THE RUFFORD FOUNDATION
FINAL REPORT

Congratulations on the completion of your project that was supported by The Rufford Foundation.

We ask all grant recipients to complete a Final Report Form that helps us to gauge the success of our grant giving. The Final Report must be sent in word format and not PDF format or any other format. We understand that projects often do not follow the predicted course but knowledge of your experiences is valuable to us and others who may be undertaking similar work. Please be as honest as you can in answering the questions – remember that negative experiences are just as valuable as positive ones if they help others to learn from them.

Please complete the form in English and be as clear and concise as you can. Please note that the information may be edited for clarity. We will ask for further information if required. If you have any other materials produced by the project, particularly a few relevant photographs, please send these to us separately.

Please submit your final report to jane@rufford.org.

Thank you for your help.

Josh Cole, Grants Director

Grant Recipient Details	
Your name	Oksana Abduloieva
Project title	Preservation Of Floodplain Landscapes Within The National Nature Park “Pyryatynsky”, Dnipro River Basin, Ukraine
RSG reference	13627-1
Reporting period	01.07.2013-01.08.2014
Amount of grant	£5889
Your email address	oksasteppe@gmail.com, oksana_abduloieva@univ.kiev.ua
Date of this report	23.08.2014

1. Please indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments
Defining typical indicators of natural habitats of endangered species of animals and plants in the Uday river floodplain			+	Regular seasonal expeditions revealed habitats of all the rare animals and plants announced in the project. This has been achieved through joint work of various experts - zoologists, botanists, geographers, officers of state guard of the national nature park "Pyriatynskyi" (*hereinafter - the Park*) and its research department, young scientists. A lot of information on the occurrence of rare species was given by the Park staff and local residents. Some animals such as Eurasian beaver (C*astor fiber*), western marsh-harrier (*Circus aeruginosus*), and dragonfly imperator (*Anax imperator*) frequently occur along the whole river valley of the Udai river. Thus, Eurasian beaver and dragonfly imperator are marked as abundant species, in sufficient quantities. Along the floodplain and on the edge of the second terrace of the river there accidentally occurred habitats of European pond turtle (*Emys orbicularis*). Seven points of habitats of European otter (*Lutra lutra*), four points – of the stoat (*Mustela erminea*) and two points - of common crane (*Grus grus*) are described along the river and its branches. The little bittern (*Ixobrychus minutus*) is rare. The birds such as common stilt (*Himantopus himantopus*), white-tailed eagle (*Haliaeetus albicilla*), are marked only in one point of occurrence; the latter species is rather visitant. By our own we found one point of occurrence of the burbot fish (*Lota lota*) and the crucian carp (*Carasius carassius*) and following the evidence of the park staff – two more places for the burbot, on the northern part of the park, and three more places for the crucian carp. There were found at least two points of habitats of butterfly teleius (*Glaucopsyche teleius*). Habitats of plants: There were described eight points of occurrence

				of orchid *Dactylorhiza incarnata*, 1 - *Dactylorhiza majalis*, 2 - *Dactylorhyza fuchsii*, 4 - *Orchis palustris*, 1 - *Epipactis palustris*, 1 - the sword lily *Gladiolus tenuis*, 1 – water plant *Utricularia minor*. Water fern *Salvinia natans* and water lily *Nymphaea candida* occur with high frequency and abundance, *Nymphaea alba* is rarer plant. *Utricularia vulgaris* occurs rarely and in moderate quantities. There were found one point of occurrence for each of the next plant species under regional protection: *Menyanthes trifoliata, Parnassia palustris* and *Comarum palustre*. The performed scientific inventory of the floodplain landscapes inhabited by rare species provides habitat classification following EUNIS system (EUNIS…, 2004), classification of vegetation of those habitats by European manuals (Roidwell et al., 2002) and mapping of habitats and landscapes (annexes 1-2). Description of key habitats in floodplain is inserted into the geobotanical TurboVeg and GIS databases. Key habitats are also mapped in ArcGIS including their geographical and ecological attributes. The collected evidence give us ideas about environmental needs of rare species and could be useful in finding or arranging potential habitats of such species within the park. There are three key groups of habitats for rare animals and plants within floodplain landscapes of the park such as: 1) wetlands including reed marshes and open watercourses with standing and smooth-flowing water; 2) flooded saline meadows of diverse humidity modes; and 3) sparsely wooded swamps. Floodplain landscapes of the Uday river demonstrate typical attributes of natural ecosystems of the rivers in the middle of the Dnipro Basin. That's why through sustaining landscapes along the Uday river we promote resilience of traditional landscapes across middle part of Ukraine.
Negative impacts on floodplain landscapes and habitats in the Park		+		In actual conditions the decline of traditional nature management and land use on the floodplain in the park is a main negative factor that causes transformation of the floodplain in the region. In order to maintain the whole diversity of currently existing natural habitats

				there is necessary a programme for supporting traditional forms of nature management. It should involve regulated grazing and haymaking, mowing of common reed, containment of becoming overgrown by woods. Recently increased recreational press also requires regulation. Water pollution as a negative impact in the river is rather of local importance nowadays and is not a prime cause of degradation of floodplain environment, quality of watercourses and mass mortalities in fish. In recent years land ploughing happens in water protection belts of watercourses that together with heavier use of agricultural chemicals and fertilisers could bring a significant risk for aquatic ecosystems. In addition, such agricultural activities increase the risk of soil erosion and pollution of water by eroded soils followed by siltation and shallowing of watercourses.
Critical changes in the floodplain			+	Transformation of floodplains in the park is composed by the next revealed critical changes: 1) becoming of a floodplain overgrown by woods, tall weeds and reeds under the decline of traditional amount of grazing, haymaking and mowing of common reed, decrease of quantity of livestock, depression of rural forms of farming within the given area and local communities. 2) Increasing fluctuations of the content of dissolved oxygen in water that is probably associated with huge accumulated funds of organic matter in watercourses and surroundings. Fluctuations of dissolved oxygen obviously have negative effects on the aquatic environment and biodiversity. 3) Invasion of undesirable and alien plants on the floodplain that reduces the area of natural habitats for native biodiversity. Resistance and sustainability of this type of floodplain can be achieved or a) in conditions of climatic climax either b) under sustainable nature management. Since the floodplain in the park is similar to floodplains of the Dnieper river basin and belongs to a nemoral, or broadleaved forest

				type in Forest-Steppe bioclimatic zone then without any disturbances the plant and soil covers will develop towards broad-leaved forest ecosystems on the most part of floodplain, except long-flooded parts. The latest ones will remain as reed marshes. Disadvantages of the climax are large duration of preceding transformations and significant changes of biodiversity compared to the current situation. Under regulated economic activities a natural succession of ecosystems and landscapes both with biodiversity changes are suspended by various disturbances. In order to assess critical changes there were examined data obtained from 25 points. Eight plots for monitoring, observations and field experiments were set. Critical changes in the floodplain can be identified by the next key indicators: a) Falling values of biodiversity; b) Transformation of structure in herb stands and change of plant mass production; c) Changes in soil layers such as increasing salinity or peat accumulation; d) Increasing fluctuations of content of dissolved oxygen in water; e) Reducing more than 10% of the area inhabited by endangered species.
The requirements of the vulnerable animals and plants to the habitats		+		Our studies identified the modes favourable for conservation and regeneration of populations of vulnerable animals and plants (appendix 3). For conservation of seven vulnerable species of plants the appropriate environment is in flooded meadows and marsh habitats, with preventing overgrowth, maintaining moderate grazing with repeating haymaking (once per 2-3 years), limitation of recreation activity. For conservation of five vulnerable species of aquatic plants the driving requirements relate to the stable mode of dissolved gases and organo-mineral content in water and stable river flow in riverbed and adjacent wetlands. Haymaking and grazing on floodplain also indirectly provide the latest requirements for aquatic environment. All the vulnerable species are not resistant to over-grazing, eutrophication and contamination and have a low competitive ability compared with alien organisms or weeds.

				Plant species under regional or national protection such as *Utricularia minor*, *Parnassia palustris, Menyanthes trifoliata, Comarum palustre* are highly vulnerable under eutrophication, contamination and biological invasion of habitats. In total conservation of at least 17 species of plants under national and regional protection and one species (*Ostericum palustre*) under protection of Bern Convention depends on the maintenance of traditional environmental mode on the floodplain. Occurrence and special environmental needs of the vulnerable species are given in appendix 3. The probability assessment of the species to regenerate in conditions of the floodplain of the Uday river was applied. The probability to regenerate includes grades: not defined; weak; moderate; sufficient; high.
Ways of sustainable management of important habitats in the floodplain: wetlands, floodplain meadows, reed marshes			+	Our conclusions regarding the ways of sustainable nature management of the floodplain include the following statements: 1) Conservation of biodiversity and landscapes of the floodplain in the park will not be possible without traditional rural management on the floodplain. 2) Traditional economic activities keep the floodplain from becoming overgrown and hence from reducing diversity of landscapes and living organisms. It is the story of the last century when rural management on the floodplain has preserved riverine ecosystems till nowadays and composed a current rich biodiversity and a diverse mosaic of natural habitats for animals, plants and human as well. Therefore it should be recommended for the management system in the park to implement and sustain such forms and limits of nature management that has been long installed by local communities. Nature management system should include the following: a) Grazing on floodplain meadows needs sustaining and optimizing. Meadow habitats need moderate grazing or mixed system while grazing is rotated with haymaking once per 2-3 years.

