**Supplementary Material**

The relationship between seasonal water level fluctuation and habitat availability for wintering waterbirds at Shengjin Lake, China

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Figure S1. Figure S1. Land-cover maps of Shengjin Lake at different water levels.

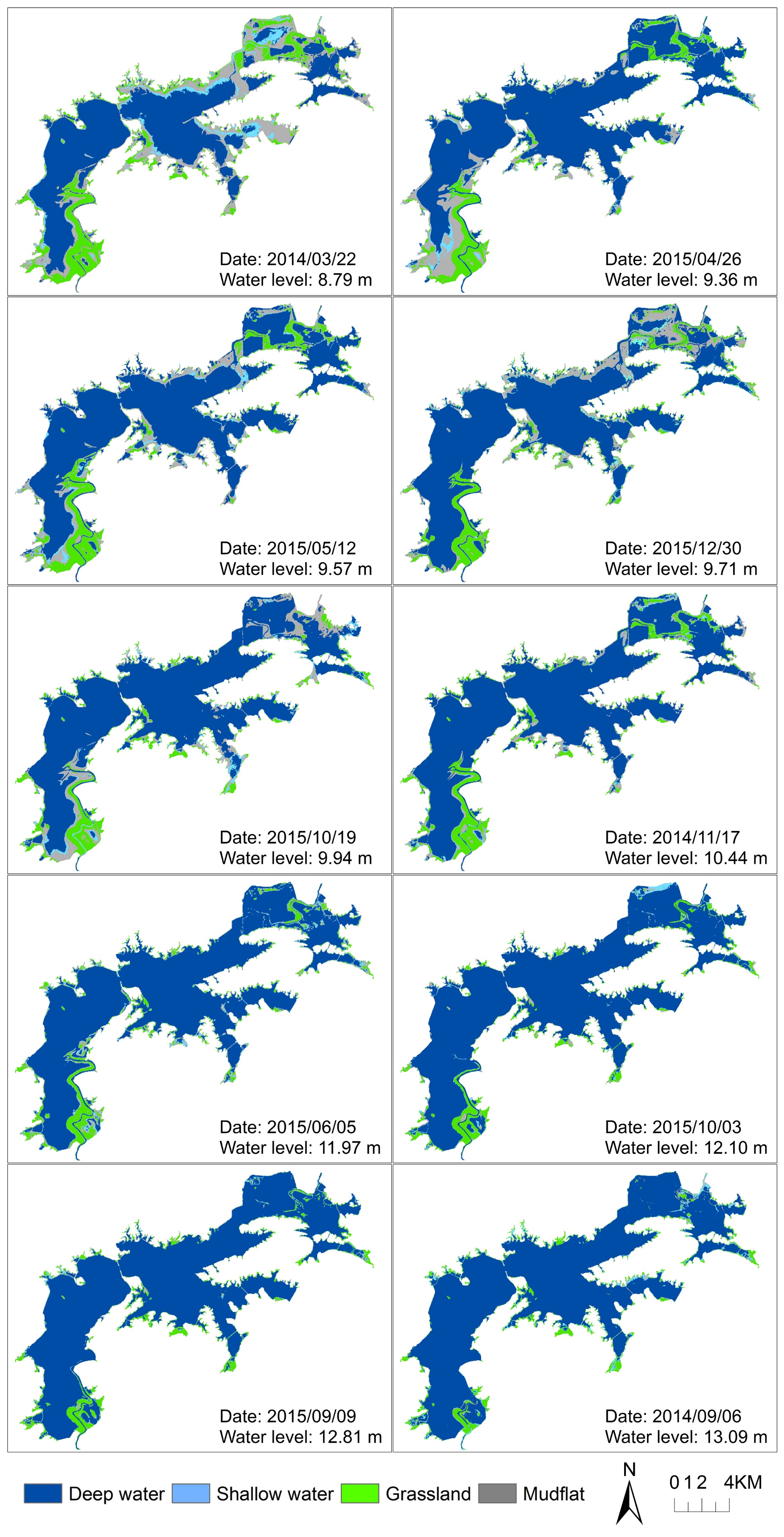


Table S1. Cloud-free Landsat images with the resolution of 30 m used in the study and the corresponding water levels measured inside the Huangpen Sluice Gate at Shengjin Lake. No.1-16 were used for land-cover classification while No.17 for defining the analysis area.

