

# European Water Management News, Wednesday 12 December 2001

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## **FROM THE EU**

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Brussels, 10 December 2001

### **1. DEEP WATER FISH: COMMISSION PROPOSES FOR THE FIRST TIME CATCH LIMITATIONS**

For the first time, the European Commission proposes to introduce conservation measures for deep water fish stocks. These are species such as blue ling, Red seabream or Black scabbardfish which are caught in waters beyond the main fishing grounds of the continental shelf in the North Atlantic. Fisheries for these species are relatively recent but have been increasing and developing over the past few years. Recent scientific advice indicates that many of the deep-sea fish stocks are too heavily exploited and are considered to be in a state which is actually or potentially outside safe biological limits. As a first step, the Commission proposes to set catch limitations in the form of Total Allowable Catches (TACs) for a number of deep-water fish stocks. In accordance with scientific advice, the Commission will, in the near future, propose a scheme to restrict fishing effort on these stocks.

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Brussels, 7 December 2001

## **2. WATER POLLUTION: COMMISSION TAKES LEGAL ACTION AGAINST PORTUGAL FOR NON-COMPLIANCE WITH COURT JUDGEMENT**

The European Commission has decided to send Portugal a so-called "letter of formal notice", a first written warning under the infringement procedure used to ensure that all EU Member States take necessary measures to comply with judgements of the Court of Justice for failing to comply with a judgement of the European Court of Justice concerning the Community's Dangerous Substances Directive (76/464/EEC). Portugal has still to formally adopt and send to the Commission pollution-reduction programmes for ninety-nine dangerous substances as required by the Directive, despite the ruling of the Court in July 2000. Commenting on the decision, Margot Wallström, Environment Commissioner, said: "Water protection is a key aspect of Community environmental policy and one which is of particular concern to many citizens because their health depends on it. I hope that Portugal will act swiftly to implement the necessary pollution-reduction programmes."

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### **IN BRIEF**

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## **3. BALTIC SEA WATER AWARD NOMINATIONS**

Nominations for the 2002 Swedish Baltic Sea Water Award are due by April 30, 2002, and are sought from the industry, public service and non-governmental sectors in countries bordering the Baltic Sea. The award seeks to highlight what different stakeholders have done individually or collectively to improve the Baltic Sea's water environment. It can be presented to an individual, company, organization or an authority in any of the Baltic Sea countries. Visit the Baltic Sea Award (<http://www.siwi.org/sbswa/sbswa.html>) page for more information.

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## **4. MEDWET COORDINATION UNIT OPENED IN ATHENS.**

MedWet is a coordination mechanism for wetland activities in the Mediterranean Basin and owes its origins to an international conference organized by Wetlands International (then IWRB) in Grado, Italy, in February 1991. The MedWet1 project (1992-1996), funded by the European Union, began building the collaborative MedWet network and developed regional methods and tools; MedWet2 extended the initiative throughout the Mediterranean Basin. In 1999 MedWet became a formal inter-regional structure for the implementation of the Ramsar Convention and serves as a model for regional wetland cooperative structures elsewhere. A MedWet Committee was established by Ramsar Resolution VII.22, and a MedWet Coordination Unit was established to keep things rolling along more or less merrily and maintain sanity amongst the Ramsar Bureau, the Unit itself, and the three technical support institutions (EKBY in Greece, Tour du Valat in France, and SEHUMED in Spain). On 21 November, ceremonies in Athens, Greece, inaugurated the new home of the Coordination Unit now based in Greece's National Center for the Environment and Sustainable Development in the newly renovated -- dare we say it -- palace of Villa Kazouli! The Convention's MedWet Coordinator, Spyros Kouvelis, and Policy Advisor, Nejib Benessaiah, in addition to two support personnel to be seconded from EKBY, and the premises themselves, are being fully funded for two years by the Government of Greece and are considered to be outposted staff of the Ramsar Bureau in Gland.

Source <http://www.ramsar.org/>

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## 5. ENVIRONMENTALISTS SLAM VENICE DAM SCHEME

ITALY: December 11, 2001

ROME - Environmentalists yesterday attacked an Italian plan to build a series of movable dams to keep the slowly-sinking lagoon city of Venice afloat as expensive and harmful to the ecosystem.

For the rest of the article click on

<http://www.planetark.org/dailynewsstory.cfm/newsid/13654/story.htm>

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## 6. PRINCE OF ORANGE LAUNCHES WATER MANAGEMENT INFORMATION SYSTEM

From the Global Water Partnership (GWP) at the International Conference on Freshwater, Bonn, Germany.

An information management system, the Integrated Water Resources Management (IWRM) ToolBox, was launched by the Crown Prince of the Netherlands in Bonn yesterday during the international conference on freshwater. "It is the only interactive database of its kind that provides a knowledge exchange mechanism on integrated water resources management," said the Prince. "Most other systems address specific water sectors and techniques."

Released by the Global Water Partnership (GWP), the IWRM ToolBox contains information on the political, institutional, and practical management processes that are needed for good water resources management. "The value of the IWRM ToolBox to water professionals," the Prince said, "is that they can enter their own information and experience into the system thereby providing feedback on how, in reality, the current policies support the water management practices they use. In this way," he added, "it is possible for policy makers to find out how effective their water policies are in given situations, and what policies need to be adapted to help practitioners better manage our water."

Among the many complexities of addressing integrated water resources management, GWP recognizes that there is an urgent need for more information on water and water management. "We need more information on stocks and flows of water, on quality, groundwater, in ecosystems and, most importantly, on water management procedures taken in the context of river basins as a whole," said Margaret Catley-Carlson, the Chairperson of the GWP.

"The GWP recognizes that a huge volume of knowledge and experience already exists on IWRM and it is vital to share this information and make it publicly available," Catley-Carlson added, "and it must be processed in a way that it is accurate and presented in an understandable format. This is one function of the IWRM ToolBox."

But even when water professionals have access to this information, political will is needed to make the changes happen as difficult decisions and complex tradeoffs will have to be made. The role of governments may have to change. They may need to move away from traditional ways and instead, devolve responsibilities to the most appropriate levels. "Governments must put in place a technically and scientifically informed, participatory process of decision making at all levels - from community to river basin level," Catley-Carlson said. "This will encourage people to put integrated water resources management into practice, and motivate the private sector."

But, this process will not happen automatically as there is a communication gap between those who build policies and those who implement them. New mechanisms are needed to bridge this gap. "This is the second function of the ToolBox," said Catley-Carlson, "so if the ToolBox is developed and maintained correctly, it will become a vital aid to the successful implementation of sustainable water resources management."

The Global Water Partnership (GWP), established in 1996, is an international network open to all organizations involved in water resources management: developed and developing country government institutions, agencies of the United Nations, bilateral and multilateral development banks, professional associations, research institutions, non-governmental organizations, and the private sector. Its mission is to support countries in the sustainable management of their water resources.

