



The project “Securing Sustainable Farming to Ensure Conservation of Globally Threatened Bird Species in Agrarian Landscape (Baltic Aquatic Warbler)” (**LIFE09NAT/LT/000233**) is co-financed by the European Union LIFE+ Programme, Republic of Lithuania, Republic of Latvia and the project partners

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**MONITORING REPORT
(2011–2013)**

**DIVERSITY, DISTRIBUTION OF VEGETATION AND THEIR SUITABILITY FOR
THE AQUATIC WARBLER TO BREED IN TULKIARAGĖ POLDER**

**Head of work group dr. Arūnas Balsevičius
Work group: Ričardas Narijauskas
Map designer Dalytė Matulevičiūtė
Translator Ričardas Narijauskas**

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1. Characterisation of vegetation

1.1. Compendium of plant communities

The vegetation of Tulkiaragė polder belongs to 2 vegetation classes and consists of communities from 13 associations and 4 rankless units (Table 1). The grassland vegetation predominates. Single trees and shrubs are observed in all territory except the eastern part where they grow more abundantly.

Table 1

Plant communities in Tulkiaragė polder

| Class/rankless unit | Association/rankless unit | 2011 | | 2013 | |
|---|--|---------------|---------------|---------------|---------------|
| | | Area, ha | % | Area, ha | % |
| <i>Phragmito-Magnocaricetea</i> Klika in Klika et Novák 1941 | <i>Caricetum acutiformis</i> Sauer 1937 | 2.25 | 0.57 | 2.25 | 0.57 |
| | <i>Caricetum distichae</i> (Steffen 1931) Jonas 1933 | 14.69 | 3.69 | 14.69 | 3.69 |
| | <i>Caricetum gracilis</i> Graebner et Hueck 1931 | 127.43 | 32.04 | 127.43 | 32.04 |
| | <i>Galio palustris-Caricetum ripariae</i> Balátová-Tuláčková et al. 1993 | 0.18 | 0.05 | 0.18 | 0.05 |
| | <i>Peucedano-Calamagrostietum canescentis</i> Weber 1979 | 2.25 | 0.57 | 2.25 | 0.57 |
| | <i>Phalaridetum arundinaceae</i> (W. Koch 1926) Libbert 1931 | 26.28 | 6.61 | 26.28 | 6.61 |
| | <i>Phragmitetum australis</i> Schmale 1939 | 116.44 | 29.28 | 116.44 | 29.28 |
| | <i>Thelypteridi-Phragmitetum Kuiper</i> 1957 | 23.32 | 5.86 | 23.32 | 5.86 |
| <i>Molinio-Arrhenatheretea elatioris</i> R. Tx. 1937 | <i>Alopecuretum pratensis</i> Kojić et al. 2003 <i>sensu lato</i> | 0.38 | 0.10 | 0.38 | 0.10 |
| | <i>Caricetum cespitosae</i> (Steffen 1931) Klika et Šmarda 1940 | 2.88 | 0.72 | 2.88 | 0.72 |
| | <i>Deschampsietum cespitosae</i> Horvatić 1930 | 0.4 | 0.10 | 0.4 | 0.10 |
| | <i>Filipendulo-Geranium</i> W.Koch 1926 | 5.32 | 1.34 | 5.32 | 1.34 |
| | <i>Lysimachio-Filipenduletum ulmariae</i> Hadač et al., 1997 | 50.92 | 12.80 | 50.92 | 12.80 |
| Rankless vegetation units | Ecotonal plant communities with common plants from the <i>Filipendulion</i> alliance | 0.48 | 0.12 | 0.48 | 0.12 |
| | Overgrowths of <i>Salix</i> sp. and tree groups of <i>Alnus glutinosa</i> | 2.10 | 0.53 | 2.10 | 0.53 |
| | Cultivated meadow | 12.59 | 3.17 | 12.59 | 3.17 |
| | Overgrowths of ruderal plant species | 9.76 | 2.45 | 9.76 | 2.45 |
| Total: | | 397.67 | 100.00 | 397.67 | 100.00 |

1.2. General characterisation of vegetation

1.2.1. Grassland

In Tulkiaragė polder, plant communities from the *Phragmito-Magnocaricetea* class, comprised by tall forbs of halophytes, attain dominance. These plant communities are distributed in the area of 313.95 ha and it makes up 78.88% of all territory. Among of them, the largest plots are covered by the plant communities from the *Magnocaricion elatae* (174.19 ha or 43.77 % of territory total), whereas communities from the *Phragmition* alliance are distributed in the area of 139.76 ha and it makes up 35.12%. In western and northern parts of the territory tall sedge and reed communities are often observed in the largest areas of Tulkiaragė polder where groundwater level is the highest. In some parts of habitats of the *Phragmitetum australis*, *Thelypteridi-Phragmitetum* and *Caricetum gracilis* the water is stagnant there during mid-period of vegetation.

Fertile meadow (*Molinio-Arrhenatheretea*) class plant communities are distinguished in the dryer areas. These communities are distributed in the area of 57.82 ha and it makes up 14.53%. In a lot of cases, due to a high groundwater level, cultivated meadows have been succeeded and fodder plants disappeared. In sites, where groundwater level is favourable for mezophytes, overgrowths of cultivated plants are observed. 3.16% of polder area is covered by this type of vegetation and mostly it is observed in eastern and some of it in southern marginal part of the polder. In some sites cultivated plants along with ruderal comprise vegetation mosaic. Ruderal plant overgrowths are distinguished in the area of 2.45%.

1.2.2. Woody vegetation

In Tulkiaragė polder woody plants are not of prevailing component there and it makes just 0.53% of all territory coverage. Just small clumps are formed by scrubs and trees which are singly distributed in all territory, and usually near canals. Groups of woody plants are distinguished in eastern part of the polder. There are numerous of *Salix aurita*, *S. cinerea* and *S. fragilis*.

1.2.3. Protected plant species

In southern and western parts of Tulkiaragė polder the species *Scutellaria hastifolia* has been found there, which is registered in the Red Data Book of Lithuania and it is of 2(V) category. Small patches of these plants has found their niche on polder embankments, canal margins and in naturalizing cultivated meadows and community of the *Deschampsietum cespitosae*. Most of *Scutellaria hastifolia* plants have been fertile.

2. Coverage of plant communities

312 contours of vegetation have been distinguished and their size varied in extent – from 0.03 ha to 13.81 ha (Table 2., Fig. 1–3). A large part (42.63%) of contours are smaller than 0.5 ha and 33.65% of contours are larger than 1 ha. Due to influence of antropogeniztion (polder vegetation is fragmented by canal system), there are a lot of contours of various size. Hidrological regime is conditioned by canals, which determined character of vegetation.

Table 2

Coverage of vegetation contours

| Contour No. | Plant communities | 2011 | | 2013 | |
|-------------|--|----------|------|----------|------|
| | | Area, ha | % | Area, ha | % |
| 1 | 2 | 3 | 4 | 5 | 6 |
| 1 | <i>Peucedano-Calamagrostietum canescentis</i> | 0.16 | 0.04 | 0.16 | 0.04 |
| 2 | Shrubs | 0.03 | 0.01 | 0.03 | 0.01 |
| 3 | <i>Caricetum gracilis</i> 98 %, <i>Peucedano-Calamagrostietum canescentis</i> 1%, <i>Phragmitetum australis</i> 1 % | 0.60 | 0.15 | 0.60 | 0.15 |
| 4 | Overgrowth of ruderal plant species | 0.39 | 0.10 | 0.39 | 0.10 |
| 5 | <i>Caricetum cespitosae</i> 91 %, <i>Peucedano-Calamagrostietum canescentis</i> 3%, <i>Filipendulo-Geranium</i> 5%, <i>Phragmitetum australis</i> 1 % | 1.11 | 0.28 | 1.11 | 0.28 |
| 6 | Overgrowth of ruderal plant species | 0.54 | 0.14 | 0.54 | 0.14 |
| 7 | <i>Caricetum acutiformis</i> | 0.49 | 0.12 | 0.49 | 0.12 |
| 8 | <i>Caricetum cespitosae</i> 98 %, <i>Peucedano-Calamagrostietum canescentis</i> 1%, <i>Caricetum distichae</i> 1% | 0.28 | 0.07 | 0.28 | 0.07 |
| 9 | <i>Caricetum cespitosae</i> 95 %, <i>Peucedano-Calamagrostietum canescentis</i> 5% | 0.65 | 0.16 | 0.65 | 0.16 |
| 10 | <i>Caricetum gracilis</i> | 1.94 | 0.49 | 1.94 | 0.49 |
| 11 | <i>Caricetum gracilis</i> 60 %, <i>Peucedano-Calamagrostietum canescentis</i> 40 % | 0.16 | 0.04 | 0.16 | 0.04 |
| 12 | <i>Phragmitetum australis</i> | 11.17 | 2.81 | 11.17 | 2.81 |
| 13 | <i>Phragmitetum australis</i> | 6.64 | 1.67 | 6.64 | 1.67 |
| 14 | <i>Phragmitetum australis</i> | 0.11 | 0.03 | 0.11 | 0.03 |
| 15 | <i>Phragmitetum australis</i> | 0.83 | 0.21 | 0.83 | 0.21 |
| 16 | <i>Phalaridetum arundinaceae</i> | 0.10 | 0.03 | 0.10 | 0.03 |
| 17 | <i>Caricetum gracilis</i> 40 %, <i>Peucedano-Calamagrostietum canescentis</i> 30 %, <i>Caricetum acutiformis</i> 10 %, <i>Caricetum cespitosae</i> 5 %, overgrowth of ruderal plant species 15 % | 0.74 | 0.19 | 0.74 | 0.19 |
| 18 | <i>Lysimachio-Filipenduletum ulmariae</i> | 3.31 | 0.83 | 3.31 | 0.83 |
| 19 | <i>Filipendulo-Geranium</i> | 0.38 | 0.10 | 0.38 | 0.10 |
| 20 | <i>Caricetum distichae</i> | 0.52 | 0.13 | 0.52 | 0.13 |
| 21 | <i>Caricetum gracilis</i> 80 %, <i>Caricetum cespitosae</i> 20 % | 1.57 | 0.39 | 1.57 | 0.39 |
| 22 | <i>Caricetum ripariae</i> | 0.18 | 0.05 | 0.18 | 0.05 |
| 23 | <i>Caricetum gracilis</i> with scarce reeds | 0.12 | 0.03 | 0.12 | 0.03 |
| 24 | <i>Caricetum gracilis</i> | 1.09 | 0.27 | 1.09 | 0.27 |
| 25 | <i>Caricetum gracilis</i> 74 %, <i>Phalaridetum arundinaceae</i> 15 %, <i>Peucedano-Calamagrostietum canescentis</i> 10 %, <i>Caricetum cespitosae</i> 1 % | 1.09 | 0.27 | 1.09 | 0.27 |
| 26 | <i>Caricetum gracilis</i> 95 %, <i>Peucedano-Calamagrostietum canescentis</i> 5 % | 0.53 | 0.13 | 0.53 | 0.13 |