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Image date | Water level (m) | Satellite |
| 1 | 13 February 2015 | 8.21 | landsat8 |
| 2 | 22 March 2014 | 8.79 | landsat7 |
| 3 | 25 March 2015 | 9.19 | landsat7 |
| 4 | 26 April 2015 | 9.36 | landsat7 |
| 5 | 12 May 2015 | 9.57 | landsat7 |
| 6 | 30 December 2015 | 9.71 | landsat8 |
| 7 | 19 October 2015 | 9.94 | landsat7 |
| 8 | 1 May 2014 | 10.09 | landsat8 |
| 9 | 17 November 2014 | 10.44 | landsat7 |
| 10 | 11 October 2015 | 11.06 | landsat8 |
| 11 | 5 June 2015 | 11.97 | landsat8 |
| 12 | 3 October 2015 | 12.1 | landsat7 |
| 13 | 8 October 2014 | 12.27 | landsat8 |
| 14 | 9 September 2015 | 12.81 | landsat8 |
| 15 | 6 September 2014 | 13.09 | landsat8 |
| 16 | 31 July 2015 | 13.52 | landsat7 |
| 17 | 18 August 2010 | 14.56 | landsat7 |

Table S2. Inventory of wintering waterbirds in the three simultaneous surveys carried out in 2 March 2014, 2 November 2014 and 12 January 2015 at Shengjin Lake.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Common name | Scientific name | Family | Order | Threatened status in IUCN Red List | Bird group1 | Dominant habitat2 | Abundance | | |
| 2 March 2014 | 2 November 2014 | 12 January 2015 |
| Great Crested Grebe | *Podiceps cristatus* | Podicipedidae | PODICIPEDIFORMES | LC | DF | DW | 32 | 63 | 217 |
| Little Grebe | *Tachybaptus ruficollis* | Podicipedidae | PODICIPEDIFORMES | LC | DF | DW | 61 | 179 | 143 |
| Dalmatian Pelican | *Pelecanus crispus* | Pelecanidae | PELECANIFORMES | VU | DF | DW | 0 | 0 | 1 |
| Great Cormorant | *Phalacrocorax carbo* | Phalacrocoracidae | PELECANIFORMES | LC | DF | DW | 657 | 2106 | 2376 |
| Little Egret | *Egretta garzetta* | Ardeidae | PELECANIFORMES | LC | LW | SW | 34 | 131 | 65 |
| Intermediate Egret | *Ardea intermedia* | Ardeidae | PELECANIFORMES | LC | LW | SW | 2 | 228 | 207 |
| Great White Egret | *Ardea alba* | Ardeidae | PELECANIFORMES | LC | LW | SW | 54 | 79 | 218 |
| Grey Heron | *Ardea cinerea* | Ardeidae | PELECANIFORMES | LC | LW | SW | 225 | 346 | 993 |
| Black-crowned Night Heron | *Nycticorax nycticorax* | Ardeidae | PELECANIFORMES | LC | LW | SW | 0 | 1 | 0 |
| Oriental Stork | *Ciconia boyciana* | Ciconiidae | PELECANIFORMES | EN | LW | SW | 0 | 23 | 75 |
| Eurasian Spoonbill | *Platalea leucorodia* | Threskiornithidae | PELECANIFORMES | LC | LW | SW | 276 | 434 | 390 |
| Tundra Swan | *Cygnus columbianus* | Anatidae | ANSERIFORMES | LC | GS | DW | 218 | 57 | 50 |
| Lesser White-fronted Goose | *Anser erythropus* | Anatidae | ANSERIFORMES | VU | GS | GL | 301 | 150 | 1478 |
| Greater White-fronted Goose | *Anser albifrons* | Anatidae | ANSERIFORMES | LC | GS | GL | 6011 | 491 | 5829 |
| Bean Goose | *Anser fabalis* | Anatidae | ANSERIFORMES | LC | GS | GL | 21250 | 17050 | 18575 |
| Swan Goose | *Anser cygnoid* | Anatidae | ANSERIFORMES | VU | GS | GL | 15 | 15 | 42 |
| Greylag Goose | *Anser anser* | Anatidae | ANSERIFORMES | LC | GS | GL | 1 | 0 | 10 |
| Chinese Spot-billed Duck | *Anas zonorhyncha* | Anatidae | ANSERIFORMES | LC | DF | DW | 121 | 85 | 1113 |
| Common Teal | *Anas crecca* | Anatidae | ANSERIFORMES | LC | DF | DW | 312 | 0 | 291 |
| Mallard | *Anas platyrhynchos* | Anatidae | ANSERIFORMES | LC | DF | DW | 18 | 4 | 639 |