Through its network, the GWP promotes integrated water resources management (IWRM). IWRM aims to ensure the coordinated development and management of water, land, and related resources to maximize economic and social welfare, without compromising the sustainability of vital environmental systems. The GWP promotes IWRM by facilitating dialogue at global, regional, area, national and local levels to support stakeholders in implementing IWRM.

The GWP network consists of nine regional committees based in Southern Africa, West Africa, the Mediterranean, Central and Eastern Europe, Central America, South America, South Asia, Southeast Asia and China. The GWP Secretariat is located in Stockholm, Sweden.

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Source <http://www.riza.nl/>

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## 7. WATER DROPLETS SAY THAT OCEAN CHEMISTRY HAS CHANGED

Microscopic water droplets trapped inside ancient salt crystals have provided evidence supporting a radical theory that the chemical composition of Earth's oceans has changed over the past 500 million years.

"We're not talking about gigantic changes," says Lawrence Hardie, professor of earth and planetary sciences in the Krieger School of Arts and Sciences at The Johns Hopkins University and the originator of the theory. "It's not going to suddenly change from what it is today, for example, into something that is very alkaline, but we do see changes in the levels of some of the major chemical components dissolved in ocean water, and these changes may be significant enough to affect marine life forms."

Hardie's theory may help scientists understand the origins of Britain's White Cliffs of Dover and other mammoth chalk deposits around the globe. Geologists know that these chalk deposits were formed from the skeletons of microscopic marine creatures called nanoplankton, but they have had difficulty explaining why the nanoplankton were so abundant when the chalk deposits formed, an era in geological history known as the Cretaceous (Greek for chalk) period.

"The nanoplankton just went whacko, and because the thinking had previously been that sea chemistry was the same in the Cretaceous, it was hard to understand why," says Hardie. "But my theory suggests that there may have been higher levels of calcium dissolved in seawater at that time, and that may have fueled a nanoplankton population boom."

First proposed in 1984 but not published until 1990, Hardie's theory about changing seawater chemistry met with heavy resistance. It links changes in the levels of calcium, magnesium, potassium, and sulfate ions dissolved in seawater to oscillations in the rate of sea floor spreading at the mid-ocean ridges. The ridges are areas where tectonic plates are pulling apart, exposing underlying lava to the ocean, which then cools and forms new sea floor.

"The ruling paradigm on seawater chemistry, its major ions and such, was that there had been no change in the past 2 billion years," says Hardie. "The bulk of geochemists who tackled this problem starting in the late 1950s thought that river water coming into the ocean interacts with sediments in the ocean, and that sort of acts like a chemical buffer system to keep the chemistry of seawater the same forever."

The latest evidence to fortify Hardie's theory comes from a project led by former Hardie student Tim Lowenstein, now a professor of geology at Binghamton University in New York. Lowenstein has

been studying microscopic drops of brine in salt crystals from various times in Earth's history. The crystals enclose the tiny drops of brine, known as fluid inclusions, as they form from evaporating seawater.

Lowenstein, Hardie, and others examined the chemical content of the inclusions with a scanning electron microscope equipped with an X-ray beam adapted for chemical analysis. They found that Hardie's theory accurately predicted what they would find in the inclusions on the basis of the time in history when the salt crystals formed. They published their findings in *Science* last month. For Hardie, the results are a vindication. He feels evidence that all might not be right with the "unchanging oceans" model can be traced as far back as the turn of the 20th century, when the German salt industry hired chemist E. H. van't Hoff, winner of the first Nobel prize for chemistry, to study some of Germany's massive salt deposits.

"He was trying to get some experimental evidence for how these huge masses of salt formed," Hardie says. "They assumed, like everyone else did at the time, that seawater was constant through time. But they looked at these deposits, and they found that there were very few that looked like they had come from something like today's seawater."

Scientists eventually ascribed the differences to changes that had occurred after the salts were buried. But the discovery in 1976 of hot brine springs on a mid-ocean Atlantic ridge started Hardie thinking about another possibility.

Hardie became interested in the springs because "the chemistry of the water that comes out of these springs doesn't look anything like seawater, and it also doesn't look anything like river water."

Oceanographers learned that heat from lava at the ridges was creating convection cells that drove seawater into cracks and crevices in the sea floor and out again at the brine springs. The seawater's trip beneath the ocean floor took out magnesium and sulfate and added calcium and potassium. Hardie developed a theory that envisioned the chemical content of the oceans as the sum of the input from the sea floor brine springs mixed with the influx of material flowing in from the continents through rivers.

"It's a simple model, really, but those are the best ones," he says. "There's no heavy math; it's really nothing more than bean counting."

Using other geological evidence to assess changes in the rate of sea floor spreading, Hardie made predictions for seawater composition at several points in geological history. He has previously tested these predictions against evidence found in samples of ancient limestone, salt and other "evaporites."

"Astonishingly, this very simple model does a pretty good job. It gets the boundaries in time between changes in ocean chemistry pretty darn close, give or take 10 million years," he says.

Acknowledging with a laugh the irony such a statement carries for non-geologists, he adds, "Which for us is pretty close."

Hardie is currently working with Steven Stanley, a paleontologist and fellow Johns Hopkins earth and planetary sciences professor, to see if they can further solidify the potential link between his theories and the nanoplankton boom in the Cretaceous period that led to the great chalk deposits. They are testing contemporary nanoplankton's reactions to seawater altered with added calcium. Funding for the research on the fluid inclusions was provided by the National Science Foundation's Earth Science Program. Other authors on the "*Science*" paper were Michael Timofeeff, Sean Brennan, and Robert Demicco, all of Binghamton University.

Author: Michael Purdy

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## **8. TINY PARTICLES OF POLLUTION MAY CARRY LARGE CONSEQUENCES FOR EARTH'S WATER SUPPLY**

According to a United Nations Population Fund report released Nov. 7, water use has grown six-fold over the past 70 years. "Water may be the resource that defines the limits of sustainable development," the report notes.

A new study issued by researchers at Scripps Institution of Oceanography at the University of California, San Diego, argues that particles of human-produced pollution may be playing a significant role in weakening Earth's water cycle, much more than previously realized. The study was funded in part by NASA and used new satellite data from NASA's Terra satellite revealing the global nature of the particles.

Tiny aerosols primarily made up of black carbon, the authors argue, can lead to a weaker hydrological cycle, which connects directly to water availability and quality, a major environmental issue of the 21st century.

The paper, based on results obtained during the international Indian Ocean Experiment (INDOEX), is published in the Dec. 7 issue of the journal *Science*.

"Initially we were seeing aerosols as mainly a cooling agent, offsetting global warming. In this article we are saying that perhaps an even bigger impact of aerosols is on the water budget of the planet," said Scripps Professor V. Ramanathan, who along with Professor Paul Crutzen, a co-author of the new study, led the INDOEX science team as co-chief scientists. "Through INDOEX we found that aerosols are cutting down sunlight going into the ocean. The energy for the hydrological cycle comes from sunlight.

As sunlight heats the ocean, water escapes into the atmosphere and falls out as rain. So as aerosols cut down sunlight by large amounts, they may be spinning down the hydrological cycle of the planet."

