

### **Description: Undisturbed Plot**

The undisturbed plot is located immediately south of the disturbed plot. The eastern portion is composed of a mixture of moist and wet graminoid tundra, and moist tussock tundra. The landform is primarily mixed high- and low-centered polygons. A small area of frost-boil tundra is present in the northcentral portion of the plot, and two ponds are centrally located in the plot.

The western portion of the plot is primarily non-patterned ground and water. A small area of wet strangmoor is present in the southwest corner.

### **Nesting**

Fifteen nests were found in the undisturbed plot and 12 were found in the disturbed plot. Each plot had 5 nesting species which were primarily shorebirds and longspurs; a Rock Ptarmigan nested unsuccessfully in the undisturbed plot (Table A-3.). Twelve nests were successful in the undisturbed plot and 9 were successful in the disturbed plot.

In the disturbed plot, 7 nests were located in strangmoor adjacent to the north side of the pad (Fig. A-3). Parts of this area showed signs of disturbance. Four of these nests were of Pectoral Sandpiper. A Red Phalarope nested at the edge of a pond about 1 m from the edge of the gravel berm on the north side of the reserve pit. A Red-necked Phalarope nest was found northwest of the pad on thermokarsted tundra with water-filled troughs. Most of the remaining nests in the disturbed plot were on non-patterned ground on the southwest portion of the plot.

In the undisturbed plot, 13 of the 15 nests were located on the eastern portion, an area with a fairly high degree of microrelief. The remaining 2 nests were on non-patterned ground, although one was on a small ridge.

Table A-3. Number of nests and nest success for bird species on disturbed and undisturbed plots, WS-9, Prudhoe Bay, Alaska, 1990.

Undisturbed Study Plot				
Species	Successful Nests	Failed Nests	Total Nests	Percent Success
Rock Ptarmigan	0	1	1	0
Lesser Golden Plover	1	0	1	100
Semipalmated Sandpiper	3	1	4	75
Pectoral Sandpiper	5	1	6	83
Lapland Longspur	3	0	3	100
Total/Mean	12	3	15	80

Disturbed Study Plot				
Species	Successful Nests	Failed Nests	Total Nests	Percent Success
Semipalmated Sandpiper	2	0	2	100
Pectoral Sandpiper	4	2	6	67
Red-necked Phalarope	1	0	1	100
Red Phalarope	1	0	1	100
Lapland Longsur	1	1	2	50
Total/Mean	9	3	12	75

## Site 4: West Sak 3

### Location and Access

West Sak 3 (Fig. A-4) is located in the Kuparuk Unit in Sec. 26, T11N, R9E, about 1.3 km southwest of Drill Site 2D. There is no road access to the pad, but it can be seen from the gravel road west of Drill Site 2D and can be reached in 5 min on foot.

### Description: Disturbed Area

The well was spudded on March 22, 1975, and suspended on April 26, 1975. The plugged-and-abandoned date on record is March 14, 1986.

The pad dimensions are approximately 70 m x 160 m. Gravel thickness on the eastern and southern portions is about 0.6 m. Two gravel ramps taper to the tundra surface; one is in the northeast corner and one is on the south side of the pad. A thicker raised area of gravel on the west side of the pad extends from the north side to the south about 80 percent the length of the pad. This gravel has a thickness of about 1.5 m. Moderate thermokarsting is evident on the thinner areas of the pad, but little thermokarsting occurs on the thicker areas. The well head consists of a pipe embedded vertically into a depression about 0.5 m deep in the gravel; it is located on the west central part of the pad. A number of wooden stakes delineate a revegetation study site on the raised portion of the gravel pad. This area was fertilized in 1986 (Jorgenson 1989).

Vegetative cover on the pad is less than 1 percent, including the fertilized area. Several grass and forb species are sparsely colonizing the thermokarst troughs.

There is a reserve pit on the west side of the pad and a flare pit to the north. A third pit, possibly another flare pit, is adjacent to the southeast edge of the pad. All pits are surrounded by gravel berms which have been breached to allow water to escape. The flare pit to the southeast contains a large mound of overburden in the center, approximately 1.7 m high. The mound is sparsely vegetated and is surrounded by water and partially-disturbed, vegetated tundra. A smaller mound of overburden in the center of the north flare pit was fertilized and seeded in 1986 as part of a revegetation study (Jorgenson 1989). This area is now heavily vegetated and is surrounded by water and partially-disturbed tundra. The reserve pit has a large mound of mud and cuttings which was seeded in 1986 (Jorgenson 1989). This area is sparsely vegetated and is

