THE VISTULA RIVER IN WARSAW

- The landscape of Warsaw Vistula
- Vistula vegetation
Photographs
Jakub Badełek – cover, p. 1, 3 (sandy islands)
Ewa Kominek – p. 2, 3 (vegetated islands), 4, 6, 8, 9 (leaves of white poplar, black poplar, wild cucumber), 10, 11, 12, 13
Magdalena Oprządek – p. 9 (wild cucumber sprouts)
Piotr Sikorski – p. 5, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24
Łukasz Maurycy Stanaszek – p. 7

Graphic, typesetting and printed by
Lotos Poligrafia Sp. z o.o., www.lotos-poligrafia.pl

© Copyright: Miasto Stołeczne Warszawa. All rights reserved.

Warsaw 2015

ISBN 978-83-941363-9-0

Published by the Warsaw Society for Birds Protection under the Project “Protection of Habitats of Priority Bird Species of the Vistula River Valley under the Circumstances of Intensive Pressure from Warsaw Agglomeration”, as supported by the European Union LIFE+ financial instrument and the National Fund for Environmental Protection and Water Management (NFOŚiGW).

The Warsaw Society for Bird Protection (STOP)
Czeska 15a/5, 03-902 Warsaw, www.stop.eko.org.pl
The landscape of Warsaw Vistula

Ewa Kominek

The capital and the adjoining municipalities form the Warsaw metropolitan area which is inhabited by nearly 3 million people. In the middle of this huge agglomeration of people is the Vistula called the queen of Polish rivers. In its central course, with the exception of the city centre, it is little regulated and has a character similar to natural. Its power and spontaneity can be seen during heavy swells or low levels of water when the riverside landscape looks spectacular.

The Vistula enchants with the mosaic of picturesque landscapes, such as riverside grasslands, riparian forest, sandy and overgrown islands in the riverbed, gentle beaches and steep slopes of the banks. These environments are home to many species of animals, including rare on a European scale. The bed of the Vistula and inter-embankment zone from Dęblin to Płock is an area protected under the Natura 2000 ecological network under the name “Middle Vistula Valley”. It also runs through Warsaw.

Warsaw Corset

In the centre of Warsaw, the Vistula is narrower and deeper than average. It partly results from a natural narrowing of the river valley in the region, due to the geological structure. However, to a large extent this is a consequence of artificial regulation, implemented in the past to improve the navigability of the river and flood protection. Every few hundred meters you can see and enter long concrete dams, such as spurs, which plunge transversely in bed. Additionally, the bottom of the Vistula is deepened, and the former flooded areas, for example under the Warsaw slope, artificially built-up and developed.
Boulevards

On the left bank of the Vistula, from Żoliborz to Czerniaków, extend the so-called Vistula boulevards. They have been built since the first half of the 19th century. Before World War II they were one of the flagships of the capital and became a symbol of the idea – promoted by Stefan Starzyński, Mayor of Warsaw – of turning the city to the river front. Developed also in the post-war times, became an attractive area for Warsaw walking and respite from the hustle and bustle. You can find here climatic places such as club-cafés or barge restaurants and hotels.

Banks

Near Warsaw, the banks of the Vistula are a mosaic of sandy beaches and steep slopes, and in some places, e.g. when the river is cornering, their appearance changes very dynamically.

During strong swell the current undermines and washes away the earth, bushes, and even trees with roots. In such steep slopes sand martins and kingfishers are willing to dig breeding burrows. In other places, especially after high water, the sand and gravel carried by the river stop and form gentle beaches.
Sandy Islands (Point Bars)

On the Vistula River islands are formed mainly in the medium run (e.g. in the vicinity of Warsaw), as a result of the movement and accumulation of sediment in the riverbed. Point bars are not very stable because the water washes away sand and gravel and transports them to other places after high water. Strong swells can completely damage islands built before.

Despite short persistence of the point bars, they play an important role in the lives of some aquatic birds – they are the breeding areas for a number of rare species nesting directly on the sand, including terns, plovers and gulls. For this reason, the areas where the islands are regularly built are protected reserves. In the close vicinity of Warsaw there are three ornithological reserves: Zawadowskie Islands, Świderskie Islands and Ławice Kiełpińskie.

