GHX-1 WATERBIRD AND NOISE MONITORING PROGRAM

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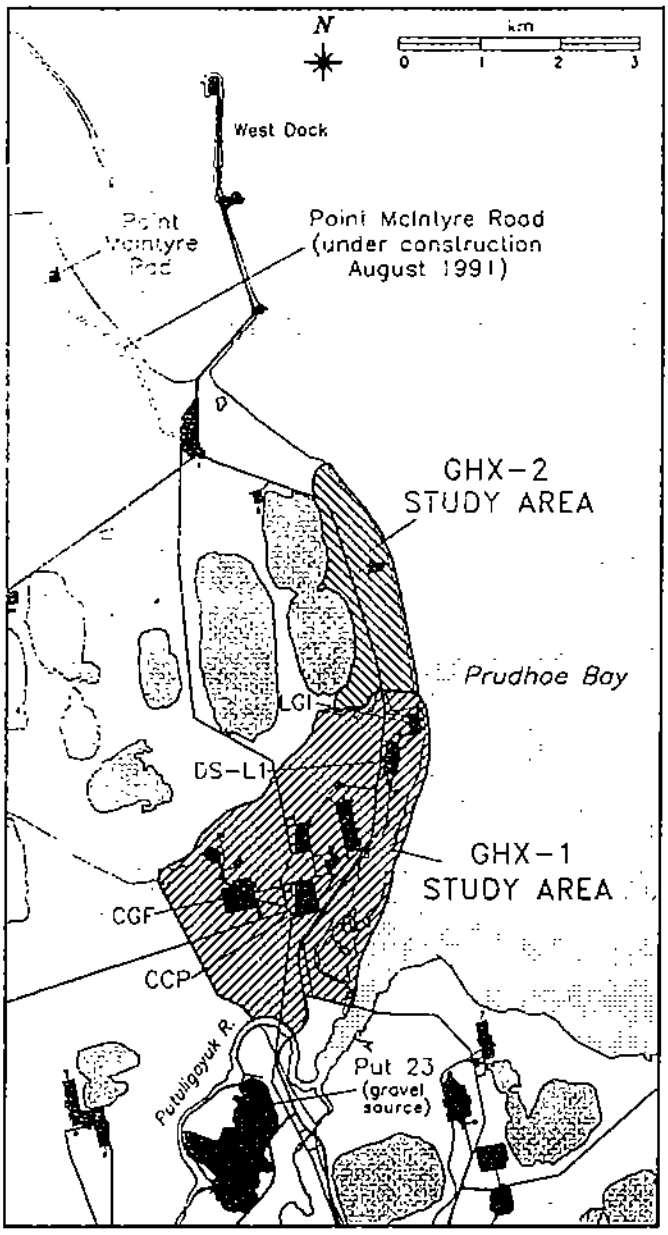

ABUNDANCE AND DISTRIBUTION OF WATERBIRDS IN THE GHX-2 STUDY AREA

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THE EFFECTS OF POINT McINTYRE/GHX-2 GRAVEL HAULING ON BRANT

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ABUNDANCE AND DISTRIBUTION OF WATERBIRDS IN THE GHX-2 STUDY AREA

FINAL REPORT

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EXECUTIVE SUMMARY

- The second phase of the Gas Handling Expansion Project (GHX-2) will involve the construction of a new pad (Apex Gas Injection [AGI]) located north of the Lisburne Gas Injection Pad along the coast of Prudhoe Bay. Prior to the construction of this new pad in 1992, ARCO Alaska, Inc., contracted with Alaska Biological Research, Inc., to assess the abundance and distribution of waterbirds in the area between May and September 1991.

- Fourteen species of waterbirds were seen during 30 road surveys of the GHX-2 study area between 26 May and 4 September 1991. Of those 14 species, five occurred on $\leq$ 5 surveys: Snow Goose, Mallard, American Wigeon, Northern Shoveler, and Spectacled Eider. Daily counts of all waterbirds ranged from a high of 317 (292 adults, 25 young) on 23 July to a low of four (2 adults, 2 young) on 4 September, the last survey date.

- The distribution and abundance of waterbirds varied between the eastern and western sections of the study area. Prior to 8 June, no birds used the the eastern side of West Dock Road because of snow cover. After mid-July, we saw more birds in the eastern section, except for two large peaks in bird numbers in the western section in late July and early August. Those peaks were due to large (200+), molting flocks of Canada Geese that temporarily moved to the eastern shore of the deep, open lake.

- Canada Geese and Brant were the most common goose species in the area. Canada Geese with broods were seen periodically during July and August and a flock of brood-rearing Brant used coastal wetlands north of West Beach State No. 1 during July and August. Peak count for this flocks was 68 adults and 56 young on 9 August. Neither species nested in the area, however. Although Greater White-fronted Geese were less common than these other geese, one pair nested successfully in the study area.

- Seven species of ducks occurred in the study area, but only three species were common: Northern Pintail, Oldsquaw, and King Eider. All of the four (Mallard, American Wigeon, Northern Shoveler and Spectacled Eider) remaining species were uncommon. We did not locate any nests of ducks in the study area and also did not seen any broods.

- Pacific and Red-throated loons were seen regularly and both species nested in the study area. The single pair of Pacific Loons that nested in the area successfully hatched one young in their second (re-nest) attempt, but it disappeared shortly after hatch. Two pairs of Red-throated Loons attempted to nest; both pairs lost their first nest. One pair re-nested and produced two young, which probably did not fledge due to their late hatch date.