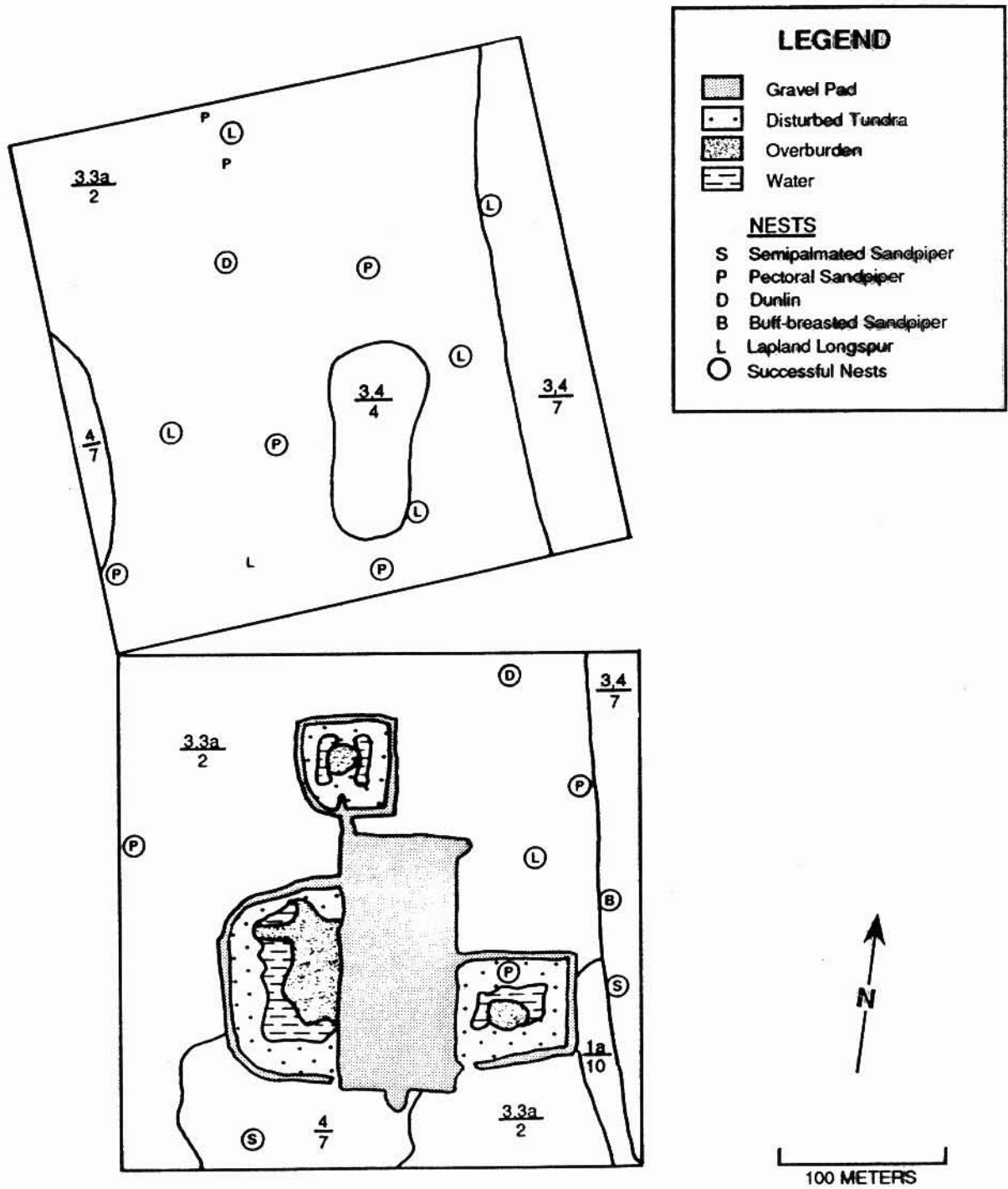


Fig. A-4. Gravel disturbance, nest locations, and geobotanical types of tundra patches on disturbed and undisturbed study plots, WS-3, Prudhoe Bay, Alaska, 1990.







