DEBRECENI EGYETEM

PRACTICAL EXERCISES FOR THE COURSE OF MANAGEMENT OF WETLANDS

- FROM NATURE CONSERVATION ASPECT

László Kövér, Ph.D.

senior lecturer

University of Debrecen

Faculty of Agricultural and Food Sciences, and Environmental Management

A Debreceni Egyetem fejlesztése a felsőfokú oktatás minőségének és hozzáférhetőségének együttes javítása érdekében
EFOP-3.4.3-16-2016-00021

SZÉCHENYI 2020

MAGYARORSZÁG KORMÁNYA

Európai Unió
Európai Szociális Alap

BEFEKTETÉS A JÖVŐBE

Content

Exercise 1 ..... *4*
Exercise 2 ..... *5*
Exercise 3 ..... *6*
Exercise 4 ..... *7*
Exercise 5 ..... *8*
Exercise 6 ..... *9*
Exercise 7 ..... *10*
Exercise 8 ..... *11*
Exercise 9 ..... *12*
Exercise 10 ..... *13*
Exercise 11 ..... *16*
Exercise 12 ..... *18*
Exercise 13 ..... *19*
Exercise 14 ..... *20*
Exercise 15 ..... *21*
Exercise 16 ..... *22*
Exercise 17 ..... *23*
Exercise 18 ..... *24*

Aims

The general aim of the course is to transfer the basic knowledge necessary for management of wetlands directly or indirectly affected by the water management practice of agriculture, which helps the agricultural water management engineer's work in accordance with the regulation of the nature conservation authority and the conservation biological principles.

Developed competencies

- Know the hydrological and biological aspects of wetlands conservation.
- Familiar with the nature conservation aspects and ongoing processes of wetland management and utilization, know and recognizes the existing relationships between them and farming practices.
- Able to use the ecological approach in wetland management and use these during farming.
- Committed to environmental and nature friendly, sustainable use of natural resources.
- Recognize the professional values, susceptible to the use of effective methods and tools.
- Open and receptive to knowledge and practical application of modern and innovative procedures.
- Partner in professional and interdisciplinary collaboration.

Contents

1. The bases of the conservation biology.
2. Natural conservation assessment, treatment.
3. The status and situation of wetlands in Hungarian and in international approaches.
4. The Hungarian and international law background of conservation of wetlands.
5. The conceptual bases of habitat management, his legal and economic background.
6. The types of river controls, their history and consequences of the interventions.
7. Revitalization of streaming waters.
8. Types of still waters, their protection and management.
9. Conservation and management of fountains, moorlands, marshes and small astatic and eustatic waters.
10. Conservation and management of reeds.
11. Conservational approaches of fish management in wild waters and fishponds.
12. Situation, conservation and management of soda pans.
13. Hunting and other recreational management of wetlands.

Exercise 1

Improve your knowledge on biodiversity and nature conservation. Why these are important nowadays?

Purpose of the exercise: To gain knowledge about biodiversity and its levels. Understand the international system of nature conservation; the ways of protection.

The International Union for Conservation of Nature (IUCN) is an international organization working in the field of nature conservation and sustainable use of natural resources. It was established in 1948. It was previously called the International Union for the Protection of Nature (1948–1956) and the World Conservation Union (1990–2008). IUCN is involved in data gathering and analysis, research, field projects, advocacy, and education. IUCN has a membership of over 1400 governmental and non-governmental organizations. Some 16,000 scientists and experts participate in the work of IUCN commissions on a voluntary basis. It employs approximately 1000 full-time staff in more than 50 countries. The IUCN is the most important organization concerning nature conservation on the world. IUCN has observer and consultative status at the United Nations, and plays a role in the implementation of several international conventions on nature conservation and biodiversity.

Guidance:

- ➔ Open the website https://www.iucn.org/.
- ➔ Browse on the webpage, watch some relevant videos.
- ➔ Please answer for the following questions:
  - Why IUCN was established?
  - What are the main goals of IUCN?
  - What are its actions?
  - What is the 'Red List' and what is the purpose of it? (https://www.iucnredlist.org/)
  - Who is targeted in the IUCN's species of day program?
  - What is the IUCN's contribution for the policy makers?
  - What solutions are provided by them to solve global challenges?

➔ Let's collect information about your country related to the activity of IUCN. (see regions label and/or download Annual Report 2018 and/or just surfing on google write the name of your country with IUCN)

➔ Let's discussed the info with your classmate, compare the countries with each other.

Exercise 2

Now, let's focus on only the freshwater and its problems. Get information about the quantity and quality of it. What we use it for? Why we have to keep attention for it?

