# ...VISITING THE HEL MARINE STATION

It was a sunny Friday afternoon in March. A group of "young scientists" – the students of the X Secondary School in Gdynia – left for the Hel Peninsula to improve their knowledge about the coastal zone of the Baltic Sea life. The additional aim of the trip was to find the first signs of spring.
We were visiting the Hel Marine Station University of Gdańsk for two days. We were taught by Krzysztof Skora, the Head of the Hel Marine Station, about many issues of the Baltic Sea mammals. A short sightseeing tour of the gray seal rehabilitation centre at the Hel Station was also a part of our trip. During our stay at the scientific centre we saw five grey seals. The young seals are set free at the protected area of Słowński National Park. Special transmitters fixed on the seal's head are responsible for sending information (via the satellites) about the current position of the animal in the Baltic Sea region.
While we were visiting the Sealarium we observed the seals' behavior during their feeding period. Who could expect that one seal can eat 5 – 9 kg herrings per day! We hoped to see a seal's pup that had been born a few days earlier. However, the seal pup with its mother had to be isolated (the mother takes care of her baby for 3 weeks and then she leaves it!). We had an opportunity to use the small fish net and tried to collect a small number of fish from the shallow water zone next to a sandy beach. The harsh weather was not good for fishing, though. It was too windy and there were so many waves on the water surface that we did not catch many organisms. After the sampling stage there was an attempt to identify the species.
We only managed to find crustaceans. Our previous attempt (late summer) gave us a number of three spine sticklebacks (a dominant pelagic fish of the shallow waters of the Puck Bay), sand eels and small flounders.
Describing briefly the method of coastal zone fish research, it is important to point out that the way of sampling has always been based on the same principles. Having the data collected for many years it is possible to follow the changes in the underwater ecosystem.
We decided to spend the last part of our visit to Hel at the beach. There were lots of broken shells, parts of trees and macro algae at the beach located at the Puck Bay side. The litter we found on the sandy beach made us sad, because we saw a negative side to the human activity. But we were satisfied by new impressions and knowledge, with a bit of spring mood, and now we are waiting for the next trip to Hel Peninsula! And we would like to give the message to the readers: if you are able to find time to visit Hel, you should not think too much and do it!


*Our brave boys are using the small fishing net. They are trying to collect some shallow water organisms.*

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*Kasia and Gosia after using the fishing net*

# SEA BUCKTHORN

**Sea buckthorn, which we Finns call 'tyrni', is a thorny bush which lives on the coast of the Gulf of Bothnia.**
**We live in Kuivaniemi and go to school at Simo and these places are located in the northern tip of the Gulf of Bothnia and that's why our "mini-orange" (=sea buckthorn) is so familiar to us. It can grow 0.5 to 3 meters long but here on our coast it is usually quite a low shrub.**
**It has thin, small and elongated leaves and its berries, which involve hard seeds, are golden-orange and little. The plant demands lots of free space, sandy soil and cold climate, but it needs a lot of sunlight too. These conditions are fulfilled here because of land uplift.**
Because of sea buckthorn's high content of healthy components, it is very famous in medicine use. Already in the olden

Dominika Oberman, Poland

Estera Krzewina, Poland

*We are observing the seals while they are fed by Artur Opanowski from the Sealarium.* *Photos: Krzysztof Martusewicz*

# – OUR LITTLE "MINI-ORANGE" (*HIPPOPHAË RHAMNOIDES*)


days people were aware of sea buckthorn's healthy qualities. It contains many different elements like vitamin C, vitamin A, vitamin E, flavonoids and oils, to name but a few. Oils from seeds are used in remedy of skin problems and it helps also if there is something wrong with digestion or intestines. Its vitamin C prevents scurvy, because one fruit of sea buckthorn corresponds to ten oranges. The Plant also prevents cancer. Several stores like Aromtech Oy in Tornio in Finland sell many products which are made of sea buckthorn. Also the cosmetic industry is interested in healthy oils and vitamins of its berries. Nowadays, different kinds of pills, salves, compresses, etc. have aroused interest among people. But we use sea buckthorn just as a daily remedy against regular flu. Couple of berries a day is enough to keep us fit.
These orange berries are used in kitchens, too, usually in desserts. Cakes, juices, jellies, jams and all other foods, which are produced from sea buckthorn, are absolutely delicious and healthy. The Berry has strong, bitter and a little bit sour taste, so we don't use it very much in foods. Even a small number of berries gives a great amount of flavor. Our special delicacy is a creamy sea buckthorn cake, of course home - made.
Sea buckthorn is a protected plant and we have to remember this when we pick it up. Fruit is ripe in October and harvesting season begins then. Sharp thorns prick hands but it is forbidden to break or cut branches and that's why picking is hard and slow. But it's worth it! One important thing to remember is also that you have to wear warm clothing when picking up the juicy berries on the windy shore.
People have used sea buckthorn through the ages because even the Ancient Greeks had remedies made of it. There is some plant in China and in Russia which is related to our sea buckthorn, but it is bigger than our bush. These days sea buckthorn has become well-known and people have started to plant it.

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# TREES IN OUR TOWN YESTERDAY, TODAY AND TOMORROW?


Populus alba L.

## Yesterday

The archive photographs of Ustka show us a completely different picture from the one we know at present. Most areas of our town were covered by forests consisting mainly of The Common Pine growing in sandy soil. The sea shore was also different: a wide beach cutting into the sea, low dunes and a large area of forests where The European Black Pine predominated.

Trees were once important symbols of a child's birth or a happy return from a long journey. They were growing by each roadside and around the houses or other buildings. In the 14th century the first church in Ustka was built and then limes were planted in the churchyard. This picturesque view could be admired by generations. The old trees in particular were the objects of worship. Small shrines and figures of saints were placed on them. People didn't destroy trees, but planted them.

In 2000 some students from our school planted 20 limes by one of the roadsides. They are called " the Millennium Trees".


Fagus sylvatica L.

## Today

Although there are several nature reserves in the neigh-bourhood of Ustka, where the trees have been preserved for years, in the town area we can see only the remnants of the old pine forests. Nowadays there are only single specimens of them, mainly on the private grounds near the houses or by the roadsides. Nearly every year we can see another withered pine. Once cut down, they are now disappearing to be lost forever.

Ustka has been a spa since 1978, but until now it hasn't had a single approved monument of nature. Our students have decided to change it because there are at least several inte-resting specimens in the town area which are especially worth being protected from devastation or logging.

The adolescents measured the trees and after that they comple-ted the documentation.

Our proposal is to establish legal protection of over 20 monuments of nature and 59 trees (some of which are collective monuments), which belong to 12 types. There are some trees among them, which represent a significant historic value for our town, and some specimens present special esthetic values. While the students were working on the documentation, some other old and healthy trees were cut down. If they had been regarded as monuments of nature, logging would not have been possible.

At present we look after " the Millenium Trees", too. They are being fertilized and pruned. Unfortunately, they become victims of vandals who destroy them thoughtlessly.

## Tomorrow

We are going to work on the documentation until the trees are given legal protection. I hope my students will be able to take part in the happening of putting signs on the first monuments of nature in our town.

In the future our students will proudly show their offspring the beautiful old trees, which will have been protected with their parents' hard work. There will be amazing monuments of nature, large numbers of freshly planted trees in the estate fields and a beautiful lime alley - the memorial to the Millenium.

*Teresa Kamińska*
*Teacher of Junior High School in Ustka, Poland*

# NATURAL HISTORY OF THE BYDGOSZCZ FOREST

To the south of Bydgoszcz – Toruń railway track there is the Bydgoszcz Forest. The history of vegetation dates back to 11, 5 or 12 thousand years. The end of ice age took place about 8 thousand years ago.
Throughout the ages, at different stages, many kinds of trees appeared, such as dwarf birch at the beginning, pine (dominant in the majority of periods), elm and hazel, at the time of optimum climate (Atlantic period), lime tree, oak and hornbeam in the latter period.
In the early Slavic period there were many lakes and rivers with beaver dens in the area. Jesuit Lake is the only one lasting till today. At present there are many inland dunes covered with pine tree forest situated in the bigger region called Bydgoszcz Forestry Management.
As there is a shortage of rainfall, the main tree species is the pine.
To preserve the natural character of the area a teaching route that presents forest life, preservation and maintenance of balance in the forest has been created.

### The forest in short

A forest begins in a nursery, where from the seed trees are prepared to be planted in a different area and successfully survive. In the area of 6 hectares there are 4 million 1 – 3-year-old seedlings of about 30 species of trees and bushes.
This area belongs to the top as far as danger of fire is concerned due to its insufficient rainfall. Therefore many precautions have been taken up, such as: setting up pools, watch towers, equipment etc.