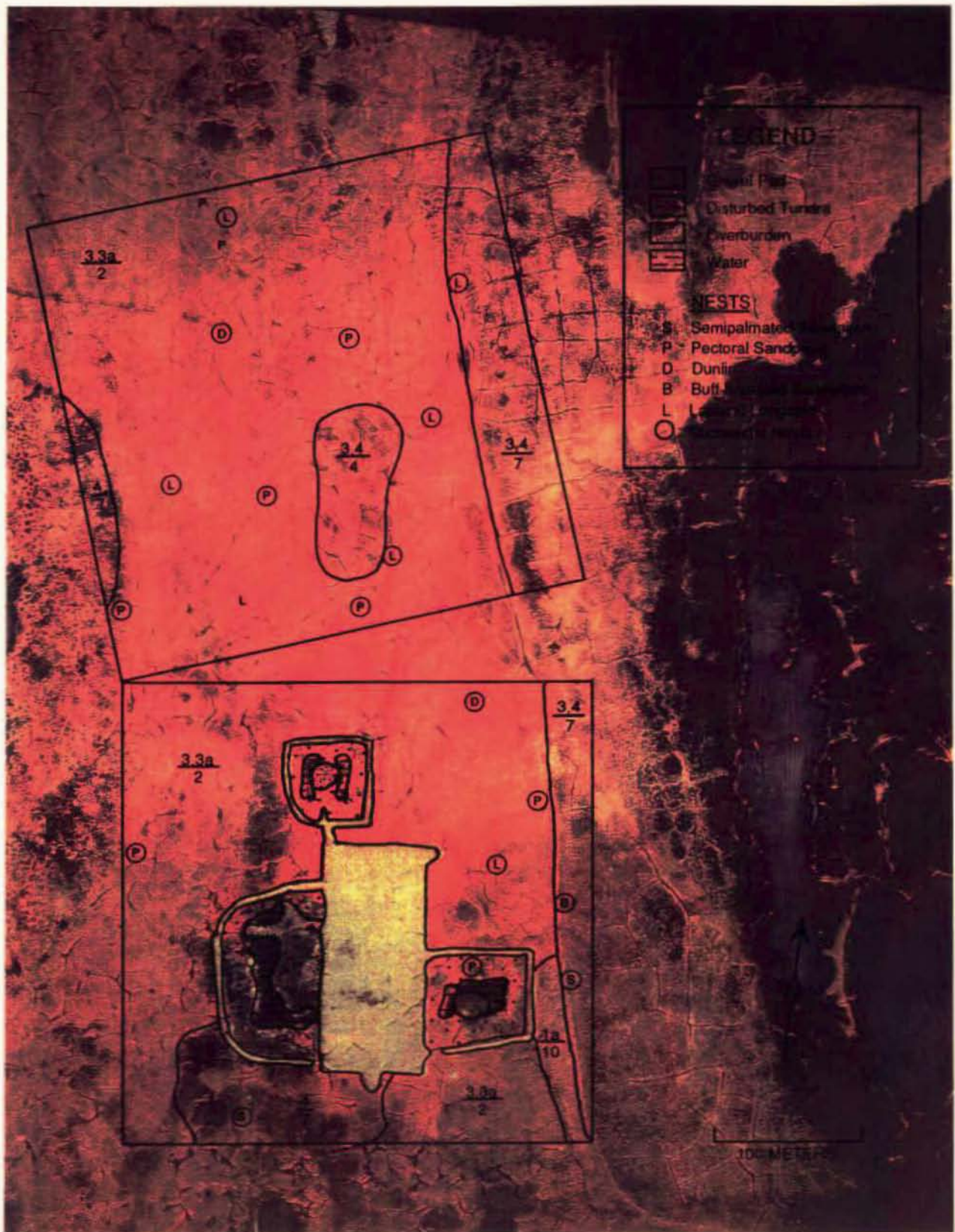


Fig. A-4. Gravel disturbance, nest locations, and geobotanical types of tundra patches on disturbed and undisturbed study plots, WS-3, Prudhoe Bay, Alaska, 1990.

surrounded by water and partially-disturbed tundra. The gravel pad and reserve and flare pits cover approximately 28 percent of the disturbed plot.

The tundra surrounding the pad is composed primarily of moist and wet graminoid tundra and moist tussock tundra. The landform is primarily low-relief high-centered polygons, many of which are poorly defined and often difficult to distinguish from the ground. Strangmoor is present on the eastern and southwestern portions of the plot. A small patch of prostrate shrub tundra is located near the southeastern flare pit.

### **Description: Undisturbed Plot**

The undisturbed plot is located north of the disturbed plot. It was positioned at a slight angle to the disturbed plot in an attempt to match tundra habitats in the two plots. It is composed of moist and wet graminoid tundra and moist tussock tundra. The landform is primarily low-relief high-centered polygons which, as is the case in the disturbed plot, are often not well defined. Strangmoor is present on the eastern and western portions of the plot, and a patch of low-centered polygons is located southcentrally.

### **Nesting**

Three species had 13 nests in the undisturbed plot, and 5 species had 8 nests in the disturbed plot (Table A-4). The proportion of successful nests was higher in the disturbed plot; all 8 nests were successful there. Ten nests were successful in the undisturbed plot. All nests in both plots were of either shorebirds or longspurs.

Nests appeared to be fairly evenly distributed throughout the undisturbed plot (Fig. A-4). In the disturbed plot, more nests were located on the eastern portion of the plot. One Pectoral Sandpiper nest was found on tundra inside the southeast flare pit.

It is interesting that no Semipalmated Sandpiper nests were found in the undisturbed plot. This was the only plot in the study in which no nests of this species were found.

Table A-4. Number of nests and nest success for bird species on disturbed and undisturbed study plots, WS-3, Prudhoe Bay, Alaska, 1990.

Undisturbed Study Plot				
Species	Successful Nests	Failed Nests	Total Nests	Percent Success
Pectoral Sandpiper	4	2	6	67
Dunlin	1	0	1	100
Lapland Longspur	5	1	6	83
Total/Mean	10	3	13	77

Disturbed Study Plot				
Species	Successful Nests	Failed Nests	Total Nests	Percent Success
Semipalmated Sandpiper	2	0	2	100
Pectoral Sandpiper	3	0	3	100
Dunlin	1	0	1	100
Buff-breasted Sandpiper	1	0	1	100
Lapland Longspur	1	0	1	100
Total/Mean	8	0	8	100



## Site 5: Mobil Kuparuk 3-15-11-12

### Location and Access

Mobil Kuparuk 3-15-11-12 (Fig. A-5) is located in the Prudhoe Bay Unit in Sec. 9, T11N, R12E. It is on the north side of the Spine Road approximately 1.6 km west of the access road to S Pad. A short spur road provides access to the pad from the Spine Road.

### Description: Disturbed Site

Two wells were drilled on this pad. The first was spudded on April 21, 1975, the second on December 1, 1980. These wells were plugged and abandoned on May 22, 1977 and March 23, 1981, respectively.

The pad dimensions are approximately 220 m x 100 m. Gravel thickness is approximately 1.3 m over most of the pad, although it tapers to tundra level on the northern portion. Gravel spray and impounded water was present near the southern and northeastern edges of the pad. Little thermokarsting has taken place on the pad. A portion of the spur road connecting the pad with the Spine Road is also included in the plot. The gravel pad and gravel spray cover approximately 21 percent of the study plot.

Very few plants are growing on the main portions of the pad. Some *Carex* spp. and *Eriophorum* spp. are colonizing the spray on the south side of the pad. The spray northeast of the pad is much thinner and is well vegetated.

