

## The Preliminary ARW program:

### Day 0, Wednesday, October 22

#### Arrival, evening program

Dinner, pre-workshop discussion

### Day 1, Thursday, October 23

#### Vulnerability of Drinking Water Systems

Drinking water infrastructure security, Environmental Risk Assessment and Management of Surface and Groundwater Quality, Developing water infrastructure and water supply systems, Occurrence and consequences of disinfection byproducts in drinking waters, Membrane Systems as a suitable method for Treating Drinking water from Microbes and Viruses, Risk Analysis and Risk Assessment of Water Distribution Systems, Water Sources Security in Slovakia.

#### Vulnerability of Wastewater and sanitation systems

Hazards, Vulnerability and Mitigation Measures of Sewerage Systems, Wastewater and sanitation systems, risks, successes, problems, Online impairment detection tools for Sanitation System

### Day 2, Friday, October 24

#### Vulnerability of Wastewater and sanitation systems

Management of water supply and sanitation during natural disasters, Challenge in Disaster reduction for sanitation systems, Vulnerability of Wastewater Systems, Risk and Uncertainty Assessment of Urban Drainage Networks with Floods Mitigation Possibilities, Flooding Urban Areas through Sewerage, Operating instructions for Wastewater treatment plants after natural disasters.

#### Emergency response plans

Rehabilitation toll for urban water collection/distribution systems, Outlook on Future Global Water Resources and Water Related Risk Management, Integrated Disaster Risk Management in Water and Sanitation Services, Strategic approach to water and sanitation during war conflicts, Economy of Water Systems during natural disasters, Risk Assessment of Chemical and Microbiological Water Quality Parameters, The Use of Data-Driven Methodologies for Prediction of Water and Wastewater Asset Failures, Management of large contaminated sites.

### Day 3, Saturday, October 25

#### Case studies from regions affected by Drinking Water System, Wastewater and Sanitation System failures

Water Supply Security Dangers, Threats, Challenges, Vulnerabilities and Risks, Water Conflict and Water Scarcity, Emergency Response Plans Case study of Water Supply and Wastewater Systems, Risk Assessment, Water Quality and Water Supply. Wastewater reuse, opportunities and challenges, Discussion of Case studies from regions affected by Drinking Water System, Wastewater and Sanitation System failures.

### Day 4, Sunday, October 26

**Field Trip** Lake Ohrid protection systems

#### Departure of participants

## ARW Directors:

### NATO Country co-director

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### Other Members of the Organizing Committee:

Jiri Marsalek, Dr.  
National Water Research Institute, Canada

Ivana Mahrikova, Mrs.  
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Tamara Kukharchyk, Mrs.  
Institute for Problems of Natural Resources Use & Ecology  
National Academy of Sciences of Belarus, Belarus

### The Science for Peace and Security

The Science for Peace and Security (SPS) Committee is the primary NATO committee supporting practical cooperation in civil science and innovation. This new organization oversees a programme which contributes to NATO's mission by linking science to society through projects conducted under well-established procedures. It focuses on security, environmental sustainability and other defined priorities of its Partner nations. The SPS Programme enables NATO to demonstrate its commitment to practical, visible projects with tangible output.

The aim of the Science for Peace and Security Programme is to contribute to security, stability and solidarity among nations, by applying the best technical expertise to problem solving. Collaboration, networking and capacity-building are means used to accomplish this end. A further aim is to facilitate continued democratic growth and support economic development in NATO's Partner countries.

### Other ARWs in 2008 on Environmental Security

Water Treatment Technologies for the Removal of High-Toxicity Pollutants, 13 - 17 Sep 2008, Kosice, Slovak Republic

The Role of Ecological Chemistry in Pollution Research and Sustainable Development, 08 - 11 Oct 2008, Chisinau, Moldova

Geographical Information Processing and Visual Analytics for Environmental Security, 13 - 17 Oct 2008, Trento, Italy

For more NATO information see <http://www.nato.int/science>



NATO Advanced Research Workshop

# Risk management of water supply and sanitation systems impaired by operational failures, natural disasters and war conflicts

under  
Science for Peace and Security  
Programme

**Ohrid, Macedonia**  
22.-26.10. 2008

Sponsored by  
**NATO**

and supported by

**AQUA PROCON Ltd.**  
Brno, Czech Republic

**University of St. Cyril & Methodius**  
Faculty of Civil Engineering  
Ohrid, Macedonia

**National Water Research Institute**  
Ontario, Canada

**Slovak University of Technology**  
Department of Sanitary and Environmental Engineering  
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**National Academy of Sciences of Belarus**  
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Minsk, Belarus



## Background

Each year more than 200 million people are affected by floods, tropical storms, droughts, earthquakes, and also operational failures, wars, terrorism, vandalism, and accidents involving hazardous materials. These are part of the wide variety of events that cause death, injury, and significant economic losses for the countries affected. As demonstrated by recent events, natural and manmade hazards can affect anyone in anyplace. From the tsunami in the Indian Ocean to the earthquake in South Asia, from the devastation caused by hurricanes and cyclones in the United States, the Caribbean, and the Pacific, to the intense rains throughout Europe and Asia, hundreds of thousands of persons have lost their lives and millions their livelihoods because of disasters triggered by natural and manmade hazards.