Table 2 (continued)

| 1 | 2 | 3 | 4 | 5 | 6 |
|----|---|------|------|------|------|
| 27 | <i>Phragmitetum australis</i> | 0.59 | 0.15 | 0.59 | 0.15 |
| 28 | <i>Phragmitetum australis</i> | 0.81 | 0.20 | 0.81 | 0.20 |
| 29 | <i>Phragmitetum australis</i> | 0.81 | 0.20 | 0.81 | 0.20 |
| 30 | <i>Caricetum gracilis</i> | 0.67 | 0.17 | 0.67 | 0.17 |
| 31 | <i>Phragmitetum australis</i> | 0.85 | 0.21 | 0.85 | 0.21 |
| 32 | <i>Peucedano-Calamagrostietum canescentis</i> 55 %, <i>Phalaridetum arundinaceae</i> 40 %, <i>Caricetum distichae</i> 5 % | 0.15 | 0.04 | 0.15 | 0.04 |
| 33 | <i>Peucedano-Calamagrostietum canescentis</i> | 0.94 | 0.24 | 0.94 | 0.24 |
| 34 | <i>Caricetum gracilis</i> | 0.47 | 0.12 | 0.47 | 0.12 |
| 35 | <i>Phalaridetum arundinaceae</i> 60 %, <i>Phragmitetum australis</i> 40 % | 1.34 | 0.34 | 1.34 | 0.34 |
| 36 | <i>Caricetum gracilis</i> | 0.32 | 0.08 | 0.32 | 0.08 |
| 37 | <i>Peucedano-Calamagrostietum canescentis</i> | 0.06 | 0.02 | 0.06 | 0.02 |
| 38 | <i>Phragmitetum australis</i> | 0.54 | 0.14 | 0.54 | 0.14 |
| 39 | <i>Caricetum gracilis</i> 90 %, <i>Peucedano-Calamagrostietum canescentis</i> 10 % | 1.04 | 0.26 | 1.04 | 0.26 |
| 40 | <i>Phragmitetum australis</i> | 0.55 | 0.14 | 0.55 | 0.14 |
| 41 | <i>Phragmitetum australis</i> | 0.76 | 0.19 | 0.76 | 0.19 |
| 42 | <i>Caricetum gracilis</i> 95 %, <i>Peucedano-Calamagrostietum canescentis</i> 5 % | 3.49 | 0.88 | 3.49 | 0.88 |
| 43 | <i>Caricetum gracilis</i> 60 %, <i>Caricetum distichae</i> 40 % | 3.03 | 0.76 | 3.03 | 0.76 |
| 44 | Overgrowth of ruderal plant species | 3.89 | 0.98 | 3.89 | 0.98 |
| 45 | <i>Alopecuretum pratensis</i> | 0.37 | 0.09 | 0.37 | 0.09 |
| 46 | <i>Filipendulo-Geranietum</i> 94 %, <i>Deschampsietum cespitosae</i> 4 %, <i>Caricetum distichae</i> 1 %, <i>Alopecuretum pratensis</i> 1 % | 1.11 | 0.28 | 1.11 | 0.28 |
| 47 | <i>Caricetum gracilis</i> 95 %, <i>Peucedano-Calamagrostietum canescentis</i> 5 % | 2.78 | 0.70 | 2.78 | 0.70 |
| 48 | <i>Phragmitetum australis</i> | 2.45 | 0.62 | 2.45 | 0.62 |
| 49 | <i>Caricetum gracilis</i> | 0.17 | 0.04 | 0.17 | 0.04 |
| 50 | <i>Phragmitetum australis</i> | 0.91 | 0.23 | 0.91 | 0.23 |
| 51 | Ecotonal <i>Filipendulion</i> alliance communities | 0.48 | 0.12 | 0.48 | 0.12 |
| 52 | <i>Caricetum gracilis</i> 99 %, <i>Peucedano-Calamagrostietum canescentis</i> 1 % | 2.35 | 0.59 | 2.35 | 0.59 |
| 53 | <i>Filipendulo-Geranietum</i> | 0.81 | 0.20 | 0.81 | 0.20 |
| 54 | <i>Caricetum gracilis</i> 97 %, <i>Caricetum ripariae</i> 2 %, <i>Phalaridetum arundinaceae</i> 1 % | 4.49 | 1.13 | 4.49 | 1.13 |
| 55 | Naturalizing cultivated meadow | 1.46 | 0.37 | 1.46 | 0.37 |
| 56 | <i>Caricetum gracilis</i> 80 %, <i>Filipendulo-Geranietum</i> 15%, <i>Caricetum distichae</i> 4 %, <i>Caricetum cespitosae</i> 1 % | 0.93 | 0.23 | 0.93 | 0.23 |
| 57 | <i>Caricetum gracilis</i> 60 %, <i>Caricetum distichae</i> 40 % | 1.02 | 0.26 | 1.02 | 0.26 |

Table 2 (continued)

| 1 | 2 | 3 | 4 | 5 | 6 |
|----|--|------|------|------|------|
| 58 | <i>Caricetum distichae</i> | 0.34 | 0.09 | 0.34 | 0.09 |
| 59 | <i>Caricetum acutiformis</i> | 1.45 | 0.36 | 1.45 | 0.36 |
| 60 | Overgrowth of ruderal plant species | 0.45 | 0.11 | 0.45 | 0.11 |
| 61 | <i>Phalaridetum arundinaceae</i> 80 %, <i>Caricetum gracilis</i> 20 % | 0.31 | 0.08 | 0.31 | 0.08 |
| 62 | Overgrowth of ruderal plant species | 0.31 | 0.08 | 0.31 | 0.08 |
| 63 | <i>Caricetum gracilis</i> 85 %, <i>Filipendulo-Geraniyetum</i> 15 % | 0.71 | 0.18 | 0.71 | 0.18 |
| 64 | Overgrowth of ruderal plant species | 1.85 | 0.47 | 1.85 | 0.47 |
| 65 | <i>Caricetum gracilis</i> 91 %, <i>Peucedano-Calamagrostietum canescentis</i> 1 %, <i>Caricetum acutiformis</i> 1 % | 0.70 | 0.18 | 0.70 | 0.18 |
| 66 | <i>Caricetum gracilis</i> 91 %, <i>Peucedano-Calamagrostietum canescentis</i> 1 %, <i>Caricetum acutiformis</i> 1 % | 0.53 | 0.13 | 0.53 | 0.13 |
| 67 | <i>Caricetum gracilis</i> 91 %, <i>Peucedano-Calamagrostietum canescentis</i> 1 %, <i>Caricetum acutiformis</i> 1 % | 0.39 | 0.10 | 0.39 | 0.10 |
| 68 | <i>Caricetum gracilis</i> 91 %, <i>Peucedano-Calamagrostietum canescentis</i> 1 %, <i>Caricetum acutiformis</i> 1 % | 0.66 | 0.17 | 0.66 | 0.17 |
| 69 | <i>Caricetum gracilis</i> 91 %, <i>Peucedano-Calamagrostietum canescentis</i> 1 %, <i>Caricetum acutiformis</i> 1 % | 0.72 | 0.18 | 0.72 | 0.18 |
| 70 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.22 | 0.06 | 0.22 | 0.06 |
| 71 | <i>Filipendulo-Geraniyetum</i> | 0.08 | 0.02 | 0.08 | 0.02 |
| 72 | <i>Peucedano-Calamagrostietum canescentis</i> 70 %, <i>Phalaridetum arundinaceae</i> 25 %, <i>Phragmitetum australis</i> 5 % | 0.44 | 0.11 | 0.44 | 0.11 |
| 73 | <i>Phragmitetum australis</i> | 2.00 | 0.50 | 2.00 | 0.50 |
| 74 | <i>Caricetum gracilis</i> | 3.69 | 0.93 | 3.69 | 0.93 |
| 75 | <i>Caricetum gracilis</i> 99 %, <i>Peucedano-Calamagrostietum canescentis</i> 1 % | 0.84 | 0.21 | 0.84 | 0.21 |
| 76 | <i>Caricetum gracilis</i> 99 %, <i>Peucedano-Calamagrostietum canescentis</i> 1 % | 0.24 | 0.06 | 0.24 | 0.06 |
| 77 | <i>Caricetum gracilis</i> 99 %, <i>Peucedano-Calamagrostietum canescentis</i> 1 % | 0.43 | 0.11 | 0.43 | 0.11 |
| 78 | <i>Filipendulo-Geraniyetum</i> | 1.34 | 0.34 | 1.34 | 0.34 |
| 79 | <i>Filipendulo-Geraniyetum</i> | 0.09 | 0.02 | 0.09 | 0.02 |
| 80 | <i>Filipendulo-Geraniyetum</i> | 0.32 | 0,08 | 0.32 | 0,08 |
| 81 | <i>Phalaridetum arundinaceae</i> | 0.03 | 0,01 | 0.03 | 0,01 |
| 82 | <i>Phalaridetum arundinaceae</i> | 0.03 | 0,01 | 0.03 | 0,01 |
| 83 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.66 | 0.17 | 0.66 | 0.17 |
| 84 | <i>Caricetum gracilis</i> | 0.75 | 0.19 | 0.75 | 0.19 |
| 85 | <i>Caricetum gracilis</i> 70 %, <i>Peucedano-Calamagrostietum canescentis</i> 30 % | 0.08 | 0.02 | 0.08 | 0.02 |
| 86 | <i>Caricetum gracilis</i> | 0.43 | 0.11 | 0.43 | 0.11 |
| 87 | <i>Phragmitetum australis</i> | 1.09 | 0.27 | 1.09 | 0.27 |

