 eggs produced in 1989, it is estimated that 46 of 55 eggs (84%) were laid during the eight day period between 5 and 12 May. A comparison of estimated laying periods and dates of egg pickup for the past nine years is shown below:

Year	Major laying period	No. of days	% of eggs laid	Approximate pickup date	Actual pickup date
1981	2- 8 May	7	71	2 May + 24 d = 26 May	25 May
1982	4-10 May	7	82	4 May + 24 d = 28 May	28 May
1983	5-11 May	7	78	5 May + 24 d = 29 May	30 May
1984*	3-13 May	11	23	3 May + 24 d = 27 May	21,23 May
1985	1-10 May	10	92	1 May + 24 d = 25 May	22,23 May
1986	30 Apr-7 May	8	85	30 Apr + 24 d = 24 May	21,24,25 May
1987	26 Apr-6 May	11	91	26 Apr + 24 d = 20 May	21 May
1988	28 Apr-8 May	11	77	28 Apr + 24 d = 22 May	27 May
1989	5-12 May	8	84	5 May + 24 d = 29 May	29 May

*Incomplete data due to Kuyt's absence on radio-tracking project.

On 8 May I calculated that the egg pickup should occur between 26 and 29 May. Earlier I had been contacted by T. Lewis (Patuxent) and it was agreed that he would travel to Fort Smith to assist in the pickup, leaving an associate in Edmonton to assist in the transport of collected eggs to Patuxent. E. Bizeau would again come in from Idaho to assist as he has done each year since 1974, even though it had been agreed that all eggs collected in 1989 would go to Patuxent. Bizeau and Lewis would be arriving in Fort Smith on 26 May.

On 18 May I heard from pilot D. Farkas whose company had the Standing Offer Agreement to provide a helicopter for the egg pickup. I told him the pickup was planned for the period 26-29 May. Farkas foresaw no difficulty in doing the work. At the time he was involved in fighting forest fires in the Interlake region in Manitoba. I tentatively selected 29 May as the pickup date.

On 26 May E. Bizeau and T. Lewis arrived. With J. Saquet I discussed helicopter fuel requirements and Saquet offered to locate fuel caches at Klewi Lake and near Sass River. On 27 May Farkas called from The Pas, Manitoba and said he would expect to arrive in Fort Smith on 28 May, setting the stage for a 29 May pickup as originally planned. Weather on 28 May was good and the forecast for the following day was favourable.

Return reservations on Canadian Airlines International from Fort Smith to Edmonton and beyond had been made by Bizeau and Lewis (Kuyt did not accompany the egg shipment). Pre-boarding arrangements were requested for the two men and the eggs.

In April I had brought in two electric incubators, on loan from CWS Wainwright. One of the machines was used and it performed perfectly.

The final breeding pair survey was flown on 28 May and T. Lewis was given the opportunity to get his first look at the crane breeding range.

During the Canadian Whooping Crane Recovery Team meeting in Regina in 1988 it had been suggested that, if there was a decreased demand for eggs in 1989 (no eggs going to Grays Lake) that full clutches (2 eggs

each) should be left in about 10 nests to determine if cranes could raise both young. Pairs so selected were picked on the basis of past reproductive performance. Most of the pairs were amongst the early nesting, experienced birds. Some changes had to be made when selected pairs were found to have only one good egg.

For the rest of the nests visited, we used the same procedure as in previous years. Eggs at nests were tested by flotation and a known live egg was left in each nest. I was prepared to remove the entire clutch of non-viable eggs and substitute a live egg from another pair or substitute single, live eggs for single, non-viable eggs found in nests. If possible, early eggs would be used as substitute eggs and later eggs collected for removal to Patuxent.

A fixed-wing support aircraft was not used in 1989. The major reason for not using such an aircraft was the same as that in other years: there was no second person completely familiar with the location of nests.

Similar to last year's operation, two fuel caches were utilized along Highway #5: one near Klewi Lake, the other near Sass River. Three drums of fuel (135 gal) were used. The use of this WBNP fuel cache greatly facilitated the work.