				Rules and regulations of moderate grazing on flooded meadows are developed. b) Winter harvesting of common reed for to keep the river floodplain and riverbed from becoming overgrown by reed marshes. Wetland habitats require mowing of reed once per 1-2 years. Reasonable capacity for harvesting local reeds and regulations for winter mowing are determined. Three permanent plots were set for monitoring the consequences of annual haymaking, induced changes of biodiversity and vulnerable species. The similar observations are started on permanent plots for winter harvesting of common reed.
Development of the nature management system for the floodplain landscapes based on landscape planning tools in order to provide conservation of vulnerable animals / plants and floodplain landscapes that are natural habitats of vulnerable species and to arrange sustainable management on floodplain in the Park		+		We created a GIS-map of the floodplain and adjacent territories. In the future the GIS-map will be useful for differentiation of nature management modes, for environmental and biological monitoring of the nature protected area of national value. The map is provided for use of staff of the park. We participated in the development of "Management-Plan" of the park for next 10 years. In the Plan there are reflected our following recommendations: a) guidance for optimising grazing on flooded meadows, b) proposals for initiating regular winter harvesting of common reed, c) action plans for conservation of vulnerable species.
Increasing environmental competence within local community and building capacity of the park and its staff			+	Participants of the project made presentations on an annual environmental conference of the Pyriatynskyi region. The prepared presentations referred to: 1) Community-based natural resource management in the park (presented by Oksana Abduloieva); 2) Impact of the fluctuations of dissolved oxygen content in water upon river sustainability in actual conditions (presented by Anatolyi Podobailo); 3) Diversity of some groups of insects in the park (pres. by Yuryi Protsenko). Presentations were made to representatives of

				local authorities, staff of the park, and representatives of another nature reserved areas of Ukraine, schoolchildren and teachers of the region, the press. During summer field examinations we involved schoolchildren and teachers of the region as well as staff of the park. Participants of the project carried out an independent examination of water quality of the riverine sites where mass mortalities in fish happened. There were clarified probable causes of this disaster. We reported on the matter on the meeting of environmental commission of the Regional Council (July-August 2013). Local media were given by interview about the state of the floodplain in environmental hot sectors where mass mortalities in fish happened. We reported about main results of field examinations on the meeting of the Environmental Committee of Regional Council (July 2013, July 2014). Conclusions of reports were reflected in the press. Information about field examinations with participation of students and schoolchildren and some practical results of our work were given in the form of articles in newspapers for several times. In places of public recreation there were showed and explained the ways and tools of environmental quality assessment like water quality and soil condition. In early spring we participated in excursion along ecological route for studying the nature of site Massalsskyi – one of prominent sites in the Park – together with teachers and representatives of another nature protected areas of Ukraine. For use of the Park we prepared proposals for the control of plant invasions on vulnerable sites of the floodplain (invasions of *Acer negungo*, *Asclepias syriaca*). Two times in 2013-2014 there was arranged ecological contest among schoolchildren «The Magical World of the White Stork». 50 pupils from the region participated in the contest and reported about birdwatching and observations of bird nesting. Winners received prizes presented by local sponsors. Following our recommendations and under support of local farms two teachers and five

				pupils of rural schools participated in the environmental camp "Desnyanski zory (Desna stars) 2014" hold in Desnyans'ko-Starogutskiy national nature park in July 2014. Participants mastered the methods of studying wild populations and received tasks to prepare research theses for Junior Academy of Sciences in Ukraine. Research work will be performed at the Pyriatynskyi national nature park.

2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).

1. Some rare animals like European otter (*Lutra lutra*), hermine stoat (*Mustela erminea*), black stork (*Ciconia nigra*), and white-tailed eagle (*Haliaeetus albicilla*) are extremely cautious, so our intention to make photo or video releases about them for educational ecological film about the park failed. There is need for especial expeditions in winter in order to film European otter.
2. Number of cattle in local communities continues constantly reducing, so at present the problem of sustaining a moderate grazing and haymaking on flooded meadows in order to preserve floodplain landscapes is escalating.
3. The park is faced with another problem in managing the floodplain – how to prevent and protect wetlands against fires, both unintentional and intentional ones. Burning reeds is a habit that has emerged and got a great distribution in the region. The introduction of regular winter mowing of common reed can overcome this problem in sustaining floodplain landscapes.
4. By reason of technical disagreement with the regional television and radio company a video-presentation about the Park has not yet filmed although scenario had been prepared.

3. Briefly describe the three most important outcomes of your project.

1. We found landscapes with typical habitats of 13 species of vulnerable animals and 13 plants under international, national or regional protection (appendix 3) associated with the floodplain. Then we evaluated and inserted into databases attributes of those habitats and landscapes. It is required for further regular records.
2. We created GIS-based map in ArcGIS platform (Esri). Its numerous layers reflect all the collected evidences about floodplain landscapes, occurrence of habitats of vulnerable species, accompanying ecological, geographical and geobotanical attributes. GIS is up-to-date and reliable tool for mapping, storage and processing data of landscapes and habitats under protection and a framework for arrangement of monitoring system and environmental management. GIS-based map is stored by participants of the project and in the Park. Also, its web-version is supported.
3. Our examinations and obtained results influenced the "Management-Plan" of the park for next 10 years. In our proposals there were highlighted guidelines of sustainable nature management on the floodplain that will provide conservation and regeneration of natural landscapes and vulnerable biodiversity. In particular, there was proven negative effect of completely protected mode and the need of utilisation of nature resources and removal of organic matter for preservation of floodplain landscapes and diversity of vulnerable habitats, animals and plants.

The forms of nature management on the floodplain were proposed and presented to the Park, local community and authorities for discussion. During presentations the advantages of traditional rural management on the riverine areas and floodplains in the existing park were cleared to local community and local authorities.
Sustainable nature management includes intentional sustaining of traditional rural forms of economic activities that preserve the nature and provide its attractiveness for tourists, vacationers and purposes of environmental education. Limits and regulations for environmentally friendly grazing, haymaking meadows, mowing reed wetlands were stated. It has to contribute to the preservation of floodplain landscapes and biodiversity, sustainability of ecological mode on the floodplain and in watercourses.
On special permanent plots we introduced observations and experiments in order to correct limits and terms of grazing and haymaking and allowable annual harvesting of reed for sustainable environmental condition of the floodplain.
The "Management-Plan" including our proposals was considered and approved by the Scientific and Technical Council of the park involving besides the staff representatives of local authorities and non-governmental organizations. At present the "Management-Plan" is on consideration in Ministry of ecology and natural resources of Ukraine.

4. Briefly describe the involvement of local communities and how they have benefitted from the project (if relevant).

The proposed forms of nature management will allow local communities to preserve traditional activities and environment with increasing possibilities for recreation and attraction of tourists.
The intentional ecological education is given to the youth and school teachers of local communities.
Regulated harvesting of the common reed could be a favourable chance for economic activity and alternative energy sources in local conditions.

Regular field examinations conducted by our experts bring additional information about ecological situation in the region to local communities through press-conferences, published materials in periodical press and brief releases on TV and in internet.

While working in the field we often clarify the exact natural value of the certain site nearby some village to interested representatives of local communities and, in turn, get from them complementing and clarifying information.

5. Are there any plans to continue this work?

Based on the created GIS-map we will arrange long-term monitoring of the next items:

a) Populations of rare and endangered species;
b) Indicators of the whole biodiversity;
c) Diversity and distribution of natural habitats of rare and endangered animals and plants;
d) Nature management and economic activities systems,
e) Funds of natural resources in the Park.

GIS-map will also serve for developing action programmes to increase abundance or regenerate rare and endangered species and to restore their habitats. The map will be useful in planning nature protective actions and management mode within the Park area.

We will continue and expand observations for rare and interesting animals and plants for to create educational film, to establish intentional platforms for animal-watching, permanent plots for studies of the impact of nature management modes on populations of rare plants.

With these purposes the guidance on monitoring for rare animals and plants is under construction.
In order to maintain and 'ex-situ' reproduce rare plants with the following repatriation into the nature a plan is formed and selected a plot of about 1 ha is selected within the economic activities zone of the Park.

For arrangement of the areas for permanent recreation we are going to participate in composing information boards and content for prospective Centre of Eco-Education.

Park administration with our assistance prepares a request to increase the area of the Park of another 3000 ha because of discovering more valuable sites and natural habitats.

Next year, in conjunction with the Regional Department of Education we plan to hold a contest for schoolchildren "Ubiquitous small creatures" devoted to the studies and conservation of insects.
For the best visualization of GIS-map we are going to accompany patches of key habitats on the map by pictures and panoramas made in situ.

6. How do you plan to share the results of your work with others?

The national nature park "Pyriatynskyi" received all the results from us to be included in the "Annals of the Nature". "Annals of the Nature" is a mandatory annual reporting book confirming functioning of the national nature park as an object of national importance of nature-protected fund of Ukraine. It is annually submitted to the Ministry of Ecology and Natural Resources of Ukraine. Local authorities and representatives of community have access to its materials as well.

The developed GIS_map of the landscapes with their attributes is available for use by the park staff.
In winter 2013-2014 participants of the project prepared and submitted proposals to the "Management-Plan" of the national nature park for next 10 years (appendix 6).

There was prepared and located in a network the online-version of GIS-map of the floodplain and surroundings including attributes of landscapes and occurrence of rare biodiversity. Link to the map: http://bit.ly/1vXawL1. (At present the online version has been made in Ukrainian).

At three meetings of the Ecological Commission of the Regional Council there were presented results of field examinations and proposals for nature management on the riverine floodplain in the Park. Also, the results of studies were repeatedly discussed at press-conferences and distributed in mass media (local newspapers, video releases, web-pages).

Photo gallery and html-version of the GIS-map are preparing for the web-site of the Park. We gained many professionally photographed pictures of floodplains and biodiversity.

