7.2 Waterfowl

While the term "waterfowl" is used throughout the text to describe the following VEC, shorebirds and other water-associated birds such as sandpipers and gulls are also included. Common and scientific names of waterfowl and passerine birds discussed in the text are provided in Appendix B. Original research on the outfitter route was compiled in an Addendum to the Waterfowl Component Study (JW/MLP 2003a) and a review of available information was compiled in a Waterfowl Component Study (JW and LMSS 2003a) completed for the preferred route. Available information on passerine birds and the assessment of environmental effects apply to the preferred and outfitter routes and are discussed in detail in Section 6.2 of the TLH - Phase III EIS/CSR (JW/IELP 2003a). Therefore, passerine birds are not dealt with specifically in the analysis of environmental effects related to the outfitter route. WST conducted breeding bird surveys for passerine birds in representative ecoregions in June 2003. A report detailing the results of the these surveys will be provided to the Canadian Wildlife Service.

7.2.1 Boundaries

Project boundaries for waterfowl are defined by the spatial and temporal extent of the anticipated physical, visual and auditory influences of the project in the area surrounding the proposed highway route.

In terms of ecological boundaries, waterfowl in the study area are widely distributed, with the majority being migratory. Given the migratory nature of these species, the spatial environmental assessment boundary for waterfowl is large, extending to the range of waterfowl populations occurring in southern Labrador. Temporal boundaries for waterfowl extend through project construction and operation, generally during April to November for most species, although there are exceptions.

Refer to Section 6.2.1 of the TLH - Phase III EIS/CSR (JW/IELP 2003a) for further detail on boundaries.

7.2.2 Methods

The survey area comprised areas of wetland and waterbodies within a 5-km corridor on either side (i.e., 10 km wide) of the outfitters route section on the TLH - Phase III (Figure 7.3). Rivers were surveyed for 10 km on either side of watercourse crossings. In terms of original research for this assessment, five aerial surveys, specifically for waterfowl, were conducted between early May and late August 2003 (JW/MLP 2003a). The surveys were completed on May 9, 2003, May 23, 2003, June 9-10, 2003, July 16-17, 2003, and September 4-5, 2003. Potential harlequin duck habitat was searched during each survey. Aerial survey techniques employed were the same as those used for surveys along the preferred route. Waterfowl data have been graphically presented through a series of contour maps that show relative numbers of waterfowl along the proposed outfitter route and give an overview of areas of bird concentration. Further detail on methods are provided in Section 6.2.2 of the TLH - Phase III EIS/CSR (JW/IELP 2003a).

N
W E
S

Grand Lake

Lake Melville

North West River

Sheshatshiu

Happy Valley - Goose Bay

TLH - Phase I

Churchill River

Traverspine River

Kenamu River

Paradise River

Eagle River

Park Lake

Otter Brook

Crooks Lake

Salmon R.

Joir River

St. Augustin River

St. Paul River

Paradise River

Cartwright Junction

TLH - Phase II

Road Section 1

Road Section 2

Road Section 3

10 km Study Area

0 12.5 25

Kilometres

LEGEND:

- TLH - Phase III Preferred Route
- TLH - Phase III Outfitter (A13 Section) Route
- TLH - Phase I/II Routes

ECOREGIONS:

- Eagle Plateau
- Kingarutuk-Fraser River
- Lake Melville
- Mecatina River
- Paradise River

Figure 7.3

Waterfowl Study Area
Outfitter (A13 Section) Route,
Trans Labrador Highway

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Consulting Engineers

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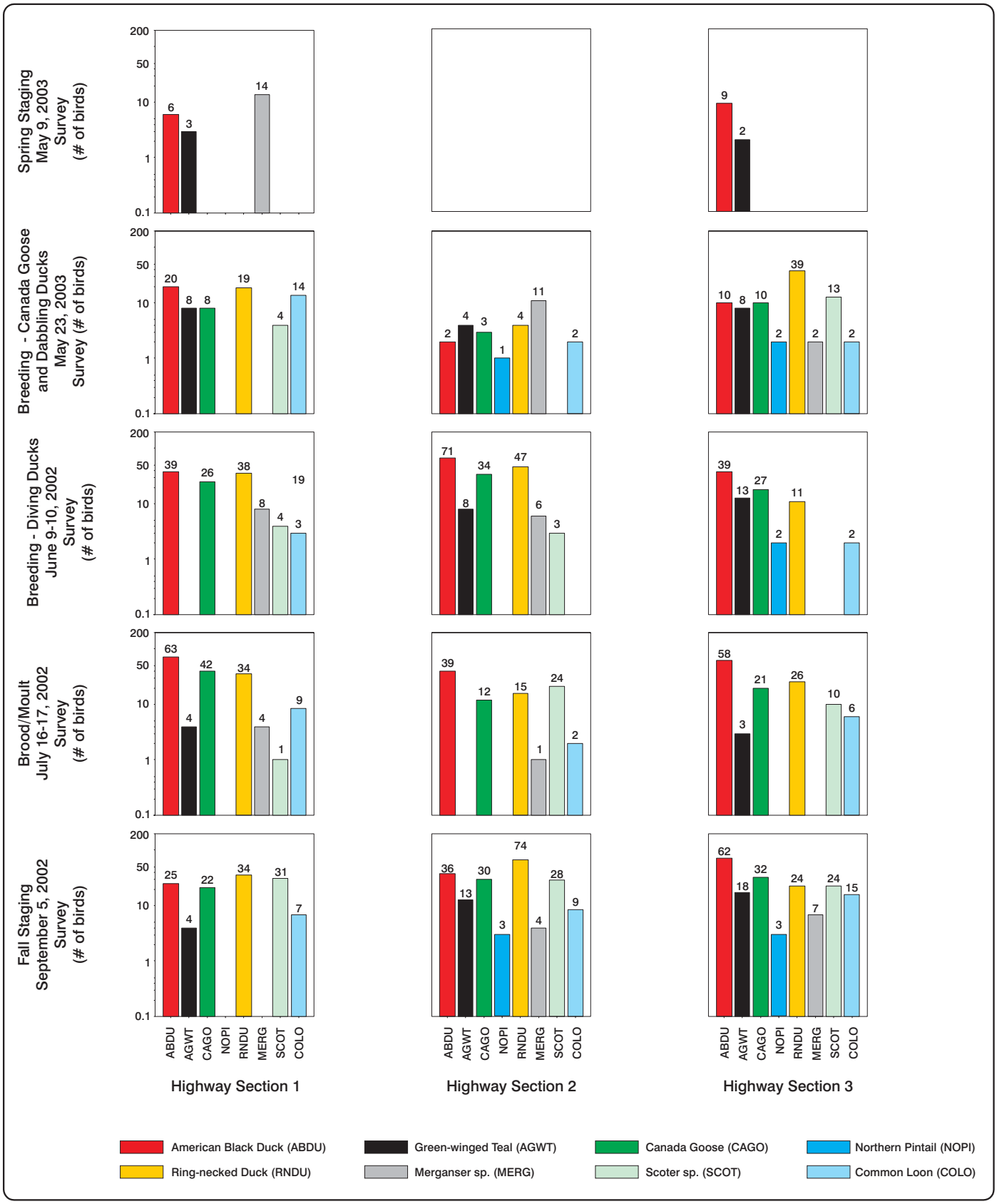
7.2.3 Existing Environment