- In conclusion, both the diversity and abundance of waterbirds in the GHX-2 study area are representative of other coastal areas in the Prudhoe Bay. Habitats in the area, except for the halophytic wet meadows north of WBS-1, are available elsewhere, and loss of some tundra habitats to gravel placement for the new pad would not be detrimental to waterbirds from a regional perspective. Only a few waterbird species are likely to be affected by construction and operation of the AGI pad and those effects can be minimized by proper planning and scheduling of construction activities.

ACKNOWLEDGMENTS

This project was funded by ARCO Alaska, Inc., and the Prudhoe Bay Unit Owners and administered by ARCO Alaska, Inc. The authors would like to thank Mike Joyce, Senior Environmental Consultant, ARCO Alaska, Inc., for his support and valuable input during all phases of the study. We also are grateful to ARCO Alaska personnel Bob Elder and Rod Hoffman for their logistical support in Prudhoe Bay.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

The second phase of the Gas Handling Expansion Project (GHX-2) will further increase the capacity for processing and re-injecting of natural gas in the Prudhoe Bay Oilfield begun by the GHX-1 project. GHX-2 also will require the expansion of the CGF and CCP facilities and the construction of a new gravel pad on the coast of Prudhoe Bay immediately south of the West Beach State No. 1 (WBS-1) exploratory pad. This new pad, the Apex Gas Injection (AGI) pad, will support facilities for re-injection of gas produced at the CGF to help maintain oil production. The AGI pad is scheduled for construction in 1992, therefore, prior to its construction, ARCO Alaska, Inc., requested that we conduct surveys for waterbirds (geese, swans, ducks, and loons) in the vicinity of the new pad in conjunction with our regular GHX-1 surveys. Because the major construction activities will take place east of West Dock Road, we evaluated abundance and distribution of waterbirds in two sections: the eastern section (i.e., east of West Dock Road) and the western section (west of West Dock Road) of the study area.

The eastern section of the GHX-2 study area was surveyed in 1985-1989 for geese during the Lisburne Terrestrial Monitoring Program (Murphy et al. 1986, 1987, 1988, 1989, 1990) and the western section was surveyed for waterbirds in 1989 during the Point McIntyre Waterbird Noise Monitoring Program (Johnson et al. 1990).

The two major objectives of our GHX-2 waterbird study were 1) to record the seasonal abundance and distribution of waterbirds in the study area surrounding the proposed AGI pad during May-September 1991; and 2) to locate nests and monitor nesting success of waterbirds in the study area.

STUDY AREA

The GHX-2 study area comprises 2 km^2 of land located on both sides of West Dock Road and extends north from the unnamed stream near the Lisburne Gas Injection (LGI) pad to the point at which West Dock Road curves west towards the base of the West Dock Causeway (Figure 1). The study area was divided into east and west sections along