Table 2 (continued)

| 1 | 2 | 3 | 4 | 5 | 6 |
|-----|---|-------|------|-------|------|
| 88 | <i>Caricetum gracilis</i> | 1.73 | 0.43 | 1.73 | 0.43 |
| 89 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.28 | 0.07 | 0.28 | 0.07 |
| 90 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.13 | 0.03 | 0.13 | 0.03 |
| 91 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.24 | 0.06 | 0.24 | 0.06 |
| 92 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.07 | 0.02 | 0.07 | 0.02 |
| 93 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.27 | 0.07 | 0.27 | 0.07 |
| 94 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.31 | 0.08 | 0.31 | 0.08 |
| 95 | <i>Thelypteridi-Phragmitetum australis</i> | 13.81 | 3.47 | 13.81 | 3.47 |
| 96 | <i>Phalaridetum arundinaceae</i> | 0.35 | 0.09 | 0.35 | 0.09 |
| 97 | <i>Caricetum gracilis</i> | 0.54 | 0.14 | 0.54 | 0.14 |
| 98 | <i>Phragmitetum australis</i> | 8.50 | 2.14 | 8.50 | 2.14 |
| 99 | <i>Phalaridetum arundinaceae</i> | 0.14 | 0.04 | 0.14 | 0.04 |
| 100 | <i>Caricetum gracilis</i> | 0.62 | 0.16 | 0.62 | 0.16 |
| 101 | <i>Caricetum gracilis</i> | 0.12 | 0.03 | 0.12 | 0.03 |
| 102 | <i>Phalaridetum arundinaceae</i> 80 %, <i>Lysimachio-Filipenduletum ulmariae</i> 20 % | 0.27 | 0.07 | 0.27 | 0.07 |
| 103 | <i>Phragmitetum australis</i> | 6.15 | 1.55 | 6.15 | 1.55 |
| 104 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.15 | 0.04 | 0.15 | 0.04 |
| 105 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.52 | 0.13 | 0.52 | 0.13 |
| 106 | <i>Caricetum gracilis</i> | 0.31 | 0.08 | 0.31 | 0.08 |
| 107 | <i>Phalaridetum arundinaceae</i> | 0.42 | 0.11 | 0.42 | 0.11 |
| 108 | Overgrowth of ruderal plant species | 2.21 | 0.56 | 2.21 | 0.56 |
| 109 | <i>Lysimachio-Filipenduletum ulmariae</i> | 1.83 | 0.46 | 1.83 | 0.46 |
| 110 | <i>Caricetum distichae</i> | 0.14 | 0.04 | 0.14 | 0.04 |
| 111 | <i>Phragmitetum australis</i> | 1.19 | 0.30 | 1.19 | 0.30 |
| 112 | <i>Caricetum acutiformis</i> | 0.20 | 0.05 | 0.20 | 0.05 |
| 113 | <i>Caricetum cespitosae</i> 95 %, <i>Peucedano-Calamagrostietum canescentis</i> 5% | 0.56 | 0.14 | 0.56 | 0.14 |
| 114 | <i>Phalaridetum arundinaceae</i> | 0.12 | 0.03 | 0.12 | 0.03 |
| 115 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.15 | 0.04 | 0.15 | 0.04 |
| 116 | <i>Caricetum gracilis</i> | 0.16 | 0.04 | 0.16 | 0.04 |
| 117 | <i>Caricetum gracilis</i> | 0.24 | 0.06 | 0.24 | 0.06 |
| 118 | <i>Caricetum gracilis</i> | 0.07 | 0.02 | 0.07 | 0.02 |
| 119 | <i>Caricetum gracilis</i> | 0.61 | 0.15 | 0.61 | 0.15 |
| 120 | <i>Caricetum gracilis</i> | 0.11 | 0.03 | 0.11 | 0.03 |
| 121 | <i>Caricetum gracilis</i> | 0.09 | 0.02 | 0.09 | 0.02 |
| 122 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.14 | 0.04 | 0.14 | 0.04 |
| 123 | <i>Caricetum cespitosae</i> 99 %, <i>Filipendulo-Geranietum</i> 1 % | 0.08 | 0.02 | 0.08 | 0.02 |
| 124 | <i>Lysimachio-Filipenduletum ulmariae</i> | 2.89 | 0.73 | 2.89 | 0.73 |
| 125 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.10 | 0.03 | 0.10 | 0.03 |
| 126 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.10 | 0.03 | 0.10 | 0.03 |
| 127 | <i>Caricetum gracilis</i> | 0.03 | 0.01 | 0.03 | 0.01 |
| 128 | <i>Phragmitetum australis</i> | 8,84 | 2.22 | 8,84 | 2.22 |
| 129 | <i>Caricetum gracilis</i> | 0.18 | 0.05 | 0.18 | 0.05 |
| 130 | <i>Caricetum gracilis</i> | 0.20 | 0.05 | 0.20 | 0.05 |
| 131 | <i>Caricetum gracilis</i> | 0.34 | 0.09 | 0.34 | 0.09 |

Table 2 (continued)

| 1 | 2 | 3 | 4 | 5 | 6 |
|-----|--|------|------|------|------|
| 132 | <i>Caricetum gracilis</i> | 0.13 | 0.03 | 0.13 | 0.03 |
| 133 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.69 | 0.17 | 0.69 | 0.17 |
| 134 | <i>Caricetum gracilis</i> | 0.15 | 0.04 | 0.15 | 0.04 |
| 135 | <i>Caricetum gracilis</i> | 0.55 | 0.14 | 0.55 | 0.14 |
| 136 | <i>Caricetum gracilis</i> | 0.31 | 0.08 | 0.31 | 0.08 |
| 137 | <i>Caricetum gracilis</i> | 0.29 | 0.07 | 0.29 | 0.07 |
| 138 | <i>Caricetum gracilis</i> | 0.36 | 0.09 | 0.36 | 0.09 |
| 139 | <i>Caricetum gracilis</i> | 0.46 | 0.12 | 0.46 | 0.12 |
| 140 | <i>Caricetum gracilis</i> | 0.13 | 0.03 | 0.13 | 0.03 |
| 141 | <i>Caricetum gracilis</i> | 0.62 | 0.16 | 0.62 | 0.16 |
| 142 | <i>Caricetum gracilis</i> | 0.10 | 0.03 | 0.10 | 0.03 |
| 143 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.51 | 0.13 | 0.51 | 0.13 |
| 144 | <i>Caricetum gracilis</i> | 0.50 | 0.13 | 0.50 | 0.13 |
| 145 | <i>Lysimachio-Filipenduletum ulmariae</i> | 2.22 | 0.56 | 2.22 | 0.56 |
| 146 | <i>Phragmitetum australis</i> | 0.10 | 0.03 | 0.10 | 0.03 |
| 147 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.64 | 0.16 | 0.64 | 0.16 |
| 148 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.39 | 0.10 | 0.39 | 0.10 |
| 149 | <i>Phragmitetum australis</i> | 0.08 | 0.02 | 0.08 | 0.02 |
| 150 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.21 | 0.05 | 0.21 | 0.05 |
| 151 | <i>Thelypteridi-Phragmitetum australis</i> | 1.80 | 0.45 | 1.80 | 0.45 |
| 152 | <i>Phragmitetum australis</i> | 1.22 | 0.31 | 1.22 | 0.31 |
| 153 | <i>Thelypteridi-Phragmitetum australis</i> | 0.36 | 0.09 | 0.36 | 0.09 |
| 154 | <i>Thelypteridi-Phragmitetum australis</i> | 7.34 | 1.84 | 7.34 | 1.84 |
| 155 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.17 | 0.04 | 0.17 | 0.04 |
| 156 | <i>Caricetum gracilis</i> | 0.41 | 0.10 | 0.41 | 0.10 |
| 157 | <i>Caricetum gracilis</i> | 0.25 | 0.06 | 0.25 | 0.06 |
| 158 | <i>Caricetum gracilis</i> | 0.16 | 0.04 | 0.16 | 0.04 |
| 159 | <i>Lysimachio-Filipenduletum ulmariae</i> | 1.27 | 0.32 | 1.27 | 0.32 |
| 160 | <i>Lysimachio-Filipenduletum ulmariae</i> | 2.38 | 0.60 | 2.38 | 0.60 |
| 161 | <i>Phalaridetum arundinaceae</i> | 0.19 | 0.05 | 0.19 | 0.05 |
| 162 | <i>Phragmitetum australis</i> | 1.01 | 0.25 | 1.01 | 0.25 |
| 163 | <i>Phragmitetum australis</i> | 0.04 | 0.01 | 0.04 | 0.01 |
| 164 | <i>Phragmitetum australis</i> | 0.92 | 0.23 | 0.92 | 0.23 |
| 165 | <i>Phragmitetum australis</i> | 1.14 | 0.29 | 1.14 | 0.29 |
| 166 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.70 | 0.18 | 0.70 | 0.18 |
| 167 | <i>Caricetum gracilis</i> | 0.32 | 0.08 | 0.32 | 0.08 |
| 168 | <i>Caricetum gracilis</i> | 0.93 | 0.23 | 0.93 | 0.23 |
| 169 | <i>Caricetum gracilis</i> | 0.45 | 0.11 | 0.45 | 0.11 |
| 170 | <i>Lysimachio-Filipenduletum ulmariae</i> 90 %, <i>Caricetum gracilis</i> 10 % | 0.60 | 0.15 | 0.60 | 0.15 |
| 171 | <i>Phragmitetum australis</i> | 0.37 | 0.09 | 0.37 | 0.09 |
| 172 | <i>Phragmitetum australis</i> | 1.27 | 0.32 | 1.27 | 0.32 |
| 173 | <i>Caricetum gracilis</i> | 1.11 | 0.28 | 1.11 | 0.28 |
| 174 | <i>Caricetum gracilis</i> | 1.52 | 0.38 | 1.52 | 0.38 |
| 175 | <i>Phragmitetum australis</i> | 0.22 | 0.06 | 0.22 | 0.06 |
| 176 | <i>Caricetum gracilis</i> | 0.85 | 0.21 | 0.85 | 0.21 |
| 177 | <i>Caricetum gracilis</i> | 0.80 | 0.20 | 0.80 | 0.20 |