The tundra surrounding the pad is primarily wet graminoid tundra. The landform generally shows little relief and is composed primarily of non-patterned ground and strangmoor. A narrow ridge of high-centered polygons passes through the eastern portion of the plot. A large lake is located west of the plot.

### Description: Undisturbed Plot

The undisturbed plot is also composed primarily of wet graminoid tundra on non-patterned ground and strangmoor. Several narrow ridges of strangmoor and high-centered polygons which pass through the plot are aligned more or less north to south. Several ponds are also present.

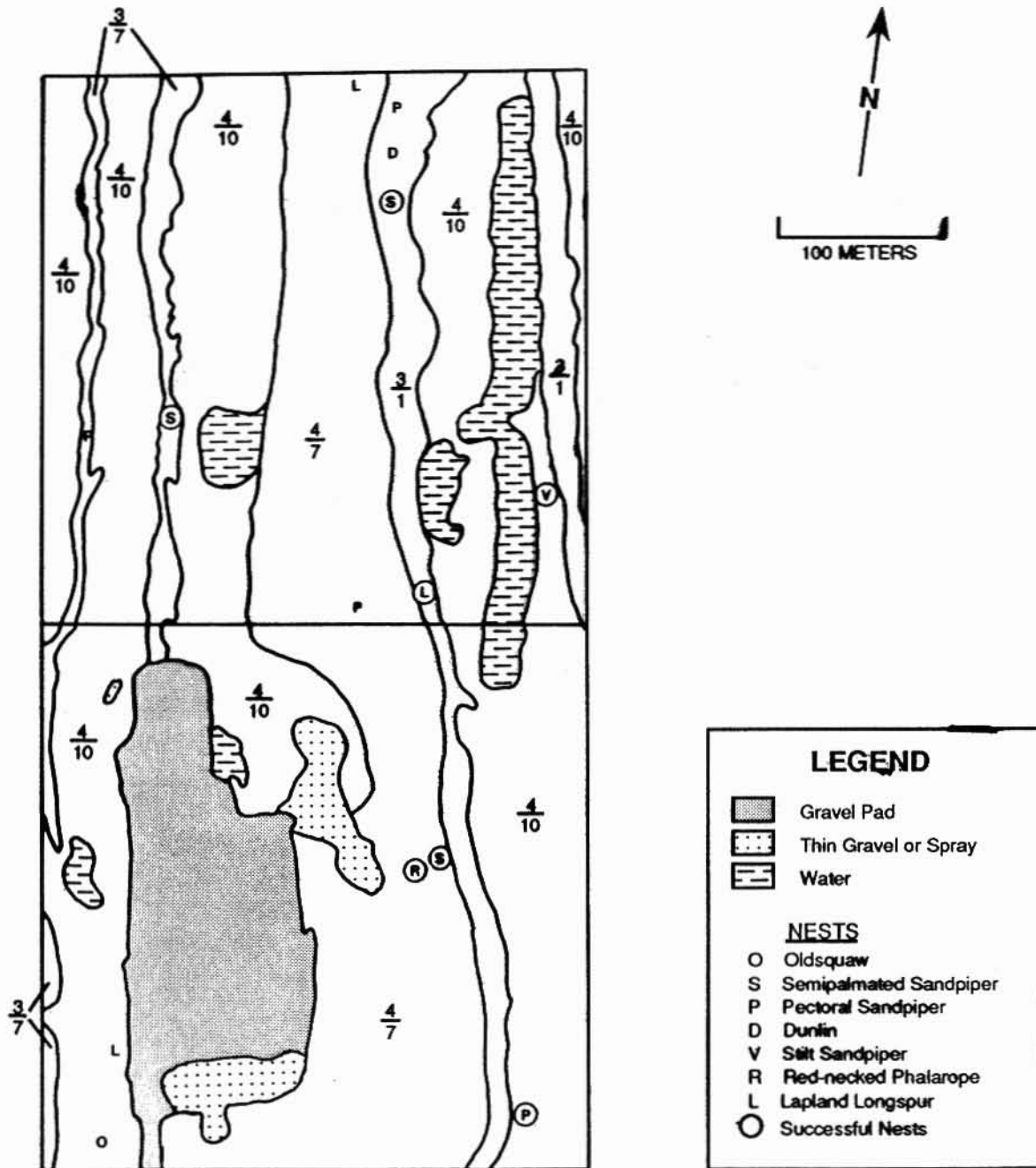


Fig. A-5. Gravel disturbance, nest locations, and geobotanical types of tundra patches on disturbed and undisturbed study plots, Mobile Kuprauk 3-15-11-12, Prudhoe Bay, Alaska, 1990.