The website of the Park: http://www.npp-p.org.ua/

The Park in Facebook: https://www.facebook.com/pages/%D0%9D%D0%B0%D1%86%D1%96%D0%BE%D0%BD%D0%B0%D0%BB%D1%8C%D0%BD%D0%B8%D0%B9-

%D0%BF%D1%80%D0%B8%D1%80%D0%BE%D0%B4%D0%BD%D0%B8%D0%B9-%D0%BF%D0%B0%D1%80%D0%BA-%D0%9F%D0%B8%D1%80%D1%8F%D1%82%D0%B8%D0%BD%D1%81%D1%8C%D0%BA%D0%B8%D0%B9/511170465579580?sk=timeline&ref=page_internal

We provided scientifically based proposals on shelter woodlines around water treatment facilities in Pyryatyn town and submitted them to local authorities in order to reduce the harmful effects of the treatment ponds on the adjacent floodplain areas.

During expeditions the studies with local schoolchildren and teachers acquainted them with ways of learning local biodiversity and guidelines of environmentally friendly nature management. Interesting results were obtained by schoolchildren and refer to: habitats of rare insects; occurrence of alien fish species in the river. Local people were involved in studies of haymaking meadows and winter harvesting of reed, they were explained the advantages of moderate grazing and haymaking compared to complete untouchability of the floodplain.

The results of field examination of landscapes, soils, vegetation, animal world, water quality in the river, biodiversity of various river sections with different levels of contamination are included in training courses of the Educational Program "Ecology" and "Biology" for students of Taras Schevchenko National University of Kyiv (Ukraine).

Scientific materials concerning a variety of natural habitats of vulnerable and endangered plants and animals of the Park, on the classification of components of the given landscapes, on threats to biodiversity conservation in key areas of the Park and on ways of protection of the floodplain against transformation are prepared for publishing.

7. Timescale: Over what period was The Rufford Foundation grant used? How does this compare to the anticipated or actual length of the project?

The stated timescale was 01.07.2013-01.08.2014 (one year and a month). There was enough time for us to fulfil all the tasks of the project.

8. Budget: Please provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures should be in £ sterling, indicating the local exchange rate used.

Item	Budgeted Amount	Actual Amount	Difference	Comments
Equipment: Binocular microscopes, 2 units	1239	1187 (1 GBP =12,08 UAH)	52	Due to fluctuation of prices we chose two compactible for field conditions and slightly cheaper devices for to reallocate funds among items of equipment. We asked permission to do it, by letter on 14.11.2013
Equipment: Field equipment	165	240 (1 GBP =12,08 UAH)	-75	Field equipment included lab glass, paper and devices (tubes, bags for collecting samples, flasks, tweezers, field pH meter, binoculars for bird-watching, solutions for fixation of

				samples like soil, insect and plant material; scales for weighing biomass). Since field equipment had been significantly expensive due to fluctuation of Ukrainian hryvnia exchange rate, we spent more funds on the equipment by saving money on microscopes and computer. We asked permission to do it, by letter on 14.11.2013
Equipment: Personal computer	413	379 (1 GBP =12,08 UAH)	34	The computer is used for storage and filling of the GIS-map, landscape and geobotanical data and utilities, as well as for educational presentations and scientific reports
Transporting services	768	768	-	-
Photography services	165	165	-	-
Computer (GIS-technologies) services	413	413	-	-
Accommodation and field lab arrangement services in field conditions	826	826	-	-
Salary and social taxes: accountant	413	394	19	Salary was reduced to compensate other expenses
Diary expenditures: Subsistence in the field	1487	1487	-	In total we hold 14 field trips to the national nature park, since July 2013 till July 2014, a total duration of 136 days, with participation of 5 experts: Abduloieva O., Golubtsov O., Protsenko Yu., Podobailo A., Gorobchyshyn V.
Unforeseen expenses: banking services for the account	0	30	-30	Opening currency account and fee
Total	5889	5889	0	

Exchange Rate on 29.03.2013: 12,104 UAH / 1 GBP, http://www.bank.gov.ua
Exchange rate on 15.07.2013: 1 GBP=12, 08 UAH.
Notes: The funds received 15.07.2013 by transfer in GBP were immediately exchanged for the Ukrainian hryvnia, in accordance with the Order of the National Bank of Ukraine on current accounts. Exchange rate on 15.07.2013: 1 GBP=12, 08 UAH. The resulting sum of funds was 71139 UAH. All further payments in Ukrainian hryvnia are compared with this rate.
Exchange Rate on 29.07.2014: 20.37 UAH / 1 GBP, http://www.bank.gov.ua/control/uk/curmetal/detail/currency?period=daily

9. Looking ahead, what do you feel are the important next steps?

We need not to stay in implementation and optimization of the developed proposals on nature management basing on the GIS-map and according to identified mosaic of landscapes.

There is need to test ways of reproduction of some species and restoration of some natural habitats in floodplain landscapes.

It is important to intentionally cultivate love and cognitive interest in youth and other members of local communities to valuable objects of wildlife like animals and plants indicated in the project. There is a need to improve the quality of environmental education and promotion of nature protection and nature reserved areas while arranging environmental education camps and ecological routes.

10. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the RSGF receive any publicity during the course of your work?

While reporting at meetings of the Regional Council, on the regional environmental conference we used the Rufford Foundation logo. In the scientific papers preparing for publishing based on the project results, in the "Acknowledgements" section there will be mentioned the support of The Rufford Foundation.

APPENDICES
TO THE FINAL REPORT

Oksana Abduloieva

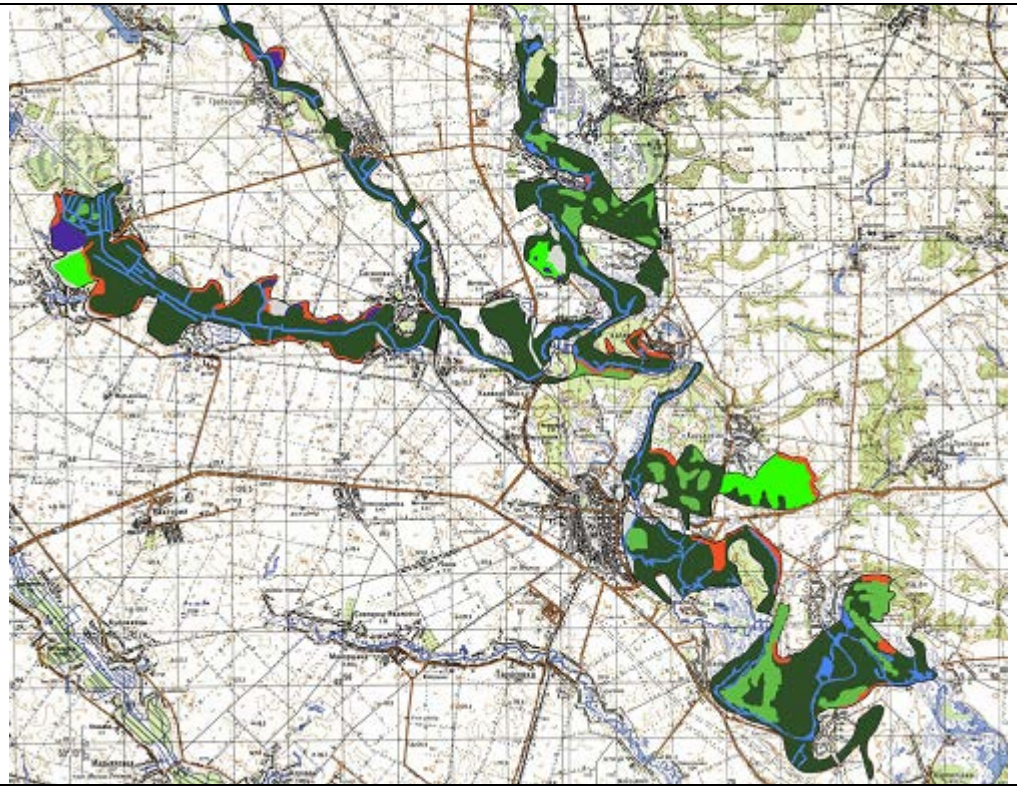
13627-1 “Preservation Of Floodplain Landscapes Within The National Nature Park “Pyryatynsky”, Dnipro River Basin, Ukraine”

KEY MATERIALS WORKED OUT DURING THE PROJECT

CONTENT

APPENDIX 1

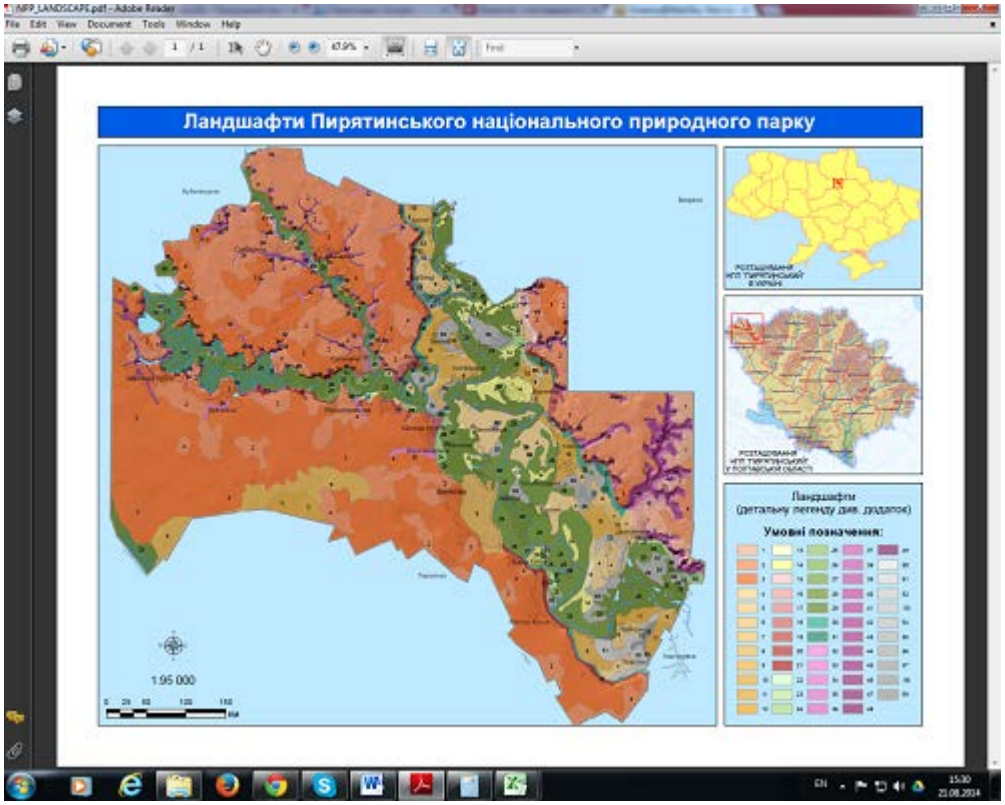
MAPPING LANDSCAPES OF THE NATIONAL NATURE PARK "PYRIATYNSKYI"