Vegetated Islands (Clusters)

With time, some higher point bars get overgrown with plants, which stabilizes and consolidates them. As a result, the islands can remain...
in the same place of the riverbed for many years and cover with trees.
Clusters are quiet, isolated places, often used by animals [such as roe deer, wild boars, otters] for breeding. Some of the islands are huge; one of the biggest – Kępa Radwankowska near Czersk – measures approximately 800 ha.
Formerly the Vistula clusters were sometimes settled, today only animals live here. Some islands have disappeared for various reasons, but left a mark in the names, e.g. Saska Kępa, Kępa Potocka, Kępa Gocławska, Kępa Tarchomińska or Kępa Zawadowska.

■ Riparian Forest

There is a narrow strip of a forest on the right bank of the river along Warsaw. Although it is only partly natural in this region, it is a riverine wetland, which is dominated by willows and poplars. Lots of space here, unfortunately, is occupied by an invasive species – box elder, originating from North America.
The water-closest area is occupied by wickers – shrubby willows – extremely resistant to periodic flooding and having the ability to rapid rebirth after their damage, e.g. due to high water.
A forest growing by the river in the heart of the capital city is a unique phenomenon in Europe. It is a place of life for many species of animals, plants and fungi. It allows passage for larger animals through Warsaw, as stretching further along the river, creates a migration corridor.

■ Open Areas

When walking in the inter-embankment paths of the Vistula near Warsaw, you mostly wander through open areas, only rarely overgrown with bushes and trees. There are some wet, flowery meadows and grasslands which are naturally periodically flooded. Unfortunately they are now largely dominated by Canadian goldenrod – a plant of foreign origin, growing on vast tracts
of meadows and fields, formerly used for agricultural purposes. Vast spaces, scenic views and close contact with nature at any time of the year leave soothed soul and lungs full of fresh air after a walk.

Vistula Vegetation

Magdalena Oprządek

The environment of the Warsaw Vistula is a place for plants which like challenges. They must tolerate harsh conditions, such as changing groundwater levels – from flooding of the river waters during the swells to summer drought – or human activity of cyclic plants’ cutting, regulation of the riverbed, and even building-up the river bank. Vegetation, facing these challenges, has created a characteristic plant formation, called the riparian forest.

A riparian forest is a riverside deciduous forest and occurs on sands and sediments drifted by the water which we call river alluvium. It is an eutrophic area, rich in various minerals which are nutrients for plants. We distinguish poplar and willow riparian forests. The former are typical of higher and better-established areas. There are as many as three species of poplar (white, black and grey), willows, elms, oaks and alders. The undergrowth in these forests is rich (see the „Summer”). Willow forests, with two characteristic species: white and crack willow, are located in
lower areas. In the undergrowth layer we can find rush species (bulrush, manna, reedmace), or species of meadow and pasture areas, associated with human activities (clover, grasses – bent, fescue, cornflower, etc.).

The lowest at the river, in the range of average water levels, there are shrubby thickets of the riverine wicker, where we can come up with three species of willow: common osier, wicker and almond willow. It is difficult to identify a particular species as willows often cross-breed and form the so-called hybrids.

Where does the name „riparian“ come from? The old Polish adjective „riparian“ meant „supple, bent“; riparian also meant lowlands. Hence it can be concluded that the alluvial lowlands are the most magnificent and that they are often overgrown with willows – trees of supple twigs. It is said that when it comes to the wealth of the riverside vegetation in the European Union, only the Loire can be compared to the Vistula riparian forests.

**Spring**

When the spring is in full bloom at the Vistula, be watchful not to miss geophytes shimmering in the sun. These are plants that use a significant amount of light that appears at the bottom of the forest before the trees come into leaf – and then bloom and bear fruit. The rest of the year is spent in the form of underground tubers, rhizomes or bulbs. At the Vistula we can enjoy the view of the yellow carpet of flowers of the lesser celandine, yellow Star-of-Bethlehem or yellow anemone.

This is the time when the willow blooms as well. Few people realize that the male flowers, popularly called „catkins“, become extremely deco-

---

**Four seasons of the year at the Warsaw Vistula**

Any time of year allows you to observe interesting species of plants and natural phenomena at the Vistula. We invite you to discover the richness located just „behind the fence“.  