2. WEATHER DURING PICKUP, 29 MAY 1989

A light rain shower occurred in Fort Smith about 0500 hrs. At 0800 hrs the sky was clear with some cloud visible in the south. The temperature was 8°C and winds were reported at 7 km/hr from the north-

east. An hour later the temperature had increased to 9.5°C and I planned for an 1100 hrs start. We departed shortly after 1100 hrs. Conditions were excellent; it was clear and sunny, and with winds of 020° at 5 km/hr and 13°C temperature (and climbing). Temperatures reached 14° at 1230 hrs, 17° at 1830 hrs and still read 14°C at 2100 hrs when we were at the last nest to be visited.

3. FLIGHT CREW

The pilot of the helicopter chartered from Canadian Territorial Helicopters Inc. was Don Farkas, who did the same work in 1988 and on several previous occasions. E. Kuyt, E. Bizeau, J. Saquet and T. Lewis constituted the rest of the crew. Kuyt and Saquet visited all nests with Kuyt measuring nests, pond water depth and determining viability of eggs. In order to speed up the operation as much as possible, the two men exited and re-entered the helicopter from opposite sides. The other men remained in the helicopter at all times. They monitored the temperature of the suitcase-incubator, recorded landings and departures at nest sites and wrote numbers of nests on collected eggs using a soft lead pencil.

Pilot Farkas was in contact with the Canadian Parks Service radio network and, at intervals, reported our position.

4. AIRCRAFT

The helicopter used was a Bell 206L (C-FNEG) on high skids. Because of the soft, marshy nature of most of the landing sites, the pilot was forced to keep power on and the engine was not shut down except during refueling.

The duration of the operation was from 1100 hrs to 2125 hrs, including 9.5 hrs flying, 27 landings at nests and three refuelings.

Although pilot Farkas did an excellent job, the availability of helicopter floats would have facilitated landings and would have reduced fuel consumption and disturbance (engine noise).

5. ROUTE (See Figure 1)

Fort Smith - nest 12/89 - nest 11-16-24-5-20-28 - Klewi fuel cache
- nest 26-10-25-19-7-8-17-21-6 - Klewi fuel cache - 27-18-9 (no landing)
- 23-13-15-4 - Sass fuel cache - 14-3-2-29 (no landing) - 22-1 - Fort
Smith.

6. EGG COLLECTION

6.1 We could not find nest 12/89 at first as the incubating crane left the nest before we had approached and was standing among spruce west of the nest. The aircraft was down near the nest from 1130-1145 (landing times are given in Table 1). The nest area was much like a floating bog, just south of a small creek and composed of clumps of swamp birch and willow with cattail and sedge interspersed. It was only possible to step from clump to clump and the numerous dead stems of swamp birch and deep holes between clumps of shrubs made the area exceedingly difficult to traverse. The nest was made of sedge, there was no bulrush in the area. The incubating crane flew a short distance north when the helicopter landed. The eggs were tested for viability at the nest and both were alive, estimated in the 15-22 day category and probably close to 22 days

old (see previous reports for test criteria). Both eggs were left in the nest - this pair has an excellent reproductive rating.

6.2 As we left the area, I saw a mew gull on a nest with one egg and several kilometres from the nest (in a dry situation in the forest) a gray wolf was seen by several crew members.

6.3 Just after crossing Highway #5 we saw a pair of whooping cranes 4 km NE of the highway-Sass River junction. One bird was banded (BWB-GWG?). Both birds ran from the helicopter (they did not fly) and they may have been moulting. We have only rarely seen cranes here although it is suitable appearing nesting or feeding habitat. Although we were not able to confirm the band identification, the list of surviving banded birds indicates only one possibility: BWB-GWG, a 1985 female. This bird is expected to breed in 1990.