Purpose of the exercise: To gain knowledge about freshwater, it's management and status nowadays. Understand the importance of sustainable freshwater management.

Guidance:

➔ Browse on webpages, read articles, watch relevant videos.

For instance: https://www.iucn.org/theme/water
http://www.fao.org/3/y7581e/y7581e06.pdf
https://www.worldwildlife.org/initiatives/fresh-water
https://www.worldwildlife.org/media?initiative_id=fresh-water
http://www.environmentguide.org.nz/issues/freshwater/best-practice-freshwater-management/
https://www.hydropower.org/topics/operations/water-footprint

➔ Please answer for the following questions:

- How much freshwater the Earth's surface contains?
- In what form and how much available for human?
- Which uses areas known of freshwater?
- What are the main threats of it? What kind of challenge should be solved in the near future?
- How, which way can we protect freshwater?
- What does it mean 'water footprint', what is it for?
- What is the role of forests in case of freshwater management?
- What are the effects of climate change on freshwater resources?

- What is/will cause the melting of glaciers, icecaps, poles?
- How can we manage the freshwater wisely, on sustainable way?

➔ With the questions mentioned above and with other relevant ones we start a roundtable discussion during the class.

Exercise 3

Wetlands cover at least six percent of the Earth and have become a focal issue for conservation due to the ecosystem services they provide. More than three billion people, around half the world's population, obtain their basic water needs from inland freshwater wetlands. But wetlands are not just relevant for human but for nature too.

Purpose of the exercise: To gain knowledge regarding to wetland, wetland types. In this exercise we deal with different types of wetlands and their importance for human and nature.

Guidance:

➔ Surfing on the net and find relevant pages for the topic.
For instance: https://en.wikipedia.org/wiki/Wetland

➔ Watch this video: https://www.youtube.com/watch?v=YegpBU6Mbek

➔ This series really great regarding the restoration of wetlands:
https://www.youtube.com/watch?v=dUbaAPTaqic

➔ Please answer for the following questions:

- What is the definition of wetland, categorize the different wetlands types!
- Describe shortly the marine and coastal zone and their subtypes!
- Describe shortly inland wetlands zone and their subtypes!
- Describe the human-made wetlands and their subtypes!
- Which way happen the utilization of wetlands?
- What are the main products of wetlands for human?
- What are the natural importance of wetlands?
- Mention some problems regarding to exploiting wetlands!
- Introduce a concrete conservation, restoration project focusing on a wetland!

Exercise 4

In this exercise we are studying about the conservation of wetlands. First of all we have to understand that different wetlands play important role to people as places of ecosystem services. However we are responsible to manage these sites sustainable way. Moreover in some cases we have to take more attention and effort for the conservation.

Purpose of the exercise: To gain detailed knowledge about the Ramsar Convention, why it was created; what is the purpose and regulations of it? What kind of area could be a Ramsar site? Data collection about the current situation of a given country regarding to the convention.

The Convention on Wetlands (Ramsar, Iran, 1971) is an intergovernmental treaty whose mission is "the conservation and wise use of all wetlands through local, regional and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world". Nowadays we can speak about around 170 nations who have joined the Convention as Contracting Parties, and more than 2.220 wetlands around the world, covering over 214 million hectares, have been designated for inclusion in the Ramsar List of Wetlands of International Importance.
The 2nd of February each year is World Wetlands Day, marking the date of the adoption of the Convention on Wetlands on 2 February 1971. Established to raise awareness about the value of wetlands for humanity and the planet, WWD was celebrated for the first time in 1997 and has grown remarkably since then. In 2015 World Wetlands Day was celebrated in 59 countries.

Guidance:

- ➔ Check the following links, but let's surf on the web and looking for relevant pages and documents.
  https://www.ramsar.org/
  https://www.ramsar.org/sites/default/files/documents/library/handbook1_5ed_introductiontoconvention_e.pdf
  https://enb.iisd.org/process/ramsar_intro.htm
- ➔ Collect information and data about the Ramsar Convention and prepare a complex power point presentation about it. At the end of your presentation introduce the current situation

at your country regarding the convention, mention the sites and the natural values of them. Let we hear your personal opinion about the implementation of the convention.

Exercise 5

Restoration ecology is the scientific study supporting the practice of ecological restoration, which is the practice of renewing and restoring degraded, damaged, destroyed ecosystems and habitats in the environment by active human intervention and action. In this exercise we study a little about restoration ecology and its application in wetland conservation.

Purpose of the exercise: To be familiar with the concept of restoration ecology, its types and its application in wetland conservation.

