

Figure 3. Percent of pre-development habitat types covered at 51 impoundment sites sampled for bird use during 1994, Prudhoe Bay oil field, Alaska. Pre-development habitat types were evaluated and mapped from 1:18000 scale black and white 24 July 1955 aerial photographs projected and scaled to 1:6000 scale base maps.

Table 4. Numbers and densities of major species groups of birds and bird nests recorded on impoundments in the Prudhoe Bay area, Alaska, during 1994.

| Site Number | Impound. Number | All Birds | | | | | | | | Loons | | | | | |
|-------------|-----------------|-----------|------|-------------|-------|------|--------|--------|---------|-------|------------------|------------------|--------------------|-----------------|-------------------|
| | | Total | | | Total | | | Mean # | | n | Total | #/ sq km | Total # Nests | Nests/ sq km | |
| n | Periods 1-4 | Rank | n | Periods 2-4 | % | Rank | /sq km | Rank | | | | | | | |
| 2 | 111205A | 6 | 15 | 44 | 6 | 15 | 0.31 | 43 | 584.80 | 9 | 0 | 0 | 0.00 | 0 | 0.00 |
| 3 | 111215G | 305 | 514 | 1 | 297 | 506 | 10.39 | 1 | 274.17 | 25 | 21 | 27 | 14.63 | 6 | 9.75 |
| 6 | 111203E | 10 | 16 | 42 | 10 | 16 | 0.33 | 41 | 513.81 | 13 | 0 | 0 | 0.00 | 0 | 0.00 |
| 7 | 121225B | 18 | 28 | 37 | 15 | 25 | 0.51 | 37 | 1493.43 | 1 | 0 | 0 | 0.00 | 0 | 0.00 |
| 8 | 121225C | 54 | 78 | 20 | 54 | 78 | 1.60 | 20 | 524.51 | 11 | 0 | 0 | 0.00 | 0 | 0.00 |
| 9 | 111315F | 16 | 22 | 39 | 16 | 22 | 0.45 | 38 | 120.59 | 46 | 5 | 7 | 38.37 | 1 | 16.44 |
| 10 | 111315C | 23 | 35 | 35 | 23 | 35 | 0.72 | 35 | 100.24 | 48 | 5 | 5 | 14.32 | 1 | 8.59 |
| 11 | 111315A | 27 | 40 | 32 | 27 | 40 | 0.82 | 32 | 357.27 | 20 | 4 | 5 | 44.66 | 1 | 26.80 |
| 12 | 111303C | 124 | 216 | 6 | 123 | 214 | 4.39 | 6 | 154.37 | 42 | 13 | 17 | 12.26 | 2 | 4.33 |
| 13 | 111301C | 33 | 60 | 25 | 27 | 54 | 1.11 | 26 | 90.41 | 49 | 4 | 6 | 10.05 | 1 | 5.02 |
| 14 | 111301A | 90 | 202 | 7 | 90 | 202 | 4.15 | 7 | 181.93 | 39 | 12 | 14 | 12.61 | 2 | 5.40 |
| 17 | 111313I | 36 | 56 | 27 | 36 | 56 | 1.15 | 25 | 457.07 | 16 | 3 | 4 | 32.65 | 1 | 24.49 |
| 18 | 111313A | 70 | 341 | 4 | 70 | 341 | 7.00 | 4 | 128.65 | 44 | 7 | 8 | 3.02 | 1 | 1.13 |
| 19 | 111301F | 59 | 110 | 12 | 59 | 110 | 2.26 | 12 | 1491.73 | 2 | 4 | 3 | 40.68 | 1 | 40.68 |
| 20 | 111405B | 10 | 17 | 41 | 10 | 17 | 0.35 | 40 | 145.49 | 43 | 0 | 0 | 0.00 | 0 | 0.00 |
| 21 | 121427D | 19 | 39 | 33 | 17 | 37 | 0.76 | 33 | 702.35 | 6 | 0 | 0 | 0.00 | 0 | 0.00 |
| 22 | 121427A | 1 | 1 | 51 | 1 | 1 | 0.02 | 51 | 35.05 | 51 | 0 | 0 | 0.00 | 0 | 0.00 |
| 23 | 121425A | 50 | 81 | 19 | 50 | 81 | 1.66 | 17 | 276.55 | 24 | 8 | 10 | 34.14 | 2 | 20.49 |
| 24 | 111401A | 6 | 10 | 46 | 6 | 10 | 0.21 | 46 | 237.42 | 31 | 0 | 0 | 0.00 | 0 | 0.00 |
| 25 | 111401D | 31 | 45 | 30 | 31 | 45 | 0.92 | 29 | 340.68 | 21 | 0 | 0 | 0.00 | 0 | 0.00 |
| 27 | 111417C | 111 | 322 | 5 | 111 | 322 | 6.61 | 5 | 224.64 | 35 | 9 | 20 | 13.95 | 1 | 2.09 |
| 28 | 111417B | 81 | 181 | 10 | 81 | 181 | 3.72 | 10 | 127.74 | 45 | 16 | 21 | 14.82 | 3 | 6.35 |
| 29 | 111417F | 23 | 47 | 28 | 21 | 45 | 0.92 | 29 | 169.03 | 41 | 0 | 0 | 0.00 | 0 | 0.00 |
| 30 | 101405A | 65 | 83 | 17 | 63 | 81 | 1.66 | 17 | 260.37 | 29 | 5 | 4 | 12.86 | 1 | 9.64 |
| 31 | 111427D | 40 | 92 | 15 | 40 | 92 | 1.89 | 15 | 816.04 | 3 | 1 | 1 | 8.87 | 0 | 0.00 |
| 32 | 111427B | 20 | 27 | 38 | 20 | 27 | 0.55 | 36 | 212.26 | 37 | 0 | 0 | 0.00 | 0 | 0.00 |
| 33 | 111427A | 56 | 74 | 22 | 56 | 74 | 1.52 | 21 | 101.47 | 47 | 7 | 8 | 10.97 | 1 | 4.11 |
| 34 | 111425D | 5 | 5 | 50 | 5 | 5 | 0.10 | 50 | 198.18 | 38 | 0 | 0 | 0.00 | 0 | 0.00 |
| 35 | 101505E | 109 | 169 | 11 | 108 | 167 | 3.43 | 11 | 237.08 | 32 | 10 | 11 | 15.62 | 2 | 8.52 |
| 36 | 101505A | 26 | 57 | 26 | 24 | 53 | 1.09 | 27 | 598.46 | 8 | 2 | 2 | 22.58 | 0 | 0.00 |
| 37 | 101503G | 19 | 65 | 24 | 19 | 65 | 1.33 | 24 | 368.17 | 19 | 0 | 0 | 0.00 | 0 | 0.00 |
| 38 | 111527D | 61 | 83 | 17 | 59 | 79 | 1.62 | 19 | 177.21 | 40 | 6 | 7 | 15.70 | 0 | 0.00 |
| 40 | 111525D | 29 | 75 | 21 | 25 | 71 | 1.46 | 22 | 236.43 | 33 | 4 | 5 | 16.65 | 0 | 0.00 |
| 41 | 111525A | 78 | 109 | 13 | 75 | 106 | 2.18 | 13 | 264.27 | 27 | 0 | 0 | 0.00 | 0 | 0.00 |
| 42 | 111513A | 2 | 6 | 47 | 2 | 6 | 0.12 | 47 | 264.55 | 26 | 0 | 0 | 0.00 | 0 | 0.00 |
| 43 | 101503C | 13 | 16 | 42 | 13 | 16 | 0.33 | 41 | 388.73 | 17 | 0 | 0 | 0.00 | 0 | 0.00 |
| 44 | 101501A | 27 | 47 | 28 | 27 | 47 | 0.97 | 28 | 263.57 | 28 | 1 | 1 | 5.61 | 0 | 0.00 |
| 45 | 101515G | 54 | 90 | 16 | 53 | 88 | 1.81 | 16 | 610.48 | 7 | 2 | 2 | 13.87 | 1 | 20.81 |
| 46 | 101515C | 18 | 41 | 31 | 18 | 41 | 0.84 | 31 | 803.45 | 4 | 0 | 0 | 0.00 | 0 | 0.00 |
| 47 | 101515D | 27 | 36 | 34 | 27 | 36 | 0.74 | 34 | 384.37 | 18 | 2 | 1 | 10.68 | 1 | 32.03 |
| 48 | 101515E | 38 | 71 | 23 | 37 | 70 | 1.44 | 23 | 523.52 | 12 | 2 | 2 | 14.96 | 0 | 0.00 |
| 49 | 101501B | 16 | 22 | 39 | 14 | 19 | 0.39 | 39 | 778.05 | 5 | 0 | 0 | 0.00 | 0 | 0.00 |
| 50 | 101517C | 95 | 190 | 9 | 94 | 184 | 3.78 | 9 | 457.71 | 15 | 4 | 7 | 17.41 | 1 | 7.46 |
| 51 | 101517B | 101 | 428 | 3 | 88 | 368 | 7.56 | 3 | 287.68 | 22 | 3 | 7 | 5.47 | 0 | 0.00 |
| 52 | 101517A | 213 | 510 | 2 | 194 | 387 | 7.95 | 2 | 220.17 | 36 | 10 | 10 | 5.69 | 2 | 3.41 |
| 53 | 101413E | 37 | 108 | 14 | 36 | 102 | 2.09 | 14 | 555.10 | 10 | 0 | 0 | 0.00 | 0 | 0.00 |
| 54 | 101413A | 96 | 198 | 8 | 94 | 195 | 4.00 | 8 | 240.30 | 30 | 5 | 6 | 7.39 | 1 | 3.70 |
| 55 | 101413D | 11 | 14 | 45 | 11 | 14 | 0.29 | 44 | 473.29 | 14 | 0 | 0 | 0.00 | 0 | 0.00 |
| 56 | 101401B | 4 | 6 | 47 | 4 | 6 | 0.12 | 47 | 283.69 | 23 | 0 | 0 | 0.00 | 0 | 0.00 |
| 57 | 101505G | 10 | 31 | 36 | 4 | 12 | 0.25 | 45 | 228.44 | 34 | 0 | 0 | 0.00 | 0 | 0.00 |
| 59 | 111401B | 4 | 6 | 47 | 4 | 6 | 0.12 | 47 | 62.07 | 50 | 0 | 0 | 0.00 | 0 | 0.00 |
| All | All | 2477 | 5135 | | 2395 | 4870 | 100.00 | | 229.94 | | 175 ^a | 221 ^c | 10.43 ^d | 33 ^e | 4.67 ^h |
| Site no's | Imp no's | | | | 0.97 | 0.95 | | | 373.08 | | 51 ^b | | 9.23 ^e | | 5.12 ⁱ |
| | | | | | | | | | 42.26 | | | | 1.64 ^f | | 1.30 ^j |