The fourth co-author of the paper, Daniel Rosenfeld, also notes that these aerosol particulates may be suppressing rain over polluted regions. Within clouds, aerosols can limit the size of cloud droplets, stifling the development of the larger droplets required for efficient raindrops.

The INDOEX project involved more than 150 scientists across several disciplines from Austria, France, Germany, India, Maldives, the Netherlands, Sweden, and the United States. The \$25 million project, sponsored by the National Science Foundation and funded in part by NASA, the Department of Energy, and the National Oceanic and Atmospheric Administration, focused on the Indian Ocean region in a "multiplatform" analysis approach of satellites, aircraft, ships, surface stations, and balloons. The project was designed to assess the nature and magnitude of the chemical pollution over the tropical Indian Ocean and to assess the significance of the region's aerosols.

A wide range of results from the project—from meteorology to chemistry—are presented in 25 papers published in a special issue of the *Journal of Geophysical Research* released Nov. 27.

Early in the project, INDOEX researchers documented a human-produced brownish-gray haze layer of about 10 million square kilometers over the Indian-Asian region. The particles within the haze, the researchers discovered, were causing a three-fold decrease in solar radiation reaching the earth's surface as compared with the top of the atmosphere. The aerosols, typically in the submicrometer- to micrometer-size range, were a mixture of sulfates, nitrates, organic particles, fly ash, and mineral dust, formed by fossil fuel combustion and rural biomass burning.

"One of the key revelations from INDOEX is that air pollution is not only an industrial phenomenon," said Scripps Professor Crutzen, 1995 Nobel Laureate. "The part of the atmosphere that you would expect to be the cleanest—the areas without a lot of industrialization—in fact can be very highly polluted, especially during the dry season."

In the new *Science* paper, Ramanathan, Crutzen, J.T. Kiehl (National Center for Atmospheric Research), and Rosenfeld (The Hebrew University of Jerusalem), say the aerosol issues raised from INDOEX are a "major environmental concern." Not only do they question the role aerosols are playing on the regional and global hydrological cycle, but, they say, globally averaged, the aerosol increases the solar heating of the atmosphere accompanied by a reduction in the solar heating of the surface of the planet and these effects maybe quite comparable with the forcing due to greenhouse gases.

"At present these effects are not generally accounted for in climate model prediction studies, but we will need to include the absorbing aerosols in future model predictions," said Kiehl.

The immediate next step, the authors argue, is to develop a reliable global inventory of aerosol emission rates, life times, and concentrations. Integrating innovative new satellite observations, field experiments, and laboratory studies with models will pave the way for breakthroughs in our understanding of aerosols and how they are modifying the environment, they say.

"Part of these results are important for creating awareness," said Crutzen. "The biomass burning in

the countries that are producing this pollution cannot go on."

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## **9. FLOODS AIN'T WHAT THEY USED TO BE; STUDY SHOWS WING DAMS HAVE MADE THEM WORSE**

Like so many other things, floods just aren't what they used to be.

In the Midwest, they are worse than ever, according to Robert Criss, Ph.D., and Everett Shock, Ph.D., both professors of earth and planetary sciences in Arts & Sciences at Washington University in St. Louis. And they say that recent flood magnitudes and frequencies cannot be blamed on global warming or climate change, the popular notions. They point to human engineering of the rivers to try to control them for navigation.

In their paper, "Flood Enhancement through Flood Control," published in the October, 2001 issue of *Geology*, Criss and Shock lay the prime blame for increased flood levels on the Missouri and Mississippi rivers over the past century on the placement of wing dams on the nation's largest rivers. Wing dams are jetties of rock placed nearly perpendicular along river banks, and are intended to stabilize channels and to keep water levels high in mid-river for barge traffic. In the reaches of both rivers in Missouri there are literally thousands of wing dams, many visible through your car's windshield. Most of them were built in the 1930s and '40s by the U.S. Army Corps of Engineers. During low flow, the wing dams keep the channel deeper for barge traffic, and increase water velocity in the center for a stable, self-scouring channel. But under flood conditions, Criss says, the structures act like scale in a pipe. They actually slow water velocity and constrict the channel, impeding the flow of water, forcing flood levels to rise.

"The main problem with wing dams is that they make flood waters deeper," said Criss. "For floods of a given magnitude, the depth of water is much greater when you have them compared with places without them. In many areas of Missouri with wing dams, flood water can be ten feet higher than it was before they were built."

Criss and Shock compared flood stage levels of the middle-Mississippi River (from the confluence of the Missouri River down to the Ohio River), and the lower Missouri River, both heavily lined with wing dams, to the Meramec River in Missouri, which is one of the few free-flowing rivers in the United States, and the Ohio River at Cincinnati. The Ohio there is free of wing dams but does have levees and navigational locks and dams, which show little effect on water depth over 140 years of data. Both the Meramec and Ohio rivers show a horizontal line on graphs Criss and Shock drew up; the Mississippi and Missouri rivers, laden with wing dams, show distinctly rising lines throughout the past century.

Criss said his study is not the first to place the prime blame on wing dams (he says levees also contribute to increased flood stages, but have less effect than wing dams). Scientists in the mid-'70s also made this claim, but he said their research largely was bitterly criticized and subsequently ignored. What makes this study different is the comparison of rivers without wing dams or other structures, such as the Meramec River, to rivers that have been profoundly modified by a variety of different methods, using data gathered since the 1860s. This comparison clarifies the consequences of different engineering practices over time.

"Where none of this kind of engineering occurred, the records today look just like the records of 100 years ago," said Criss. "Such is not the case on the heavily engineered Mississippi River at St. Louis. Before World War II, floods that reached 38 feet or higher at St. Louis were very rare, occurring only about every 50 years, but now flood stages of this magnitude occur every five years or so."

"Severe flooding is commonplace now. If you look at our table and graphs, you see the trends are going up. The government is misleading the public by saying the Great Flood of '93 was a once in two-hundred-year event, or even a 70-year-event. Our data show it won't take a century for a flood like that to reoccur. I would not even be surprised if it happened in the next 15 years."

Criss said that over nearly two centuries the U.S. Army Corps of Engineers has done "a lot of marvelous good for the Midwest in making rivers navigable and stable. I don't know if we can ever



go back to the rivers being the way they were in the days of Lewis and Clark, or if we'd even want to. But I do think we should look at the consequences of what we build. There are some downsides to certain practices that have to be incorporated into our thinking. It's essential that we recognize what these effects are."

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## **10. URI CHEMICAL OCEANOGRAPHERS SUCCESSFULLY USE NATURALLY OCCURRING RADIUM TO MEASURE GROUND WATER INPUT TO RHODE ISLAND SALT PONDS**

Chemical oceanographers Margaret K. Scott and S. Bradley Moran at the University of Rhode Island's Graduate School of Oceanography have estimated the input of ground water to coastal systems by measuring naturally occurring radium-226 (226Ra) as a ground water tracer.

In a recent study, reported in the *Journal of Environmental Radioactivity*, Scott and Moran collected and analyzed water samples from Rhode Island salt ponds and several local residential drinking wells, as well as sediment cores from each pond to determine how much 226Ra was present in the water and sediments.