A summary of selected waterfowl species that were observed during each survey along the proposed outfitter (A13 section) route is provided, by highway section, in Figure 7.4. Species diversity and numbers were low during the May 9 survey as much of the survey area was still ice or snow-covered. Only American black duck, green-winged teal and merganser sp. were observed (Figure 7.4). By the May 23 survey, species diversity and numbers increased and during the June survey, the greatest numbers of ducks were observed (Figure 7.4). American black ducks were observed in all highway sections during most surveys and were among the most commonly observed species during surveys (Figure 7.4). Similarly, Canada geese were observed in all highway sections during most surveys, with distributions being fairly even between highway sections (Figure 7.4). Ring-necked ducks were the most abundant ducks during the fall survey, with a concentrations in highway section 2 (Figure 7.4). Mergansers were observed on all five surveys in 2003, while observations of other species such as scoters, northern pintail and green-winged teals varied between surveys (Figure 7.4).

Following is a description of observations of individual species during each of the five waterfowl surveys completed along the outfitter (A13 section) route in 2003. Relative numbers of waterfowl along the highway route are depicited in Figures 7.5 to 7.9, giving an overview of areas of bird concentration. Observations of five or more individuals of a species are indicated. Refer to Section 6.2.3.1 in the TLH - Phase III EIS/CSR (JW/IELP 2003a) for detailed discussion on trends in populations of each species.

American Black Duck

During the May 9, 2003 survey, 15 American black ducks were observed, two groups of three individuals near the Kenamu River area and several congregations of two birds along the western portion of the outfitter (A13 section) route. During the May 23, 2003 survey, 32 black ducks were observed, again in groups of one or two birds. One group of four black ducks was observed approximately 2.5 km west of the outfitter (A13 section) route, southwest of Crooks Lake. By the June 9 - 10, 2003 survey, the number of black ducks observed had increased to 149, with group size still tending to be individuals or pairs. However, several groups of five black ducks were observed and one group of 14 black ducks was seen approximately 1.5 km north of the road route, south of Crooks Lake (Figure 7.7). Several groups of moulting black ducks were observed along the highway route during the July 17-18, 2003 survey (Figure 7.8) and a total of 59 ducklings were observed. During the September 4-5, 2003 survey, congregations of black ducks occurred at various locations along the route (total of 123 individuals). The largest congregation (11 birds) was seen along the eastern section of the outfitter (A13 section) route as it approaches the preferred route, approximately 7 km to the west (Figure 7.9).



9308-1.cdr 29SEPT03 11:10am

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Environmental Scientists
Consulting Engineers

Figure 7.4

Selected Waterfowl Observations by Highway Section and Survey Date Outfitter (A13 Section) Route, Trans Labrador Highway