^atotal number of observations, ^btotal number of birds, ^dmean weighted density of all birds (#birds/3x7.06 sq km), ^eaverage density, ^fSE, ^gtotal number of nests, ^hdensity of nests (#nests/7.06 sq km), ⁱaverage density, ^jSE

Table 4. Continued.

| Site Number | Gulls, Terns, and Jaegers | | | | | Waterfowl | | | | | Geese | | | | |
|----------------|---------------------------|-------|----------|---------------|--------------|-----------|-------|----------|---------------|--------------|-------|-------|----------|---------------|--------------|
| | n | Total | #/ sq km | Total # Nests | Nests/ sq km | n | Total | #/ sq km | Total # Nests | Nests/ sq km | n | Total | #/ sq km | Total # Nests | Nests/ sq km |
| 2 | 0 | 0 | 0.00 | 0 | 0.00 | 1 | 1 | 38.99 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 3 | 12 | 20 | 32.73 | 0 | 0.00 | 79 | 95 | 51.47 | 19 | 30.88 | 51 | 61 | 33.05 | 13 | 21.13 |
| 6 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 7 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 8 | 0 | 0 | 0.00 | 0 | 0.00 | 23 | 26 | 174.84 | 1 | 20.17 | 0 | 0 | 0.00 | 0 | 0.00 |
| 9 | 0 | 0 | 0.00 | 0 | 0.00 | 3 | 4 | 21.93 | 1 | 16.44 | 3 | 4 | 21.93 | 1 | 16.44 |
| 10 | 0 | 0 | 0.00 | 0 | 0.00 | 4 | 7 | 20.05 | 0 | 0.00 | 1 | 1 | 2.86 | 0 | 0.00 |
| 11 | 2 | 2 | 31.82 | 0 | 0.00 | 4 | 4 | 35.73 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 12 | 5 | 6 | 9.71 | 0 | 0.00 | 44 | 73 | 52.66 | 9 | 19.48 | 20 | 30 | 21.64 | 5 | 10.82 |
| 13 | 2 | 6 | 19.38 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 14 | 4 | 8 | 13.98 | 0 | 0.00 | 19 | 59 | 53.14 | 0 | 0.00 | 8 | 17 | 15.31 | 0 | 0.00 |
| 17 | 1 | 1 | 23.33 | 0 | 0.00 | 8 | 19 | 155.08 | 0 | 0.00 | 3 | 7 | 57.13 | 0 | 0.00 |
| 18 | 1 | 1 | 0.41 | 0 | 0.00 | 10 | 106 | 39.99 | 0 | 0.00 | 1 | 1 | 0.38 | 0 | 0.00 |
| 19 | 1 | 1 | 33.64 | 0 | 0.00 | 14 | 14 | 189.86 | 2 | 81.37 | 5 | 5 | 67.81 | 0 | 0.00 |
| 20 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 21 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 22 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 23 | 5 | 7 | 51.53 | 2 | 20.49 | 13 | 22 | 75.11 | 2 | 20.49 | 11 | 20 | 68.29 | 2 | 20.49 |
| 24 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 25 | 1 | 1 | 71.99 | 0 | 0.00 | 6 | 10 | 75.71 | 0 | 0.00 | 2 | 5 | 37.85 | 0 | 0.00 |
| 27 | 6 | 11 | 59.14 | 0 | 0.00 | 18 | 55 | 38.37 | 1 | 2.09 | 3 | 6 | 4.19 | 0 | 0.00 |
| 28 | 7 | 11 | 13.22 | 1 | 2.12 | 13 | 19 | 13.41 | 1 | 2.12 | 10 | 16 | 11.29 | 1 | 2.12 |
| 29 | 0 | 0 | 0.00 | 0 | 0.00 | 1 | 1 | 3.76 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 30 | 0 | 0 | 0.00 | 0 | 0.00 | 16 | 17 | 54.64 | 2 | 19.29 | 6 | 7 | 22.50 | 2 | 19.29 |
| 31 | 0 | 0 | 0.00 | 0 | 0.00 | 20 | 25 | 221.75 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 32 | 0 | 0 | 0.00 | 0 | 0.00 | 8 | 10 | 78.62 | 1 | 23.58 | 4 | 4 | 31.45 | 1 | 23.58 |
| 33 | 2 | 3 | 32.26 | 0 | 0.00 | 11 | 13 | 17.83 | 2 | 8.23 | 10 | 11 | 15.08 | 2 | 8.23 |
| 34 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 35 | 7 | 22 | 98.85 | 1 | 4.26 | 13 | 15 | 21.29 | 4 | 17.04 | 6 | 5 | 7.10 | 1 | 4.26 |
| 36 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 37 | 0 | 0 | 0.00 | 0 | 0.00 | 5 | 9 | 50.98 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 38 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 40 | 2 | 26 | 1024.43 | 0 | 0.00 | 5 | 6 | 19.98 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 41 | 1 | 2 | 13.73 | 0 | 0.00 | 23 | 32 | 79.78 | 1 | 7.48 | 2 | 2 | 4.99 | 0 | 0.00 |
| 42 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 43 | 0 | 0 | 0.00 | 0 | 0.00 | 3 | 3 | 72.89 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 44 | 1 | 2 | 60.28 | 0 | 0.00 | 3 | 3 | 16.82 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 45 | 1 | 1 | 30.75 | 0 | 0.00 | 12 | 19 | 131.81 | 1 | 20.81 | 0 | 0 | 0.00 | 0 | 0.00 |
| 46 | 0 | 0 | 0.00 | 0 | 0.00 | 5 | 5 | 97.98 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 47 | 3 | 4 | 888.89 | 0 | 0.00 | 5 | 5 | 53.38 | 1 | 32.03 | 0 | 0 | 0.00 | 0 | 0.00 |
| 48 | 0 | 0 | 0.00 | 0 | 0.00 | 8 | 12 | 89.75 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 49 | 0 | 0 | 0.00 | 0 | 0.00 | 3 | 1 | 40.95 | 1 | 122.85 | 3 | 1 | 40.95 | 1 | 122.85 |
| 50 | 1 | 1 | 6.87 | 0 | 0.00 | 36 | 76 | 189.05 | 0 | 0.00 | 11 | 31 | 77.11 | 0 | 0.00 |
| 51 | 0 | 0 | 0.00 | 0 | 0.00 | 55 | 236 | 184.49 | 0 | 0.00 | 15 | 70 | 54.72 | 0 | 0.00 |
| 52 | 2 | 2 | 1.62 | 0 | 0.00 | 50 | 66 | 37.55 | 3 | 5.12 | 12 | 15 | 8.53 | 2 | 3.41 |
| 53 | 5 | 19 | 884.54 | 0 | 0.00 | 4 | 6 | 32.65 | 0 | 0.00 | 2 | 2 | 10.88 | 0 | 0.00 |
| 54 | 1 | 2 | 8.34 | 0 | 0.00 | 14 | 32 | 39.43 | 1 | 3.70 | 8 | 26 | 32.04 | 1 | 3.70 |
| 55 | 0 | 0 | 0.00 | 0 | 0.00 | 3 | 3 | 101.42 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 56 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 57 | 1 | 1 | 19.04 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 59 | 1 | 2 | 24.58 | 0 | 0.00 | 2 | 3 | 31.04 | 0 | 0.00 | 2 | 3 | 31.04 | 0 | 0.00 |
| All | 75 | 162 | 7.65 | 4 | 0.57 | 564 | 1112 | 52.50 | 53 | 7.51 | 199 | 350 | 16.53 | 32 | 4.53 |
| Site no's | 51 | | 67.75 | | 0.53 | 51 | | 53.02 | | 8.89 | 51 | | 13.30 | | 5.03 |
| | | | 30.81 | | 0.41 | | | 8.23 | | 3.00 | | | 2.94 | | 2.51 |

Table 4. Continued.