Guidance:

- ➔ Get information about restoration ecology, e.g.:
  https://en.wikipedia.org/wiki/Restoration_ecology
  https://www.youtube.com/watch?v=Kaeyr5-O2eU
- ➔ Let's focus on wetland restoration:
  https://www.epa.gov/wetlands/basic-information-about-wetland-restoration-and-protection
  https://msnucleus.org/watersheds/what_is_restoration.htm
  Several videos about this topic on the net:
  https://www.youtube.com/watch?v=YpjjZQjJ3HI
  https://www.youtube.com/watch?v=75Rm0a5lPdg
- ➔ Please answer for the following questions:
  - What does mean restoration ecology?
  - What types has got the restoration ecology, please describe them!
  - What is wetland restoration, why we do it?
  - What are the main action points of a wetland restoration?
  - Why and what should we monitoring after a project?
- ➔ Prepare a power point presentation about a concrete case study of wetland restoration!

Exercise 6

In this exercise we are studying about what bioindicator means? We will mention bioindicator species and get information about biological monitoring (biomonitoring).

Purpose of the exercise: To be familiar with the concept of restoration ecology, its types and its application in wetland conservation.

Guidance:

- ➔ Let's get informed about the bioindicator, biomonitoring. Browse on the net, e.g.: https://en.wikipedia.org/wiki/Bioindicator

A bioindicator is any species (an indicator species) or group of species whose function, population, or status can reveal the qualitative status of the environment. For example, copepods and other small water crustaceans that are present in many water bodies can be monitored for changes (biochemical, physiological, or behavioural) that may indicate a problem within their ecosystem. Bioindicators can tell us about the cumulative effects of different pollutants in the ecosystem and about how long a problem may have been present, which physical and chemical testing cannot. A biological monitor or biomonitor is an organism that provides quantitative information on the quality of the environment around it. Therefore, a good biomonitor will indicate the presence of the pollutant and also attempt to provide additional information about the amount and intensity of the exposure. The wetlands are the main places of the biomonitoring because these organisms, creatures are quite sensitive for pollutions.

Within several species the dragonflies are a typical example for bioindicator. They are predators, both in their aquatic larval stage, when they are known as nymphs or naiads, and as adults. Several years of their lives are spent as nymphs living in fresh water; the adults may be on the wing for just a few days or weeks. They are fast, agile fliers, sometimes migrating across oceans, and often live near water. They have a uniquely complex mode of reproduction involving indirect insemination, delayed fertilization, and sperm competition. During mating, the male grasps the female at the back of the head, and the female curls her abdomen under her body to pick up sperm from the male's secondary genitalia at the front of his abdomen, forming the "heart" or "wheel"

posture. Loss of wetland habitat threatens dragonfly populations around the world. Dragonflies are represented in human culture on artefacts such as pottery, rock paintings and jewellery.

➔ Find other examples for bioindicators and introduce them and their connection to waterbody!

➔ Please answer for the following questions:
- What is the definition of bioindicator?
- What is and who does the biomonitoring?
- Which species are important in case of biomonitoring?
- What is the link between biomonitoring and wetland conservation?

Exercise 7

Let's watch a film about the Hungarian wetlands, titled: Wild Hungary – A Water Wonderland. There are three main scenes, the famous saline plains of Hortobágy, the beautiful blue lake Balaton, and the flushing green riverine forests of Gemenc. Also there are three main characters, animal "actors" if we may call them like this. An otter, an old couple of white-tailed eagle, and spawning catfish. Besides them we can peek into the lives of turtles, magpie, asps, insects, and game. We dive with them, we fly among them, we gaze with them at the time-lapsing landscapes of flooding rivers, falling snow, and icing waters.

Purpose of the exercise: To get experience about some Hungarian nature values especially for those that link to wetlands.

Guidance:

➔ Open the following link https://www.youtube.com/watch?v=mHHjosWMCx4 (use the English subtitle)

➔ Please answer for the following questions:
- What are the most important wetlands in Hungary and why?
- What animal species can we see in the film?
- What kind of authentic professionals appear in the film, what is the significance of them?

- Why difficult and complex the protection of White-tailed Eagle?
- Why so important the wetlands for this eagle species?
- What can we do to protect these animals?
- What kind of changing happens with the river Danube during a year?
- What does this change mean for nature?

Exercise 8

In this exercise you will learn about another example for bioindicator, about Mayflies. You get information about the mystery lifecycle of them that is inseparable from water.

Purpose of the exercise: Get informed about the Mayflies and their lifecycle, especially on the blooming (mating dance). Understand the link between water quality and their density.