The radioactive element radium was discovered in 1898 by Marie and Pierre Curie in pitchblende (or uraninite) from North Bohemia. It is commonly used to make self-luminous paints, as a neutron source, and for the treatment of conditions such as cancer. It is a white alkaline earth metal that tarnishes black upon exposure to air. It luminesces, decomposes in water, emits radioactive radon gas, disintegrates radioactively until it reaches stable lead, and is a radiological hazard. With a half-life of 1,600 years, radium is more than a million times more radioactive than the same mass of uranium (<http://www.webelements.com/>).

Scott and Moran, funded by the Rhode Island Sea Grant Program, found that using 226Ra as a tracer of ground water input yielded results that were comparable to previous estimates of ground water input to these ponds. The scientists calculated that the imbalance between the amount of 226Ra going into and being discharged from the salt ponds indicated an additional source of radium to the ponds, which they determined to be ground water.

"Quantifying the input of ground water and associated chemicals, such as nutrients, to the state's coastal waters is important for developing a better understanding of the harmful effects of natural and man-made inputs and improving coastal zone management," said Moran. "Our most recent research has focused on seasonal variations in the input of groundwater and associated nutrients to these coastal ecosystems."

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## **11. PARADOX OF GROUNDWATER AGE HAS IMPLICATIONS FOR HYDROLOGY**

CHAMPAIGN, Ill. — How old is your groundwater? Chances are, it's much older than you, or many scientists, had thought.

Recent work by two University of Illinois geologists, Craig Bethke and Thomas Johnson, has shown that groundwater in aquifers is generally older than expected on the basis of flow velocity. That means that flow rates along an aquifer are higher than predicted by age measurements.

While of little consequence when taking a sip from the tap, the researchers' findings have important implications when using radiometric methods to estimate the sustainable yield of a water supply, for example, or to predict the rate at which a contaminant will migrate through the ground.

Groundwater tends to flow through aquifers that are constrained by layers of less permeable rock called aquitards. Hydrologists commonly figure that a groundwater's age reflects the time it takes to migrate along the aquifer – conceptually like the time it takes for water molecules to flow through a pipe.

“But water molecules don’t see an aquifer as a pipe,” Bethke said. “Some water mixes between the aquitards and aquifers, and the water in aquitards is generally very old.”

Bethke and Johnson have shown that the effect of aquitards on the age of groundwater depends only upon the ratio of water mass involved, not on the mixing rate. “At low mixing rates, very old water is supplied to the aquifer, but the water in the aquitard remains old,” Bethke said. “At high mixing rates, less-old water is supplied to the aquifer, because younger water is moving into the aquitard.”

While mixing increases the age in aquifers, it also has the counter-balancing effect of decreasing the age in aquitards. “The two effects exactly cancel,” Bethke said. “This is the paradox of groundwater age, and it has broad implications in groundwater hydrology.”

Like carbon-14 dating of artifacts, scientists can use radioactive isotopes to age-date groundwater.

“If a sample proves to be very old, we might conclude that it has been migrating very slowly through the aquifer,” Johnson said. “However, the water may have migrated quickly, and only appears very old because of the effect of the surrounding aquitards.”

Such a situation could be particularly troublesome when injecting toxic chemicals in the ground for disposal, as the waste could enter the biosphere much faster than anticipated. Incorrect age/flow determinations also could allow landfill leachate to contaminate water supply wells.

“Because the rate of mixing doesn’t matter, the contribution of aquitards to the age of groundwater in aquifers depends only on the ratio of water mass in aquitards to that in aquifers,” Bethke said.

“You can think of groundwater age as a quantity distributed by diffusion, dispersion and cross-formational flow.”

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Bethke will discuss the paradox of groundwater age at the American Geophysical Union meeting in San Francisco, Dec. 10-14. The National Science Foundation supported his work.

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## **12. WATER, SEDIMENTS IN ICE-BOUND ANTARCTIC LAKES MAY HARBOR UNIQUE MICROORGANISMS, ECOSYSTEMS**

Liquid lakes buried thousands of meters below the Antarctic ice sheet are likely the home to unique habitats and creatures that thrive in them. Exploration of those lakes will therefore require extreme care and an international cooperative effort, according to a team of authors writing in the Dec. 6 issue of *Nature*.

The pressure exerted by the continent-wide ice sheet together with heat generated by the Earth from below and the enormous insulating properties of the overlying ice sheet, may mean that liquid water exists in many -- if not all -- of the lakes. That may mean that they harbor life, according to a team of authors, led by Martin Siegert of Bristol University.

Microbiologists funded by the National Science Foundation (NSF), working with ice samples gathered from deep beneath Russia's Vostok Station -- that is thought to be refrozen water from Lake Vostok itself -- have argued that microbes may survive in extreme cold and darkness under more than 4,000 meters of ice. John Priscu of Montana State University, one of those NSF-funded biologists, is a co-author of the paper.

Antarctica is home to more than 70 lakes that lie thousands of meters under the ice sheet. The lakes include one under the South Pole and another, Lake Vostok, deep in the Antarctic interior, that is comparable in size and depth to one of the North American Great Lakes.

Given the conditions in the lakes, the authors state, it is reasonable to believe "that subglacial lakes house a variety of microorganisms potentially unique to subglacial Antarctica and, if they are isolated hydrologically, unique to each lake."

In the *Nature* article, Priscu and his colleagues also argue that the sediments at the bottom of Lake Vostok, and in other lakes, may also sustain life.

They caution, though, that developing both the technology and the experimental protocols to explore those lakes without contaminating the waters or harming any microbial communities that may exist there will be an extremely complex undertaking that will require "significant multinational

cooperation."

The United States Antarctic Program, which is managed by NSF and which coordinates almost all U.S. research in Antarctica, already has taken some non-invasive steps to explore Lake Vostok. During the 2000-2001 research season, researchers from the Lamont-Doherty Earth Observatory at Columbia University conducted detailed airborne radar mapping of the lake to more thoroughly understand its physical and geographical boundaries.

In 1999, two NSF-funded teams, one headed by Priscu and another headed by David Karl of the University of Hawaii, published papers in Science describing evidence that viable microbes lived in the "accreted," or melted and refrozen ice from Lake Vostok.

Priscu and his co-authors write in the Nature article that these investigations into the nature of Lake Vostok "have helped to define the next generation of research objectives, and it is likely that several exciting bio-geochemical-physical systems will be documented during the next decade."

Recognizing the scientific and technological challenges and opportunities of such an undertaking, NSF's Office of Polar Programs has established an NSF committee to study the possible scientific exploration of the lakes.

Karl Erb, who heads the U.S. Antarctic Program, cautioned committee members that future workshops to discuss whether and how to proceed with scientific exploration will need to explore how advanced technologies, including technologies that may as yet not be developed, can enable scientists to achieve their research goals. He noted that the workshops will "bring out the likely interplay between science goals and technology requirements: The goals should define the requirements but the state of the technology may proscribe the goals."