| Site Number | Swans | | | | | Ducks | | | | |
|----------------|-------|-------|-------------|------------------|-----------------|-------|-------|-------------|------------------|-----------------|
| | n | Total | #/ sq km | Total # Nests | Nests/ sq km | n | Total | #/ sq km | Total # Nests | Nests/ sq km |
| 2 | 0 | 0 | 0.00 | 0 | 0.00 | 1 | 1 | 38.99 | 0 | 0.00 |
| 3 | 4 | 3 | 1.63 | 1 | 1.63 | 24 | 31 | 16.80 | 5 | 8.13 |
| 6 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 7 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 8 | 0 | 0 | 0.00 | 0 | 0.00 | 23 | 26 | 174.84 | 1 | 20.17 |
| 9 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 10 | 0 | 0 | 0.00 | 0 | 0.00 | 3 | 6 | 17.18 | 0 | 0.00 |
| 11 | 0 | 0 | 0.00 | 0 | 0.00 | 4 | 4 | 35.73 | 0 | 0.00 |
| 12 | 2 | 4 | 2.89 | 0 | 0.00 | 22 | 39 | 28.13 | 4 | 8.66 |
| 13 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 14 | 0 | 0 | 0.00 | 0 | 0.00 | 11 | 42 | 37.83 | 0 | 0.00 |
| 17 | 0 | 0 | 0.00 | 0 | 0.00 | 5 | 12 | 97.94 | 0 | 0.00 |
| 18 | 0 | 0 | 0.00 | 0 | 0.00 | 9 | 105 | 39.61 | 0 | 0.00 |
| 19 | 0 | 0 | 0.00 | 0 | 0.00 | 9 | 9 | 122.05 | 2 | 81.37 |
| 20 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 21 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 22 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 23 | 0 | 0 | 0.00 | 0 | 0.00 | 2 | 2 | 6.83 | 0 | 0.00 |
| 24 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 25 | 0 | 0 | 0.00 | 0 | 0.00 | 4 | 5 | 37.85 | 0 | 0.00 |
| 27 | 0 | 0 | 0.00 | 0 | 0.00 | 15 | 49 | 34.18 | 1 | 2.09 |
| 28 | 0 | 0 | 0.00 | 0 | 0.00 | 3 | 3 | 2.12 | 0 | 0.00 |
| 29 | 0 | 0 | 0.00 | 0 | 0.00 | 1 | 1 | 3.76 | 0 | 0.00 |
| 30 | 0 | 0 | 0.00 | 0 | 0.00 | 10 | 10 | 32.14 | 0 | 0.00 |
| 31 | 0 | 0 | 0.00 | 0 | 0.00 | 18 | 23 | 204.01 | 0 | 0.00 |
| 32 | 2 | 2 | 15.72 | 0 | 0.00 | 4 | 6 | 47.17 | 0 | 0.00 |
| 33 | 0 | 0 | 0.00 | 0 | 0.00 | 1 | 2 | 2.74 | 0 | 0.00 |
| 34 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 35 | 0 | 0 | 0.00 | 0 | 0.00 | 7 | 10 | 14.20 | 3 | 12.78 |
| 36 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 37 | 0 | 0 | 0.00 | 0 | 0.00 | 5 | 9 | 50.98 | 0 | 0.00 |
| 38 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 40 | 0 | 0 | 0.00 | 0 | 0.00 | 5 | 6 | 19.98 | 0 | 0.00 |
| 41 | 0 | 0 | 0.00 | 0 | 0.00 | 16 | 16 | 39.89 | 1 | 7.48 |
| 42 | 5 | 14 | 617.28 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 43 | 0 | 0 | 0.00 | 0 | 0.00 | 3 | 3 | 72.89 | 0 | 0.00 |
| 44 | 0 | 0 | 0.00 | 0 | 0.00 | 3 | 3 | 16.82 | 0 | 0.00 |
| 45 | 0 | 0 | 0.00 | 0 | 0.00 | 12 | 19 | 131.81 | 1 | 20.81 |
| 46 | 0 | 0 | 0.00 | 0 | 0.00 | 5 | 5 | 97.98 | 0 | 0.00 |
| 47 | 0 | 0 | 0.00 | 0 | 0.00 | 5 | 5 | 53.38 | 1 | 32.03 |
| 48 | 0 | 0 | 0.00 | 0 | 0.00 | 8 | 12 | 89.75 | 0 | 0.00 |
| 49 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 50 | 0 | 0 | 0.00 | 0 | 0.00 | 25 | 45 | 111.94 | 0 | 0.00 |
| 51 | 0 | 0 | 0.00 | 0 | 0.00 | 40 | 166 | 129.77 | 0 | 0.00 |
| 52 | 0 | 0 | 0.00 | 0 | 0.00 | 38 | 51 | 29.02 | 1 | 1.71 |
| 53 | 0 | 0 | 0.00 | 0 | 0.00 | 2 | 4 | 21.77 | 0 | 0.00 |
| 54 | 0 | 0 | 0.00 | 0 | 0.00 | 6 | 6 | 7.39 | 0 | 0.00 |
| 55 | 0 | 0 | 0.00 | 0 | 0.00 | 3 | 3 | 101.42 | 0 | 0.00 |
| 56 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 57 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 59 | 0 | 0 | 0.00 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| All | 13 | 23 | 1.09 | 1 | 0.14 | 352 | 739 | 34.89 | 20 | 2.83 |
| Site no's | 51 | | 12.50 | | 0.03 | 51 | | 38.61 | | 3.83 |
| | | | 12.10 | | 0.03 | | | 6.95 | | 1.78 |

Table 4. Continued.

| Site Number | Shorebirds | | | | | Passerines | | | | |
|----------------|------------|-------|-------------|------------------|-----------------|------------|-------|-------------|------------------|-----------------|
| | n | Total | #/ sq km | Total # Nests | Nests/ sq km | n | Total | #/ sq km | Total # Nests | Nests/ sq km |
| 2 | 4 | 11 | 428.85 | 0 | 0.00 | 1 | 3 | 116.96 | 0 | 0.00 |
| 3 | 155 | 318 | 172.30 | 3 | 1.63 | 30 | 46 | 24.92 | 2 | 1.08 |
| 6 | 10 | 16 | 513.81 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 7 | 7 | 13 | 776.58 | 0 | 0.00 | 8 | 12 | 716.85 | 0 | 0.00 |
| 8 | 25 | 44 | 295.88 | 1 | 6.72 | 6 | 8 | 53.80 | 0 | 0.00 |
| 9 | 5 | 8 | 43.85 | 0 | 0.00 | 3 | 3 | 16.44 | 0 | 0.00 |
| 10 | 10 | 18 | 51.55 | 0 | 0.00 | 4 | 5 | 14.32 | 0 | 0.00 |
| 11 | 12 | 22 | 196.50 | 0 | 0.00 | 5 | 7 | 62.52 | 0 | 0.00 |
| 12 | 57 | 114 | 82.23 | 0 | 0.00 | 4 | 4 | 2.89 | 0 | 0.00 |
| 13 | 21 | 42 | 70.32 | 1 | 1.67 | 0 | 0 | 0.00 | 0 | 0.00 |
| 14 | 48 | 114 | 102.67 | 1 | 0.90 | 7 | 7 | 6.30 | 0 | 0.00 |
| 17 | 16 | 23 | 187.72 | 1 | 8.16 | 8 | 9 | 73.46 | 0 | 0.00 |
| 18 | 48 | 221 | 83.37 | 0 | 0.00 | 4 | 5 | 1.89 | 0 | 0.00 |
| 19 | 36 | 87 | 1179.82 | 0 | 0.00 | 4 | 5 | 67.81 | 0 | 0.00 |
| 20 | 10 | 17 | 145.49 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 21 | 16 | 36 | 683.37 | 0 | 0.00 | 1 | 1 | 18.98 | 0 | 0.00 |
| 22 | 1 | 1 | 35.05 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 23 | 22 | 40 | 136.57 | 0 | 0.00 | 2 | 2 | 6.83 | 0 | 0.00 |
| 24 | 6 | 10 | 237.42 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 25 | 18 | 27 | 204.41 | 0 | 0.00 | 6 | 7 | 52.99 | 0 | 0.00 |
| 27 | 55 | 207 | 144.41 | 3 | 2.09 | 23 | 29 | 20.23 | 0 | 0.00 |
| 28 | 38 | 69 | 48.70 | 0 | 0.00 | 7 | 61 | 43.05 | 0 | 0.00 |
| 29 | 15 | 37 | 138.98 | 1 | 3.76 | 5 | 7 | 26.29 | 0 | 0.00 |
| 30 | 30 | 47 | 151.08 | 0 | 0.00 | 12 | 13 | 41.79 | 0 | 0.00 |
| 31 | 15 | 61 | 541.07 | 0 | 0.00 | 4 | 5 | 44.35 | 0 | 0.00 |
| 32 | 7 | 10 | 78.62 | 0 | 0.00 | 5 | 7 | 55.03 | 0 | 0.00 |
| 33 | 26 | 38 | 52.10 | 0 | 0.00 | 10 | 12 | 16.45 | 0 | 0.00 |
| 34 | 3 | 3 | 118.91 | 0 | 0.00 | 2 | 2 | 79.27 | 0 | 0.00 |
| 35 | 65 | 102 | 144.80 | 1 | 1.42 | 13 | 17 | 24.13 | 0 | 0.00 |
| 36 | 18 | 47 | 530.71 | 0 | 0.00 | 4 | 4 | 45.17 | 0 | 0.00 |
| 37 | 13 | 55 | 311.53 | 0 | 0.00 | 1 | 1 | 5.66 | 0 | 0.00 |
| 38 | 27 | 40 | 89.73 | 0 | 0.00 | 26 | 32 | 71.78 | 0 | 0.00 |
| 40 | 10 | 29 | 96.57 | 0 | 0.00 | 4 | 5 | 16.65 | 0 | 0.00 |
| 41 | 37 | 56 | 139.62 | 2 | 4.99 | 14 | 16 | 39.89 | 0 | 0.00 |
| 42 | 2 | 6 | 264.55 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 43 | 6 | 8 | 194.36 | 0 | 0.00 | 4 | 5 | 121.48 | 0 | 0.00 |
| 44 | 13 | 27 | 151.41 | 0 | 0.00 | 9 | 14 | 78.51 | 0 | 0.00 |
| 45 | 23 | 47 | 326.05 | 0 | 0.00 | 15 | 19 | 131.81 | 2 | 13.87 |
| 46 | 12 | 35 | 685.87 | 0 | 0.00 | 1 | 1 | 19.60 | 0 | 0.00 |
| 47 | 7 | 12 | 128.12 | 0 | 0.00 | 10 | 14 | 149.48 | 0 | 0.00 |
| 48 | 19 | 47 | 351.51 | 0 | 0.00 | 8 | 9 | 67.31 | 0 | 0.00 |
| 49 | 8 | 15 | 614.25 | 0 | 0.00 | 3 | 3 | 122.85 | 0 | 0.00 |
| 50 | 38 | 85 | 211.44 | 0 | 0.00 | 15 | 15 | 37.31 | 0 | 0.00 |
| 51 | 22 | 111 | 86.77 | 1 | 0.78 | 8 | 14 | 10.94 | 0 | 0.00 |
| 52 | 82 | 244 | 138.82 | 1 | 0.57 | 50 | 65 | 36.98 | 0 | 0.00 |
| 53 | 27 | 77 | 419.05 | 1 | 5.44 | 0 | 0 | 0.00 | 0 | 0.00 |
| 54 | 58 | 133 | 163.89 | 2 | 2.46 | 16 | 22 | 27.11 | 0 | 0.00 |
| 55 | 8 | 11 | 371.87 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| 56 | 2 | 4 | 189.13 | 0 | 0.00 | 2 | 2 | 94.56 | 0 | 0.00 |
| 57 | 2 | 10 | 190.37 | 0 | 0.00 | 1 | 1 | 19.04 | 0 | 0.00 |
| 59 | 1 | 1 | 10.35 | 0 | 0.00 | 0 | 0 | 0.00 | 0 | 0.00 |
| All | 1216 | 2856 | 134.85 | 19 | 0.90 | 365 | 519 | 24.50 | 4 | 0.19 |
| Site no's | 51 | | 249.26 | | 0.80 | 51 | | 52.62 | | -0.29 |
| | | | 32.13 | | 0.26 | | | 14.38 | | 0.27 |