### The layers in the forest:

We can differentiate four layers of forest vegetation: trees (pine), bushes and shrubs (oak, lime tree, wild pear etc), herbs and small bushes (grass, raspberry), and moss.
Kinds of forests: We have got pine forests and mixed, damp, deciduous forests.
Foresters of that region take up various activities in order to prevent spreading of pests. The main mechanism leads towards creating a wide-angled, complex method of self-regulation, which is creating favorable conditions for insectivores.

### Little retention

Poland is a country of small supplies of clean, fresh water. It is due to changes made in the past like draining marshes in the area of Bydgoszcz Forestry for example, which destabilized retention.
That is why we build dams etc. there.
Alders cover a part of our forest. They perform a great role in regulation of dampness and microclimate.
The Bydgoszcz Forestry Management is a part of the Protected Landscape Dune Park of Bydgoszcz – Toruń Valley. More than 150 hectares of the area are covered with marshes and meadows mainly; you can find 40 nature monuments there as well.
Meadows are important for their variety of organisms: i.e. deer, which need food rich in nitrogen, and badgers find their food there. Such ecosystems as this meadow are often given a status of ecological areas, because of their biocenotic and landscape values.

### Mill Stream, Struga Młyńska

The industry situated in Bydgoszcz and Białe Błota has led to air pollution and water contamination. Therefore sewage treatment plants have been built, waters from which come to Struga. It has been a great help in maintaining the area of nature untouched.
The area of Bydgoszcz Forestry is unfortunately under the influence of harmful by-products from the industry nearby.

### Trees on the post agral lands

Forests cover 28,2 percent of Poland`s area. The program for development of forestation hopes to raise the percent to 30 in 2020.
The content of the article is based on observations, examinations and aid to protect the natural environment.

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# THE BALTIC SEA PROJECT AND GOOD ADVENTURE WITH BIODIVERSITY

Our school biology club gathers pupils aged 11-13. They are interested in phenomena that occur in natural environment and in the environmental preservation as well. Living in a big city, they can observe on a daily basis the results of pollution around them.
Our students have been participating in realization of the tasks connected with BSP for three years. They learn how to carry out observations and note the results of their work. They get to know plants and animals which are the subject of observation.
Observations and research are carried out not only in Cracow but also during the trips outside Cracow.
Air Quality Programme was realized just then – in 2004 in Mursasichle and a year later in Niepołomice. Students checked out what kinds of lichen and in what quantity occurred on trees.
Apart from this, they examined the condition of both branches and needles. Not to mention the fact that they analyzed occurring phenomena and determined the degree of environmental pollution.
We also accomplish tasks within the Bird Ecology Programme. Twice a year (in January and April) we check the number of water birds such as swans, seagulls, black-headed gulls and coots that spend winter on the River Vistula in Cracow.
In 2005 we participated in a project Phenological Studies. The actions we took encouraged our students to conduct attentive observations of animals and plants that appear in spring. At that time we started cooperation with the Meteorological Office in Warsaw within the project COST 725 – Establishing a European Data Platform for Climatological Application.
Students' task is to observe the stages of plants development that help to determine phenological seasons.
The results of the observations are sent to the Meteorological Office, where the international database comes into existence. The database is used for further research on climate.
The students willingly participate in the above-mentioned programmes. They consider them as a chance to gain new interesting experience combined with a direct contact with nature.

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# OIKOSOPHY - A new Awareness of Man and Nature

With the idea of oikosophy or environmental culturing a new main emphasis is described in sustainability of ecological education.
Education in the area of environmental problems often demands a change of attitude, from scientific knowledge of nature to an aesthetic dialogue between man and his environment, in order to produce empathy for nature.
The experience of nature and the engagement in natural processes build the main idea of oikosophy, focusing on the change of attitude, as expressed by the phrase: "estimating my house" (=oikos Greek).
So, as it has been mentioned above, environmental culturing looks for the aesthetic dialogue between man and nature. As a suitable medium of translation, action arts, music, dance, theatre and especially theatre-performance are particularly appreciated.
In the context of UNESCO programmes, the following environmental culture projects involving art, music and theatre have been carried out so far in the Summer Theatre Workshops and the Summer Camps of the BSP with students and teachers from the Baltic countries and all over Europe:

*Summer Theatre Workshops and their leader, Volker Stiehl*

- HOW A CAR WORKED
- THE HYMN TO THE SEA
- WORLD TREE AND SUNGATE – THE NIGHTGUARD
- LAST GAME LOST
- SHAKESPEARE'S HEIRS
- FROM EARTH SOUND AND MAN'S SONG – THE TREE
- IN THE CLOUDY CUCKOO-LAND
- FAUST SHALL LIVE – WE HAVE A DREAM
- LIVING SPACE – ROOM FOR LIFE

The dominant idea of oikosophy is the aesthetic dialogue of nature and culture to create a unity of 'arts' and 'appearances', which means the arranged and experienced environment as an indivisible entity, established by mankind and granting a sense and importance for all living life. From this point of unity, a feeling of emotion, a swinging rhythm of nature and all being arises, an ideal or an idea, driven by movement, rhythm and dynamics.
Already in the sixties young painters, artists, musicians and theatre performers primarily from the off-theatre scene started to configure the design of their environment with action painting, happenings, fluxus and performances. Thereby, very often conflicts between mankind, nature and technology became triggering themes for their actions.

The dream of the intermedial impulse, the hindsight of all arts on their origin of "art - is - life - is - art" for a moment seems to have become true in this performance for the artist and audience at the same time. But these actions are usually fragile works of art.
They require agreement of the audience consisting of unprepared, unprejudiced spectators. They should be present with sufficiently high tolerance and readiness for a new experience .
The whole event must have the character of a workshop.
Performance art requires experimental conditions, which should create a certain and necessary extasy. Therefore, high demands are placed on the performance artist, since he has to exert discipline while – at the same time – being totally involved.
Environmance art is an intermedia field, a no man's land.
When it is fully realized it can become magic. In such moments performance art attains a rare and essential concentration of creative energy in the "here an now" – unlike all other forms of art.

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Aleta Feldmane, Latvia

# The BSP and Lake Victoria
## - the importance of networks

Lake Victoria is a sea of problems and an ocean of opportunities, and it would be a pity if the lake were to go the same way as the lakes in the developed countries. Therefore it is a duty to prevent the destruction of the lake environment and overuse the fish resources. The conference in Tanzania was built on the question of how to save Lake Victoria and the purpose was to learn more about the lake and to twin a network between upper secondary students in Kenya, Tanzania and Uganda that could help conserve the lake. The Swedish delegation contributed the experiences from the Baltic Sea Project and we wanted to share our knowledge with our East African friends.

*East African and Swedes share their knowledge…*

The conference took place in Mwanza, Tanzania, in Mwanza Upper Secondary School, and students from the three countries around the lake participated, as well as a group of us from Nacka gymnasium in Sweden and a group from the Swedish youth organisation Fältbiologerna. In total the conference hosted 220 persons.

In this article we would like to describe the social contacts that were established during the conference. Therefore, we interviewed students about their opinions of the conference and on this basis we could draw some conclusions.

During the conference we experienced lots of new impressions, and together with other students we discussed opinions and problems. An important question was if the cooperation would continue after the end of the conference and if we could look forward to and plan for new conferences and opportunities to meet and discuss.

Here we present some students' answers to the above-mentioned questions. 20-year-old Juweiriya Senga, from Tanzania, said the following:

*How do you feel about the conference?*

- Well, I feel great because first we get to know each other. Simply because we are mixed up with different people from east Africa and Sweden, we get to know how the environment is being kept.

*Do you think this conference will accomplish international cooperation around Lake Victoria and the Baltic Sea?*

- I think yes, because we are here for one week and I think it's enough for us to participate in seminars and all other activities, which are very educative. This is a good start for future cooperation.

*Do you have any other reflections?*

It really hurts me that we are leaving each other, who knows if we ever will meet again.

The second question was about the students' experiences of meeting other young people from different countries. And the conclusion we came to was that most of the people in East Africa don't travel much, not to other countries and even not between cities and villages in their own country. Therefore, the conference was a great opportunity to socialize.

Many students said that they were willing to stay in touch with other students, especially with students from other countries so they can continue discussing important issues even when they are at home. This is very important, because it's the students that are the future, who may think about the environment and maybe even encourage the rest of the society to take care together.

*Lake Victoria is a sea of problems…*

Photos: Maria Chuvashova, Therese Carlefalk

All the students and teachers were very happy to come to the conference and participate in the twinning of the network in order to save Lake Victoria. The delegation from Sweden took part in the conferences as representatives of the Baltic Sea Project and we were happy to feel that we could join our forces. The links between all the countries and young people are really important and the contact should be maintained for the future.

This conference made a great deal to promote international cooperation and debates between the East African countries and it raised the interest of young East Africans to fight for the environment in their native countries and spread the knowledge all around the world.