Table 2 (continued)

| 1 | 2 | 3 | 4 | 5 | 6 |
|-----|--|------|------|------|------|
| 178 | <i>Caricetum gracilis</i> | 0.27 | 0.07 | 0.27 | 0.07 |
| 179 | <i>Lysimachio-Filipenduletum ulmariae</i> | 1.72 | 0.43 | 1.72 | 0.43 |
| 180 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.84 | 0.21 | 0.84 | 0.21 |
| 181 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.29 | 0.07 | 0.29 | 0.07 |
| 182 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.08 | 0.02 | 0.08 | 0.02 |
| 183 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.06 | 0.02 | 0.06 | 0.02 |
| 184 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.56 | 0.14 | 0.56 | 0.14 |
| 185 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.63 | 0.16 | 0.63 | 0.16 |
| 186 | <i>Phragmitetum australis</i> | 0.28 | 0.07 | 0.28 | 0.07 |
| 187 | <i>Phragmitetum australis</i> | 6.44 | 1.62 | 6.44 | 1.62 |
| 188 | <i>Lysimachio-Filipenduletum ulmariae</i> | 1.99 | 0.50 | 1.99 | 0.50 |
| 189 | <i>Caricetum gracilis</i> | 0.21 | 0.05 | 0.21 | 0.05 |
| 190 | <i>Caricetum gracilis</i> | 0.37 | 0.09 | 0.37 | 0.09 |
| 191 | <i>Caricetum gracilis</i> | 0.47 | 0.12 | 0.47 | 0.12 |
| 192 | <i>Caricetum gracilis</i> | 0.91 | 0.23 | 0.91 | 0.23 |
| 193 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.76 | 0.19 | 0.76 | 0.19 |
| 194 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.17 | 0.04 | 0.17 | 0.04 |
| 195 | <i>Lysimachio-Filipenduletum ulmariae</i> | 1.52 | 0.38 | 1.52 | 0.38 |
| 196 | <i>Phragmitetum australis</i> | 2.67 | 0.67 | 2.67 | 0.67 |
| 197 | <i>Caricetum gracilis</i> | 2.31 | 0.58 | 2.31 | 0.58 |
| 198 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.12 | 0.03 | 0.12 | 0.03 |
| 199 | <i>Phragmitetum australis</i> | 0.18 | 0.05 | 0.18 | 0.05 |
| 200 | <i>Caricetum gracilis</i> | 0.91 | 0.23 | 0.91 | 0.23 |
| 201 | <i>Caricetum gracilis</i> | 1.68 | 0.42 | 1.68 | 0.42 |
| 202 | <i>Caricetum gracilis</i> | 1.22 | 0.31 | 1.22 | 0.31 |
| 203 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.29 | 0.07 | 0.29 | 0.07 |
| 204 | <i>Phragmitetum australis</i> | 0.43 | 0.11 | 0.43 | 0.11 |
| 205 | <i>Phragmitetum australis</i> | 0.05 | 0.01 | 0.05 | 0.01 |
| 206 | <i>Caricetum distichae</i> 60 %, <i>Phalaridetum arundinaceae</i> 40 % | 0.25 | 0.06 | 0.25 | 0.06 |
| 207 | <i>Phragmitetum australis</i> | 2.15 | 0.54 | 2.15 | 0.54 |
| 208 | <i>Lysimachio-Filipenduletum ulmariae</i> 70 %, <i>Phalaridetum arundinaceae</i> 30 % | 0.29 | 0.07 | 0.29 | 0.07 |
| 209 | Cultivated meadow | 4,34 | 1.09 | 4,34 | 1.09 |
| 210 | <i>Caricetum distichae</i> | 3.44 | 0.86 | 3.44 | 0.86 |
| 211 | <i>Caricetum gracilis</i> 99 %, <i>Phalaridetum arundinaceae</i> 1 % | 9.60 | 2.41 | 9.60 | 2.41 |
| 212 | <i>Phalaridetum arundinaceae</i> 40 %, <i>Lysimachio-Filipenduletum ulmariae</i> 30 %, <i>Caricetum distichae</i> 30 % | 0.80 | 0.20 | 0.80 | 0.20 |
| 213 | <i>Phragmitetum australis</i> | 0.53 | 0.13 | 0.53 | 0.13 |
| 214 | <i>Phragmitetum australis</i> | 1.17 | 0.29 | 1.17 | 0.29 |
| 215 | <i>Caricetum gracilis</i> 99 %, <i>Phalaridetum arundinaceae</i> 1 % | 6.43 | 1.62 | 6.43 | 1.62 |
| 216 | Cultivated meadow | 5.50 | 1.38 | 5.50 | 1.38 |
| 217 | Cultivated meadow | 0.18 | 0.05 | 0.18 | 0.05 |
| 218 | Scrubs | 0.64 | 0.16 | 0.64 | 0.16 |

Table 2 (continued)

| 1 | 2 | 3 | 4 | 5 | 6 |
|-----|--|------|------|------|------|
| 219 | <i>Caricetum gracilis</i> 75 %, <i>Caricetum distichae</i> 20 %, <i>Phalaridetum arundinaceae</i> 5 % | 0.82 | 0.21 | 0.82 | 0.21 |
| 220 | <i>Caricetum distichae</i> 70 %, <i>Phalaridetum arundinaceae</i> 20 %, <i>Lysimachio-Filipenduletum ulmariae</i> 10 % | 1.85 | 0.47 | 1.85 | 0.47 |
| 221 | <i>Caricetum gracilis</i> 90 %, <i>Phalaridetum arundinaceae</i> 10 % | 2.79 | 0.70 | 2.79 | 0.70 |
| 222 | <i>Lysimachio-Filipenduletum ulmariae</i> | 0.80 | 0.20 | 0.80 | 0.20 |
| 223 | Scrubs | 0.40 | 0.10 | 0.40 | 0.10 |
| 224 | <i>Lysimachio-Filipenduletum ulmariae</i> 80 %, <i>Phalaridetum arundinaceae</i> 18 %, overgrowths of cultivated plants 2 % | 0.66 | 0.17 | 0.66 | 0.17 |
| 225 | <i>Lysimachio-Filipenduletum ulmariae</i> 80 %, <i>Caricetum distichae</i> 15 %, <i>Phalaridetum arundinaceae</i> 5 % | 3.79 | 0.95 | 3.79 | 0.95 |
| 226 | <i>Phragmitetum australis</i> | 8.48 | 2.13 | 8.48 | 2.13 |
| 227 | Scrubs | 0.84 | 0.21 | 0.84 | 0.21 |
| 228 | <i>Lysimachio-Filipenduletum ulmariae</i> 50 %, <i>Caricetum distichae</i> 25 %, <i>Phalaridetum arundinaceae</i> 20 %, <i>Caricetum gracilis</i> 5 % | 0.31 | 0.08 | 0.31 | 0.08 |
| 229 | <i>Lysimachio-Filipenduletum ulmariae</i> 50 %, <i>Caricetum distichae</i> 25 %, <i>Phalaridetum arundinaceae</i> 20 %, <i>Caricetum gracilis</i> 5 % | 1.40 | 0,35 | 1.40 | 0,35 |
| 230 | <i>Phragmitetum australis</i> | 0.90 | 0.23 | 0.90 | 0.23 |
| 231 | <i>Lysimachio-Filipenduletum ulmariae</i> 40 %, <i>Caricetum distichae</i> 30 %, <i>Phalaridetum arundinaceae</i> 20 %, <i>Caricetum gracilis</i> 10 % | 0.21 | 0.05 | 0.21 | 0.05 |
| 232 | <i>Caricetum distichae</i> 50 %, <i>Phalaridetum arundinaceae</i> 20 %, <i>Lysimachio-Filipenduletum ulmariae</i> 30 % | 1.43 | 0.36 | 1.43 | 0.36 |
| 233 | <i>Caricetum gracilis</i> 95 %, <i>Phalaridetum arundinaceae</i> 5 % | 1.81 | 0.45 | 1.81 | 0.45 |
| 234 | <i>Caricetum distichae</i> 40 %, <i>Phalaridetum arundinaceae</i> 30 %, <i>Lysimachio-Filipenduletum ulmariae</i> 30 % | 0.52 | 0.13 | 0.52 | 0.13 |
| 235 | <i>Caricetum distichae</i> 40 %, <i>Phalaridetum arundinaceae</i> 30 %, <i>Lysimachio-Filipenduletum ulmariae</i> 30 % | 2.91 | 0.73 | 2.91 | 0.73 |
| 236 | <i>Phragmitetum australis</i> | 2.22 | 0.56 | 2.22 | 0.56 |
| 237 | <i>Caricetum gracilis</i> 95 %, <i>Phalaridetum arundinaceae</i> 5 % | 1.33 | 0.33 | 1.33 | 0.33 |
| 238 | <i>Caricetum gracilis</i> 95 %, <i>Phalaridetum arundinaceae</i> 5 % | 1.10 | 0.28 | 1.10 | 0.28 |
| 239 | <i>Lysimachio-Filipenduletum ulmariae</i> 70 %, <i>Phalaridetum arundinaceae</i> 30 % | 0.76 | 0.19 | 0.76 | 0.19 |