	LANDSCAPE UNITS – FACIES (ACCORDING TO THE NATIONAL CLASSIFICATION OF LANDSCAPES):
	wooded eluvial autonomous plains with black soils – deep leached chernozems of low humus
	eluvial autonomous plains with typical chernozems of medium humus
	accumulative superaquatic forest-meadow waterlogged floodplains
	Trans-eluvial accumulative slope facies
	Trans-aquatic facies
	Aquatic facies
	Residential facies
	Topographic base scaling 1:200 000 Topographic base reflects a part of Pyriatyns'kyi administrative district of Poltava region (Ukraine)

APPENDIX 2

PDF-VERSION OF THE GIS-MAP (SCREENSHOT, IN UKRAINIAN) OF THE NATIONAL NATURE PARK "PYRIATYNSKYI"



Link to online-version of the map: http://bit.ly/1vXawL1 (in Ukrainian)

Mapping made in ArcGis. Legend to the map filled in Excel including the next table of attributes (in Ukrainian):

Example of headings of the table of attributes

OBJECT ID	Relief	Soil number	Soil type	General character of landscape	Kind of landscape with type of vegetation	Index	Habitat

APPENDIX 3

HABITATS OF RARE BIODIVERSITY ON THE RIVER FLOODPLAIN OF THE NATIONAL NATURE PARK "PYRIATYNSKYI".

(OBSERVATIONS AND RELEVES IN JULY 2013 – JULY 2014)

Vulnerable species under national, international and regional protection	Examples of habitats registered according to releves numbers (appendix 4)	Key landscapes for the favourable for conservation and regeneration of the species in the park	Assessment of probability for the species to regenerate in the Udai river floodplain
ANIMALS:			
1. European otter (*Lutra lutra*)	31; also riverbanks of Orzhytcya river outside of the park area at present but under consideration	Aquatic and wooded floodplain landscapes. Not disturbed and not polluted banks with densely bushes and tall forbs, no or poor recreational press	moderate
2. Eurasian beaver (*Castor fiber*)	36; And in general frequently along Udai riverbanks	Aquatic, marsh and wooded floodplain landscapes	high
3. Hermine stoat (*Mustela erminea*)	-	Not disturbed wooded floodplain overgrown with bushes and derivative meadows with tall forbs, no or poor recreational press	Not defined
4. Common crane (*Grus grus*)	6	Saline-meadow floodplain dominated by tall forbs. Complete un-disturbance while nesting and migrating	sufficient 15-20 bird pairs in the Udai river valley
5. western marsh-harrier (*Circus aeruginosus*)	39	Floodplain marsh landscapes. Reed marshes	high
6. White-tailed eagle (*Haliaeetus albicilla*)	8	Wide areas of undisturbed flooded swamps and marshes. Also mixed woods on the second river terrace	Irregularly visitant bird
7. Common stilt (*Himantopus himantopus*)	36, 39	Floodplain aquatic, marsh and saline-meadow with tall forbs landscapes	Irregularly visitant bird
8. Little bittern (*Ixobrychus minutus*)	36, 39	Floodplain aquatic and marsh landscapes	Approximate quantity about 100 pairs
9. European pond turtle (*Emys orbicularis*)	1, 7	edge of sandy lands of floodplain and the second river terrace	sufficient
10. The burbot (*Lota*	19, 21	Deep riverbed areas with	Weak due to strong

Vulnerable species under national, international and regional protection	Examples of habitats registered according to releves numbers (appendix 4)	Key landscapes for the favourable for conservation and regeneration of the species in the park	Assessment of probability for the species to regenerate in the Udai river floodplain
lota)		moderate flow. Depth more than 1.5 m, flow, abrasive shaded banks, coastal locations of fallen wood, stable gas mode in water	fluctuations of the dissolved oxygen mode and high temperatures in summer in water of the river last years
11. Crucian carp (*Carassius carassius*)	21 and surroundings	Not polluted eutrophic river backwaters with muddy bottom, moderately overgrown by vegetation of the classes Potametea and Lemnetea, with constant gas and trophic mode in water. Wetland melioration and degradation of oxbows negatively affect the fish.	Not defined but rather moderate under stable water conditions
12. Butterfly teleius (*Glaucopsyche teleius*)	3, 5, 27-28, 35	Floodplain saline meadows, especially with abundant populations of the plant *Sanguisórba officinális* on which the larva develops	sufficient
13. Dragonfly (*Anax imperator*)	4, 8, 32, 36, 39	Floodplain aquatic, marsh, saline meadow and wooded landscapes. Riverbanks and watercourse free of chemical and biological contamination and not overgrown by wood	sufficient
PLANTS:			
1. *Dactylorhiza incarnata*	6, 8, 28	Floodplain saline meadows	Moderate, nature management measures are needed
2. *Orchis palustris*	8, 28	Floodplain saline meadows and moist meadows of tall forbs	The same as above
3. *Gladiolus tenuis*	35	Lowland saline meadows, rush-grass floodplain and lowland meadows	The same as above
4. *Epipactis palustris*	35	Lowland saline meadows, sedge-grass floodplain and lowland meadows	low, nature management measures are needed
5. *Salvinia natans*	19, 21, 36	clear eutrophic shallow riverbed and backwaters with no or poor	High provided trophic mode in

Vulnerable species under national, international and regional protection	Examples of habitats registered according to releves numbers (appendix 4)	Key landscapes for the favourable for conservation and regeneration of the species in the park	Assessment of probability for the species to regenerate in the Udai river floodplain
		flow, oxbows covered by vegetation of the class Lemnetea and Potametea	river to be stable
6. *Nymphaea alba*	19, 36	The same as above	High provided trophic mode in river to be stable
7. *Nymphaea candida*	19, 21, 36	The same as above	High provided trophic mode in river to be stable
8. *Utricularia vulgaris*	19, 21, 36	The same as above	Sufficient provided trophic mode in river to be stable
9. *Menyanthes trifoliata*	34	Floodplain marshes	Moderate, nature management measures are needed to keep trophic mode of marshes
10. *Parnassia palustris*	6, 35	Floodplain saline and moist meadows	Moderate, nature management measures are needed
11. *Comarum palustre*	39	Floodplain marshes dominated by sedges	Sufficient if trophic mode of marshes to be stable
12. *Inula helenium*	3, 30	Floodplain saline and moist meadows dominated by grasses and tall forbs	High provided grazing to be sustained
13. *Ostericum palustre*	3-4, 6, 27-29, 30	Floodplain saline and moist meadows dominated by grasses, sedges and tall forbs	High provided grazing and haymaking to be sustained

APPENDIX 4

EXCERPT FROM A SHAPEFILE IN DATABASE - TURBOVEG FOR WIINDOWS 2.99: RELEVES OF HABITATS

=> Number of releve: 1

Date: 2013/07/12

Address: Usovka village, Pyriatyns'kyi national nature park, Poltava region. Among villages Leliaky and Usivka, left bank of the Udai River, beyond the pine forest, on the fringe / grazing

Longitude: 32.50185013

Latitude: 50.34359807

Altitude (m): 93

Syntaxa of vegetation: alliance Agrostion vinealis, class Molinio-Arrhenatheretea

Herb stand cover (%): 50

Max.height of herb stand (cm):60

Element of relief: river terrace

Habitat code (Ukr.): mesic pastures

Habitat code CORINE: Unmanaged mesic grassland

Land use condition: Pasture

Ownership: State

Type of relief: Plain flat terrain

Drainage condition: No artificial drainage and water intake

Watercourse condition: Watercourse preferably in natural condition with poor changes of riparian vegetation

Portion of square for mowing / grazing: 10-30%

Portion of arable area: 0%

Threats and impacts: Decline of grazing

Flora richness: 36

Shannon index: 2.38

Evenness index: 0.66

Dominant plants (% of cover): Galium verum (30), Origanum vulgare-(17), Phleum pretense (5), Poa angustifolia (5).

=> Number of releve: 3

Date: 2013/07/09

Address: Povstyn village, Pyriatyns'kyi district, Poltava region

Longitude: 32.61360000

Latitude: 50.16810000

Altitude (m): 101

Syntaxa of vegetation: aliance Deschampsion caespitosae, order Molinietalia, class Molinio-Arrhenatheretea

Herb stand cover (%): 100

Max.height of herb stand (cm):50

Micro-(nano-) relief: Undulated

Element of relief: floodplain terrace

Soils: meadow (Gleysols Umbric)

Soil attributes: alluvial meadow soil, highly solonetsous saliniferous, loamy on alluvium. Soil layers described in TurboVeg

Habitat code (Ukr.): flooded meadow of river valleys of alliance Cnidion venosi

Habitat code CORINE: Moist or wet eutrophic and mesotrophic grassland

Land use condition: Abandoned

Ownership: State

Type of relief: plain undulated relief

Drainage condition: No artificial drainage and water intake

Watercourse condition: Watercourse preferably in natural condition with poor changes of riparian vegetation

Portion of square for mowing / grazing: 10-30%

Portion of arable area: 0%

Threats and impacts: Decline of grazing

Flora richness: 22

Shannon index: 2.08

Floristic composition of dominant species: rush+forb - Carex caespitosa (40), Festuca regeliana (30), Geranium pratense (40),

Lathyrus pratensis (10), Calystegia sepium (7), Lythrum salicaria (10).