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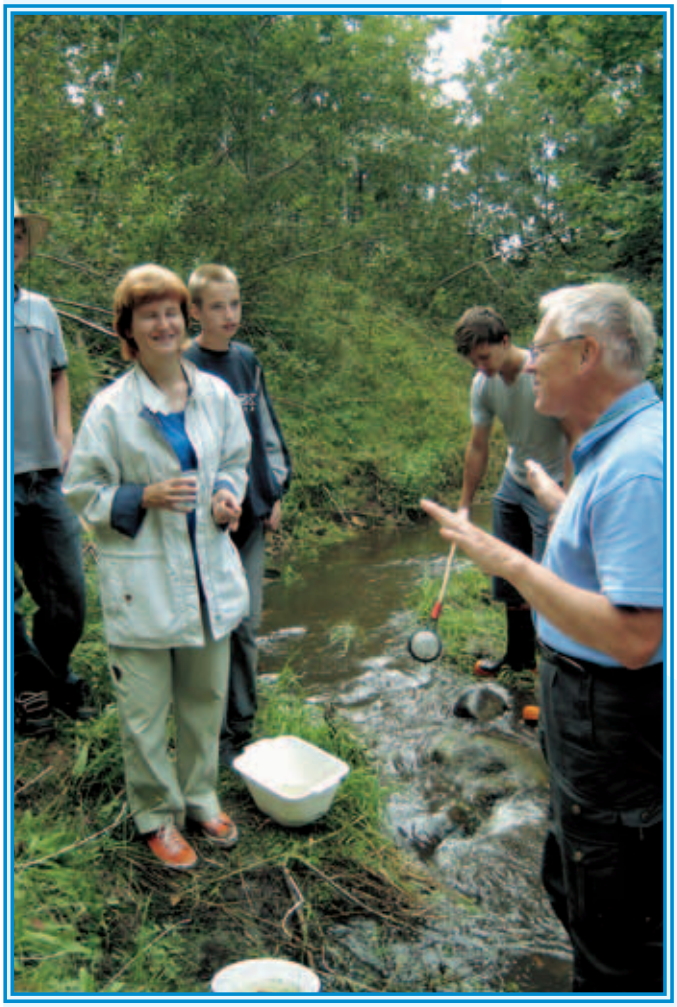
# WE KEEP OUR BSP CONTACTS ON

## Exploration of two rivers in Vecpiebalga

Latvian students from the Vecpiebalga secondary school had a chance to take part in a local river research. It was possible with the help of experienced teachers of Biology from Lund in Sweden: Ingvar and Kerstin Lennerstedt. They have visited our school several times and have made good friends with our students. So we were offered to go on expedition to two small local rivers and examine the quality of water by observing the insects and other animals living in the water. They showed us the method that is different from methods used in Latvia.

At the beginning of September the Swedish teachers came to our school and a group of our students and some of our teachers decided to explore two small rivers in our region, which are typical here. First we went to the Tulija River, which flows through the forests and farming land. The Swedish teachers taught us their method of river study.


***Elina catching water animals in the Tulija River***



Photos: Andris Avotins

***Ingvar Lennerstedt talking about the life of water animals***

We caught insects and other living beings from the water and compared them with the pictures from literature. It turned out that there lived "good water animals"- *Ephemeroptera* and *Trichoptera* in the Tulija River. We also measured the temperature and depth, calculated the speed of water flow and observed the vegetation in the surroundings of the river. After that we concluded that the water of the Tulija River was very clean.

The other river – the Balga River – flows through Vecpiebalga village and we examined it not far from the centre. Besides some "good water animals" there were also several species of "bad water animals" – *Acellus*, *Chironomus* and *Lymnaea* that can survive there. It means that the water of the Balga River is not so clean. It is so because of wastewater coming from the village and surrounding farms.

Ingvar Lennerstedt said that we could be proud of our rivers, because they are so clean and the environment is not so damaged as in other countries with more intensive economics.

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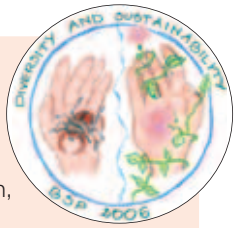


Małgorzata Nowicka, Poland

# HOW WE EXPLORED THE STREAM

Our village Mastaičiai is in the centre of Lithuania, 300 km away from the Baltic Sea. Despite that distance, the Aukstazys Stream, flowing through the village, connects us with the Baltic Sea in such a way: the Auktazys Stream flows into a bigger river called the Jiesia, the latter flows into the biggest river in Lithuania, the Nemunas. The Nemunas flows into the Baltic Sea. That is how we are related to all the countries participating in the Baltic Sea Project.

We decided to make a thorough research of the Aukstazys. Our club for environmental and regional studies 'Ainiai' (years 3-7) called the project 'The research of the Aukstazys Stream'. The research took 3 months (March, April, and May). We worked according to the environmental history program.

We visited people living near the stream and found out that the stream has even several names. We were also told that the stream's outer view changed a lot 40 years ago after the melioration.

We measured the length, flow, width and depth of the stream. We took seven water samples from different places and examined its pollution. The research showed increased concentration of phosphates and ammonia, which is the result of everyday waste.

Students informed the elder of the community and the Environment Protection Department, belonging to Kaunas District Council, about the results. They also made a report during the students' conference.

We also invited primary school pupils to participate in this project but their works were a little bit different. Pupils from years 1 to 4 cleaned the strand of the stream, picked herbs and organized a picture exhibition.

In the cleaned-up stream we organized ship regatta dedicated to the World Water Day. It is a traditional event, which our school had been organizing for six years.

For this regatta every pupil tries to build a ship as beautiful and interesting as possible because ships are evaluated in three competitions. On the day of the regatta we organize the ship exhibition, during which the jury selects the most beautiful and original ships, and their creators are rewarded diplomas. After the lessons regatta is organized in the stream, during which the fastest ships are selected.

With this regatta, dedicated to World Water Day, and with this project we are trying to attract the attention of village people to the only stream flowing through the village, which connects us to the Baltic Sea.

To the BSP Newsletter readers we also suggest organizing regatta. We are sure you will experience a lot of joyful and creative discoveries!

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Kate Vaciete, Latvia

**Students present the project to the community**

Photo: Antanas Grebliauskas

Martins Alhimovics, Latvia

# THE LESK STREAM - WATER MONITORING

Zigmars Leinbots, Latvia

The Lesk is a small river running through the Boguszów – Gorce Municipality and flowing into the Bóbr River in the Czarny Bór Municipality. Although it is not very long or wide, it certainly makes a great object for biological and chemical research. The river has its source at the foot of Dzikowiec Mountain near Kuźnice Świdnickie.
It flows from the source down to White Forester's Lodge and this is its forest and mountainous section. Then the Lesk runs through Boguszów – Gorce and Czarny Bór, further towards Witków Śląski, where it flows into the Bóbr River. In this section the river flows quite slowly in a well-shaped bed.
The analysis was done near Dzikowiec Mountain.
The research, led by a biology teacher, was done by students of III LO im. M. Kopernika in Wałbrzych. All chemical measurements were taken on the spot. We photographed three spots where we made the analysis and the whole area of our research. We hope this will be an interesting piece of reading for those who would like to learn about the condition of the Lesk River.

The Lesk River

The autors of the article in the Lesk Stream valley

Photos: Marga Czyż

## DESCRIPTION OF THE SPOT

Our research took place in the area of the floodplain of the Lesk River situated north-west of White Forester's Lodge in Miła Street. One of the reasons for choosing this area was quite big water acreage, which let us choose spots of different characteristics situated in reasonably short distances. Another reason was the diversity of the flora and fauna visible at first glance (documented in pictures). Plants richly overgrowing the banks of the river and water plants were a temptation to choose this area.
The last but not least argument for deciding on the Lesk River was the location. Firstly, we could compare the condition of water from the mainstream of the river and the floodplain. Secondly, we could find a great number of plants – natural indicators of water condition. Thirdly, we had a chance to compare spots of different depth on the floodplain. Considering the above-mentioned factors, we think that our research should be a rich source of information on the Lesk River condition.
Finally, it is worth mentioning that the river floodplains are the best exponents of the water quality in a given river because of a continuous water exchange. In a way they are 'half-stagnant' waters – easy to explore with small differences from running waters (with the exception of temperatures but comparable chemical characteristics). What is more, the flora and fauna diversity is bigger and provides far more information. It is worth mentioning that recently the Lesk has been chosen by Wałbrzych Forest Inspectorate for introducing and acclimating beavers in the floodplains near Dzikowiec Mountain. This – and the trout which can be found in the Lesk – proves the water cleanness.