He also adds that any scientific exploration of subglacial lakes, including Lake Vostok, should include international and interagency participation.

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Read about the Vostok research conducted by Priscu and by Karl at:

<http://www.nsf.gov/od/lpa/news/press/99/pr9972.htm>

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### **13. CUMULATIVE PESTICIDE RISK ASSESSMENT METHODOLOGIES DEVELOPED; PRELIMINARY REPORT RELEASED FOR ORGANOPHOSPHATES**

EPA is releasing its preliminary assessment of the cumulative risks of organophosphate pesticides and is seeking both scientific peer review and widespread public comment on the scientific methodologies used to develop the risk assessment. These risk assessment techniques represent a significant advance in EPA's abilities to evaluate pesticides. The new methodologies, developed over the past five years with extensive scientific peer-review, allow EPA to evaluate potential exposures to multiple pesticides, taking into account food, drinking water and residential uses. A public comment period is open through March 8, 2002.

"Developing and applying the scientific methodologies to perform a cumulative pesticide risk assessment represent a major step forward in EPA's ability to evaluate the safety of pesticides," said Stephen L. Johnson, Assistant Administrator for Prevention, Pesticides, and Toxic Substances.

"Because this is the first time for EPA to apply these new methods together, we are not yet ready to draw firm conclusions about the pesticides in this initial evaluation. EPA expects, and will welcome, a robust public comment period to help us fine-tune the risk assessment. This type of analysis will add significantly to our understanding of pesticide exposure, and with these tools we will continue to ensure that the United States has the safest, most abundant food supply in the world," Johnson added. The preliminary report being released today for public review examines one category of pesticides--the organophosphate insecticides--as a group because they are chemically similar and act the same way in the body. EPA has already taken action to significantly reduce risk from exposure to individual organophosphates. The preliminary cumulative risk assessment considers potential exposures to 31 organophosphates through food, drinking water and residential uses. Residential uses include pesticide applications in and around homes, schools, public buildings, golf courses,

parks, public health-related uses and other areas where people may come in contact with pesticide residues.

The new methodologies evaluate potential exposures for different age groups and take into account the variability in potential exposure at different locations across the country and at different times of the year. EPA relied on a large variety of data sources, such as monitoring data that measure pesticide residues found in food, in order to obtain the most realistic estimates of actual exposure to the population from organophosphate pesticides.

Until the Agency solicits external scientific peer review and incorporates any necessary revisions, it is premature to draw conclusions about specific risks or to consider potential risk management actions. EPA has previously enacted risk reduction measures on individual organophosphate pesticides, leading to significant reduction in potential risk. EPA remains confident in the overall safety of the nation's food supply, and continues to emphasize the importance of eating a varied diet rich in fruits and vegetables. EPA's analysis indicates that drinking water appears not to be a major contributor to risk. Although most indoor uses of organophosphate pesticides have been eliminated through earlier risk reduction actions, remaining uses may be reevaluated.

The cumulative risk assessment released today is preliminary. To gain public and scientific peer review on these innovative methodologies, EPA is continuing to seek guidance and input from the scientific community and other interested stakeholders about the initial findings, the scientific methods used in the assessment and any revisions and refinements that may be necessary. EPA will present the preliminary assessment during two public meetings: 1) a Technical Briefing scheduled for Jan. 15, and 2) the FIFRA Scientific Advisory Panel (SAP) meeting on Feb. 5-8. Information on these meetings will be available at: <http://www.epa.gov/pesticides> and at:

<http://www.epa.gov/scipoly/sap>, respectively. The SAP is an advisory committee of independent scientific expert peer reviewers. Following consideration of comment from the public and SAP, EPA intends to issue a revised cumulative risk assessment by August 2002. The release of the preliminary cumulative risk assessment is an important step toward meeting the statutory goal called for in the Food Quality Protection Act of reassessing 66 percent of pesticide food tolerances by August 2002.

The preliminary risk assessment documents are available at: <http://www.epa.gov/pesticides>. In the near future, EPA is planning to post on this web page the actual data used to conduct this assessment.

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#### **14. DEVELOPMENT OF AN INFORMAL VIRTUAL NETWORK TO SHARE WATER-RELATED INFORMATION IN DEVELOPING COUNTRIES**

In general, non-Governmental Organizations (NGOs) face two main challenges to have more impacts in practical terms. One of them is lack of access to official but reliable information, and the other is the fact that these organisations often work in an isolated manner. In the water sector, every year enormous amounts of innovative solutions and useful information are developed by NGOs, as well as by other water-sector organizations. However, much of this information has poor dissemination, and thus it remains almost unknown.

The Third World Centre for Water Management in Mexico is developing an Informal Virtual Network to share and disseminate information on important and critical water and environment-related issues, mostly from developing countries. This major effort is oriented to make unknown water-related information available, and to make visible the organizations and/or the persons behind the information. The first stage, from where the informal virtual network will be launched, has been completed. The second stage will include the links with interested organizations or institutions to participate in the development of the network. The third stage will include the availability of papers on water and environment free of charge in the network.

For more information, please contact

<mailto:ecastelan@thirdworldcentre.org>, and visit the web site of the Centre: <http://www.thirdworldcentre.org/>

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## **15. FELLING OF FORESTS ADDING TO WORLD'S WATER SHORTAGES AS DAMS FILL UP WITH SILT**

### **UNEP Urges Sustainable Management of River Systems and Reservoirs to Reduce the Threat**

Bonn/Nairobi, 4 December 2001 - Many of the world's reservoirs, upon which billions of people depend for drinking water and food production, are suffering significant reductions in storage capacity as a result of sedimentation, an international conference on freshwater was told today. Studies indicate that, on average, one per cent of the water storing capacity of the globe's reservoirs is being lost annually because of a build up of muds and silt.

The current storage capacity of reservoirs world-wide is estimated at just under 7,000 cubic kilometers. Unless urgent action is taken, a fifth of this or some 1,500 cubic kilometers, will be gradually lost over the coming decades, a new book concludes.

Experts fear that the loss could be even higher and faster if the scientific forecasts on climate change prove sound and the rates of deforestation in the developing world are not checked.

Global warming is predicted to increase the severity of storms and rains, accelerating the natural erosion rates in and around rivers that feed reservoirs. It is also likely to exaggerate the extremes in rainfall patterns making it even more vital that the storage capacity of reservoirs is maintained. Meanwhile the felling and clearing of trees for agriculture is aggravating the situation.

The levels of erosion from hillsides, planted with crops, are 150 times higher than from the same land covered with trees, studies show.

Klaus Toepfer, Executive Director of the United Nations Environment Programme (UNEP) told a press gathering at the International Conference on

Freshwater taking place in Bonn, Germany: "The issue of dams can arouse strong passions on both sides. Some people are very much in favor of building dams and others are vehemently against.

However what we are talking about here is the state and fate of the existing stock of dams and reservoirs on whose waters billions of people depend for not only irrigation and drinking water, but also for industry and the production of hydroelectricity".

