Table S1. Water depths and sandbar areas in relation to distance from weirs in Tancheon, 2003

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Variables |  | Distance (m) | | | | | | |
| 0-100  (n=11) | 100-200  (n=6) | 200-300  (n=10) | 300-400  (n=4) | 400-500  (n=10) | 500-600  (n=6) | 600-700  (n=5) |
| Water depth  (cm) | Mean | 21 | 34 | 33 | 36 | 49 | 29 | 69 |
| S.E. | 2 | 12 | 9 | 7 | 15 | 6 | 16 |
| Min. | 13 | 17 | 15 | 16 | 16 | 16 | 22 |
| Max. | 31 | 100 | 119 | 50 | 177 | 58 | 110 |
| Areas of sandbars  (m2) | Mean | 929 | 764 | 710 | 142 | 903 | 365 | 274 |
| S.E. | 215 | 265 | 235 | 71 | 401 | 193 | 106 |
| Min. | 186 | 0 | 0 | 0 | 0 | 0 | 0 |
|  | Max. | 2,729 | 1,712 | 2,174 | 305 | 4,488 | 1,251 | 562 |

Table S2. Thawed ratios (%) of the water surfaces in relation to distance from weirs in Tancheon, 2003

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Distance  (m) |  | Severe cold days | | | Cold days | | | Warm days | | | |
| Jan. 5 | Jan. 6 | Jan. 29 | Jan. 12 | Jan. 24 | Jan. 27 | Feb. 13 | Feb.18 | Feb. 20 |
| 0-100  (n=11) | Mean | 39.1 | 39.1 | 36.4 | 80.9 | 92.7 | 72.7 | 100.0 | 100.0 | 99.1 |
| S.E. | 5.5 | 5.5 | 5.6 | 6.0 | 1.9 | 9.4 | 0.0 | 0.0 | 0.9 |
| Min. | 10 | 10 | 10 | 40 | 80 | 30 | 100 | 100 | 90 |
| Max. | 70 | 70 | 60 | 100 | 100 | 100 | 100 | 100 | 100 |
| 100-200  (n=6) | Mean | 20.0 | 23.3 | 21.7 | 76.7 | 78.3 | 61.7 | 100.0 | 100.0 | 100.0 |
| S.E. | 8.5 | 8.4 | 9.3 | 11.7 | 10.9 | 14.4 | 0.0 | 0.0 | 0.0 |
| Min. | 0 | 0 | 0 | 20 | 20 | 0 | 100 | 100 | 100 |
| Max. | 60 | 60 | 50 | 100 | 100 | 100 | 100 | 100 | 100 |
| 200-300  (n=10) | Mean | 13.0 | 18.0 | 18.0 | 68.0 | 76.0 | 61.0 | 94.0 | 100.0 | 96.0 |
| S.E. | 5.8 | 5.3 | 5.6 | 12.1 | 9.5 | 9.6 | 4.7 | 0.0 | 2.1 |
| Min. | 0 | 0 | 0 | 0 | 0 | 0 | 50 | 100 | 80 |
| Max. | 60 | 60 | 50 | 100 | 100 | 100 | 100 | 100 | 100 |
| 300-400  (n=4) | Mean | 2.5 | 2.5 | 8 | 60.0 | 62.5 | 42.5 | 100.0 | 100.0 | 95.0 |
| S.E. | 2.2 | 2.2 | 2.2 | 15.8 | 16.7 | 18.8 | 0.0 | 0.0 | 4.3 |
| Min. | 0 | 0 | 0 | 20 | 20 | 0 | 100 | 100 | 80 |
| Max. | 10 | 10 | 10 | 100 | 100 | 100 | 100 | 100 | 100 |
| 400-500  (n=10) | Mean | 3.0 | 3.0 | 6.0 | 58.0 | 63.0 | 42.0 | 87.0 | 99.0 | 85.0 |
| S.E. | 2.0 | 2.0 | 2.1 | 10.8 | 10.5 | 9.4 | 8.6 | 0.9 | 8.7 |
| Min. | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 90 | 30 |
| Max. | 20 | 20 | 20 | 100 | 100 | 90 | 100 | 100 | 100 |
| 500-600  (n=6) | Mean | 5.0 | 5.0 | 3.3 | 61.7 | 60.0 | 43.3 | 100.0 | 100.0 | 95.0 |
| S.E. | 3.1 | 3.1 | 1.9 | 12.3 | 13.1 | 12.8 | 0.0 | 0.0 | 4.6 |
| Min. | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 100 | 70 |
| Max. | 20 | 20 | 10 | 90 | 100 | 80 | 100 | 100 | 100 |
| 600-700  (n=5) | Mean | 0.0 | 0.0 | 0.0 | 16.0 | 20.0 | 12.0 | 96.0 | 100.0 | 74.0 |
| S.E. | 0.0 | 0.0 | 0.0 | 8.8 | 11.3 | 6.6 | 2.2 | 0.0 | 11.9 |
| Min. | 0 | 0 | 0 | 0 | 0 | 0 | 90 | 100 | 30 |
| Max. | 0 | 0 | 0 | 40 | 60 | 30 | 100 | 100 | 100 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Distance  (m) |  | Severe cold days | | | Cold days | | | Warm days | | |
| Jan. 5 | Jan. 6 | Jan. 29 | Jan. 12 | Jan. 24 | Jan. 27 | Feb. 13 | Feb.18 | Feb. 20 |
| 0-100  (n=11) | Mean | 12.6 | 11.4 | 11.4 | 9.9 | 11.8 | 9.9 | 7.9 | 7.5 | 3.7 |
| S.E. | 5.6 | 4.5 | 4.1 | 4.4 | 4.3 | 4.2 | 3.4 | 1.8 | 1.5 |
| Min. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Max. | 52 | 38 | 42 | 43 | 47 | 49 | 41 | 19 | 14 |
| 100-200  (n=6) | Mean | 9.7 | 10.2 | 11.7 | 9.5 | 22.3 | 17.3 | 11.2 | 14.8 | 11.2 |
| S.E. | 8.8 | 7.5 | 10.7 | 5.5 | 10.1 | 7.6 | 3.4 | 7.2 | 4.9 |
| Min. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Max. | 58 | 51 | 70 | 38 | 69 | 57 | 22 | 52 | 34 |
| 200-300  (n=10) | Mean | 9.1 | 7.5 | 6.4 | 6.3 | 11.9 | 6.6 | 10.4 | 7.6 | 4.1 |
| S.E. | 5.9 | 4.9 | 3.3 | 3.3 | 5.4 | 3.0 | 4.8 | 2.9 | 2.1 |
| Min. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Max. | 55 | 45 | 31 | 30 | 54 | 29 | 47 | 30 | 20 |
| 300-400  (n=4) | Mean | 0.0 | 0.8 | 0.0 | 4.3 | 0.0 | 4.3 | 3.0 | 0.0 | 4.5 |
| S.E. | 0.0 | 0.6 | 0.0 | 3.7 | 0.0 | 2.7 | 2.6 | 0.0 | 3.3 |
| Min. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Max. | 0 | 3 | 0 | 17 | 0 | 13 | 12 | 0 | 16 |
| 400-500  (n=10) | Mean | 0.0 | 0.0 | 0.0 | 3.1 | 3.5 | 6.5 | 3.2 | 4.3 | 6.5 |
| S.E. | 0.0 | 0.0 | 0.0 | 1.3 | 1.7 | 3.5 | 2.8 | 1.5 | 3.3 |
| Min. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Max. | 0 | 0 | 0 | 12 | 13 | 35 | 30 | 14 | 32 |
| 500-600  (n=6) | Mean | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 6.8 | 10.7 | 4.7 | 7.8 |
| S.E. | 0.0 | 0.0 | 0.0 | 1.8 | 0.0 | 4.9 | 7.3 | 2.1 | 4.0 |
| Min. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Max. | 0 | 0 | 0 | 12 | 0 | 33 | 49 | 15 | 27 |
| 600-700  (n=5) | Mean | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.2 | 1.2 |
| S.E. | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.1 | 1.1 |
| Min. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Max. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 6 |

