

EXPEDITION BRIEFING & FORMS

Belarus Wetlands

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The Expedition Briefing in your hands is your initiation to the project from the scientist's own perspective. You will learn about the inspiration that led the scientist(s) to launch the research, the objectives, goals, and even achievements of the project to date. You will get a very real sense of how your participation contributes to solving a global research question.

Your assignment is to apply your own skills and talents to the research question. Your support helps to make the project – and over 130 like it – possible. Thank you for contributing your time and money to support scientific research, providing experiential learning, and inspiring environmental responsibility and global citizenship.

Now, find a comfortable chair and prepare for a fascinating journey.

~ Earthwatch Institute Staff

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Belarus Wetlands

EXPEDITION BRIEFING

Team I: July 30 – August 12, 2007

Team II: August 20 – September 2, 2007



Dear Earthwatch Volunteers,

Welcome to the *Belarus Wetlands* expedition! Belarus is a small country in the center of Europe. Around 200 years ago almost all of its territory was waterlogged. At the present time it is still comprised of preserved bogs to a great degree. Almost 14% of the territory of Belarus consists of bogs. The greatest amount of European bogs is situated here and they influence the ecology of all Europe. But throughout history Belarusian bogs were considered a source of peat and a harmful object of nature, and were subject to large-scale “improvement.” They still continue to be drained and destroyed. Therefore, I would like to invite you to help me in the field investigation of bogs with the aim of selecting bogs which have to be preserved.

You will be able to make the acquaintance of Belarus, its history and its people. I am sure you will be impressed by Belarusian bogs – they are especially good for adventurous travel. And I am sure that many years from now you will still be satisfied by the fact that you did something very important for conserving nature.

We will be glad to meet you in Belarus!

Sincerely,

N.A. Laman, Director, Institute of Experimental Botany, National Academy of Sciences of Belarus, and the *Belarus Wetlands* project staff

Belarus Wetlands

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GENERAL INFORMATION

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POSITIONS/TITLES:	1) Research Fellow, Laboratory of Geobotany, Department of Natural History 2) Research Fellow, Laboratory of Geobotany, Department of Botany, School of Biology 3) Head of the Laboratory of Geobotany, Department of Forestry 4) Senior Lecturer of Botany, Department of Biology and Ecology
AFFILIATIONS:	1-3) V.F. Kuprevich Institute of Experimental Botany, National Academy of Sciences of Belarus, Minsk, Belarus 4) Yanka Kupala State University of Grodno, Grodno, Belarus

PROJECT TITLE:	Belarus Wetlands
RESEARCH SITE:	North and Mid Republics of Belarus
RENDEZVOUS POINT:	Hotel Academicheskaja, Minsk, Belarus
EXPEDITION DATES:	Team I: July 30 – August 12, 2007 Team II: August 20 – September 2, 2007
TEAM SIZE MINIMUM/MAXIMUM:	5/10 volunteers
MINIMUM AGE OF PARTICIPATION:	18 years of age

THE EXPEDITION

1. PROJECT OVERVIEW

Wetlands in Belarus are extensive and various, with bogs making up 14% of the country. Bogs are a type of peatland and include oligotrophic (low nutrient), mesotrophic (medium nutrient) and eutrophic (high nutrient) bogs. Oligotrophic or raised bogs are most in need of conservation and research, and are the focus of the *Belarus Wetlands* research project. Bogs are extremely important as they improve the gas composition of the atmosphere, carry out climate regulation, and regulate the character of flowing and subsoil water levels in vast contingencies to bog territories. Globally, the last two centuries have seen a period of artificial reconstruction of nature, during which the bogs of Belarus were mostly destroyed. Despite all the negative consequences of melioration, there remain a small number of bogs in Belarus, which require research and conservation measures.

Peatlands contain more than 20% of the world's carbon and up to 70% of all carbon stored in biotic systems, which is 3-3.5 times the amount stored in the world's tropical rainforests. Western Europe has lost most of its natural peatlands and it is important to conserve remaining peatlands in countries such as Belarus where significant areas of the habitat remain. The long-term goal of this project is to find comprehensive and effective conservation systems for the raised bogs of Belarus.

Note: See *Belarus Wetlands: The Research* in the appendix of this briefing for information on the research objectives, methods, and results of this project.

2. RESEARCH AREA

Overview

The Republic of Belarus is located in the eastern part of Europe and borders Russia, Lithuania, Ukraine, Poland and Latvia. The climate of Belarus is moderately continental with mild and humid winters, warm summers and wet autumns. The country's terrain is predominantly low, hilly land with an average height of 160 meters above sea level, while the highest point is only 345 meters above sea level and the lowest is 80 meters. This flatness creates favorable conditions for the expansion of human settlements and the development of agriculture, industry, transport and service lines, tourism and recreation services.

Research Site

The fieldwork will take place in Narochanski National Park in the north of Belarus, in the Poozerje (meaning "Land with Lakes") region. This area was formed after the last glacier 10-12 thousand years ago and has special kinds of soils on moraine. The climate is moister and cooler here than in southern Belarus. Lakes occupy 10% of the territory in Poozerje and the biggest lake of Belarus, Naroch, is situated here. About 8% of the Poozerje territory is occupied by raised bogs, including Jelnia, the largest bog massif in Europe. There are more than 30 species of mosses in the area, including sphagnum mosses (18 species), gypnum mosses (6 species), and liverworts (10 species). Sphagnum moss is the most common and the only trees found in the bogs are short, compressed pines. Other areas are dominated by woody plants including cranberry, butterbur, wild rosemary, myrtle, crowberry, heather, and great bilberry. Cotton-grass is typical among grasses, as well as sedges and insectivorous sundews. In general, raised bogs are very picturesque, unforgettable and

fascinating. There is a lot of history connected with the bogs of Belarus and the landscape found here is mostly untouched by development.

Flora and Fauna

The flora of Belarus includes 1,923 species of vascular plants (1,680 indigenous), 477 lichens and 435 mosses. Forests account for 36% of the country's territory. Bogs occupy 14% of Belarus and meadow takes up 16%. The forests and bogs, apart from being sources of timber (10-11 million cubic meters per year), perform numerous ecological functions (e.g. water protection, water regulation, soil protection, assimilation functions, etc.) as well as sanitation, recreation and health-building functions. Belarusian forests and bogs play an important biospheric role and make a considerable contribution to the ecological stabilization of Central and Eastern Europe. The Republic's forests and bogs concentrate considerable natural resources of alimentary melliferous, medicinal, technical and other useful herbs. Blackberry, cranberry, bilberry, blueberry, ashberry, wild pears, and high cranberry are widely spread in the forests. About 1,500 tons of mushrooms, 400 tons of medicinal raw materials, 34,000 tons of birch-tree sap, 16,000 tons of hazelnuts, and more than 20,000 tons of galipot are produced annually in Belarus.

The fauna of Belarus includes more than 31,000 species, among them 440 species of vertebrates, 77 species of mammals and 310 birds (214 nesting). Elk, bear, brown hare, bison, foxes and wolves are dominant in the Belarusian Poozerje. Weasels, beavers, minks, otters, muskrats, roes, willow grouses, cranes, owls, gulls, ducks, bitterns, herons and many other animals are often present on the bogs. There are snakes, lizards, ticks, spiders, gnats and midges as well. One species of snake (viper) is poisonous, but rarely encountered.

Natural Resources

About 30 kinds of mineral raw materials can be found in Belarus (more than 4,000 deposits and fields). The most significant are potassium salts, Belarus being a European leader with regards to these reserves. The country is rich in rock products, such as granite, dolomite and dolomite limestone, marl, chalk, clay, loam, sand and gravel. There are also raw materials for the production of natural paints (marsh iron ore, ochre, glauconite, etc.). Currently, geological exploration in search for amber, titanium and rare-earth metal deposits is underway. Noteworthy is the fact that the mining resources in Belarus are still insufficiently investigated.

One of the most common natural resources found in Belarus is fresh water. There are more than 20,000 rivers and streams in the country with a total length of 91,000 kilometers, and about 11,000 lakes. Over half of the water resources belong to the Black Sea basin, the rest belong to the Baltic Sea basin. More than 145 artificial lakes have also been created in Belarus. The most important is the Viliya Reservoir, which gives birth to the Viliya-Minsk system of canals and directs water to Minsk, the Republic's capital. The availability of high quality water resources stimulates the construction of sanatorium and spa resort complexes and the development of companies trading and exporting mineral curatives and bottled water.

