Directorate for **Nature Management**

Note 2004 – 1

Traditional cultural landscapes in the Barents Region - the KNP model

Report on the initial phase of the project



Environmental collaboration



Nature areas and their use



Flora and fauna



Outdoor recreation

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Традиционные культурные ландшафты Баренцева региона – модель КНП

Отчет о начальной фазе проекта

Note 2004-1

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Abstract

This DN-notat is a report on the initial phase of the project "Developing traditional cultural landscapes in the Barents Region – the KNP model". The aim with the project is protection and restoration of cultural landscapes in Kenozero National Park in the south-west part of the Archangelsk region. To maintain the biodiversity and other values of the cultural landscape it is necessary to develop efficient management methods for especially valuable abandoned areas and good agricultural methods for living villages. Kenozero National Park has been a prioritised area for cultural heritage for many years within the cooperation work on environmental issues between The Soviet Union and Norway, based on an agreement resigned in 1992. The Kenozero National Park is a unique area of cultural landscape complexes. However, it is threatened by re-growth as many other valuable cultural landscapes in Europe. A cooperating project for protection and restoration of cultural landscapes within the park was therefore initiated in 2002. This report presents some examples of semi-natural vegetation types in the park and their characteristic species as well as the re-growing threats. It also illustrates the opportunities for the park to focus on the cultural landscapes and their biodiversity values in connection with tourism. The Norwegian Directorate for Nature Management and the RF Ministry of Natural Resources are responsible for this project.

Резюме

Настоящая публикация является отчетом о начальной фазе проекта "Развитие традиционных культурных ландшафтов Баренцева региона – модель КНП". Целью проекта является охрана и восстановление культурных ландшафтов Кенозерского национального парка, расположенного в юго-западной части Архангельской области. Для сохранения биоразнообразия и других ценностей культурного ландшафта необходима разработка эффективных методов управления растительностью наиболее ценных брошенных ареалов, а также перспективных сельскохозяйственных методов для живых поселений. Кенозерский национальный парк уже много лет является приоритетным объектом охраны культурного наследия в рамках сотрудничества между Советским Союзом и Норвегией по природоохранным вопросам, на основе договора, обновленного в 1992 г. Кенозерский национальный парк – уникальная территория, содержащая культурно-ландшафтные комплексы. К сожалению он, как и многие другие ценные культурные ландшафты Европы, находится под угрозой зарастания. По этой причине в 2002 г. был начат совместный проект по защите и восстановлению культурных ландшафтов парка. Настоящий отчет дает примеры полуестественных типов растительности парка, характерных для них видов растений, а также процессов зарастания, угожающих им. Отчет также иллюстрирует возможности парка уделять внимание культурным ландшафтам и биоразнообразию в связи с туризмом. Во главе проекта стоят Норвежское Управление по охране природы (Direktoratet for naturforvaltning) и Министерство природных ресурсов РФ.

Preface

The bilateral Russian-Norwegian Commission on cooperation on environmental issues is led by the Russian Federation Ministry of Natural Resources and the Norwegian Ministry of Environment. The commission decided at its annual meeting in Tromsø in April 2002 to make Kenozero National Park in the Archangelsk region one of its three main target areas for future cooperation. In addition to cultural heritage cooperation, the commission program for the park also includes biodiversity, active development of the cultural landscapes, social development and eco-tourism.

One of the main new projects adopted by the commission was the protection and restoration of cultural landscapes within the park. The general coordinator of the Kenozero National Park target area is the Norwegian Directorate for Cultural Heritage and the Russian Research Institute for Culture and Nature Heritage. The Norwegian Directorate for Nature Management and the Russian Federation Ministry of Natural Resources are, however, responsible for this new cultural landscape project. They have appointed Ann Norderhaug, the Norwegian Crop Research Institute, as the leader of a Russian-Norwegian expert group that shall follow the project and take part in the development of a good management of the valuable cultural landscapes. The other members of the group are Marina Kuleshova (the Russian Research Institute of Culture and Nature Heritage), Vladimir Kalutskov (the Moscow State University), Denis Tormosov and Alexander Kozykin (Kenozero National Park), Akse Østebrøt (Norwegian Directorate for Nature Management) and Nils Midgaard (Vefsn Agricultural College).

This report on the initial phase of the project is written by Ann Norderhaug and Hanne Sickel, The Royal Norwegian Society for Development. The Norwegian Directorate for Nature Management wants to thank all those who has taken part in or supported the project, with special thanks to Elena F. Shatkovskaja, General Director for the park, and to those who organized the excursions and field work.

Trondheim, January 2004
Berit Lein
Assitant Director General

Предисловие

Российско-норвежское сотрудничество по вопросам охраны окружающей среды проводится под руководством Министерства природных ресурсов РФ и норвежского Министерства охраны окружающей среды. На ежегодном заседании комиссии в Трумсе в апреле 2002 г. было решено дать Кенозерскому национальному парку в Архангельской области статус одного из трех главных объектов будущего сотрудничества. Программа по парку включает не только сотрудничество по культурному наследию, но также и биоразнообразие, активное развитие культурных ландшафтов, социальное развитие и экотуризм.

Один из главных новых проектов, принятых комиссией – охрана и восстановление культурных ландшафтов парка. Координаторами работы, проводимой с Кенозерским национальным парком, являются Норвежское Управление по культурному наследию (Riksantikvaren) и Российский НИИ культурного и природного наследия. Ответственны за этот новый проект по культурным ландшафтам Норвежское Управление по охране природы (Direktoratet for naturforvaltning) и Министерство природных ресурсов РФ. Анн Нурдерхауг из Норвежского НИИ сельскохозяйственных культур (Planteforsk) является руководителем российско-норвежской экспертной группы, которая должна следить за проектом и участвовать в разработке правильного управления ценными культурными ландшафтами. Остальные члены группы – М. Кулешова (Российский НИИ культрного и природного наследия), В. Калуцков (МГУ), Д. Тормосов и А. Козыкин (Кенозерский национальный парк), Аксе Эстебр_т (Норвежское Управление по охране природы) и Нильс Мидгорд (Сельскохозяйственный колледж в Вефсне).

Авторами настоящего отчета о начальной фазе проекта являются Анн Нурдерхауг и Ханне Сиккель из Королевского общества развития Норвегии (Det Kgl. Selskap for Norges Vel). Норвежское Управление по охране природы желает выразить свою благодарность всем, кто участвовал или оказывал поддержку проекту. Особую благодарность мы хотим выразить генеральному директору парка Е. Шатковской, и всем, кто сделал экскурсии незабываемыми!

Трондхейм, январь 2004 г.
Берит Лейн,
директор

Summary

Kenozero National Park is a remarkable example of Northern-European cultural landscapes where the connection between nature and culture is still evident. The National Park contains numerous elements of cultural heritage. It has therefore been a prioritised area for cultural heritage for many years within the Russian-Norwegian cooperation regarding environmental issues. The complex mixture of natural and cultural landscapes, however, also creates a high biodiversity both with regard to the landscape, habitat and species level.

The biodiversity as well as the cultural heritage of Kenozero National Park are now threatened by land use changes and re-growth. To maintain the high biodiversity and the traditional landscape structure in the park it is therefore necessary to restore and manage cultural landscapes and valuable semi-natural vegetation types. A new project regarding the protection and restoration of cultural landscapes within the park was therefore initiated in 2002. The main aim of the project is to develop efficient management methods for especially valuable uninhabited and abandoned areas and agricultural methods for living villages that maintain the biodiversity and other landscape values. To stimulate the locals to take part in the maintenance of the landscape qualities in the vicinity of the living villages, it is necessary to take the farmers need of economic benefit into consideration when developing agricultural methods. Norwegian projects have shown that this is possible. Knowledge of traditional agricultural methods from before the Sovjet period is important in this connection. Investigation of traditional agricultural methods and how they have created different semi-natural vegetation types is therefore included in the project work.