6.4 A bird was on nest 11/89 as we approached. It then walked off the nest and flew north. The nest is located in a round stem bulrush stand with firm bottom. The nest, made of dead bulrush stems clipped off a few centimetres above the water, measured 130 cm across and 10 cm high. Pond water depth at 1 m from the nest edge was 26 cm (Table 1). Both eggs were alive, category 15-22 days and close to 22 days old. The smaller of the two eggs was collected.

6.5 As we flew north through the nonbreeder area, we saw a pair of whooping cranes 300 m NW of Thin Bird Lake. We did not examine these birds closely. I had seen paired birds there on 13 May.

6.6 A bird was observed standing amongst trees near nest 16/89. The nest, composed of bulrush is located in the same stand of bulrush where a

nest has been located each year since 1984 when the pair first nested there. Both eggs were tested and a live egg, estimated at 22 days was left in the nest. Because of the excellent previous production by this pair I had planned to leave both eggs. However, the field test for the second egg was not conclusive and it was collected. Any wind or disturbed air (by helicopter rotor) tends to ruffle the water in the viability testing container, making egg movement in the water difficult to detect.

6.7 A bird was on nest 24/89 and at our approach it walked north-east, then flew east. The nest is located in a shallow pond, and from the numerous dead standing trees (small willows and spruce) near the nest, it appears the standing water is of relatively recent origin. Almost surely, this nesting pair is the same pair, then called 21/88 and 27/87, which nested the previous two years on an islet 400 m west of nest 24/89 in a similar pond with dead trees. The nest was built on a small islet and consisted of rhizomes with attached mud as the base of the nest with a relatively thin layer of dry sedge stalks topping the nest. The nest held a single egg (first seen 13 May) which tested live (about 18-20 days). The egg was left in the nest.

6.8 A bird was standing in low shrubs immediately north of nest 5/89 as we approached from the south. The nest is located within a few metres of last year's nest beside a tiny pond but the area contains a surprising amount of water not readily visible from the air. The nest is located in a sedge stand and was made of fine sedge (identical to last year's nest). Both eggs were alive, were in the 15-22 day category and were estimated to be close to 22 days old. The older of the eggs was left in the nest

and the other one collected. As we left the area I saw a bird about 400 m west of the nest.

6.9 In the Nyarling area a bird remained sitting on nest 20/89 until we were close to the nest. The birds of this pair have always been reluctant to move from the nest and we had not yet seen the nest contents this year. We noted four or five moulted feathers beside the nest which held two eggs. The nest material contained some bulrush but mostly sedge. The large eggs moved lively in the water of the test container. The older egg was left in the nest, the younger egg collected. The nest is located near a tall larch tree in a sedge marsh with a single bulrush stand.

6.10 We had some difficulty finding nest 28/89, also in the Nyarling area. The nest is located in a relatively dry area and there was no water at the nest (Table 1). The nest was in a stand of swamp birch and built with dry stalks of cattails collected by the cranes from a dry stand of cattails about 6 m away. The nest was located outside the cattail stand, although it would have been better hidden within the cattails. The nest is that of a pair likely nesting for the first time. I could not detect a movement by either of the two eggs during testing and the egg just removed from nest 20/89 was left in the nest and both eggs from pair 28/89 were collected. The adult birds stayed near the nest until the helicopter was a few metres above ground, then the cranes flushed.

6.11 We now flew south to the Klewi fuel cache where we refueled from 1350-1417 (Table 1).

6.12 A bird was on nest 26/89 and as we approached it walked off. The nest is in open marshes, just east of a tall live spruce. The nest was located in a bulrush and sedge marsh and had a base of peatmoss-like plants topped by a thick layer of bulrush. One egg (14-18 days old) was seen to rotate in the test water and it was left in the nest. During the quick test we could not see any motion by the second, younger egg. That egg was collected. As we left the nest we saw a black bear about 400 m north of the nest.

6.13 A bird was on nest 10/89 and as we approached, the bird left the nest and flew to the southeast. Again we noticed moulted feathers on the nest. I removed feathers to decrease the conspicuousness of the nest. The small, shallow nest was made of bulrush. Both eggs were alive and in the 15-22 day category, estimated about 20 days old. One egg was collected.