"It would seem prudent and sensible for us to manage the existing stock in the most sustainable way possible. Otherwise we face increasing pressure on natural areas with water, such as wetlands and underground aquifers, with potentially devastating environmental consequences to wildlife and habitats," he said.

"We must act to reduce the loss of forests and to re-forest cleared areas as part of a comprehensive strategy of watershed management of the world's river systems. We must also act to reduce the threat of global warming. However, there will always be natural levels of erosion which will contribute to a loss of water storage capability. So I call on engineers to also provide technical solutions that offer environmentally friendly ways of extending the lives of the world's reservoirs," said Mr Toepfer.

He said sustainable management of reservoirs would take a central role in the work of UNEP's new Dams and Development Project (DDP), which is based in South Africa. The unit was formed in the wake of the World Commission on Dams which published its final report last year.

The unit has secured funding and pledges of over \$2.5 million from the governments of Germany, the Netherlands, Sweden, Switzerland and the United Kingdom.

Jeremy Bird, Interim Coordinator of the DDP unit, said they would also be looking at how to improve the performance of reservoirs and dams across a

wide range of issues from agriculture to power generation. Next week a meeting in Prague, Czech Republic, will examine, how it might be possible to raise the hydroelectric output of such schemes.

Rodney White, author of the new publication "Evacuation of Sediments from Reservoirs" (see notes to editors) and a fellow of the Institution of Civil

Engineers, said: "The loss of capacity of the world's dams should be of highest concern for governments across the globe and at the moment I do not

believe this issue is commanding the attention it deserves. The demand for water is rising, not

falling, as the population of the planet climbs from six billion today to an estimated 10 billion by 2050. I am extremely concerned that water shortages in some of the poorer parts of the world will intensify unless we act to reduce reservoir sedimentation and conserve storage in existing dams using sound management techniques. Sediment removal should be a fundamental feature in the design of dams and their associated infrastructure".

Mr Toepfer said the issue of dwindling capacity of reservoirs was one piece in the puzzle of delivering sufficient quantities of clean water to the world's people.

Other research shows that significant amounts of the water used in irrigation is also being lost and squandered. In developing countries water consumption for agriculture is typically 70 to 80 per cent of the total water consumption. Typically 60 per cent is wasted or used inefficiently.

UNEP is calling for action in this area too. Meanwhile the distribution systems in many cities in developing countries lose 50 per cent or more of

the water as a result of leaks and poor management. "Progress needs to be made here as well," said Mr Toepfer.

Dr White's report (see notes to editors) estimates that the storage capacity of the world's more than 25,000 reservoirs, based on figures from the Paris-based International Commission on Large Dams, amounts to around 6,815 cubic kilometers.

The global rate of storage loss as a result of sedimentation is approaching one per cent annually and this exceeds the current creation of storage from new dams under construction.

The report highlights that the rate of annual loss varies dramatically from region to region and country to country. China is losing over two per cent

of its water storage capacity annually, followed by the Middle East, which is losing 1.5 per cent and Central Asia, 1.00 per cent.

It also highlights how clearing of forests is reducing the storage capacity of dams.

"For example data from the Ringlet reservoir in Malaysia shows clearly the dramatic effects of deforestation. The catchment has been gradually changed from forests to plantations and holiday facilities," said Dr White.

Sedimentation rates are now eight times higher than they were in the mid-1960s, the report concludes.

The report also highlights some management techniques that can restore some of the storage capacity of reservoirs including a method known as flushing in which flood waters due to heavy rains or melt waters from mountains are used to sweep debris, mud and silt out of the reservoir downstream.

It concludes that the technique is likely to work in parts of Central America; areas in North and South America where the rivers are fed by the Rockies and Andes; parts of Central Africa from Cote D'Ivoire in the west to Sudan in the east; areas in Central Asia where the rivers are fed by the Himalayas including Pakistan, India and Nepal and parts of Asia including Cambodia, Vietnam and Thailand.

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## **16. OVER-REPORTING OF GLOBAL FISHERIES CATCH MEAN OVERFISHING PROBLEMS ARE WORSE THAN FEARED**

Certain countries have been submitting exaggerated fish catch claims to the United Nations Food and Agriculture Organisation (FAO), according to a study published in Nature on 29 Nov. China is accused of being a main culprit, accounting for 40% of the deviation between actual and reported claims.

Authorities on global fisheries have been suspicious of the relationship between failing fisheries and rising global catches; in 1996 the FAO reported that 60% of valuable fish species had been overfished, yet in the same year global catches were reportedly at an all time high of 87 million.

Over reported marine catches would now seem to explain this anomaly, says Nature. This discovery has grave implications for the state of the oceans.

The real danger from such flawed data is that the seas have been subsequently mismanaged due to

their perceived state. The inflated global fisheries catch statistics have allowed a less urgent approach to be taken to the overfishing problem, generating complacency among governments and a slackening in policy to alleviate the situation. Consequently, more species of fish have been marketed, new fishing areas have opened up and huge government subsidies to the industry have been allowed to continue – all creating the incentive and demand to overfish.

WWF apports blame of the state of the oceans to government subsidies, these subsidies make it economically viable to send bigger trawlers and more fleets out to fish – which is not so environmentally viable. WWF claim that today's fishing fleet is estimated to be "two and a half times the capacity needed to sustainably fish the oceans".

Dr. Daniel Pauly, the author of the Nature report, calls for "a stronger position" for the FAO when "negotiating the supply of accurate data from nations of the world" and that "those data must be evaluated". As it stands, the FAO is the only body that maintains global fisheries statistics and the organisation has no means of independently verifying the catch reports.

The World Trade Organisation (WTO) has attempted to monitor government subsidies to the fishing industry which it says are "trade distorting, and undermine the sustainable use of fish resources".

However their ability to determine the truth from governments on their granting of subsidies is proven to be weak. In 1996, Japan claimed they donated a conservative US\$7 million to the industry, according to a WTO report. However, in the same year a World Bank report stated Japan had spent three-quarters of a billion dollars on fisheries subsidies. The means of monitoring and checking government claims on their contributions are unreliable and there is no legislation in place to hold governments accountable for the submission of flawed data, says the report.

Andy Rosenburg, Dean of the Colleges and Agriculture at the University of New Hampshire, warns, "It's not a case of 'lets gradually phase in some solutions.' It's rather more urgent than that." Careful management is called for and regulations need to be adhered to as a repetition of the Canadian Grand Banks catastrophe is not a prospect that would be welcomed by many.

New research highlights marine reserves as a productive way of replenishing fisheries according to a recent report in the magazine Science, this month. Whatever plans are made in the future to maintain fish stocks it is imperative that the overseeing bodies have means at their disposal to verify the information they receive and ways of enforcing their laws.

Source <http://www.edie.net/>

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## **17. LOWERING RATES OF BEACH EROSION: ESTUARIES MAY BE KEY**

The tide rolls in and the tide rolls out. Many geologists believe that the interaction between the tides and water moving down rivers causes sand to settle into estuaries that act as "sinks." That is, the sand cannot move out of them. In the December issue of the GEOLOGICAL SOCIETY OF AMERICA BULLETIN, Michael Fenster from Randolph-Macon College proves this notion is all washed up.

