Newsletter March/April 2010

Conference – 13 – 16 June 2010

("Aquatic biodiversity and climate change – an arid region perspective")

The second announcement for the conference at Augrabies National Park (13 – 16 June) 2010 was circulated earlier. If you have not received a copy, please contact Paul Fouche (pso@univen.ac.za). As stated earlier, accommodation is limited at the Park, but Jan Roos secured some of the chalets and camping sites. Booking for this will be on a "first pay" basis only. The details of the types of accommodation, rates and other information are in the Second Announcement. A list of other accommodation is included.

SACNASP

During a recent Council Meeting it was decided to add a new category: Aquatic Scientists. Members can register for this category and those already registered can add it as a second category or change it as their only choice (see below).

Journal

AJAS 34(3) was published in November 2009 and is a special addition celebrating the 40 years of aquatic research at the Rand Afrikaans University/University of Johannesburg. A word of thanks to Mike and the various authors. We want to congratulate the Department of Zoology at the University of Johannesburg for the achievement and are looking forward to the next 40 years of excellent work.

Mike Coke reports that AJAS 35(1) is due out online in the first week of April. This issue includes the final UJ Centre for Aquatic Research papers, plus others. Handover of finalised manuscripts for AJAS 35(2) is set of the 4th week of April. We are awaiting our first Thompson Scientific Impact Factor rating, expected by mid-year. Web-based

manuscript management is due to commence later this year and is expected to make the system easier to manage.

A further special addition is planned for 2010 and Mike approached various scientists around the country to write papers on the current status of research in their respective fields of expertise. Where possible, the authors will attend the conference in June and deliver a plenary paper on the topic. It is the feeling of Exco that this will link to the theme of last year's conference **"Beyond rapid assessments - time for an aquatic research renaissance in South Africa"** and guide our thoughts on future needs. We are looking forward to this with anticipation.

Finances and membership

On the financial side we can report that membership invoices were send out during the first few weeks of January and of the 124 members invoiced, almost half (58) has paid their fees. Although this is not bad going, we will really appreciate it if the remaining 66 members will also pay their fees ASAP, especially as their subscription to AJAS will lapse on 31 March if we don't receive payment before then. In addition we had 16 applications for membership in 2010. This is very good news and shows that the society is growing, unfortunately of those new members, only four have paid their fees! So thank you very much to our paid up members, and we are looking forward to receive the payments of those who are not. For queries contact Nico (nicos@uj.ac.za).

SACNASP AQUATIC SCIENCE FIELD OF PRACTICE

Include: Limnology (L), Hydrobiology (H), Estuarine and Coastal Marine Science (M) and Water Science (W)

Aquatic science is the study of the planet's oceanic and freshwater environments.
Oceanography is the study of the biological, chemical, geological, optical and physical characteristics of oceans and estuaries. Oceanography entails research on the physical and chemical characteristics of oceans, including geological, geophysical and geochemical characteristics, the movement of ocean currents and the interaction between wind and water, temperature and moisture-content at the contact surface of air and water.
Limnology involves the study of these same characteristics in inland systems (lakes, rivers, streams, ponds, and wetlands) including both fresh and salt waters.
The **marine scientist** makes a study of the sea - life within it, the seabed and the air above the sea.

3.1 Certificated Natural Scientist – Aquatic Science

The following are some examples of the scientific activities of a Certificated Aquatic Scientist:

- Operate water, wastewater and industrial water treatment plants.
- Perform water pollution control duties. (W)
- Involved in community water supply services. (W)
- Analyse water, wastewater and industrial water samples for physical, chemical and microbiological parameters. (W)
- Chemical dosing of a Plant System. (W)
- Quality control of drinking water. (W)
- Routine data/sample collection in fieldwork outside the laboratory using standardized methods.
- Sample preparation of bulk samples for analysis.
- Monitor the rainfall, inflow into dams and dam contents, the quality of water and using rates in order to facilitate the timeous identification and solving of possible problem areas. (H)
- Routine laboratory analysis of solid, liquid or gas samples in the laboratory using standardized methods.
- The determination of the quantity and quality of precious or base metals and non-metallic elements in ores, concentrates, etc. in marine mineral resources.
- Quality control and product evaluation of marine products.
- Implementing methods to analyze marine-related samples. (M)
- Ensuring that instruments are accurately calibrated by routine checking, maintenance and calibration of on-line and laboratory instrumentation
- Routine conditioning of systems to maintain operational standards.
- Recording details of work performed as well as making sure that subordinates keep up-to-date daily

records on test results.