6.14 The bird on nest 25/89 walked east as we approached the nest. Many feathers, including large black primary feathers, were at the nest. Most likely the bird was flightless or nearly so. The deep nest was made of bulrush and was located in a bulrush stand. The bottom of the marsh was firm, providing easy walking for a change. A few isolated larch trees and swamp birch were scattered throughout the area. Both eggs were live and were in the 15-22 day category. The larger, older egg (more lively than the younger egg) was left in the nest and the younger egg collected.

6.15 A bird was at nest 19/89 as we approached and the second bird 300 m east of the nest. The incubating bird walked away from the nest, then flew to join its mate. Both birds then flew another 100 m east.

The nest, located in a sedge marsh with many clumps of willows and swamp birch, was made of sedge. Both eggs were live (15-22 day category) and they were left in the nest.

6.16 A bird on nest 7/89 walked off the nest and into a clump of spruce. The nest located in a sedge marsh was made of a thin layer of dry sedge and bulrush with a base of rhizomes with adhering mud. One egg was live and estimated at 20 days of age. The larger egg did not show movement and it was collected.

6.17 The bird at nest 8/89, only 1.5 km from nest 7/89, most likely was disturbed when we were working near nest 7/89. The bird was seen in a small spruce clump west of the nest. We saw only one egg in the nest although the nest had contained two eggs. I located bits of eggshell in the water about 1 m from the nest. The remaining egg was live and active in the test vessel. The egg, estimated about 22 days old was left in the nest (made of bulrush).

6.18 As we landed near nest 17/89 we noted an American coot on a nest 3 m from the helicopter. That nest contained eight eggs. One of the eggs was tested and it sank, so it probably was about 14 days old. The coot had returned to the nest before we had returned from our investigation of the crane nest. The crane nest, in a cattail marsh, was made of dry cattail leaves on a base of mud and dead vegetation or rhizomes. This was a one-egg clutch and the large egg was live and about 22 days old. Again there were many moulted feathers scattered around the nest. The feathers were removed. As we swung away from the nest enroute to nest 21/89 we saw another black bear.

6.19 A bird was on nest 21/89 when we approached. Again we sighted many feathers around the nest. The nest, made of bulrush, was located in a floating bog consisting of sedge with scattered willow clumps. Both eggs tested live and the older egg was slightly tilted when placed in water. It was probably 22-24 days old. The other egg was collected.

6.20 The bird on nest 6/89 walked south into the woods and was not seen again. The large nest, located on the same peninsula where the birds have nested at least on four previous occasions, was made of bulrush. As we tested one egg, the other egg rocked on its own accord while still in the nest. The first egg tested did not show any movement in the water. The second egg, in the 22-25 day category was active and was left in the nest.

6.21 We flew to the Klewi fuel cache to refuel. We were down from 1634-1647. After we crossed Highway #5 I saw two whooping cranes in the Upper Klewi River. No doubt these were RWR-Orange and WBW-O, birds we have seen in that area on three or four previous occasions this year. From a distance we also saw a bird standing beside nest 5/89.

6.22 We were unable to land close to nest 27/89 as the lake on which the nest is located is surrounded by tall spruce. As we circled looking for a landing site the crane left the nest and flew west. We landed in a forest opening well south of the nest. The nest, located in a small bulrush island was made of bulrush. The water between shore and the bulrush stand was 50-60 cm deep including a soft muddy bottom. This is a new nest site and neither of the eggs showed any motion. It is not unusual to find that a first-time nest contains non-viable eggs. J. Saquet went back to the helicopter to pick up previously collected egg

21/89 and it was placed in the nest. The original eggs were collected. The extra trip extended our down time to almost 30 minutes.

6.23 A bird was on nest 18/89, located in a bulrush and willow bog immediately northwest of a large live spruce. The large number of feathers, including black primaries were removed from the vicinity of the large flat-topped nest. Both eggs were live and they were left in the nest. This pair, made up of an experienced breeder and a new female (the original female went missing after arriving at ANWR last fall), in view of lack of experience should perhaps not have been rewarded with both eggs. However, the walking to and from the nest was atrocious in this floating bog and I feared falling with the egg on the return trip. This fact and the almost predator proof nature of this inaccessible nest made me decide to leave both eggs in the nest.