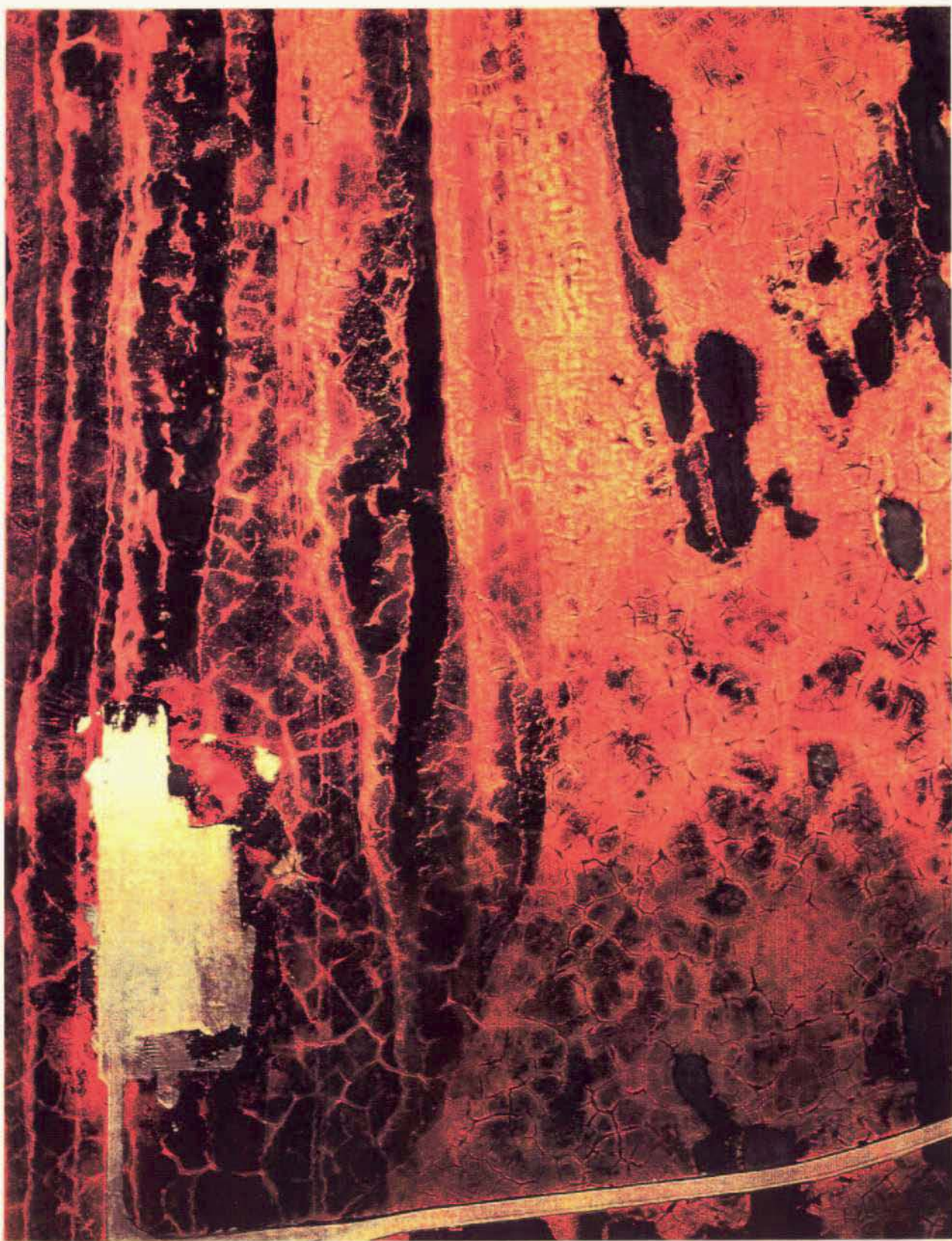






Fig. A-5. Gravel disturbance, nest locations, and geobotanical types of tundra patches on disturbed and undisturbed study plots, Mobile Kuprauk 3-15-11-12, Prudhoe Bay, Alaska, 1990.



## **Nesting**

Nesting densities were lower at this site than at most other sites in this study. Five species had 9 nests in the undisturbed plot, and 5 species had 5 nests in the disturbed plot (Table A-5). The proportion of successful nests was slightly higher in the disturbed plot; 4 nests were successful in the undisturbed plot compared to 3 in the disturbed plot. All nesting species were either shorebirds or longspurs with the exception of an Oldsquaw which nested unsuccessfully near the pad in the disturbed plot.

Some of the unsuccessful nests in both plots showed signs of fox predation. In the undisturbed plot, 6 of the 9 nests were located on the narrow ridges of strangmoor or high-centered polygons which pass through the plot. These ridges, because they were much drier than the surrounding habitat, may have been preferred routes of foxes passing through the area; nests located on them may have been more susceptible fox predation.

Table A-5. Number of nests and nest success for bird species on disturbed and undisturbed study plots, Mobil Kuparuk 13-15-11-12, Prudhoe Bay, Alaska, 1990.

Undisturbed Study Plot				
Species	Successful Nests	Failed Nests	Total Nests	Percent Success
Semipalmated Sandpiper	2	0	2	100
Pectoral Sandpiper	0	3	3	0
Dunlin	0	1	1	0
Stilt Sandpiper	1	0	1	100
Lapland Longspur	1	1	2	50
Total/Mean	4	5	9	44

Disturbed Study Plot				
Species	Successful Nests	Failed Nests	Total Nests	Percent Success
Oldsquaw	0	1	1	0
Semipalmated Sandpiper	1	0	1	100
Pectoral Sandpiper	1	0	1	100
Red-necked Phalarope	1	0	1	100
Lapland Longspur	0	1	1	0
Total/Mean	3	2	5	60

## Site 6: Term Well C

### Location and Access

Term Well C (Fig. A-6) is located in the Prudhoe Bay Unit in Sec. 3, T11N, R12E. An access road to the site leaves the Spine Road approximately 0.9 km east of the access road to S Pad. The pad is approximately 1 km north of the Spine Road.

### Description: Disturbed Plot

The well was spudded on March 2, 1979, and suspended on April 25, 1979. A steel railing surrounds the well head.