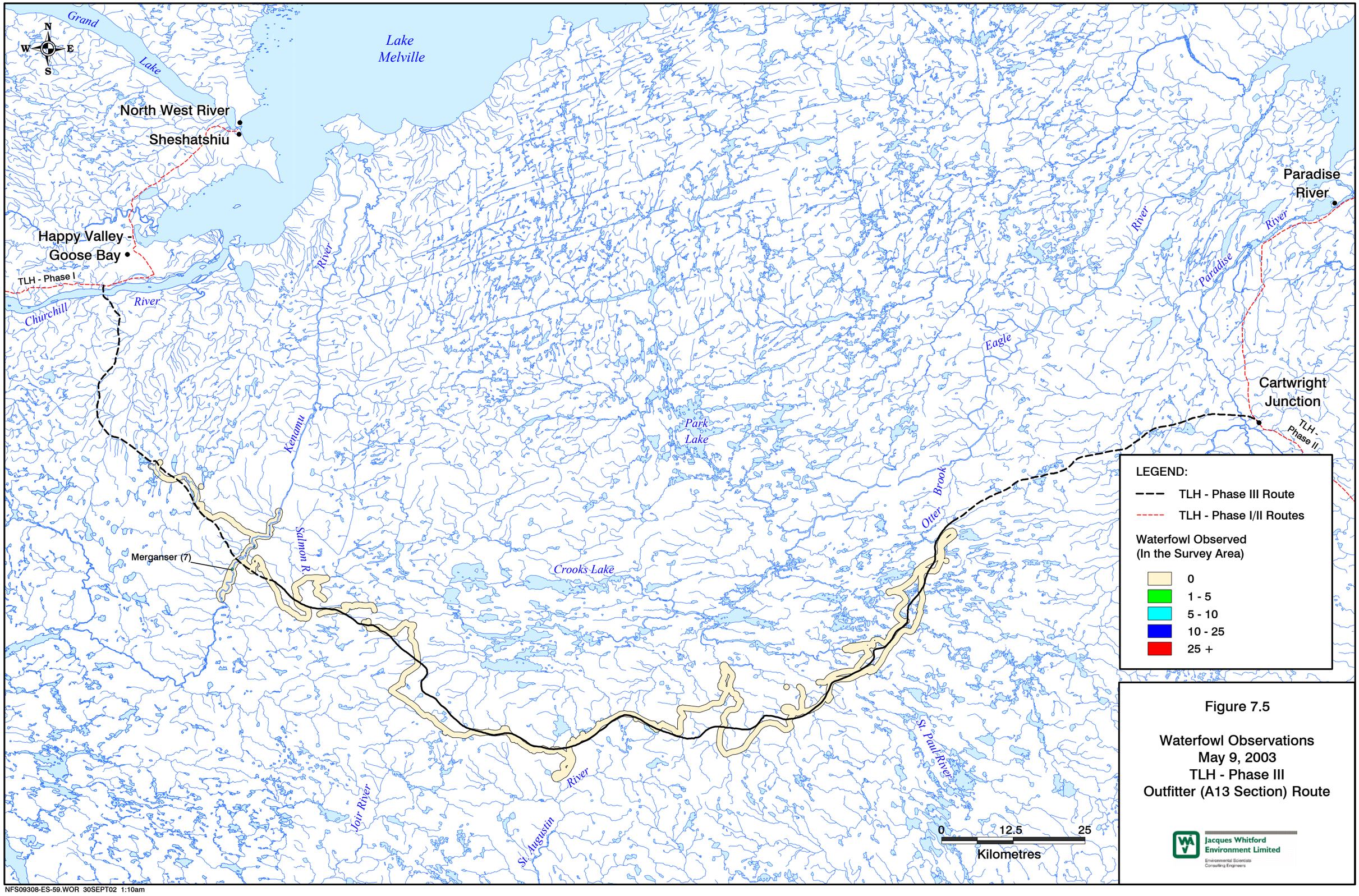

Figure 7.5

Waterfowl Observations
May 9, 2003
TLH - Phase III
Outfitter (A13 Section) Route

Jacques Whitford Environment Limited
Environmental Scientists
Consulting Engineers

NFS09308-ES-59.WOR 30SEPT02 1:10am

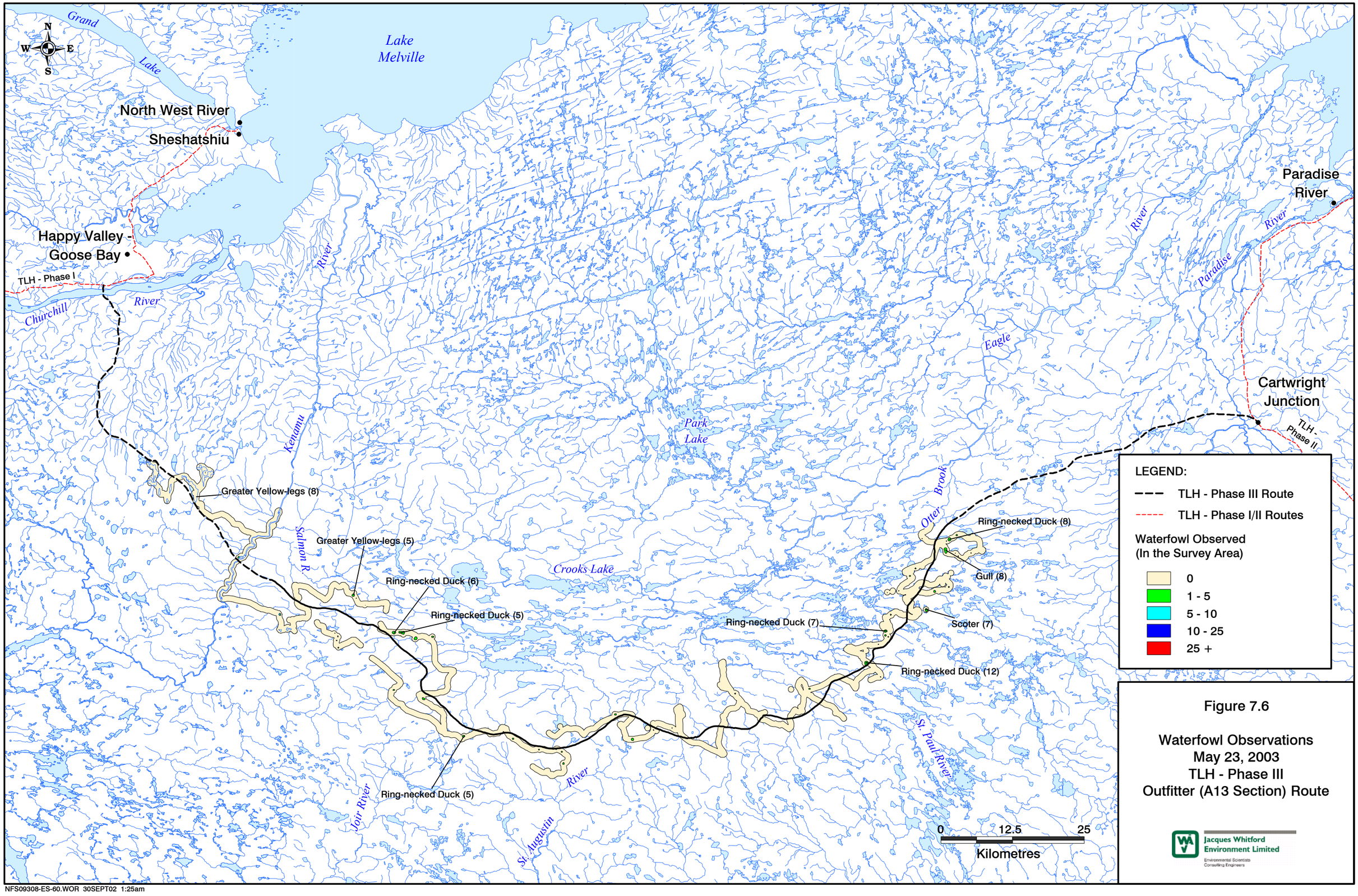

Figure 7.6

Waterfowl Observations
May 23, 2003
TLH - Phase III
Outfitter (A13 Section) Route