Blossoming willow, male
rative downy yellow balls after flowering. In the past, the wood of willow served as e.g. material for producing boats, shovels, troughs and other tools of everyday use. Baskets were weaved with flexible willow twigs. Willow wood was burnt in bread stoves – the bread was supposedly the most ruddy. Human life somehow went around the willow. This is worth remembering when we buy decorative wicker baskets for trinkets. Nowadays there are more and more companies that specialize in manufacturing and selling energetic willow – a species bred so as to be an efficient material that gives energy.

Spring is also often associated with pollination of trees. This is an important period for the maintenance of the species. Both willows and poplars are anemophilous, which means that they are pollinated with pollen carried by the wind. Their inflorescences, called catkins, bloom before developing leaves, which increases the chances of spreading pollen. They are pollinated when the pollen gets on the stem’s stigma. Then the plant produces seeds, which – provided with a soft fluff – are transported on long distances with the help of wind gusts. When the seed falls on wet ground, it begins to germinate and forms a new plant. Let us remember that the white „fluff“ of a willow and poplar is not pollen, but a part of a seed, which allows it to move quickly.

Going back to the same places on the Warsaw Vistula, we can observe the phenomenon of succession, which means gradual changes in species composition of the vegetation, due to changes in habitat conditions or appearing new species of plants.

There are three stages of succession. The initial one is associated with appearing pioneer species, i.e. those that colonize the area as the first ones. The Vistula willow and poplar are among them. Their appearance allows the entry of new species. The habitat becomes stable which means that an optimal phase has occurred. The succession at the Vistula is often impeded, which is caused by a repetitive factor, such as the annual ice float run-off that prevents sprouting of trees. What then is the final stage of succession at the Vistula? It is difficult to answer this question because the nature of the Vistula is unpredictable even for naturalists!
refers to the ashen colour of the underside of the leaf.
There is a lot of shade in the riparian forest. What adapted very well to these conditions are vines that in the race for light evolved adaptation enabling climbing on the supports. Therefore they do not have to invest in thickness but back the length of their shoots which are called lianas after growing stiff. Just go down to the riverbank to feel like in a jungle, entangled in vines of hops. Also wild cucumber and thicket creeper – newcomers from the American forests – have creeping stems. Apparently the stem of the wild cucumber achieves the length up to 6 meters during the season!
During the holiday walk, the shade dominant in the wetland can arouse anxiety, but it also gives respite to the heated body. And the remarkable rustle of leaves calms down... The most common sound is leaves of the poplar moving in the wind. The white poplar is especially phenomenal, because at stronger wind blows its white, ribbed and hairy underside of the leaves send silver reflections to walkers. On the other hand, the black poplar leaves are heart-shaped.
If you go down to the river bank during low water, it will be possible to see the cracked ground – a fertile alluvium, also called the silt, deposited by flood waters. They consist mostly of dust and sand which, shrinking due to lack of water, form interesting structures, reminiscent of patterns on a turtle shell. It is thanks to the silt that

### Summer

What astonishes with its smell, variety and luxuriance in summer is the green layer of the riparian forest. Its most characteristic species include stinging nettle, ground-ivy or ground elder. These species like shade and humidity and were used in cooking and herbal medicine in the folk tradition. For example, young leaves of ground elder, traditionally called herb gerard, were added to salads. Nettle leaves, collected until May, contain a lot of vitamin A and C and iron. The last but not least in the thicket of the riparian undergrowth is the European dewberry – a small shrub whose Polish species name [jeżyna popielica]
Wild cucumber is easy to notice at the Vistula. Its sprouts can get as long as 6 m during the season.

Leaves of withe and black poplar
The Vistula bank is rich in leaves of extremely different shapes – from smooth oak leaves with a wavy contour, through crinkled leaves of poplar, to asymmetric elm leaves with serrated edges.

The constantly changing conditions at the Vistula River are perfect for invasive species. These are expansive plants of foreign origin, which thanks to the abundance of seeds and their special structure which facilitates their dissemination, win the race for light and nutrients, planting extensive banks of the river and displacing native species. The most common include the North American box elder, predominant in many riverside forests. This species, the plants can retrieve valuable minerals such as calcium and magnesium.