Guidance:

➔ Get informed about Mayflies, browse on the net, find articles concerning to this taxon.
e.g.: https://en.wikipedia.org/wiki/Mayfly
https://www.youtube.com/watch?v=4UjlT7fqJ1s
https://www.youtube.com/watch?v=PBHBfck67D8
https://www.youtube.com/watch?v=0fKPTm-L7xs

Mayflies (also known as Canadian soldiers in the United States, and as shadflies or fishflies in Canada; also up-winged flies in the United Kingdom) are aquatic insects belonging to the order Ephemeroptera. This order is part of an ancient group of insects termed the Palaeoptera, which also contains dragonflies and damselflies. Over 3,000 species of mayfly are known worldwide, grouped into over 400 genera in 42 families. Mayflies exhibit a number of ancestral traits that were probably present in the first flying insects, such as long tails and wings that do not fold flat over the abdomen. Their immature stages are aquatic fresh water forms (called "naiads" or "nymphs"), whose presence indicates a clean, unpolluted environment. They are unique among insect orders in having a fully winged terrestrial adult stage, the subimago, which moults into a sexually mature adult, the imago. Mayflies "hatch" (emerge as adults) from spring to autumn, not necessarily in May, in enormous numbers. Some hatches attract tourists. Fly fishermen make use

of mayfly hatches by choosing artificial fishing flies that resemble the species in question. The brief lives of mayfly adults have been noted by naturalists and encyclopaedists since Aristotle and Pliny the Elder in classical times.

➔ Let's watch the following videos:
https://www.youtube.com/watch?v=1r1wxLKhE2o
The mating dance of Mayflies is a wonderful natural phenomena at the river Tisza, in Hungary, in June. Thousands and thousands mayflies flying and mating at the same time. They do not really live for a long time, usually the males die after the mating while the females after laying the eggs. We speak about blooming of Mayflies when we see a tons of dead Mayflies on the river.

➔ Here is an interesting conservation project regarding a Mayfly species in Hungary.
https://www.youtube.com/watch?v=Kvc9WbzsjD4&t=600s

➔ Please answer for the following questions:
- Please describe the lifecycle of Mayflies!
- Introduce in details the mating procedure of this taxon.
- Why the waterbody is so important for these creatures?
- What are the threats for this taxon?
- What can we do regarding to their protection?

Exercise 9

Frogs are very particular about where they breed and often migrate back to their ancestral breeding ponds each year. They follow the same route, regardless of what gets in their way, which sometimes leads to them crossing roads. At that term many individuals could die due to the traffic or any other natural predators, especially in case of a closed pond. National parks, conservation NGOs, or just an activist organize programs, do actions to save frogs.

Purpose of the exercise: In this exercise we get familiar with conservation activities of frogs.
Guidance:

➔ First of all, let's read about the threats for frogs, eg.: pollution, loss of habitat, climate change, invasive species, road mortality, pet trade, infection disease, etc.

Surfing on sites, e.g.: https://www.savethefrogs.com/.

Get information which way can we help the frogs.

E.g.: http://arkansasfrogsandtoads.org/frog-help/

https://www.goodnewsnetwork.org/how-you-can-help-protect-endangered-frogs/

https://www.tiredearth.com/articles/how-protect-frogs-extinction

➔ Watch this video: https://www.youtube.com/watch?v=6M8hbg4IUBQ

➔ Here you can watch a video about a frog protection project with fence in Hungary: https://www.youtube.com/watch?v=TiHu55zs7IY

➔ Please answer for the following questions:

- What can you say about frogs, why they are important for the ecosystems?
- What are the threats for them?
- How, which way can we protect them?

Exercise 10

In the following you will learn about some animal species which are relevant at wetlands especially in case of different kind of human-wildlife conflicts. These species are the Eurasian otter (*Lutra lutra*), the Eurasian beaver (*Castor fiber*), Muskrat (*Ondatra zibethicus*) and the Great cormorant (*Phalacrocorax carbo*).

Purpose of the exercise: To get informed about some species relevant at wetlands, and be familiar about the problems occur to human.

Guidance:

➔ Browse on the net and be familiar with the mention species.

- The Eurasian otter, also known as the European otter, Eurasian river otter is a semiaquatic mammal native to Eurasia. The most widely distributed member of the otter subfamily (Lutrinae) of the weasel family (Mustelidae), it is found in the waterways and coasts of Europe, many parts of Asia, and parts of northern Africa. The Eurasian otter has a diet mainly of fish, and is strongly territorial. It is endangered in parts of its range, but recovering in others. The Eurasian otter's diet mainly consists of

fish. Fish is their most preferred choice of food in Mediterranean and temperate freshwater habitats. During the winter and in colder environments, though, fish consumption is significantly lower, and the otters use other sources of food, including amphibians, crustaceans, insects, sometimes small mammals, including. Back to the fish consumption, in Hungary and many other counties in Europe the problem is when otters appear at fish ponds and start to catch fish. It could be a significant problem to the fisherman, loss of money. As the otter is a protected species the defence is really difficult against them. Use of dogs, electric fence, any other alarm devices could be mean solution.