- Supervising the activities of subordinates.
- Management of the relatively low level risks associated with marine science processes, systems, equipment and infrastructure.

Minimum Training

Three year (360 credits according to HEQF Tertiary Education) with major fields of study such as Applied Chemistry, Applied Mathematics, Biochemistry, Biological Sciences, Botany, Chemistry, Civil Engineering, Computer Science, Earth Science, Entomology, Genetics, Geography, Geology, Hydrology, Industrial Psychology, Mathematical Stats, Mathematics, Microbiology, Oceanography, Operations Research, Physical Geography, Physics, Plant Sciences, Psychology, Soil Science, Statistics, Structural Science, Structure Design, Water Care, Water Care Science, Zoology.

3.2 Professional Natural Scientist – Aquatic Science

The following are some examples of the scientific activities of a Professional Aquatic Scientist:

- Ensure the optimal utilisation of the country's water resources by providing civil, planning and design engineers with the necessary hydrological data and flow analysis to minimise the risks of floods and flood damage and to ensure that the most economic water schemes are built. (H)
- Conduct operational analysis to ensure the best operation procedures for flood control and drought periods. (H)
- Develop underground water as a primary or supplementary source of water supply. (H)
- Research to improve the methods of hydrological evaluations and to develop operating procedures for multi-purpose dams and dam schemes to improve water utilisation. (H)
- Use their expert knowledge of water supply systems, rivers, catchment areas and hydrology to plan and manage water supply at all times. (H)
- Implement water pollution awareness programmes. (H)
- Maintain and update relevant documentation such as water court orders, water rights agreements and water use and re-use agreements. (H)
- Predict future water requirements with special reference to new and planned projects, and to inform the relevant authorities well in advance of the increased demand. (H)
- Investigate new water supply techniques such as the tapping of ground water and desalination processes and to determine the suitability thereof. (H)
- Undertake research and develop methods that will aid the evaluation, development and utilisation of the nation's water resources, concentrating on both the quality and quantity of natural water. (H)
- The gathering, processing, evaluation and release of hydrological data such as river flow, dam content, evaporation and rainfall figures, as well as data on the quality of water. (H)
- Determine the surface water potential on a countrywide, regional, as well as task-orientated basis and make calculations of the extent and intervals of recurrence of floods. (H)
- Locate, evaluate and develop ground water for various needs. (H)

- Ground-water studies by installing ground water level recorders throughout the country to collect long-term information on fluctuations in ground-water levels. (H)
- Liaise with overseas institutions in the exchange of research information and attend international conferences. (H)
- Research to extend the currently available knowledge on the locating of shoals of fish and the methods used in landing these fish; the observation and conservation of fish and crustacean population. (M)
- Investigations into the productivity of the oceans at all stages of the food chain, extending from minute single-celled plants to increasingly larger fish, marine mammals which include scads, whales and dolphins and to fish that are of commercial importance such as pilchards and crayfish. (M)
- Research of the mineral resources of the sea that have not yet been exploited fully at this stage; the exploitation of ordinary salt, magnesium, magnesium salt, iodine, potassium, diamonds, oil, etc. (M)
- Research of ocean transport to provide information that enables ship designers to build improved seafaring vessels, transportation services at sea. (M)
- Research on ocean currents, wind and wave movements, to aid in the selection of the fastest and cheapest sea routes. (M)
- Hydrographical surveys to locate sandbanks and reefs to decrease the risk of stranding and collision. (M)
- Maintenance and improvement of recreational facilities in coastal areas as well as constantly attempting to improve the existing safety equipment, such as mechanical and electrical barricades, used to keep sharks away from the bathing areas. (M)
- Research on the tides, currents and wave movements, contours on the seabed where the laying of pipelines' are planned and the effect of dumping sewage and industrial effluent on fish and other marine organisms. (M)
- Collect strategic data on coastline ocean currents, waves, seabed profiles, magnetic irregularities and acoustics beneath the surface of the ocean to aid in the defence of South Africa's coastline. (M)
- Manage wastewater and industrial water treatment plants. (W)
- Analyse water, wastewater and industrial water samples for physical, chemical and microbiological parameters. (W)
- Manage water resources (W)
- Research and develop new technologies in the water field.
- Studies the composition of waste water as well as how to purify it to acceptable levels for discharge. (W)
- **I**nvolved in research to improve the purifying of water. (W)
- To advise on microbiological, chemical and physical problems experienced by operating and maintenance personnel.
- Manage all aspects of chemical discharge to ensure effective pollution control.
- Manage all process plants associated with water.
- Ensure that the water purifying plant is operated in the best practical manner with minimal biological,

physical and chemical damage to plant and environment. (W)