In summer, take a look at a riverside islands and point bars. They are both in the southern and northern part of the Warsaw Vistula. They are very dynamic ecosystems, often flooded, hence always without trees. You will find, however, interesting, because occurring mainly on sandy-muddy ground, small plants: papyrus sedge and water mudwort.

**Autumn**

Autumn is often associated with multi-coloured leaves. At the Warsaw’s river it is possible to collect and compare leaves of different species of poplar and willow. If you dry them, you can then create compositions.
brought to Europe in the 17th century as an ornamental plant to parks and gardens, began to run wild two centuries later, and therefore appeared in natural habitats, including the rivers. During the autumn walk, you can observe a huge amount of maple fruit, samaras. Their abundance makes it easy to extend the range of the species to new areas.

What foreshadows autumn is also the invasive giant and Canada goldenrod. They form a dense yellow cast with the height of 1-2 meters. Initially, these plants were planted in the gardens, from which they spread onto the river. At the edge of the riparian forests, a Japanese knotweed may occur as well. Its stems, which resemble bamboo, grow up to 3 meters! It reproduces with just a piece of sprout of several centimetres, which makes it a particularly dangerous species to the native flora. The knotweed forms fields which eliminates the appearance of other species.

Autumn at the Vistula also means intense colours of fruit, e.g. of the spindle. Its orange-pink bolls are a delicacy for small birds – robins. At the Warsaw’s Vistula fragment you can also come across the old fruiting pear or apple – traces of the former settlements. The present day Saska Kępa and Białołęka were inhabited, from the 16th century, by Olędrzy – Dutch settlers who settled in the floodplain after its grubbing and drying.
Winter

Is winter the time which disables observation of vegetation? Naturally not! Since you are not tempted by the views of multi-coloured flowers and leaves, you can finally take a look at the bark and the habit of the trees. The bark is a „protective mantle“ of the tree and its appearance varies with the age of the plant. The habit is an overall shape of the overground part of the tree: the thickness and length of the trunk and the shape of the crown.

Poplars have a classic habit: a thick, straight trunk, branchy crown and several thick boughs diagonally rising into the sky. Young white poplar’s bark is light grey, blackened with age; at the base of the trunk it is heavily cracked. The bark of black poplar, however, is dark brown, with plenty of offshoots and tuber growths. The willow, in contrary, has a low and sometimes stocky trunk and a more rounded habit compared to its riverine companion. There are often hollows in the trunk. The bark is dark grey, shaky; contains salicin which is antipyretic. Oaks have the most shaky bark. Their trunk is thick, straight, can become twisted with age. A branchy crown has broad-ovoid shape. The winter walk may surprise you with a dark-brown-bark tree, with deep, vertical grooves, forming a network of grooves and furrows. The shape of the crown is quite exotic, because it is umbrella-like, with wide open branches, resembling horizontal puffs. It can be associated with the savannah acacia. This is the black locust, North American invasive species, which also appears in the bushes and woods in the vicinity of the river.

In winter it is easier to notice signs of the Vistula floods – in the form of light grey lines on the trees, showing the water level – as well as of the exposed roots due to high water and washing away the material by the river. Dead wood is also easy to notice. Its name is quite unfortunate, because this „dead“ wood gathers half of the
forest biodiversity! There are many species of fungi, invertebrates and insects, and if they are there, then there are also woodpeckers which, by pecking hollows, form breeding grounds for many species of birds, e.g. tits.

The Central Vistula Valley in the Warsaw section is an exceptional area on a European scale. The river in this section, apart from the left bank section in the city centre, has maintained its natural braided characteristic. Sandy banks are regularly eluted away during flooding, and at times several hundred meters inland, and in favourable conditions fresh alluvium occupy an area that can be measured in tens of hectares. A valley in the mid-embankment relatively unchanged by man is flooded regularly, which made it possible to maintain the unique parts of riparian willow and poplar forests. Such forests are now a rarity in similar valleys of large European rivers. In the part of the valley beyond
Vegetation of riparian and silt forests from islands in the Legionów area

