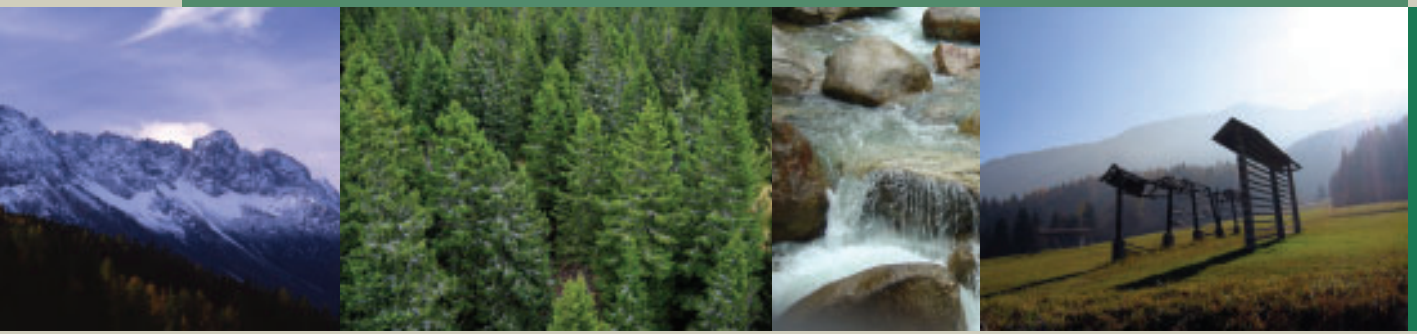

CROSS-BORDER GROUNDWATER WATER BODY

KARAWANKEN

for integrated planning of spatial development

EXAMPLE OF GOOD PRACTICE

figure 1: young cone of spruce
figure 2: subfosil leaves in the travertine
figure 3: the accumulation Planšarsko jezero near village Jezersko
figure 4: position of the Karavanke water body
figure 5: geological profile of the Karavanke tunnel

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EXAMPLE OF GOOD PRACTICE

REGARDING:

1. integrity of water bodies,
2. morphology of the surface and its impact on water characteristicts,
3. forest and biodiversity and their role in water cycle,
4. human resources and traditional land use and
5. expert baselines for new demands and development challenges.

TREASURES OF NATURE FOR BETTER QUALITY OF LIFE

Mountains are a gift of nature. Due to difficult access they preserved several unspoiled natural resources. The richness of flora and fauna, the variety of surface forms, the exceptional natural heritage and unique cultural landscape. But the Alps are also known for intensive rainfalls, several springs and Mountain Rivers rich with water flora and fauna. The water environment is often also an important source of healthy and clean drinking water, which is an important treasure for the present and the future. Such a hidden treasure is also groundwaters in the Karavanke range on the border between Austria and Slovenia.

STRATEGIC RESOURCE FOR SUSTAINABLE DEVELOPMENT

The Karavanke is a range extending along the Slovenian-Austrian border for almost 150 km. Its terrain consists of long and prominent ridges, whose slopes steeply fall to the northern and southern side. Ridges are interrupted by long, deep and narrow valleys. The highest peaks reach over 2000 m above sea level. In the entire range prominent ridges with mountain meadows and forests prevail. The area is scarcely populated, the main economic activities are grazing and forestry, in some places tourism is also developing, especially winter sports centres.

The Karavanke is a natural barrier, which is why in the past were built several important mountain passes and steep roads, which impeded the movement of goods and services. At the beginning of the 20th Century a railway tunnel was built through the Karavanke, at the end of the 20th Century was built also a motorway tunnel. At the time of the construction they were among the longest tunnels in Europe. During the construction of both tunnels, but especially during the construction of the motorway tunnel, important and very substantial sources of clean groundwater were found. On the northern side of the tunnel 250 l/s flow out, on the Slovene side 130 l/s flow out. Water on the Slovene side is used to supply the population with drinking water, on the Austrian side it is an important source for future supply.

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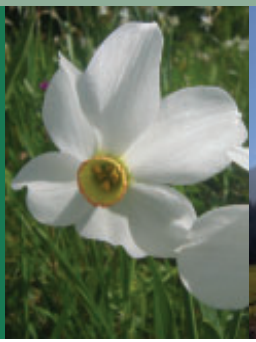
figure 6: dafodil
figure 7: hayrack near Podkoren
figure 8: fossil of triglobite
figure 9: Begunjščica mountain
figure 10: mineral water spring
figure 11: fire-woods
figure 12: cows in a pool