Peat fields are widely spread in Belarus but due to intensive exploration, the fields have largely been exhausted as production sources. The total geological reserves are estimated at 4.4 billion tons. The extractable resources constitute 600 million tons, while the rest is within protected zones or is included into the land stock of the Republic. A comprehensive use of peat resources is important.

Population

Approximately 10.4 million people reside in Belarus, with over 24% of the urban population living in Minsk. Belarus is a somewhat densely populated country and its territory is inhabited rather uniformly, most densely in central regions. The country is home to people of over 130 different nationalities, including large populations of Russians, Poles, Ukrainians, Jews, and Lithuanians. Other nationalities include Tatars, Azerbaijanians, Armenians, Latvians, Koreans, Germans, Georgians, Ossets, Gypsies, Moldavians and others.

History and Political Situation

The first humans appeared in the Belarusian territory about 40,000-100,000 years ago. These lands were generally inhabited about 8,000-10,000 years ago. Indo-European tribes, ancestors of Slavs and Balts, began to settle on the Belarusian land in late third and early second millennium B.C. The Belarusian ethnic group began to form in the sixth to eighth centuries. As a result, East Slavic ethnic communities appeared and were part of the ancient Russian community forming the state of Kievan Russia in the ninth century. In the 13th century, the Belarusian and Lithuanian ethnic territories became the center of formation of one of the largest feudal monarchies in Europe, the Great Principality of Lithuania. In the middle of the 16th century, the Great Principality of Lithuania and the Kingdom of Poland united to form a new state – Rzecz Pospolita. By the end of the 18th century Rzecz Pospolita was split and the Belarusian territory was included in the Russian Empire.

After the victory of the October uprising of 1917 in Petrograd, Soviet power was proclaimed in Minsk on November 8, 1917. On January 1, 1919, the Belarusian Soviet Socialist Republic was proclaimed, which became part of the USSR in December of 1922. Western Belarus, which became part of Poland in 1921, was reunified with the BSSR in 1939. During the period of June 22, 1941 to July 28, 1944 Belarus was occupied by fascist Germany. The role of Belarus in the fight against invaders and sacrifices it made for liberation of the world from fascism allowed it to be among the first states to found the United Nations. On July 27, 1990, the Supreme Council of the BSSR passed the Declaration on State Sovereignty. In December 1991 the Republic of Belarus acceded to the Commonwealth of Independent States. On March 15, 1994, the Supreme Council adopted the Constitution of the Republic of Belarus according to which Belarus was declared a unitary, democratic, social, law-governed state. The first presidential election took place in July 1994 and Alyaksandr Lukashenko was elected. He was reelected in 2001 and again in 2006.

Culture

Belarus is a country with an ancient and rich history and unique culture. It has a significant number of historical towns and cities, many of which have preserved ancient temples and cloisters, palaces and castles of magnates of Rzecz Pospolita and of the Russian Empire, as well as valuable architectural, historical and cultural monuments. Urban and rural areas include over 20,000 historical and cultural monuments and about 100 centers of artisan arts. Besides natural reserves and national parks, there are settlements and towns that represent complex memorials preserving the Belarusian historical environment and traditional way of life.

In terms of religion, Belarus consists of mostly orthodox Christians with a Roman Catholic minority. The official language is Belarusian while Russian is also widely spoken and each ethnic minority also has its own language.

3. PROJECT STAFF

Most of the project staff speak Russian and Belarusian, and all have some level of spoken English.

Principal Investigator

Natallia Zeliankevich, born in 1971, holds an M.S. in Botany and will be responsible for supervision, organization and scientific design of the project, data analysis, location of ecological profiles and lectures. Since 1998 she has been a junior researcher at the Institute of Experimental Botany of the National Academy of Sciences of Belarus. Previously, she was a specialist in Biology and Chemistry in the Department of Natural History at the Belarusian State Pedagogical University, and a teacher of Chemistry and Biology at School N67 in Minsk. She also took a post-graduate course in Botany at the Institute of Experimental Botany. Natallia speaks functional English.

Co-Principal Investigator

Dzimitry Grumo, born in 1975, holds a Ph.D. in Biology and Ecology and will be responsible for assisting with organization of the project, taxation of stand, location of ecological profiles, taking of peat specimens, and lectures. Since 2001 he has been a junior researcher at the Institute of Experimental Botany. Previously he worked in the Department of Botany at Mogiliov State University and he has taken a post-graduate course in Botany at the Institute of Experimental Botany. Dzimitry speaks functional French and a little English.

Research Staff

Anatoliy Puchilo, born in 1961, holds a Ph.D. in Biology and since 2005 has been Head of the Laboratory of Geobotany at the Institute of Experimental Botany. He will be responsible for location of ecological profiles and selection of typological sample plots (TSP), taxation of stand and taking of peat specimens. He has been a junior and senior researcher at the Institute of Experimental Botany and speaks basic English as well as basic German.

Oleg Sozinov, born in 1973, holds a Ph.D. in Biology and will be responsible for the leveling of ecological profiles, definition of plants, geobotanical description, botany, biodiversity and lectures. Since 1997 he has been a senior lecturer of Botany in the Department of Biology and Ecology at Yanka Kupala State University of Grodno. Previously he was a laboratory assistant at the Institute of Biochemistry of the National Academy of Sciences of Belarus. He has also taken a post-graduate course in Botany at the Institute of Experimental Botany. Oleg speaks a little English and functional Polish.

Invited Scientists

Nina Tanovitskaya, born in 1955, holds a Ph.D. in Technology and Mechanization of Peat Production and will be responsible for geomorphology and hydrology of peatlands. She has been a researcher at the Institute for Problems of Natural Resources Use and Ecology at the National Academy of Sciences of Belarus since 1990, prior to which she was a junior researcher at the same institute. Previously she was a specialist in peat and peatlands with the Department of Mire Machinery at Belarusian Polytechnical University, and she was a designer in the Central Design Department at the National Academy of Sciences of Belarus. She also took a post-graduate course in peat and peatlands at the Institute of Peat. Nina speaks functional English.

Vyatcheslav Rakovitch, born in 1962, holds a Ph.D. in Geoecology from the Belarusian Natural Technical University. He is currently a senior researcher at the Institute for Problems of Natural Resources Use and Ecology. He speaks functional English and his responsibilities on the project include geomorphology and hydrology of peatlands.

Graduate Student

Tatsiana Broska, born in 1982, is a post-graduate student in Botany in the Department of Biology at the Belarusian State University. Previously she was a laboratory assistant at the university. She will be responsible for the description of phytocenoses and flora and speaks functional English.

Logistics Staff

Victor Diadko, born in 1951, is the expedition driver.

Ludmila Malahova, born in 1987, is the expedition cook.

Current Staffing Schedule (Subject to Change)

Note: Below is the tentative schedule at the time of printing, however, staffing schedules are subject to change. If a staff member will not be present, another individual of comparable skills will replace him/her.

Staff Member Present	Team I	Team II
Natallia Zeliankevich	X	X
Dimitry Grumo	X	X
Anatoliy Puchilo	X*	X*
Oleg Sozinov	X	X
Nina Tanovitskaya	X*	
Vyatcheslav Rakovitch		X*
Tatsiana Broska	X	X
Victor Diadko	X	X
Ludmila Malahova	X	X

* These staff members may be present for only a portion of the expedition.

DAILY LIFE IN THE FIELD

4. VOLUNTEER TRAINING AND ASSIGNMENTS

Training

The following lectures will be given to volunteers during the expedition:

- *Bogs, their peculiarities and conditions*: This lecture is to familiarize you with the phenomenon of bogs, their distribution on Earth and specific features of different kinds of bogs, and to offer a general characterization of their diversity. Special attention will be given to formation, development and condition of oligotrophic bogs. You will become acquainted with bog flora and main bog plant associations. Information will be given on peat deposit and its properties.
- *Geobotanical methods of field research in work*: In this lecture theoretical bases of work in the field will be given and principles of work with equipment will be shown.
- *Rules of safety on the bogs*: You will be taught how to orient yourself in different field conditions and will be shown poisonous mushrooms and plants. Information about medical aid will be provided.
- *History and culture of Belarus*: Information on the political and cultural development of Belarus will be given. Customs and legends will be touched upon and you will also learn about Belarus in World War II. This lecture may be carried out during transportation to the field site.

Project staff would also like to hear from you, such as information about your home country, your family, your job and your hobbies. Please bring some pictures (CD and PowerPoint are available) about your life and try to be ready to introduce yourself and your country to the team.

Assignments

Every working day volunteers will be subjected to varying field conditions. You have to be ready to go across watery and swampy parts of the bogs. Most of the work requires strength and endurance and some work (collection of herbarium and definition of productivity of phytocenosis), while less physically intense, requires fine motor control.