The anti-flood dykes vegetation has been preserved to a limited extent, but also there are scattered areas of valuable wetlands, oxbow lakes and remnants of old forests. All these habitats are extremely important refuge for many rare wetland birds and plants in Europe. In comparison to other areas, the valley does not have a particularly high concentration of vascular plants. In the mid-embankment area in the centre of Warsaw more than 180 species have been found, while in the reserves covering the sandy alluvia there are about 100 of them. River valley plants have specific habitat requirements and that is why they grow only in riverbank areas and nowhere else. This feature is particularly noticeable in the case of nature habitats. On alluv-
Sandy shoals on the Vistula River at the height of Wilanów during low tide

Vistula as a braided river spreads along a wide stretch of Warsaw; floodwaters during floods entered the area of Wilanów to 3 km (that can be seen well on the floodplain area map). Crossing to the other side of the river was only possible by boat. Such a vast valley was a difficult area to colonize, being adjacent to areas of increasing density of people. When in the 16th century during the reign of Sigismund Augustus it was decided to build the first bridge, people were aware of the difficulty of the project. It became the longest river crossing in Europe. The next bridge was not built until the mid-19th century. It was a lot easier then, because

Panorama of the city of Warsaw from the Praga bank, by Pierre van der Aa from 1729. [source: http://www.geodezja.mazovia.pl/map_daw_maz.htm]
already at that time metal structures were used in building.
Up until the 19th century, backwaters maintained natural plant accumulations – primarily wetlands and occasionally grazed and regularly flooded grasslands. On the first immortalized panoramic photograph taken from the Royal Castle tower in 1875 one can see vast grasslands and riparian forests in the Saska Kepa area. On earlier 17th and 18th century illustrations by Coquarta or by van der Aa there are buildings depicted on the steep banks of the Vistula, which could then be settled without much fear of losing one’s possessions during flooding. In the 19th century buildings were erected ever lower, so that during major floods there were of occurrences of the destruction of townships along the Vistula. High waters broke off bridges and took big wooden buildings, which then drifted with the water flow. During the floods in 1884 Wilanów and Morysin parks were under water, 1.5 km away from the river.
In response to the tragic episodes anti-flood embankments were built. They were 3-metre earth embankments along the river a few hundred meters away from the river, which with great enthusiasm among Varsovians arose in stages during the 19th and 20th centuries. While at the mid-embankment vegetation and natural habitat conditions had not changed significantly, outside the embankments a complete change had taken place. Today, it is considered that the construction of embank-
ments was a bad idea, because they resemble painkillers that do not heal, but only prevent greater illnesses. Nowadays, in such situations, attempts are made to increase the water storage capacity of the river valley, which is recommended both in terms of nature preservation as well as economically. Regulatory works being conducted on the riverbed that facilitate the navigation of vessels of larger displacement should be mentioned. Fortunately, they were never completed, because they could have led to the disappearance of many sandbanks and islands. As a result of these activities the most natural habitats have been preserved in mid-embankments and those beyond the embankments here and there became dry through lack of flooding of the riparian forests, such as Natoliński Forest, Morysin or Młociny. The river occasionally “claims” those areas taken away from it and during flooding breaks the embankments, flowing over into areas inhabited by people, such as in 2001.

- **Valuable natural habitats and their vascular plant species**

**Vegetation of the river sandbanks**
Every year the river current of the Vistula moves approximately 5,000 rail cars of sand and grav-
Shallow silts with a high proportion of red pigweed and creeping yellowcress.

Silt-covered land with high proportion of brown flat-sedge on the organic substrate with considerable thickness.

Large areas of silt with red pigweed on lower ground periodically filled with water.

Not many plants can survive on such a harsh base. The sand becomes hot and dries. In places where water flows slowly there is an accumulation of organic debris in the form of silt. Annual plants from the Bidentea class develop on the silt-covered land. They usually form small surfaces with thickets of willow, sometimes they occupy large areas as in the Zawadowski Islands, Ławice Kiełpińskie and Kępy Kazuńskie reserves. In these positions there are usually loose knotweed, red pigweed, Italian cocklebur and water whorl-grass. Much less often, on thicker layers of organic deposits, characteristically bursting husk-like in times of drought, groupings are formed from
the Isoëto-Nanojuncetea class. These habitats represent mostly small patches of broadleaf plantain and fine species of bulrush, marsh cudweed and brown flatsedge. They have a short lifespan, related to the availability of the typical subsoil for these plants. In the most dried out parts of sand psammophilic vegetation develops loosely, such as commonly wood small-reed and the protected variegated scouring rush.