## ANALYSIS AND THE RESULTS

We were working in seven different spots where we focused on different matters. We chose three places for water analysis to have more accurate measurements. We wanted to check the amount of chemicals of a certain type in the water and have a closer look at the flora and fauna of the river. Here is the list of our interests: water quality (odour, colour, and turbidity), temperature, pH, nitrate content, phosphate content, hardness and the flora and fauna of the river.

## CONCLUSION

- The results of our analysis and observations prove the cleanliness of the Lesk River which allows us to classify its water as the first cleanliness category.
- A big variety of the flora and fauna confirms the quality of water.
- The area of the Lesk River makes it a good place to spend one's free time.

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# Green School in Międzygórze

Kristiana Arnava, Latvia

From 07/06 to 10/06 2005 the science class from XII Secondary School in Łódź set out to a Green School in Kotlina Kłodzka. The main target of the journey was to do research work evaluating the condition of coniferous trees and exploring the condition of adjacent waters. That is why we carried out a lot of research work.

***EVALUATION OF AIR QUALITY USING BIOINDICATORS***

During one of our hiking trips we worked on establishing the purity of air. We based our evaluation on the number and morphological types of lichens we came across on leafy trees. We conveyed our research on oaks. On the bark of the examined trees we confirmed the presence of three species of lichens – with powdery and leafy bodies. After a short analysis we classified air quality as the 3. This means that the air in this area is averagely polluted. It bears witness to the presence of concentration of sulphur dioxide in the quantity of 70-100mg / $m^3$.

***NEEDLE LOSS***

We also conducted investigation on fully-grown spruces – we studied the number of fallen needles and the percentage of destruction of the branches. We were verifying the percentage of needle loss in annual increment. The investigation was carried out by ten groups of students. It turned out that the average percentage of needle loss is 60%. It means that the trees on this territory are being devastated by acid rains.

***EVALUATION OF WATER QUALITY USING BIOINDICATORS***

The last of our researches touches upon defining the quality of water in The Wilczki Stream in Międzygórze. To reach this goal, we had to check chemical and physical proprieties of the water:

Transparency – very good
Temperature – 8-10°C
Concentration of oxygen – 11mg $O_2$/l
Degree of saturation of oxygen 80%

Our class found the following species of water invertebrates:

- *Ephemeroptera sp.*
- *Perla sp.*
- *Limnophilus flavicornis*
- *Anabolia nerrosa*
- *Notidobia cilianis*
- *Gammarles pulex*

According to our research, the water has I class of purity. Owing to the exploration carried out by our class, we got to know that the territory is being polluted by toxic gases coming from the southern and eastern part of our country.

***Potok Wilczki, where students were working on evaluating the air quality using bioindicators***

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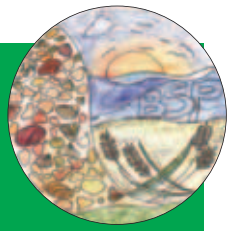
# PHYSICO-CHEMICAL ANALYSIS OF THE KACZA RIVER



Ance Birkmane, Latvia

**A Complex of Engineering and Environmental Protection Schools provides a wide range of ecological education subjects, moulds ecological culture and ethics. Within the confines of ecological program "The Baltic Sea Project" students of our school monitor the local environment, carry out measurements, estimate and prognosticate the condition of the environment.**

**Last year we paid special attention to the Kacza River, which flows into the Bay of Gdańsk.The Kacza became the subject of our monthly examination.**

**The Kacza river is not a big flow (about 14.5 km. in length), which crosses the Tri-City bypass, flows through the forests of the Tri-City Landscape Park, Mały Kack, Redłowo and Orłowo districts and flows into the Bay of Gdańsk just next to a pier in Orłowo. The beach in Orłowo is a part of the most beautiful Tri-City beach. Swimming has been banned there for years owning to bacteriological pollution of the Bay of Gdańsk waters. Bacteriological examinations, conducted systematically by the Sanitary-Epidemiological Station, show insignificant improvement in the water purity. We have decided to check the state of purity of the Kacza river water.**

**Water samples were collected in three points:**

- **Maria's Spring**
- **Powstania Styczniowego Street**
- **Estuary in the Bay of Gdańsk**

**Our examination included the following indicators: water temperature, reaction, dilluted oxygen, BOD, (biochemical oxygen demand), COD (chemical oxygent demand), nitrogen compounds, phosphate, alkalinity and chloride. Each time when the water sample was collected the flow was also measured (the amount of water carried by the Kacza is changeable and depends on the amount of rainfall) in order to estimate the amount of pollution carried by the river to the Baltic Sea.**

**The Kacza collects pollution almost on its whole length, but the most evident inflow begins at Mały Kack. Numerous pipes can be seen from that point onwards, carrying sewage to the Kacza. It is difficult to estimate quantitative inflow of pollution from roads, fields and allotments, which is particularly intensive during and after the rain.**

**Our findings show that characteristic features of the Kacza flow are:**

- **proper oxygenation (large content of dilluted oxygen) but with little capability of self-purification of the flow, which is confirmed by low values of BOD7 in relation to rather high of COD**
- **high level of nitrite pollution and high value of COD**
- **large content of phosphate**
- **a big differentiation of the pollution load carried to the sea water.**

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*Teacher: Ewa Choromańska-Kowalczyk*
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# Chemical Water Analysis in BSP Water Quality Project

Samanta Retere, Latvia

## History:

The aim of this study is to gather information about the nutrient concentrations (total nitrogen Ntot and total phosphorus Ptot) in different parts of the Baltic Sea.
At BSP Salacgriva Water Quality meeting (May 2004) it was agreed to arrange a small size chemical water analysis project in order to see if it would work as a new part in our BSP Water Quality project. The teachers of Meri-Pori Upper Secondary suggested to organize the project. The scientist Hannu Haahti from the Finnish Institute of Marine Research promised laboratory help in measuring the samples.
In autumn 2004 the information and the bottles were sent to some BSP schools and during the winter 2005 we got 9 samples from 6 countries. They were measured by the Finnish Institute of Marine Research.

## The schedule in 2005-06 :

In October 2005 the bottles and the following instructions were sent to the participating schools:
"The recommended way to do the sea water sampling would be taking one sample from the coastal waters and another from the open sea area. Sample bottles should always be rinsed with the seawater sample from the sampler before they are filled. To get the open sea area sample we would suggest for instance asking for help from some fishermen or maybe even more easily from harbour pilots. Samples should be stored protected from light and refrigerated (0-4°C).
Still we hope that you fill the whole bottle with the sample water so that there is not very much air in it. Close the cap tightly in order to avoid leakages."
The sampling time was in November.
We got 8 samples from 5 countries around the Baltic Sea, both from coastal sea water and from open sea area. We got also samples from rivers and lakes near the Baltic Sea.
The samples from the schools came by mail to Meri-Pori Upper Secondary. We sent them for measurements to the Finnish Institute of Marine Research (FIMR).

## The participants:

Denmark: Sönderborg, Amtsgymnasiet (Birthe Zimmerman)
Estonia: Kärdla, Palade Basic School (Karin Poola); Sillamäe, Kannuka Kool (Alla Vjugova);Tartu, Tartu Nature House (Sirje Janikson)
Finland: Pori, Meri-Pori Upper secon-dary (Anja Hokajärvi, Simo Korpela) Poland: Kołobrzeg , Zespol Szkół Nr 2 (Maria Adamiak)
Sweden: Osby , Ekbackeskolan (Bo Persson); Söderköping, Nyströmska Skolan (Anders Svensson)

## Conclusions:

The amount of nutrients depends strongly on the season. Our common sampling time was in November, so this year's results should be comparable with each other. As for the last year, the comparability is not so good, because then the actual sampling time was much longer.
In river samples (Tartu, Estonia) total nitrogen values are high, but lower than last year's values. Total phosphorus values are low.
Agriculture is a major reason of phos-phorus content of the rivers.
The waters from farmers' fields bring a lot of phosphorus. In the cities the waste water purification usually cleans the water from a great deal of phosphorus compounds, so the city waste waters can nowadays be rather clean from phosphorus.
Of course, the fertilization of the fields also brings nitrogen to the rivers. Some nitrogen also comes straight from the air (wet deposition of NOx). In waste water purification the reduction of nitrogen is rather complicated, so there are usually quite a lot of nitrogen compounds left in the purified waters of the cities, too.
Near the cities of Kolobrzeg, Pori and Söderköping the waters contained quite a lot of nutrients last year. As to the nitrogen, the open sea sample of Kołobrzeg was and still is significantly cleaner than the coastal sample. All values in Kołobrzeg samples are lower than last year. In Pori the coastal sample was and is still even cleaner of phosphorus than the open sea sample. This is quite possible in Pori, because the streamings coming from the river area can go rather far, and, on the other hand, the deep and rocky coastal area allows quite free water exchange with open sea waters. The waters near Söderköping are now slightly cleaner than last year, but the values are still high.
Last year the water near smaller towns Kärdla, Sillamäe and Sönderborg was surprisingly clean compared with the others, but now the same samples show bigger values. In Sönderborg the amounts of phosphorus and in Sillamäe the amounts of coastal nitrogen have risen rather a lot.
The water of lake Osby shows now much bigger values of phosphorus and nitrogen in comparison to last year. In this small lake the yearly changes seem to be rather big.