The largest proportions of birds recorded during the ice-free sampling periods were shorebirds (59%, 2856 birds) and waterfowl (23%, 1112 birds), with smaller proportions of passerines (11%, 519 birds), loons (5%, 221 birds), and gulls-terns-jaegers (3%, 162 birds) (Table 4). Red-necked Phalaropes comprised the largest proportion (35%, 1721 birds) of the 37 species recorded (Appendix B, Table B-1). Semipalmated Sandpiper, Lapland Longspur, and Northern Pintail (*Anas acuta*) also comprised notable proportions (9%, 452 birds; 7%, 328 birds; 6%, 312 birds, respectively; Appendix B, Table B-1). No other species represented more than 5% of the total number of birds recorded on impoundments. Nevertheless, 54 Spectacled Eiders (*Somateria fischeri*) (1% of total birds, Appendix B, Table B-1), currently listed as Threatened under the Endangered Species Act (58 Federal Register 27474-27480), were recorded in areas affected by impoundments. Impoundments where Spectacled Eiders were recorded were generally larger than the average size of the 51 bird use impoundments (Table 5). These impoundments also contained a slightly higher proportion of temporarily flooded tundra (53% versus 46%) and may be more spatially complex, as indicated by the impoundment area divided by the total perimeter of water within the impoundment (Table 5). The percent coverage of the predominant pre-development habitat for the impoundments where Spectacled Eiders were observed, 7-Aquatic Strangmoor, was higher than for all 51 impoundments (46% versus 37%, Table 6).

Shorebird density (134.85 birds per km²) was the highest of the bird groups, comprising 59% of the density of all birds combined. Waterfowl followed with 52.50 birds per km² and 23% of all birds combined, with ducks contributing to the majority of waterfowl density with 34.89 birds per km² or 15% of the total bird density (Table 7).

Systematic searches were made only for nests of waterfowl, gulls and loons; all other nests were found incidentally. A total of 114 sightings of nests of 20 species or species groups of birds was recorded in areas affected by impoundments (Table 8). Nests of Pacific Loon, Canada Goose, and Greater White-fronted Goose accounted for 60 (53%) of all nests found (Table 8). Of the remaining species, only Red-necked Phalarope (11 nests, 10%) and Spectacled, King, and unidentified eiders (17 nests, 15%) represented notable proportions of the total (Table 8). Impoundments with Spectacled Eider nests were generally larger than the average size of the 51 bird use impoundments (Table 5). These impoundments contained a slightly higher proportion of temporarily flooded tundra (65% versus 46%) and may also be more spatially complex (Table 5). The predominant pre-development habitat for impoundments with Spectacled Eider nests, 7-Aquatic Strangmoor, was higher than for all 51 impoundments (59% versus 37%, Table 6).

Table 5. Physical characteristics of impoundments where Spectacled Eiders were observed and nested compared to all impoundments sampled for bird use in the Prudhoe Bay oil field, Alaska, summer 1994.

| | Impound. Area (sq km) | Impound. Area (ha) | Percent of Area Open Water | Area of Open Water (sq km) | Percent of Area Tundra | Area of Tundra (sq km) | Index of Complexity | Perimeter of Water Bodies (m) |
|---|-----------------------------|--------------------------|-------------------------------|----------------------------------|---------------------------|------------------------------|------------------------|-------------------------------------|
| Impoundments with Spectacled Eider Sightings (n=11) | | | | | | | | |
| Total Area | 3.598 | 359.831 | 47.15% | 1.697 | 52.92% | 1.904 | 5.240 | 68675.5 |
| Average | 0.327 | 32.712 | | 0.154 | | 0.173 | | 6243.2 |
| Standard Deviation | 0.292 | 29.212 | | 0.140 | | 0.246 | | 7294.8 |
| Minimum | 0.010 | 0.986 | | 0.009 | | 0.001 | | 404.3 |
| Maximum | 0.884 | 88.356 | | 0.411 | | 0.814 | | 26727.4 |
| Impoundments with Spectacled Eider Nests (n=4) | | | | | | | | |
| Total Area | 2.319 | 231.946 | 35.30% | 0.819 | 64.82% | 1.503 | 5.215 | 44475.2 |
| Average | 0.580 | 57.987 | | 0.205 | | 0.376 | | 11118.8 |
| Standard Deviation | 0.266 | 26.620 | | 0.145 | | 0.324 | | 10738.3 |
| Minimum | 0.235 | 23.480 | | 0.072 | | 0.074 | | 2575.5 |
| Maximum | 0.884 | 88.356 | | 0.411 | | 0.814 | | 26727.4 |
| All Impoundments Sampled for Bird Use (n=51) | | | | | | | | |
| Total Area | 7.060 | 705.980 | 54.14% | 3.822 | 45.87% | 3.239 | 4.388 | 160906.5 |
| Average | 0.138 | 13.843 | | 0.075 | | 0.064 | | 3155.0 |
| Standard Deviation | 0.194 | 19.400 | | 0.103 | | 0.133 | | 4139.2 |
| Minimum | 0.006 | 0.558 | | 0.000 | | 0.001 | | 0.0 |
| Maximum | 0.884 | 88.356 | | 0.416 | | 0.814 | | 26727.4 |

Complexity = Area of Impoundment (ha) divided by the Perimeter of Water Bodies (km).

Table 6. Summary of pre-development habitat types following Troy (1988) classifications, for impoundment bird use study sites comparing impoundments with Spectacled Eider observations and nests to all bird use study site impoundments. Pre-development habitat types were evaluated and mapped from 1:18000 scale black and white 24 July 1955 aerial photographs projected and scaled to 1:6000 scale base maps.

| | Habitat Type | Area (sq km) | Percent of Total Area | Percent of Total Area with Spectacled Eider observations | Percent of Total Area with Spectacled Eider nests |
|-----|--|--------------|-----------------------|--|---|
| 1 | Moist High-centered Polygons | 0.017 | 0.2 | 0.2 | 0.1 |
| 2 | Moist Smooth Tundra | 0.024 | 0.3 | 0.0 | 0.0 |
| 3 | Moist, Wet Low-centered Polygons, Strangmoor | 0.150 | 2.1 | 0.8 | 0.3 |
| 4 | Wet Low-centered Polygons | 0.442 | 6.3 | 6.4 | 3.9 |
| 5 | Wet Strangmoor | 0.100 | 1.4 | 0.0 | 0.0 |
| 6 | Wet Smooth Tundra | 0.260 | 3.7 | 3.5 | 5.2 |
| 7 | Aquatic Strangmoor | 2.626 | 37.1 | 46.2 | 59.0 |
| 8 | Pond-No Emergents | 1.019 | 14.4 | 6.7 | 8.1 |
| 9 | Pond-Emergents | 1.583 | 22.4 | 30.8 | 16.8 |
| 4&5 | Mix Wet Low-centered Polygons, Strangmoor | 0.579 | 8.2 | 2.7 | 4.2 |
| 4&7 | Mix Wet, Aquatic Low-centered Polygons, Strangmoor | 0.268 | 3.8 | 2.8 | 2.5 |
| 8+9 | Open Water | 2.602 | 36.9 | 37.5 | 24.9 |
| | Total Area* | 7.067 | | | |

* Difference from Table 1 total is due to map corrections, rounding and map calculation errors.