6.24 As we approached nest 9/89 we saw no bird at the nest. We circled lower and sighted the nest but the two eggs had disappeared. No landing was made. This is our worst producing pair, only rarely have these birds raised a chick. As we left the area we saw two cranes flying southwest of the nest.

6.25 Nest 23/89 is on a large shallow lake and the bird was visible from a long way off. As we approached the site, the bird walked north and then flew off as the helicopter landed just east of the nest. It was an easy walk to the nest. The large nest located in a narrow stand of bulrush, was an untidy mess of bulrush. Both eggs were large and alive (category 15-22 days, closer to 15 than 22 days). The more lively (older?), larger egg was left in the nest. Both adults were observed walking near the north end of the lake when we were still on the ground.

6.26 A bird was off nest 13/89 when we approached. Most likely the crane had walked off the nest when we circled nest 23/89, 1.5 km to the west. The bird walked east, then flew north and joined its mate. We could not land near the nest and pilot Farkas put the aircraft down on a small burned island west of Boot Lake. Although this was only 200 m from the nest it took a long time to get there as the water in Boot Lake was surprisingly deep. We could not see through the tall bulrush and had to have the helicopter come back to spot the nest. The nest on the edge of a large bulrush stand was made of bulrush. Both eggs were live and the shorter, thicker egg was collected.

6.27 Nest 15/89 which only had one egg was visited next. The bird walked northwest. The nest, a thick pile of bulrush, was located in a sedge-bulrush marsh, a short distance from a creek. The large egg, in category 15-22 days, was left in the nest.

6.28 Nest 4/89 was one of the nests in which I planned to leave two eggs. A bird was on the nest as we approached and the second bird was several hundred metres east. The nest is in the same sedge-bulrush marsh where the cranes nested in 1987 and 1988. The nest was made of bulrush. Both eggs were live, showing a good rocking motion in the water. They were in the 15-22 day category and about 22 days old. The large, rather stubby eggs were left in the nest.

6.29 We flew to the Sass River fuel cache where we were on the ground from 1912-1926 hrs.

6.30 A bird was on nest 14/89 as we approached (I had seen the bird on the nest after we left nest 4/89). The bird walked off the nest island to the south shore of the nest lake. During our walk to the

island, and when we worked on the nest island, the crane returned, exhibiting the typical whooping crane distraction display (bill in or near water, wings dragging in water), sometimes within 20 or 30 metres of the nest. The bird carried a faded tan band on right leg (former RWR-Orange, 4/78, most likely a male). The nest island, a stand of bulrush, was in 24 cm deep water but there was no measurable water at 1 m from the nest. One egg was lively, in the 15-22 day category and it was left in the nest. During a brief test we could not detect motion in the second egg.

6.31 Both birds were at nest 3/89. They walked, then flew a short distance east. The nest, made of bulrush is in a large shallow pond now almost completely filled in with bulrush stands. The edge of the pond consists of soft deep mud but the rest of the pond provides reasonably good footing. This is another of the nests where I wanted to leave both eggs. The eggs showed a rocking motion in water and were in the category 22-25 days. Both eggs were carefully blotted dry and left in the nest. With both birds at the nest the eggs may have been close to hatching. One of the adults flew back towards the nest before we had left the area.

6.32 Nest 2/89, also attended by experienced breeders, was another nest where I planned to leave both eggs. The nest is again located in the same marsh where the birds have nested for several years. Bulrush and sedge are the nest materials used and the nest is located on a small swamp birch islet. Both eggs were live (one was heard peeping). Eggs were in the 22-25 day category from their position in the water and undoubtedly close to 25 days old. The two eggs were left in the nest.