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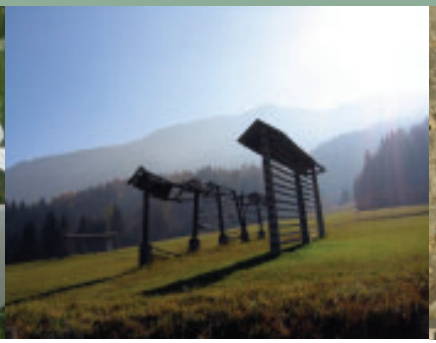

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NATURAL HERRITAGE WHICH NEEDS TO BE MANAGED CAREFULLY

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The Karavanke is an unusual range, which is in front of our eyes still changing. It was created as a consequence of great tectonic movements between Eurasian Plate in the north and Adriatic Plate in the south. In the entire range the rocks are compressed together as palm leaves. Tectonic motion in geological past caused great movements, which were vertical, as well as horizontal. The main ridges of the range consist of narrow and elongated limestone and dolomite lamellae, which form large karst-fractured aquifers.

Intensive geological events in the past caused several natural phenomena and the creation of often unusual natural heritage. Important fossil flora and fauna, unusual terrain forms of cones, walls and towers are preserved. The Karavanke is known for its mineral resources, unusual presence of tuffs. Between villages Jezersko and Železna Kapla (Eisenkappel) there are also unusual mineral waters rich with carbon dioxide. Several natural spas used to be here; today carbon dioxide is used for special dry health treatments.

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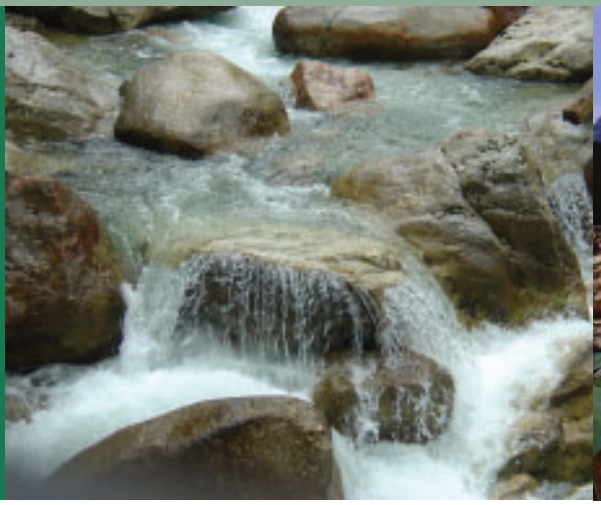
COMMON NEW KNOWLEDGES ALSO FOR ADAPTING TO CLIMATE CHANGES

The discovery of large water resources in the motorway tunnel through the Karavanke encouraged Slovenia and the Austrian state of Carinthia to reflect together on where the water flows from and how to protect it. That is why at the beginning of the 90's both sides founded a common expert committee, which is dealing with the questions of sources of drinking water in the Karavanke. Through the years the committee investigated groundwater's from the mountain pass of Korensko sedlo in the outermost western part of the Karavanke to Mount Peca in the outermost eastern part. Investigations in both sides of the border were harmonised and went on at the same time. Geological Survey of Slovenia from Ljubljana and Joanneum Research Forschungsgesellschaft mbH from Graz coordinated the activities. Results were presented always bilingually and for both sides of the border.

During investigations around 3200 sources were registered on both sides of the state border. For each source were determined basic characteristics and its creation. Two common cross-border geological and hydro-geological maps of the entire area were made and aquifers that extend on both sides of the state border were determined. For all important sources in the border area were determined basic chemical characteristics of groundwater. With the help of the analysis of sources and simultaneous measurements of flows were determined the basic characteristics of water balance of the entire Karavanke range.

On the basis of all hydro-geological investigations was made a common Austrian-Slovene database, which is supported by modern technology of geographic information systems. A part of data is available through home page also to the general public (http: \\ gis.ktn.gv.at/atlas). The whole set of data is the basis for groundwater management in the cross-border area.

slika 13: water is source of life
slika 14: mountain ridge
slika 15: christmas rose
slika 16: meeting of the permanent commission
slika 17: symbol of ICPDR
slika 18: symbol of Sava Commission
slika 19: Helios' environmentally friendly coatings