- The European beaver is a species of beaver which was once widespread in Eurasia. It was hunted to near-extinction for both its fur and castoreum; and by 1900, only 1200 beavers survived in eight relict populations in Europe and Asia. Reintroduced through much of its former range, it now occurs from Great Britain to China and Mongolia, although it is absent from Portugal, the southern Balkans, and the Middle East. Beaver are a keystone species helping support the ecosystem of which they are a part. They create wetlands, which increase biodiversity and provide habitat for many rare species such as water voles, otters, and water shrews. They coppice waterside trees and shrubs so that they regrow as dense shrubs which provide cover for birds and other animals. Beaver dams trap sediment and improve water quality, and recharge groundwater tables and increase cover and forage for trout and salmon. Currently the largest numbers can be found across Europe, where reintroductions have been successful in 25 countries (including Hungary) and conservation efforts are ongoing. As the beavers cut out the trees (because for food, for building or their teeth) the foresters do not really like them. In some cases the beavers could cause agricultural damages (especially in case of a maize filed) and problems for the water managers. Due to these in some countries beavers are huntable with permission.
- The Muskrat is the only species in genus *Ondatra* and tribe Ondatrini, is a medium-sized semiaquatic rodent native to North America and an introduced species in parts of Europe, Asia, and South America because this fur that is very warm. The muskrat is found in wetlands over a wide range of climates and habitats. It has important effects on the ecology of wetlands and is a resource of food and fur for humans. The muskrat

is the largest species in the subfamily Arvicolinae, which includes 142 other species of rodents, mostly voles and lemmings. Muskrats are referred to as "rats" in a general sense because they are medium-sized rodents with an adaptable lifestyle and an omnivorous diet. In some European countries, such as Belgium, France, and the Netherlands, the muskrat is considered an invasive pest, as its burrowing damages the dikes and levees on which these low-lying countries depend for protection from flooding. In those countries, it is trapped, poisoned, and hunted to attempt to keep the population down. Muskrats also eat corn and other farm and garden crops growing near water bodies. Due to this species is a non-native one in Hungary and could cause damages at dikes all year round huntable without any limitation.

- The Great cormorant known as the great black cormorant across the Northern Hemisphere, the black cormorant in Australia, the large cormorant in India and the black shag further south in New Zealand, is a widespread member of the cormorant family of seabirds. The great cormorant feeds on fish caught through diving. The average weight of fish taken by great cormorants increased with decreasing air and water temperature, being 30 g during summer, 109 g during a warm winter and 157 g during the cold winter. Cormorants consume all fish of appropriate size that they are able to catch in summer and noticeably select for larger, mostly torpedo-shaped fish in winter. Thus, the winter elevation of foraging efficiency described for cormorants by various researchers is due to capturing larger fish not due to capturing more fish. In some freshwater systems, the losses of fish due to overwintering great cormorants were estimated to be up to 80 kg per ha each year. This is a really serious problem and the just push the situation that cormorant is a protected species throughout Europe due to the Bird Directive. Alarm systems and physical defence modes are possible against them.

➔ Mention some other species that are relevant in human-wildlife conflict, please introduce them and concrete problem(s).

Exercise 11

In this exercise we focus on a bird species that's activity (autumn migration) one of the most wonderful natural phenomena in Hungary: the Eurasian crane. In this phenomena has an essential role of an artificial types of wetlands, of the fishponds.

Purpose of the exercise: Understand the link between a protected bird species and wetlands. Get informed about the migration of cranes. See that in certain cases the priority of conservation on wetlands is needed to protect birds.