6.33 We flew by nest 29/89 and we saw the bird standing beside its nest in a cattail and shrub stand near a small creek. The single egg was visible. I did not want to land here as the egg is only an estimated four to six days old and the adults are nesting for the first time. This was only our good fortune as the nest is located in an inaccessible area along a creek, in cattails (usually deep water), and with innumerable dead sticks near the nest, preventing a landing with the helicopter.

6.34 We saw a bird with a yellow leg band standing on nest 22/89 as we approached from the south. Only one egg remained in the nest although on 13 May when the nest was found, there were two eggs. The nest is located in a stand of bulrush and made of rushes. The single egg did not appear to be alive and J. Saquet went back to the helicopter to get egg 13/89 which was put in the nest. As we left, we saw one adult several hundred metres east of the nest.

6.35 The Lobstick nest 1/89 was the last one to be visited. Here also I wanted to leave two eggs. A bird was on the nest as we circled and as we approached to land, the crane walked into spruce woods north of the nest. The nest, placed against a swamp birch was on an islet in a shallow marsh. The islet was a natural 25 cm high hummock on which the birch was growing. A few stalks of bulrush had been placed on the flattened hummock and no measurement could be made of nest height. Both eggs rocked when placed in the water and the two eggs were left in the nest. We were able to land close to the nest and with good footing in the area, we were on the ground only six minutes (Table 1). As we departed, a sandhill crane flew low over the marsh.

6.36 We landed at Fort Smith at 2125. The air temperature was still about 14°C.

7. SUMMARY OF EGG COLLECTION

On 29 May 1989, I collected 15 whooping crane eggs from the 30 nests known to be present in the breeding range. Our determinations show that 17 of the 30 nests in 1989 contained two viable eggs each, and of the other eight nests which originally held two eggs, three nests had one viable egg, two nests (27/89 and 28/89) had no viable eggs, nest 8/89 had lost one of its eggs and the remaining egg was live, nest 22/89 which lost an egg had a non-viable egg remaining and nest 9/89 (originally with two eggs) had been destroyed and both eggs were missing. No eggs were removed from 2-egg clutches 1/89, 2/89, 3/89, 4/89, 12/89, 18/89 and 19/89, nor from one-egg clutches 15/89, 17/89, 24/89, 29/89 (not visited) and 30/89 (found after pickup). Egg substitution was made in nest 22/89 (egg from nest 13/89), in nest 27/89 (egg from nest 21/89) and in nest 28/89 (egg from nest 20/89). Twenty-one single egg clutches (as in the case of the 17 2-egg clutches containing viable eggs except perhaps nests 29/89 and 30/89 which were not examined) were left after the egg pickup. A total of 36 eggs was left in nests, with 34 of these eggs alive at time of testing. The other two eggs were not tested.

Pair 9/89 is our poorest producing pair, rarely has it raised a chick. Pair 22/89 had only one egg (non-viable) remaining and also lost both eggs last year. Pair 8/89 (losing an egg in 1989) failed to hatch its egg in 1988. It seems, therefore, that some pairs are continuously plagued by misfortune.

The 15 eggs collected were measured, weighed and examined on 30 May and the details are given in Table 2. Seven eggs were alive, five were not viable and three eggs were questionable. All eggs were transported to the Patuxent Research Center by T. Lewis. Lewis had to remain in Edmonton overnight but had an associate assisting from Edmonton to Patuxent.

Water depth (Table 1) at 1 m from nest edges averaged 23.4 cm, comparable to 1988 and 1987. Nest measurements averaged 116 cm (diameter) and 14.2 cm (height), again similar to previous years.

Landings at nest sites averaged 10.6 minutes, somewhat higher than the past few years and no doubt related to the difficult walking conditions we encountered at several nest sites.

Warden Saquet, Bizeau and Lewis provided valuable assistance in viability tests and recording data in the field and during egg examination in Fort Smith. In only one instance did we encounter problems in finding the nest while we were on the ground. We were fortunate in having excellent weather during the field project.