Two model sites have been chosen for the project:
- the village Porzhinskoye, that was abandoned fifteen years ago
- Zikhnovo, a still living village.

In these two villages and their surroundings the different meadow types have been registrated and mapped. Species lists for the meadows have also been made. This meadow type registration has been supplemented by excursions to other parts of the park. The registration shows the importance of the traditional managed (i.e. semi-natural) meadows for the total biodiversity of the park with regard to species. It also shows the importance of the meadows for the landscape diversity and impression. They represent what we today call a sustainable nature resource utilization and are important elements in the pastoral landscape of the park.

Краткое содержание

Кенозерский национальный парк – замечательный пример североевропейских культурных ландшафтов, где связь между природой и культурой все еще отчетливо заметна. Национальный парк содержит многочисленные элементы культурного наследия. По этой причине парк уже много лет является приоритетным объектом охраны культурного наследия в рамках российско-норвежского сотрудничества по вопросам охраны окружающей среды. Но сложный комплекс природных и культурных ландшафтов создает также и высокое биоразнообразие, как на ландшафтном, так и на экосистемном и видовом уровне.

Как биоразнообразие, так и культурное наследие Кенозерского национального парка в настоящее время находятся под угрозой из-за изменений в использовании ареалов, и зарастания. Для сохранения высокого биоразнообразия и традиционной структуры ландшафтов поэтому необходимо восстанавливать ландшафты и ценные полуестественные типы растительности и управлять ими. Поэтому в 2002 г. был принят новый проект по охране и восстановлению культурных ландшафтов парка. Главная цель проекта – разработать эффективные методы управления для особенно ценных незаселенных и брошенных ареалов, и сельскохозяйственные методы для обжитых поселений, способные сохранить биоразнообразие и другие ландшафтные ценности. Для того, чтобы успешно привлечь местное население к участию в сохранении ландшафтных ценностей вблизи живых поселений, необходимо при разработке сельскохозяйственных методов принимать во внимание потребность крестьян в экономической выгоде. Норвежские проекты показывают, что это последнее возможно. Знание традиционных сельскохозяйственных методов досоветского периода имеет в связи с этим большое значение. Изучение традиционных сельскохозяйственных методов, и каким образом они способствовали созданию разных типов полуестественной растительности, поэтому включено в задачи этого проекта.

Для проекта были выбраны два модельных пункта:
- деревня Порженское, заброшенная 15 лет назад
- Зихново, поныне живая деревня

В этих двух деревнях и их округе были зарегистрированы и занесены на карты различные

Norwegian psychological research shows that most people are very attracted by such pastoral landscapes. This makes them to a special resource with regard to eco-tourism. Many research projects show that species-rich semi-natural meadows are hard to recreate. This underline the necessity of finding ecological sound management methods to maintain remaining valuable meadows and cultural landscapes in the park.

The registration also shows how the history can be read in the landscape by traces leaved by traditional agricultural methods, also in the forests. In Kenozero National Park traditional agriculture included slash and burn. This has not been practiced for several decades but still the forest structure and the existence of some plant species may tell about the former land use.

To keep the landscape open in un-populated areas a pasture cultivator has been used to restore abandoned meadows and some deciduous forests have been thinned. Experiences from a Norwegian project, however, show that these management methods may be successful only on certain circumstances. The effects of different management methods are therefore studied as part of the project. This outtrying of methods must, however, go on for some years before any results can be reported. The effects of different management methods are therefore studied as part of the project. This outtrying of methods must go on for some years before any results can be reported. So far it seems, however, as a succesfull management probably imply a supplement to the pasture cultivator by other management methods as for example hay cutting or grazing.

The registration of important areas with regard to biodiversity in Zechnovo, shows that many of the most important areas are situated in the village or very close to the village. A number of plant species were here registrated in several different meadow types, road sides and field margins. The highest number of species was registrated in traditionally managed meadow types with long continuity and little or none manuring or fertilization. To keep the high level of biodiversity within the area it is important to maintain all the different habitats. Since they are situated in or near the village this is probably not a too difficult task. The management methods include continued grazing and hay cutting. The farm animals are in other words an important resource with regard to maintenace of the biodiversity in the living villages. If good agricultural meathods are developed they may also be an important resource with regard to the farmers economy. Hopefully, the Norwegian experiences showing that "ecology and economy" can be combined, may be useful in this connection.

типы луговых сообществ. Были составлены списки видов для каждого луга. Регистрация типов луговых сообществ была дополнена засчет экскурсий в других частях парка. Результаты регистрации показывают значение традиционно управляемых (т.е. полуестественных) лугов для общего биоразнообразия парка на видовом уровне. Они также показывают значение лугов для ландшафтного разнообразия и для впечатления, которое ландшафты оставляют. Они являются примерами того, что в наше время часто называют экологически ответственным использованием природных ресурсов, и являются важными элементами пасторального ландшафта парка. Норвежские психологические исследования показывают, что большинство людей сильно привлечены такими пасторальными ландшафтами. Это делает их особенными ресурсами для экотуризма. Многие научно-исследовательские проекты показывают, что богатые видами полуестественные луга очень трудно создать заново. Это подчеркивает необходимость выявления экологически здоровых методов управления оставшимися ценными лугами и культурными ландшафтами парка.

Регистрация также показывает, как возможно читать историю ландшафта по следам, которые оставляли традиционные сельскохозяйственные методы, в том числе и в лесах. На территории Кенозерского национального парка традиционное земледелие включало подсечно-огневые приемы. Эти приемы уже много десятилетий не практикуются, но тем не менее структура леса и наличие некоторых видов растений все еще свидетельствуют о прежних методах землепользования.

С целью сохранения открытого характера ландшафта в незаселенных территориях для воссоздания брошенных лугов использовался культиватор, и некоторые лиственные леса прореживались. Опыт одного норвежского проекта, однако, показывает, что такие методы управления растительностью могут иметь успех только при определенных условиях. Поэтому эффект разных методов управления растительностью особо изучался как часть проекта. Испытание методов, естественно, должно еще продолжаться несколько лет, прежде чем будет возможным опубликовать результаты. На данный момент кажется, что успешное управление будет иметь предпосылкой, что использование культиватора должно сопровождаться другими методами управления растительностью, как например сенокос и выпас скота.

Регистрация важных для биоразнообразия ареалов в Зихново показывает, что многие из самых важных ареалов находятся в самой деревне или очень близко к деревне. Ряд видов растений здесь были отмечены в нескольких разных типах лугов, обочин дорог и окраин полей. Самое высокое число видов было отмечено в использованных традиционным образом лугах с длительной непрерывной историей использования и без, или почти без унаваживания или удобрения. Чтобы сохранить высокий уровень биоразнообразия на территории парка необходимо сохранить все разные типы среды. Так как они расположены близко к деревне, это представляется не слишком трудной задачей. Методы управления включают продолжение выпаса скота и сенокоса. Сельскохозяйственные животные, иными словами, являются важным ресурсом для содержания биоразнообразия живых деревень. Если удастся разработать перспективные сельскохозяйственные методы, они также могут стать важным ресурсом по отношению к экономике крестьян. Надеемся, что норвежский опыт, показывающий возможность совмещения "экологии и экономики", может оказаться полезным в этом плане.

Photo chart 1.

Agriculture in Kenozero has created many different types of meadow, which provide living conditions for a number of plant and animal species. Many of these species are in decline (including in Norway) due to changes in management practices and as a result of overgrowing.