He and his colleagues conducted research at the Kennebec River estuary in northeast Maine to test their hypothesis that spring floods supplant tidal energy and deliver sediment to the coast.

"We found that spring floods that are caused mostly by rain and melting snow provide enough energy to change the overall net direction of sand migration downstream," Fenster said. "Our work shows that policies that regulate whether or not to build dams and where to dump dredged materials should consider the net movement of sand within estuaries. This change could result in lower erosion rates on beaches."

This research establishes that estuaries contribute coarse-grained sediment to the coast in some places such as New England, that dams are a crucial component of the coastal system because they can cut off the supply of sediment that would ordinarily and naturally be transported to the coast, and that coarse sediment that fills estuaries and harbors--consequently producing navigation problems--do not always come from the ocean.

"Beaches can receive new nourishment from rivers," Fenster said. "What we can see on the beach is not the sum total of what we have."

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## **18. NEW BILINGUAL WEB SITE ON WETLANDS IS CREATED IN CHINA**

Recently a new bilingual (Chinese and English) Web site on wetlands is open in China. This Web site is managed by Wetlands International – China with the aim at promoting public awareness of wetlands value and functions in China and letting overseas readers know about development and problem of wetlands in China. At present the Web site is still at trial basis with relatively simple contents. It is believed that with experience gained it will become a good window for both Chinese and foreign readers. Chinese readers may through this window may gain wetland knowledge and its new development trends in the world, and foreign readers may through this window get to learn more of the development of wetland causes in China. Wetlands International – China is sincerely hoping that its readers show more care for and extend their support to this new bilingual Web site. Their comments and suggestions are most welcome (lilukang@public3.bta.net.cn). Please click [www.wetwonder.org](http://www.wetwonder.org). (Reported by Li Lukang, WI-China). [This interesting new sites appears to be "optimized for Microsoft's Internet Explorer".]

Source <http://www.ramsar.org/>

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## **MEETINGS**

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### **19. BIOSOLIDS, THE RISKS & BENEFITS - AN UPDATE ON THE LATEST RESEARCH**

CIWEM is holding a conference titled "Biosolids, the risks & benefits - an update on the latest research" on Wednesday 9th January 2002 at the National Liberal Club, Whitehall Place, London, SW1A 2HE. Using organic materials (biosolids, sewage sludge, composts and manures) on land to maintain soil structure and fertility and to complete nutrient cycles is an important part of sustainable development. But we need to understand and manage the risks and we need to know how to make best use of the beneficial constituents.

There has been a huge amount of research into wastewater biosolids and some of it can be extrapolated to understand the other organic residuals. Much of this important work will be presented at this seminar and reviewed by experts actively involved with it.

This conference will include a €1.25 million research project into biological risk including the effectiveness of treatments for a wide range of pathogens and a risk assessment to the point of harvest. The kinetics of die-off during treatment and after application to soil have also been researched - how sanitary is soil? A long term field trial into the effects of metals on crops and soil micro-organisms (€3 million) over 9 sites with contrasting soils and climates will be reported - what is safe? The subject of organic micropollutants is wide and complicated - what is really out there and what is their significance - one of the world's experts will be reviewing this area. The conference will also cover research that has quantified the potential benefits in terms of major and minor nutrients and the effects on soil physical properties. Farmers and other users know that there are benefits because they see the effects; in order to make the best use of them we need to quantify effects and to be aware of the tools being developed for precision farming, even to using remote sensing from space, which is now becoming a practicable reality.

The conference venue is very conveniently located in central London. Come and learn about the latest research and development and discuss it with experts doing the work. For more details email



[tim.evans@messages.co.uk](mailto:tim.evans@messages.co.uk).

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## 20. MEMBRANE TECHNOLOGY FOR DRINKING WATER AND WASTEWATER

Innovative technologies at the 12th European Water, Sewage and Solid Waste Symposium

"New approaches in water, wastewater and solid waste" is the motto of the 12th European Water, Sewage and Solid Waste Symposium which will take place from 13 to 15 May 2002 in Munich on the occasion of IFAT. New approaches are only another way of reaching a classical target: To ensure a high quality of the product water while efficiently using resources and protecting the environment. Membrane technology promises to meet all these requirements. It is thus topic of the first session, which will open on 13 May 2002 the water, and wastewater part of the Symposium, organised by the European Water Association (EWA) in co-operation with the German Association for Water, Wastewater and Waste (ATV-DVWK). Membrane filtration is already used for some time, both in the drinking water and the wastewater sector. It allows the elimination of problematic substances like bacteria and viruses, improves the degradation of organic matters and thus the quality of the treated wastewater respectively the drinking water.

A further expansion of this technique is however hindered by the costs on one hand (especially energy costs) and limited experiences from the operation on the other side. The lectures at the symposium will present know-how and insights concerning these two problems.

### **Membrane Technologies and Alternative Water Systems**

Membrane technologies play an important role with the so-called Alternative Water Systems. These are used where the centralised system of drinking water supply and wastewater disposal are no longer technologically and economically feasible. Prof. Dr. Karl-Ulrich Rudolph (University Witten-Herdecke, Germany) and Dr. Takuji Nakazato (Japan Institute of Wastewater Engineering Technology) will present results of an international study that gives 60 examples from all over the world where the use of Alternative Water Systems and the role of membrane technology therein.

### **Experiences with different membrane technologies**

Dr. Hendrik Walther and Dipl.-Chem. Simone Stein from the municipal waterworks of the City of Leipzig (Germany) will compare the two membrane techniques ZeeWeed® and VRM®. They will present the dimensioning/ design of two recently constructed medium-sized wastewater treatment plants that use these technologies. The lecture is completed by a detailed description of the two technologies as well as of the first experiences concerning the parameters energy consumption, amount of sludge produced and costs.

### **Nitrification Membrane Assisted Bioreactors**

Sebastian Ąbczyński of the Technical University Gliwice (Poland) presents a study about the treatment of ammonia-rich wastewater in membrane-assisted bioreactors. The research focused on the effects on nitrification of the wastewater at different sludge retention times. The results show how the problematic nitrification inhibition of ammonia-rich wastewater can be prevented.

### **Alpha Values in Membrane Bioreactors**

The dissemination of membrane technology is hindered fundamentally by high-energy costs, which are especially influenced by the oxygen transfer in the aeration tanks. Dipl.-Ing. Stefan Krause, Prof. Peter Cornel and Dr.-Ing. Martin Wagner from the Institute WAR of the Technical University of Darmstadt (Germany) present the first measurements of  $\alpha$ -values in large scale in two German wastewater treatment plants operating with membranes. As the respective measurement processes have so far only been used in conventional activated sludge systems, the lecturers show how they

have to be adapted for the use in membrane systems.