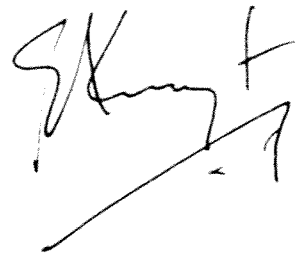
A handwritten signature in black ink, appearing to read "G. King", with a long horizontal line extending from the bottom of the signature.

Table 1. Helicopter landing times, nest size and water depth of nest ponds, recorded during whooping crane egg pickup, 29 May 1989.

Nest No.	Helicopter*		Down time (min)	Nest diameter (cm)	Nest height**(cm)	Nest pond*** depth (cm)	
	Down	Up					
12/89	1130	1145	15	-	-	-	
11/89	1203	1211	8	130	-	-	
16/89	1219	1228	9	110	10	26	
24/89	1234	1243	9	130	13	25	
5/89	1248	1255	7	100	13	26	
20/89	1309	1316	7	120	12	15	
28/89	1327	1335	8	100	16	32	
Fuel	1350	1417	(engine shut down)				-
26/89	1431	1438	7	104	15	-	
10/89	1444	1450	6	80	10	30	
25/89	1454	1501	7	110	14	20	
19/89	1506	1513	7	100	20	23	
7/89	1522	1529	7	120	10	40	
8/89	1536	1541	5	120	15	22	
17/89	1543	1555	12	100	14	14	
21/89	1558	1611	13	110	17	30	
6/89	1614	1624	10	152	11	18	
Fuel	1634	1647	(engine low rpm - no charge)				15
27/89	1659	1728	29	116	20	15	
18/89	1733	1744	11	130	14	30	
9/89	no landing- nest found destroyed						15
23/89	1756	1806	10	150	17	25	
13/89	1811	1839	28	140	15	17	
15/89	1845	1853	8	130	15	20	
4/89	1858	1904	6	110	20	19	
Fuel	1912	1926	(engine low rpm - no charge)				18
14/89	1934	1952	18	120	18	19	
3/89	1957	2008	11	120	13	24*	
2/89	2018	2028	10	100	10	32	
29/89	no landing						7
22/89	2036	2049	13	114	16	17	
1/89	2106	2112	6	100	-	29	
						18	

* Helicopter times provided by E. Bizeau.

** Height above water.

*** Water depth at 1 m from nest edge.

+ Nest on island, water depth at 3 m from nest (measurement included).

- Nests 12/89 and 28/89 in dry situations, no water near nest; nest 1/89 on natural islet.

Average length of down time at nests: $287/27 = 10.6$ min/landing.

Mean nest diameter: $3016/26 = 116$ cm.

Mean nest height: $355/25 = 14.2$ cm.

Mean pond depth: $586/25 = 23.4$ cm.

Table 2. Measurements, estimated age and viability test results of whooping crane eggs collected 29 May 1989.

Egg No.	Length (mm)	Width (mm)	Weight (g)	Estimated age (d)	Viability test, remarks
5/89	97	65	193	15 -(22)*	Live, good rocking motion
6/89	104	65	205	15 -(22)	Questionable, asymmetric egg
7/89	103	60	176	(15)- 22	Questionable, no motion seen
10/89	97	65	191	15 -(22)	Live, good motion
11/89	102	63	183	15 -(22)	Live, good rocking motion
14/89	103	63	196	(15)- 22	No motion
16/89	99	64	192	(15)- 22	Live, slight motion
22/89	105	63	197	15 -(22)	No motion
23/89	99	61	178	(15)- 22	Good rotation
25/89	105	62	196	(15)- 22	Slight rocking, rotation
26/89	90	62	175	12 -(16)	Good rotation
27/89A	95	60	172	(15)- 22	No discernable motion
27/89B	91	60	162	(15)- 22	Slight rotation, questionable
28/89A	100	64	200	(15)- 22	No motion
28/89B	101	64	199	(15)- 22	No motion

* 15- (22) Means closer to 22 d. than 15d.

Figure 1. Whooping Crane Egg Pick
Route, 29 May 1989

— Wood Buffalo N
Nat. Park border