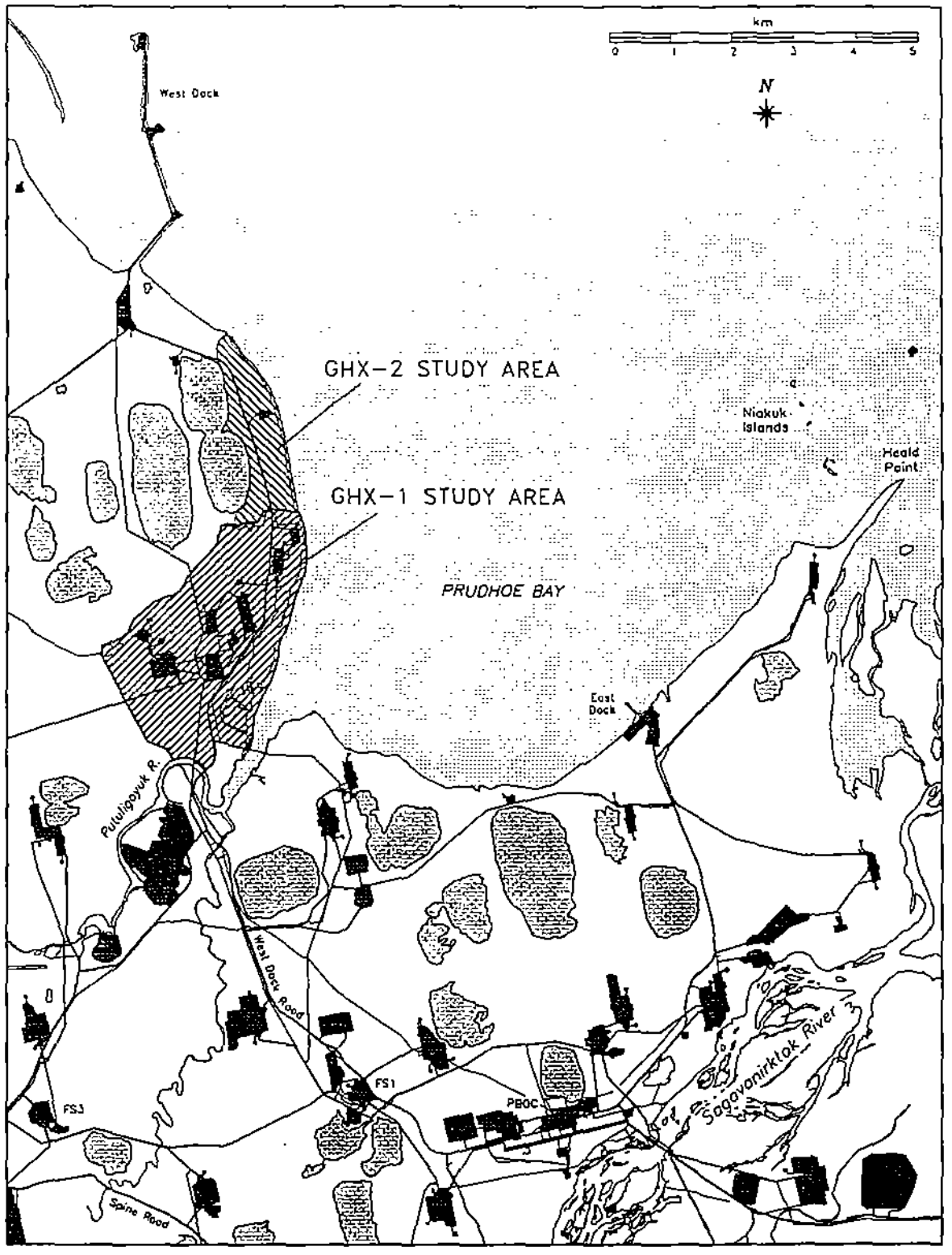

Figure 1. Location of the GHX-2 study area relative to the GHX-1 study area and other oilfield facilities, Prudhoe Bay, Alaska, 1991.

West Dock Road with 1.3 km^2 (64% of the total study area) located between the road and Prudhoe Bay (eastern section), and 0.7 km^2 (35%) between the road and the large deep, open lake to the west (western section). The new AGI pad will be located in the eastern section of the study area south of WBS-1 (Figure 2). The southern boundary of the study area directly abuts the northern boundary of the GHX-1 study area (Anderson et al. 1992).

Basic landforms, vegetation, and hydrology in the study area are similar to those described for the GHX-1 study. Waterbird habitat types in the study area were mapped previously and the eastern section was described in the 1988 Lisburne Terrestrial Monitoring Program annual report (Murphy et al. 1989), and the western section was described in the Point McIntyre Waterbird and Noise Monitoring Program (Johnson 1990).

METHODS

Methods for the road surveys followed those described for the GHX-1 study area (Anderson et al. 1992). The survey route included West Dock Road and the WBS-1 road and pad.

Methodology for nest searches was modified because of the limited extent of the study area. All suitable waterbodies for nesting waterbirds were visible from the road system and from the WBS-1 pad, therefore, no systematic ground searches were conducted for waterbird nests. Nest fate was determined using the same criteria outlined in the GHX-1 study.

RESULTS

We saw 14 species of waterbirds during 30 road surveys of the GHX-2 study area between 26 May and 4 September 1991 (Table 1). Of those 14 species, five occurred on $\leq$ 5 surveys: Snow Goose, Mallard, American Wigeon, Northern Shoveler, and Spectacled Eider. Daily counts of all waterbirds ranged from a high of 317 (292 adults,