In an environment where natural hazards are present, local actions are decisive in all stages of risk management: in the work of prevention and mitigation, in rehabilitation and reconstruction, and above all in emergency response and the provision of basic services to the affected population. Commitment to systematic vulnerability reduction is crucial to ensure the resilience of communities and populations to the impact of natural and manmade hazards.

Current challenges for the water and sanitation sector require an increase in sustainable access to water and sanitation services in residential areas, where natural hazards pose the greatest risk. In settlements located on unstable and risk-prone land there is growing environmental degradation coupled with extreme conditions of poverty that increase vulnerability. The development of local capacity and risk management play vital roles in obtaining sustainability of water and sanitation systems as well as for the communities themselves.

Unfortunately water may also represent a potential target for terrorist activity or war conflict and a deliberate contamination of water is a potential public health threat. An approach which considers the needs of communities and institutions is particularly important in urban areas affected by armed conflict. Risk management for large rehabilitation projects has to deal with major changes caused by conflict: damaged or destroyed infrastructure, increased population, corrupt or inefficient water utilities, and impoverished communities.

Natural and manmade hazards and the sustainability of water resources are important issues in Water Resources Management. Moreover, safety is one of the most important aspects of water management. Water Resource Management also seeks to balance environmental, economic, and cultural values. Natural and manmade hazards have far-reaching physical, biological, environmental and socio-economic impacts. The vital output of this Advanced Research Workshop is multi-hazard risk management, sustainable recovery plans at a community level, and strengthening institutions responsible for sustainability and replication of these efforts.



## Proposed Workshop

The proposed Advanced Research Workshop aims to provide an opportunity for increasing the awareness and provide an overview of the water and sanitation sector in risk management. The overall goal of the program is to bring together scientists from NATO and partner countries and focus the communication on challenges in water supply and sanitation systems impaired by operational failures, natural disasters and war conflicts. The proposed topic will focus on the issues surrounding emergency access to drinking water system, wastewater and sanitation system following operational failures, natural disasters and the impact of conflict. It will also focus on subsequent approaches to rehabilitation and mitigation. Mitigation measures aim to fulfill basic needs, providing minimum levels of well-being and preventing the spread of disease. Water supply and sanitation system are particularly important in this context, as lack of access to them can lead rapidly to the spread of communicable diseases.

## Language

The ARW will be conducted in English. To fully contribute to, and benefit from, the workshop program, all participants must be proficient in this language.

## Venue

The city of Ohrid is located at Ohrid Lake in the western part of the Republic of Macedonia, 170 km from the capital Skopje. The ARW will be held in the University Congress Centre located at the shore of Ohrid Lake about 6 km south from the center of old city.

## Accommodation

Hotel is a part of University Congress Center. The rooms are equipped with bathroom, telephone, TV and internet.



## Participation

This ARW is open to scientists and professionals with experience related to water and wastewater management. The attendance will be limited to 45 experts, by invitation only. To obtain an Official Invitation, please send the attached Application to Attend, preferably by email, to address below before July 31, 2008. Late applications will be considered only if space is available. The final selection of participants will be made in consultation with NATO, respecting their recommendations on numbers of participants from various countries. The selected participants will receive an official Invitation to Attend by August 31, 2008, and will be responsible for obtaining their own health, accident and travel insurance, as well as visa to enter the Macedonia (if required).

## Costs of Attendance and Financial Assistance

The workshop registration fee of €150 will be waived for all NATO sponsored participants. The cost of room and board (approximately €150), and travel expenses may be partly or fully subsidized for the selected candidates from the NATO and Cooperation Partner Countries, provided that (a) they do not work for commercial or industrial undertakings, or (b) are invited as key speakers. Travel support will be awarded for the most economical way of travel and in competition for the limited funds available. Invitations to attend will be conditional - pending the candidate's final confirmation and posting a deposit (€150) for hotel costs (where required). After October 1, 2008, this deposit will be nonrefundable.

## Contributed Papers

Participants are invited to submit a paper on the workshop topic of their choice (see the preliminary ARW Program). Paper abstracts (about 200 words) should be enclosed with the Application to Attend. Full papers must be delivered by September 15, 2008, according to the instructions to be distributed later. Edited workshop proceedings will be published by Springer as a book.

**For further information (Call for Application to Attend):**

<http://www.aquaprocon.cz/arw/>

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