## Chapter 8 Škocjanski zatok Nature Reserve: a case study of a protected urban wetland area and tourist attraction

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### Abstract

The creation of Škocjanski zatok is closely connected with a municipal decision to reclaim the area for urban development. After many years of degradation, a civil initiative took over with a vision of protecting this devastated man-made wetland and started the process of renaturation. The outstanding ornithofauna, halophyte vegetation, and other habitats were the main arguments that led to the declaration of protected status of Škocjanski zatok in 1998. The restored reserve has become a quickly developing new destination for ecotourism (attracting responsible visitors and helping to extend the region's tourist season). Different groups also use the area for their purposes, such as elementary and secondary school programmes and universities. Special attention is given to specific interest groups related to nature history, ornithology, arts, crafts, and earth sciences. Properly selected forms of nature-based tourism represent a support activity with a positive effect on the maintenance and promotion of this protected area.

*Key words*: protected areas, nature-based tourism, ecotourism, Škocjanski zatok Nature Reserve, Slovenia

### Introduction

Biodiversity is essential for humans because it provides many different goods and ecosystem services. In recent decades, biodiversity and other aspects of natural heritage of Slovenia have been gaining interest and they are among the most important motivations behind tourism visits. In fact, tourism development is growing intertwined with areas that are rich in biodiversity. Ecotourism is, in that regard, the most appropriate type of tourism because it has a relatively minor impact on the environment. Because protected areas represent a basis for public environmental education, and ecotourism in protected nature areas generally takes the form of legitimate activity, they require adequate policy regulation and/or management (Guillemain et al., 2007).

On the short Slovenian coastline, which is approximately 48 km long, coastal wetlands are of particular interest since they are perceived as important bird diversity hotspots (See: Škornik et al., 1995; Sovinc, 2012). They attract many birdwatchers from all around Europe and other continents. In addition, such wetlands attract many other groups of visitors and are a valuable destination for the organisation of education activities such as field excursions, biology and ecology courses, practical experiments, and so on. At the time of writing, investigation of the significance of marine coastal wetlands for tourism development in Slovenia is lacking (e.g. Jurinčič and Popič, 2009; Sovinc, 2012).

On the other hand, several studies have already illustrated win-win scenarios that can emerge between conservation practices and enhancement of ecosystem services (Chan et al., 2006; Reyers et al., 2012). We can easily consider protected areas to be the hotspots of many ecosystem services (Pueyo-Ros, 2018). They include: provisioning services (food, water, or wood); regulation services that affect the weather, floods, diseases, waste, or water quality; supporting services, such as soil formation, and biodiversity maintenance; as well as cultural services that provide aesthetic or spiritual benefits, or satisfaction in tourism and recreation (Figueroa and Aronson, 2006; Nikodinoska et al., 2015).

Nature-tourism, however, is an important expression of the relationship between nature and societies. Therefore, the aim of this chapter is to discuss the role of a specific protected area and its potential for the responsible development of the appropriate forms of nature-based tourism.

### A case study: Škocjanski zatok Nature Reserve (ŠZNR)

On the coast, where the Rižana and Badaševica rivers used to flow into the sea, lies Škocjanski zatok Nature Reserve, the last witness to the insular past of the town of Koper (Fig. 1). Today, ŠZNR is encircled by the coastal town of Koper (neighbouring port), the highway and railway, and other (sub)urban areas. It can therefore be considered as urban wetland, according to the Ramsar classification. As it is located in the vicinity of the town of Koper, it belongs to the Koper littoral region and it is also a part of Koper Bay and the Gulf of Trieste (Učakar, 2009).

The area of Škocjanski zatok has a majority of sunny days (up to 2,350 hours per year) and temperatures in the range of 0 °C to 20 °C (Ogrin, 1995). The precipitation regime is also sub-Mediterranean, with high precipitation in spring and autumn and low precipitation in the winter and summer (Ogrin, 1995). ŠZNR is the largest brackish wetland in southwest Slovenia, covering 122.7 ha (Šalaja et al., 2007) and a very unique eco-



Fig. 1 Protected area of Škocjanski zatok Nature Reserve and its location in Slovenia Source: DOPPS, 2015

system. Its unique ecosystem is a product of its proximity to the sea and Mediterranean climate and sub-Mediterranean vegetation, which allows great diversity of plant and animal species, many of them rare and endangered. It is an important European nesting, wintering, and migration site for many bird species.