## The future:

The water research will continue. All the present participants – of course – are welcome to continue our research. We will send you the sampling bottles etc., but we hope that you will send us possible feedback from everything concerning this study.
As for new members, the applications to join our group can be sent to the following e-mail address: anja.hokajarvi@pori.cedunet.fi, and we would especially hope to get sea water samples from you.
We will send the instructions and bottles in the middle of October and the sampling time will be at the beginning of November.
Dear partners! Thank you very much for co-operation!
Special thanks to scientist Hannu Haahti from the Finnish Institute of Marine Research!

Chemical water analysis Total N and P (μmol/l). Sampling places 2006

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# EDUCATIONAL CRUISE ACROSS THE GULF OF GDAŃSK

On 20th May 2005 a group of students especially interested in developing their knowledge in the field of biology and chemistry, took part in an educational cruise on a hydrographic vessel named HESTIA.
The cruise was organized by the Aquarium of Sea Fishery Institute in Gdynia, which is the patron of educational program called "Protect our Baltic Sea".
During the 3-hour-cruise across the Gulf of Gdańsk we were able to observe the work of oceanographers, and we were introduced to the equipment used by researchers working in the sea. We had an opportunity to compare a trawl, used for catching organisms swimming in the sea (nekton, plankton), with a drag which is a specially made trawl of heavier construction, used for catching organisms living at the bottom of the sea (benthos). We could also check how the scoop works, which helps sampling the water from different depths, and STD sound measuring Salinity, Depth and Temperature of water.
The oceanographer showed us how to use the Secchi disc, too. It is a white, steel disc, 20 cm in diameter, which is put into the depths of water. The depth on which it becomes invisible must be multiplied by 2, and then the measurement gives us a piece of information about the reach of visible radiation. We learnt a lot about the shape of our sea, and about brackish character of the Baltic Sea, which is often called the "sweetest sea in the world".
There was also a possibility to see organisms caught from the bottom of the sea with a drag. We classified mollusks, like *Mytilus edulis*, which was often covered with *Balanus improvisus*. There was also *Macoma baltica* and *Cardium glaucum*. What is more, we recognized bivalves: *Mesidotea entomon, Cragon crangon* and *Gammaridae*, too.
We were told many interesting details about other species living in the Gulf of Gdańsk and about many things that are dangerous for the Baltic fauna and flora because of human activity. This great adventure helped us understand the meaning of the statement made by a famous marine biologist – Ludwik Żmudziński:
"The sea is not only a great place for relax, but it is also a huge laboratory, a big pantry and enormous place to work".
On our return, some of us made a short course of steering the vessel... luckily, the vessel stayed in a good condition and we got back home pleased, suntanned and rich in knowledge!

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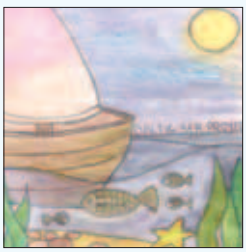
***A group of students on board of HESTIA***

***We classify mussels and snails picked from the bottom of the sea***



*Gunta Bensone, Latvia*


*Justyna Muracka, Poland*

# FOUR WARM AUTUMN DAYS IN KABLI

Young natterjack – toad (*Bufo calamita*)

Krista Zile, Latvia

Fieldwork activities

Photos: Sirje Janikson

BSP Coast Watch seminar started for 17 teachers from Latvia, Lithuania, Russia and Estonia in Tallinn in Audentes Private School. After a short tour of the school, our short excursion along the North Estonian Klint started. This klint is the central part of a larger structure, the 1200 km long Baltic Klint. The Estonian National Committee of the UNESCO has accepted the Baltic Klint as a candidate for geological heritage site. Our main purpose was to visit Pakri Peninsula, to have a look at the sections of Cambrian and Ordovician rocks. It is also the only nesting area of the black guillemot (*Cepphus grille*) in Estonia. Due to the fact that Pakri Bay is relatively deep and ice-free, it was chosen as a site of the military harbour by Tsar Peter the Great in 1718. During Soviet times a Military Submarine Base was located in Paldiski and the whole Pakri Peninsula was closed for ordinary people, including scientists. After the excursion we turned southward to Kabli, a little old village, in the South-West of Estonia. We felt honoured, because Doris Kareva, the Secretary-General of Estonian National Commission for UNESCO, opened and participated in the seminar. Later she mentioned that it was the first time for her to see the activities of one of the most highly appreciated UNESCO projects. During the seminar she realized how the activities of the whole project were directed to widen the understanding of the world. Students, who had a possibility to participate in the project, perceive the surroundings more sensibly. Nature protection and sustainable development are the main questions of survival of the today's world.

During the next few days we had lectures concerning coastal management, bird-ringing, practical coast-watch, group-works etc. Here are some facts and thoughts shared with us by the lecturers:

- Limestone was the main building material in the northern part of Estonia, in the south it was replaced with bricks and in Finland with wood. Why? Limestone layers that are situated on ground level in the north of Estonia are dipping slightly southwards (3-4 km per km) and are lying already deep in the ground in the southern part.
- Finnish bedrock, granite, is very hard to work up and was therefore replaced with wood.
- Reed-roofs were not characteristic of the coastal areas of the south-western part of Estonia in the Häädemeeste municipality and neighbourhood, because reed was not growing there in older times.
- On coastal meadows more than 500 species of vascular plants grow, of which the Wild Gladiolus (*Gladiolus imbricatus*) population is the biggest in Europe. The spawning ponds for Natterjack Toad (*Bufo calamita*) were restored and their reintroduction on coastal meadows was carried out. We saw two young natterjack-toads during our trip to Sooküla sand-quarry!

We visited the Kabli Bird station on the next day. The most numerous bird-species ringed in Kabli Bird station (1969-2004) is the gold-crest (*Regulus regulus*), with more than 520 000 individuals. All in all, 169 species and subspecies have been recorded in Kabli Bird Station.

The practical coast-watch was the important part of the course. A small exhibition of different animal and plant species found on the shore was made. Teachers have worked out three plans on how to involve teachers of other subjects in coast-watch survey and what can be done before and after the practical investigations, like drawing and essay competition, drama etc. Teachers also discussed the need to change the questionnaire. They recommended adding questions about weather conditions, like temperature, wind direction, clouds etc. Also a need to prepare tables with common plant and animal species of the Baltic was mentioned.

The teacher-training seminars have been a very important part of the BSP since its beginnings. Up to the seminar, the teachers sending me the protocols every autumn were just names on the paper, except for the Estonians, but now I know the people behind the names and that is a great moment!

"Coast – our common, valuable, shared resource", Estonia September - 2005.

The objectives of the workshop were:

- to get an overview of natural and man-caused processes on the coastal areas and management of the coastal areas as important bird habitats;
- to learn how to work with Coast-watch questionnaire and how to use it at different school levels and subjects.

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# ALGAE WORKSHOP ON ÅLAND IN AUGUST 2005

Photo: J. Mol

*Liisa Jääskeläinen*
*BSP General Coordinator*
*1989–1992*

**"Blue-green algae – a learning task for the protection of the Baltic Sea" was the title of a workshop for BSP-teachers, organised on Åland, Finland, from 8th to 11th August 2005. This workshop was Finland's main contribution to the BSP in 2005. We had 21 participants coming from Denmark, Estonia, Germany, Latvia, Russia and Finland.**

The programme consisted of lectures, discussions and group work as well as visits to the sea, to the local farm and a fish cultivation plant. We were especially grateful to Dr Seppo Knuuttila and Dr Liisa Lepistö, both being prominent researchers at the National Environmental Institute.
The government of Åland supported the programme.
The report made by Simo Korpela and Jarmo Perttula is available as a CD and as a paper copy.
During the workshop, a set of posters and other materials about the Baltic Sea and its condition was recommended to all BSP participants. These materials – in English, Finnish, Russian and Swedish - can be found at
http://www.ymparisto.fi/default.asp?contentid=81243&lan=FI&clan=en

The workshop was planned to be a meaningful sequence of learning experiences, which will help us to understand:
- what blue-green algae is,
- how it can be identified,
- what the reasons behind this phenomenon are,
- what can be done to decrease the number of blue-green algae (by us as individuals, as a school, by production sector – locally, nationally and internationally).