Volunteer assignments may include:

- *Adding to and looking after the herbarium collection*: It is necessary to put every found species of flora in dry paper and again in new dry paper every day. This task may also include assisting local researchers in studying soil cover, defining heights, covering plants, and recording dates.
- *Helping staff level territory*: This includes cutting, transferring landmarks and measuring sticks, and measuring reliefs on special pickets. It requires physical strength and endurance.
- *Documenting phytocenosis productivity*: This includes cutting off all vegetation from five small plots, dividing by species and weight, and collecting samples of bark, needles, lichens, mosses, etc. to record their pollution. It is straightforward but tedious work.
- *Taking peat specimens and digging soil (peat) profiles*: Profiles of up to two meters in depth will be dug. This requires physical strength.
- *Helping with taxation of stand trees*: This includes converting each tree on each typological sample plot (TSP), defining tree heights and diameters and dividing them by growth class and vitality. This type of work will have to be done on every TSP.

5. TEAM ITINERARY

The team will spend Day 1 and Days 12, 13 and 14 in Minsk, and the days in between at the field site. Below is a tentative itinerary for the expedition, however, be aware that all schedules can and do fluctuate and flexibility is important. You can expect to work for eight hours per day with an additional hour or two of travel to the research sites. It is customary for team members to spend time together following each day's work. Group activities may include fishing, swimming, singing folk songs, meals, and lectures.

- Day 1:** Arrive at the Minsk airport or train station. Transfer to the hotel and rest after the long flight. Meet at the hotel's hall (7:00 pm). Evening welcome party at the café Academia (7:30 pm). Free time and rest.
- Day 2:** Breakfast at the Academia and free time (9:00-11:30 pm). Meet at the hotel's hall. Pack the expedition bus, make some purchases at the supermarket and travel to the field site. Bag lunch (2:00-2:30 pm). Travel to the field site (survey sights and visit interesting places of culture on the way). First acquaintance with research site and accommodation (2:30-7:00 pm). Dinner and free time.
- Day 3:** Breakfast (9:00-9:30 am). Visit the regional center, registration of foreigners with the police (9:30 am-1:30 pm). Bag lunch (1:30-2:30 pm). Lectures about safety rules and instruction on bog work, practical work (3:00-6:00 pm). Dinner (6:30-7:30 pm). Briefings, acquaintance with contiguous sites and free time.
- Days 4-6:** Breakfast (8:00-8:30 am). Travel to the wetland site and fieldwork (9:00 am). Bag lunch and short rest (1:30-2:30 pm). Fieldwork and return from the field (2:30-7:00 pm). Dinner (7:00-8:00 pm). Sort specimens, briefings, rest.
- Day 7:** Breakfast (9:00-9:30 am). Travel to historical place, museum or other (10:00 am). Bag lunch (2:00-3:00 pm). Rest, swim, etc., and return from the excursion (3:00-7:00 pm). Dinner (7:00-8:00 pm). Briefings, activities (campfire, singing, etc.) and rest.
- Days 8-11:** Same as Days 4-6.
- Day 12:** Breakfast (9:00-9:30 am). Pack expedition bus and clean rooms (10:00-11:00 am). Return to Minsk (survey sights and visit interesting places of culture on the way). Bag lunch (1:00-2:00 pm). Arrive at the hotel and rest (4:00-7:00 pm). Dinner at the café Academia and free time.
- Day 13:** Breakfast at the Academia and free cultural program in Minsk (9:00 am). Lunch at the Academia and rest (2:00 pm). Meet with research staff and joint excursion in Minsk such as visiting Octiabrskaja square, City Hall, Orthodox Church, Old City (Troickoe Predmestie), Island of Tears, etc. (3:00-7:00 pm). Farewell party at the Academia and certificate award ceremony (7:00-9:00 pm).
- Day 14:** Breakfast at the Academia (9:00 am). Transfer to the Minsk airport and depart.

Cultural and Historical Opportunities

This expedition offers a strong cultural component for volunteers. During field research the team will work near different Belarusian villages, which will give volunteers the opportunity to meet and visit local people including fishermen, hunters, forestry workers, scientists and artists. The project also has a tradition of visiting important historical places, churches, monuments and other interesting places on the way to the research site; for example, the fortification and military installations of Stalin's Line and the memorial complex of Khatyn, a village which was reduced to ashes during World War II.

6. ACCOMMODATIONS

While in Minsk on nights 1, 12 and 13, volunteers will stay at the Hotel Academicheskaja. Each room has two beds and an en suite bathroom with shower. You will need to share a room with another volunteer of the same gender. Linens are typically provided and electricity is readily available.

The team will travel from Minsk to the field site and back in a large bus that is old and not terribly comfortable, but reliable. In the field volunteers will stay in simple cabins (called “hunthouses” or “foresthouses”). These cabins should have cots to sleep on, but it is best to bring a sleeping bag and sleeping pad. Rooms will be shared by several volunteers and staff of the same gender. There will be a kitchen in each cabin (situated near the dining room) with a gas-stove or electric oven, refrigerator, table for food preparation, storage and place for washing dishes.

While the cabins will most likely have modern toilets, you should be ready for the absence of flushing cistern toilets. The traditional toilet of Belarusian villages is a small outside house with a pit and no sink. The team will try to find a “banija” (bathhouse) to shower and use as frequently as possible. However, much depends on local conditions. In certain towns and almost all villages, the local economy does not provide for these comforts. You should be prepared to relieve yourself in the field with limited privacy. Laundry facilities are not available but you may choose to use a wash basin to wash your clothes by hand. Most of the time there will be access to electricity and a refrigerator, but you should not plan on frequent email or internet use. The planned expedition sites are no more than five miles from the nearest villages.

7. FOOD

During the days in Minsk, all team members will have meals at the café Academia. There are some pubs or cafés in some of the places the team will pass through or spend the night. During field days, a paid cook will be in charge of meal preparation, but all volunteers may assist with cooking on a rotational basis. Usually the cooks prepare typical meals eaten by Belarusian families. Belarusian staples include bread, potatoes, cabbage and pork. Patties made of potatoes and meat, and meat and cabbage pies are also very common. Mushrooms are a common filling and usually accompanied by meat. You can expect many soups and boiled meat, often higher in fat and sodium than the modern Western diet.

Below are examples of the foods and drinks you might expect during your expedition. Please bear in mind that variety depends on availability. This list is intended to provide a general idea of food types, but it is very important that volunteers be flexible.

- Breakfast:** Macaroni, potatoes, boiled rice, boiled buckwheat, various salads, eggs, ham, wurst, tinned meat, sandwiches
- Lunch:** Various sandwiches
- Dinner:** Borshch, shchi, fish soup, rassolnik, potato soup, macaroni, potatoes, boiled rice, boiled buckwheat, various salads, eggs, ham, wurst, tinned meat, pancakes, cutlets, fish fried, vareniks with blueberry, chicken, pickles, sweets
- Snacks:** Food will be available to volunteers in the kitchen for between-meal snacking
- Beverages:** Tea, coffee, kompot, mineral water
- Water:** Bottled water is not available in most of Belarus, but the well water in the village is potable; if you are not comfortable with drinking well water, you may choose to boil some on your own or bring a water filter or treatment tablets

Note: If you anticipate wanting particular foods or want to bring special foods or drinks (e.g. alcohol) to share with the rest of the team and field staff, please bring these with you from your home country.

Special Dietary Requirements

Special diets cannot be accommodated due to field conditions. Please alert Earthwatch to any special dietary requirements as soon as possible (e.g. diabetic, lactose intolerant, etc.), but be aware that it will not be possible to obtain foods not typical of the region and the project cannot accommodate those needing Kosher, Halal, vegetarian, vegan, low-sodium, low fat, or other special diets.

Special note to vegans and strict vegetarians: Almost all meals will involve some kind of animal product and it is impossible to plan for those that only eat certain types of foods. It may be possible to obtain meals that do not contain chunks of meat, but most broths and sauces will be made from animal products. If this poses a problem, then participation on this Earthwatch expedition should be seriously reconsidered.

TRAVEL PLANNING

8. BEFORE YOU LEAVE

Note: All foreign travelers to Belarus must fill out an Immigration Form upon arrival. You will receive this form on the plane and can fill it out either on the plane or in the airport after landing.

For a listing of useful websites for passport and visa requirements see Section 14 '*Helpful Resources.*'

Passport Information

Most visitors traveling from outside Belarus will require a passport valid for at least six months beyond the dates of travel.