Table 7. Densities of birds and bird nests recorded at 51 randomly selected areas affected by impoundments (total area = 7.1 sq km) in the Prudhoe Bay oil field, Alaska, 1994.

| Species Group | Mean no. birds/sq km | % of Total | Mean no. nests/sq km | % of Total |
|-----------------------|----------------------|------------|----------------------|------------|
| Loons | 10.43 | 4.5 | 4.67 | 33.7 |
| Gulls, Terns, Jaegers | 7.65 | 3.3 | 0.57 | 4.1 |
| Waterfowl | 52.50 | 22.8 | 7.51 | 54.3 |
| Swans | 1.09 | 0.5 | 0.14 | 1.0 |
| Geese | 16.53 | 7.2 | 4.53 | 32.7 |
| Ducks | 34.89 | 15.2 | 2.83 | 20.4 |
| Shorebirds | 134.85 | 58.6 | | |
| Passerines | 24.50 | 10.7 | | |
| All Birds | 229.94 | 100.0 | 12.75 | 92.1 |

Table 8. Nests recorded at 51 randomly selected areas affected by impoundments (total area = 7.1 sq km) in the Prudhoe Bay oil field, Alaska, 1994.

| Species | Total Nests | % of Total | Nests/km sq |
|-----------------------------|-------------|--------------|-------------|
| Pacific Loon | 31 | 27.2 | 4.39 |
| Red-throated Loon | 2 | 1.8 | 0.28 |
| Tundra Swan | 1 | 0.9 | 0.14 |
| Canada Goose | 16 | 14.0 | 2.27 |
| Greater White-fronted Goose | 13 | 11.4 | 1.84 |
| Unidentified Goose | 3 | 2.6 | 0.43 |
| Greater Scaup | 1 | 0.9 | 0.14 |
| King Eider | 4 | 3.5 | 0.57 |
| Spectacled Eider | 4 | 3.5 | 0.57 |
| Unidentified Eider | 9 | 7.9 | 1.28 |
| Oldsquaw | 1 | 0.9 | 0.14 |
| Unidentified Duck | 1 | 0.9 | 0.14 |
| Glaucous Gull | 4 | 3.5 | 0.57 |
| Red-necked Phalarope* | 11 | 9.6 | |
| Red Phalarope* | 1 | 0.9 | |
| Pectoral Sandpiper* | 1 | 0.9 | |
| Semipalmated Sandpiper* | 3 | 2.6 | |
| Semipalmated Plover* | 3 | 2.6 | |
| Lapland Longspur* | 4 | 3.5 | |
| Snow Bunting* | 1 | 0.9 | |
| All Species/Groups | 114 | 100.0 | |

* These species represent opportunistic nest observations; because these data do not represent systematic nest searches, density calculations are not included.

Aggregations on Specific Impoundments

Some impoundments supported exceptionally large numbers of birds. In fact, over 70% of all birds were seen on only 15 of the 51 impoundments (Table 4). Impoundments varied considerably in size, however, and only four of the 15 impoundments that supported large numbers of birds also supported high densities of birds (Table 4). High variability in densities of birds on study plots in the PBOF is typical (Troy 1988). Thus, comparisons of bird abundance in this report are based on overall weighted mean densities of birds on all 51 impoundments, (mean number of birds per km²), rather than on comparisons of bird densities on individual impoundments (Table 7). Figures 4 through 15 are impoundment maps for 21 of the 51 bird study sites. These 21 study sites account for 75% of all bird observations for periods 2, 3, and 4. Figures 4 through 15 illustrate historic habitat types within the maximum impoundment flood area, current open water levels, and waterfowl nest locations.

Bird Densities on Pre-Impoundment versus Impoundment Areas

Based on weighted mean densities of the 14 most common species of birds typically found on study plots in the PBOF (Troy 1988; Declan Troy unpub. data), we computed the expected number and densities of birds in areas affected by impoundments (Table 9). Impoundments generally supported lower densities than pre-impoundment areas. For 10 species (Table 9), weighted mean densities in impoundment areas were lower than in the same area before it was influenced by impoundment. For one species (Oldsquaw), there was no difference, and for three species (Pacific Loon, Greater White-fronted Goose, and Red-necked Phalarope), impounded areas supported higher densities than the same areas prior to impoundment (Table 9). Densities of Red-necked Phalaropes were eight times higher in areas affected by impoundments compared to the same area prior to impoundment.

Using regression analysis, Mann-Whitney U test, and the Wilcoxon signed rank test, we compared expected pre-impoundment bird densities with observed bird densities for the 51 impoundments sampled in 1994 (Table 9). For Mann-Whitney U test, and the Wilcoxon signed rank test, we found no statistically significant differences in weighted mean bird densities in areas affected by impoundments versus the same area prior to impoundment (Table 10). Regression analysis resulted in a non-significant regression of impoundment bird density on pre-impoundment bird density (Fig. 16). We also computed correction factors to adjust for 1994 variation from the multi-year weighted mean bird density (Fig. 17, Table 10). Even after such corrections, there

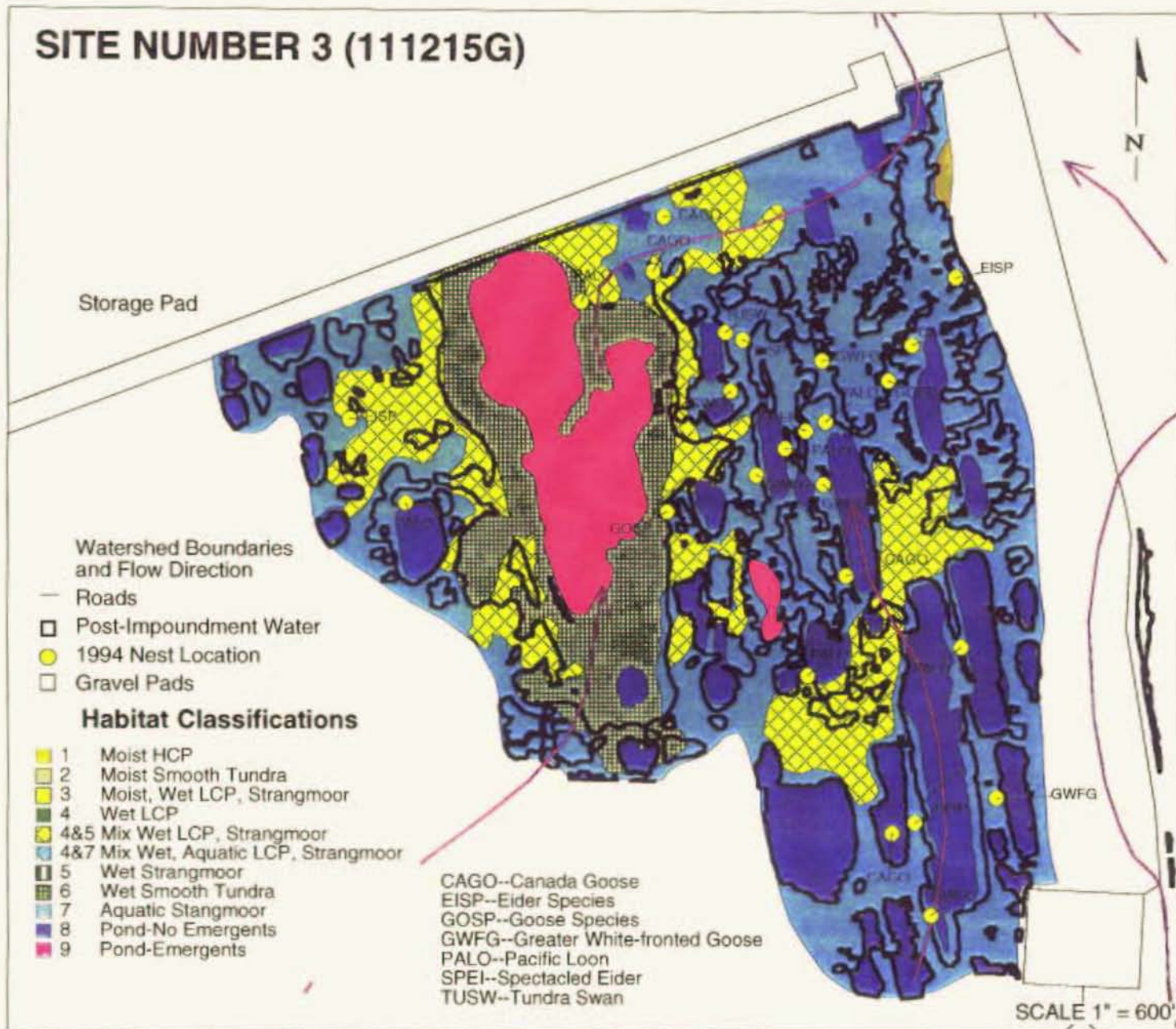
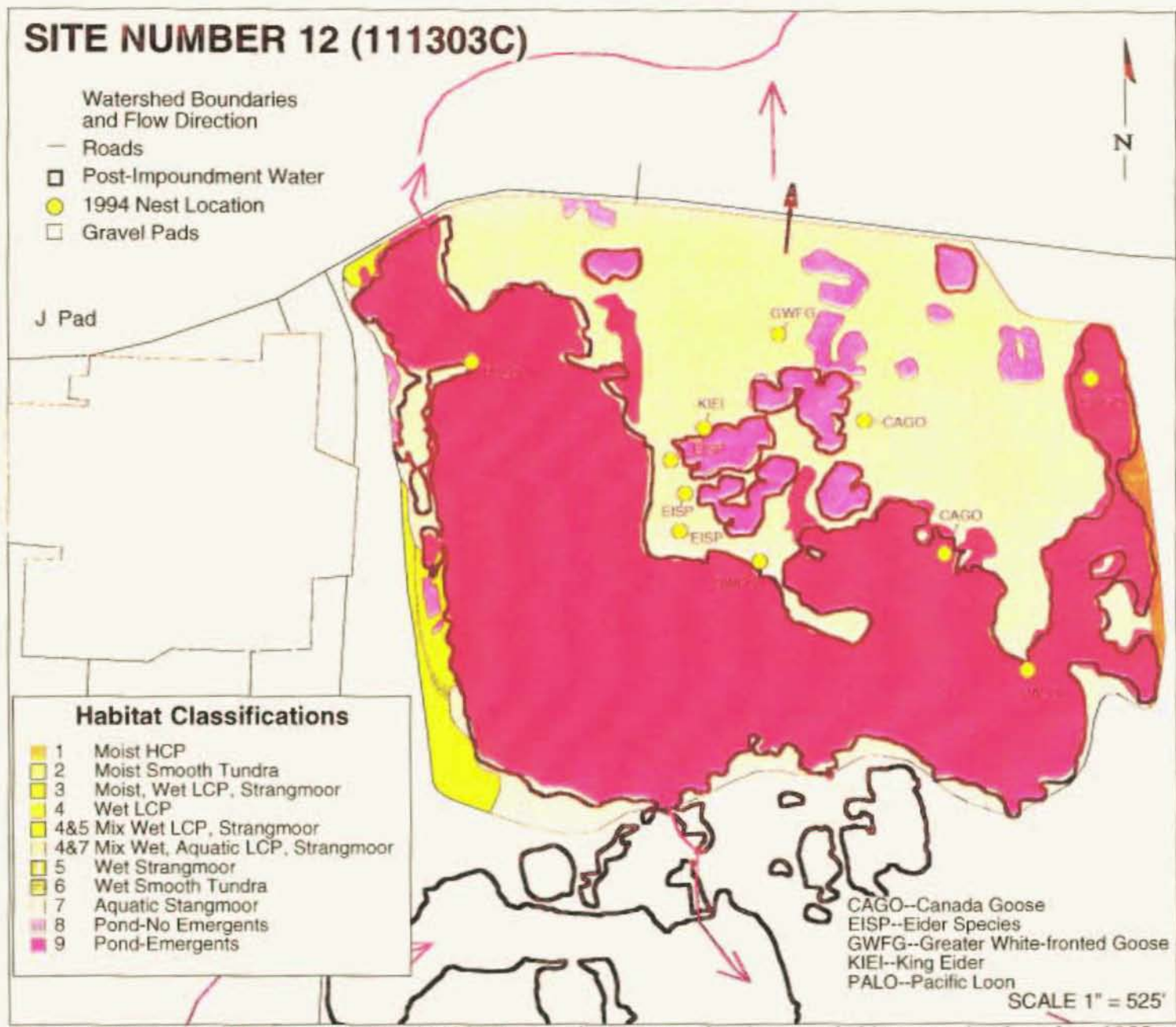