Established sandy shoals and islands in the river within a few years are overgrown with thickets of willow species with narrow leaves, so-called “willowgrounds” [wiklinowiska]. These are the only woody plants able to endure regular destruction by ice floe during the spring thaw. The common hemp willow and the more rare al-

Red pigweed and Italian cocklebur

Variegated scouring rush and rare species of sandy river shoals by the Vistula

Hemp willow and almond willow, the basic “willow-ground” ingredient resistant to ice floe during spring thaw
mond willow, which are widespread on the river shoals, show the greatest resistance.

Riparian forests
Riparian forests, that today are rare in Europe, dominated at one time the entire Vistula valley beyond the elevated areas. Today, in the Warsaw section in an unchanged form they can be found only in the area of the mid-embankment. During larger floods, due to the proximity of the water stream, even big trees on quite large areas are often completely eluted away. Those growing close to the river are removed for safety reasons, so that they do not create an obstruction along with the ice floe. That is why old forests of poplars and willows are a rarity. A feature typical of wetlands is their regular (once every few years) flooding from the riverbed waters, and the lack of flooding over the decades causes the disappearance of typical species and the penetration of others. How the wetlands that were flooded for the last time at the end of the 19th century look, can be seen in the Morysin Park. Huge poplars there are vestiges of the old riparian poplar forests.

In typical riparian willow and poplar forests in the mid-embankment the forest stands are formed by white and brittle willow in the former, and white, grey and black poplar in the latter. Tall trees here sometimes grow to an enormous size, and from a distance their light-coloured foliage stands out from among the other foliage. It particularly stands out from maple ash.
foliage, frequent although an uninvited guest in the wetlands. Its original site is alluvium in North America, and even on this continent it is sometimes invasive. It is a huge problem on the Vistula wetlands, because removing it from the natural forest stand – even at high volume – is a process measured in decades. During the inventory on alluvial islands maple ash was found even in places inaccessible to people.

is all in places tangled with vines, such as common hop and hedge bindweed. Unfortunately, increasingly one can find there another American species, the prickly cucumber with characteristic cucumber pods.

Not found anywhere else, the wealth of forms of vegetation in some places is reminiscent of a tropical jungle. Apart from the wealth of trees and shrubs of an actual jungle, the Vistula wetlands really look similar. On the Warsaw section the wetlands have a small number of protected plants, such as the broad-leaved orchid, guilder rose and alder buckthorn.

**Oxbow lake vegetation**

Based on geological concepts oxbow lakes are not permanent, although they are much old-

Riparian willow trees with willow tree stands and very thick undergrowth around Wilanów. Such well-cultured riparian willow trees are to be found almost in the centre of the city

The floor of the riparian forest is covered by an exceptional thicket of shoots, which is usually formed by the European bird cherry and dewberry, as well as rampant herbaceous plants, growing up to two meters or more in height. This
er than settlements on areas where Warsaw is today. Many unnamed reservoirs in the region of the mid-embankment, which due to large narrowing of the valley between the embankments, will disappear during the next flood as a result of sand movement by the river’s waters. Typical oxbow lakes are almost exclusively outside the anti-flood embankments. The largest lakes include Czerniakowskie, Powsińska, Powsinkowskie, Wilanowskie and Lisowskie.

Typical oxbow lakes are almost exclusively outside the anti-flood embankments. The largest lakes include Czerniakowskie, Powsińska, Powsinkowskie, Wilanowskie and Lisowskie.

In oxbow lakes around Warsaw there are many rare species, such as yellow water lily, and in a few areas water fern – the floating water moss and rootless duckweed – the smallest plant in the world – can be observed there.

Damp meadows and peat bogs
Flooded meadows and grasslands persist as a result of grazing or mowing, and to a small extent due to ice floe activity. Unused they quickly become overgrown with bushes and trees. This type of meadows and grasslands once covered Saską Kępa, Zakole Wawerskie and the whole vast areas around the Vistula River. Meadows that were outside the anti-flood embankments are gradually degraded and only small patches near embankments where during floods water seepage occur, persist for longer. On flood meadows mown less often (due to cnidion dubii) mouse garlic, great burnet and ragged robin appear en masse among the grasses. Flooded and often grazed or mowed, the grasslands are mainly created by creeping bentgrass, creeping
yellowcress and creeping Jenny. In some regions ostericum palustre has been noted, which has European significance within the Natura 2000 network.