| | | | | | |
|-----|--|------|------|------|------|
| | <i>Caricetum distichae</i> 30 % | | | | |
| 240 | <i>Lysimachio-Filipenduletum ulmariae</i> 95 %, <i>Phalaridetum arundinaceae</i> 5 % | 0.50 | 0.13 | 0.50 | 0.13 |
| 241 | <i>Lysimachio-Filipenduletum ulmariae</i> 90 %, <i>Caricetum distichae</i> 10 % | 2.74 | 0.69 | 2.74 | 0.69 |
| 242 | <i>Caricetum gracilis</i> 85 %, <i>Caricetum distichae</i> 15 % | 6.11 | 1.54 | 6.11 | 1.54 |
| 243 | <i>Caricetum gracilis</i> 95 %, <i>Phalaridetum arundinaceae</i> 5 % | 5.22 | 1.31 | 5.22 | 1.31 |
| 244 | <i>Lysimachio-Filipenduletum ulmariae</i> 80 %, <i>Caricetum distichae</i> 10 %, <i>Phalaridetum arundinaceae</i> 10 % | 1.25 | 0.31 | 1.25 | 0.31 |
| 245 | <i>Phalaridetum arundinaceae</i> 60 %, <i>Lysimachio-Filipenduletum ulmariae</i> 40 % | 0.10 | 0.03 | 0.10 | 0.03 |
| 246 | <i>Phalaridetum arundinaceae</i> 40 %, <i>Lysimachio-Filipenduletum ulmariae</i> 30 %, <i>Caricetum distichae</i> 20 %, <i>Caricetum gracilis</i> 10 % | 0.34 | 0.09 | 0.34 | 0.09 |
| 247 | <i>Caricetum gracilis</i> | 2.41 | 0.61 | 2.41 | 0.61 |
| 248 | <i>Lysimachio-Filipenduletum ulmariae</i> 80 %, <i>Caricetum distichae</i> 10 %, <i>Phalaridetum arundinaceae</i> 10 % | 1.19 | 0.30 | 1.19 | 0.30 |
| 249 | <i>Lysimachio-Filipenduletum ulmariae</i> 80 %, <i>Caricetum distichae</i> 10 %, <i>Phalaridetum arundinaceae</i> 10 % | 2.68 | 0.67 | 2.68 | 0.67 |
| 250 | <i>Caricetum gracilis</i> 95 %, <i>Phalaridetum arundinaceae</i> 5 % | 1.84 | 0.46 | 1.84 | 0.46 |
| 251 | <i>Caricetum gracilis</i> 95 %, <i>Phalaridetum arundinaceae</i> 5 % | 1.32 | 0.33 | 1.32 | 0.33 |
| 252 | <i>Phragmitetum australis</i> | 1.14 | 0.29 | 1.14 | 0.29 |
| 253 | <i>Phragmitetum australis</i> | 0.10 | 0.03 | 0.10 | 0.03 |
| 254 | <i>Phragmitetum australis</i> | 3.02 | 0.76 | 3.02 | 0.76 |
| 255 | <i>Phragmitetum australis</i> | 0.63 | 0.16 | 0.63 | 0.16 |
| 256 | <i>Caricetum gracilis</i> 95 %, <i>Phalaridetum arundinaceae</i> 4 %, <i>Caricetum distichae</i> 1% | 1.44 | 0.36 | 1.44 | 0.36 |
| 257 | <i>Lysimachio-Filipenduletum ulmariae</i> 50 %, <i>Phalaridetum arundinaceae</i> 45 %, <i>Caricetum distichae</i> 5 % | 0.07 | 0.02 | 0.07 | 0.02 |
| 258 | <i>Lysimachio-Filipenduletum ulmariae</i> 50 %, <i>Phalaridetum arundinaceae</i> 45 %, <i>Caricetum distichae</i> 5 % | 0.15 | 0.04 | 0.15 | 0.04 |
| 259 | <i>Lysimachio-Filipenduletum ulmariae</i> 50 %, <i>Phalaridetum arundinaceae</i> 45 %, <i>Caricetum distichae</i> 5 % | 0.08 | 0.02 | 0.08 | 0.02 |
| 260 | <i>Caricetum gracilis</i> | 1.62 | 0.41 | 1.62 | 0.41 |
| 261 | <i>Phragmitetum australis</i> | 2.10 | 0.53 | 2.10 | 0.53 |
| 262 | Cultivated meadow | 2.55 | 0.64 | 2.55 | 0.64 |
| 263 | <i>Phragmitetum australis</i> | 0.23 | 0.06 | 0.23 | 0.06 |
| 264 | <i>Phragmitetum australis</i> | 1.40 | 0.35 | 1.40 | 0.35 |

Table 2 (continued)

| 1 | 2 | 3 | 4 | 5 | 6 |
|-----|--|-------|------|-------|------|
| 265 | <i>Lysimachio-Filipenduletum ulmariae</i> 85 %, <i>Phalaridetum arundinaceae</i> 5 %, <i>Caricetum gracilis</i> 5 %, <i>Phragmitetum australis</i> 5 % | 0.51 | 0.13 | 0.51 | 0.13 |
| 266 | <i>Lysimachio-Filipenduletum ulmariae</i> 85 %, <i>Phalaridetum arundinaceae</i> 5 %, <i>Caricetum gracilis</i> 5 %, <i>Phragmitetum australis</i> 5 % | 0.56 | 0.14 | 0.56 | 0.14 |
| 267 | <i>Lysimachio-Filipenduletum ulmariae</i> 85 %, <i>Phalaridetum arundinaceae</i> 5 %, <i>Caricetum gracilis</i> 5 %, <i>Phragmitetum australis</i> 5 % | 1.38 | 0.35 | 1.38 | 0.35 |
| 268 | <i>Lysimachio-Filipenduletum ulmariae</i> 85 %, <i>Phalaridetum arundinaceae</i> 5 %, <i>Caricetum gracilis</i> 5 %, <i>Phragmitetum australis</i> 5 % | 1.94 | 0.49 | 1.94 | 0.49 |
| 269 | <i>Phragmitetum australis</i> | 3.39 | 0.85 | 3.39 | 0.85 |
| 270 | <i>Phalaridetum arundinaceae</i> 95 %, <i>Caricetum gracilis</i> 5 % | 2.38 | 0.60 | 2.38 | 0.60 |
| 271 | <i>Phalaridetum arundinaceae</i> 80 %, <i>Caricetum gracilis</i> 20 % | 7.65 | 1.92 | 7.65 | 1.92 |
| 272 | <i>Phragmitetum australis</i> | 0.41 | 0.10 | 0.41 | 0.10 |
| 273 | <i>Phragmitetum australis</i> | 0.59 | 0.15 | 0.59 | 0.15 |
| 274 | <i>Caricetum gracilis</i> | 0.24 | 0.06 | 0.24 | 0.06 |
| 275 | <i>Phalaridetum arundinaceae</i> 60 %, <i>Caricetum gracilis</i> 20 %, <i>Lysimachio-Filipenduletum ulmariae</i> 15 %, <i>Phragmitetum australis</i> 5 % | 1.82 | 0.46 | 1.82 | 0.46 |
| 276 | <i>Caricetum gracilis</i> 99 %, <i>Phragmitetum australis</i> 1 % | 1.79 | 0.45 | 1.79 | 0.45 |
| 277 | <i>Caricetum gracilis</i> 99 %, <i>Phragmitetum australis</i> 1 % | 2.25 | 0.57 | 2.25 | 0.57 |
| 278 | <i>Phalaridetum arundinaceae</i> 80 %, <i>Caricetum distichae</i> 10 %, <i>Caricetum gracilis</i> 10 % | 1.33 | 0.33 | 1.33 | 0.33 |
| 279 | <i>Phragmitetum australis</i> | 10.25 | 2.58 | 10.25 | 2.58 |
| 280 | <i>Caricetum gracilis</i> 70 %, <i>Phalaridetum arundinaceae</i> 10 %, <i>Lysimachio-Filipenduletum ulmariae</i> 10 %, <i>Caricetum distichae</i> 10 % | 4.09 | 1.03 | 4.09 | 1.03 |
| 281 | <i>Phragmitetum australis</i> | 0.77 | 0.19 | 0.77 | 0.19 |
| 282 | <i>Phragmitetum australis</i> | 0.17 | 0.04 | 0.17 | 0.04 |
| 283 | <i>Caricetum gracilis</i> 60 %, <i>Phalaridetum arundinaceae</i> 30 %, <i>Caricetum distichae</i> 10 % | 0.79 | 0.20 | 0.79 | 0.20 |
| 284 | <i>Caricetum gracilis</i> 90 %, <i>Phalaridetum arundinaceae</i> 10 % | 6.09 | 1.53 | 6.09 | 1.53 |

Table 2 (continued)