The protected area is divided into two main parts (Mozetič et al., 2010):

- 1. a brackish lagoon with nesting islets, mudflats, and saltmarshes which are influenced by tides and overgrown with different types of halophytes; and
- 2. a freshwater marsh with wet and marshy meadows, open water areas of various depth surrounded by reed beds and thermophilic shrubs.

There are no natural lagoons in Slovenia, therefore the man-made lagoon (i.e. of anthropogenic origin) ŠZNR represents a semi-closed euryhaline and eurytherm habitat.

### The creation of Škocjanski zatok

When the town of Koper started to expand in 1950s, Škocjan Bay was steadily modified into a man-made lagoon, named Škocjanski zatok. Due to anthropogenic activities in the 1970s and 1980s (draining and filling the lagoon, and disposing of various types of waste, from construction material and organic waste to other types of municipal waste), the watery areas of Škocjanski zatok shrank from 230 to 80 hectares (DOPPS, 2007) (Fig. 2). The mobilisation of a civil initiative in the 1990s (Kaligarič et al., 1993), inspired by ornithologists and supported by 7,000 local inhabitants who signed a petition, resulted in the establishment of the protected area. In November 1993, Škocjanski zatok was temporarily declared a natural sight and later, on the basis of an emergency decree issued by the Ministry of Culture in March 1998, the Slovenian Parliament adopted the *Škocjanski zatok Nature Reserve Act* (1998), which represented the end of many years of conservation efforts to protect Škocjanski zatok (Šalaja et al., 2007).

The former wetland was later consequently restored, renatured, and slightly expanded into today's Škocjanski zatok Nature Reserve. In 2006 and 2007, the restoration of the lagoon and creation of a freshwater marsh at Bertoška bonifika took place in accordance with the LIFE-Nature project "Restoring and conserving habitats and birds in Škocjanski zatok Nature Reserve" (LIFE00NAT/SLO/7226). Moreover, after many years, life reŠKOCJANSKI ZATOK NATURE RESERVE: A CASE STUDY ...



Fig. 2 The evolution from Škocjan Bay (1950) into Škocjanski zatok Nature Reserve (2014) and the reduction of the area

Source: authors according to Surveying and Mapping Authority of the Republic of Slovenia

turned to Škocjanski zatok, which is now thriving with rich marine and brackish flora and fauna (DOPPS, 2007). The reserve is commonly known as "the green heart of the Town of Koper" (Mozetič et al., 2014).

This wetland is especially important in term of biodiversity as it hosts rich fauna and flora and many endangered and vulnerable animal and plant species (41% of all Slovenian amphibian species, 41% of all reptile species, over 60% of all birds observed in Slovenia, and 36% of all mammals living in Slovenia are present in this area (Mozetič and Šalaja, 2005)). To this end it was designated as a Slovenian nature reserve, an ecologically important area (EPO) open to the public, and a Natura 2000 site of Birds and Habitat Directives. Management of ŠZNR is in the hands of the non-governmental organisation *Društvo za opazovanje in proučevanje ptic Slovenije – BirdLife Slovenia* (DOPPS) (1999–2019). It is the very first case in Slovenia that an NGO was granted a management licence over a protected area (DOPPS, 2015).

ŠZNR is also important as an educational and research laboratory, where many scientists can investigate the characteristics of a northern Adriatic coastal habitat and its properties. For more than three decades, the area has provided an area for the research of many scientists such as ornithologists, botanists, marine biologists, entomologists, nature conservationists, and many others. One of the main concerns has been to ascertain whether the deepening of the central part of the lagoon and its connection with the sea channel was successful. The study of the marine macrofauna of the lagoon after the deepening process showed that the ecological conditions substantially improved. In fact, some studies using the modern approach of biotic indices (Pittaco et al., 2017) confirmed the diversification of marine fauna in the lagoon and incremental increases in the number of feeding guilds. Moreover, this confirms the fact that the abundant macrobenthic fauna is sustaining the wintering bird community. In addition, the planning of artificial muddy islets simultaneously with the deepening of the lagoon proved to be a successful strategy to attract important wetland bird species—which were the main motivation to protect the area.

Due to its vicinity and connection with the harbour Koper (*Luka Koper*) through the marine channel, the area is susceptible to bioinvasion, e.g. colonisation of alien species. Maritime transport is one of the most recognised pathways for the introduction of alien species into a new environment. Alien organisms, which were able to survive the long journey from the area of origin in the ballast tanks of a ship or on its hull, get released into the new area, i.e. the waters off of Koper. Through the marine channel, they are able to enter the lagoon and cause modifications in the native biota.