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Figure 7.7

Waterfowl Observations
June 9-10, 2003
TLH - Phase III
Outfitter (A13 Section) Route

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Environmental Scientists
Consulting Engineers

NFS09308-ES-57.WOR 30SEPT02 11:30am

N
W E
S

Grand Lake

Lake Melville

North West River

Sheshatshiu

Happy Valley - Goose Bay

TLH - Phase I

Churchill River

Kenamu River

Park Lake

Crooks Lake

Eagle River

Paradise River

Paradise River

Cartwright Junction

TLH - Phase II

Otter Brook

Salmon R

Joir River

St. Augustin River

St. Paul River

Black Duck (5)
Black Duck (6)
Canada Goose (6)
Ring-necked Duck (7)
Goldeneye (6)
Red Breasted Merganser (7)
Ring-necked Duck (5)
Ring-necked Duck (7)
Black Duck (11)
Canada Goose (5)
Canada Goose (8)
Canada Goose (7)
Black Duck (17)
Ring-necked Duck (10)
Canada Goose (5)
Black Duck (12)
Scoter (16)
Black Duck (9)
Black Duck (5)
Black Duck (5)
Black Duck (6)
Surf Scoter (6)
Canada Goose (14)
Scoter (6)
Ring-necked Duck (5)
Black Duck (6)
Canada Goose (6)
Red Breasted Merganser (6)
Ring-necked Duck (5)
Black Duck (5)
Black Duck (5)
Black Duck (6)
Ring-necked Duck (5)
Goldeneye (5)
Canada Goose (7)
Ring-necked Duck (6)
Green Wing Teal (10)
Black Duck (6)
Black Duck (5)
Black Duck (7)
Black Duck (6)
Canada Goose (8)
Scoter (12)
Black Duck (6)
Black Duck (5)
Black Duck (5)
Black Duck (5)
Scoter (7)
Scoter (6)
Black Duck (5)
Ring-necked Duck (16)
Black Duck (6)

LEGEND:

- TLH - Phase III Route
- TLH - Phase I/II Routes

Waterfowl Observed
(In the Survey Area)

- 0
- 1 - 5
- 5 - 10
- 10 - 25
- 25 +

0 12.5 25
Kilometres

Figure 7.8

Waterfowl Observations
July 16-17, 2003
TLH - Phase III
Outfitter (A13 Section) Route

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Consulting Engineers

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N
W E
S

Grand Lake

Lake Melville

North West River

Sheshatshiu

Happy Valley - Goose Bay

TLH - Phase I

Churchill River

Kenamu River

Park Lake

Eagle River

Paradise River

Paradise River

Cartwright Junction

TLH - Phase II

Salmon R

Crooks Lake

Otter Brook

St. Paul River

Joir River

St. Augustin River

Black Duck (6)
Canada Goose (10)
Ring-necked Duck (9)
Ring-necked Duck (8)
Black Duck (5)
Scoter (7)
unid. divers (11)
Canada Goose (6)
Ring-necked Duck (5)
Scoter (6)
Surf Scoter (6)
Canada Goose (5)
Ring-necked Duck (9)
Black Duck (5)
Green Wing Teal (13)
Black Duck (7)

White-winged Scoter (7)
Ring-necked Duck (7)
Ring-necked Duck (5)
Ring-necked Duck (12)
Black Duck (6)
Black Duck (6)
Canada Goose (6)
Ring-necked Duck (22)
Canada Goose (6)

Green Wing Teal (7)
Black Duck (11)
unid. diver (6)
Scoter (10)
Black Duck (8)
Ring-necked Duck (20)
Canada Goose (6)
Black Duck (5)
Canada Goose (8)
unid. diver (7)
Canada Goose (6)
unid. diver (5)
Black Duck (9)

LEGEND:

- TLH - Phase III Route
- TLH - Phase I/II Routes

Waterfowl Observed
(In the Survey Area)

- 0
- 1 - 5
- 5 - 10
- 10 - 25
- 25 +

0 12.5 25
Kilometres

Figure 7.9

Waterfowl Observations
Sept. 5, 2003
TLH - Phase III
Outfitter (A13 Section) Route

Jacques Whitford Environment Limited
Environmental Scientists
Consulting Engineers

NFS09308-ES-58.WOR 30SEPT02 12:10am

Green-winged Teal

During the May 9, 2003 survey, green-winged teal were observed at the outlet of Brennan Lake, along the Kenamu River and on an unnamed river approximately 1 km north of the highway route, 55 km west of where the outfitter (A13 section) route meets the preferred route. During the May 23, 2003 survey, most observations of green-winged teal were of single birds. Some groups of two and four birds were also seen. Individuals were distributed along the highway route, usually in ponds associated with wetlands or in areas of slow moving water associated with rivers. Similarly, during the June 9 to 10, 2003 survey, numerous groups of one or two green-winged teal were observed. During the July 17 - 18, 2003 survey of the outfitter (A13 section) route, only seven adult green-winged teal were observed, one adult had nine young (Figure 7.8). During the September 4-5, 2003 survey, green-winged teal were seen along each highway section, with one group of 13 birds observed approximately 7 km south of the route and another group of seven birds near Otter Brook (Figure 7.9).