| 1 | 2 | 3 | 4 | 5 | 6 |
|---------------|--|---------------|---------------|---------------|---------------|
| 285 | <i>Caricetum gracilis</i> 90 %, <i>Phalaridetum arundinaceae</i> 10 % | 0.76 | 0.19 | 0.76 | 0.19 |
| 286 | <i>Caricetum gracilis</i> 90 %, <i>Phalaridetum arundinaceae</i> 10 % | 0.46 | 0.12 | 0.46 | 0.12 |
| 287 | <i>Lysimachio-Filipenduletum ulmariae</i> 60 %, <i>Phalaridetum arundinaceae</i> 40 % | 0.47 | 0.12 | 0.47 | 0.12 |
| 288 | <i>Phalaridetum arundinaceae</i> 50 %, <i>Lysimachio-Filipenduletum ulmariae</i> 20 %, <i>Caricetum distichae</i> 15 %, <i>Caricetum gracilis</i> 15 % | 2.10 | 0.53 | 2.10 | 0.53 |
| 289 | Scrubs | 0.19 | 0.05 | 0.19 | 0.05 |
| 290 | <i>Phragmitetum australis</i> | 0.35 | 0.09 | 0.35 | 0.09 |
| 291 | <i>Phragmitetum australis</i> | 0.19 | 0.05 | 0.19 | 0.05 |
| 292 | <i>Phragmitetum australis</i> | 0.12 | 0.03 | 0.12 | 0.03 |
| 293 | <i>Caricetum gracilis</i> | 0.19 | 0.05 | 0.19 | 0.05 |
| 294 | <i>Phalaridetum arundinaceae</i> | 0.20 | 0.05 | 0.20 | 0.05 |
| 295 | <i>Phalaridetum arundinaceae</i> | 0.70 | 0.18 | 0.70 | 0.18 |
| 296 | <i>Phragmitetum australis</i> | 0.38 | 0.10 | 0.38 | 0.10 |
| 297 | <i>Phragmites australis</i> and scrubs | 0.51 | 0.13 | 0.51 | 0.13 |
| 298 | <i>Phalaridetum arundinaceae</i> 60 %, <i>Caricetum gracilis</i> 20 %, <i>Lysimachio-Filipenduletum ulmariae</i> 15 %, <i>Phragmitetum australis</i> 5 % | 2.57 | 0.65 | 2.57 | 0.65 |
| 299 | <i>Caricetum gracilis</i> 90 %, <i>Phalaridetum arundinaceae</i> 10 % | 2.22 | 0.56 | 2.22 | 0.56 |
| 300 | <i>Caricetum gracilis</i> 90 %, <i>Phalaridetum arundinaceae</i> 10 % | 6.63 | 1.67 | 6.63 | 1.67 |
| 301 | <i>Phalaridetum arundinaceae</i> 70 %, <i>Caricetum distichae</i> 30 % | 0.77 | 0.19 | 0.77 | 0.19 |
| 302 | <i>Phragmitetum australis</i> | 0.32 | 0.08 | 0.32 | 0.08 |
| 303 | <i>Phalaridetum arundinaceae</i> 70 %, <i>Caricetum distichae</i> 30 % | 1.15 | 0.29 | 1.15 | 0.29 |
| 304 | <i>Phalaridetum arundinaceae</i> | 0.28 | 0.07 | 0.28 | 0.07 |
| 305 | <i>Phragmitetum australis</i> | 0.51 | 0.13 | 0.51 | 0.13 |
| 306 | <i>Phragmitetum australis</i> | 0.42 | 0.11 | 0.42 | 0.11 |
| 307 | <i>Caricetum gracilis</i> | 0.24 | 0.06 | 0.24 | 0.06 |
| 308 | <i>Phragmitetum australis</i> | 0.70 | 0.18 | 0.70 | 0.18 |
| 309 | <i>Caricetum gracilis</i> | 0.19 | 0.05 | 0.19 | 0.05 |
| 310 | <i>Phragmitetum australis</i> | 0.72 | 0.18 | 0.72 | 0.18 |
| 311 | <i>Caricetum gracilis</i> | 0.14 | 0.04 | 0.14 | 0.04 |
| 312 | <i>Phragmitetum australis</i> | 0.35 | 0.09 | 0.35 | 0.09 |
| Total: | | 397.84 | 100.00 | 397.84 | 100.00 |

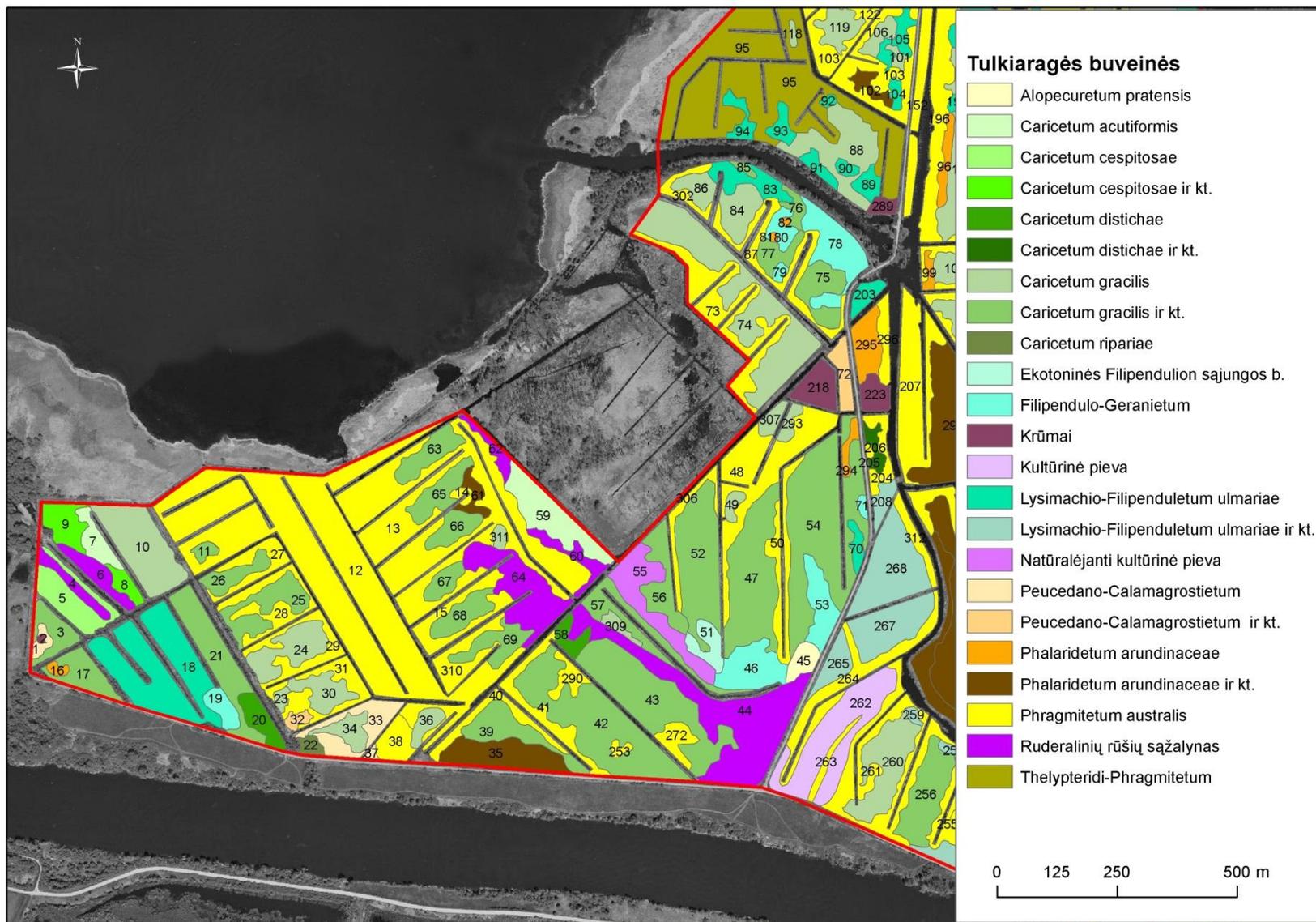


Fig. 1. Vegetation of western part of Tulkiaragė polder (in, 2011–2013)

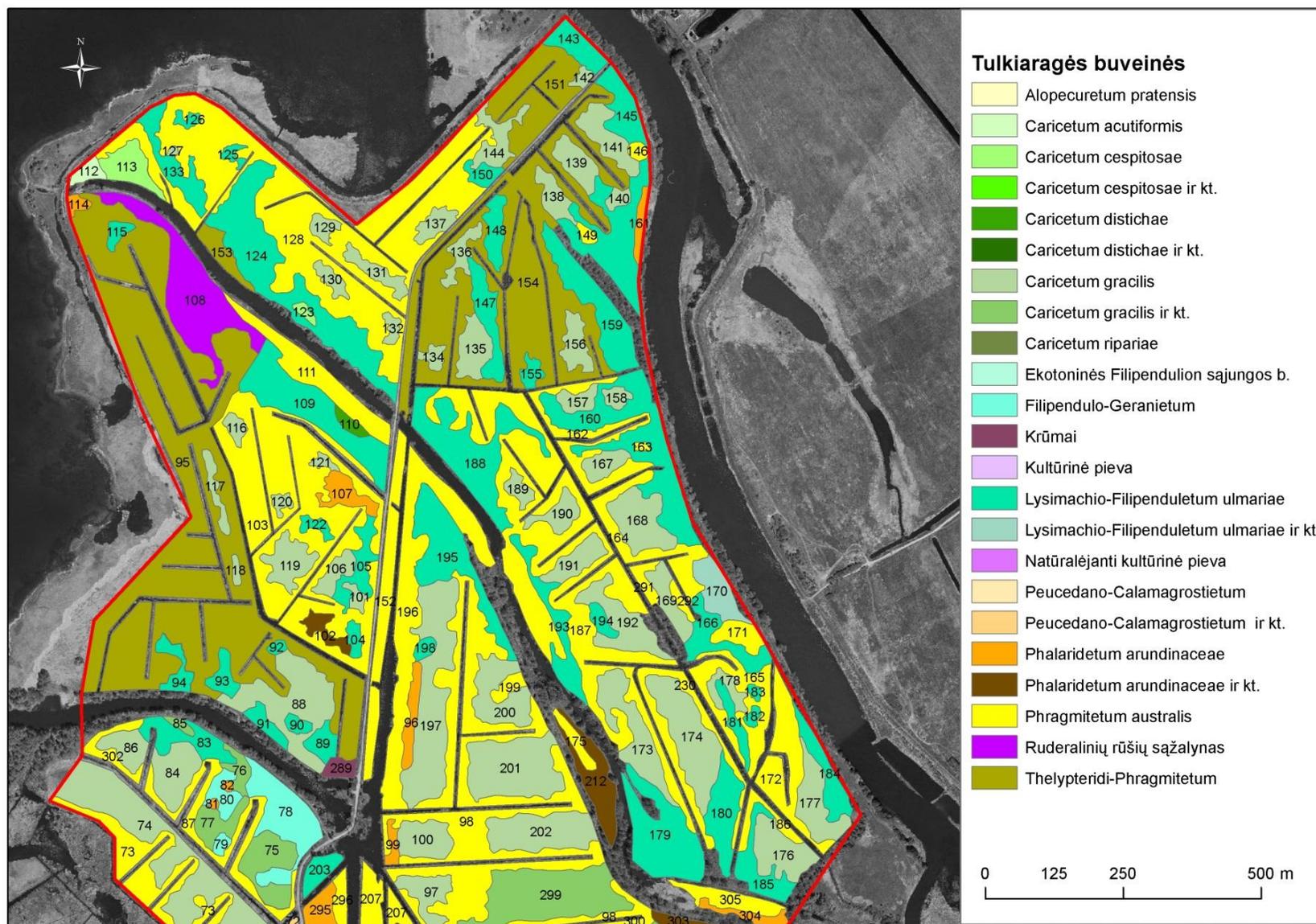


Fig. 2. Vegetation of northern part of Tulkiaragė polder (in 2011–2013)