## Why the theme of blue-green algae?

Blue-green algae as such are environmentally a priority of great concern. In 1992 the Baltic Sea states agreed on a list of most serious problems of the Baltic Sea. The list included 132 so called "hot spots". Originally there were 10 "hot spots" on Finland's list. At the moment only one remains and it is the nutrient emission of agriculture around the Archipelago Sea (Saaristomeri, Skärgårdshavet). The number of blue-green algae depends very much on the ways of cultivation. In March 2005 in Finland, the state committee of sustainable development, headed by Mr Matti Vanhanen, Prime Minister, appealed to all sectors of public administration, companies and citizens to diminish nutrient emissions flowing to the Baltic Sea. In our political culture this is a strong gesture.
Blue-green algae can be understood as an awareness-raising window. If you learn to deal with this issue, you have learned how to deal with one of the core issues of the future of the Baltic Sea.

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Photos: Simo Korpela

# The best adventure with
## THE MOST BEAUTIFUL ENVIRONMENT IN EUROPE

Photo: Jan Kucharzyk

Maciek Kawalski is taking photos

From 29th May to 2nd June I took part in "The 13th International Environmental Camp" of Meri-Pori Upper Secondary School in Finland. During the stay there we could: go sightseeing in Pori and Reposaari – an old fishing village, conduct environmental research (chemical water analysis, air quality study, bird watching), see windpower centre, nuclear power plant, Kemira industrial plant and …

The most interesting place during the entire trip was, for me, indisputably, the Nature House Arkki in Pori. There the participants had an opportunity to watch a short film about the environment of surrounding places and admire a marvellous, breathtaking exhibition of butterflies. It was one of the most beautiful things I have ever seen. Imagine six huge showcases filled with rare, often protected, species from all over the world! What's more, this exposition contains different types of butterflies: from small, resembling bees, through medium-length to big, tropical, bright-coloured ones (my favourite was bright green). Besides, Simo Korpela, who collects them, gave us a fascinating lecture about butterflies.

We spent one day on research work. The group that I was a participant of concentrated on bird watching. We tried to find as many species as possible in this area. We had a few guides who showed us how to mark birds and handle them and how to recognize birds by their voice. It was wonderful to meet those people who derive great pleasure from observating nature. We watched birds at a pond, an alluvial land, a lake and a large delta of a river. We saw many species, such as the Grey Heron, Marsh Harrier, Red Phalarope, as well as a variety of gulls and swans. From the bird tower Teemuluoto on the delta of the Kokemaki River we saw a vast area of wetland. Right there, we spotted a nice, familiar view – a duck mother carrying five little ducklings on her back. It was touching.

And something that attracts everybody - creating power. The Kirrisanta Windpower Centre and Olkiluoto Nuclear Power Plant were particularly worth seeing. First, we were in Kirrisanta. We had a possibility to hear a lecture about transformating windpower into electricity. The lecturer told us how huge mills were built, how people could operate them and what the minimal speed was to create electricity. It was really fascinating. For a long time I had been wondering how it worked and thanks to this lecture I satisfied my curiosity.

The most thrilling time we spent in a nuclear power station. The whole visit can be summarized: go billions of years backwards in time, watch the animation, and learn about the origin of uranium. There was a scientific exhibition titled: "Electricity from Uranium". We stepped inside a full-sized reactor pressure vessel. We went to a radiation laboratory and took a personal radiation test, saw the radiation (!) with the help of a cloud chamber and used the periscope to see how the Olkiluoto area was monitored. I wish we had had more time to watch everything carefully, but we had only one hour...

**Jan Kucharzyk as a professional photographer**

This trip gave me a chance to spend some time in the open air, too. I had a great time in the Isosuo Marshland Nature Protection Area. We were walking on wooden tracks through mires and swamps. There were really nice views around us, several clear small lakes and ponds and special plants such as *Parnassia palustris*, *Eriophorum angustifolium* or *Betula humilis*.

Ever since my trip to Finland, I have had a different attitude to nature which surrounds me. I notice beautiful plants or inte-resting animals in my everyday life. I respect nature's rights.

**The summercamp has influenced my point of view on lots of issues. It was a nice time for meeting new interesting places and people. If you ever have an opportunity to go there, don't hesitate...**

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Photo: Maciej Kawalski

At the Isosno Marshland Nature Protection Area



Bird watching

Uprooting pines, poplars and aspens.

*Photos: Maciej Kowalski and Jan Kucharzyk*

# A trip to East Africa and a glimpse of Lake Victoria

**Lake Victoria Youth Corporation (LVYCo) organised a conference in the city of Mwanza in Tanzania on the south coast of Lake Victoria. Students from Kenya, Tanzania and Uganda were invited to discuss the problems of Lake Victoria. A Swedish environmental youth organisation called Fältbiologerna was also invited together with us, students from Nacka gymnasium in Sweden. It was a 5-day-long conference filled with activities for 220 participants.**

In the opening ceremony different representatives from each country and organisations were invited to the stage and together with Chris Mafuru, the Mwanza teacher who made the conference possible, they officially opened the conference. After the ceremony the workshop leaders and the different workshops were presented. All students were divided into different workshop groups and mixed with students from each of the participating countries. At the workshops the students had an opportunity to discuss typical problems of Lake Victoria region, for an example pollution or destruction of wetlands. The groups worked with their specific problem for the whole conference and at the end every group was supposed to present their results in different ways, such as drama or posters. The groups made fieldtrips to interview people and learn more about the problems the group was working with. Fieldtrips were made to quite a few places. Our group went to a fishermen's camp and talked to native fishermen. We also went to a fish market, a beach and to a yard for the leftover from the fish export industry.

Photo: Danny Vähäkuopus

*Mountain of dead fish a big problem of Lake Victoria*

The most interesting was the yard where we learnt that the fish leftovers were dried, cooked and ground to powder to feed the fish in the fishponds. This way the leftovers were recycled and transferred into food for the locals. Some were eaten or sold as food at the market.

The fieldtrips were very informative and we could see with our own eyes what the situation was like. It was very interesting to visit the fishermen's camp and the African students translated our questions from English to Swahili in order to communicate with the fishermen. In this way we could ask the local fishermen about their situation and way of living.

After the visit to the fishermen's camp we also visited a fish market. It was interesting to see what the fish markets looked like. Together with the African students and teacher we went into the market. It was quite crowded and the group walked very fast and I got lost from the group for a while, but everyone was friendly and helped me to find my fellow students. In the fish market they showed us the fishing boats and how they packed the small fish to transport them.

The bags with the fish were very big and looked very heavy.

We also participated in seminars and they were very interesting. For example there was a seminar about HIV/AIDS and a role-play seminar where we acted as different groups of people deciding on the future of Lake Victoria, such as fishing companies, local fishermen, environmentalists, journalists, local politicians and women organizations. The members of the groups were supposed to come up together with a solution to the problem of over fishing of the Nile Perch in Lake Victoria. At the meeting the Local Fishing Company said that they wanted to expand. Then all of the others got the opportunity to say what they thought. After that the groups had the opportunity to ask the other groups about their opinions. It was very interesting to see how some groups got very exited. After a while the local politicians said it was time to mingle and everyone had an opportunity to talk and try to argue and persuade each other to change their views. After some time it was time to vote. After the voting the results were presented: The local fishing company was allowed to expand.

**With students living near Lake Victoria and students with knowledge of the problems in the Baltic Sea, each problem could be discussed from different points of view. Together the students could get a general view of the problem. We think that it was a brilliant idea to let students from each country have an opportunity to discuss the problem. Discussing with students from Kenya, Tanzania and Uganda we learned much about the situation in Lake Victoria. We believe that the students of East Africa also learned something from us regarding the situation in the Baltic Sea and they hopefully learned much from each other, too.**

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# Sustainable fisheries in the Baltic Sea. Kołobrzeg, 2005

**Teachers and students from Denmark, Estonia and Poland came to Kołobrzeg / Poland to take part in the BSP course on sustainable fishery on 12th – 14th September 2005.**
**The course was organized by Zespół Szkół nr 2 in Kołobrzeg and Sonderskov – Skole in Sonderborg / Denmark. Mr. Soeren Levring, the headmaster of the Danish school and Danish BSP national coordinator presented the idea of the course and made it possible by securing the money to cover the expenses of the event.**
The participants represented four schools from Denmark, one school from Estonia and (apart from our school) an upper secondary school from Poland.
On the first day of their stay in Kołobrzeg the guests were welcomed by the mayor of the town, Mr. Henryk Bieńkowski and had a walk round its streets. During the course they also made a sea trip a fishing boat, visited our school and The Marine School in Kołobrzeg.
Problems concerning fishing industry in Poland were presented to the participants at a meeting with Mr. Jerzy Wachowski, a skipper and fishing boats owner.
**The most important item of the programme was the chemical and biological research of Lake Resko and The Baltic Sea waters near Dźwirzyno. To do the research the participants of the course were divided into two teams and worked in two different places.**
The chemical research was led by Elżbieta Zarzycka and the biological research by Maria Adamiak. Our Danish guests were a bit disappointed with what they found because low-water wildlife in Denmark is much richer and more varied than in the waters of the Polish coast.
Finally, on the last day of the course, the students exchanged their opinions, summed up their work by drawing appropriate conclusions and prepared the materials for multimedia presentation.