=> Number of releve: 4

Date: 2013/07/09
Address: Povstyn village, Pyriatyns'kyi district, Poltava region
Longitude: 32.61360000
Latitude: 50.16810000
Herb stand cover (%): 100
Max.height of herb stand (cm): 120
Syntaxa of vegetation: alliance Magno-Caricion elatae Koch 1926, class Phragmito-Magnocaricetea.
Micro-(nano-) relief: no
Type of relief: plain undulated, depressed part of floodplain
Element of relief: floodplain terrace
Soil type: alluvial meadow soil
Soil attributes: deeply solonetsous saliniferous loamy on alluvium
Habitat code (Ukr.): flooded meadows of river valleys of alliance Cnidion venosi
Geomorphological processes: water flooding / swamping. Ground water level 30cm.
Habitat code CORINE: Moist or wet eutrophic and mesotrophic grassland
Land use condition: Abandoned
Ownership: State
Drainage condition: No artificial drainage and water intake
Watercourse condition: Watercourse preferably in natural condition with poor changes of riparian vegetation
Portion of square for mowing / grazing: 10-30%
Portion of arable area: 0%
Threats and impacts: Decline of grazing
Flora richness: 20
Shannon index: 1.10
Floristic composition of dominant species: Carex caespitosa (40), Iris pseudacorus (10), Typha angustifolia (5).

=> Number of releve: 5

Date: 2013/07/09
Address: Povstyn village, Pyriatynskyi national nature park, Poltava region
Longitude: 32.61609077
Latitude: 50.16452880
Altitude (m): 101
Syntaxa of vegetation: aliance Deschampsion caespitosae, order Molinietalia, class Molinio-Arrhenatheretea
Herb stand cover (%): 90
Average height of herb stand (cm): 40
Max. height of herb stand (cm): 80
Element of relief: central, higher part of floodplain
Type of relief: plain undulated
Soils: alluvial meadow soil (Fluvisols Eutric), highly solonetsous saliniferous, loamy on alluvium. Soils attributes conserved in TurboVeg
Habitat code (Ukr.): floodplain meadows of river valleys of alliance Cnidion venosi
Habitat code CORINE: Mesic grasslands
Land use condition: Pasture
Ownership: State
Drainage condition: No artificial drainage and water intake
Portion of square for mowing / grazing: 10-30%
Portion of arable area: 0%
Threats and impacts: overgrazing or decline of grazing
Flora richness: 38
Shannon index: 2.28
Dominant plant species: Centaurea jacea (30), Festuca regeliana (50), Geranium pratense (10), Lathyrus pratensis (15), Lythrum salicaria (10).

=> Number of releve: 6

Date: 2013/07/09
Longitude: 32.50070000

Latitude: 50.34130000
Address: between Usovka and Leliaky villages, Pyriatyns'kyi national nature park, Poltava region left bank of the Udai River
Syntaxa of vegetation: aliance Deschampsion caespitosae, order Molinietalia, class Molinio-Arrhenatheretea
Herb stand cover (%): 60
Soils: Leptosols Gleyic, poorly developed, sandy on sands
Habitat code (Ukr.): floodplain meadows of river valleys of alliance Cnidion venosi
Habitat code CORINE: Mesic grasslands
Land use condition: Abandoned, locally over-grown with Salix bushes
Ownership: State
Type of relief: plain undulated
Drainage condition: No artificial drainage and water intake
Threats and impacts: Decline of grazing
Flora richness: 36
Shannon index: 3.58
Complete plant species composition conserved in TurboVeg.

=> Number of releve: 7

Date: 2013/07/09
Longitude: 32.50056267
Latitude: 50.34058532
Address: between Usovka and Leliaky villages, Pyriatyns'kyi national nature park, Poltava region left bank of the Udai River
Syntaxa of vegetation: aliance Potentillo argenteae-Poion angustifoliae
Herb stand cover (%): 90
Soils: Albeluvisols Distric, poorly developed, sandy on sands
Habitat code (Ukr.): Mesic pastures
Habitat code CORINE: Mesic grasslands
Land use condition: Pasture
Ownership: State
Type of relief: Plain flat terrain
Threats and impacts: overgrazing
Flora richness: 14
Shannon index: 1.32
Dominant plant species: Festuca regeliana (70), GAlium verum (20), Achillea collina (20), Trifolium pratense (20). Complete plant species composition conserved in TurboVeg.

=> Number of releve: 8

Date: 2013/07/09
Longitude: 32.49884605
Latitude: 50.33625757
Address: Usovka village, left bank of the Udai River, Pyriatyns'kyi district, Poltava region, Pyriatynskyi national nature park, marshes straight near the riverbed
Element of relief: floodplain
Syntaxa of vegetation: aliance Phragmition communis W.Koch 1926, class Phragmito-Magnocaricetea
Herb stand cover (%): 100
Max. height of herb stand (cm): 100
Soils: peat bog, solonetsous saliniferous, derivative of Histosols Terric
Habitat code (Ukr.): communities of tall helophytes of riverine and flooded areas
Habitat code CORINE: Beds of large sedges normally without free-standing water
Land use condition: Abandoned
Ownership: State
Type of relief: Plain flat terrain
Drainage condition: No artificial drainage and water intake
Watercourse condition: Watercourse preferably in natural condition with poor changes of riparian vegetation
Portion of square for mowing / grazing: 5-10%
Portion of arable area: 0%
Threats and impacts: over-grazing

Dominant plant species: Carex riparia (10), Acorus calamus (10), Glyceria maxima (10), Lysimachia vulgaris (5). Complete plant species composition conserved in TurboVeg.

=> Number of releve: 11

Date: 2013/07/10
Longitude: 32.57214546
Latitude: 50.24989427
Altitude (m): 95
Address: Kharkivtsy village, Pyriatyns'kyi village, Poltava region, plot of winter harvesting of reed in 2013
Element of relief: floodplain
Length of plot (m): 10.0
Width of plot (m): 15.0
Syntaxa of vegetation: aliance Phragmition communis, class Phragmito-Magnocaricetea
Herb stand cover (%): 80
Max. height of herb stand (cm): 200
Soils: Gleysols Histic, solonetsous saliniferous
Habitat code (Ukr.): transformed in succession eutrophic bogs
Geomorphological processes: waterflooding and swamping
Habitat code CORINE: Reedbeds normally without free-standing water
Land use condition: Abandoned
Ownership: State
Type of relief: Plain flat terrain
Drainage condition: No artificial drainage and water intake
Watercourse condition: Watercourse preferably in natural condition with poor changes of riparian vegetation
Ground water level (m): 0, 4
Portion of square for mowing / grazing: 5-10%
Portion of arable area: 0%
Threats and impacts: regulating of water level
Flora richness: 15
Shannon index: 0.90
Dominant plant species: Phragmites australis.

=> Number of releve: 14

Date: 2013/07/11
Longitude: 32.47637000
Latitude: 50.36393000
Address: Gurbyntsy village, Pyriatyns'kyi district, Poltava region, close to the Udai River
Element of relief: floodplain
Type of relief: Plain flat terrain
Geomorphological processes: flooding and swamping
Syntaxa of vegetation: class Alnetea glutinosae
Herb stand cover (%): 100
Max. height of herb stand (cm): 100
Soils: Gleysols Histic, solonetsous saliniferous, silty-loamy on alluvium
Habitat code (Ukr.): [Salix] communities of flooded riverbanks
Habitat code CORINE: Riparian [Salix], [Alnus] and [Betula] woodland
Land use condition: Abandoned, somewhere haymaking
Drainage condition: No artificial drainage and water intake
Groundwater level (m): 0, 3
Watercourse condition: Watercourse preferably in natural condition with poor changes of riparian vegetation
Portion of square for mowing / grazing: 5-10%
Portion of arable area: 0%
Threats and impacts: drying, decrease of water level
Flora richness: 21
Shannon index: 2.14
Dominant plant species: Alnus glutinosa (20), Salix alba (40), Carex riparia (40), Iris pseudacorus (20), Phalaroides arundinacea (40).

=> Number of releve: 19

Date: 2013/07/28
Longitude: 32.50190000
Latitude: 50.33108300
Address: Leliaky village, Pyriatynskyi district, Poltava

region, Khomenkove, along the left bank of the Udai River

Syntaxa of vegetation: aliance Nymphaeion albae, class Potametea

Habitat code (Ukr.): natural eutrophic watercourses with vegetation Magnopotamion or Hydrocharition

Habitat code CORINE: Permanent non-tidal, slow, smooth-flowing watercourses

Watercourse condition: Watercourse preferably in natural condition with poor changes of riparian vegetation

Flora richness: 12

Shannon index: 2.10

Dominant plant species (% of cover): Nymphaea candida (60), Wolffia arrhiza (50), Spirodela polyrrhiza (20), Lemna minor (25), Stratiotes aloides (10).

=> Number of releve: 21

Date: 2013/07/28

Longitude: 32.50190000

Latitude: 50.33108300

Address: Leliaky village, Pyryatynskyi district, Poltava region, after Khomenkove and Mohylne, along the left bank of the Udai River

Syntaxa of vegetation: aliance Hydrocharition R.Tx.1955, class Lemnetea

Habitat code (Ukr.): natural eutrophic watercourses with vegetation Magnopotamion or Hydrocharition

Habitat code CORINE: Permanent non-tidal, slow, smooth-flowing watercourses

Watercourse condition: Watercourse preferably in natural condition with poor changes of riparian vegetation

Flora richness: 9

Shannon index: 1.73

Dominant plant species: Ceratophyllum submersum (40), Lemna minor (40), Stratiotes aloides (10), Lemna trisulca (25).