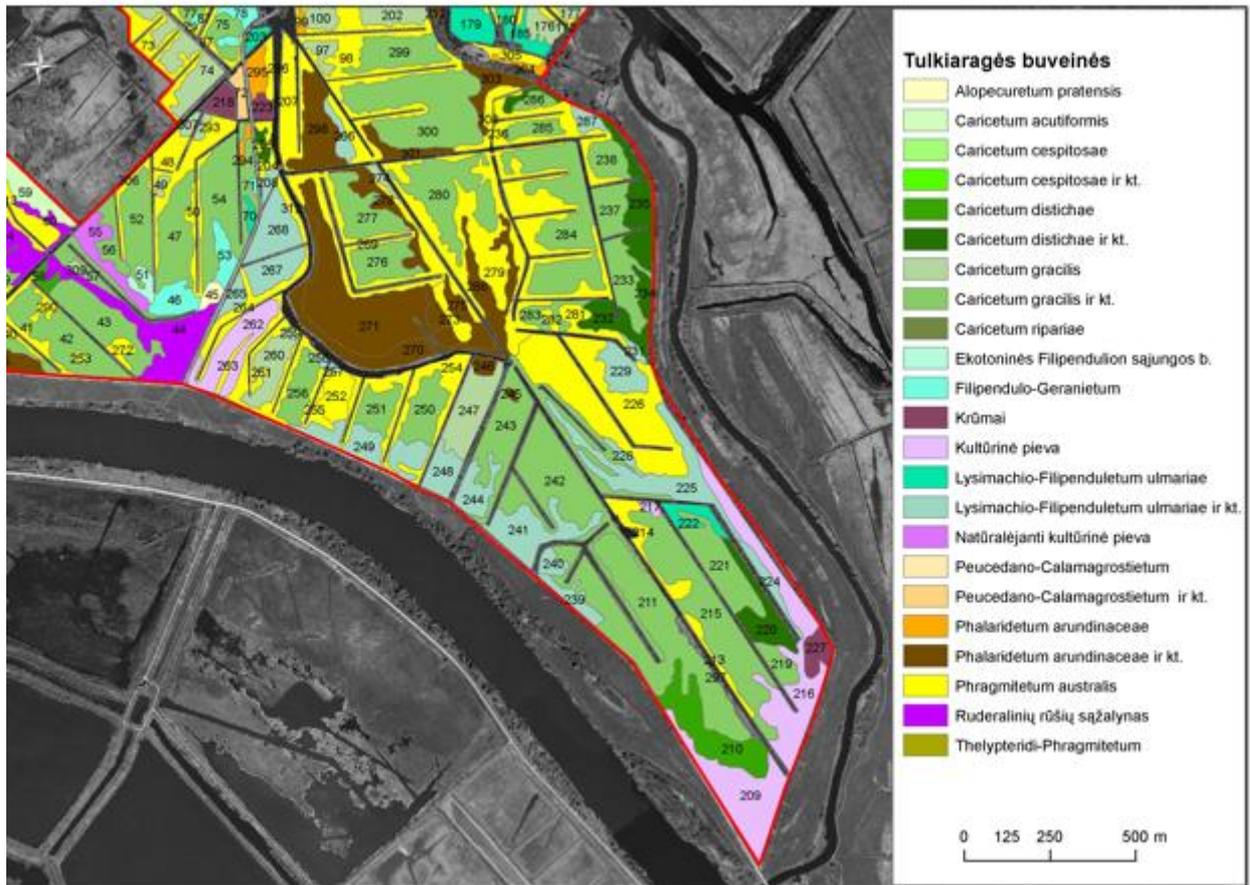


Fig 3. Vegetation of eastern part of Tulkiaragės polder (in 2011–2013)

3. Brief characterizations of plant communities

Alopecuretum pratensis

1. Physiognomy. Heterogeneous grassland where a layer of tracery *Alopecurus pratensis* and a lower thick field of various grass are distinguished.
2. Coverage of shrubs. No shrub layer.
3. Tussocks. Micro conformation is plain.
4. Stability. Dynamic plant community, which depends on farming activities.
5. Variations of species composition. *Filipendula ulmaria* plants flourish rather abundantly.
6. Successions, reasons and tendency. Successional ways are conditioned by future land-use.
7. Farming and intensity. No farming activities.
8. The key factors in the development of community. Farming activities and hydrological conditions.
9. Vegetation changes. In monitoring plot almost double number of species is detected than in 2011, however, prevailing species plants abundance and coverage remained unchanged. Most likely, in 2011, authors who carried out monitoring, limited described area to lesser than 100 meters in square.

Caricetum acutiformis

1. Physiognomy. The overgrowth of *Carex acutiformis* monodominant.
2. Coverage of shrubs. No shrubs layer.

3. Tussocks. No tussocks.
4. Stability. Relatively stable.
5. Variations of species composition.
6. Successions, reasons and tendency. Generally, fertile meadows are succeeded by this community due to waterlogging or absence of farming activities.
7. Farming and intensity. Absence of farming.
8. The key factors in the development of community. Fluctuations of hydrological regime and haymaking.
9. Vegetation changes. Plant communities species composition remained unchanged, just abundance increased of *Phragmites australis*.

Caricetum cespitosae

1. Physiognomy. Tall grassland where prominent *Carex cespitosa* and *Filipendula ulmaria* plants thrive.
2. Coverage of shrubs. No shrubs layer.
3. Tussocks. Scarce, but tall tussocks.
4. Stability. Relatively stable.
5. Variations of species composition. *Filipendula ulmaria* plants may grow abundantly.
6. Successions, reasons and tendency. This community develops from other fertile meadow community due to waterlogging or absence of farming activities.
7. Farming and intensity. No farming.
8. The key factors in the development of community. Hydrological regime and land use.
9. Vegetation changes. Plant communities' species composition is changed slightly. Multiplications of *Filipendula ulmaria*, *Veronica longifolia* and *Carex disticha* has been observed.

Caricetum distichae

1. Physiognomy. Monodominant overgrowths of *Carex disticha*.
2. Coverage of shrubs. No shrubs.
3. Tussocks. No tussocks.
4. Stability. Under the influence of constant hydrological and farming conditions, communities are stable, however, due to cessation of mowing or waterlogging of habitats they are succeeded by the *Lysimachio-Filipenduletum vulgaris*, seldom – *Thelypterido-Phragmitetum*.
5. Variations of species composition. In unmowed plant communities *Lysimachia vulgaris* or *Phragmites australis* begins to dominate.
6. Successions, reasons and tendency. These communities are formed on slightly more elevated ground than *Caricetum gracilis*. Fluctuations steadily proceed under the influence of inconstant hydrological conditions i.e. *Caricetum gracilis* have formed under the influence of water balance after heavy inundation of water, but in drier seasons it withers and steps aside for the *Caricetum distichae*. Very often these two communities along with *Phalaroides arundinacea* comprise a very complicated vegetation mosaic. In the lower reaches of Nemunas these fluctuations previously were described in old literature. Succession proceeds differently due to cessation of mowing of plant communities or the waterlogging during abnormal long floods.
7. Farming and intensity. Some plots have been mowed.
8. The key factors in the development of community. The fluctuation of hydrological regime, mowing.
9. Vegetation changes. Abundance of *Carex disticha* slightly decreased. In all places abundance of *Phalaroides arundinacea* cenopopulations increased, also, in some

places, multiplication of *Phragmites australis* was determined. In plant communities *Carex acuta* started to grow abundantly.

Caricetum gracilis

1. Physiognomy. The overgrowth of *Carex acuta* monodominants.
2. Coverage of shrubs. No shrub layer.
3. Tussocks. No tussocks.
4. Stability. Like *Caricetum distichae*, under the influence of constant hydrological and farming conditions, communities are stable, but in plots which have been waterlogged for extensive periods of time, these communities are changed to the *Lysimachio-Filipenduletum vulgaris* and in plots, which have not been mowed for a long time – *Thelypterido-Phragmitetum*. However, these fluctuations are not frequent and intense like *Caricetum distichae* because of *Caricetum gracilis* is one of the most stable sedge communities in Tulkiaragè polder. This is determined by the competitive ability of *Carex acuta* and its ability to form dense overgrowth, where, under the influence of inconstant environmental conditions, plants of other separate species hardly penetrate through and grow singly. *Caricetum gracilis* phytocenosis, without having been mowed, remains stable for many years if it is not overgrown by reeds.
5. Variations of species composition. The facies of *Caricetum gracilis* and *Phragmites australis* are described.
6. Successions, reasons and tendency. The widespread communities are confined to lower and wetter areas than *Caricetum distichae* or *Phalaridetum arundinaceae* in Tulkiaragè polder.
7. Farming and intensity. Some plots have been mowed.
8. The key factors in the development of community. The fluctuation of hydrological regime and mowing.
9. Vegetation changes. Essential vegetation changes have not been determined, except, that in some areas coverage of *Phragmites australis* increased.

Deschampsietum cespitosae

1. Physiognomy. Layer formed by sparse capitulums of the *Deschampsia cespitosa* as well as layer formed by dense leaves and dwarfish grasses are distinguished.
2. Coverage of shrubs. No shrub layer.
3. Tussocks. No tussocks.
4. Stability. These communities are sensitive to farming activities and hydrological conditions.
5. Variations of species composition. In some places *Filipendula ulmaria* plants grow abundantly.
6. Successions, reasons and tendency. Under the influence of poor aeration, the cultivated meadows have been changed by these communities. Due to absence of farming activities they may be overgrown by reeds.
7. Farming and intensity. Absence of farming.
8. The key factors in the development of community. Farming activities and hydrological regime.
9. Vegetation changes. Abundance and coverage of *Deschampsia caespitosa* decreased. Multiplication of species such as *Veronica longifolia*, *Persicaria amphibia* and *Filipendula ulmaria* has been observed.