Visa Information

Note: To apply for your visa, you will need a letter of invitation from the Principal Investigator (PI). This letter will be sent to you by Earthwatch, and you should provide it to the visa agency you use to obtain your visa. Before you receive your letter, however, **you will need to provide your Earthwatch contact person with the following information as soon as possible: Your name, nationality, address, phone number, fax number, email address, date of birth, passport number and expiration date, and your dates of arrival to and departure from Belarus.**

Citizens of most countries need a Business Visa for entry into Belarus (please do not confuse this with a Visitor Visa, which is used to visit family in Belarus). A Tourist Visa is only available to those booking through a travel agency in Belarus or a travel agency in another country which has an agreement with Belarus state travel. Processing of a visa can take 3-6 months for non-US citizens, so please begin this paperwork right away. **You will not be allowed to board the plane to Belarus if you do not have a valid visa.**

You are strongly advised to work with a visa processing agency to obtain your visa. These agencies are accustomed to communicating with Belarus officials and most charge around US\$100 for a visa. See below for suggested agencies. If you elect to act through the embassy or consulate to obtain your visa, please visit it personally. It is better not to send papers to them by mail.

Remember to provide your letter of invitation from your PI when applying for your visa. It will take a minimum of 30 days for the PI to obtain the letter and this time must be added to the time it will take for your visa to be processed.

Essential Information for Volunteers Requiring Visas

Type of Visa	Most visitors must get a BUSINESS VISA .
Where to Get a Visa	Contact a visa agency (strongly recommended), which can both expedite and simplify the process. See below for a list of visa agencies. You can also contact the nearest Belarus embassy or consulate to find out how to apply for your visa. Please note that this process can take weeks or more.
Required Information	You will need to send your passport (valid for at least six months beyond your stay), the letter of invitation from your PI , a Visa Application and Immigration Form, 2-4 passport-size photos plus payment to the visa agency. Please be sure that your passport is valid for at least six months beyond your stay.
Cost of a Visa	Generally between US\$40-100, but varies from country to country and can potentially cost up to US\$180 . A visa agency will charge an additional fee, which you can inquire about directly.

Visa Agencies

In the United States	In Europe	In Australia
PassportVisaExpress.com 1911 North Fort Myer Drive, Suite 503 Arlington, VA 22209 Tel: +1 888 596-6028, +1 703 351-0992 Fax: +1 703 351-0995 Email: info@passportvisaexpress.com Web: www.passportvisaexpress.com	The Visaservice Tel: +44 (0) 8708 900 185 Fax: +44 (0) 20 7278 8464 Web: www.visaservice.co.uk Thames Consular Services Ltd Tel: +44 (0)20 8995 2492 Fax: +44 (0)20 8742 1285 Web: www.visapassport.com	Ask your travel agency if they can send your visa application on your behalf.

Additional Entry Information

Once you arrive in Belarus, you will need to register your visa and passport in each area you visit. In Minsk, the hotel can register your documents. Once you arrive at the field site, the PI will register your visa and passport on your behalf.

In addition to a visa and passport, **you must purchase Belarus medical insurance in the airport**. There are several desks just before Passport Control at the airport. For those arriving by train there will be time to purchase the insurance in Minsk. This is required in order to register your passport and visa with the police. Please be sure to purchase this insurance. It costs approximately US\$1 per one day of stay in Belarus.

There is a possibility of random document checks by Belarus police, so you should carry your passport and registered visa (or photocopies) on your person at all times. You are also advised to leave copies of these documents with a responsible person in your country of origin.

For more information concerning entry and exit requirements and traveling in Belarus, see:

- www.belarusembassy.org
- www.belarustourist.minsk.by
- www.belintourist.by
- www.alatantour.com

International Evacuation and Travel Medical Insurance

In addition to the Belarus medical insurance that you must purchase at the airport upon arrival, travel medical and evacuation insurance is mandatory for Earthwatch volunteers while on an Earthwatch expedition anywhere in the world. The insurance covers volunteer travel medical risk, including medical expenses and medical evacuation, while traveling with Earthwatch overseas or on an expedition within your home country. Without insurance, the costs of such measures can range from US\$20,000 to \$50,000.

The emergency medical and evacuation assistance provider for Earthwatch is On Call International. On Call is a 24-hour international operation which provides medical assistance and evacuation, a 24-hour nurse help line and other travel assistance services such as lost baggage and lost document assistance.

Basic coverage is valid in the country of your expedition and during international travel to and from your expedition. If the expedition takes place in your home country, coverage begins when your group forms for the expedition and ends when the group disbands, and is incremental to your existing health insurance. Options are available for volunteers who would like to extend the period of coverage, increase insurance amounts or purchase additional cancellation or baggage insurance.

A detailed description of the Volunteer Medical and Evacuation Insurance Program policy, including the optional coverage increases, will be sent with this briefing. **Please note that policies are specific to each Earthwatch office.**

To contact On Call International in the event of an emergency, dial:

- 1-866-509-7715 from within the US
- +1-603-898-9159 from outside the US

State that you are on an Earthwatch expedition. The Earthwatch policy number is #US008020.

Cancellation Insurance

Trip cancellation insurance is highly recommended for Earthwatch volunteers. Depending on the level of coverage you purchase, cancellation insurance will help cover your airfare and Earthwatch Contribution if you are unable to travel. Earthwatch Institute does not reimburse airfare or costs associated with cancelled flights or expeditions. If your expedition is cancelled by Earthwatch, the insurance company will not refund your airfare; they will only refund fees associated with changing your tickets (usually about US\$100-150). You are encouraged to buy flexible or refundable plane tickets. See the *Earthwatch Optional Coverage Application* included in your Expedition Briefing packet. Note that volunteers with preexisting medical conditions are encouraged to explore their coverage options.

Earthwatch Europe volunteers can purchase travel insurance from Earthwatch, which is underwritten by Endsleigh and includes Additional Cancellation Cover. Additional Cancellation Cover insurance includes cover for non-refundable travel expenses should your expedition be cancelled. Alternatively, if Earthwatch Europe volunteers hold their own travel insurance they may be able to purchase Additional Cancellation Cover through their existing insurer.

Travel Agencies

Contact your local travel agent or use the web to find the lowest rates to make your travel arrangements. A list of suggested travel agents can be found in Section 14 'Helpful Resources.' Be sure to give your rendezvous details to your travel agent as soon as possible so they can plan your trip accordingly.

Other Advice / Information

- *Local currency:* The Belarusian Ruble (BYR). Notes are BYR 100,000; 50,000; 20,000; 10,000; 5000; 1000; 500; 100; 50; and 10.
- *Language:* The official languages of Belarus are Belarusian and Russian. The official language of the project is English.
- *Telephone code:* +375
- *Electricity:* 220 volts, 50 Hz. Adaptors are recommended. Most sockets are only compatible with the thin Russian plugs so European standard plugs won't fit in all sockets. Belarus uses the C and F plug types.



Type C



Type F

- *Time zone:* GMT/UTC +2 (GMT + 3 from last Sunday in March to Saturday before last Sunday in October).
- *Personal funds:* Volunteers on most Earthwatch expeditions find it is useful to have the equivalent of US\$100-200 in cash for miscellaneous expenses, souvenirs, sodas, alcoholic beverages, etc. during the expedition.
- *Currency exchange:* The most convenient place to exchange funds will be at the airport upon your arrival. Exchange money ONLY at special exchange centers or banks. Do NOT change money with private persons; this is forbidden. There will be very few opportunities to exchange money once at the field site. Cash machines/ATMs are only available in Minsk.
- *Required insurance:* Again, **you must buy Belarus medical insurance at the airport** (even if you have other insurance), as you will need it in order to register with the police. It costs about US\$1 per day in Belarus.
- *Required funds.* According to new rules, if you are a foreigner traveling to Belarus you must have at least US\$14 per day for the duration of your stay in the country (you will not use this money, you just need to have it).
- *Smoking:* Smoking is prohibited in the field (on the bogs and forests) during the expedition, and it is especially important to follow this rule during dry and hot days. Smoking is permitted in the towns and in your accommodations, as long as your roommates do not mind.
- *Checking luggage:* Please note that if you will be taking an international flight that has one or more connections within Belarus, it will be necessary to collect any checked bags at the airport where you first arrive in the country. After proceeding through Customs, you will have to recheck your luggage before flying on to your final destination.

9. PROJECT CONDITIONS

Please show this section to your physician when he/she is completing your health statement. Be sure to discuss inoculation requirements with your physician well in advance of your departure date. See Section 10 'Health Information' for inoculation information.