The flooding of the meadow with burnet and mouse garlic. Apart from embankments, they resemble fresh meadows, only occasionally near embankments, where water permeating during flooding is greater, can one find nicer floodplain meadows.

Extremely valuable habitats are in areas with water seepage where there are peatbogs. These areas are associated with numerous groups of protected species. They are usually located on the edge of alder and riparian forests, in areas set back from the river, often on the edge of a valley. Such areas most rich in species are on the Zakole Wawerskie, where Adder’s-tongue, marsh lousewort, bogbean, broad leafed marsh orchid and early marsh orchid grow. These plants’ habits are heavily built-up and at the same time it is also claimed that they are used for agricultural purposes. Both activities endanger the floristic wealth. Similarly as the wetlands, communities of meadows and peatbogs in the centre of urban agglomeration are unusual, although not so rare.

**Recreation by the Vistula**

River valleys, especially in urban areas, have enormous recreational potential. Donau Park in Vienna (Austria), Red Ribbon Park in Qinhuangdao (China), Mill River Park in Calgary...
European cities riverbanks have been totally revitalized; there are pedestrian boulevards, nature parks and tourist trails. Rivers are an oasis of greenery and creeping bentgrass a place for recreation. On areas covered with riparian forests, in flood prone valleys, such as the Vistula valley in Warsaw, walks and bike rides have become exceptionally attractive. About 25,000 people annually use the pedestrian and bike track built in 2009 on the Praga side of Warsaw. That is more then in the entire Narewiański National Park and comparable to Poleski and Drawieński National Parks. Traffic on the path by the Vistula is constantly growing. Excessive growth of tourism in protected areas carries with it a huge risk of destruction of plant habitats, especially since the vegetation is very sensitive to damage. Creation of an extensive tourist infrastructure in the Vistula valley is hence a response to the expectations of today’s residents and the need for conservation of nature.

[Canada] or Jangjaeheon River Park in Seoul [South Korea] are better known examples of areas, where excellent conditions for recreation have been created among nature. In many

First pedestrian and bike path by the Vistula, which twelve months after it was built is one of the biggest attractions in the city. 25,000 people use it annually
The Warsaw Society for Bird Protection (STOP)

Our Society was established in 2004 to congregate environmental protection activists, ornithologists and bird lovers. We want people to discover the nature by educating and enabling them to experience the joy of contact with nature. Our efforts focus on the Warsaw agglomeration area where we attempt to gain involvement of the local community so as to protect the birds together and disseminate the idea of bird protection. For more information about STOP’s activities, our nature outings, presentations and other current events please go to our website www.stop.eko.org.pl and Facebook fanpage.

stop.eko.org.pl

The Project “Protection of Habitats of Priority Bird Species of the Vistula River Valley under the Circumstances of Intensive Pressure of Warsaw Agglomeration” has received grant from the European Union LIFE+ financial instrument and from the National Fund for Environmental Protection and Water Management (NFOŚiGW).

Numerous project activities are aimed at improving the living conditions of birds, rare on the European scale, and occurring at the Vistula River in the Warsaw agglomeration, e.g. little tern and common tern. New islands will be built: a permanent one and several floating ones, where the birds will be able to breed. Favourable habitat for breeding will be protected from the pressure from predators and penetration of the people, and the monitoring system will allow rapid municipal services’ notification and respond to threats. The project includes all-year ornithological monitoring, enabling documentation of bird life at the Vistula River.

Five artificial bird nesting habitats in the form of floating rafts with a total area of 600 m² have been established under the project and three nature reserves on the Vistula River (Wyspy Świderskie, Ławice Kiełpińskie and Wyspy Zawadowskie) have been marked. Furthermore, the application “Warsaw Vistula Birds” has been developed and online views of selected bird habitats are to appear on the project’s website soon.

An important aspect of the project is to draw attention of the residents – through various educational and promotional events – to the natural richness of the Vistula. Along the river, there will be places for natural education, leisure, as well as a nature trail.

The website wislawarszawska.pl is a source of information about the project activities and a place to share free multimedia and publications.