Galio palustris-Caricetum ripariae

1. Physiognomy. The overgrowths of monodominant *Carex riparia* are distributed in small areas.

2. Coverage of shrubs. No shrub layer.
3. Tussocks. No tussocks are observed.
4. Stability. These communities are stable under the influence of constant hydrological and farming conditions.
5. Variations of species composition. Variations are not established because of communities are rare and occupy small areas.
6. Successions, reasons and tendency. The communities are distributed in wetter or similar to *Caricetum gracilis* habitats. In Tulkiaragè polder they occupy a small area; therefore it is not very significant in vegetation mosaic.
7. Farming and intensity. No farming.
8. The key factors in the development of community. Not established.
9. Vegetation changes. Significant increase of *Phragmites arundinacea* coverage has been observed. In plant community rather abundant *Calystegia sepium* cenopopulations found their niche there.

Lysimachio vulgaris-Filipenduletum

1. Physiognomy. Meadow communities of the mid level of flood-plain of polder where *Lysimachia vulgaris* or *Filipendula ulmaria* dominates. These communities are rich in sedges such as: *Carex acuta* and especially *Carex disticha* and also *Phalaroides arundinacea* grows there.
2. Coverage of shrubs. The communities are not covered or slightly covered by shrubs.
3. Tussocks. No tussocks are observed.
4. Stability. The communities are stadial. A composition of species is mixed and often is rich in nitrophites especially *Calystegia sepium*.
5. Variations of species composition. *Lysimachia vulgaris* (mostly) or *Filipendula ulmaria* dominates.
6. Successions, reasons and tendency. The communities have formed under the influence of cessation of mowing of the *Caricetum distichae* community in drier habitats or due to the saturation of *Phalaridetum arundinacea* or *Caricetum gracilis* phytocenosis in more soggy habitats. It's possible that as a consequence of constant mowing, communities of sedge regenerate.
7. Farming and intensity. No farming.
8. The key factors in the development of community. Cessation of mowing and waterlogging.
9. Vegetation changes. Coverage increased of edificator *Filipendula ulmaria* as well as of species such as *Veronica longifolia*, *Persicaria amphibia*, *Calystegia sepium* and *Cirsium arvense*. Abundance decreased of some gramineous plants (*Festuca pratensis* and *F. rubra*).

Phalaridetum arundinaceae

1. Physiognomy. The overgrowth of monodominat *Phalaroides arundinacea*.
2. Coverage of shrubs. No shrub layer.
3. Tussocks. No tussocks are observed.
4. Stability. The communities are stable under the influence of constant hydrological and farming conditions; however the formation of *Lysimachio-Filipenduletum vulgaris* starts, due to the saturation of habitat in some plots, but this process is not very intensive in Tulkiaragè polder.
5. Variations of species composition. The composition of species is uniform. *Phalaroides arundinacea* is a species of high competitive ability, which forms a dense and high herbal layer and it's strong rootstocks are intertwined in the soil table, therefore separate species cannot thrive there and as a result, overgrowth of Reed

canary grass can expand easily in the area by rivalling tracery communities of *Caricetum distichae*.

6. Successions, reasons and tendency. These communities are formed on slightly more elevated areas than *Caicetum gracilis* in Tulkiaragè polder. Under the influence of constant ecological conditions, Reed canary grass tends to expand in the area.
7. Farming and intensity. Absence of farming activities.
8. The key factors in the development of community. Seasonal inundation of water, stability of ecological conditions and party – mowing.
9. Vegetation changes. Essential changes are not determined.

Phragmitetum australis

1. Physiognomy. The overgrowth of *Pragmites australis* monodominants.
2. Coverage of shrubs. No shrub layer.
3. Tussocks. No tussocks.
4. Stability. Under the constant conditions communities are stable and expand in the area very quickly.
5. Variations of species composition. No variations.
6. Successions, reasons and tendency. In various areas communities are formed in the wettest and waterlogged habitats of polder and have come to replace sedges and Reed canary grasses communities (*Caricetum gracilis*, *Caricetum distichae*, *Phalaridetum arundinaceae*) because of absence of farming. A constant mowing would give an opportunity for communities of sedge or Reed canary grass to regenerate.
7. Farming and intensity. Absence of farming activities.
8. The key factors in the development of community. Cessation of mowing, partly – flooding of habitats.
9. Vegetation changes. Plant communities remained stable.

Thelypteridi-Phragmitetum

1. Physiognomy. The overgrowth of monodominant *Phragmites australis* with an abundant intermixture of sedge.
2. Coverage of shrubs. No shrub layer.
3. Tussocks. No tussocks.
4. Stability. Under the constant conditions communities are stable and expand in the area very quickly.
5. Variations of species composition. No variations.
6. Successions, reasons and tendency. A constant mowing would give an opportunity for communities of sedge or Reed canary grass to regenerate.
7. Farming and intensity. Absence of farming activities.
8. The key factors in the development of community. Cessation of mowing.
9. Vegetation changes. Plant communities remained stable.

The overgrowths of ruderal plant species

1. Physiognomy. Phytocenosis of high nitrophils with *Anthriscus sylvestris* predomination.
2. Coverage of shrubs. No shrub layer.
3. Tussocks. No tussocks.
4. Stability. These communities are stadial.
5. Variations of species composition. Considerable variations are not common there.

6. Successions, reasons and tendency. The communities have formed under the influence of cessation of mowing in artificial habitats near canals. Trends of succession are vague.
7. Farming and intensity. Absence of farming activities.
8. The key factors in the development of community. Formation of canal embankment and cessation of mowing.
9. Vegetation changes. Overgrowths remained stable.

4. Suitable plant communities for the Aquatic Warbler

In Tulkiaragè polder two Aquatic Warbler (*Acrocephalus paludicola*) singing males were observed in the *Caricetum distichae* community in contour 210. The *Caricetum distichae* communities were distinguished in 38 contours and they are distributed in the area of a small scale (14.69 ha – 3.69 % of total vegetation area). However, it is the most important that these communities were observed in small plots – 4 contours plots are larger than 1 ha and one of it is just of 3 ha.

Table 3

The distribution and coverage of the *Caricetum distichae* communities (in 2011–2013)

| Contour No. | Area, ha | Occupied part of the contour, % |
|-------------|----------|---------------------------------|
| 1 | 2 | 3 |
| 210 | 3.44 | 100 |
| 220 | 1.30 | 70 |
| 43 | 1.21 | 40 |
| 235 | 1.17 | 40 |
| 242 | 0.92 | 15 |
| 232 | 0.72 | 50 |
| 225 | 0.57 | 15 |
| 20 | 0.52 | 100 |
| 280 | 0.41 | 10 |
| 57 | 0.41 | 40 |
| 229 | 0.35 | 25 |
| 303 | 0.34 | 30 |
| 58 | 0.34 | 100 |
| 288 | 0.32 | 15 |
| 241 | 0.27 | 10 |
| 249 | 0.27 | 10 |
| 212 | 0.24 | 30 |
| 301 | 0.23 | 30 |
| 239 | 0.23 | 30 |
| 234 | 0.21 | 40 |
| 219 | 0.16 | 20 |
| 206 | 0.15 | 60 |
| 110 | 0.14 | 100 |
| 278 | 0.13 | 10 |
| 244 | 0.12 | 10 |
| 248 | 0.12 | 10 |
| 283 | 0.08 | 10 |

Table 3 (continued)

| 1 | 2 | 3 |
|--------------|------|--------------|
| 228 | 0.08 | 25 |
| 246 | 0.07 | 20 |
| 231 | 0.06 | 30 |
| 56 | 0.04 | 4 |
| 8 | 0.03 | 1 |
| 256 | 0.01 | 1 |
| 46 | 0.01 | 1 |
| 32 | 0.01 | 5 |
| 258 | 0.01 | 5 |
| 259 | 0.01 | 5 |
| 257 | 0.01 | 5 |
| Total | | 14,69 |

5. Recommendations on management of the territory forming suitable plant communities for the Aquatic Warbler

The vegetation in Tulkiaragè polder has been formed under the influence of both environmental and anthropogenic factors. The key environmental factors which have shaped the distribution of vegetation are hydrological and trophic conditions. If we take into account that the term of spring tides partly depends on pumping station work intensiveness, then we can treat it that the flooding factor is partly of man-induced origin. Other important anthropogenic factors are: mowing and grazing. Mowing is a very important factor in the maintenance of plant communities, whereas grazing is important factor in changing of plant communities. Thus, in order to form suitable plant communities for the Aquatic Warbler in Tulkiaragè polder, attention must be paid to the intensity of grazing and mowing and favourable terms of flooding.

We recommend to start mowing of reedy vegetation of the *Caricetum distichae*, *Caricetum gracilis* and *Phalaridetum arundinaceae* communities as they are potentially suitable breeding ground for the Aquatic Warbler.

The assiduous mowing of vegetation (twice per year) is required in the areas where *Phragmitetum australis* and *Thelypterido-Phragmitetum* communities are distinguished and the trends of succession must be observed there too.

Hay must be taken away from the territory.

The extensive mowing or grazing can be applied in other areas occupied by plant communities from the *Molinio-Arrhenatheretea* class.

6. Changes of vegetation during 2011–2013

In Tulkiaragè polder essential changes in vegetative cover has not been determined. The contours of plant communities remained the same in size. Absolutely no alterations are observed in the communities from the *Phragmitetum* alliance. However, in many areas where phytocenosis from the *Magnocaricion* alliance are confined, multiplication of *Phragmites australis* is observed. In fertile meadow communities species such as *Filipendula ulmaria*, *Veronica longifolia* and *Persicaria amphibia* started to grow. These plants are characteristic to unmown meadows. So, during two years, tendency of vegetation development remained the same – sedge communities are overgrowing by reeds, meanwhile, fertile meadows grass communities where gramineous plants or sedges predominate – by overgrowths of meadowsweet.