To the examining physician:

Your patient has volunteered to join a field research team that has specific physical demands of which you and your patient should be aware. **We need your accurate evaluation of your patient's ability to meet the conditions detailed below in order to safeguard his/her health and safety and ensure that he/she can participate fully and effectively.**

General Conditions of the Research Site

Belarus is comprised mainly of elevated flat areas and depressed areas, many of the latter being swampy and occupied by lakes. The climate is generally similar throughout the country, with cold winters and mild summers. The average January temperature is -6°C/20°F. The average July temperature is around 18°C/65°F. Annual precipitation and humidity are high, with moist, rainy summers. You should be prepared to get dirty and wet. Note that conditions in Belarus are very changeable from year to year. Summers may be hot and dry with temperatures of 35°C/95°F, or cool with temperatures of 15°C/60°F and daily rain.

Humidity	High		
Summer Temperature Range	15°C/59°F	to	34°C/93°F
Average Altitude	160 m/524 ft above sea level		
Annual Precipitation	650-750 mm/26-29.5 in		

Physical Demands

The team will be transported as close as possible to the fieldwork sites, but you should expect to walk up to 10 kilometers/6.2 miles per day at a moderate to slow pace. Sites will vary from relatively remote to quite close to villages and agriculture. Note that while there will be occasional opportunities to use basic washroom facilities in villages, when fieldwork is being conducted in more remote locations you should be prepared to go to the bathroom outdoors, with little privacy.

Traveling to the bogs may involve bushwhacking through unmarked trails and thick (sometimes thorny) vegetation, occasional moderately steep hiking and lots of unstable and challenging terrain. Upon approaching the bog areas, the terrain gets much wetter with hummocks (small mounds of grass) interspersed with deeper water. Walking on hummocks takes good balance and coordination as they are similar in shape to a mushroom, so if you miss the center, your foot will slip off and dunk in the water. At times you will need to move through heavy muck, which takes a lot of strength as it sucks you down when you try to pull your booted feet out.

Other tasks may involve digging in the muck/soil and sawing small trees. Both require good physical condition. These more challenging tasks will be balanced with less intensive tasks like working in the herbarium and collecting plant samples.

You will need to carry your own gear for the day (food, water, clothing layers, etc.) as well as some group/scientific gear and samples. Pack weights can be expected to be 4.5-9 kilograms/10-20 pounds depending on your personal needs.

Below are the expected demands of the project, but please keep in mind that conditions may change and the project could potentially be more or less strenuous than the chart indicates.

Activity	Workload/Intensity
Sitting	1-2 hours per day
Bending	As needed, on and off all day in the field
Walking and hiking	Up to 10 km/6.2 mi for 1-4 hours per day during fieldwork
Carrying	4.5-9 kg/10-20 lbs for 1-2 hours every day

To prepare for this project, you are advised to undertake a program of physical conditioning that involves hiking up to 10 kilometers/6.2 miles over inclines. Pulling your feet out of muck requires strong and flexible hip, leg and abdominal muscles. To best prepare for unstable hiking surfaces, you should conduct balance exercises to strengthen your ankles, knees, and hips. Additionally, due to the risk involved with working on bogs that are sometimes located on top of deep lakes or pools, **all volunteers must be able to swim.**

Potential Hazards

Hazard Type	Associated Risks and Precautions
Bog work	Work on the bog can be difficult and caution is required. Every day you will work in a very wet place with a lot of mosquitoes. You must be ready to cross watery and swampy areas. There is high risk of falling, scratches and bruises. Bring bandages. In some places, the bogs consist of a thick film of sphagnum moss over a deep lake or pool. This cover may stand weight of about 80 kg/176 lbs, and walking over it causes waves. The team will not likely visit such places, but in any case you must be cautious. Do NOT move on the bog alone. Finally, the bog landscape looks similar over many kilometers and it is easy to get lost. It is imperative to stay with the team.
Water	You will be working in and around water all the time and you must be prepared to become wet from the humidity of the bog. While conditions may be hot you will likely feel cold from the water. To stay dry, bring comfortable clothes, waterproof gear, a hat, rubber boots and warm socks. Try to change clothes or dry them in the evening. Generally, you will be wearing waders, which provide some buoyancy (unless water gets inside). You should also be prepared to cope with the inherent hazards of working in and around water: falling in, getting bumped and scraped, getting injured, ingesting or aspirating water, etc. Training on how to work safety in these conditions will be provided, but swimming lessons will not. You must have at least a basic swimming ability; if nothing else, you must be able to tread water.
Snakes	Only one species of snake (viper) in the area is poisonous. Be careful when walking, sitting down, taking samples, etc. If you do see a snake, do not approach or touch it.
Insects	Biting midges, gnats, flies and mosquitoes are common in wetlands, all of which bite and may cause discomfort. Tick-borne encephalitis (vaccination is available in many parts of the world, but not in the US) and Lyme disease are present in Belarus. Wear long-sleeved shirts, long pants, and a hat while outside to prevent illnesses carried by insects. It is also recommended that you bring insect repellent containing DEET.
Plants	Do NOT eat unknown berries or touch unknown mushrooms. Ask researchers!
Fire	Dry peat is very flammable. You may NOT smoke on the bogs!
Food and water	Do not drink tap water unless it has been boiled, filtered, or chemically disinfected. Do not drink un-bottled beverages or drinks with ice. Do not eat fruits or vegetables unless they have been peeled or cooked. Avoid unpasteurized milk and products that might have been made from unpasteurized milk, such as ice cream. Avoid food and beverages obtained from street vendors. Do not eat raw or undercooked meat or fish. Some types of fish may contain poisonous biotoxins even when cooked.

Medical Conditions of Special Concern

The following conditions would make participation difficult or impossible: hydrophobia, discomfort in or around water, conditions that affect balance, vertigo, and any limitation to full mobility (including stability on uneven surfaces). If you have any condition that requires supervision or access to full medical care (e.g. heart or kidney problems, epilepsy, seizures, anemia, blood clotting issues, bone brittleness, etc.) or are pregnant, you should consult your physician prior to participation due to the long distance to medical care. If you have any injury or weakness in your hips, knees, ankles or feet, please ensure you are fully healed and have sought medical advice prior to participation. Please consult a physician if you are on any medication or have a medical condition that exacerbates bruising to a dangerous level.

Those with respiratory conditions may find the presence of the plant species *Ledum palustre L.* an irritant. The plant secretes a smelly substance with a slight narcotic effect, although there is little wind to transport the substance during the field season. Additionally, volunteers with any known allergies should bring along appropriate medication.

Those who are uncomfortable with or have any phobias of snakes, lizards, spiders, gnats or midges, or with being in remote areas, should not participate.

All volunteers must be able to swim.

10. HEALTH INFORMATION

Routine Immunizations

Make sure to have the following up-to-date immunizations: DPT (diphtheria, pertussis, tetanus), polio, MMR (measles, mumps, rubella) and varicella (if you have not already had chicken pox).

Project Inoculations

The following are recommendations only. Medical decisions are the responsibility of each volunteer. Note that health conditions around the world are constantly changing, so keep informed and consult your physician, a local travel health clinic, the US Center for Disease Control (www.cdc.gov), the World Health Organization (www.who.int) or the resources in Section 14 'Helpful Resources' for the latest health information for travelers. These recommendations are for this project site only. Please consult your physician for guidance on inoculations if you intend to travel to other parts of the country.

Yellow Fever	If traveling from a country or region where it is endemic, a Certificate of Vaccination is required.
Tick-borne Encephalitis	This inoculation is recommended, however, note that the vaccine is not available in many countries.
Hepatitis A	This inoculation is recommended for health reasons.

11. PACKING CONSIDERATIONS

PLEASE SEE THE PACKING CHECKLIST AT THE BACK OF THIS BRIEFING AND REMEMBER TO TAKE YOUR BRIEFING WITH YOU ON YOUR EXPEDITION.

General Considerations

Do not bring more luggage than you can carry and handle on your own. It is best to pack your items in a backpack as wheeled luggage may not work well on uneven roads. You should bring clothing you don't mind getting wet and muddy, and set aside some additional clothing for the days in Minsk. You are advised to pack a carry-on bag with an extra set of field clothing and personal essentials in the event that your luggage is lost and/or takes several days to catch up with you. Check with your airlines about baggage size regulations.

Belarusians and volunteers from other countries would be happy to see any souvenirs, photographs, gifts or other items that characterize you and your country.

Weather Consideration

Please take weather conditions into consideration when packing for your expedition. Climate information can be found in Section 9 'Project Conditions.' Be prepared for humid weather. Even hot days can feel cold when you are wet out on a bog, so clothing you can layer is best.