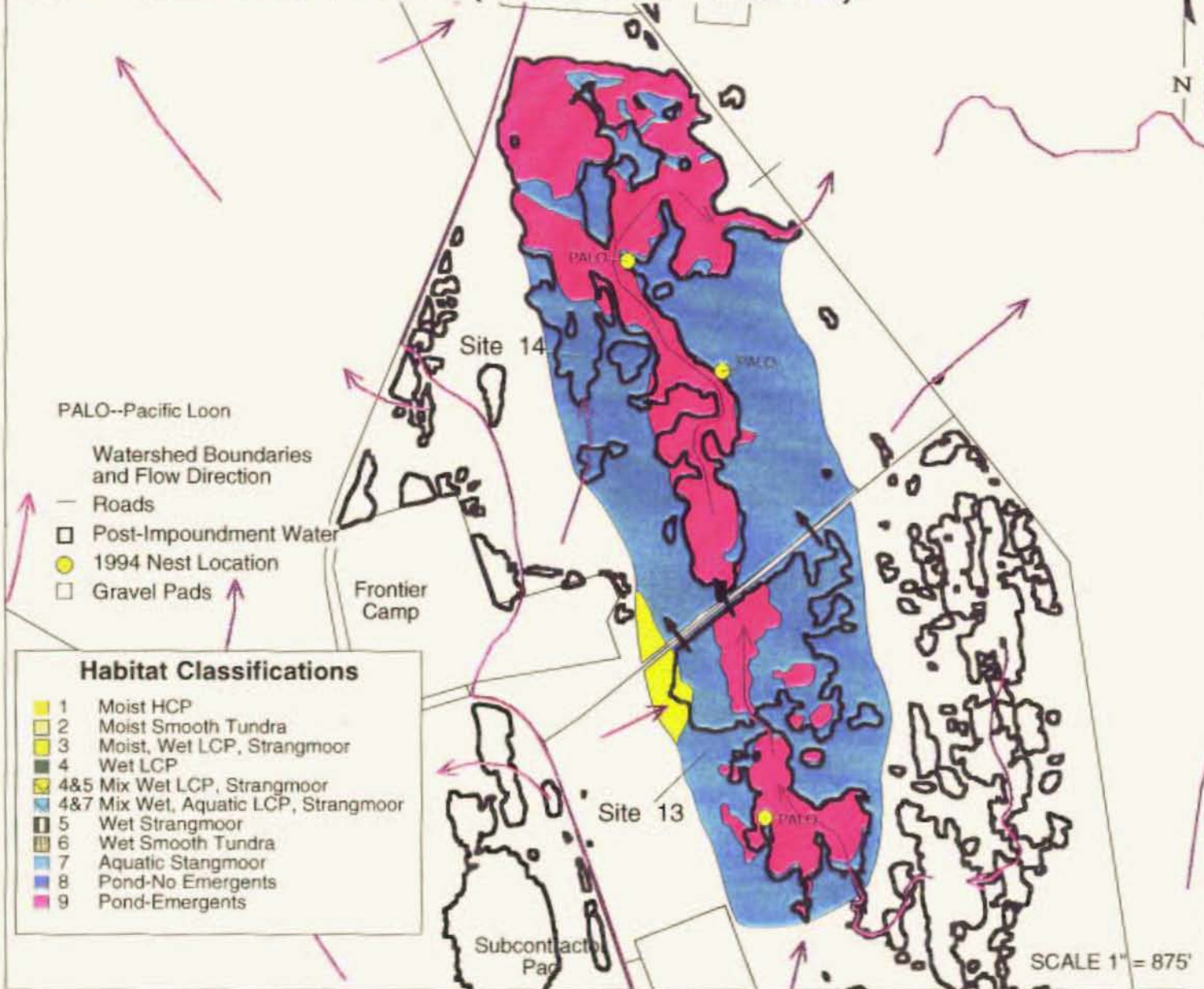
Figure 4. Study Site 3 (Impoundment 111215G) map showing pre-development habitat mapping based on 1955 aerial photography, post-impoundment open water boundaries based on July 1993 aerial photography, and waterfowl nest locations from summer 1994 field studies in the Prudhoe Bay oil field, Alaska. A total of 506 birds of 24 species were recorded at Site 3 during periods 2, 3 and 4, summer 1994.



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Figure 5. Study Site 12 (Impoundment 111303C) map showing pre-development habitat mapping based on 1955 aerial photography, post-impoundment open water boundaries based on July 1993 aerial photography, and waterfowl nest locations from summer 1994 field studies in the Prudhoe Bay oil field, Alaska. A total of 214 birds of 20 species were recorded at Site 12 during periods 2, 3 and 4, summer 1994.

SITE NUMBERS 13 & 14 (111301C & 111301A)



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Figure 6. Study Sites 13 and 14 (Impoundments 111301C and 111301A) map showing pre-development habitat mapping based on 1955 aerial photography, post-impoundment open water boundaries based on July 1993 aerial photography, and waterfowl nest locations from summer 1994 field studies in the Prudhoe Bay oil field, Alaska. A total of 256 birds of 13 species were recorded at Sites 13 and 14 during periods 2, 3 and 4, summer 1994.