Таблица 1.

Сельское хозяйство в Кенозере создало много различных типов луговой растительности, которые дают возможности для жизни целого ряда видов растений и животных. Численность многих из этих видов, например в Норвегии, в настоящее время быстро сокращается по причине изменения методов ведения сельского хозяйства и зарастания.

1. Meadows that have been managed using traditional methods over a long period can be very rich in species. This hay meadow near Zikhnovo is still in a good state, and 52 plant species were recorded here. In such well-maintained meadows one can find species such as globeflower Trollius europaeus, ox-eye daisy Leucanthemum vulgare, autumn hawbit Leontodon autumnalis, harebell Campanula rotundifolia, and ragged robin Lychnis flos-cuculi. (Area no. 14, fig.2)

1. Луг, который длительное время подлежал традиционным способам пользования, может быть очень богат видами. Сенокосный луг около Зихново все еще хорошо сохранен, и здесь было найдено 52 разных вида. На таком умеренно увлажненном лугу среди других видов можно найти купальницу европейскую (Trollius europaeus), нивяник обыкновенный (Leucanthemum vulgare), кульбабу осеннюю (Leontodon autumnalis), колокольчик круглолистный (Campanula rotundifolia) и кукушкин цвет обыкновенный (Lychnis flos-cuculi).





2. This meadow near Zikhnovo is still in good condition. This type of meadow develops on moister soils with moderate fertilising, and can have a rich selection of different meadow species. Without proper management such meadows soon become overgrown due to the good mounts of nutrients and moisture in the soil. Here we found around 40 different species including selfheal Prunella vulgaris, spreading bellflower Campanula patula, mouse-ear hawkweeds Hieracium pilosella coll., and field scabious Knautia arvensis all of which are species which soon disappear if a meadow is no longer managed. (Area no. 2, fig.2)

2. Луг у Зихново, который все еще находится в хорошем состоянии. Этот тип лугов развивается на увлажненных почвах при умеренном удобрении и может содержать широкий спектр различных луговых видов. Если такой луг выходит из пользования, он сравнительно быстро зарастает, по причине благоприятных условий питательности и влажности почвы. На этом лугу мы нашли ок. 40 видов, в том числе черноголовку обыкновенную (Prunella vulgaris), колокольчик раскидистый (Campanula patula), ястребинки из группы волосистых (Hieracium pilosella coll.) и короставник полевой (Knautia arvensis), которые все являются быстро исчезающими видами, если луг выходит из пользования.



3. Species-rich meadow on a peninsula in Zikhnovo. Globeflower Trollius europaeus, dominates in the moist parts, whereas common milkwort Polygala vulgaris, is present in large quantities in the drier parts. The peninsula is also a nesting site for common tern Sterna hirundo. (Area no. 16, fig.2)

3. Богатый видами сенокосный луг на полуострове в Зихнове. Купальница европейская (Trollius europaeus) доминирует на более увлажненных участках, а истод обыкновенный (Polygala vulgaris) встречается в большом количестве в сухих частях луга. Полуостров, впрочем, является местом гнездования обыкновенной крачки (Sterna hirundo).



4. Common milkwort Polygala vulgaris is a species that prefers to grow in moist to dry meadows, which are managed in a traditional fashion without large amounts of fertilisers. (Area no.7, fig. 2)

4. Истод обыкновенный (Polygala vulgaris) – вид, произрастающий преимущественно на сухих – умеренно увлажненных лугах, пользование которыми все еще происходит традиционным способом, и которые не сильно удобряются.



5. A meadow near Zikhnovo that is still cut and in addition grazed by cattle and sheep. The dung is in heaps which are later spread over the meadow. Here we found 36 species including common milkwort Polygala vulgaris. (Area no. 12, fig. 2)

5. Луг у Зихново, который все еще косят, и на котором кроме этого выпасают коров и овец. Навоз собирается в кучи, для того чтобы его потом равномерно распределить по лугу. Здесь мы нашли ок. 36 видов, среди них истод обыкновенный (Polygala vulgaris).



6. Dry meadow, or more correctly a dry slope, on Medvezhy Island (Bear Island). Large junipers Juniperus communis are an impressive feature of such meadows. Amongst species which typify dry meadows within the Kenozero National Park are burnet saxifrage Pimpinella saxifraga, common milkwort Polygala vulgaris, mountain everlasting Antennaria dioica, greater knapweed Centaurea scabiosa, and tormentil Potentilla erecta.

6. Сухой луг, или скорее сухой склон, на о. Медвежьем. Крупные колоннообразные можжевельники (Juniperus communis) – живописная особенность этих лугов. Среди видов, характеризующих сухие луга Кенозерского национального парка, можно назвать бедренец камнеломку (Pimpinella saxifraga), истод обыкновенный (Polygala vulgaris), кошачью лапку двудомную (Antennaria dioica), василек шероховатый (Centaurea scabiosa) и лапчатку серебристую (Potentilla argentea).



7. Globeflower meadows are characteristic in the Kenozero National Park. Globeflower Trollius europaeus is here growing together with wild pansy Viola tricolor in a dry to moister section of a meadow below the church at Porzhinskoye.

7. Луга с купальницей характерны для Кенозерского национального парка. Купальница европейская (Trollius europaeus) здесь произрастает вместе с фиалкой трехцветной (Viola tricolor) в сухой – умеренно увлажненной части луга ниже церкви в Порженском.



8. When a meadow is heavily fertilised then nutrient loving species such as dandelions Taraxacum officinale coll. have an advantage over more specialised species. If a species-rich meadow is fertilised for the first time many of the species can soon disappear.

8. Когда луг сильно удобряется, фаворизируются требовательные к удобрению виды, как например одуванчик (Taraxacum officinale coll.), в убыль более низкорослым и менее требовательным видам. Поэтому, если ранее не удобряемый, богатый видами луг начать удобрять, половина видов растений в течение короткого времени может исчезнуть.

Photo chart 2.

Hay meadows and pastures which are no longer managed eventually become overgrown. The overgrowing process varies dependent upon various natural and cultural factors present in the area. Here are some examples of hay meadows and pastures in various stages of regrowth in Kenozero.

Таблица 2.

Сенокосные луга и пастбища, которые остаются неиспользованными, постепенно зарастают. Процесс зарастания развивается по-разному, в зависимости от природных и культурных условий на месте. Здесь приводятся примеры сенокосных лугов и пастбищ Кенозера в разных стадиях зарастания.



9. This is the same meadow as on photo no. 7, photo chart 1. Large parts of this meadow are at present characterised by overgrowing by tall and nitrogen-demanding species such as cow parlsey Anthriscus sylvetris and nettle Urtica dioica. If a meadow is not cut or grazed over a period then dead plant material can prevent short grasses and herbs from seeding.

9. Тот же луг, как на фотографии 7, табл.1. Большая часть этого луга в настоящее время имеет сильные признаки зарастания высокими нитрофильными травами, как например купырь лесной (Anthriscus sylvestris) и крапива двудомная (Urtica dioica). Когда луг больше не косят, или когда на нем прекращается выпас скота, начинают накапливаться мертвые растительные остатки, которые не позволяют невысоким травам прорастать и выживать на лугу.