Ring-necked Duck

No ring-necked ducks were observed during the May 9, 2003 survey. As noted above, much of the landscape remained ice and snow-covered and few waterfowl were observed. During the May 23, 2003 survey, 62 ring-necked ducks were observed, most along the western third of the outfitter (A13 section) routing, where the amount of wetland and standing water is greatest (Figure 7.6). Group size varied from single birds to groups of seven or eight. During the June 2003 survey, 96 ring-necked ducks were observed, including a group of 25 on an unnamed lake approximately 1.5 km north of the outfitter (A13 section) route, located in the central portion of the route (Figure 7.7). During this survey, most ring-necked ducks were associated with smaller waterbodies within wetland areas. During the July 17 - 18, 2003 survey, ring-necked ducks were generally observed in small groups of five or less birds; several groups of ring-necked ducks also had broods, totaling 35 young. One grouping of 16 ring-necked ducks was observed on the eastern portion of the highway route (Figure 7.8). During the September 4 - 5, 2003 survey, ring-necked ducks were distributed throughout the survey area (total of 132 individuals), mainly in groups of five or less (Figures 7.9). Several larger grouping were observed, including 20 ring-necked ducks seen on a small lake approximately 8 km north of the route (Figure 7.9) and a group of 22 seen approximately 7 km south of the route (Figure 7.9). Some ring-necked ducks were observed with broods; it was apparent that some were flightless at that time.

Canada Geese

No Canada geese were recorded during the May 9, 2003 survey. Again, as noted above, the lack of early spring staging sites along the outfitter (A13 section) route likely accounts for no observations of Canada geese at this time. During the May 23, 2003 survey, geese were observed, all in single individuals or groups of two. By the June 9 - 10, 2003 survey, 87 Canada geese were observed. Observations were distributed along the highway route, with individuals generally associated with string bogs, ribbed fens, and along the grassy shorelines of small rivers. Observations still tended to be of single individuals or pairs. However, one group of nine birds was observed southwest of Crooks Lake, approximately 1 km south of the outfitter (A13 section) route (Figure 7.7). Thirteen Canada goose nests were also observed, all generally on small islands in string bogs or small waterbodies surrounded by wetland habitat types (Figure 7.7). Five of these nests were located in an area of wetlands and small ponds along the western section of the outfitter (A13 section) route, south of Crooks Lake (Figure 7.7). By July 17 - 18, 2003, some aggregations of Canada geese were again

evident (Figure 7.8) and several broods were identified. During the September 4 - 5, 2003 survey, Canada geese were observed in groups ranging from three to ten individuals, with groupings of two or three birds common (total of 84 individuals). A group of 10 Canada geese were seen approximately 2.5 km northeast of the route (Figure 7.9) and four groups of goslings were observed.

Scoters

Scoters were not observed during the May 9, 2003 surveys but were seen during the May 23, 2003 surveys. Observations were of one or two birds, except for one group of seven individuals seen approximately 5 km east of the outfitter (A13 section) route, 20 km south of where it joins the preferred route (Figure 7.6). Only seven scoters were observed during the June 9 - 10, 2003 survey. During the July 17 - 18, 2003 survey, 35 scoters were observed, including five broods (totaling 26 young). One brood group totaled 16 birds (Figure 7.8). During the September 4 - 5, 2003 survey, scoters were observed in groups ranging from one to ten birds (Figure 7.9). White-winged scoters were identified at four locations on the eastern and central sections of the outfitter (A13 section) route, including a group of seven south of Crooks Lake (Figure 7.9).

Mergansers, **Common Goldeneye and Other Ducks**

Relatively small numbers of mergansers were observed during the May and June surveys. All observations were of common mergansers and occurred generally in groups of one to seven individuals. During the May 9, 2003 survey, mergansers were seen only along the Kenamu River and the outlet of Brennan Lake (Figure 7.5). During the May 23, 2003 survey, 28 mergansers were observed and 14 were counted during the June 9 - 10, 2003 survey, including a group of five birds west of the Kenamu River (Figure 7.7). In all surveys, mergansers tended to be found along rivers and lakes, rather than in wetland areas, and none were observed in the wetland complexes along western end of the outfitter (A13 section) route during the June survey. During the July 17 - 18, 2003 survey, only seven adult mergansers were observed (five identified as common mergansers and two identified as red-breasted mergansers). Two red-breasted merganser broods were recorded, totaling 11 birds (Figure 7.8).

Relatively few common goldeneye were observed during the 2003 surveys and, similar to mergansers, they were usually associated with rivers and lakes, rather than wetland areas. No common goldeneye were observed during the two surveys in May 2003 and only nine individuals were observed during the June 9 - 10, 2003 survey, with one group of five west of the Kenamu River (Figure 7.7). Eleven common goldeneye, including two broods (totaling nine young), were observed along the outfitter (A13 section) route during the July 17 - 18, 2003 survey (Figure 7.8). During the September 4 - 5, 2003 survey, only one common goldeneye was observed along the western portion of the outfitter (A13 section) route.

Two scaup spp. were recorded during the July 17 - 18, 2003 survey and during the June 9 - 10, 2003 and September 4 - 5, 2003 surveys, two and six northern pintail were observed, respectively.

Harlequin Duck

No harlequin duck were observed during surveys in 2003. It appeared that potential harlequin duck habitat along the outfitter (A13 section) route may be limited as there were few large rivers traversed by the A13 section and areas of fast flowing water were minimal.

7.2.4 Potential Interactions

During construction, the clearing of vegetation may result in the loss of nesting habitat for waterfowl. Noise and general disturbance, including use of lights, blasting activities and vehicular movement during construction of the highway and at watercourse crossings, may also disturb nesting or foraging birds. During operation, noise and regular vehicular activity may also cause disturbance, resulting in avoidance of habitat in the vicinity of the highway.

The presence of the highway will result in improved access to areas previously difficult to reach except by air, boat in the summer or snowmobile in winter. This may lead to increased hunting pressure on waterfowl in the region.

An accidental event such as a forest fire may cause waterfowl to avoid areas previously inhabited. Contamination of waterbodies resulting from spills of fuel or other hazardous materials could lead to oiling of waterfowl and other water-associated birds, as well as reduced foraging opportunities for aquatic feeders. Similarly, siltation of waterbodies during construction could also result in reduced foraging opportunities. Collisions with vehicles may cause mortality to waterfowl.