Migration of cranes in Europe:
Cranes that breed in Europe use different migration routes on their way to the wintering grounds depending on the location of their breeding area. In Scandinavia (Norway, Sweden, parts of Finland), central Europe (Germany, Poland, Czech Republic) as well as the Baltic (Latvia, Lithuania, western Estonia) breeding cranes use the western European flyway, which leads to wintering areas in France and Spain after stopovers in Germany. In the last years an increasing trend of shorter migrations routes and a shift to the north of the overwintering grounds can be determined. The majority of the Finnish cranes as well as many breeding cranes of middle- and eastern Estonia use the Baltic-Hungarian flyway. This route is directed southwards to begin with and leads to stopover sites in eastern Hungary and northern Serbia. In favourable weather conditions a noteworthy part of the cranes overwinters in this region while numerous birds migrate even further to northern Africa via Italy. Many birds overwinter in Tunisia, even though the North African winter area reaches form Libya to Morocco. An increasing part of the birds that rest in Hungary migrates to the west via northern Italy to wintering grounds in southern France (Camargue). At the same time more and more colour-marked cranes from Finland and Estonia have been identified in Germany which shows a present large-scale displacement of birds of the Baltic - Hungarian flyway, when seen in connection with a significant rise of the autumn resting population in Germany. In contrast cranes that breed near the Russian border in the southeast of Finland, in eastern Estonia and in western Russia use the eastern European flyway across the Black Sea and Turkey to Israel. While a small part overwinters here, most cranes continue their route to wintering grounds in eastern Africa (especially Ethiopia). In the far east of Europe the

Volga - Iranian - flyway exists where birds of the Caspian region travel to wintering grounds in Iran. At least for the birds of the West European flyway a decrease in migratory behaviour can be described the further west the cranes breed in central Europe. So a significant part of the birds that breed in North-West Germany remains near the breeding areas in the winter. This behaviour can be observed to an increasing extent in cranes from northeast Germany, where individual couples either overwinter near the breeding areas or briefly escape to the west in late autumn and already return to the breeding grounds in winter. In England breeding cranes don´t show any migratory behaviour and overwinter in the surroundings of their breeding grounds. The migration route to the wintering grounds in autumn and on the return trip to the breeding grounds in spring hardly differ from each other since the same stopover sites are often used. The spring migration is often faster in order for the cranes to return to their breeding areas more quickly.

Guidance:

- ➔ Let's visit the Visitor Centre of Hortobágy National Park.
  https://www.hnp.hu/en/szervezeti-egyseg/tourism/oldal/the-world-of-cranes
- ➔ There walk around the exhibition and study the following subjects:
  - recent crane species on Earth, distribution of them
  - ranges and migration routes of cranes of the world
  - population trends and cultural aspects of cranes
  - the importance of Hungary during the migration of cranes
- ➔ Do not forget to watch the brand new short film about the cranes at Hortobágy.
- ➔ After the visitor centre let's heading to the Hortobágy Great Fishponds.
  https://www.hnp.hu/en/szervezeti-egyseg/tourism/oldal/hortobagy-great-fishponds
  The preferred term is during the fall, the best time is mid of October.
- ➔ Then you can use the narrow gauge railway to reach the biggest unit of the fishpond system, called Kondás.
  https://www.hnp.hu/en/szervezeti-egyseg/tourism/oldal/hortobagy-great-fishponds-and-narrow-gauge-railway
- ➔ At the Kondás station there are some observer cottages from where you can wait for the sunset.

- ➔ During the sunset you can enjoy the migration of thousands of cranes; when they come back from their feeding places (e.g.: maize fields) to spend their night on the ponds.
- ➔ Make a report about your experiences!

Exercise 12

Alkaline, sodic lakes are natural shallow water bodies formed in the deeper locations of the alkali lowlands. These wetlands – with high concentrations of sodium carbonate and their catchment areas in Hungary's Carpathian Basin support lowland Pannonic loess steppic grasslands. They have most spectacular coverage after winter precipitation and spring snowmelts, but can also become completely dry in the end of summer. This type of wetland called as the paradise of birds.

Purpose of the exercise: To gain knowledge about alkaline lakes. Understand how they were created, what is the conservation importance of them. Study how, which way can we protect these areas.

Guidance:

- ➔ First of all let's familiar with the definition of sodic lake. Check sites and read about it.
- ➔ For instance: https://en.wikipedia.org/wiki/Soda_lake
  http://www.termeszetvedelem.hu/_user/downloads/nok/Alkaline%20lakes%28angol%29.pdf
  https://www.youtube.com/watch?v=BNia2RZcyg0
  http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=3366&docType=pdf
  http://www.feher-to.hu/index.php/en/latnivalok/sodic-lakes-of-pusztaszer
  There are sodic lakes all around the world from to the American continent through Africa until Australia. Here is book about the African ones:
  https://books.google.hu/books?id=jP3cDAAAQBAJ&pg=PA137&lpg=PA137&dq=life+project+alkali+lakes&source=bl&ots=3ulmpDbu3Y&sig=ACfU3U0DYzSV8t7VD2XxQXKyk_MkTYQbkQ&hl=hu&sa=X&ved=2ahUKEwjn24Tt5e3iAhUFxYsKHXDsBRQQ6AEwCnoECAgQAQ#v=onepage&q=life%20project%20alkali%20lakes&f=false
- ➔ Please answer for the following questions:

- What is the definition of alkali, sodic lake; how it was created?
- How can you describe this kind of wetlands, water bodies?
- Why these areas are valuable regarding to conservation?
- Please describe the flora and fauna of alkali, sodic lakes!
- What are the main threats of this areas?
- What can we do for its protection?