10. An example of a meadow in the early stages of regrowth. The meadow is still rich in species, although nitrogen-loving species such as cow parsley Anthriscus sylvestris, dandelion Taraxacum officinale coll. and the grass Dactylis glomerata ssp. glomerata are becoming dominant. In addition rosebay willow-herb Epilobium augustifolium and wild raspberry Rubus idaeus have spread to moister areas on the edge of the meadow. There is also aspen Populus tremula in the meadow, and nettle Urtica dioica dominates in an area that is especially rich in nutrients. (Area no. 3, fig. 2)

10. Пример луга в ранней фазе зарастания. Он все еще богат видами, но азототребующие виды, такие как купырь лесной (Anthriscus sylvestris), одуванчик (Taraxacum officinale coll.) и ежа сборная (Dactylis glomerata ssp. glomerata) увеличивают свою численность и вскоре станут доминирующими. Иван-чай узколистный (Epilobium angustifolium) и малина (Rubus idaeus) также прижились на увлажненных участках на периферии луга. Кроме того, имеются всходы осины (Populus tremula), а крапива двудомная (Urtica dioica) доминирует в одном месте, особенно богатом питательными веществами.



11. A meadow near Zikhnovo which is also in the early stages of regrowth. Tall, nutrient-demanding herbs have spread to give the meadow an untidy look. There are trees along the edge of the meadow. (Area no. 15, fig 2)

11. Луг у Зихново, который также находится в ранней фазе зарастания. Высокие, требовательные к содержанию питательных веществ травы стали обычны и придают лугу беспорядочный облик. Всходы деревьев имеются на окрашне луга.

12. A meadow near Zihknovo which is becoming overgrown. Scots' pine Pinus sylvestris and silver birch Betula pubescebs have become established in the meadow, with the help of wild boar Sus scrofa. They tear up the tight mat of grass in the old meadow and expose the soil thus allowing trees to become established. The presence of wild boar in Kenozero results in meadows becoming overgrown at a faster rate than expected. In this picture we can also see aspen Populus tremula, which can easily spread itself via root shooting.



12. Луг в Зихново, находящийся в процессе зарастания. Сосна (Pinus sylvestris) и береза (Betula pubescens) обосновались на лугу, не без хорошей помощи кабанов. Они разрывают плотный травяной покров старого луга и обнажают почву, после чего семена деревьев легче прорастают. Наличие кабанов в Кенозере приводит к тому, что многие луга зарастают намного быстрее, чем этого можно было ожидать. На фотографии также видна осина (Populus tremula), быстро проникающая в луг с опушки при помощи корневых всходов.



13. A meadow disrupted by wild boar.

13. Луг, перерытый кабанами.



15. This picture shows a moist (mesic) meadow which is heavily overgrown by aspen Populus tremula. (Area no.10, fig.2)

15. Увлажненный тип луга, сильно зарастающий осиной (Populus tremula).



14. A meadow by Zikhnovo in an advanced stage of regrowth. Silver birch Betula pubescens has become well established in the former open meadow and a thick layer of dead grass has built up. (Area no.13, fig. 2)

14. Луг у Зихново, где зарастание пошло дальше. Береза (Betula pubescens) здесь прочно прижилась на ранее открытом лугу, и образовался мощный слой пожухлой травы с предыдущих сезонов.



16. A dry meadow that apparently has not been cut for several years. Scots' pine Pinus sylvestris has started to grow in the meadow. Regrowth is slower in dry and shallow-soiled types of meadow so this meadow may still support many of the species characteristic of a traditionally managed meadow. It is therefore easier to restore than a meadow with damper and thicker soils where regeneration can occur quickly.
(Area no. 6, fig.2)

16. Сухой луг, где наверное не косили уже много лет. На лугу проросла сосна (Pinus sylvestris). Зарастание происходит медленнее на сухих лугах с бедной почвой, так что этот луг все еще может содержать много видов, характеризующих луга с традиционным пользованием. Поэтому легче восстановить такой луг, чем луг на более влажной и богатой почве, где процесс зарастания может протекать очень быстро.

Photo chart 3.

The cultural and natural heritage of Kenozero National Park make the park very attractive for eco-tourism. Here some examples of the unique qualities and resources that may be used for such tourism.

Таблица 3.

Культурное и природное наследие Кенозерского национального парка делает парк очень привлекательным для экотуризма. Здесь приводятся несколько примеров уникальных ценностей и ресурсов, которые могут быть использованы для такого жанра туризма, ищущего впечатлений.



17. Cultural artefacts, cultural landscapes and natural landscapes can be found in one place, as illustrated here with the view from the church spire at Porzhinskoye. The cultural field lie in a mosaic of woodland and wetlands in an open landscape. In this area are a number of rare wetland birds, corncrake and other species associated with cultural landscapes. This makes the area especially interesting for ornithologists.

17. Памятники культуры и культурные и природные ландшафты можно встретить в одном и том же месте, как здесь, наблюдая вид с купола церкви в Порженском. Угодия вместе с лесами и водоемами создают мозаику все еще открытого ландшафта со множеством следов прошлого. Здесь живет целый ряд редких водных птиц, а также коростель и другие виды птиц, связанных со старинным культурным ландшафтом. Это делает местность особенно интересной для орнитологов.



18. The corn crake Crex crex is included in the red lists over threatened species in both Norway and in the Archangel region of Russia. The species decline is largely due to changes in agricultural practices. The species is however not uncommon in the cultural landscape around Kenozero.

18. Коростель (Crex crex) занесен в Красную книгу Норвегии и в Красную книгу Архангельской области. Уменьшение численности вида прежде всего связано с изменениями в сельском хозяйстве, и таким образом в ландшафте. В культурных ландшафтах Кенозерья вид, однако, нередок.

19. Meadows of globeflower are an impressive sight during flowering. These represent one of the beautiful and species-rich meadow types in park, formed by traditional agriculture, and are what we today describe as an ecological and sustainable use of natural resources. (Area no. 16, fig.2)

19. Луга с купальницей представляют собой красивое зрелище во время цветения этого вида. Они являются одним из нескольких красивых и богатых видами растений типов лугов, которые сформировало традиционное сельское хозяйство, и свидетельствуют о том, что в наше время часто характеризуется как экологически ответственное использование природных ресурсов.





20. Food traditions and exciting taste experiences based upon local resources, such as the biodiversity of different freshwater fish, are important elements in tourist experiences.

20. Богатые кулинарные традиции и интересные кулинарные впечатления, основанные на местных ресурсах, как например "биоразнообразие" пресноводных рыб, являются важной составляющей туризма, ищущего впечатлений.

21. It's a great experience to taste food prepared on an open fire and served in the open in such a pastoral landscape.

21. Блюда, приготовленные на костре и поданные под открытым небом в таком пасторальном ландшафте – незабываемое впечатление.





22. A traditional timber house is characteristic of the style in the villages. Surrounded by gardens full of herbs and other useful plants creating a beautiful atmosphere of traditional village life. In the Kenozero National Park history lives on together with the cultural artefacts around about.

22. Традиционные рубленные здания характеризуют общую массу построек в деревнях. Они обрамлены содержательными садами и огородами с травами и другими полезными растениями, живописным образом создающими атмосферу традиционной деревенской жизни. В Кенозерском национальном парке история ландшафта все еще жива, и связь между памятниками культуры и окружением отчетлива.

23. Domestic animals are an important resource in the Kenozero National Park for the inhabitants, the landscape and for tourism. They help to keep the cultural landscape open in an ecologically acceptabel and effective way. They also add to the experiences for tourists to the area. In Norway are animal products also used in a commercial way.

23. Домашние животные являются важным ресурсом Кенозерского национального парка, как для населения, так и для ландшафта, и для туризма. Они содержат культурный ландшафт в его традиционном, открытом обличье и способствуют его сохранению экологически правильным и эффективным образом. Они также придают ландшафту живой вид и делают его привлекательным для туристов. В Норвегии в настоящее время помимо этого местные продукты домашнего животноводства используются как перспективные и окупающиеся нишевые продукты в туристической отрасли.