7.2.5 Issues and Concerns

Issues and concerns related to waterfowl include:

- loss of nesting habitat due to vegetation removal;
- avoidance of habitat due to project-related disturbances (i.e., noise);
- increased hunting pressure on waterfowl due to improved access;
- reduced foraging opportunities as a result of spills of fuel or other hazardous materials or siltation of waterbodies; and
- mortality through vehicle collisions or spills of fuel or other hazardous materials.

7.2.6 Existing Knowledge

While waterfowl may not avoid areas of human activity during breeding, they have been noted to avoid these areas during early brood-rearing (Kuchel 1977). Reduced reproductive success has been reported in the vicinity of human activity (Bengtson 1972; Dzubin 1984; Cassirer and Groves 1990), with the greatest disturbance occurring during nesting, incubation and brood rearing. The presence of a highway itself does not typically cause a disturbance response, rather, it is human presence on the highway that causes the greater effect. Monitoring of highway traffic conducted for the Northumberland Strait Crossing project (Confederation Bridge) suggests that the abundance of scoters, common eiders, long-tailed ducks and red-breasted mergansers was not negatively affected by the construction and initial months of operation of the Confederation Bridge (JW 1998d). Other species such as Canada goose and American black duck appear to be able to tolerate human activity, as evidenced by the presence of Canada goose and black duck broods in many urban parks. However, in Washington State, Canada goose broods avoided areas of human activity within their home range, particularly during the first few weeks after hatching (Eberhardt et al. 1989), indicating that the ability to tolerate disturbance is likely the result of habituation to predictable disturbances.

Linear developments provide access for hunters. In a study of ruffed grouse hunting in Alberta, harvesting along highways accounted for 96 percent of the birds killed (Fischer and Keith 1974).

Refer to Section 6.2.6 of TLH - Phase III EIS/CSR (JW/IELP 2003a) for further discussion on the existing knowledge related to the potential effects of the highway on waterfowl.

7.2.7 Mitigation

WST has attempted to reduce the project's potential effects on waterfowl through project design and planning. Specific mitigative measures include the following:

- vegetation removal restricted to 30 m in the right-of-way;
- reduction or avoidance of in-stream activity;
- use of accepted practices for erosion control and slope stabilization;
- drainage to and through wetlands will be maintained to prevent loss of water supply to downslope areas;
- no harassment or feeding of waterfowl by project personnel;
- construction vehicles will remain in the right-of-way and all-terrain vehicles will use designated routes, avoiding wetland areas wherever possible;
- all construction personnel will be required to follow all applicable legislation for hunting and using and storing firearms;
- at locations along the highway where active waterfowl nests are present or suspected, maintenance activities will be restricted until eggs have hatched and broods are mobile; and
- design and implementation of fuel and other hazardous material spill contingency plans and emergency response in the event of an accident.

7.2.8 Environmental Effects Assessment

7.2.8.1 Construction

The environmental effects of highway construction on waterfowl will be similar for both the preferred route and the outfitter route. These effects include direct loss of potential foraging and nesting habitat through vegetation removal along the highway right-of-way and noise and human disturbance during construction. The amount of forest vegetation that will be removed as a result of highway construction along the outfitter route is approximately 481 ha (includes spruce/fir forest, spruce/lichen forest and hardwood scrub). The amount of wetland or otherwise unforested area (includes lichen/soil barren) that will be removed is approximately 335 ha. For comparison, the amount of forested vegetation that will be removed along the preferred route is approximately 496 ha and the amount of wetland or otherwise unforested vegetation that will be removed is 230 ha. Overall, there will be more vegetation removed during construction of the outfitter route, as the route is longer (726 versus 816 ha). However, the vegetation types that will be affected by construction are not considered unique within the region traversed by either route.

Refer to Section 6.2.8.1 of the TLH - Phase III EIS/CSR (JW/IELP 2003a) for further discussion on the environmental effects of highway construction on waterfowl.

An analysis was conducted based on waterfowl density, defined as the number of waterfowl observed per hectare of wetland. Sixteen wetlands were identified to have a relatively high density (density greater than 0.10), 18 with moderate density (density between 0.05 to 0.10 ha), and 28 with low density (density less than 0.05). The wetlands with the highest density are indicated in Table 7.3 and their locations are indicated in Figure 7.4.

Table 7.3 Wetlands with Waterfowl Densities Greater Than 0.10 birds/ha

Wetland No.	Area (ha)	No. of Waterfowl	Density (#birds/ha)
10	4.61	1	0.217
21	33.06	5	0.151
24	26.55	3	0.113
60	11.64	3	0.257
62	17.44	4	0.229
65	28.18	4	0.142
69	2.45	3	1.223
72	25.9	4	0.154
73	24.32	3	0.123
75	14.77	2	0.135
85	10.64	5	0.47
92	12.23	2	0.163
95	195.01	25	0.128
104	33.23	4	0.12
106	24.92	5	0.2
108	7.27	1	0.137

Five wetlands with waterfowl densities greater than 0.10 birds/ha are greater than 2 km from the centre line of the proposed highway (Figure7.10). Ten of the wetlands are less than 1 km from the centre line, with three on the central section of the outfitter (A13 section) route being immediately adjacent to or within the highway right-of-way (Figure 7.10). The wetland with the highest density of birds, Wetland 69, is approximately 160 m from the centre line of the proposed highway (Figure 7.10). More wetlands with a waterfowl density of greater than 0.10 birds/ha were identified along the outfitters route than were observed along the preferred route (21 versus 9).

Analysis of the June survey results also indicated that the probability of the occurrence of waterfowl increases with wetland area, suggesting support for the hypothesis that, in this region, suitable waterfowl habitat is widespread, although not highly productive. Few areas were identified that had waterfowl densities suggestive of more productive habitat.