The pad dimensions are approximately 150 m x 65 m. This is a thick pad with gravel depth over 2 m in some areas. An access road to the pad is on the west portion of the plot. A reserve pit south of the pad is surrounded by a berm composed of gravel and overburden. The pit is water-filled and has a mud bank. A small gravel pit between the reserve pit and the road is not attached to the pad. The gravel disturbance and reserve pit cover approximately 21 percent of the plot.

The tundra surrounding the pad is primarily moist and wet graminoid tundra. The landform is varied and includes poorly defined low-relief high-centered polygons, low-centered polygons and strangmoor, and a small area of well-defined high-centered polygons south of the pad. Much of the area between the road and the pad is heavily thermokarsted, non-patterned ground. Several ponds are present on the southern portion of the plot.

### Description: Undisturbed Plot

The undisturbed plot is adjacent to the east side of the disturbed plot and slightly offset to the north. It is composed primarily of moist graminoid tundra. The landform is a combination of poorly defined low-relief high-centered polygons, and low-centered polygons and strangmoor. Patches of well-defined high-centered polygons are also present. Ponds are located on the southern portion of the plot.

### Nesting

Six species had 7 nests in the undisturbed plot and 4 species had 12 nests in the disturbed plot (Table A-6). The undisturbed plot had the lowest nesting

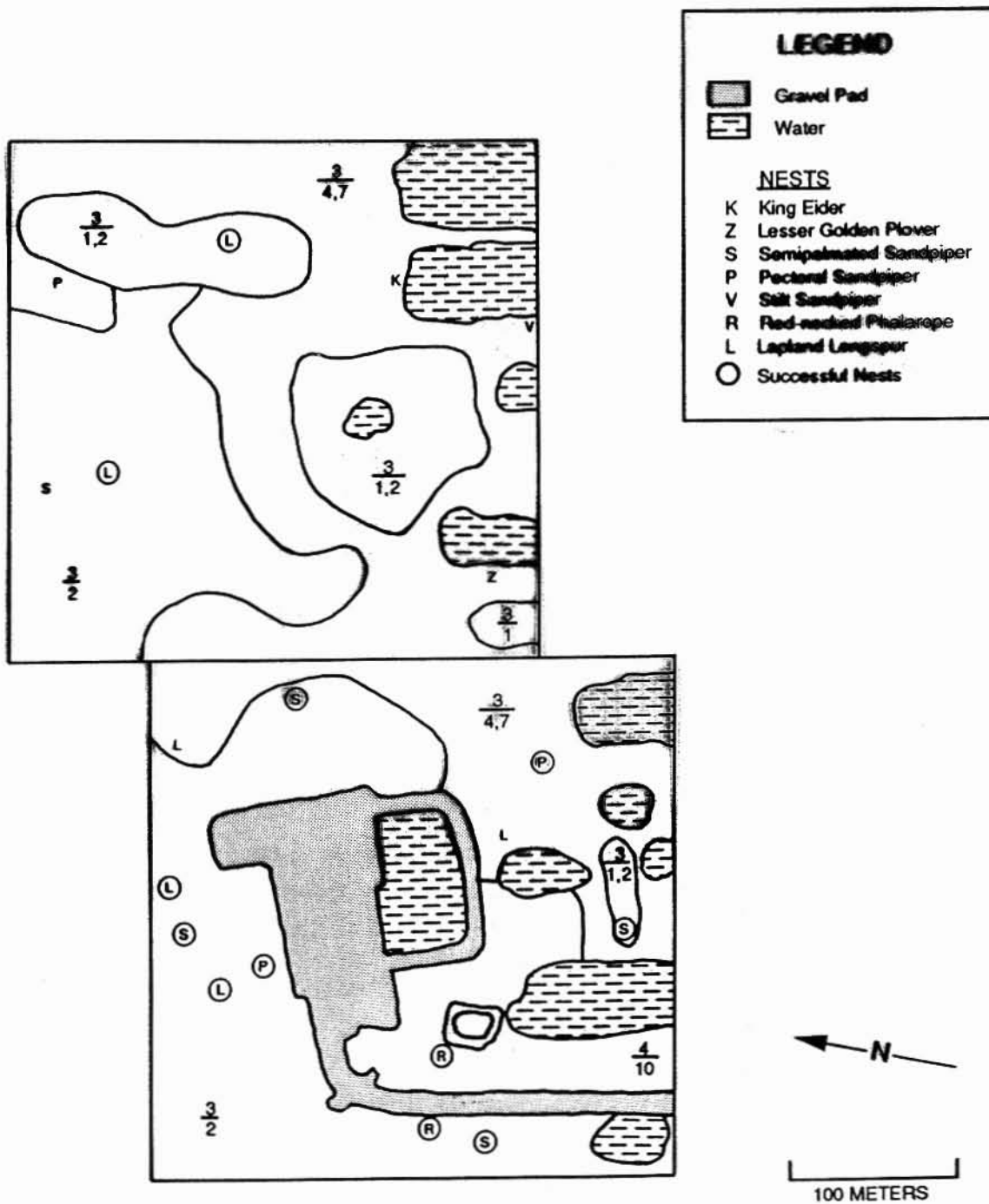


Fig. A-6. Gravel disturbance, nest locations, and geobotanical types of tundra patches on disturbed and undisturbed study plots, Term Well C, Prudhoe Bay, Alaska, 1990.









Fig. A-6. Gravel disturbance, nest locations, and geobotanical types of tundra patches on disturbed and undisturbed study plots, Term Well C, Prudhoe Bay, Alaska, 1990.

success of all plots in this study; only 2 nests were successful. Nest success was higher in the disturbed plot; 10 nests were successful. All nesting species were either shorebirds or longspurs with the exception of a King Eider which nested unsuccessfully in the undisturbed plot.