24. Holy symbols and sites within the park, such as these holy trees emphasise the continuing pagan beliefs that can seem exciting and attractive for many tourists looking for something genuine and original. The holy trees are cultural artefacts, yet they are also of protective value as they are often rather old and therefore play a special ecological role. Such old trees may support rare species of lichens and insects.

24. Святые символы и места парка, как например одиночные священные деревья, являются выражением все еще живой веры с элементами язычества, и могут представлять собой нечто привлекательное и интересное для многих туристов, ищущих подлинное и первозданное. Священные деревья являются памятниками культуры, но в то же время они являются заслуживающими охраны природными элементами, так как они часто старые и поэтому играют особую экологическую роль. Такие старые деревья, в частности, могут оказаться местом обитания редких видов лишайников и насекомых.



25. The parks' inhabitants are an essential element in ensuring the continuance of a living cultural landscape. There openness to visitors is also an important resource in terms of tourism. To stay as a guest of a family in one of the villages is a great experience.

25. Жители парка представляют собой важную предпосылку для содержания живого культурного ландшафта. В то же время их гостеприимство может оказаться важным ресурсом для туризма. Побывать в гостях у семьи одной из деревень парка – незабываемое впечатление.

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1. Introduction

The Soviet Union and Norway signed an agreement in December 1988 on cooperation on environmental issues. The Russian Federation (RF) and Norway re-signed the agreement in 1992. This cooperation is led by the RF Ministry of Natural Resources and the Norwegian Ministry of Environment. The commission meets annually, chaired by the Russian vice minister and the Norwegian State secretary.

Since the start of the cooperation many working groups, expert groups, programs and projects have been initiated in the Russian part of the Euro-Arctic Barents Region. Kenozero National Park has been an area of priority for cultural heritage cooperation for many years within the framework of the commission. The commission decided at its annual meeting in Tromsø 15-16th of April 2002 to make Kenozero NP as one of its three main target areas for future cooperation and to expand the activities of the park. The commission program for this area includes not only co-operation on cultural heritage, but also biodiversity, active development of the cultural landscape, ecotourism, social development, etc. Kenozero National Park is a unique area of cultural landscape complexes (both populated and uninhabited). The populated villages still remain in a form of traditional use, and therefore form the basis for the future maintenance of the park. One of the main new projects adopted by the commission was therefore the protection and restoration of an active cultural landscape, which was to be initiated by an excursion in 2002. The intention was followed up with a project in chosen landscapes (countryside/villages) from 2003. The coordinator of the Kenozero NP target area is the Norwegian Directorate for Cultural Heritage and the Russian Research Institute for Culture and Nature Heritage, while the new cultural landscape project is the responsibility of the Norwegian Directorate for Nature Management and the RF Ministry of Natural Resources.

2. Kenozero National Park

Kenozero National Park is situated in the south-west part of the Archangelsk Region not far from the old city of Kargopol and east of the Karelia Republic. It was established according to the Russian Federation Governmental Decree of 28th December 1991 and belongs to the Russian Federation Ministry of Natural Resources. The area of the National Park is 139663 ha.

Kenozero is a remarkable example of Northern-European cultural landscapes where the connection between nature and culture is evident. The culture of northern Russia still thrives in the area. The National Park contains a great many elements of cultural heritage, among these are 46 churches and chapels built from logs. There are also other elements that have sacred significance even today such as sacred stones and groves. The traditional landscape structure is of great importance for the people in the park and for the landscape experience.

Kenozero National Park also has a high biodiversity at both landscape, habitat and species levels. The complex mixture of natural and cultural landscapes creates a number of different habitats for many different species, especially meadow plants, insects and birds (Shatkovskaya 2002). Nutrient-rich bedrock also contributes to a high diversity as regards both vegetation types and plant species.

The political and economical changes in Russia during the 20th century have affected the area in many ways. Many people have left the small villages and moved to the cities. The structure of traditional life in the area has been partly disrupted, some cultural landscapes and cultural landscape elements destroyed and the biodiversity partly reduced. The visual connections between villages and sacred elements have also been reduced due to abandonement and overgrowing. In addition the Soviet period caused a loss of knowledge of traditional agriculture. However, differing from most other places, much of the natural and cultural heritage in Kenozero has been preserved and the establishment of Kenozero National Park stopped the degradation. The National Park is now working for reestablishment of cultural landscapes, monuments of wooden architecture and other monuments as well as conservation of natural elements and biodiversity. It is planned that the Kenozero National Park shall be the centre for sustainable development and rural support in the area.

3. The Project

The agricultural practices in the area are not suitable to keep all the valuable cultural landscapes open. Overgrowing of old hay meadows and pastures has become a large problem. To maintain the high biodiversity and the traditional landscape structure in the park it is therefore necessary to restore and manage cultural landscapes and valuable semi-natural vegetation types. Vefsn Agricultural College (Norway) has projects in Russia since 1992. In 2000 they establis-

hed a cooperative agreement with the Kenozero National Park to support the Park with agricultural equipment and knowledge as how to use it. The equipment, chain saws and a pasture cultivator, are used for thinning of deciduous forests and to keep hay meadows and pastures open. The practical work started in 2002. This project has been supported by the Barents Secretary.
However, experiences from the Norwegian project «Living summer farms » (supported by the Norwegian Research Council) show that such management methods are successful only on certain conditions (Norderhaug and Sickel 2002, Hansen et al. 2002a and b). There is therefore a need to develop efficient management methods for abandoned areas that could keep the most valuable parts of the cultural landscape open in a way that also maintains the high biodiversity of the semi-natural vegetation types. To stimulate the locals to take part in the maintenance of the landscape qualities in the vicinity of the living villages, it is also necessary to develop new agricultural methods. These must take biodiversity and cultural landscape qualities as well as the farmers need of economic benefit into consideration. To maintain biodiversity this development, however, has to be based on knowledge about traditional agricultural methods from before the Soviet period. This knowledge is still present among elderly people in the villages.

4. The aim of the project

The aim of the project can be separated in the following main goals:

1. To map contemporary and previous types of land use.
2. To investigate the traditional agricultural methods and how they have created different semi-natural vegetation types.
3. To study (by field-experiments) the effects of different management methods and their ability to create an open landscape with high qualities both regarding biodiversity and production (in the hay-meadows and pastures).
4. To develop good agricultural methods for inhabited villages and management methods for the uninhabited villages according to the results from point 1, 2 and 3.
5. To formulate suggestions for restoration activities that can lead to a sustainable development and revive the old cultural landscapes.
6. To stimulate the locals to take part in the maintenance of the landscape qualities in the vicinity of the inhabited villages by taking into account both economy and ecology when developing agricultural methods.

5. Methods

In the beginning of June 2002 a cooperative Russian-Norwegian expedition was arranged in Kenozero National Park. During the excursion a Russian-Norwegian expert group which shall follow the project and take part in the development of good management and agricultural methods, was established. The members of the group are Ann Norderhaug (the Norwegian Crop Research Institute, leader of the group) Marina Kuleshova (the Russian Research Institute of Culture and Nature Heritage), Vladimir Kalutskov (the Moscow State University), Denis Tormosov and Alexander Kozykin (Kenozero National Park), Akse Østebrøt (Norwegian Directorate of Nature Management) and Nils Midgaard (Vefsn Agricultural College). It was also decided to concentrate the project work on two different sites. These sites shall function as model sites for other areas in the Kenozero National Park and for similar areas in other Russian National Parks.

5.1 Model site 1: Porzhinskoye

Porzhinskoye was abandoned fifteen years ago. The village is situated in the middle of the national park and the area has high priority because of especially valuable cultural monuments and landscape. The church is one of the oldest in the area. It is situated in a «sacred grove», and surrounded by a very special fence. It is intended that the church shall be restored, and the village be used for tourism.