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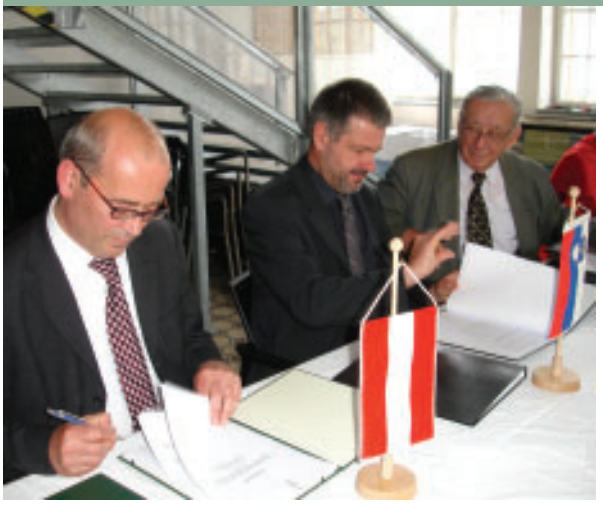
CONNECTION BETWEEN EXPERIENCES AND CONTEMPORARY DEMANDS

Permanent Slovenian Austrian Commission for the Drava river was established on the basis of Law on the Ratification of the Agreement between the Republic of Slovenia and the Republic of Austria on further validity of the appointed Yugoslav–Austrian Contracts in the relations between the Republic of Slovenia and the Republic of Austria, and the Agreement between the Government of the Republic of Slovenia and the Federal Government of the Republic of Austria on further validity of the appointed Yugoslav–Austrian Contracts in the relations between the Republic of Slovenia and the Republic of Austria (Official Gazette of the Republic of Slovenia – MP 4/1993).

In the focus of work of the Commission are the water management questions on the Drava River. On the 12th session in May 2003 was agreed wider working area supplemented by activities arised from Water Framework Directive. Some ad – hoc expert working groups for different water topics were established.

Activities of Permanent Slovenian Austrian Commission for the Drava river are closely connected with International Commission for the protection of the Danube River and The Convention of the Protection and Use of Transboundary Watercourses and International Lakes.



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NEW SHAPE OF PARTNERSHIPS FOR INTEGRATED WATER MANAGEMENT

Implementation of water legislation is possible only by cooperation between competent authorities, experts, business and general public. Such cooperation contributes to better management with local resources, increase public awareness about importance of clean water, education and improve public participation in the process of water management.

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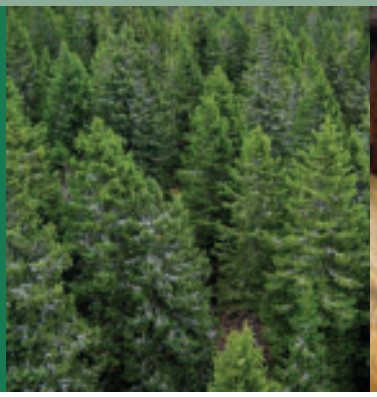
As a case of good practice we present ten years of the cooperation between Ministry of Environment and Spatial Planning and Helios from business sector. The collaboration was very successfully. The Helios Fund for keeping Slovenian water clean is financed from environmental friendly coatings. With money from the Fund 51 local wells were revitalized, 17 Karstic caves were cleaned and 16 water learning paths were established. In cooperation were involved also experts, local authorities, schools and associations.

Such partnerships Slovenia support also in cooperation with neighbouring countries and regions. In June 2008, the initiative was launched in the frame of the International Sava River Basin Commission for the establishment of the Sava Water Parnership, as a means of permanent link with the business sector in the Sava river basin.

figure 20: spruce forest
figure 21: lakelet in the cave Križna jama
figure 22: wolves



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CHALLENGES FOR THE FUTURE

On the basis of the provisions of Water Directive it is necessary to reach common protection of cross-border karst aquifers. The activities that brought to determination of common cross-border body of groundwater of the Karavanke can be considered a model of good practice in the field of the protection of cross-border water bodies of groundwater. These activities illustrate approaches, which range from scientific and professional methods to activities that enable mutual understanding of profession and politics on both sides of the state border and also wider in the region. The ultimate goal of all these activities is an efficient and mutually coordinated management of groundwater resources.

This experiences Slovenia transpose on the Dinaric region. In May 2008 an agreement between Balcan countries and World Wide Foundation (WWF) was signed on cooperation in project Dinaric Arc. In this project ecosystem approach will be used. The main goals of this project are as follow: research of the vulnerability of karstic hydrological systems, sustainable use of water resources as an important drinking water resource of the region and conservation of terrestrial and underground biodiversity.

Published by: Ministry of the Environment and Spatial Planning
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Figures: A. Brancelj (22), M. Brenčič (naslovnica, 5, 14), N. Colnar (17), C. Čevka (15), P. Frantar (naslovnica, 3, 4, 7, 9, 11, 12, 20), U. Gale(naslovnica, 2, 13), M. Grm (8), A. Kolar (6, 21), A. Mihorič (1), A. Miklavžin (4), E. Strobl (10),
Design: A. Miklavžin
Print: Birografika Bori

Ljubljana, June 2008