On the disturbed plot, several nests were located near gravel disturbances. Red-necked Phalaropes nested on both sides of the access road in areas of thermokarsting near water-filled troughs. Four nests were clustered on tundra north of the pad, and a longspur nested unsuccessfully just south of the pad.

Table A-6. Number of nests and nest success for bird species on disturbed and undisturbed study plots, Term Well C, Prudhoe Bay, Alaska, 1990.

Undisturbed Study Plot				
Species	Successful Nests	Failed Nests	Total Nests	Percent Success
King Eider	0	1	1	0
Lesser Golden Plover	0	1	1	0
Semipalmated Sandpiper	0	1	1	0
Pectoral Sandpiper	0	1	1	0
Stilt Sandpiper	0	1	1	0
Lapland Longspur	2	0	2	100
Total/Mean	2	5	7	29

Disturbed Study Plot				
Species	Successful Nests	Failed Nests	Total Nests	Percent Success
Semipalmated Sandpiper	4	0	4	100
Pectoral Sandpiper	2	0	2	100
Red-necked Phalarope	2	0	2	100
Lapland Longspur	2	2	4	50
Total/Mean	10	2	12	83



## Site 7: Hurl State

### Location and Access

Hurl State (Fig. A-7) is located in the Prudhoe Bay Unit in Sec. 5, T10N, R13E, approximately 2.1 km southeast of P Pad. There is no road access to the pad; it can be reached in about 30 min on foot from P Pad.

### Description: Disturbed Area

Two wells have been drilled on this pad. The first was spudded on May 11, 1969, and has a plugged-and-abandoned date of April 4, 1980. The second well was spudded on January 6, 1981 and was suspended on February 18, 1981.

The pad dimensions are about 60 m x 180 m and gravel thickness averages approximately 1.6 m. A gravel road from an airstrip joins the pad on the north side. The pad surface is flat, and thermokarsting is evident only in a small area of spray at the west end where a water-filled trough was present. The well heads are located south and east of the pad center; one consists of a pipe embedded in the ground, and the other is a "christmas tree" with a railing around it. A shallow cement structure located east of the pad center is covered. A fairly extensive area of thin gravel and gravel spray surrounds much of the pad, particularly on the southern and northeastern sides. A large reserve pit adjacent to the southeast end of the pad was filled with mud and water. The gravel, gravel spray, and reserve pit cover approximately 28 percent of the plot. Including a barren area south of the reserve pit, approximately 33 percent of the plot is disturbed..

Very little vegetation was present on the gravel surface; total cover was less than 1 percent. Thick patches of *Eriophorum* spp. were colonizing some areas of gravel spray on the south side.

The area of barren ground south of the reserve pit appeared to be disturbed and is devoid of vegetation. The remaining area surrounding the pad is composed of moist and wet graminoid tundra. The predominant landform is non-patterned ground; some strangmoor, low-centered, and a small patch of high-centered polygons are also present. The remnants of an old road can be seen northeast of the gravel.

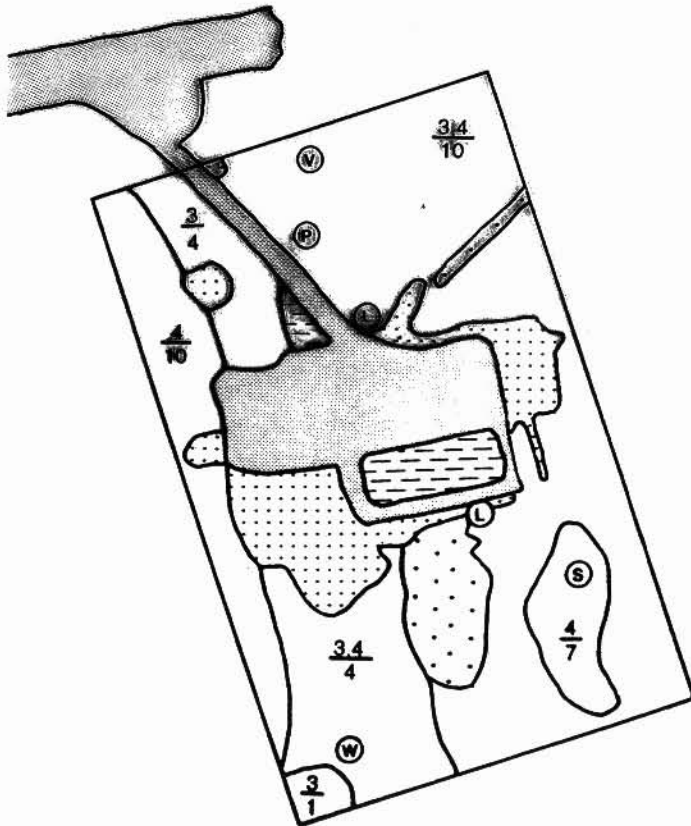
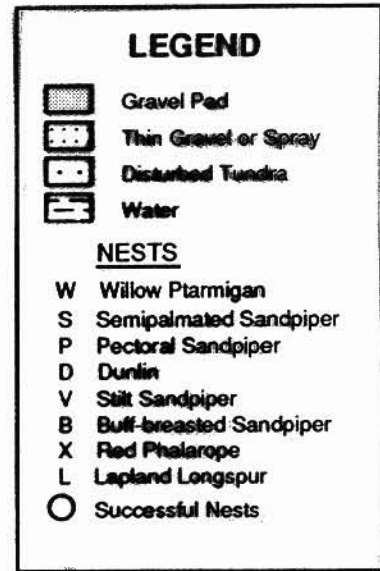
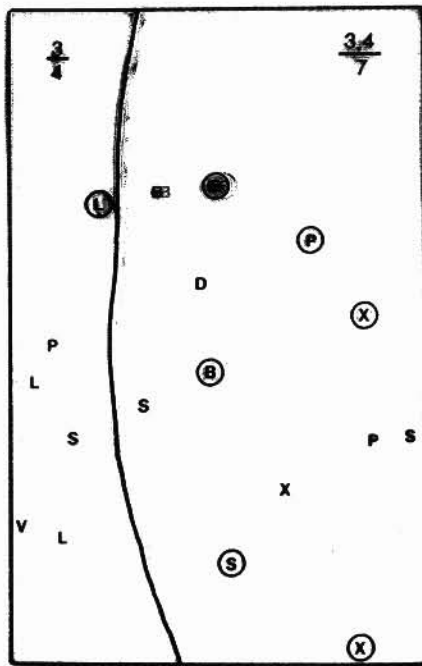