Essential Items

Make sure to bring your Earthwatch Expedition Briefing with you! It includes important information to which you may need to refer during your expedition, as well as during your journey to and from the rendezvous site. Additionally, the following items are essential: passport and visa (absolutely necessary!), some money, a sleeping bag, sneakers/trainers, extra set of comfortable clothes, mosquitoes repellent and rubber boots (Wellingtons). Note that you will wear rubber boots every day in the field and other boots are not useful on the bogs. Your rubber boots should be tight fitting, so bring lots of socks to ensure a good fit. **Please see the Expedition Packing Checklist for a complete list of what you will need.** You are encouraged to go through the list and mark off each required item right before you leave for your expedition.

12. RECOMMENDED READING

Please read *Belarus Wetlands: The Research in the appendix of this briefing.* This document was prepared by the Principal Investigators and Earthwatch and explains the research conducted through this project as well as some results to date. Below are additional recommended materials for those interested in further preparing for the expedition. Many can be purchased online through popular vendors. See Section 14 'Helpful Resources' for suggested vendor websites.

Scientific Books

- *The Book of Swamp and Bog* by John Eastman with illustrations by Amelia Hansen, Stackpole Books, 1995
- *Bogs of the Northeast* by Charles W. Johnson, University Press of New England, 1985
- *Great Natural Areas in Eastern Pennsylvania* by Stephen J. Ostrander, Stackpole Books, 1996
- *Bogs of Belarus* by T.I. Kucharchik, Minsk, 1996
- *Peatlands and environmental change* by Dan Charman Chichester, Wiley, c. 2002

Journals/Articles

- *Peatland Ecosystems and Man*, an impact assessment edited by O.M. Bragg *et al.*, Department of Biological Sciences, University of Dundee in association with the International Peat Society, 1992
- *The raised bogs of Belarus, their geobotanical structure, condition and conservation* by I.W. Berniakovich, pages 9-16 in the materials of the International Science Congress "The modern problems of studying, using and reservation of natural complex of Polesje," Minsk, 2000

Popular Books

- *Wise Use of Mires and Peatlands* by Hans Iosten and Donald Clark
- *Bogs: The Ecology, Classification and Conservation of Ombrotrophic Mires* by R. Lindsay

Film

- *Bog is a Whole World* by Edward Zommer

Project Field Report

Each Earthwatch Institute-supported project submits a report on the past year's research and results to Earthwatch, generally on an annual basis. The most recent field report for this project may be available online through www.earthwatch.org/expeditions/zeliankevich.html. Note that reports are not available for all projects.

13. EMERGENCIES IN THE FIELD

In the event of an emergency, the injured/ill person would be carried from the bog by team members and then evacuated by minibus, which is always accessible, to the hospital. There are First Aid posts and clinics in local villages where minor injuries will be treated according to basic First Aid procedures.

In the event of a personal emergency requiring a volunteer to leave the project early, project staff can help to arrange a taxi from the field site to the airport and a staff member can accompany the individual to the airport and help with all needs. Early departures can only be accommodated in emergency circumstances.

Safety Training	All employees have basic safety training and can administer First Aid.	
Nearest Clinics	Team I Regional clinic Str. Oboronnaja, 1 Belynichy Tel: 8 022 32 51 643	Team II Regional hospital Str. Engels, 80 Sharkovschina Tel: 8 021 54 41 234
	Nearest Hospital	The nearest major hospital is 19 kilometers away and can take anywhere from 20 minutes to an hour to reach.
	Team I Regional hospital Str. Belynickogo-Biruly, 12 Mogilov Tel: 8 022 27 86 65	Team II Regional hospital Str. Engels, 80 Sharkovschina Tel: 8 021 54 41 234

14. HELPFUL RESOURCES

Project-related Websites

- Sites featuring PI Zeliankevich and the project: http://foto.mail.ru/mail/zeliankevich_nat and http://foto.rambler.ru/users/zeliankevich_nat
- Bog information: <http://www.jamesmdeem.com/bogpage.htm>
- Article on peat burning: <http://www.newscientist.com/article.ns?id=dn6613>

Passport and Visa Information

- Belarus travel site with entry information: www.traveldocs.com/by
- Belarus Ministry of Foreign Affairs: <http://www.mfa.gov.by/eng/index.php?id=1&d=belarus>
- Embassies around the world: <http://www.embassyworld.com>
- For Japanese citizens: http://www.rainbowt.jp/travel/visa_top.html
- For Australian citizens: <https://www.passports.gov.au> and <http://www.dfat.gov.au/visas/index.html>
- Passport Visa Express (for US citizens): <http://www.passportvisaexpress.com>
- The Visaservice: <http://www.visaservice.co.uk>
- Thames Consular Services Ltd: <http://www.visapassport.com>

Travel Guidebooks and Booksellers

- Lonely Planet: <http://www.lonelyplanet.com>
- Rough Guide: <http://travel.roughguides.com>
- Amazon: <http://www.amazon.com>
- Barnes and Noble: <http://www.bn.com>

Travel Agencies and Advice

- Belarus travel: www.belarus.org, www.belarusguide.com and www.belarus-online.com
- World Travel Guide: <http://www.worldtravelguide.com>
- UK Foreign Office travel advice: <http://www.fco.gov.uk/travel>
- STA Travel (contact Angie Kurtz or Chris Chappell and mention that you will be going on an Earthwatch Expedition): <http://www.statravel.com>
36 Geary Street
San Francisco, CA 94108
Tel: +1 415 391-8407
Email: sfo@statravel.com
- STA Travel (UK): <http://www.statravel.co.uk>
Tel: +44 (0) 1865 792800
Fax: +44 (0) 1865 792911
Email: manager.oxford@statravel.co.uk
Quote code: EWE01/02
- Wexas International (Europe): <http://www.wexas.com>
Tel: +44 (0) 20 7581 8761
Fax: +44 (0) 20 7581 7679
Email: southern@wexas.com
Quote code: EWE01/02

Airline/Airport Resources

- Flight comparison tools: <http://www.bookingbuddy.com> and <http://www.1800-fly.com>
- Airport codes worldwide: <http://www.logisticsworld.com/airports.asp>

Country Information

- Country information from around the world: <http://www.countryreports.org>
- National Geographic Map Machine: <http://plasma.nationalgeographic.com/mapmachine>
- US State Department: <http://www.state.gov>
- Time worldwide with GMT/UTC: <http://www.worldtimeserver.com>
- Currency converter: <http://www.xe.com>
- Electrical current converter: <http://kropla.com/electric2.htm>
- Telephone dialing codes: <http://kropla.com/dialcode.htm>
- Online unit conversions: <http://www.onlineconversion.com>
- Worldwide weather: <http://www.wunderground.com> and <http://www.tutiempo.net/en>
- ATM locator: <http://visa.via.infonow.net/locator/global/jsp/SearchPage.jsp> and <http://www.mastercard.com/atmlocator/index.jsp>

Health Information

- Travel health website: <http://www.mdtravelhealth.com>
- Center for Disease Control: <http://www.cdc.gov>
Tel: +1 800 311-3435 or +1 888 232-3228
- World Health Organization: <http://www.who.int>
- The Travel Doctor: <http://www.tmvc.com.au>
- Disease outbreaks: <http://www.who.int/csr/don/en>
- MASTA Travelers' Healthline (UK)
Tel: 0906 8 224100 (within UK)

APPENDIX

BELARUS WETLANDS: THE RESEARCH

The following information was taken from the research proposal submitted by the Principal Investigators to Earthwatch Institute. Included is a description of the research conducted through this project, some results to date, and other information regarding the accomplishments of the project and the staff. Specific details regarding research sites, methods, etc. is subject to change slightly from year to year and such changes may not be incorporated into this document.

BACKGROUND, OBJECTIVES, AND METHODS

Background

Bogs make up about 14% of Belarusian territory, numbering up to 10,000. Most began to form throughout the last 11,000 years. Oligotrophic bogs occupy 433.9 thousand hectares making up 18.2% of the area of all Belarusian bogs. Raised bogs are the dominant type of bog in North Russia and the Baltic. The border of their distribution goes across Belarus. The number of bogs of the oligotrophic nature is about 1,650. Of these, 745 peat deposits have industrial importance, 79.1% are concentrated in the northern geobotanical subzone of Belarus.