## BIOLOGICAL RESEARCH

The number of macro fauna species in the Baltic Sea is very limited. You can find there *Cardium, Balanus sp.*, *Gammarus* and others of this kind. The main reasons are: cold water currents, lack of bottom perennial meadows and low salinity, which influences the balance of living processes in the sea.
We found Lake Resko macro fauna rich both in quantity and quality. Its shore, inaccessible, overgrown with reed is heaven for many bird species both settled down and migrant.
The water creatures (caught and marked) prove that the lake water is of very broad quality.

*Andrzej Kropidłowski, Soeren Levring*
*Zespół Szkół nr 2 in Kołobrzeg, Poland and Sonderskov – Skole in Sonderborg, Denmark*

**Photo 1. Sarah from Sondenborg believes books should always be at hand.**
**Photo 2. They look professional and they are.**


*Photos: Andrzej Kropidłowski*

*Verbascum thapsus*

# Diversity of plants on the medow of an industrial Silesia region

*Iris pseudoacorus*

My name is Ewa Rojczyk. This year I have graduated from Maria Konopnicka Secondary School in Katowice. As I see my future connected with natural sciences, I took part in the final of the Biology Olympiad in Poland. Students can participate in this competition on condition that they write a research work. Within the confines of this task I decided to work out a proposal of a 'nature path' in my hometown. It is commonly believed that industrial cities are devoid of greenery. Yet, it is not always true.

In my research work I presented the diversity of plants on the meadow surrounding the Mleczna River. This river is situated in the southern part of an industrial Silesian city – Katowice – in southern Poland. The forests of Katowice occupy a relatively large area of the city and they are considerably transformed by man. Furthermore, they are a traditional holiday location for citizens. However, hardly anyone, apart from experts, is interested in meadows and their natural virtues. That is why I decided to show the vegetation of the meadow. The described area had been afflicted with deteriorating human activities, so I stated that the phenomenon of self-restoring of the natural environment is worth observing.

I outlined a walking route about 700 metres long, which I called 'a nature path'. It begins on the dirt road on the edge of the meadow and fini-shes in the mixed forest.

I distinguished seven main observation points. Each of them is characterized by a different habitat:

- A meadow with a great number of ruderal and pioneer species – most typical here are the specimens of *Verbascum thapsus* and of perennials from the *Asteraceae* family, for example: *Tanacetum vulgare, Artemisia vulgaris* or *Solidago gigantea*
- A dry meadow – characterized by the domination of *Cirsium vulgare* accompanied by plants from the *Apiaceae* family
- Water thicket – I focused on water and waterside plants
- A damp meadow and a deciduous forest – the occurrence of plants from two, different habitats. Some interesting specimens are *Sambucus racemosa* and poisonous *Iris pseudoacorus* – the only species of iris that is not a protected species
- A riparian forest – this point is determined by a numerous occurrence of the specimen of *Salix alba* with many trunks. Nearby one can also notice: *Betula pendula, Alnus glutinosa* and *Populus tremula*, which can be even 100 years old
- The edge of a mixed forest and a damp meadow – the richest point as regards vegetation. We should pay special attention to *Lysimachia vulgare* with sharp leaves and to *Viscaria vulgaris* – a rare plant occurring on the edges of forests and thickets
- A pine-oak mixed forest – with a domination of *Pinus sylvestris* and *Quercus robur*.

The above described 'nature path' is not a typical one. Its peculiar feature is a small participation of trees and the points placed relatively close together. Thanks to that we can prove that even a limited area can be characterized by a diversity of habitats. This diversity is connected with the presence of ecotones – transitional zones between ecosystems. In this case, ecotones are for example: roadsides, the junctions of water and land environments, the junctions of meadow and different types of forests.

The massive occurrence of *Potamogeton pectinatus* in the river shows that this habitat is eutrophic – fertile and rich in nitrogen. Thanks to water plants, self-purification of the river proceeds.

To arrange the 'nature path', I suggest doing some simple work, for example: building a footbridge, hardening the ground, and putting up an information board. It is also important to leave dead trees lying on their original positions. With time they can become independent observation points.

And how about the future? We mustn't assume that the list of species on the described area is even close to being complete. On the contrary, we should expect its extension, especially if the observation period is prolonged – March, April. Further research should also include phytosociological, hydro-biological and soil aspect. We can carry on observation from late spring until early autumn. Possible ground hardening would enable visiting this 'nature path' even in early spring.

*Ewa in a medow*

*Photos: Ewa Rojczyk*

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*Photo: J. Mol*

# BIODIVERSITY AT AGS

The freshmen at AGS were introduced to the first project in their general knowledge course. In this article, a summary of the first day in the course will be made. The subject for 1.b was biodiversity at AGS, where all the students were divided into groups and given different assignments. The headline of the project was "Our Position in the Universe". All 5 freshmen classes each had different headlines. The freshmen at AGS experienced their first general knowledge course project in the weeks 36-37.
1.b's headline was "Our Position in the Universe", and the first day was spent mostly outdoors. We had to find out different things about our school, Amtsgymnasiet i Soenderborg and about the biodiversity at the school premises. There were 5 groups: one doing research on the plants at AGS, both inside and outside, another was assigned to find certain plants and draw a map of the area, the third group was assigned to make some observations on the air quality, observing species of lichen on the trees growing on the lawn outside the buildings of AGS, the fourth group had to find out different things about the picturesque lake situated in "The street" at AGS, and the fifth group was assigned to make a macro index of the water in the pond outside the cafeteria, to decide the quality of the water. The students enjoyed the time spent outside, learning different things about the place where they will spend the next 3 years of their lives, studying. The course is a part of the new school reform in Denmark, and for our form the subjects involved in "Our position in the Universe" were Physics, History, Biology and Maths. The entire course lasted for 5 days, with each subject being explored. A lot of observations were made, and many questions were answered. This course was the first in a series in the following weeks and years.

***Student: Anne Kragh-Müller***

# BIODIVERSITY AT MY SCHOOL

During the project "Our position in the universe" we learned about the biodiversity in and around Amts Gymnasiet Sønderborg (Biodiversity means: "Many different kinds of biological life"). Inside the school we have many different kinds of plants, and they thrive here. Plants that normally wouldn't grow in Denmark. One of the conditions they require to grow here is a subtropical climate. That indicates that inside my school we have a subtropical climate.

One of the things that I find positive about all these plants is that they also create a good environment and good surroundings for the people who "work" here.
We investigated the plant life inside and around the school, and the results told us a lot about how good the environment is. We learned about lichens. The lichen is a symbiosis between a fungus and an alga. It can actually show how much $SO_2$ the air contains. If the air contains much $SO_2$, there will not be many lichens on the trees.
Many other experiments showed us the quality of the environment inside and around the school and the biodiversity at AGS. We have many plants and animals living around the school, and therefore I conclude that at my school we have a high factor of biodiversity.

***Student: Jannik Hansen***

# BIOLOGICAL PHENOMENA IN AT-COURSE

In our AT-course, we studied a lot of biological phenomena and found factors that in a close cooperation decide about the biodiversity at AGS. The first phenomenon we took a close look at, was our olive tree, which can be found in the big hall called "The Street". An olive tree needs a subtropical climate, and you wouldn't think we have that at our school, but the roof is made of glass and works just like a greenhouse. When the sun is shining through the glass it's not able to get out again because of the greenhouse effect, so the tree gets its subtropical climate, just as if it was in Greece.
The next observation we made was connected with the Orobanche hederae, which grows right next to the Hedera helix. The Orobanche hederae is a so-called parasite plant. This plant does not have green grains so it's all brown. It gets its glucose from the Hedera helix, because it's not able to produce its own glucose. That's because it hasn't got the green grains in it, and it would need them to conduct the process of photosynthesis.
The next thing we wanted to study was the root zone plant at the school. This is a plant called Cyperus alternifolius. It needs a lot of water, so it grows in a tank full of water. The root zone plant cleans the water from ammonium, phosphate and nitrate. The plant lives on these substances, so it's like a little cycle.
Outside the school we have some Epipactis helleborine, which are also called orchids. They are protected, so if someone takes them or destroys them, they will get a big fine.
We also studied our rainwater tank, which is situated beside our outdoors sports ground. We used a macro index schedule to check off the insects we caught in the tank. The more bugs we found, the better the water quality is. The best number on the mark scale is ten, and we gave the tank an eight, which is the same as saying that the water quality in the rainwater tank is "good". From all these observations we had made, we concluded the biodiversity at AGS to be good and healthy.