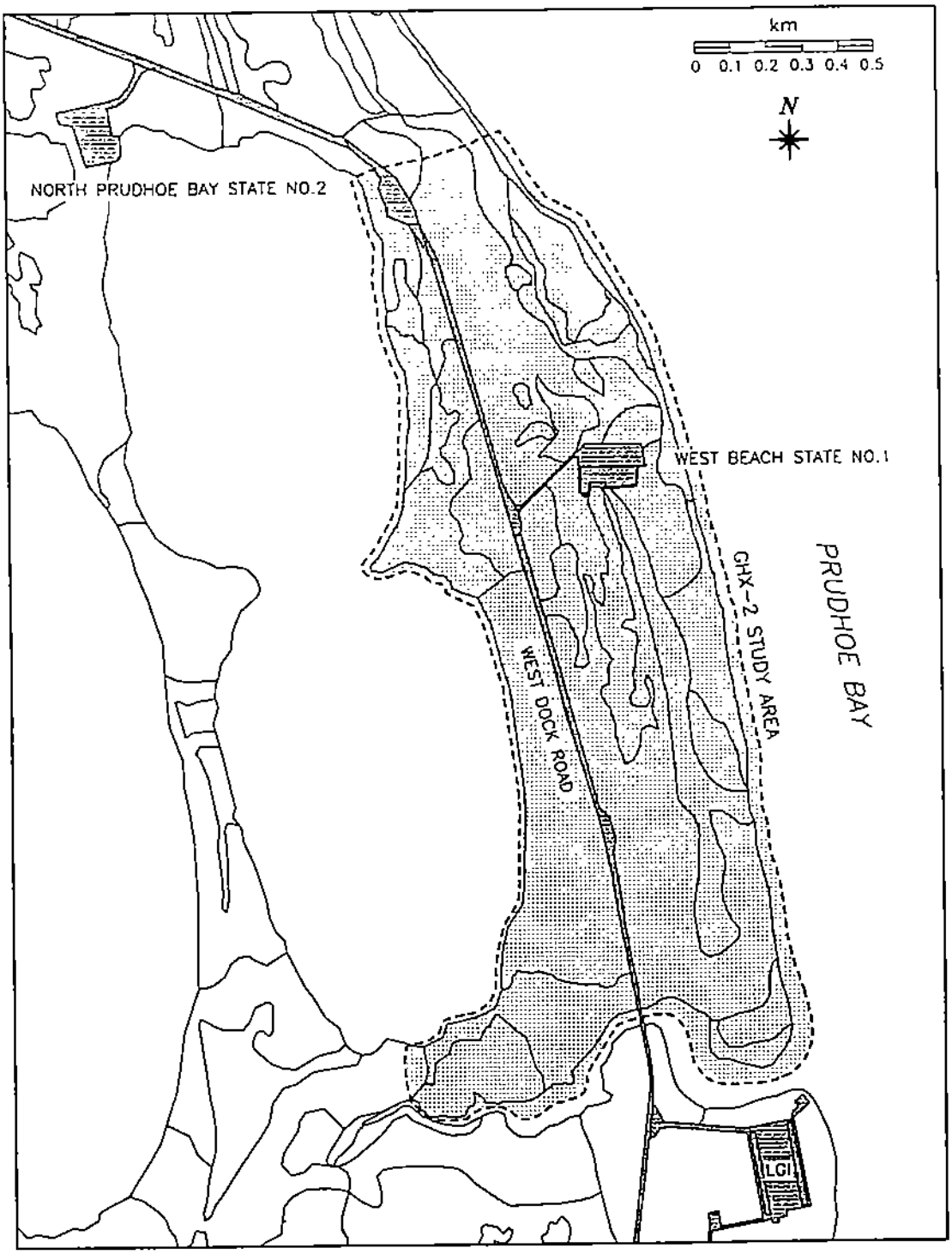

Figure 2. The GHX-2 study area (shaded area) and the location of the proposed Apex Gas Injection pad, Prudhoe Bay, Alaska, 1991. The footprint for the Apex Gas Injection pad indicates the location of gravel placement that will take place in 1992.

Table 1. Counts of waterbirds from road surveys in the GHX-2 study area, 27 May - 5 September 1991. Counts in parentheses are unfledged young or juveniles; all other counts are of adults. Species observed on less than three survey dates are included in the daily total but are listed as footnotes[a].

Survey Dates	Canada Goose	White-fronted Goose	Brant	Tundra Swan	Northern Pintail	Old-squaw	Northern Shoveler	King Eider	Spectacled Eider	Pacific Loon	Red-throated Loon	Daily Total
26 May	5	0	0	0	2	0	0	0	0	0	0	7
27 May	11	3	0	2	3	0	0	0	0	0	0	19
28 May	2	23	0	0	4	0	0	0	0	0	0	29
29 May	4	14	0	2	1	0	1	0	0	0	0	22
30 May	4	35	0	2	22	7	2	5	0	0	0	77
31 May	3	14	4	2	8	6	1	4	0	0	0	42
4 June	1	1	0	0	15	26	0	15	2	0	0	60
8 June	2	2	2	2	9	12	2	14	0	0	0	43
13 June	0	1	8	1	2	13	2	6	2	7	0	45
17 June	7	2	46	0	0	14	0	10	0	4	2	94
21 June	10	2	50	0	3	12	0	9	1	5	2	98
24 June	2	6	17	0	2	26	0	13	0	5	2	73
27 June	10	5	13	4	1	6	0	4	0	1	1	45
2 July	29	8	5	0	1	0	0	5	0	0	1	49
6 July	37	2 (1)	4	0	1	3	0	0	0	0	0	52 (1)
10 July	37 (6)	0	17 (6)	0	2	2	0	11	0	0	2	69 (12)
15 July	8 (7)	4 (7)	9 (3)	4	0	0	0	0	0	3	0	25 (17)
19 July	2 (4)	0	16 (3)	0	2	3	0	0	0	2	1	29 (7)
23 July	241 (8)	0	24 (17)	0	17	8	0	0	0	1	1	292 (25)
27 July	0	0	42 (38)	0	22	3	0	0	0	3	1	71 (38)
31 July	215 (14)	0	38 (20)	0	4	1	0	0	1	4	1	264 (34)
5 August	20	0	58 (33)	0	29	0	0	0	0	2	1	110 (33)
9 August	12	0	71 (56)	0	7	0	0	0	0	1 (1)	2 (1)	93 (58)
14 August	1	0	34 (13)	0	18	0	0	0	0	1 (1)	2 (2)	56 (16)
16 August	14 (13)	0	0	0	7	0	0	0	0	1 (1)	4 (2)	26 (16)
20 August	8 (12)	0	4 (6)	0	13	0	0	0	0	1	2 (2)	28 (20)
24 August	2 (4)	0	14 (11)	0	3	0	0	0	0	0	0 (2)	19 (17)
28 August	0	0	3 (2)	0	5	0	0	0	0	0	1 (2)	9 (4)
1 September	0	0	6	0	6	0	0	0	0	0	1 (2)	13 (2)
4 September	0	0	0	0	0	0	0	0	0	2	0 (2)	2 (2)

[a] Snow Goose: 9 adults, 17 June
American Wigeon: 4 adults, 21 June
Mallard: 1 adult, 13 June
Unidentified Eider: 5 adults, 6 July; 6 adults, 19 July

25 young) on 23 July to a low of four (2 adults, 2 young) on 4 September, the last survey date.