- Control microbiological, chemical and physical standards during unit run-ups, report on water related aspects and ensure the timely completion of the necessary documents. (W)
- The practical application of aquatic science knowledge, called technology, to the benefit of the community in diverse fields such as agriculture, potent water, etc. (M)
- Create and develop procedures and data management techniques which highlight norms, trends and abnormal patterns. (W)
- Control aquatic operational activities (biological, physical and chemical); ensure a high degree of efficiency, availability and that output meets demand.
- Determine validity and accuracy of aquatic analytical data (biological, physical and chemical) and interpret conditions. (W)
- Where is a particular organism, where do pollutants come from, where does the current flow, etc. (A)
- How much plankton is in an area, how much heat is contained in surface waters, how much oxygen is available in the deep ocean, etc. (A)
- How fast do algae grow, how do whales eat, how are molecules formed/changed/decomposed, how does water move from Florida to Cape Cod? (A)
- How and why is the world changing? (A)
- Maintain records of all data produced to reflect a complete history.
- Managing all aspects of laboratory/field functions as well as monitoring project work performed by technicians and ensuring that policies and procedures are adhered to.
- Manage all aspects of waste discharge to ensure effective pollution control.
- Supervise and direct the activities of subordinate laboratory and plant personnel.
- Preparing and implementing laboratory work schedules in accordance with priorities.
- Organize and direct the routine care and maintenance of Laboratory equipment.
- Exercising financial control and assisting with the compilation of the annual budget.
- Aquatic chemists are interested in organic, inorganic and trace-metal chemistry. (A)
- Physical limnologists and oceanographers are concerned with water movements on all scales, from global circulation patterns to small-scale mixing. (L)
- Marine geologists study the processes that have led to the formation of the ocean basins, and the ways in which geothermal and other geological processes interact with seawater. Geologists working in freshwater systems may be interested in the record of past climates or organisms found in the sediments. (M)
- Optical limnologists and oceanographers are interested in the factors that affect the transmission of light through the water. (L)
- Aquatic biologists may study how organisms adapt to their aquatic environment (e.g. currents or light), and how they interact with each other and with their environment.()A)
- Chemists may study the effect of compounds released by organisms on; for example, trace metal chemistry or the transport and distribution of chemicals due to water mass movement. (A)
- Comparative studies, looking for similarities and differences between habitats as varied as tropical

and Polar Regions, nutrient-rich and nutrient poor regions, or stable and unstable regions. (A)

- Aquatic scientists study processes that cover time scales ranging from less than a second to daily, weekly, monthly, seasonal, annual, decadal, or geological (millions of years) time scales, and spatial scales ranging from millimetres to ocean-wide. (A)
- Aquatic science is interdisciplinary. Physical and biological oceanographers collaborate to understand the effect of physical processes on organisms, while chemists and biologists work together to understand the ways in which the chemical constituents of water bodies interact with plants, animals, and microorganisms such as bacteria. (A)
- Aquatic scientists are conducting studies related to global change and develop and test models in order to predict future conditions and to predict the impact of increased carbon dioxide and other greenhouse gas emissions, increased UV-B radiation resulting from stratospheric ozone depletion, changes in currents or ocean temperature, the effects of increased nutrient loading and pollution due to fertilizers, pesticides, sewage or habitat destruction, the short- and long-term effects of increased acidity due to burning of fossil fuels and the increasing pollution of drinking water, and the impact of various fishing practices on commercially important populations such as fish and lobster. (A)

Minimum Training

Four year (480 credits according to HEQF or more Tertiary Education) with major fields of study such as

Agricultural Meteorology, Analytical Chemistry, Animal Physiology, Animal Science, Applied Chemistry, Applied Mathematics, Biochemistry, Biological Oceanography, Biological Sciences, Biology, Biotechnology, Botany, Chemistry, Civil Engineering, Coastal Geoscience, Environmental Chemistry, Environmental Management, Environmental Science, Estuarine Ichthyology, Fisheries Science, Genetics, Geography, Geohydrology, Geology, Geophysical Fluid Dynamic, Groundwater Hydrology, Hydrogeology, Hydrology, Ichthyology, Marine Botany, Marine Ecology, Mathematical Stats, Mathematics, Microbiology, Ocean Science, Oceanography, Operations Research, Physical Oceanography, Physics, Plant Sciences, Population Dynamics, Structural Science, Structure Design, Underwater Studies, Water Care, Water Care Science, Water Microbiology, Water Resource Management, Water Resource Technology, Water Resources, Water Science, Water Utilization, Zoology