Fig. A-7. Gravel disturbance, nest locations, and geobotanical types of tundra patches on disturbed and undisturbed study plots, Hurl State, Prudhoe Bay, Alaska, 1990.

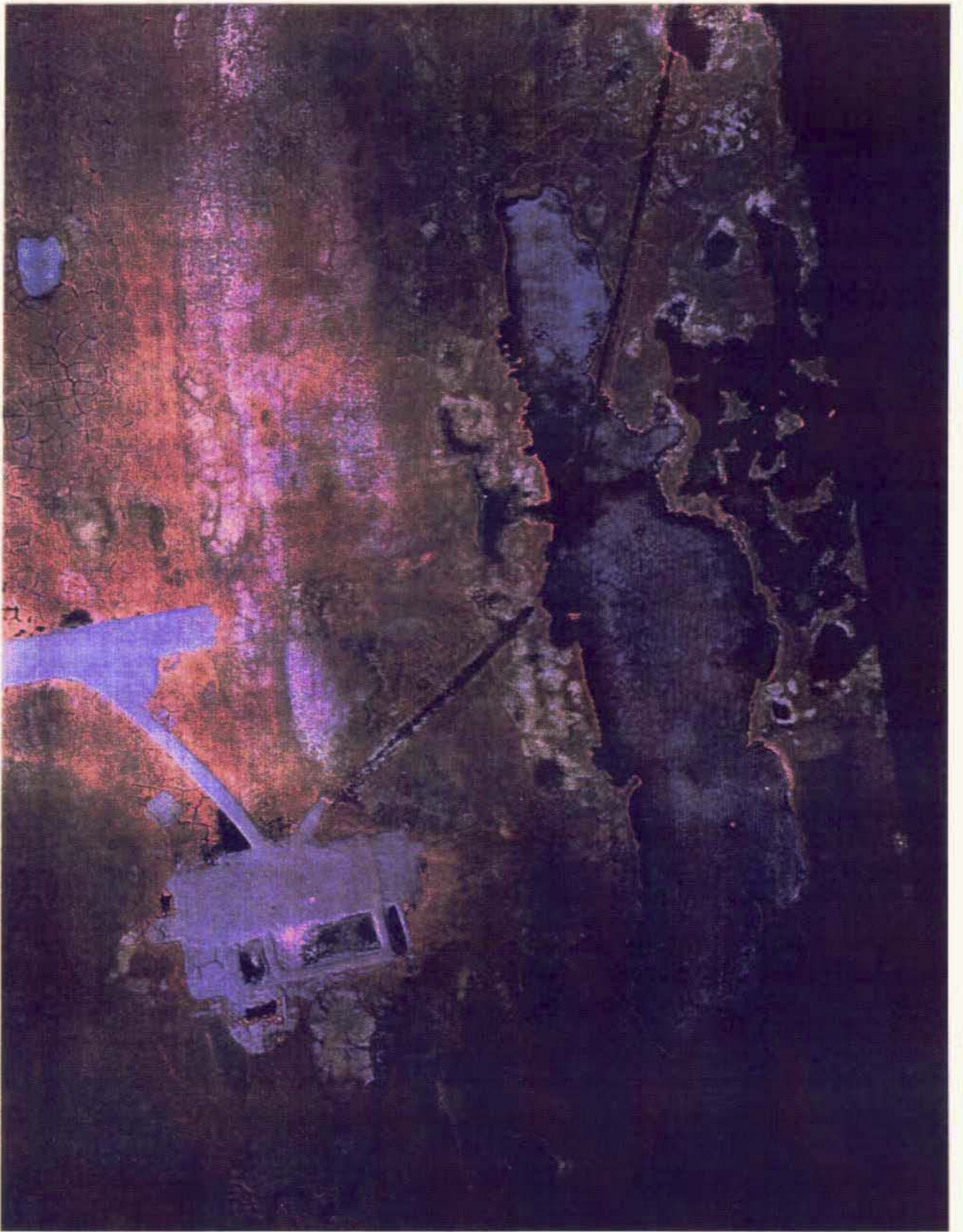






Fig. A-7. Gravel disturbance, nest locations, and geobotanical types of tundra patches on disturbed and undisturbed study plots, Hurl State, Prudhoe Bay, Alaska, 1990.