Around the church, there are still open hay meadows which were mown until 6 years ago. Bushes and trees have, however, established in some of the previously open meadows and partly closed the landscape making it impossible to enjoy the view to other villages and cultural monuments in the area. To stop the overgrowing, restore the landscape and keep the meadows open, different managing methods are tried out. The experiments were started in 2002, and carried out both in the meadows and in the young deciduous forests. Experiences from Norwegian projects are used in this connection (cf. Norderhaug and Sickel 2002, Hansen et al. 2002a and b, but also Norderhaug et al. 1999). The effects of different management methods are followed and studied within selected areas with regard to changes in the vascular plant species composition and landscape development during five years. Based on the field studies we will suggest management methods for different species-rich semi-natural vegetation types.

5.2 Model site 2: Zikhnovo

Zikhnovo is one of the inhabited villages. The youngest person living here is 32 years old. There are, however, few inhabitants in the village during winter. The houses in the village are situated close to each other in the traditional way and the cultural landscape is most beautiful. There are 6-7 cows and 8-12 sheep per family. Vegetables are grown in the gardens and potatoes in the fields. Many hay meadows were manured during the Sovjet period about 25 years ago but they are not manured or fertilised today. The hay is still cut with scythes. The farm animals graze around the houses in the village. Most of the young people have left the village because they cannot find any jobs with an acceptable income within the area. This situation is typical also for other villages in the park.

However, Kenozero National Park has development plans for Zikhnovo and has already done a lot of work in the village. The chapell that was built in the 18th century has been restored through support from the Norwegian Directorate for Cultural Heritage. Old houses have also been restored and planned to be used in connection with a new cultural summer school for children. Development of agricultural methods that can maintain the biodiversity and other cultural landscape qualities as well as strengthen the economy of the farmers may attract young people to settle in the village again.

In Zikhnovo we study and map the biodiversity of the cultural landscape and contemporary and previous land use. The biodiversity mapping started in 2003. We also investigate the old traditional agricultural methods based upon interviews. Based on this information it may be possible to develop new agricultural methods in cooperation with the local people, methods that can increase the production and income to the farmers and at the same time maintain the cultural landscape values.

6. Preliminary results

6.1 Traditional cultural landscapes and biodiversity

Different meadow types have been recorded and mapped in the two model site areas as well as in other parts of the park during excursions in 2002 and 2003. Recording work shows the importance of the traditional managed (semi-natural) meadows for the total biodiversity of Kenozero National Park with regard to species. It also shows the importance of the meadows for the landscape diversity and impression. They constitute large areas in the landscape with special vegetation and a high biodiversity. The character of the hay meadows and pastures, their species-richness and content of plants and animals, are a result of the human influence on the nature. Grazing and hay cutting create species-rich vegetation types because the growth and expansion of competitive herbs, shrubs and trees are prevented. The open meadows are suitable biotopes for many small and light demanding plants. This explains the often very high number of species per measured area in a hay meadow or pasture compared to other "more natural" biotopes.

Many of the plants and animals included on the total species list for the park are connected to and dependant upon these habitats. To maintain the biodiversity it is therefore necessary to continue the management of them. Hay meadows and pastures that are no longer cut for hay or grazed will very soon become overgrown. The vegetation will change from light open grass and herb rich habitats to bush and tree rich vegetation and forest with shade-tolerant species in the field layer. Restoration studies in Norway and other countries show that it is very difficult to re-establish a semi-natural vegetation. The chance to successfully restore meadows that have been abandoned for a long period of time is less than for areas that are still only slightly overgrown.

Our observations also show that especially model site 1 has a high variety of meadow types with regard to biodiversity and management. In general the most interesting semi-natural meadows and pastures with regard to biodiversity were found in the village or very close to it. Also the roadverges and field margins were species-rich. In Zikhnovo we found a high number of vascular plants and species characteristic for meadows with a long continuity of traditional use. The most interesting pastures and hay meadows are those where little manure has been applied. These meadows have a higher biodiversity than those with high manuring rate. Management studies in many countries show that manuring and fertilisation may decrease the biodiversity of species-rich meadows or pastures dramatically. Some plant species do not tolerate fertilisation. Others cannot compete with nitrophilous plants which receive an advantage when they are fertilised. To keep the high biodiversity and the characteristic plant species composition of the semi-natural hay meadows and pastures in Zikhnovo it is therefore necessary to continue the traditional management and not apply higher amounts of manure or fertilisers. In this respect it is advantageous that the most interesting meadows are situated in or near the village.

We also examined several meadows in the surroundings of Zikhnovo. They were, however, mostly abandoned and more or less overgrown. Meadows in early stages of overgrowing were dominated by large nitrophilous herbs like wild chervil (Anthriscus sylvestris), meadowsweet (Filipendula ulmaria), nettle (Urtica dioica), willow herb (Epilobium augustifolia) and raspberry (Rubus idaeus). Aspen (Populus tremula), was often expanding from the edges of the meadows. Withered grass from earlier seasons had accumulated in the bottom layer. In meadows in later stages of overgrowing bushes and trees like willow species (Salix spp), birch (Betula pubescens), pine (Pinus sylvestris), aspen (Populus tremula) and alder (Alnus incana) had become well established. Most of the meadows checked in the surroundings of the village were less species-rich than the meadows in Zikhnovo and lacked the plant species characteristic for hay meadows and pastures with long continuity of traditional management.

Our recording work also shows how history may be interpreted within the landscape from traces left by traditional agricultural methods, also in the forests. In this area traditional land use included slash and burn. This has not been practiced for several decades but still the forest structure and the existence of some plant species may give clues about the former land use.

The trials with management methods in model site 2 need to continue for several years before any results can be reported and conclusions may be drawn. At present it seems that the most successful management as regarding both biodiversity and the cultural landscape is to supplement use of the pasture cultivator with other methods such as cutting or grazing.

6.2 Main meadow types

Different types of globeflower meadows (Trollius europaeus) are common and characteristic for Kenozero National Park. They are found on rather moist and nutrious-rich soils. Such meadows were earlier common also in Norway, especially in the north, but are now disappearing. They can be species-rich and contain species like

Globeflower *Trollius europaeus*
Water avens *Geum rivale*
Common sorrel *Rumex acetosa*
Imperforate St John's-wort *Hypericum maculatum*
Cow parsley *Anthriscus sylvestris*
Melancholy thistle *Cirsium helenioides*
Lady's-mantle species *Alchemilla spp.*
Dropwort *Filipendula ulmaria*
Wood cranesbill *Geranium sylvaticum*
Wild angelica *Angelica sylvestris*
Tufted hair-grass *Deschampsia cespitosa*
Many alpine sow-thistles *(Cicerbita alpina)* and northern wolfsbanes *(Aconitum septentrionale)* in a globeflower meadow indicate that the meadow is abandoned and starting to become overgrown. In later stages the abandoned meadow will probably also be invaded by aspen *(Populus tremula)*, silver birch *(Betula pubescens)*, willow and sallow *(Salix spp.)*.