Exercise 13

Epheremal wetlands play important role for the biodiversity. But for which species? Which are the most important threat factors of this kind of habitat?

Purpose of the exercise: Study about the epheremal wetlands, understand the importance of these type of habitats. See some examples about species are used these, protection opportunities. Finally we got some information how can we carry out a birdwatching at wetlands.

Guidance:

➔ Open the website https://media.uaf.edu/media/t/0_149i8qwt and watch the video.
Read about it, for instance:
https://www.srs.fs.usda.gov/compass/2015/09/10/ephemeral-wetlands-and-climate-change-implications-for-frogs-and-toads/
http://parcplace.org/wp-content/uploads/2017/08/parcmwbrochure.pdf
https://eprints.usq.edu.au/4636/ etc.

➔ Please answer for the following questions:

- How could you describe an epheremal wetland?
- What is the main role of these areas regarding to biodiversity?
- Mention some taxon or species (flora and fauna) that use these kind of wetlands!
- Which are the most important threat factors of epheremal wetlands?
- Why useful the regular monitoring on these areas?
- Why is difficult to protect this kind of habitats?
- How do you carry out a birdwatching? How do you identify species?

Exercise 14

A bog is a wetland that accumulates peat, a deposit of dead plant material often mosses, and in a majority of cases, sphagnum moss. It is one of the four main types of wetlands. Bogs have distinctive assemblages of animal, fungal and plant species, and are of high importance for biodiversity, particularly in landscapes that are otherwise settled and farmed.

Purpose of the exercise: To gain knowledge about bogs. Understand how they were created, what is the conservation importance of them. Study how, which way can we protect these areas.

Guidance:

- ➔ First of all let's familiar with the definition of bog. Check sites and read about it.
- ➔ For instance: https://en.wikipedia.org/wiki/Bog
  On the youtube you can find some really great videos about the bogs, peats and their importance:
  https://www.youtube.com/watch?v=ogOhGlcJSuQ
  https://www.youtube.com/watch?v=kYqygTcO-YQ
  https://www.youtube.com/watch?v=QnMMLr4Z3fo
- ➔ There are conservation study for bogs, here is an example from Ireland:
  https://www.chg.gov.ie/app/uploads/2015/09/sea-environmental-report-of-dnrbsacmp.pdf
- ➔ Please answer for the following questions:
  - What is the definition of bog and peat; how these are/were created?
  - How can you describe this kind of wetlands, water bodies?
  - Why these areas are valuable regarding to conservation?
  - Please describe the flora and fauna of bogs!
  - What are the main threats of this areas?
  - What can we do for its protection?

Exercise 15

A marsh is a wetland that is dominated by herbaceous rather than woody plant species. Marshes can often be found at the edges of lakes and streams, where they form a transition between the aquatic and terrestrial ecosystems. They are often dominated by grasses, rushes or reeds.

Purpose of the exercise: To gain knowledge about marsh, marshland. Understand how they were created, what is the conservation importance of them. Study how, which way can we protect these areas and do sustainable reed-management.

Guidance:

- ➔ First of all let's familiar with the definition of marsh, marshland. Check sites and read about it. For instance: https://en.wikipedia.org/wiki/Marsh
  Videos: https://www.youtube.com/watch?v=4xoAQCq0vvI
  https://www.youtube.com/watch?v=_1F4MAn142w
- ➔ The reed as a product is a big issue in several countries.
  https://www.hiss-reet.de/thatched-roof/knowledge-about-thatch/reed-harvest/?L=1
  https://www.youtube.com/watch?v=hzRyVcQNZjU
  At the Netherlands there is project to use up this material in the bioenergy sector:
  http://edepot.wur.nl/282354
- ➔ Reed management can be key issue in case of a marshland, read this article to get an overview about the European situation.
  https://www.sciencedirect.com/science/article/abs/pii/S0006320707004429
- ➔ Please answer for the following questions:
  - What is the definition of marsh, marshland; how these are/were created?
  - How can you describe this kind of wetlands, water bodies?
  - Why these areas are valuable regarding to conservation?
  - Please describe the flora and fauna of marshland!
  - What are the main threats of this areas?
  - What can we do for its protection?
  - How does happen a reed harvesting?
  - What is the reed used for?