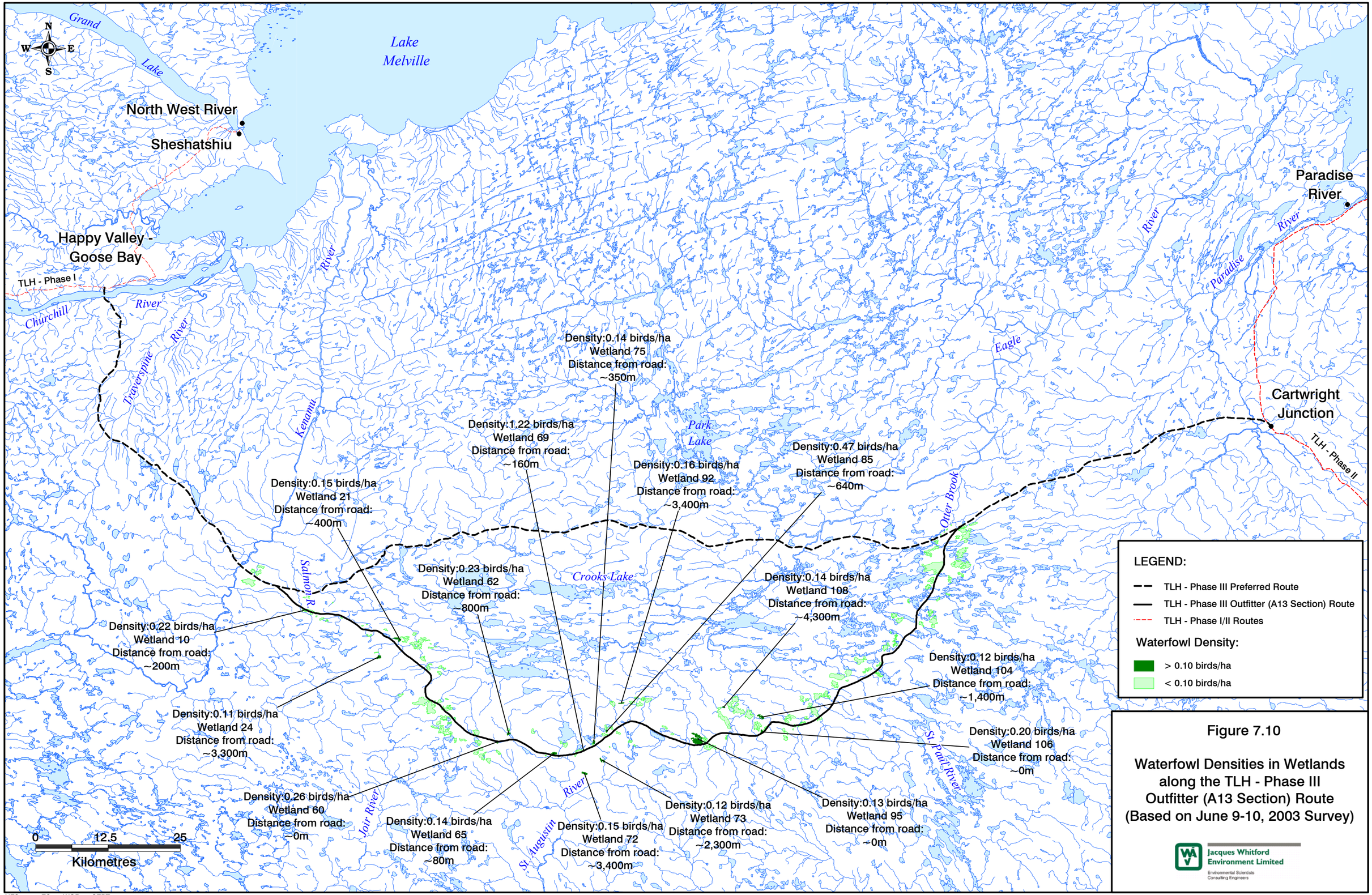

Figure 7.10

Waterfowl Densities in Wetlands along the TLH - Phase III Outfitter (A13 Section) Route (Based on June 9-10, 2003 Survey)

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Environmental Scientists
Consulting Engineers

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7.2.8.2 Operation

The environmental effects of highway operation on waterfowl will be similar for both the preferred route and the outfitter route. No further habitat will be altered during operation. As noted above, waterfowl will likely become habituated to non-threatening activity along the highway, specifically vehicle traffic; therefore, the potential disturbance effects are negligible.

Refer to Section 6.2.8.2 of the TLH - Phase III EIS/CSR (JW/IELP 2003a) for further discussion on the environmental effects of highway operation on waterfowl.

7.2.8.3 Accidental and/or Unplanned Events

The environmental effects of an accidental or unplanned event on waterfowl will be similar for both the preferred route and the outfitter route. Effects may include mortality through an accidental spill of fuel or other hazardous materials into waterbodies or in riparian zones, fire that could destroy habitat for some cavity nesting ducks, such as common goldeneye and common merganser, or cause waterfowl and shorebirds to abandon burned areas. Mortality induced through collisions with vehicles may also occur. However, the volume of traffic anticipated to occur on the proposed highway is relatively low. Therefore, it is likely that the number of individual birds killed as a result of vehicle collisions will be low.

Refer to Section 6.2.8.3 of the TLH - Phase III EIS/CSR (JW/IELP 2003a) for further discussion on the environmental effects of an accidental event on waterfowl.

7.2.9 Environmental Effects Evaluation

The key potential interactions between project activities and waterfowl include direct disturbance, habitat loss and increased hunting pressure. The following definitions are used to rate the significance of the predicted residual environmental effects of the project on waterfowl.

A **major (significant) environmental effect** is one affecting a waterfowl population in such a way as to cause a change in abundance and/or distribution beyond which natural recruitment (reproduction and in migration from unaffected areas) would not return that population, or any populations or species dependent upon it, to its former level within several generations. The effect is not reversible.

A **moderate (significant) environmental effect** is one affecting a portion of a waterfowl population in such a way as to cause a change in the abundance and/or distribution of that portion of the population or any populations or species dependent upon it over one or more generations, but does not change the integrity of any population as a whole. The effect may not be reversible.

A **minor (not significant) environmental effect** is one affecting a specific group of individuals of a species of waterfowl in such a way as to cause a change in abundance and/or distribution in a localized area and/or over a short period (one generation or less), but not affecting other trophic levels or the integrity of the population itself. The effect is reversible.