The abundance of waterbirds varied between the eastern and western sections of the study area throughout the study period (Figure 3). Differential snow melt between the eastern and western sides of West Dock Road accounted for the lack of bird sightings east of the road prior to 8 June. The eastern, coastal section was upwind of the road and did not develop a large "dust shadow", therefore, snow tended to melt later there than on the western section, which was downwind from the road and had an extensive dust shadow. After mid-July, we saw more birds in the eastern section, except for two large peaks in bird numbers in the western section in late July and early August. Those peaks were due to large, molting flocks of Canada Geese that temporarily moved around the south edge of the deep, open lake and into the study area.

GEESE AND SWANS

Canada Geese already were present in the study area on the first survey (26 May) and were one of the more common bird during all surveys (Table 1). We did not find any nests of Canada Geese in the study area, but they have nested south of the WBS-1 pad in the past (Murphy et al. 1986, 1988, 1990). Although Canada Geese did not nest in 1991, we regularly saw broods during July and August. Canada Geese with broods used both the eastern and western sections of the study area, but occurred most often east of the road (8 of 13 flocks). Brood sightings prior to 16 August were clustered along the banks of the unnamed stream north of LGI and the appearance of broods on both sides of West Dock Road indicated that the geese crossed the road with some regularity. After 16 August, all broods used habitats south of the WBS-1 in the area of the proposed AGI pad; those broods were mostly older age classes and some were flight capable. A large flock (200-250 birds) of molting Canada Geese used the southern and western margins of the large lakes west of West Dock Road during July and August and were seen in the study area on 23 July (235 birds) and 31 July (170 birds). None of those molting birds was seen east of West Dock Road. This molting flock is an annual occurrence in the area with total numbers of geese ranging from 75-300 birds (Johnson et al. 1990). We did not see any Canada Geese in the study area after 24 August.

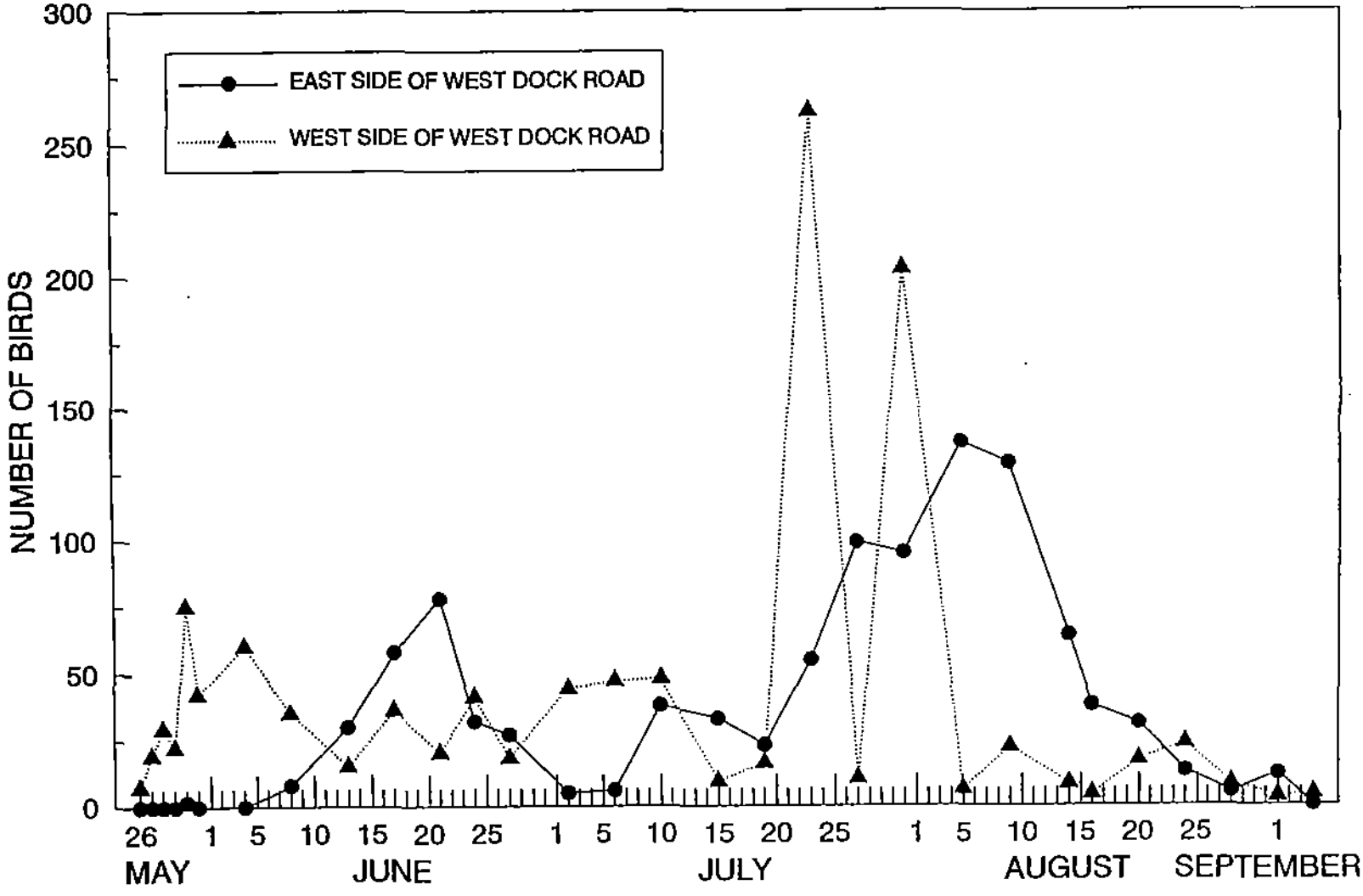

Figure 3. Road survey counts of all waterbirds seen on the east and west sides of West Dock Road in the GHX-2 study area, Prudhoe Bay, Alaska, 1991.