***Student: Sabrina Valentin***

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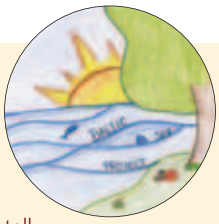

Elina Kleinberga, Latvia

# A TRIP TO SAINT PETERSBURG TO THE YOUTH ENVIRONMENTAL PARLIAMENT 2006

## Friday 21 April

Four students and two teachers left Kirkkonummi at about 9 am. and headed towards the eastern border of Finland and Saint Petersburg by Russian bus. We collected some other students and teachers from Finland and Sweden first at Helsinki and later at Joutseno. The journey to Russia didn't feel as long as it really was, because we could chat with other people and we didn't have problems at customs.

When we arrived in Saint Petersburg, we were shocked because the houses in the suburbs were huge and the traffic was really heavy. Driving through the city seemed to last forever but luckily we were able to take some pictures of beautiful buildings etc.

At last (about 9 pm) we got to our destination, Znamenka Palace, which used to be the Summer Residence of the Russian Royal Family. The Palace was impressive with all its crystal chandeliers and spacious halls. We, of course, got a room at the farthest corner of the second floor.

## Saturday 22 April

The Parliament meeting was held on Saturday. More than 60 people living around the Baltic Sea (Estonia, Finland, Russia and Sweden) discussed how to live more environmentally friendly everyday lives. During the day we took part in different workshops which we were able to choose ourselves. We met a lot of new people and even got to know some of them a bit better.

For lunch and dinner we had some traditional Russian dishes. We also had many tea breaks during the day.

In the Parliament we created a code of environmentally friendly lifestyle, accepted it and promised to tell about these things to our friends and family as well, so that they would live more ecologically.

In the evening, after closing the Parliament, we went for a walk to get to know the surrounding area. We saw two fabulous churches and even went inside one of them. The church really took our breath away because its decorations and paintings were absolutely amazing. We got back to Znamenka by a local bus, which was quite an experience.

## Sunday 23 April

After breakfast we packed our luggage and boarded a bus which took us to the centre of Saint Petersburg. There we got off the bus to do some sightseeing and shopping for souvenirs. At 2 pm we went to a restaurant to have lunch and then back to the bus to begin our journey home.

We spent the whole day again on the bus and this time even got a bit bored. We stopped only for a while in Viipuri to buy something to eat and later to drop other students and teachers at a service station near the border before heading for Helsinki. Finally we arrived back in Kirkkonummi and got home to get some sleep before going back to school the following day.

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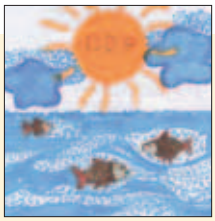
Anna Stępniak, Poland

Keistine Kevja, Latvia

The Finnish group and Winter Palace

Photo: Tuovi Ronkainen



Diana Reine, Latvia

# A SHORT HISTORY OF OUR PARTICIPATION IN THE BSP. I LO IN ŁAŃCUT

**We started our adventure with the BSP programme three years ago. At the beginning we took part only in "Air Quality" and "Bird Counting", but gradually as we gained experience the number of projects increased. At present we are participating in almost all of them. Participation in the projects as well as the ways of working out solutions has been an attempt to find answers on how to save our environment. Assuming that we are creative beings, and that each of us has got some kind of force to examine and to create, we approached our projects with enthusiasm.**

**We started the Air Quality Project in 2003. In the age of globalization the problem of clean air seems to be the most important. The recently started project enabled us to evaluate the present state of pollution and contamination, which is produced by the progress of civilization. We started this project by dividing all participants into research teams, preparing indispensable materials and studying our tasks. We wanted to confirm or exclude the occurrence of Rhytisima acerinum and lichens in the park surrounding Łańcut Castle. We drew the following conclusions from our study: since in our city one big boiler was built and many smaller were closed, the air quality in Łańcut has improved.**

**Another project involves counting birds in winter. From water birds in Łańcut only mallards are found. Within the framework of the above mentioned projects, we organize outings, excursions, field meetings and sessions. We think this approach will enable us to see problems of our habitat and help us to understand its biological mechanisms.**

**Generally, we have found the BSP programme very stimulating, challenging and satisfying. We have discovered new ways of studying as well as new methods of teamwork.**

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*Ewelina and Maciek examining the occurence of lichen in the Park of Łańcut*

Inese Meistere, Latvia

*Journey through the swamps of Biebrza*

Photos: Katarzyna Drzewicka, Marzena Mazur

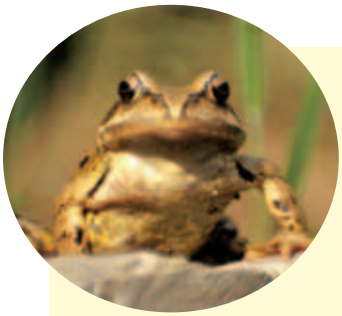

Photo: A. Musiol

# Fibonacci numbers and nature

Maths teacher, Anastazja Nędzi, and her student, Tomasz Oszkiel.

**The world that surrounds us is astonishing. Everywhere we can admire its beauty. But sometimes you may think that nature is chaotic – its one of the biggest mistakes you can make. The whole nature is like an architectural masterpiece. It is full of rules, schemes and what is most important – it is strictly connected with mathematics. There are many examples of this dependence, but the Fibonacci numbers are one of the clearest.**

Leonardo Fibonacci was a famous Italian mathematician. He created an arithmetic sequence based on a simple rule: we add previous element of the sequence to the present item and we have a next element of the sequence. So we have: 1,1,2,3,5,8… etc. The question is how these numbers can be used by nature? In your everyday life you do not pay attention to it but after reading this article I hope you will do it. Firstly, we have to look at flowers' petals. Have you ever counted them? I did that, and the results were amazing. Most numbers were the Fibonacci numbers! For example an iris has three petals, a buttercup five, a daisy thirteen, a chicory twenty one, a plantain thirty four. All of these numbers can be found in the Fibonacci sequence! Of course there are exceptions, like fuchsia or a very popular four-leaf clover.

A daisy

Would you ever believe that seeds on some plants are not randomly arranged? Seeds on seed heads of a sunflower or coneflower form spirals in two directions. However, it is not the most interesting fact about seeds, because the number of left-turned and right-turned spirals is not coincidental – in most cases it is a Fibonacci number! The reason is simple – optimal packing. It means that seeds are diffused at any stage, not crowding in the centre and not too sparse at the edges.

The same happens with pinecones. If you look at where the stalk connects to the tree you will see spirals. There are also two sets of them: left-turned and right-turned and the number of them is a Fibonacci number.

Now something about our body. We have five fingers in one hand, two hands, one nose, two legs, five senses, one heart, liver, two lungs: one with two lobes and one with three lobes, which gives us the total of five lobes. All these numbers have one connection – they are Fibonacci numbers. There is one even more astounding thing – the proportion of a human body. Fibonacci sequence is closely related to the golden section. It means that the human body is "built" by an architect who used the proportion 1,61. Explanation: the ratio of certain stubs of our body is the same for every human! If you measure your height and the height from the ground to your navel, divide those results and you get 1,61. There are many stubs of our body (on our hands, arms etc) which – if divided by one another – give us this number.

There are many more connections between mathematics and nature, not only with Fibonacci numbers, but I think that those examples prove that our world is not chaotic. That mathematics is not only a boring subject with which you have to struggle during maths lessons but something much more fascinating.

A sunfower

All photos: J. Mol

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## Logo Competition Result

**The result of the logo competition for the 5th Final BSP Conference "Diversity and Sustainability" in Silesia Province, Poland, 2006.**

We received 102 logos from different BSP schools in the Baltic countries. The jury selected the logo according to the artistic quality of the design and the ways in which it symbolises the theme of diversity and sustainability.

It was a very hard work to choose the best logo. Some of the logos we received have been published in this issue of the BSP Newsletter. The winning Logo will be printed on invitations, the programme of the conference, T-shirts, bags, etc.

Thanks to all participants for the fantastic work.

The prize (digital camera) will be given to the winner during our conference.

The winner – **Małgorzata Piechota**
II Upper Secondary Konopnicka School,
ul. Głowackiego 6, 40-052 Katowice, Poland

*Congratulations to the winner!*
*Jolanta Mol*

*Jury: Piotr Murawa (artist), Krzysztof Kafel (Advisor of the Minister for Education), Janusz Trawka (computer teacher), Krystyna Urbańska (National Co-ordinator of UNESCO ASPnet), Karina Łopata and Beata Łupieżowiec (BSP Newsletter Layout Designers)*


Some of the many art works sent in for the BSP Competition for the LOGO of the final conference in Katowice, Poland

*Barbara Tarko, Poland*

*Ieva Grundmane, Latvia*


*Susse Jensen, Denmark*