| Northern Pintail | *Anas acuta* | Anatidae | ANSERIFORMES | LC | DF | DW | 0 | 20 | 225 |
| Garganey | *Spatula querquedula* | Anatidae | ANSERIFORMES | LC | DF | DW | 0 | 0 | 69 |
| Eurasian Wigeon | *Mareca penelope* | Anatidae | ANSERIFORMES | LC | DF | DW | 0 | 0 | 87 |
| Gadwall | *Mareca strepera* | Anatidae | ANSERIFORMES | LC | DF | DW | 0 | 0 | 86 |
| Falcated Duck | *Mareca falcata* | Anatidae | ANSERIFORMES | NT | DF | DW | 9 | 30 | 1750 |
| Northern Shoveler | *Spatula clypeata* | Anatidae | ANSERIFORMES | LC | DF | DW | 0 | 0 | 22 |
| Smew | *Mergellus albellus* | Anatidae | ANSERIFORMES | LC | DF | DW | 1 | 0 | 0 |
| Ruddy Shelduck | *Tadorna ferruginea* | Anatidae | ANSERIFORMES | LC | DF | DW | 3 | 9 | 6 |
| Common Shelduck | *Tadorna tadorna* | Anatidae | ANSERIFORMES | LC | DF | DW | 0 | 0 | 15 |
| Tufted Duck | *Aythya fuligula* | Anatidae | ANSERIFORMES | LC | DF | DW | 0 | 0 | 154 |
| Hooded Crane | *Grus monacha* | Gruidae | GRUIFORMES | VU | LW | MF | 248 | 26 | 87 |
| White-naped Crane | *Antigone vipio* | Gruidae | GRUIFORMES | VU | LW | SW | 0 | 0 | 2 |
| Common Moorhen | *Gallinula chloropus* | Rallidae | GRUIFORMES | LC | DF | DW | 1 | 5 | 0 |
| Brown Crake | *Zapornia akool* | Rallidae | GRUIFORMES | LC | SB | SW | 2 | 0 | 0 |
| Pied Avocet | *Recurvirostra avosetta* | Recurvirostridae | CHARADRIIFORMES | LC | SB | SW | 17 | 0 | 0 |
| Northern Lapwing | *Vanellus vanellus* | Charadriidae | CHARADRIIFORMES | LC | SB | MF | 746 | 98 | 704 |
| Grey-headed Lapwing | *Vanellus cinereus* | Charadriidae | CHARADRIIFORMES | LC | SB | MF | 45 | 0 | 0 |
| Little Ringed Plover | *Charadrius dubius* | Charadriidae | CHARADRIIFORMES | LC | SB | MF | 0 | 2 | 0 |
| Long-billed Plover | *Charadrius placidus* | Charadriidae | CHARADRIIFORMES | LC | SB | SW | 2 | 0 | 0 |
| Common Redshank | *Tringa totanus* | Scolopacidae | CHARADRIIFORMES | LC | SB | SW | 0 | 0 | 36 |
| Spotted Redshank | *Tringa erythropus* | Scolopacidae | CHARADRIIFORMES | LC | SB | SW | 16 | 27 | 47 |
| Green Sandpiper | *Tringa ochropus* | Scolopacidae | CHARADRIIFORMES | LC | SB | SW | 10 | 11 | 98 |
| Wood Sandpiper | *Tringa glareola* | Scolopacidae | CHARADRIIFORMES | LC | SB | SW | 0 | 1 | 48 |
| Common Greenshank | *Tringa nebularia* | Scolopacidae | CHARADRIIFORMES | LC | SB | SW | 17 | 3 | 73 |
| Marsh Sandpiper | *Tringa stagnatilis* | Scolopacidae | CHARADRIIFORMES | LC | SB | SW | 0 | 6 | 0 |
| Eurasian Curlew | *Numenius arquata* | Scolopacidae | CHARADRIIFORMES | NT | SB | SW | 0 | 0 | 184 |
| Dunlin | *Calidris alpina* | Scolopacidae | CHARADRIIFORMES | LC | SB | SW | 0 | 0 | 24 |
| Black-tailed Godwit | *Limosa limosa* | Scolopacidae | CHARADRIIFORMES | NT | SB | SW | 0 | 0 | 8 |
| Common Sandpiper | *Actitis hypoleucos* | Scolopacidae | CHARADRIIFORMES | LC | SB | SW | 0 | 0 | 6 |
| Common Snipe | *Gallinago gallinago* | Scolopacidae | CHARADRIIFORMES | LC | SB | SW | 5 | 3 | 0 |
| Black-headed Gull | *Larus ridibundus* | Laridae | CHARADRIIFORMES | LC | DF | DW | 350 | 152 | 2108 |
| European Herring Gull | *Larus argentatus* | Laridae | CHARADRIIFORMES | LC | DF | DW | 6 | 10 | 13 |

1GS: geese, SB: shorebirds, LW: larger waders, DF: deep-water feeders.

2DW: deep water, SW: shallow water, MF: mudflat, GL: grassland.