### **Membrane Filtration and Trickling Filter**

Dr. Werner Fuchs from the Department of Environmental Biotechnology of the Institute for Agrobiotechnology in Tulln (Austria) presents a two-year project where the combination of trickling filters with dead-end membrane filtration was examined. The advantage of this mode of membrane operation is the low energy consumption. The lecturer will present important factors to be considered concerning flocculation and backflush of the membrane.

In addition to the session "Membrane technology" there is a session "TV inspection for operation and maintenance" on 14 May and on 15 May a session "Finances, Charges and Cost Reduction Potential". The 12th European Water, Sewage and Solid Waste Symposium will take place from 13 to 15 May 2002 on the premises of the New Munich Trade Fair Centre on the occasion of IFAT, the international fair for waste disposal and the environment. We will regularly keep you informed about current developments until the beginning of the Symposium in May 2002.

Further information:

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## **21. COVERAGE OF THE INTERNATIONAL CONFERENCE ON FRESHWATER: 3-7 DECEMBER 2001**

The International Conference on Freshwater took place from 3-7 December 2001 at the International Congress Center Bundeshaus in Bonn, Germany, with 118 governments, 47 intergovernmental organizations and 73 representatives of major groups in attendance.

The Conference was convened as a preparatory step on freshwater issues for the upcoming World Summit on Sustainable Development (WSSD). Delegates met in Plenary and Working Group sessions to consider issues of water access, scarcity, pollution and natural disasters, as well as financing and capacity building. A closed-door ministerial session considered the equitable and sustainable use of water resources and the mobilization of financial resources for infrastructure investment.

A full coverage of the International Conference on Freshwater can be found at <http://www.iisd.ca/linkages/sd/water/sdh20/>

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## **22. FOURTH WATER ONLINE COURSE FROM 18.2.-8.3.2002**

The online course "Institutional Changes in the Urban Water and Sanitation Sector" is offered for the fourth time from 18 February - 8 March 2002 by The Network University (TNU) and the IRC International Water and Sanitation Centre.

The course deals with the trend towards private public partnerships (PPP) in the water sector. It addresses the various forms and experiences made with PPP so far, institutional alternatives to PPP in peri-urban and rural areas and future trends in the sector.

The three-week certificate course is designed for an international audience of sector professionals, politicians, consultancies, NGOs, and other relevant stakeholders.

The course is supervised and taught entirely on the Internet. Knowledge exchange and knowledge sharing are central features of the learning process, guided interactive discussions and weekly assignments aim to deepen the knowledge about the subject topic.

Please find more information in the course demosite at: [www.netuni.nl/demos/water](http://www.netuni.nl/demos/water)

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### **23. CELTIC WATER IN A EUROPEAN FRAMEWORK: POINTING THE WAY TO QUALITY**

The Third Inter-Celtic Colloquium on Hydrology and Management of Water Resources

To be held at the National University of Ireland, Galway

8th - 10th July 2002

During the past year publication and enactment of the European Union Water Framework Directive has set challenging targets for Member States in relation to the long-term management of European water resources. By the year 2016 water quality of all surface and ground waters in member states must, through a combination of planning, treatment and remediation be returned to their original pristine state. Some of the issues involved in this task will be addressed at this Colloquium.

The main topic of the Colloquium will address water quality in Celtic Region.

For more information see <http://www.nuigalway.ie/hydrology/celtic.htm> (a/o call for papers).

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### **INDUSTRIAL NEWS**

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#### **24. RWE EXPANDS ITS POSITION IN CHILEAN WATER MARKET**

Thames Water Plc. - RWE Group, London/Reading, management company of RWE's core water business, acquires the majority in the Chilean water supplier ESSEL, Rancagua. So far, Thames Water and Electricidade de Portugal SA, Lisbon (EDP), together held 51 % in ESSEL. After the transfer of EDP's shareholding of 25.5 % to Thames Water, Corfo, a Chilean state-owned company, continues to hold the remaining 49 %. ESSEL Empresa de Servicios Sanitarios del Libertador SA supplies over 500,000 inhabitants of Chile's sixth region with water and waste water services. In fiscal 2000, the company generated net sales of approx. Euro 17 million. With this move Thames Water is expanding its position further in the Chilean water market. Together with the majority interest in ESSBIO, Concepción, and the franchise acquisition for ESSAM, the company obtains a market share of 20 % in Chile.

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#### **25. THAMES WATER AFFILIATE BIDS FOR MALAYSIAN COMPANY**

KUALA LUMPUR, MALAYSIA — Puas Emas Sdn Bhd is bidding for Indah Water Konsortium (IWK) and is planning to invest in the company over the next 33 years.

Former minister of Domestic Trade and Consumer Affairs Megat Junid Megat Ayud has an indirect 35-percent interest in Puas Emas, where he is chairman, while the UK's Thames Water Overseas Ltd. has a direct 30-percent stake, the Ananova news service reported.

The company will submit a detailed technical and financial proposal to the government after mid-December, Megat Junid said, according to Ananova.

Puas Emas submitted a proposal to the government in August to acquire 100-percent equity interest in IWK and has been asked by the government to submit a detailed proposal, the news service

reported.

Megat Junid, who is also chairman of Multi Vest Resources Bhd, which holds 35-percent interest in Puas Emas, said Puas Emas is now finalizing details of the proposal, the report said.

Megat Junid said Puas Emas plans to invest over the next 33 years in IWK for capital expenditures, operations and management, Ananova said.

Source <http://www.watertechnonline.com/>

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## 26. ITALY PLANS BIG INVESTMENT IN WATER PROJECTS

NAPLES, ITALY — Italian energy giant Enel's water unit expects to invest 60 trillion to 70 trillion lire (US\$28 billion to \$32 billion) in water management projects in the coming years, Enel Hydro's chief executive said 4 December.

In the region of Campania alone, the investment will be 2.5 trillion (US\$1.2 million) over the next five years, CEO Rocco Failla told Reuters News Service said. Failla did not specify a time frame for the full investment, the news service said.

Failla was in Naples, the capital of the southern Italian region of Campania, to present a regional water management contract, which Enel won alongside Rome-based utility Acea, Reuters said.

The management contract is with water firm Ato3, which is owned by the southern Italian region of Campania and covers 900 square kilometers (347.5 square miles). It has one of Italy's largest water client bases, said the news service.

The deal will give Enel and Acea a 45-percent stake in the management contract, Reuters said.

Source <http://www.watertechnonline.com/>

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## 27. VIVENDI RAISES \$1B THROUGH SALE OF SHARES

PARIS — Media giant Vivendi Universal said it has sold about 9 percent of its stake in Vivendi Environnement SA, the world's largest water company, raising nearly \$1.1 billion. Read the rest of the article at [http://www.watertechnonline.com/news.asp?mode=4&N\\_ID=27710](http://www.watertechnonline.com/news.asp?mode=4&N_ID=27710)

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## 28. New DHI Subsidiary in India

DHI (India) Water & Environment, Pvt. Ltd. is now formally registered in Delhi and will be fully operational by 1st. January 2002.

With the establishment of the new DHI subsidiary, DHI Water & Environment wishes to develop further its growing activities and software sales in India and enhance its service capability towards its clients.

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