Greater White-fronted Geese were less common than Canada Geese and were most abundant during May (Table 1). The peak count was 35 birds on 30 May. We found one Greater White-fronted Goose nest in the study area, approximately 5 m west of a gravel pull-off on West Dock Road (Figure 4). This pair hatched one gosling, which was seen (with the pair) near the nest on 6 July. We saw brood-rearing White-fronted Geese only one other time, on 15 July, when we saw four adults with seven goslings (two broods of 5 and 2 young) on the bank of the unnamed stream north of LGI (west of the road).

Brant were the most common goose species in the area from mid-June until late August (Table 1). Brant concentrated their use of the study area east of the road and north of WBS-1 (Figure 5). The first brood of Brant was seen on 10 July and the brood-rearing flock peaked at 68 adults and 56 young on 9 August. We also saw broods of Brant along the edge of the unnamed stream north of LGI on 27 July (18 adults/16 young), 20 August (4 adults/6 young), and 24 August (10 adults/8 juveniles). Most Brant had left the brood-rearing area north of WBS-1 by mid August.

Snow Geese occurred in the study area on only one date, 17 June. Nine (7 adults/2 subadults) Snow Geese, in a mixed flock with two Brant, were feeding in a small *Arctophila* pond west of the road and northwest of WBS-1.

Tundra Swans occurred regularly in the study area from 27 May until 8 June, but only twice after mid-June (Table 1). We only saw swans west of the road, usually in small ponds located between the edge of the large lake and West Dock Road. Most (5 of 8 sightings) swans were concentrated near the northern edge of the study area. Although Tundra Swans did not nest in the area in 1991, a nest site was located on a small mound approximately 500 m south of WBS-1 in 1990; four cygnets were hatched at this nest. This site was located within the footprint of the new AGI pad.

DUCKS

Seven species of ducks occurred in the GHX-2 study area, but only three species were common: Northern Pintail, Oldsquaw, and King Eider (Table 1). All of the four (Mallard, American Wigeon, Northern Shoveler and Spectacled Eider) remaining species were uncommon. We did not locate any nests of ducks in the study area and also did