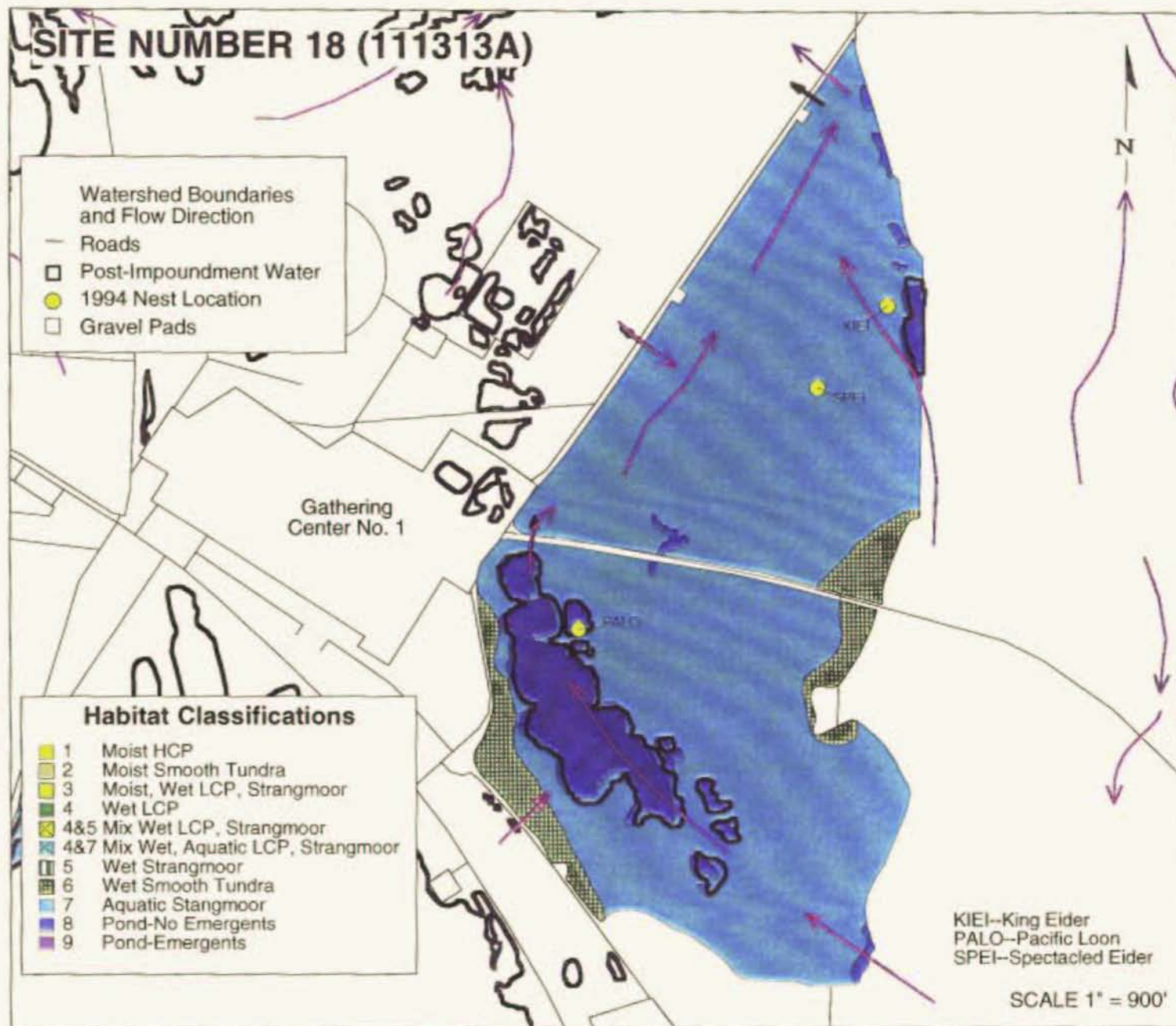


Figure 7. Study Site 18 (Impoundment 111313A) map showing pre-development habitat mapping based on 1955 aerial photography, post-impoundment open water boundaries based on July 1993 aerial photography, and waterfowl nest locations from summer 1994 field studies in the Prudhoe Bay oil field, Alaska. A total of 341 birds of 13 species were recorded at Site 18 during periods 2, 3 and 4, summer 1994.

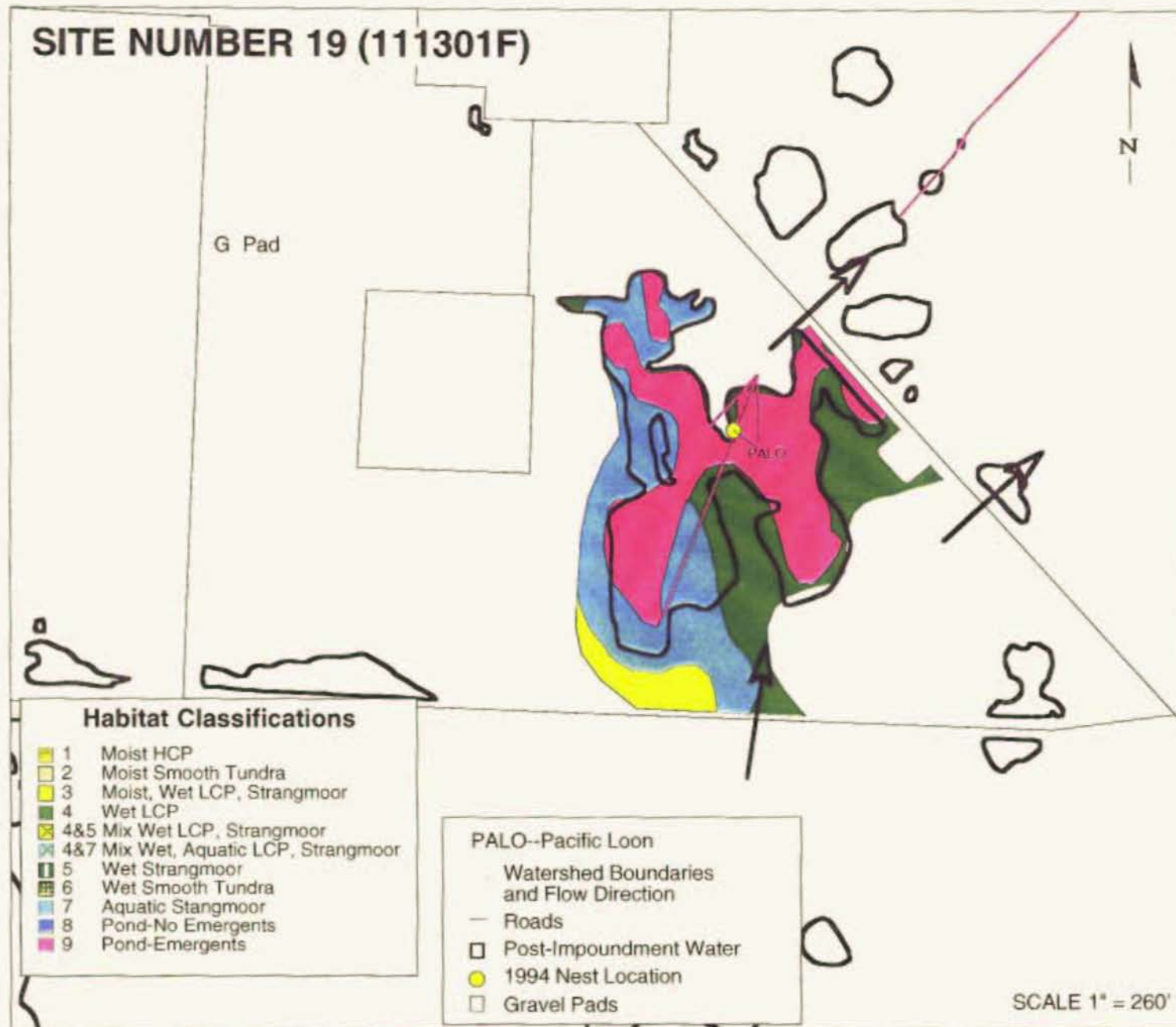


Figure 8. Study Site 19 (Impoundment 111301F) map showing pre-development habitat mapping based on 1955 aerial photography, post-impoundment open water boundaries based on July 1993 aerial photography, and waterfowl nest locations from summer 1994 field studies in the Prudhoe Bay oil field, Alaska. A total of 110 birds of 13 species were recorded at Site 19 during periods 2, 3, and 4, summer 1994.

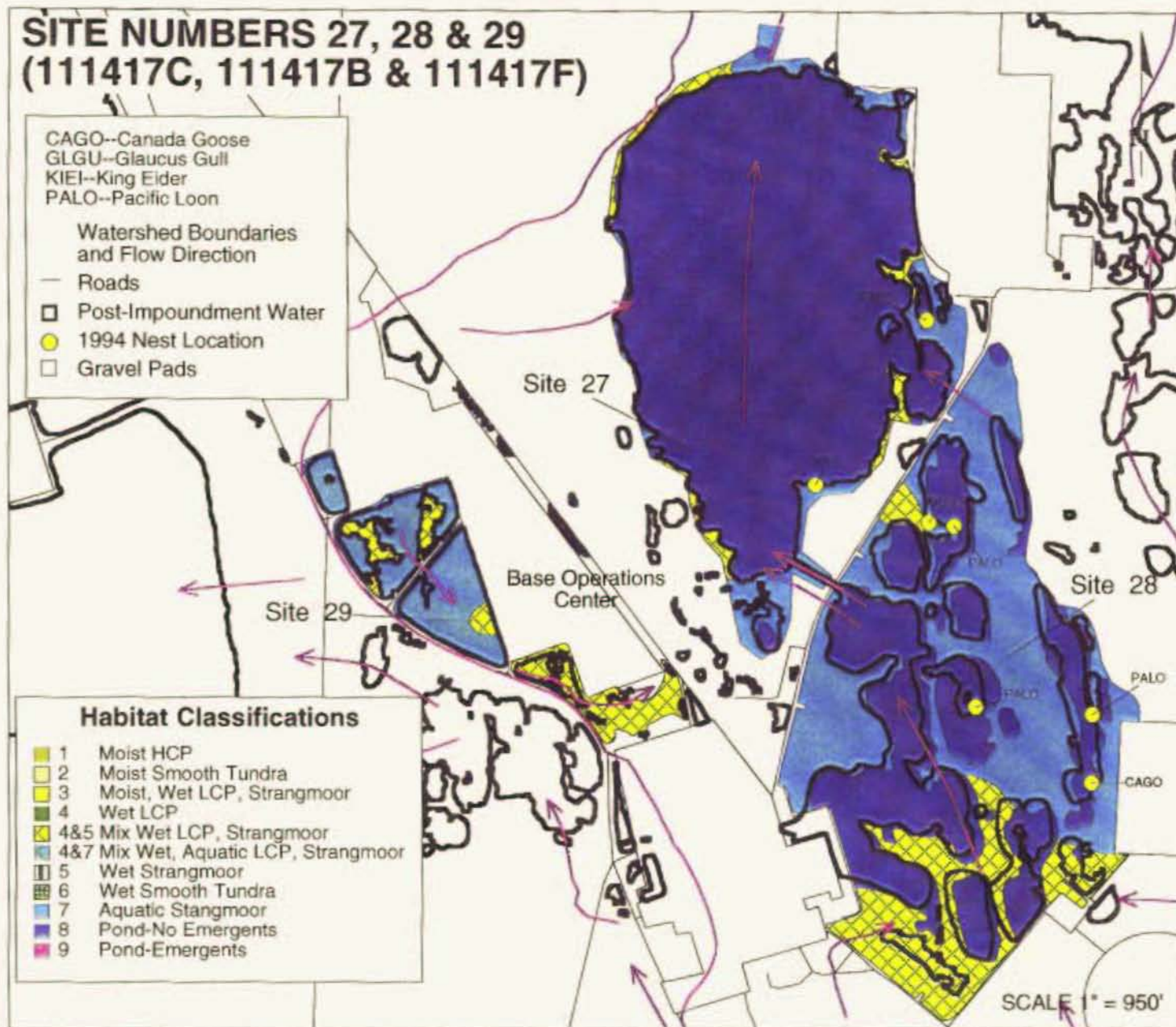


Figure 9. Study Sites 27, 28 and 29 (Impoundments 111417C, 111417B and 111417F) map showing pre-development habitat mapping based on 1955 aerial photography, post-impoundment open water boundaries based on July 1993 aerial photography, and waterfowl nest locations from summer 1994 field studies in the Prudhoe Bay oil field, Alaska. A total of 548 birds of 21 species were recorded at Sites 27, 28 and 29 during periods 2, 3 and 4, summer 1994.