Large-scale melioration of bogs in Belarus has been ongoing for 130 years, but the man-induced impacts have not been studied. During the last two centuries, many of the eutrophic bogs of southern Belarus were destroyed. Waterlogged soils of Belarus make up 41,305 hectares, 42% of them are meliorated, and only 2,379 hectares are not impacted or changed. A decrease of the area of raised bogs was especially rapid in the subzone of deciduous-pine forests, where only 15.2% bogs were preserved in natural condition. In Belarus in general 3.4% of raised bogs have been produced, 11% have been drained completely, 56.35% have been drained partially and 29.2% remain in their natural condition (T.I.Kucharchik 1996). This last figure is fairly impressive due to the continuing process of melioration and lack of registration of peat deposits in Belarus. Intensive development of the bogs of Belarusian Poozerje (the northern region) has been continued in Belarus, where 80% of oligotrophic row bogs are concentrated. At the present time, most oligotrophic bogs are not meliorated. But the threat for bogs is large due to unsupervised cultivation by kolkhozes (large-scale, collective farms) and industrial complexes, which rent land situated on bogs.

- *Peatland*: The words "peatland" and "mire" are generally used interchangeably. These terms both encompass all wetlands where plant production exceeds decomposition allowing for the accumulation of organic matter as peat.
- *Bog*: This term is usually restricted to refer to depressional basins that receive water primarily through precipitation. These are acidic and nutrient poor (oligotrophic) peatlands dominated by sphagnum, peat or mosses. The formal term for this kind of peatland is a ombrotrophic mire.
- *Raised bog*: These are bogs that have a domed profile - highest at the center and gently sloping away at the edges. They are formed by depressional areas filling with vegetation and accumulating peat. The surface of a raised bog is not usually flat, but is often made up of a series of hummocks and hollows.
- *Blanket bogs*: These are typically found in upland areas and tend to follow the contours of the landscape.
- *Melioration*: This refers to the process of altering bogs.

From: Mitsch, W.J. and Gosselink, J.G. 1993. *Wetlands* (2nd ed.). Van Nostrand Reinhold Co., New York.

Despite the fact that scientists have studied bogs for more than a century, the role of bogs in the ecosystem is still widely debated. During the history of the former USSR, bogs were a subject of investigation not for the sake of their conservation, but mainly for their industrial usage. They were valuable only as deposits of useful organic substance and as forestry plantations. Sometimes they were considered unnecessary and even harmful. Only in the last decade has an ecological approach to studying bogs become standard scientific practice in Belarus. There has also been a shift from looking only at economical factors to understanding the benefits of pure research not driven by economic products.

The location of bogs/mires is easy to predict based on the land-forms, but the process of mire formation and development are dynamic and difficult to describe. One of the major challenges in this kind of research has been the use of the terms. Unfortunately, up to now there has been no unified concept among scientists as to the process of bog formation. Therefore there is not a clear definition of the term "bog." This term has been developed by experts from different fields over a long period of time. In the mire study of the All-Union botanical society in 1966, bogs were determined as a sub-type of mire surface with permanent or mostly surplus moistening. Bogs are covered with certain hydrophilic plant communities. A characteristic of mire is the domination of the organic fertilizer accumulating processes and as a result the forming of peat. As a result there are special bog peat soils. Thus, a bog consists of three necessary components: peat, water and vegetation. Peat is the basic organizer of the ecosystem of bogs. The correlation between peat and water is 5:95%.

Belarus has three types of mires: oligotrophic (nutrient poor), mesotrophic (moderate nutrients) and eutrophic (nutrient rich) bogs. The most scientifically interesting for us are oligotrophic bogs. Oligotrophic (raised) bogs have a zone-intrazonal type of vegetation. Feeding of the bogs comes only from the atmospheric precipitation (e.g. rain, snow, etc.). Subsoil waters do not have access to the surface of bogs. As a result water and substratum are acidic and poor in nutrients. The surface of the bog is prominent and the depth of peat deposit may reach 12 m. Bogs are often distributed on watersheds or may represent the final stage of the evolution of low mires. They are not flooded by floodwaters. The nutrient poor environment is a cause and an effect of vital functions of sphagnum mosses that often dominate the flora. Sphagnum mosses, because of their anatomical structure, may hold up to 20 times their weight in water, so they form high watering levels and usually start swamping a territory.

In addition, sphagnum mosses contain phenols and are very resistant to decomposition. Because of the inaccessibility of oxygen in peat deposit, they form highly acidic environments. This provides high mobility of ions. Low mineralization (conversion of organic matter to inorganic forms) of raised bogs is supported in such a way. The top of bogs is usually without woody vegetation as woody species are not well adapted to growing on bogs. Instead, bog grasses and shrubs have a high occurrence because they can form root systems in growing deposit. The margins of the bogs are covered by pine trees. Bog vegetation in Belarus is complicated and has a large range from simple, single stratum communities to diverse communities with several floristic stratums. Most bogs are covered in ridge-pool complexes which are mostly elongated lakes and can quite often be numerous in the central part of a bog. As a side effect of the low mineralization, bogs keep pollen and spores preserved in peat for thousands of years and reflect the past geological history.

Bogs have many important functions. Among all ecotopes of plants on the land, only bogs have a special position between small biogenic and large geological circulation of substances. They transfer carbon and nitrogen (N₂) from biogenic (derived from natural processes) into geological circulation (abiotic or non-biological) and clean atmosphere of carbon dioxide (CO₂). Incomplete mineralization of dead remains only occurs in bogs. Therefore carbon and N₂ are conserved in peat deposit. In terms of removing of CO₂ from the atmosphere, a single hectare of bog is 7-15 times

more effective than a hectare of forest. Bog vegetation releases 1.6×10^8 tons per year of oxygen (Dobrodejew 1977).

Bogs are also reservoirs of fresh water. They accumulate water from atmospheric precipitation and prevent direct losses to groundwater. In such a way, they provide water for full-flowing rivers. Oligotrophic bog water can be used as an atmospheric pollution indicator. Since bogs accumulate water, they smooth the climate cycle and reduce the occurrence of flooding.

A phenomenon of thermophoresis (particle motion along a temperature gradient) provides movement of contaminants in dust from contiguous territories to the bogs, which is absorbed into bog vegetation. Practically all heavy metals and radionuclids, which fall with atmospheric precipitation, are absorbed by oligotrophic bogs' vegetation and peat. Drained peat deposits accumulate the largest amount. As a result meliorated bogs that lose their contaminant holding capacity become a source of radionuclid dust storms, which have occurred in Belarus once every five years during last 30 years. A migration of radionuclids from polluted regions in the cleaner ones occurs during these storms. During the strongest dust storms in Belarus, 20 tons of dry substances can transfer the distance of one hectare.

Bogs are refuges for many species of flora and fauna. Belarus has over 270 bird species present in total each year. Many of these birds use bogs as refuges during their migrations between western Europe (during winter) and northern Russia (during nesting). For example, the river Pripiat is the most popular path of migration to Europe for wild geese, ruffs and other birds. Belarusian bogs are significant as the main place of reproduction for many birds. Among them there is the most threatened species of bird in Europe, the aquatic warbler (*Acrocephalus paludicola Vieill*). Belarus holds over 57% of the European population. A checklist of birds can be found at <http://www.bsc-eoc.org/avibase/avibase.jsp?region=by&pg=checklist&list=clements>.

From an economic point of view, bogs are rich in irreplaceable natural resources. Vegetation supporting 56% of all berry resources in Belarus are related with oligotrophic bogs. Pineries in and around oligotrophic and mesotrophic bogs make up 10.3% of all Belarus pineries. The total amount of peat preserved in bogs is 4397.8 million tons, or 25130.8 million cubic meters. Peat with a high content of bitumen and carbohydrate complex is the base of the bituminous and hydrolytic industry and is also connected with oligotrophic bogs.

In addition, bogs are popular objects of recreation, where local inhabitants gather mushrooms and berries. The percentage of adventure travel and hunting is one of the highest in bogs. The history of Belarus is connected with bogs; therefore they are an indispensable attribute of folk legends and fairytales.

Objectives and Methods

The long-term goal of this project is to find comprehensive and effective systems of conservation for the raised bogs of Belarus.

Vegetation has the most important role in the development and dynamics of raised bogs. Unique plant communities of high bogs are the most stable ones among all other plant communities of Belarus. Undisturbed raised bogs may exist for centuries (in the absence of climate change) and may restore themselves after some level of disturbance due to their vegetation. Stages of bog development are connected with certain plant associations that create specific kinds of peat. The only attempt to carry out full plant ecology investigation of bogs was made in the 1970s by the Institute of Experimental Botany. Classification of bog vegetation was worked out in the Institute of Experimental Botany of NAS of Belarus. It includes the following subordinate units: type of bog, group of types, and class of types. There are 21 types of bogs, 6 groups of types, and 3 classes of types in Belarus. Our planned complete plant ecology investigation would allow doing this work

completely and in a larger scale. Additionally, we would receive data on dynamics of bog vegetation by comparing our data with previous data.