It is for this reason that the lagoon of Škocjanski zatok has attracted marine biologists and ecologists to investigate potential colonisation, settlement, and impacts on native biota. Up to the time of writing, many alien species have been detected in the protected area and some of them are already well established in their new environment. Among such alien species, it is worth to mention the bioconstruction species—a sedentary colonial polychaete *Ficopomatus enigmaticus*, which creates reefs (up to 1 m<sup>2</sup> each) in the lagoon. Furthermore, some invasive alien species have been recorded in the lagoon, such as the Japanese oyster *Magallana gigas*, the clam *Arcuatula senhousia*, and the alienbubble shell *Haminoea japonica* (Lipej et al., 2012), however, none of them appear to be having a negative impact on the environment.

In recent years, some studies have also been performed on the effect of climate change on this coastal wetland, especially from the standpoint of sea level rise (Ivajnšič and Kaligarič, 2014; Kaligarič and Ivajnšič, 2014). As was mentioned, the area also attracts a significant number of naturalists and birdwatchers. Moreover, ŠZNR is gradually becoming more and more interesting for the local population; not only for recreationists, but also for enthusiastic groups or individuals, who enjoy spending time in nature. In their research, Brečko Grubar and Kovačič (2011) presented results showing the positive attitude of the Koper Municipality population towards Škocjanski zatok. In spite of some generational differences (in contrast to the younger population, a large share older people remember the lagoon as abandoned area of degradation), the results showed that the local population is familiar with the reasons for the protection of Škocjanski zatok, and is supportive of the protection regime. In general, the locals recognised the reserve as a great contribution to the level of quality of the residential environment in the area (Brečko Grubar and Kovačič, 2011).

### Škocjanski zatok Nature Reserve as an attraction for visitors

After the formal protection and implementation of the renaturation, the area of ŠZNR became increasingly interesting for its visitors. Organised tours for groups became a reality and at the same time, an opportunity for the development of environmentally and ecologically-oriented (sustainable) tourism. Activities and suggestions of how to include ŠZNR into the integrated tourism supply have also taken place. Balažič et al. (2011) identified the potentials of the reserve and its integration into tourism products in Slovenian Istria, including the promotion of environmentally friendly mobility (cycling, arrival at a destination, movement through a destination), and the involvement of cultural heritage, local gastronomy, and produce providers. This continues to be a challenge for ŠZNR management.

However, ŠZNR is oriented toward teaching visitors about nature via experiencing nature (DOPPS, 2016). Controlled nature-based or ecotour-

ism in ŠZNR began in 2007, when the restoration was completed and an educational nature trail in the freshwater part of the reserve was prepared and opened for visitors (Šalaja, 2016). Larger groups of visitors are guided by skilled employees, while smaller groups or individuals can visit the open nature trail on their own. According to the *Škocjanski zatok Nature Reserve Act* (1998), entrance to the nature reserve is free of charge, while guided visitation is obligatory for the groups of more than ten and for all school and educational groups (regardless of size). The reserve manager carries out the guided tours upon payment (DOPPS, 2016).

New visitor facilities (visitor centre, observation points, central observation tower, stable for grazing cattle) built in 2015 offer many opportunities for various programmes or events, such as guided tours for lay and professional public, organisation of workshops, lectures, meetings, and conferences. Visitors can visit properly equipped birdwatching observation points (Fig. 3) along the nature trail, together with the 12 m high central



Fig. 3 A group of pupils from primary school during outdoor lessons in Škocjanski zatok Nature Reserve Photo by Bojana Lipej, 2013

observation tower, placed in a strategic location between the lagoon and freshwater wetlands, which offers a great panoramic view of the whole protected area (DOPPS, 2016).

In addition, the visitor centre, which is the main facility of the protected area, is equipped with a modern lecture room and laboratory for practical experiments. At the same time, it provides basic services for visitors who visit the nature reserve (reception with information about the nature reserve, a shop with souvenirs and products from local Slovenian providers, and bar with refreshments). In addition to the basic programmes, visitors can rent a hall at the visitors centre to host their events: mostly conferences and workshops.