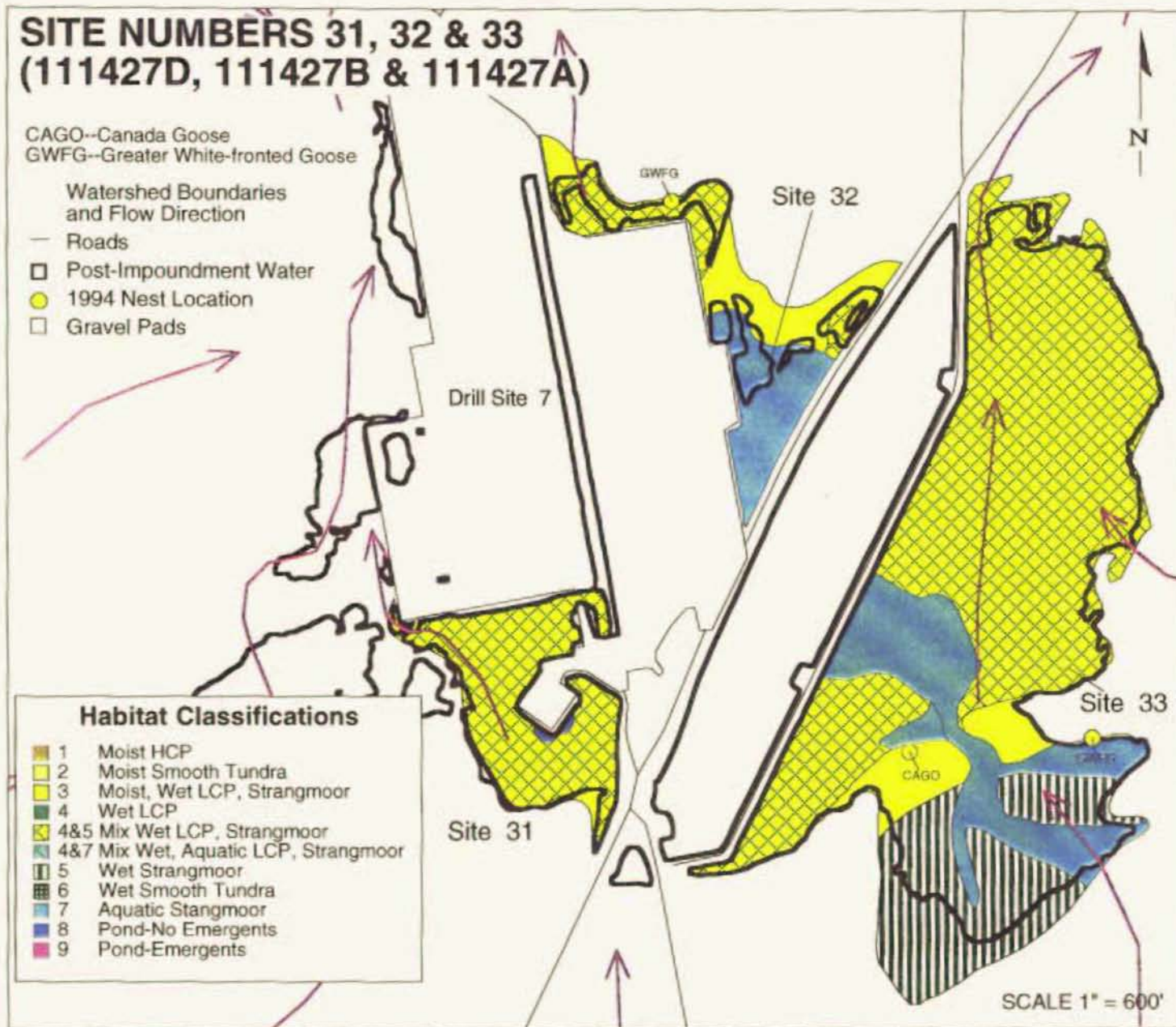


Figure 10. Study Sites 31, 32 and 33 (Impoundments 111427D, 111427B and 111427A) map showing pre-development habitat mapping based on 1955 aerial photography, post-impoundment open water boundaries based on July 1993 aerial photography, and waterfowl nest locations from summer 1994 field studies in the Prudhoe Bay oil field, Alaska. A total of 193 birds of 15 species were recorded at Sites 31, 32 and 33 during periods 2, 3 and 4, summer 1994.

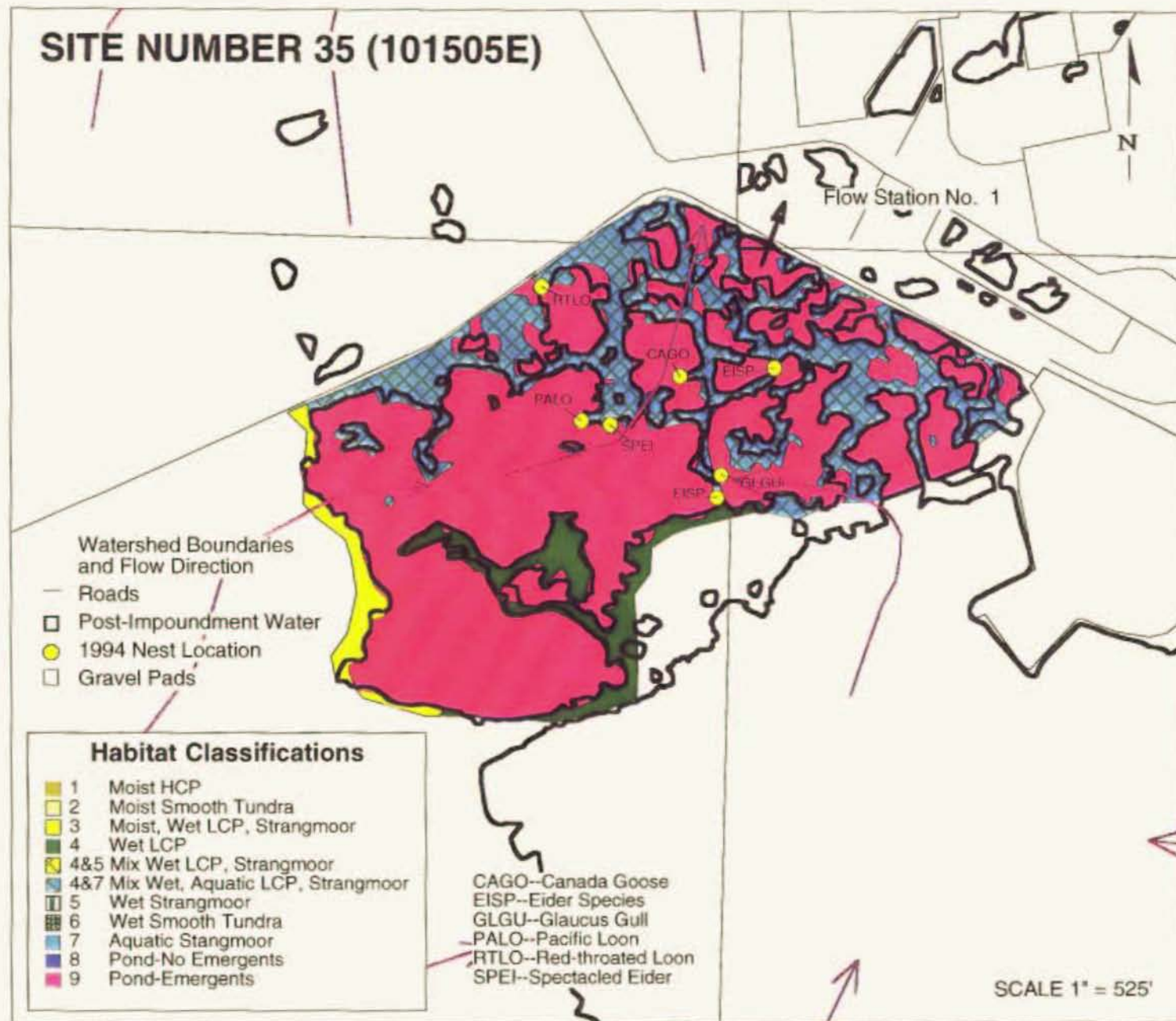


Figure 11. Study Site 35 (Impoundment 101505E) map showing pre-development habitat mapping based on 1955 aerial photography, post-impoundment open water boundaries based on July 1993 aerial photography, and waterfowl nest locations from summer 1994 field studies in the Prudhoe Bay oil field, Alaska. A total of 167 birds of 14 species were recorded at Site 35 during periods 2, 3 and 4, summer 1994.