A **negligible (not significant) environmental effect** is one affecting a specific group of individuals of a species of waterfowl in such a way as to cause a change in abundance and/or distribution in a localized area and/or over a short period (one generation or less) in a manner similar to small random changes in the population due to natural irregularities, but having no measurable effect on the population as a whole. The effect is reversible.

The proposed highway is a linear development that will avoid wetland areas, where feasible. Therefore, interactions with waterfowl will be reduced. For waterfowl, the environmental effects will be restricted to removal of habitat in the immediate highway corridor and the indirect effect of improved access to areas along the highway that may result in increased hunting pressure. Based on the preceding discussion and proposed mitigations, the residual effects of the project on waterfowl are assessed as minor (not significant) for construction, operation and accidental events (Table 7.4) due to the dispersed nature of waterfowl distributions on the landscape and the likelihood that only a small proportion of any waterfowl population may be affected by human activities in a given area. Overall, the project is not likely to result in significant adverse environmental effects on waterfowl.

7.2.10 Cumulative Environmental Effects

The cumulative effects related to the interaction of existing activities and potential future activities with the proposed highway will be the same regardless of whether the highway follows the preferred route or the outfitter route. However, if the highway follows the outfitter (A13 section) routing, it is unlikely that the road will be within the boundaries of the proposed Akamiuapishku/Mealy Mountain National Park. Therefore, resources that may have fallen within the boundary of the National Park will not be protected from future development or exploitation.

If resources agencies do not have adequate resources to plan or manage activities such as cabin development and forest harvesting in riparian zones may, it cause waterfowl to be displaced from nesting and foraging areas and may degrade water quality, thus affecting forage availability for waterfowl. Similarly, uncontrolled access to wetlands by ATV could result in noise disturbance or destruction of nests by ATVs, negatively affecting nesting waterfowl. Riparian zones and surrounding waterbodies may be degraded through improper forest harvesting practices, cabin construction and other human activities such as ATV use. The low density of waterfowl in the region means that only a few individuals from a population would likely be affected as long as the effects are limited to areas near the road.

If hunting occurs in the future under inadequate regulatory enforcement, local declines in populations of waterfowl could result. For example, migratory bird regulations now allow harvesting in Labrador to begin on the first Saturday in September. Waterfowl surveys conducted for the EIS/CSR in 2002 and 2003 indicated that in early September there are young waterfowl that are still flightless during this period. Groups of such waterfowl would be particularly vulnerable to hunting, particularly if a large number of hunters are covering large areas using ATVs. If unregulated hunting occurs, a moderate (significant) cumulative effect (i.e., one affecting a portion of a population in such a way as to cause a change in the abundance and/or distribution of that portion of the population or any populations or species dependent upon it over one or more generations, but does not change the integrity of any population as a whole) may result from this activity.

Table 7.4 Environmental Effects Summary - Waterfowl

	Construction	Operation	Accidental/Unplanned Events
Mitigation: • vegetation removal restricted to 30 m in the right-of-way; • reduction or avoidance of in-stream activity; • use of accepted practices for erosion control and slope stabilization; • drainage to and through wetlands will be maintained to prevent loss of water supply to downslope areas; • no harassment or feeding of waterfowl by project personnel; • construction vehicles will remain in the right-of-way and all-terrain vehicles will use designated routes, avoiding wetland areas wherever possible; • all construction personnel will be required to follow all applicable legislation for hunting and using and storing firearms; • at locations along the highway where waterfowl nests are present or suspected, maintenance activities will be restricted until eggs have hatched and broods are mobile; and • design and implementation of fuel and other hazardous material spill contingency plans and emergency response in the event of an accident.			
Environmental Effects Criteria Ratings			
Magnitude	Low	Low	Unknown
Geographic Extent	<1 km^2	1-10 km^2	100 km^2
Frequency	Continuous	Continuous	<10
Duration	72	>72	>72
Reversibility	Reversible	Reversible	Unknown
Ecological/Socio-economic Context	Low/May be affected by effects to water and fish and fish habitat and influence resource use and users.		
Environmental Effects Evaluation			
Significance	Not Significant (Minor)	Not Significant (Minor)	Not Significant (Minor)
Level of Confidence	High	High	High
Likelihood[1]	n/a	n/a	n/a
Sustainable Use of Resources[1]	n/a	n/a	n/a
[1] Likelihood is only defined for effects rated as significant, and Sustainable Use of Resources is only defined for those effects rated as significant and likely (Canadian Environmental Assessment Agency 1994).			
Environmental Monitoring and Follow-up: • WST will monitor areas for waterfowl and will restrict construction activities as appropriate. • The contractor and WST will be briefed further on monitoring for waterfowl during the environmental awareness session.			
Key: Magnitude: High, Medium, Low, Nil or Unknown Geographic Extent (km^2): <1, 1-10, 11-100, 101-1,000, 1,001-10,000, >10,000 or Unknown Frequency (events/year): <10, 11-50, 51-100, 101-200, >200, Continuous or Unknown Duration (months): <1, 1-12, 13-36, 37-72, >72 or Unknown Reversibility: Reversible, Irreversible or Unknown Context: Existing Disturbance (High, Medium, Low, Nil or Unknown) Significance: Minor, Moderate, High Level of Confidence: High, Medium, Low Likelihood: High, Medium, Low or Unknown Sustainable Use of Resources: High, Medium, Low or Unknown			

The various resource management agencies should consider a cooperative management or regional land use planning approach to managing the land and resources along the highway and surrounding area. In addition, the departments and agencies responsible for managing wildlife resources may need to review existing management policies and programs to ensure that they are appropriate. There may also be a need for agencies to increase their enforcement staff levels.

For a detailed discussion on cumulative environmental effects, refer to Section 6.2.10 of the TLH - Phase III EIS/CSR (JW/IELP 2003a).

7.2.11 Environmental Monitoring and Follow-up

WST will monitor areas for waterfowl and will restrict construction activities as appropriate. The contractor and WST employees will be briefed further on this during the environmental awareness session.