=> Number of releve: 27

Date: 2011/07/12

Longitude: 32.48712000

Latitude: 50.32790000

Altitude (m): 99

Address: Leliaky village, Pyriatyns'kyi national nature park, Poltava region. Permanent plot #1 for monitoring dynamics of grasslands on floodplain

Syntaxa of vegetation: aliance Deschampsion caespitosae, order Molinietalia, class Molinio-Arrhenatheretea. Association Festucetum regelianae

Herb stand cover (%): 100

Max. height of herb stand (cm): 150

Soils: Gleysols Umbric, solonetsous saliniferous loamy, humid

Groundwater level (m): 1, 5

Habitat code (Ukr.): floodplain meadows river valleys of alliance Cnidion venosi

Geomorphological processes: flooding

Habitat code CORINE: Moist or wet eutrophic and mesotrophic grassland

Land use condition: Abandoned. In the past the plot was highly grazed by cattle.

Type of relief: Plain flat terrain

Drainage condition: No artificial drainage and water intake

Portion of square for mowing / grazing: 10-30%

Portion of arable area: 0%

Threats and impacts: Decline of grazing. Burning traces are present in 2013.

Flora richness: 34

Shannon index: 2.62

Dominant plant species (% of cover): Festuca regeliana (70), Geranium pretence (20).

=> Number of releve: 28

Date: 2013/07/12

Longitude: 32.48593000

Latitude: 50.32935000

Altitude (m): 99
Address: Leliaky village, Pyriatyns'kyi national nature park, Poltava region. Permanent plot #2 for monitoring dynamics of grasslands on floodplain
Syntaxa of vegetation: alliance Deschampsion caespitosae, order Molinietalia, class Molinio-Arrhenatheretea
Herb stand cover (%): 75
Min. height of herb stand (cm): 10
Max. height of herb stand (cm): 50
Soils: Лучні (Gleysols Umbric)
Habitat code (Ukr.): floodplain meadows of river valleys of alliance Cnidion venosi
Geomorphological processes: flooding
Habitat code CORINE: Moist or wet eutrophic and mesotrophic grassland
Land use condition: haymaking. Haymaking in 2013
Type of relief: Plain flat terrain
Drainage condition: No artificial drainage and water intake
Portion of square for mowing / grazing: 95-100%
Portion of arable area: 0%
Flora richness: 48
Shannon index: 2.82
Soils: Gleysols Umbric, solonetsous loamy, humid. Soil attributes conserved in TurboVeg
Dominant plant species: Centaurea jacea (50 Poa pratensis (20 Trifolium pratense (30 Trifolium pratense (10), Trifolium repens (10), Festuca regeliana (10), Geranium pratense (10), Lotus ucrainicus (20), Agrostis capillaris (5).

=> Number of releve: 29

Date: 2013/07/12
Longitude: 32.48517000
Latitude: 50.33040000
Altitude (m): 100
Address: Leliaky village, Pyriatyns'kyi national nature park, Poltava region. Permanent plot #3 for monitoring dynamics of grasslands on floodplain
Type of relief: Plain flat terrain
Element of relief: river terrace
Micro-(nano-) relief: no
Geomorphological processes: impermanent flooding
Syntaxa of vegetation: aliance Deschampsion caespitosae, order Molinietalia, class Molinio-Arrhenatheretea
Herb stand cover (%): 100
Min. height of herb stand (cm): 30
Max. height of herb stand (cm): 200
Soils: Planosols Eutric. Soil attributes conserved in TurboVeg
Habitat code (Ukr.): floodplain meadows of river valleys of alliance Cnidion venosi
Habitat code CORINE: Moist or wet eutrophic and mesotrophic grassland
Land use condition: Abandoned
Watercourse condition: Watercourse preferably in natural condition with poor changes of riparian vegetation
Portion of square for mowing / grazing: 5-10%
Portion of arable area: 0%
Threats and impacts: Decline of grazing. The plot has not been mowed for a couple of years. In 2013 traces of burning are absent.
Flora richness: 17
Shannon index: 2.34
Plant mass: 2013: 2, 68 kg of wet plant above-ground mass/m2, or 0, 97 kg/m2 of air-dried mass. Hay of tall forbs
Dominant plant species: Carex disticha (20), Geranium pratense (50), Siella erecta (30), Vicia cracca (30).

=> Number of releve: 30

Date: 2013/07/11
Longitude: 32.47198000
Latitude: 50.37238000
Altitude (m): 99
Address: behind Gurbyncy village, Pyriatyns'kyi national nature park, Poltava region
Element of relief: depression on river terrace
Micro-(nano-) relief: Undulated relief
Syntaxa of vegetation: aliance Deschampsion caespitosae, order Molinietalia, class Molinio-Arrhentheretea
Herb stand cover (%): 100
Min. height of herb stand (cm): 30
Max. height of herb stand (cm): 150
Soils: meadow podzolized gleyed soil, slightly loamy on ancient alluvial loamy deposits (Gleysols Umbric).
Habitat code (Ukr.): Tall-herb communities of humid meadows. grassland with Salix cinerea
Habitat code CORINE: Moist or wet eutrophic and mesotrophic grassland
Land use condition: Abandoned
Ownership: State
Type of relief: Undulated relief
Portion of square for mowing / grazing: 5-10%
Portion of arable area: 25-50%
Threats and impacts: Decline of grazing
Flora richness: 25
Shannon index: 2.49
Dominant plant species: Festuca regeliana (20), Deschampsia cespitosa (10), Inula helenium (3).

=> Number of releve: 31

Date: 2013/07/11
Longitude: 32.48822000
Latitude: 50.34082000
Altitude (m): 79
Address: Krucha urochyshche, Pyriatyns'kyi national nature park. Poltava region
Exposure: N-E. Exposure degrees: 30
Syntaxa of vegetation: aliance Alnion incanae (=Alno-Ulmion), class Querco-Fagetea. Plant community is a derivate of riverine Alno-Ulmion forests.
Tree crown cover (%): 40
Herb stand cover (%): 20
Type of relief: plain hilly
Element of relief: foot of riverine slope
Micro-(nano-) relief: hilly
Geomorphological processes: sheet erosion
Habitat code (Ukr.): flooded [Quercus-Ulmus-Fraxinus] woods (suballiance Ulmenion minoris)
Habitat code CORINE: Fluvial [Fraxinus] - [Alnus] and [Quercus] - [Ulmus] - [Fraxinus] woodland
Land use condition: Abandoned
Watercourse condition: Watercourse preferably in natural condition with poor changes of riparian vegetation
Portion of square for mowing / grazing: 0-5%
Portion of arable area: 0%
Threats and impacts: erosion
Flora richness: 16
Shannon index: 2.06
Soil attributes: Chermozems Haplic, poor-humused, silty and loamy on loess deposits
Dominant plant species: Acer negundo (20), Alnus glutinosa (10), Ulmus laevis (10), Robinia pseudoacacia (5), Rubus caesius (2), Salix fragilis (5). Floristic composition is poor and transformed.

=> Number of releve: 34

Date: 2013/07/11
Longitude: 32.53180000
Latitude: 50.23183000
Address: Massalskyi ostryv, Pyriatyn town, Pyriatyns'kyi region, Poltava region
Element of relief: oxbow depression
Syntaxa of vegetation: class Alnetea glutinosae. Dominant

classification association -Alnetum thelipteridosum

Tree crown cover (%): 60

Herb stand cover (%): 60

Soils: peat bog saliniferous derivative from Histosols Terric

Soil attributes: solonetsous saliniferous

Habitat code (Ukr.): [Alnus glutinosa] plain swamp forests. Forest habitat type: C5.

Geomorphological processes: water flooding and swamping

Habitat code CORINE: Broadleaved swamp woodland not on acid peat

Land use condition: Abandoned

Ownership: State

Type of relief: Plain flat terrain

Watercourse condition: Watercourse preferably in natural condition with poor changes of riparian vegetation. Groundwater level - 60cm under soil surface.

Portion of square for mowing / grazing: 0-5%

Portion of arable area: 0%

Flora richness: 15

Shannon index: 1.97

Dominant plant species (% of cover): Alnus glutinosa (60), Thelypteris palustris (60), Carex riparia (20), Caltha palustris (10).

=> Number of releve: 35

Date: 2013/07/13

Longitude: 32.60457000

Latitude: 50.18313000

Altitude (m): 95

Address: Kuty uroshychshe, below Deimanivka village, Pyriatynskyi national park, Poltava region,

Type of relief: plain undulated. Surface flat with marshy depressions

Element of relief: river terrace

Micro-(nano-) relief: Undulated relief

Syntaxa of vegetation: order Molinietalia, class Molinio-Arrhenatheretea

Herb stand cover (%): 100

Soils: Planosols Eutric. Soil attributes conserved in TurboVeg

Habitat code (Ukr.): [Molinia caerulea] meadows

Habitat code CORINE: Moist or wet eutrophic and mesotrophic grassland

Land use type: Nature reserved area

Land use condition: Abandoned

Watercourse condition: Watercourse preferably in natural condition with poor changes of riparian vegetation

Portion of square for mowing / grazing: 5-10%

Portion of arable area: 1-10%

Threats and impacts: Decline of grazing

Flora richness: 17

Shannon index: 2.34

Dominant plant species (% of cover): Molinia caerulea (60-80), Geranium palustre (10-20), Festuca regeliana (5).