Table S3. Abundance of the dabbling ducks in relation to distance from weirs in Tancheon, 2003

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Distance  (m) |  | Severe cold days | | | Cold days | | | Warm days | | | |
| Jan. 5 | Jan. 6 | Jan. 29 | Jan. 12 | Jan. 24 | Jan. 27 | Feb. 13 | Feb.18 | Feb. 20 |
| 0-100  (n=11) | Mean | 1.9 | 2.1 | 1.3 | 0.3 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 |
| S.E. | 1.0 | 1.2 | 0.6 | 0.3 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| Min. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Max. | 10 | 12 | 6 | 3 | 3 | 0 | 0 | 0 | 0 |
| 100-200  (n=6) | Mean | 0.5 | 0.7 | 0.7 | 0.3 | 0.0 | 0.2 | 0.0 | 0.0 | 2.0 |
| S.E. | 0.5 | 0.6 | 0.5 | 0.3 | 0.0 | 0.2 | 0.0 | 0.0 | 1.6 |
| Min. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Max. | 3 | 4 | 3 | 2 | 0 | 1 | 0 | 0 | 11 |
| 200-300  (n=10) | Mean | 0.8 | 0.8 | 0.1 | 0.5 | 0.4 | 0.2 | 0.3 | 0.3 | 0.2 |
| S.E. | 0.7 | 0.7 | 0.1 | 0.5 | 0.4 | 0.2 | 0.2 | 0.2 | 0.2 |
| Min. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Max. | 7 | 7 | 1 | 5 | 4 | 2 | 2 | 2 | 2 |
| 300-400  (n=4) | Mean | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 1.8 | 0.0 | 0.0 |
| S.E. | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 | 0.9 | 0.0 | 0.0 |
| Min. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Max. | 0 | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 0 |
| 400-500  (n=10) | Mean | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.0 | 0.2 | 0.2 | 0.7 |
| S.E. | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.2 | 0.2 | 0.7 |
| Min. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Max. | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 2 | 7 |
| 500-600  (n=6) | Mean | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 1.8 |
| S.E. | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.6 | 0.0 | 1.7 |
| Min. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Max. | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 11 |
| 600-700  (n=5) | Mean | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 |
| S.E. | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 |
| Min. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Max. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |

Table S4. Abundance of the diving water birds in relation to distance from weirs in Tancheon, 2003