Our main research objectives are:

- On the basis of obtained data, to find (and recommend to conserve) the most unique and valuable natural complexes.
- To create a methodological base and criterion for the conservation of wetlands together with a complete study of vegetation of the most representative bogs of Belarus
- To carry out a full complex of geobotanical investigations on these bogs.

To achieve these objectives, we aim to:

- Describe the diversity of vegetation of high bogs and the geobotanical diversity of high bogs of Belarus. Geobotanical diversity of high bogs besides characteristic vegetation includes characteristics of peat deposit, peculiarity of hydrology and history of bog massif.
- To study peculiarities of raised bog vegetation and the structure of peat deposit in every subzone of Belarus. Belarus is situated near the border of two geobotanical zones. Its territory includes three geobotanical subzones: the north subzone of oak-darkconiferous forests, the central subzone of hornbeam-oak-darkconiferous forests, and the south subzone of deciduous-pine forests. It is known that vegetation of Belarus in general and vegetation of raised bogs in particular may show zone specific changes from north to south.
- To investigate the level of anthropogenic pressure on raised bog systems.

Study of structural elements of vegetation is carried out on key plots, which may be represented in the form of ecological profiles with a series of typological sample plots (TSP). These key samples have to reflect not only typical and representative formation-typological structure but also zonal peculiarities of vegetation and their subzonal variants. The number of investigated plots and scale of investigations are determined by the size of object and by the goals of the research. On parts of bogs with woody vegetation we plan to locate TSP for analyses of stand and for possible repeated investigations. On parts of bogs without woody vegetation we plan to carry out geo-botanical descriptions (GD). Their size varies from 10 to 25 m².

Surface water condition is determined visually. Allocation of sections with vegetation of oligo-, meso- and eutrophic kind is ascertained. Location of plant association with measurements of their extension is established. Height of the territory on every border of neighbor associations is carried out. An analysis of the condition of contiguous territories, their mutual interaction and analyses of level of anthropogenic influence on bogs is being carried out.

Both TSP and GD complete complex of geobotanical investigations are carried out. Locating of TSP depends on placement in representational stands. The size of TSP is determined by demands of methods of forest statistics and forest taxation (TSP has to include no less than 100-200 trees for statistical treatment of dates). Usually their size varies from 0.1 to 1.0 ha.

The stand structure is studied on the basis of dates of the entire tally, measuring of diameters, measuring of heights of trees according to diameter class, and distribution of trunks in groups of grown class. Grown class measures the extent to which an individual tree competes for light with surrounding vegetation. It is necessary to take cores of wood to do analyses of dendrochronological rhythm of trees.

Undergrowth is investigated on 25 fixed plots. Species composition, age, and average heights are estimated. The character of underbrush is analyze by dates of the same 25 plots with distribution into species and stratum. Maximal, minimal and average heights are defined.

Soil plant cover is described on 1 x 1 m² fixed plots. They are situated on diagonals of TSP. On every plot, these descriptions of complete species composition of moss and grasses, semi-shrubs and sub-shrubs, and determination of their abundance, height, frequency, percentage of coverage and other geobotanical parameters have to be done. We collect herbarium and carry out definitions of rare plant species and communities.

Productivity is defined on plots 1 x 1 m² or 50 x 50 cm² for shrub-grass stratum and 25 x 25 cm² for moss stratum, where the over-ground part of plants is cut. It has to be done 5-10 times. Cut mass is divided into botanical groups (e.g. grasses, sedges, herbs, shrubs and semi-shrubs, mosses and ferns) and weighed, and then they have to be dried for lab work.

Soil-water conditions are investigated on the basis of locating every TSP soil cut, carrying out of morphological description of soils, and taking specimens for the subsequent lab work analyses. The thickness of peat deposit with the taking of specimen is made by bore and probe. It will allow us to define the stratigraphy of the deposit.

Our investigation will be carried out with the help of methods worked out and approved by the Laboratory of Geobotany of the Institute of Experimental Botany. Some regulations of methods of the ex-USSR have been taken into consideration (Sukachiov 1974, Zoin 1961).

RESULTS AND OPPORTUNITIES

This investigation of the geobotanical structure of raised bogs is the first large-scale research of its kind in Belarus. The importance of bogs in general and raised bogs in particular is beginning to be highlighted on Belarusian television. As a result of this project, a booklet and other popular scientific literature will be published to further popularize bogs and to educate both the scientific community and the general public about the importance and services of bogs. Results of this investigation will be published and will be common property of the public, specialists, and students and teachers of biology and forestry.

Despite of the growing popularity of bog conservation in European society, Belarusian bogs are expected to be cultivated in the future due in part to the country's financial difficulties. After executing full investigations and estimates of the condition of bogs, recommendations for their rational use will be given. It will then be possible to indicate what type and level of cultivation is sustainable and which bog massifs are suitable.

To acquaint the population with raised bogs and to sell them as an object of recreation is to pave the way for a new usage of bogs. The Principal Investigators will be able to pick out and recommend the most suitable bogs for adventure travel and for educational trip by schools.

The first and most important aim of our investigation is to prepare a scientific basis for effective conservation of bogs. We will select bog massifs with the greatest need for conservation and will prepare scientific bases for their preservation. Collected data will be handed over to the Ministry of Ecology of the Republic of Belarus and used for organization of reserves, national parks, and other designated conservation areas.

This research has been and will continue to be disseminated in a variety of ways, including through books, scientific articles, popular articles, presentations, participation in conferences by the Principal Investigators, film, university theses, and more. The data is being used by a number of organizations and groups, including the Ministry of Natural Resources and Preservation of the Environment, Belarus State University, the National Academy of Sciences of Belarus, the State Committee on Ground Resources, the Administrative Office of the President of Belarus, and many others.

Thanks to this research project, a total of 16 plant species have been conserved/protected and a total of 24810 hectares of habitat have been protected, managed or restored.

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EXPEDITION PACKING CHECKLIST

Essential Items

- This Expedition Briefing
- Photocopies of your passport, flight itinerary and credit cards in case the originals are lost or stolen; the copies should be packed separately from the original documents
- Passport and visa
- Certification of inoculation (for those from Asian countries)
- At least US\$14 per day for the duration of your stay in Belarus (you will not use this money, you just need to have it due to Belarusian entry rules)

Required Items

Clothing/Footwear for Fieldwork

Note: Field clothing should be made from material that dries quickly. Bring clothing that you don't mind getting wet and dirty.

- Knee-high (or higher) rubber boots (Wellingtons)
- T-shirts
- Shorts
- Lightweight long-sleeved shirts
- Lightweight pants
- Warmer clothing made from wool or synthetic fabric, not cotton (jeans are NOT recommended)
- Waterproof clothing/gear
- Plenty of extra pairs of warm socks

Clothing/Footwear for Leisure

- One pair of comfortable shoes (e.g. sneakers/trainers)
- One set of comfortable clothing to keep clean and dry

Field Supplies

- Small daypack/rucksack
- Drybag or plastic sealable bags in various sizes (good for protecting equipment such as camera from dust, humidity and water, and also for carrying your lunch in the field)
- Insect repellent spray with DEET
- Water bottle(s)
- Sunglasses
- Hat with wide brim to protect against sun
- Compass
- Whistle

Bedding and Bathing

- Bed sheet
- Sleeping bag (a sleeping bag can be provided if you wish; however they are not the most comfortable or warm)
- Towel

Personal Supplies

- Spending money (Belarus rubles are the best form of currency)
- Personal toiletries (biodegradable soaps and shampoos are encouraged)
- Roll of toilet paper
- Antibacterial wipes or lotion (good for “washing” hands while in the field)
- Personal First Aid kit (e.g. anti-diarrhea pills, antibiotics, antiseptic, itch-relief, pain reliever, bandages, blister covers, etc.) and personal medications
- Sunscreen lotion with SPF 30 or higher
- Medications in their original bottles and photocopies of any prescriptions
- Extra contact lenses and cleaning solution and an extra pair of eyeglasses if you wear them

Optional Items

- Guide to Belarus
- Wildlife guide(s)
- Books, games, journal, etc. for down time
- Flashlight/Torch or headlamp with extra batteries and extra bulb
- Earplugs
- An individual mosquito net if you would like to sleep in a tent
- Camera with extra batteries and film/digital memory storage and/or video-camera
- Pocket knife or multi-tool (pack in your checked luggage, not your carry-on)
- Swimsuit for recreational time
- Mobile phone (not guaranteed to receive service while in the field)
- Fishing gear