The stable with Camargue white horses represents an additional attraction. Riding horses with professional guidance and walking along the nature trail is fun for children. It is necessary to mention that Camargue horses are very important for management of the reserve as they preserve the vegetation balance of the freshwater part of the reserve by grazing. Recently, however, they have become an important part of visitor programmes because visitors like them. Various programmes with horses have been prepared such as "I'm learning and growing with horses", which is based on a holistic approach to the horse world. Children are learning to understand horses as animals and as their friends (DOPPS, 2016).

After the opening of the new visitor facilities in ŠZNR in March 2016, the number of visitors on a yearly basis has ranged from 52,000 to 58,000 (Tab. 1).

Visitors/Years	2016	2017	2018
Guided visitors (groups)	7,399	7,092	7,401
Visitors related to various programmes	4,580	2,176	2,606
All visitors	51,730	58,240	54,000

Tab. 1 Number of visitors of Škocjanski zatok Nature Reserve after the opening of new facilities in 2016

Source: DOPPS, 2019

The number of visitors who took guided tours has ranged from 4,000 to 7,400 per year. Two peaks are evident throughout the year, the higher spring peak (from 1,400 to approx. 1,800 visitors), and the lower autumn peak (from 900 to approx. 1,300 visitors) (Fig. 4). In winter and in the mid-summer the number of visitors is very low, not exceeding 200 visitors per month. There are no large differences between the compared years.



Fig. 4 The number of visitors of Škocjanski zatok Nature Reserve by month in the period of 2016 to 2018

Source: DOPPS, 2019

# Škocjanski zatok Nature Reserve as an educational playground

ŠZNR does not only play an exceptional role as a site for the conservation of rare and endangered species, it also has an important educational role. The diversity of habitats, from freshwater to silt and gravel shores and almost completely marine habitats represent a unique opportunity to carry out various educational activities; mostly outdoor activities which are highly interdisciplinary (integrating science, technical, and social sciences) and incorporate many contemporary didactic approaches that help shape pupils' intellectual abilities, and encourage exploration and scientific thinking. Pupils can learn about nature and its diversity through their own experiences and consequently develop a responsible attitude towards the preservation and protection of the natural environment. All of this encouraged the manager of ŠZNR to prepare the first educational programme in 2006 with the help of an education specialist from the Royal Society for the Protection of Birds (RSPB, UK), and within the framework of the project "AdriaWet 2000 – Adriatic Wetlands for Natura 2000" (OP Slo-Ita 2007–2013). The programme laid the foundations for appropriate educational work with young pupils as well as for raising awareness among the broader public about importance of nature protection. The educational programme was renewed in 2014, based on past educational experiences and exchanging knowledge with educators of similar protected areas in Italy and Slovenia. The main reason for the renovation of the existing educational programme was to spread awareness among young people that nature is vulnerable and sustainable management of natural resources is one of the most important tasks for our future.

The renewed programme created four different educational programmes, oriented toward different age groups:

- "Nature is a wonderful and magical world", where preschool children discover the secrets of nature through their senses (they learn about diversity in nature with specially prepared children's games);
- 2. "An adventure trip through Škocjanski zatok Nature Reserve" is a programme for pupils of 6 to 8 years that offers them a playful and instructive way of learning about diversity in nature as well as encouraging their interest in science;
- 3. "Observing and learning about Škocjanski zatok Nature Reserve" is a programme, prepared for pupils aged 9 to 11 that is based on an active approach. Through experiments, auditory and visual observation, solving puzzles and tasks, young pupils learn about the nature, diversity of habitats, plant and animal species, including how plants and animals adapt to their environments; and
- 4. "Exploring in Škocjanski zatok Nature Reserve" is a programme prepared for pupils of 12 years and over and is based on active research work. Pupils learn that certain processes and phenomena occur in nature and there are logical explanations for them.

Figure 5 shows the structure of visitors on guided tours (for 2018), which is more or less the same since the opening of the visitor centre in March 2016. The majority of visitors (more than 2/3) are pupils from elementary schools, pupils from secondary schools, and university stu-



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Fig. 5 A structure of the visitors of Škocjanski zatok Nature Reserve in 2018 Source: DOPPS, 2019

dents (more than 200 visit the area every year). Other visitors belong to the groups of adults, seniors and young families, groups with special needs, and preschool children.

It is evident from the above figure that the number of all participants in educational activities (from preschool children to university students), has grown steadily from 2006 to 2018 (Fig. 6). There were about 1,000 in 2008, 2,000 in 2013, over 4,000 in 2017, and in 2018 there were nearly 5,000.