=> Number of releve: 36

Date: 2013/07/15

Longitude: 32.49802000

Latitude: 50.30347000

Altitude (m): 102

Address: Keibalyvka, Pyriatynskyi national nature park, Poltava region, permanent plot #7 of reed mowing

Syntaxa of vegetation: aliance Phragmition communis W.Koch 1926, class Phragmito-Magnocaricetea

Herb stand cover (%): 100

Max. height of herb stand (cm): 360

Habitat code (Ukr.): communities of tall helophytes on riverine and flooded areas

Habitat code CORINE: Water-fringing reedbeds and tall helophytes other than canes

Land use condition: Abandoned

Type of relief: Plain flat terrain

Soils: peat bog saliniferous derivative from Histosols Terric

Watercourse condition: Watercourse preferably in natural condition with poor changes of riparian vegetation. Regularly flooded

Threats and impacts: Decline of grazing

Dominant plant species: Phragmites australis

=> Number of releve: 39

Date: 2013/10/11

Syntaxa of vegetation: aliance Phragmition communis W.Koch 1926, class Phragmito-Magnocaricetea.

Longitude: 32.55753000

Latitude: 50.22702000

Altitude (m): 96

Address: Pyriatynskyi national nature park, Poltava region. Route from Pyriatyn to Sumy town, on the North-West, behind Pyriatyn waste water treatment facility. Stationary plot No4-5 of reed mowing

Habitat code (Ukr.): communities of tall helophytes of riverine and flooded areas

Habitat code CORINE: Reedbeds normally without free-standing water

Land use condition: Abandoned

Type of relief: Plain flat terrain

Drainage condition: No artificial drainage and water intake. Seasonally flooded.

Watercourse condition: Watercourse preferably in natural condition with poor changes of riparian vegetation

Threats and impacts: Decline of grazing

Soil type: Histosols Terric, turf-mud soil

Soil attributes: solonetsous saliniferous peat bog. Along the margins of riverbed – Planosols Eutric sod-loamy on alluvium

Herb stand cover (%): 100

Max. height of herb stand (cm): 220

Dominant plant species: Phragmites australis.

APPENDIX 5

NATURAL HABITATS UNDER PROTECTION OF BERN CONVENTION (1979) OCCURRED ON THE FLOODPLAIN IN THE PARK

Habitat code under Resolution No. 4 (1996) of the Convention	Cover, % of the park area	Representatively	Relative Surface	Conservation status	Global assessment
D5.2 Beds of large sedges normally without free-standing water	20	B	C	A	B
E2.25 Continental meadows	10	C	C	B	C
E3.4 Moist or wet eutrophic and mesotrophic grassland	30	A	C	B	B
E5.415 Eastern nemoral riverbanks with tall herb communities	4	B	C	B	C
E5.424 - Eastern nemoral tall-herb communities of humid meadows	1	B	C	B	C
G1.11 - Riverine [Salix] woodland	10	A	C	A	C
C1.222 - Floating [Hydrocharis morsus-ranae] rafts	<1	D	-	A	C
C1.223 Floating [Stratiotes aloides] rafts	1	B	C	A	C
C1.224 Floating [Utricularia australis] and [Utricularia vulgaris] colonies	<1	B	C	B	C
C1.225 Floating [Salvinia natans] mats	1	A	C	A	C
C1.3413 - [Hottonia palustris] beds in shallow water	<1	C	C	B	C

Footnotes: according to the Emerald Standard Data Form and Annex I of Resolution 4 (1996) of the Bern Convention,

- Representatively of the natural habitat type on the site: A – excellent, B – good, C – significant, D - non-significant.
- Relative surface: A 100% >= p > 15%; B 15% >= p > 2%; C 2% >= p > 0%.
- Conservation status (structure, functions, restoration possibility): A – excellent, B – good, C – moderate conservation or conservation with losses.
- Global assessment (of significance of the Object to conserve habitats): A – excellent, B – good, C – important.

APPENDIX 6

PROPOSALS INCLUDED INTO THE "MANAGEMENT-PLAN"[1] OF THE NATIONAL NATURE PARK "PYRIATYNSKYI" FOR NEXT 10 YEARS

The area of Pyriatyns'kyi district (Poltava region, Ukraine) nearby the rivers Udai, Orzhytcya, Perevod includes flooded meadows and woodland landscapes, used traditionally for grazing, haymaking and building with natural materials like reed. True natural, resource and recreational values of this area are associated exactly with such social-ecological systems and require nature management to be sustained.

Adaptive co-management systems are a good option in this case. These systems are defined as flexible community-based systems of nature resource management tailored to specific locations and situations, supported by and working with various organizations at different levels (Folke et al. 2003).

Progress towards an adaptive co-management involves (Olsson, P., C. Folke, and T. Hahn. 2004):

- coordinating information and ongoing activities,
- building knowledge and understanding of ecosystem dynamics,
- developing a social network for ecosystem management.

The work of our experts and staff of the Park involved in the studies of floodplains is focused on achieving these objectives.

Our studies, as well as some foreign researches (Olsson, P., C. Folke, and T. Hahn., 2004) demonstrate that nationally protected areas including flooded meadows and fresh marshes need improved management practices to prevent them from becoming overgrown. At the same time such practices will support both high diversity and quantities of living orhanizms like endangered birds, mammals, insects, plants.

The urgent steps towards sustainable management of the Park area are the next:

a) annual haymaking in recent amounts to be sustained and not be considered a negative impact on the natural lands of the Park.
b) provide an increase of haymaking areas on the floodplain including reserved zones within the Park (in the last case – based on resolutions of the Scientific and Technical Council).
c) Search for investments for development of haymaking, harvesting of reed, sustaining sufficient quantities of livestock, local cutting of shrubs to restore areas of flooded meadow and marsh landscapes.

Grazing should be considered a traditional form of farming and nature management that has moderate impact on natural lands in local conditions. The most benefit of grazing and haymaking for preserving landscapes is sustaining stability of grassland ecosystems and containment from becoming overgrown by shrubs and woods.

The guiding principle of nature management: grazing and haymaking are allowed in the extent that they do not cause a significant decrease in the number and area or extinction of rare and endangered species of plants and animals within certain natural lands and durable changes of the habitat or territory.

Systems of grazing or otherwise removal of green herb mass (in particular, mowing) provide grassland ecosystems to be stable, stop the overgrown shrubs and woods. By mowing hay on the flooded meadows, human removes relatively small portion of biological production, just aboveground mass, 1/5-1/2 of the total plant mass.

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[1] - *("Management-Plan" is an official document with the title «Development of the Draft for Land Management of the National Park "Pyriatynskyi", for Protection, Rehabilitation and Recreational Use of its Natural Resources and Objects», 2013)

At present, in surroundings of the Park there are only three agricultural enterprises with extant livestock farms. The vast majority of land users are local residents - individuals. Grazing is carried out without great accumulation of cattle in one location while framework of grazing areas is branched and changeable. Haymaking is mainly carried out by trailed mowers, remains – by motorized spits and by hands.

Separately for grazing and haymaking it is needed to identify appropriate lands, to estimate harvesting capacities, limits and terms of utilization. The most appropriate mode of managing lands on the floodplain is mixed system where grazing and haymaking rotate.

Each year areas for grazing should be limited. Under limits grazing is acceptable and even useful disturbance in natural successions on the floodplain for to maintain biodiversity and landscape diversity. While grazing there should be needed so far as possible to minimize harmful impacts of watering livestock on aquatic environment of the Park.

Ecological routes should be implemented and refined. Nowadays in the Park there are developed three routes through key reserved locations. Along the routes visitors can observe the most picturesque landscapes, bird life, and various flying insects. Priority objects are the next ones: white egret, gray egret, common crane, common moorhen, western marsh harrier; traces of mammals – beaver and otter.

In locations for conservation of endangered species nature management should be aimed at sustaining the mosaic and diversity of landscapes. It is recommended sustaining haymaking and moderate grazing on river slopes to resist overgrown shrubs and woods.

REGULATION OF GRAZING ON THE FLOODPLAIN FOR PREVENTING BECOMING OVERGROWN BY WOODS (SOME EXCERPTS FROM THE GUIDANCE)

Adaptive grazing systems in the Park should conserve recreational attractiveness of the area and sustain a landscape.

Floodplain meadows in the studied region are constant pastures provided sustainable management. Re-growth and yield of meadow pastures are mostly affected by frequency of flooding. Due to repeated and sufficient flooding utilization of floodplain meadows as pastures is especially effective.

Regulated grazing is based on:

1) limits of the allowable number of cattle according to the square of pastures and productivity;

2) compliance of terms, duration, frequency and sequence of grazing on land sections.

Low level of free grazing ranges: 1 ha of natural meadows per 0, 24-0, 3 nominal head of cattle; 1 nominal head of cattle per 3-4 hectares.

Medium level of free grazing ranges: 1 ha per 1 nominal head of cattle.

While grazing within pasture units cattle is kept in one unit for 3-4 days. Before returning cattle the re-growth of herb stands in a unit lasts 18-21 days in May - early June and 36 days - in August.

The drier conditions, the rarer soil moisturizing - the lower frequency of returning cattle on pasture units is recommended.

It should follow scientific advices (Andreev, 1985; Bogovin et al., 1990; Arhypenko et al., 2008; Abduloieva et al., 2009) regarding timing, the beginning and end of grazing, duration of rest for re-growth of herb according to the type of lands and meadows avoid Grazing marshes and wetlands should be avoided, as well as on littoral zones of watercourses.

Grazing period continues about 150 days. Each pasture unit should be grazed not more that 4-5 times per grazing period on floodplain meadows and not more than 3 times – on lowland and upland meadows. Cattle can be rotated between pasture units each 30-38 days on flooded meadows; 50 days - on drier meadows.

It is needed to have 7-10 pasture units in flooded meadows, of a total area 35-50 ha; 12 or more units in drier meadows, of a total area 60 hectares.