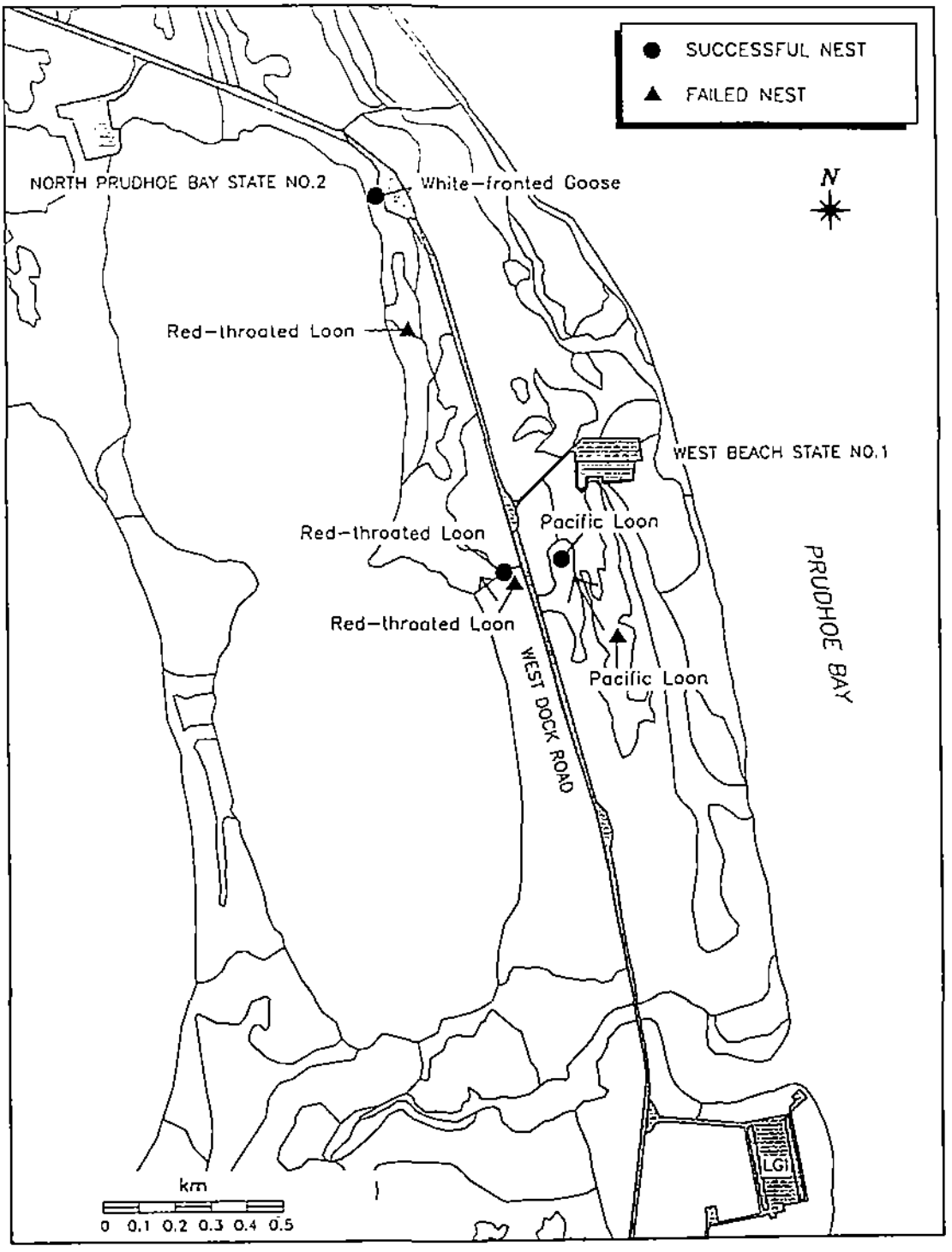

Figure 4. Locations of successful and failed waterbird nests in the GHX-2 study area, Prudhoe Bay, Alaska, 1991. Arrows between nest sites indicate re-nesting attempts.

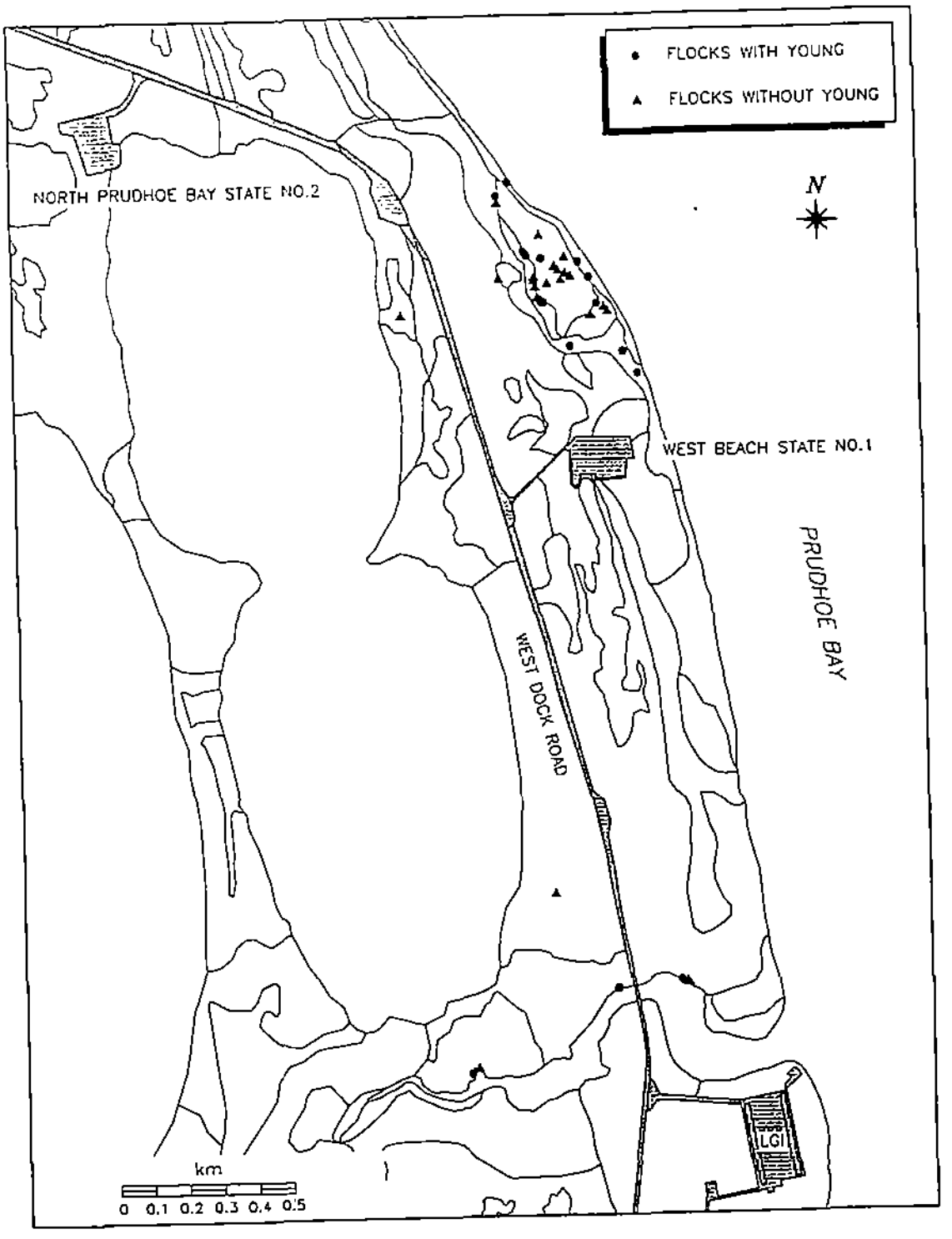

Figure 5. Locations of Brant flocks (with and without young) in the GHX-2 study area, Prudhoe Bay, Alaska, May-September 1991.

not seen any broods.

Northern Pintails showed both early and late peaks in abundance, but tended to be more abundant in early August (Table 1). Almost equal numbers of pintails occurred in the eastern and western sections of the study area (109 and 105 birds, respectively). We saw Northern Pintails in most of the shallow-water habitats in the study area: shallow ponds near the WBS-1 pad and road, brackish ponds used by brood-rearing Brant, and small ponds and impoundments west of the road.