Some of the globeflower meadows are manured or fertilized. They are less species-rich and contain species that tolerate or perhaps may be favoured by manuring as for example

Smooth meadowgrass *Poa pratensis*
Willowherb *Epilobium angustifolium* (also indicating overgrowing)
Bush vetch *Vicia sepium*
Bitter vetchling *Lathyrus pratensis*
(lots of) Cock's-foot *Dactylis glomerata*
Hogweed species *Heracleum sibiricum*
Bedstraw species *Galium album*
Nettle *Urtica dioica*

Also meadow types found on less nutrient-rich and moist to dry soils, are common. They may be species-rich and contain species like

Common bent *Agrostis capillaris*
Heath wood-rush *Luzula multiflora*
Wavy hair-grass *Deschampsia flexuosa*
Meadow buttercup *Ranunculus acris*
Tufted vetch *Vicia cracca*
Lesser stitchwort *Stellaria graminea*
White clover *Trifolium repens*
Caraway *Carum carvi*
Dandelion *Taraxacum spp.*
Wild strawberry *Fragaria vesca*
Yarrow *Achillea millefolium*
Red clover *Trifolium pratense*
Red fescue *Festuca rubra*
Different hawkweed species *Hieracium spp.*
Heath speedwell *Veronica chamaedrys*

Manuring and fertilising of such meadows favour species like dandelion while other species like wild strawberry may disappear.

On dry and lime/base-rich soils some of the most species-rich meadow types were found. They contain species like
Hoary plantain *Plantago media*
Brown knapweed *Centaurea jacea*
Maiden pink *Dianthus deltoides*

Greater knapweed *Centaurea scabiosa*
Alpine cinquefoil *Potentilla crantzii*
Burnet saxifrage *Pimpinella saxifraga*
Lady's bedstraw *Galium verum*
White clover *Trifolium repens*
Mountain everlasting *Antennaria dioica*
Heath dog violet *Viola montana*
Ox-eye daisy *Leucanthemum vulgare*
Yarrow *Achillea millefolium*
Red fescue *Festuca rubra*
Hoary cinquefoil *Potentilla argentea*

7. A resource for tourism

The results of the fieldwork on cultural landscape vegetation in Kenozero National Park underline the importance of the meadows for the landscape as a whole both with regard to biodiversity on all levels, the landscape history and structure, the view and the aesthetic impression. They are living cultural monuments and represent what we today call a sustainable utilisation of nature resources. Norwegian psychological research furthermore shows that most people are very attracted by such pastoral landscapes (Strumse 1998). The meadows can therefore also be considered as a resource for eco-tourism. In addition all the species connected to and dependant upon the cultural landscapes and meadow habitats are a resource for experience tourism.

8. Litterature

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9. Attachments

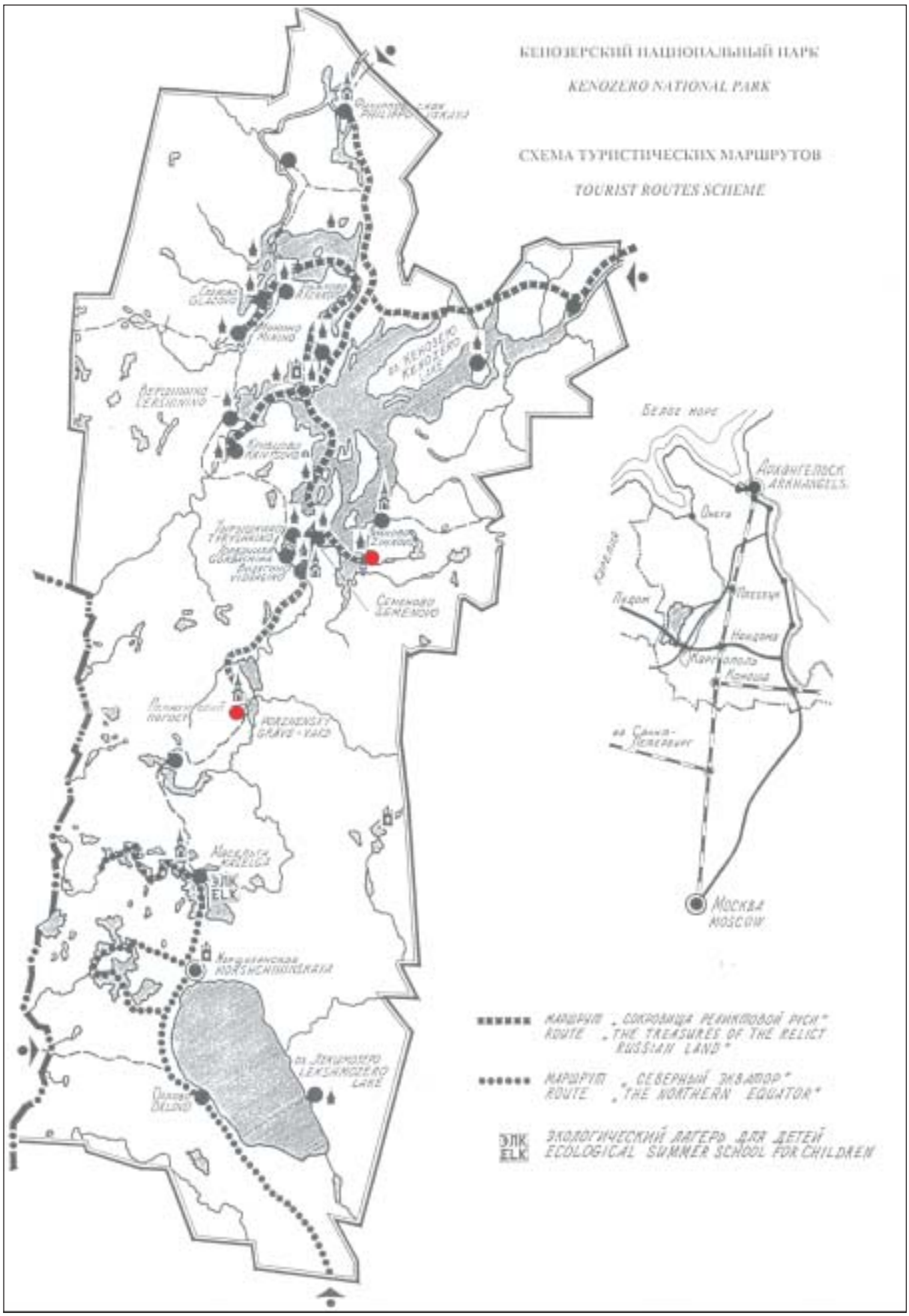


Figure 1.
Kenozero National Park and its geographical position in Russia. The two model sites, Zikhnova and Porzhinskoye, are market with a red spot on the map.



Figure 2.
This aerial photo shows the village Zikhnovo. Botanical investigations have been carried out in the numbered areas.