Table 1. Evaluation of pasture areas in the land fund of local village councils within the territory of the Park

Villages and their local councils	Number of cattle, ind.	Square of pastures, hectares	Average square, ha*1 nominal head of cattle^{-1}	Compliance to limits (3-4 ha*1 nominal head of cattle^{-1}
Velyka Krucha	90	330	3.7	Sufficient square
Deimanyvka	120	800	6.7	Sufficient square with large reserve fund
Kharkivtcy	78	320	4.1	Sufficient square
Kaplyncy	130	330	2.5	Not sufficient square
Sasynivka	140	670	4.8	Sufficient square with presence of reserve fund
Davydivka	137	420	3.1	Sufficient square
Berezova Rudka	180	910	5.1	Sufficient square with large reserve fund
Oleksandryvka	90	200	2.2	Not sufficient square
Town council of the Pyriatyn town	30	120	4.0	Sufficient square
Grabaryvka	60	100	1.7	Not sufficient square

Determining limits of grazing

To determine the required square of pasture there are used the following calculations.
The daily portion of green mass:

$$P_d = \frac{H * L_{dh}}{Y * k} \quad [1],$$

P_d – daily square for grazing in hectares,

H – number of cattle in a herd in nominal heads (500 kg per 1 nominal head)

L_{dh} – limit of green herb per nominal head of cattle for a day, in kg,

Y – productivity of the pasture before grazing, in kg*ha^{-1},

K – portion of herb stand eaten, in %.

Example 1: What is the daily area for grazing required for a herd of 50 cows when there is needed 60 kg*day^{-1} of green mass per nominal head? 1 nominal head of cattle is equal to average milch cow weighing 500 kg. Portion of herb stand to be eaten is about 40%. Herb yield is 6000 kg*ha^{-1} (60 hundredweights*ha^{-1}) of green mass.

$$P_d = \frac{50 * 60}{6000 * 40/100} = 1.25 \text{ ha}$$

If herd is grazing on a pasture unit for 4 days, then the square of a unit to be at least 5 ha.

Example 2: How many cows can feed on natural pasture with an actual yield of 4000 kg*ha^{-1}? Grazing period covers 140 days and portion of herb stand eaten (k, %) is 50%.

$$RC_d = \frac{Y * k}{L_{dh} * T} \quad [2]$$

RC_d is requested capacity of a pasture namely quantity of livestock to feed a pasture for certain time interval. T – grazing period, in days. The others values are the same as in the [1] equation.

$$RC_d = \frac{4000 * 50/100}{60 * 140} = 0.24 \text{ nominal heads of cattle per hectare}$$

Requested capacity of a pasture for the whole grazing period:

In some foreign systems of pastures there is decided to add 15-25% for reserve fund to the calculated limits of the square. This can be useful for years when harvest fails or other unfavorable circumstances happen.

Combined systems of grazing and haymaking

For every three years there is planned a cycle where grazing and haymaking rotate.

Two fields are selected. First year on the first field grazing continues from the beginning of the grazing period till the middle of June, afterwards it leaves for haymaking and silage; the second field to be mowed in May-June, afterwards latter re-growth of herb to be grazed in late summer. In autumn grazing covers all the fields, remains to be mowed in the end of grazing. Under such mode herb stand becomes denser and soil compaction - weaker. If there are noticed decrease of harvest, falling density of herb stand and sward the fields should rest for two years: one year for dissemination and one year – for strengthening young plants.

Haymaking

Yield of the most floodplain meadows with good moisturizing in the Park ranges 17-40 hundredweights of hay per hectare.

In floodplain meadows on rich soils there can be made two harvests of hay beginning from the phase of early flowering of grasses. Herb stands of low re-growth should be grazed after first mowing.

In cases of meadows where endangered plants like orchids and sword lily are registered it is recommended to make hay after dissemination of these plant populations, since the second decade or the middle of July; in locations of *Epipactis palustris* – later, in August.

For locations where endangered plants are registered such as *Orchis palustris*, *Dactylorhyza* sp., *Epipactis palustris, Gladiolus tenuis*, it is recommended free grazing of poor or moderate level that ranges: 0.2-0.3 nominal heads of cattle per hectare or 3,7-5 hectares per a nominal head of cattle.

Any type of floodplain meadows should be given time to spread seeds at least each 3 years. With this aim in a given year haymaking is allowed only after dissemination of the most dominant grasses and forbs.

APPENDIX 8
PRECONDITIONS
FOR NATURE PROTECTION MANAGEMENT IN THE PARK

Meadow-pasture landscapes appeared spread on the floodplain due to developed traditional systems of haymaking and grazing.

Such economic activities like building for industrial and commercial purposes, irrigation, industries, heavy transport were not introduced in the past on the area.

On the given river floodplain the next activities occurred in the past: intensive grazing and haymaking, drainage of waterlogged floodplains of small rivers, transforming channels of small rivers, dividing the entire floodplain of small rivers by melioration drainage artificial channels, peat extraction, mowing of common reed, vegetable and melon crops on the drained floodplain, cultivation of artificial sown meadows, local livestock and water pollution by animal waste, shipping of small rivers, locally - recreation.

In the past on the floodplain of the Udai River branches there had been applied complex of melioration measures for a long time to improve conditions for agriculture. Most wetlands and flooded lands along small rivers within the Pyryatyns'kyi district were drained. Peat extraction was associated with the floodplain and lowland terrains of the second river terrace. Much of the flooded areas was sufficiently transformed and now represents modified versions of eutrophic herbaceous and shrub ecosystems.

Table 2. Ways of controlling human-made disturbance upon floodplain landscapes in the region

Forms of transformation	Objects	Spatial distribution	Measures of sustainable management
Arable lands	Fields and crops	patches	Regulating amounts of chemicals and fertilizers
Stockbreeding	Pastures	patches	Limits of grazing
	Haymaking lands	Punctate and patches	Limits of haymaking
	Places for holding and watering livestock	punctate	Arranging borders
Industries	Some factories along the river	Linear or mosaic	Monitoring of environmental quality of the locations under influence, sustaining shelter woodlines
Building and exploitation of buildings	Highways, power lines, pipelines, gas line	linear	Arranging shelter woodlines
fires	Fields, haymaking lands, reeds	mosaic	Preventive measures like mowing of reed in winter, preventive ditches, advance restriction involving the staff of the Park
recreation	Forests, camps, beaches	Punctate and spatch	Forbiddance of commercial using of natural resources, limits for general using of natural resources
hunting	Forests, wetlands,	patches and stripes	Complete forbiddance.

Forms of transformation	Objects	Spatial distribution	Measures of sustainable management
	marshes		Control poaching
Fishery and picking invertebrates	Rivers and ponds	Stripes and punctate	Complete forbiddance for commercial use, limits for general using
Mortalities of animals on highways, crop lands	Transporting routes and crop fields	punctate	Ecological education, increasing awareness through information campaigns, boards and restrictive signs
Water drainage and melioration of watercourses, water pollution	Riverbeds of rivers, artificial channels	Stripes, patches, punctate	Certification of watercourses, identification of sources of pollution. Compliance with sanitary and quarantine regulations
Biological pollutions and invasions	Disturbed habitats	punctate	Local measures for clearing the invaded poaches of containment of invasive populations

Table 3. Administrative and economic division of the area of the national park "Pyriatynskyi"

Divisions, the is land users and land owners	Square of lands, ha	Portion of square of the whole Park area, %
Berezova Rudka division:	1640,12	13,6
Berezova Rudka village council	846,74	7,0
Grabarivka village council	190,8	1,6
Oleksandrivka village council	100,00	0,8,00
College of Berezova Rudka village of Poltava State Agrarian Academy	90,92	0,8
State agricultural enterprise «Berezivske»	411,66	3,4
Keibalyvs'ke division:	4962,8	41,3
Davidivka village council	1020,0	8,5
Sasynivka village council	2180,8	18,1
Pyriatyn town council	800,0	6,7
State enterprise "Pyriatyns'ke forestry »	962,0	8,0
Kharkivets'ke division:	5425,5	45,1
Velyka Krucha village council	1012,0	8,4
Deimanivka village council	1547,7	12,9
Kaplyntcy village council	1174,2	9,8
Kharkivtcy village council	880,0	7,3
Open Joint Stock Company «Kaplyntcyvs'ke»	149,0	1,2
State enterprise «Pyriatyns'ke forestry »	662,6	5,5
IN TOTAL	12028,42	100

Thus, lands of the Park are divided among land users and owners in such way: 46% of lands are in constant using of the Park, 35% are reserved lands not given for using or ownership, 13,5% - lands in using of state forestry's, about 5% - lands in other using.
So, at the moment the park can directly manage and effect on the management of about half of its lands.

Table 4. Land owners and land users within the area of the Park

Owners of lands, land-users and lands of state ownership	Square of the Park area	
	hectares	%
Agricultural enterprises	560,66	4,6
Residents who are users or owners of lands	-	-
Institutions and organizations: industrial and other enterprises, companies of transporting and communications; divisions, companies and institutions of state defence, schools	90,92	0,8
Lands in constant using of the Park	5555,14	46,2
Companies and organizations for recreation	-	-
Companies and organizations of historical and cultural significance	-	-
Forestry enterprises	1625,0	13,5
water management companies	-	-
Enterprises of foreign investors and joint ventures	-	-
Reserved lands and lands not given for ownership or constant using within a locality	-	-
Reserved lands and lands not given for ownership or constant using outside a locality	4196,70	34,9
IN TOTAL	12028,42	100

Table 5. Areas of natural lands in the Park

Type of lands	Total square in the Park, ha	Portion of square in the Park, %	Area belonging to floodplains
Wetlands and marshes	7175,4	59,7	completely
Haymaking lands and pastures on meadows	3173,59	26,4	70%
Woods	1280,65	10,6	80%
Open watercourses	398,78	3,3	-
IN TOTAL	12028,42	100	-

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