Oldsquaw peaked in abundance during June and rarely occurred in the study area after mid-July (Table 1). Most (98 of 142 birds) Oldsquaw occurred west of the road, primarily in small ponds and near the large lake, where we often saw small flocks loafing on the lake shore.

King Eiders first appeared in the study area on 30 May and numbers peaked at 15 on 4 June (Table 1). We did not see any King Eiders in the study area after 10 July. As with Oldsquaw, more (65 of 95 birds) King Eiders used the western section of the study area than the eastern section. West of the road, King Eiders primarily used small ponds located between the large lake and West Dock Road, usually south of the entrance to WBS-1. King Eiders east of the road used small ponds both north and south of WBS-1.

LOONS

Pacific Loons first occurred in the study area on 13 June and numbers peaked on that date at seven birds (Table 1). Only one pair of loons nested in the study area (south of WBS-1) and lost their first nest for unknown reasons (Figure 4). This pair then moved northwest to an adjacent pond, re-nested, and successfully hatched one young in early August. This brood was seen on two subsequent surveys before disappearing in mid-August. Pacific Loons occurred on both sides of West Dock Road in approximately equal numbers (24 birds east of the road and 22 birds west of the road).

Red-throated Loons did not arrive in the study area until 17 June and pairs or single loons occurred on most surveys (Table 1). Two pairs of Red-throated Loons nested in the study area, both west of the road (Figure 4). Although both nesting efforts failed by late June, one pair re-nested several meters northwest of its original nest. This second nesting attempt was successful and we saw two young on 9 August; the adult apparently

was still incubating the second egg on 5 August when we saw the first young. Unlike Pacific Loons, Red-throated Loons occurred almost exclusively in the western section of the study area (39 of 42 birds).

DISCUSSION

The GHX-2 study area, although of limited areal extent, supported a waterbird avifauna representative of the Prudhoe Bay region. Many species, however, were present in low numbers or during only part of the summer in 1991. Construction and operation of the new AGI pad will affect waterbird use of the area south of WBS-1 through direct habitat loss and could affect use in nearby areas because of disturbance. Waterbird species most likely to be affected by these activities would be those that were most abundant or that used habitats covered by gravel for the new pad. The primary waterbird species that could be adversely affected by GHX-2 activities are Brant, Canada Goose, and Pacific Loon. The main impacts would be direct coverage of habitats by gravel during construction, and potentially noise disturbance during construction and operation.

The occurrence of brood-rearing Brant in coastal habitats north of WBS-1 in 1991 was unusual only in the length of time (June-August) that they occupied the area. Brant used this area during all five years of the Lisburne study, but prior to 1988 most use occurred in mid- to late August and early September, when birds began dispersing from the major brood-rearing area southeast of CCP (Murphy et al. 1986, 1987, 1988, 1989, 1990). Brant with broods used the area only during early August in 1988 and during both late July and early August in 1989. Although systematic ground surveys were not conducted in 1990, adults with broods were seen north of WBS-1 during two aerial surveys for Brant in late July (Ritchie et al. 1991). These observations suggest that Brant use of this coastal habitat north of WBS-1 is now an annual event and, although the area does not support the same level of use seen at the major brood-rearing island southeast of CCP, it does provide suitable habitats for a smaller brood-rearing flock. The distance of these coastal habitats from the AGI pad and the buffering effect of the WBS-1 pad probably will moderate the effects of disturbance from the new pad, at least during

operation. Disturbance during construction and drilling would be more severe and could adversely affect use of the area by brood-rearing Brant if they were present during those activities.

Canada Geese are present in the GHX-2 study area throughout the summer, but only during the nesting and brood-rearing seasons are they likely to be affected by construction or operation of the AGI pad. Although the shallow pond south of the WBS-1 entrance has supported nesting by Canada Geese in the past, this pond is marginal habitat in most years due to late snow melt. The large flock of molting Canada Geese that uses the deep, open lakes west of West Dock Road have been observed annually since 1985. These two large lakes provide an abundant amount of suitable habitat for these molting birds that is well removed from disturbance on West Dock Road and any possible disturbance from the AGI pad. In addition, these molting geese are only present in the area for approximately 4-6 weeks during July and August and move out of the area as soon as they are able to fly.

The new AGI pad will be placed almost entirely on tundra habitats, therefore, direct loss of ponds used by loons and ducks will be minimal. However, the northern entrance road to AGI will cross the pond used by nesting Pacific Loons in 1991 and probably will result in loss of the nest site. Because other ponds in the vicinity have been used by Pacific Loons in the past, including ponds west of the road, the loss of one nest site would not adversely affect nesting effort. In the GHX-1 study area, the location of Pacific Loon nests near DS-L1 and NGI indicate that nearby pads do not always cause abandonment of suitable nest sites and that nesting success is not always adversely affected by nearby pads.

In conclusion, both the diversity and abundance of waterbirds in the GHX-2 study area are representative of other coastal areas in the Prudhoe Bay. The habitats in the GHX-2 study area, except for the halophytic wet meadows north of WBS-1, are available elsewhere, and loss of some tundra habitats to gravel placement would not be detrimental to waterbirds from a regional perspective. Only a few waterbird species are likely to be affected by construction and operation of the AGI pad and those effects can be minimized by proper planning and scheduling of construction activities.

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