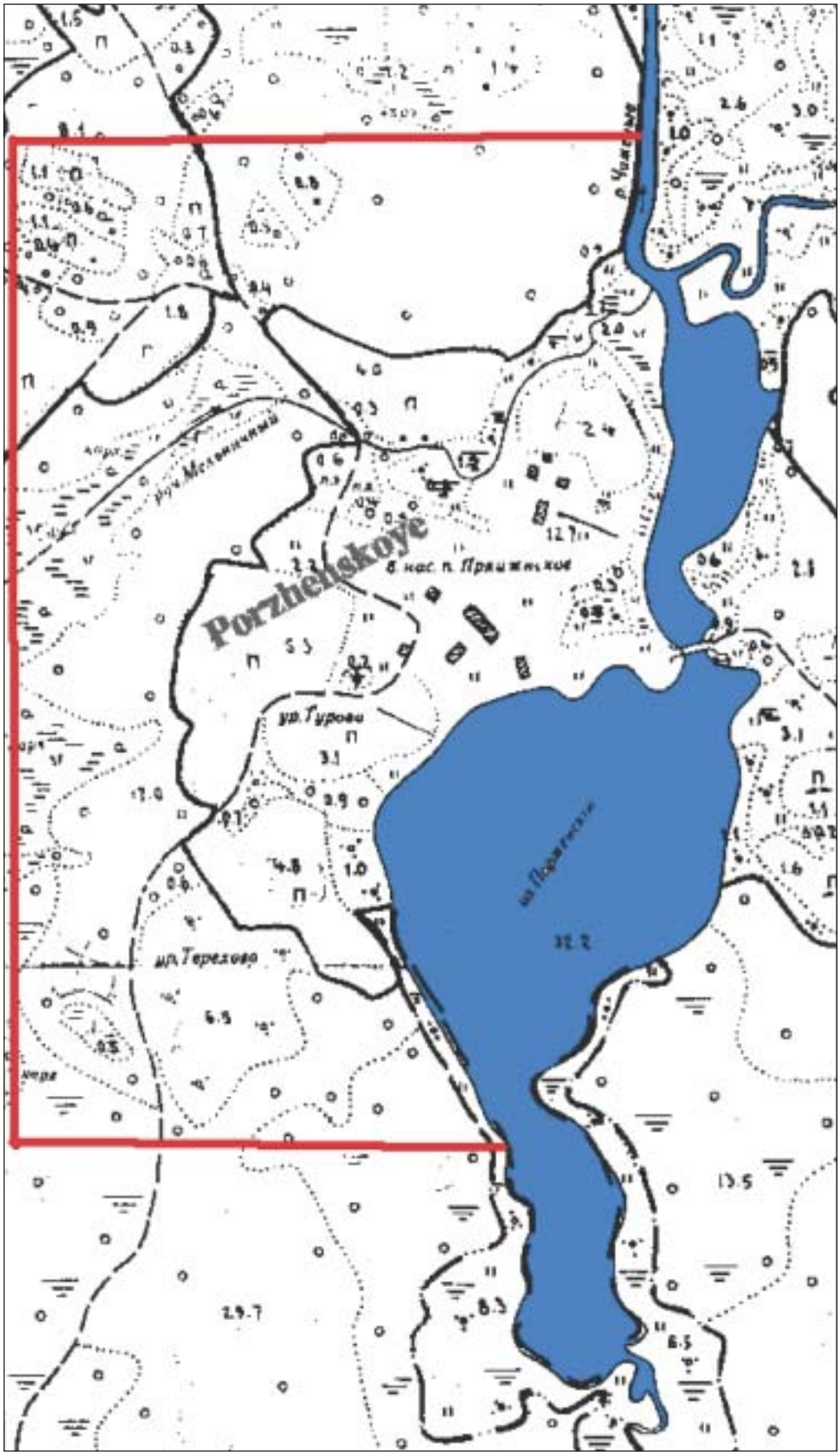


Figure 3.
This map shows the village Porzhinskoye. Botanical investigations have been carried out in the area limited by the red line and the lake.

10. Appendix 1.

A preliminary species list from meadows in Zikhnovo.

Meadow number (fig.2)	No.1	No.2	No.3	No.4	No.5	No.12	No.14
Achillea millefolium	1	1	1	1	1	1	1
Agrostis cappilaris		1	1				1
Alchemilla sp.	1	1	1	1	1	1	1
Alnus incana			1	1			1
Angelica sylvestris				1	1		1
Anthoxanthum odorata	1		1		1	1	1
Anthriscus sylvestris	1	1	1		1	1	1
Arctium sp.			1		1		
Betula pubescens			1			1	1
cf. Campanula patula	1	1	1				
Campanula rotundifolia							1
Carex nigra ssp. juncella							1
Carex nigra ssp. nigra	1			1			
Carex pallescens	1						
Carum carvi	1	1				1	1
Centaurea jacea	1	1			1	1	1
Cerastium fontanum		1			1		1
Dactylis glomerata	1	1	1	1	1	1	1
Deschampsia cespitosa	1	1	1	1	1		1
Deschampsia flexuosa			1				
Epilobium augustifolium		1	1	1	1		1
Equisetum arvense	1	1		1	1	1	1
Equisetum pratense			1				
Equisetum sylvaticum		1		1			1
Festuca rubra							1
Filipendula ulmaria			1	1			1
Fragaria vesca	1	1	1		1	1	1
Galeopsis ladanum			1				
Galium album	1	1	1	1		1	1
Galium triflorum			1				
Geranium sylvaticum	1	1	1		1		1
Geum rivale	1	1	1	1	1	1	1
Heracleum sibiricum	1		1	1	1	1	1
Hieracium Pilosella Coll.	1	1	1				
Hieracium umbellatum	1	1	1	1	1		
Hypericum maculatum	1	1	1	1	1	1	1
Knautia arvensis	1	1	1	1	1		
Lathyrus pratensis	1	1	1		1	1	1
Leontodon autumnalis						1	1
Leucanthemum vulgare	1	1	1	1	1	1	1
Luzula multiflora	1						1
Luzula pilosa						1	1
Lychnis flos-cuculi			1				1
Myosotis arvensis			1			1	

Appendix 1. continues.

Meadow number (fig.2)	No.1	No.2	No.3	No.4	No.5	No.12	No.14
Picea abies			1				
Pimpinella saxifraga	1		1			1	
Pinus sylvestris			1			1	
Plantago major						1	1
Plantago media			1				
Poa pratensis			1				
Polygala vulgaris						1	
Populus tremula	1	1	1	1	1		1
Potentilla erecta					1		
Prunella vulgaris	1	1	1	1	1		
Ranunculus acris	1	1	1	1		1	1
Ranunculus auricomus							1
Ranunculus repens		1	1	1	1	1	1
Rhinanthus serotinus	1	1	1				1
Rosa acicularis					1		
Rubus idaeus	1	1					
Rumex acetosa			1		1	1	1
Rumex acetosella	1	1	1				
cf. Rumex longifolius	1	1		1			
Salix caprea							1
Salix phylicifolia					1		
Sorbus aucuparia							1
Stellaria graminea	1						
Succisa pratensis							1
Taraxacum sp.	1	1	1	1	1	1	1
Trifolium medium	1						
Trifolium pratense	1	1	1	1	1	1	1
Trifolium repens	1	1	1	1	1	1	1
Trollius europaeus	1		1		1		1
Urtica dioica			1	1	1	1	
Veronica chamaedrys	1	1	1	1	1	1	1
Veronica serpyllifolia	1				1		1
Vicia cracca	1	1	1	1	1	1	1
Vicia sepium	1	1	1	1	1	1	1
Viola arvensis			1				
Viola canina ssp. canina	1						

List of DN-Notat (DN Note)

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2000-1: FoU-seminar. Konsekvenser av vindkraft for det biologiske mangfoldet 50,-
2000-2: Kalking i vann og vassdrag. Overvåking av større prosjekter 1999 50,-
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2000-7: Handel med truete arter. Sjekkliste for CITES internettutgave

2001

2001-1: Terrengkalkingsprosjektet – årsrapporter 1998 og 1999. Terrengkalking for å avgifte surt overflatevann. 50,-
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2001-4: Terrengkalkingsprosjektet – Årsrapport 2000. Terrengkalking for å avgifte surt overflatevann 50,-
2001-5: Friluftsliv i mulighetenes land. Landskonferanse Friluftsliv. Trondheim 6. - 8. juni 2001 50,-

2002

2002-1: Kalking i vann og vassdrag. Effektkontroll av større prosjekter 2001 50,-
2002-2: Villaksseminaret 2001. Lærdal 4.-5.september 2001. Gyrodactylus salaris – kveletak på laksen? 50,-
2002-3: Fisketrapper i Norge 50,-

2003

2003-1: Handel med truete arter – sjekkliste for CITES internettutgave
2003-2: Terrengkalkingsprosjektet – Årsrapport 2001 Terrengkalking for å avgifte surt overflatevann 50,-
2003-3: Kalking i vann og vassdrag - Effektkontroll av større prosjekter 2002 50,-
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(also on internett)

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