Fig. 6 Number of participants of the educational activities in Škocjanski zatok Nature Reserve in the period of 2006 to 2018 The only exception was in 2015 when, due to (re)construction of the infrastructure in the reserve, the number of participants in educational activities was negligible.

### Škocjanski zatok Nature Reserve and its costs and benefits

Although the new facilities of ŠZNR opened in 2016, we have already detected some strengths and weaknesses. Among strengths, we should point out the attractions for visitors, with special regard to better quality of life (Fig. 7).



Fig. 7 Lessons for young bird-watchers Photo by Bojana Lipej, 2014 Despite its status as a protected area, ŠZNR also acts as a city park for the residents of Koper and an educational playground for young people. Among weaknesses, we should mention the inability to control the number of visitors, which often exceeds optimal capacity. In addition, the lack of skilled personnel is also a disadvantage (Tab. 2).

Tab. 2 Identified strengths and weaknesses of the current state of Škocjanski zatok Nature Reserve after the construction of new facilities

Strengths	Weaknesses
preservation of a protected area in the middle of an urban area contributes to better quality of life for the local people	inability to control the number of visitors and no direct contact with the majority of them
opportunity to explore, experience and learn in nature (quiet tourism)	too many visitors in relation to optimal capacity
the reserve is becoming a new destination of quickly developing nature-based tourism (at- tracting responsible visitors and helping to ex- tend the region's tourist season)	pollution (noise, waste, vandalism, air pollu- tion)
accessible for people with special needs (disabled, blind, deaf)	deficiency of the marketing and promotion strategy
situated on the Slovenian coast, it's also an in- valuable asset in the promotion of other sights in the area	visitor programmes are weather dependent
flexibility in preparation of various pro- grammes and organisation of visits	shortage of personnel for carrying out educa- tional activities and working with visitors
	possible conflicts of interest with the local com- munity regarding development plans
	still not enough contact with local deci- sion-makers and businesses

Source: DOPPS, 2015

The income derived from visitors represents approximately 10% of the total ŠZNR management budget. Services (guided tours, workshops, horse riding, hall rentals, lectures, etc.) represent the largest share (almost 50%) of the total income from visitors. The income from the bar has increased, while the amount of income from purchases in the gift shop has decreased (DOPPS, 2019) (Fig. 8).

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Fig. 8 Income derived from visitors of Škocjanski zatok Nature Reserve in the period of 2016 to 2018 Souce: DOPPS, 2019

### Conclusion

Škocjanski zatok Nature Reserve, once a degraded area, has improved much in terms of biodiversity and now represents a model for successful restoration, due to the successful civil initiative for protected status. Additionally, ŠZNR has regained much of its past biodiversity or even improved from the aspect of certain Natura 2000 habitat types (Ivajnšič and Kaligarič, 2014). Due to its location and infrastructure, ŠZNR also represents an ideal area for the development of environmentally-oriented tourism (Fig. 9). Tourists and visitors in protected areas are mostly oriented toward observing and experiencing nature, and they usually don't make demands on the environment or harm the local flora and fauna (Lipej and Kerma, 2017).

The number of visitors after 2016 shows that Škocjanski zatok has already become a tourist attraction for all kinds of visitors, not just researchers and locals. In order to preserve the exceptional nature and biodiversity of the reserve appropriate promotion and marketing strategy as well as visitor programmes that will ensure sustainability of the area and successful development of different forms of sustainable and responsible tourism should be arranged. The nature reserve and its countryside offer great possibilities for development of nature-based tourism in general. Outdoor acCHALLENGES OF TOURISM DEVELOPMENT IN PROTECTED AREAS OF CROATIA AND SLOVENIA



Fig. 9 Panoramic view over the freshwater part of Škocjanski zatok Nature Reserve Photo by Bojana Lipej, 2017

tivities, observation of nature, education in a natural local environment can be linked to learning about quality local gastronomy and staying in an authentic local environment, which is a win-win situation for the locals as well as the visitors (Jurinčič et al. 2011, 150).

Tourism activities that are small-scale, implemented quietly, and do not cause pollution, disturb nature, or require additional actions, are compatible with the basic goals of nature conservation. These are the key differences that separate tourism activities inside and outside protected areas (Sovinc, 2017). Since the beginning of the reserve's restoration, a total of  $\epsilon_{3.1}$  million has been spent for that purpose. This is another one of many examples of how it is better to conserve (or maintain) rather than restore. One of the main challenges for the future of Škocjanski zatok Nature Reserve is to obtain equilibrium between nature conservation and sustainable tourism.

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