Exercise 16

A fishpond, is a controlled pond, artificial lake, or reservoir that is stocked with fish and is used in aquaculture for fish farming, or is used for recreational fishing or for ornamental purposes. In this exercise we get information about these artificial wetlands, these benefits and conservation importance.

Purpose of the exercise: To gain knowledge about fishponds. Understand where and why they were created, what is the conservation importance of them.

Guidance:

➔ Let's read about fishponds, their history, purpose, especially on aquaculture.
- https://en.wikipedia.org/wiki/Fish_pond
- Here is a book (Fishing for a Living: The Ecology and Economics of Fishponds in Central Europe) from you can get a wide view about the European fishponds from ecology and economics aspects as well. https://books.google.hu/books?id=AO2yxvy2Gy0C&pg=PA143&lpg=PA143&dq=fishpond+system&source=#v=onepage&q=fishpond%20system&f=false

➔ There are fishponds for ecotourism purpose, for instance at Hortobágy National Park.
fish harvesting: http://www.hnp.hu/en/szervezeti-egyseg/tourism/oldal/fish-pond-harvest
birdwatching: https://www.hnp.hu/en/szervezeti-egyseg/tourism/oldal/hortobagy-great-fishponds-and-narrow-gauge-railway

➔ Please answer for the following questions:
- What is the definition of fishpond? Why these are created?
- What were/are the main goals of these areas?
- What is the conservation relevance of these habitats?
- Let's mention some flora and fauna species of a given fishponds?
- How these could manage in aspect of conservation?
- Introduce a fishpond chosen by you!

Exercise 17

Different manmade barriers have built on waters worldwide. The primarily purpose of these infrastructures is the electricity production. However, what is good for man is not necessarily good for the wildlife, moreover! In many cases the changed circumstances had negative effects for wildlife. Typical example for it the dams. What can we do to find and keep the balance?

Purpose of the exercise: To gain knowledge about dams and their functions. Get information about the effects of them regarding to abiotic and biotic aspects of water body. Study about the solution how we can help the wildlife.

Guidance:

➔ Read some about dams.

For instance: https://en.wikipedia.org/wiki/Dam

https://en.wikipedia.org/wiki/Aswan_Dam

https://en.wikipedia.org/wiki/Iron_Gates

➔ The dams can/could cause ecological disaster, e.g.: in case of the Danube (Iron Gate) and the European sturgeon (*Huso huso*), https://en.wikipedia.org/wiki/Beluga_(sturgeon).

➔ There is a conservation program to help this species, Sturgeon 2020.
https://slideplayer.hu/slide/1969467/
https://link.springer.com/article/10.1007/BF03165708

➔ A widespread nature protection intervention is the so called fish ladder.

https://en.wikipedia.org/wiki/Fish_ladder

➔ Here you can watch short videos about fish ladder.

https://www.youtube.com/watch?v=sabk7Khq0kQ

https://www.youtube.com/watch?v=gPJdklAuCb0

➔ Please answer for the following questions:

- Why dams paly significant role in the ecology of a water body?
- What changes (abiotic, biotic) happen in a waterbody due to a dam?
- What can we do to make a dam more eco-friendly?
- Please mention some case studies concerning dams and wildlife!

Exercise 18

At the last exercise let's discuss about the recreation importance of wetlands. What kind of activities are relevant? We focus on especially on 'green', sustainably ways, for instance ecotourism.

Purpose of the exercise: To get information about the different recreation opportunities on and around a wetland areas.

Guidance:

- ➔ Read webpages and articles related to wetlands and recreation.
- ➔ For instance: https://www.aswm.org/pdf_lib/21_ecotourism_6_26_06.pdf
  - Classic and popular form of recreation at wetlands is the fishing.

  https://www.torchcoatheater.com/blogs/news/8-reasons-why-fishing-is-a-great-hobby-1
  - There is a new form of fishing, so called 'catch and release'.

  https://www.nps.gov/grba/planyourvisit/upload/fishing-catch-and-release.pdf
  - Of course there are exist several types of water sport as well. Some off them extreme but open for the general public too, e.g.: rafting and canyoning.
  - In case of ecotourism one of the most famous activity is the birdwatching, there are several sites, and offers on the net regarding this.

  https://wetlands.org.au/birdwatching/

  https://walthamstowwetlands.com/bird-watching

  https://www.jacksonbottom.org/natural-resources/birds-bird-watching/
  - Hunting could be a way of ecotourism as well, that is generally well-regulated many parts of the world in case of wetlands.

  https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1242271.pdf
  - Hunting could happen in sustainable way as well.

  http://ec.europa.eu/environment/nature/info/pubs/docs/factsheets/hunting.pdf
- ➔ Prepare a case study of a chosen wetland focusing on recreation!