

SASaQS CONFERENCE

AUGRABIES FALLS JUNE 2010

AQUATIC BIODIVERSITY AND CLIMATE CHANGE – AN ARID REGION PERSPECTIVE

SUMMARY OF PRESENTATIONS

Post evolutionary perspective on freshwater fish taxonomy in Southern Africa. With an overview of the changes the past 40 – 45 years, Prof. Paul Skelton provided insight in the taxonomy of freshwater fish. New technologies e.g. molecular genetics provide new insights in the understanding of the distinctive features of species that are not visible through morphometrics.

Interesting presentations stimulated discussions and it was clear that biomonitoring and auditing is important for the River Health programme and water quality monitoring in general. Work has to continue on the classification of water resources and selection of biomonitoring sites. Operationalise Ecological Reserve and monitor the Resource Quality Objectives for compliance. Capacity building therefore needed.

Routine monitoring of different river systems will assist in water quality management. The RHP provides the information on the state of the rivers and recent studies on the Shingwedzi, Limpopo, Vaal and Orange Rivers supply the needed information. Studies on non-perennial rivers are necessary also to understand the impacts of anthropogenic activities on reduced flows in these systems. Water quality will have to be determined before utilization of water after system changes e.g. the Voëlvlei Dam experience.

Eutrophication is still one of the most important phenomena that require ongoing research. Hartbeespoort Dam is a good example. The effects of stressors on aquatic organisms under these conditions are an interesting field of study. Health indexes that includes histology and spermatology are being developed to determine these effects on aquatic health

Genetics including bar-coding provided insights in the classification of species and the value of sample contributions by collaborators was emphasized. A number of presentations on tiger fish proved its popularity as angling fish and the concern about this sensitive species in a polluted environment. Results presented showed levels of angling stress and water quality as measured in the physiology of affected fish. Results on the effects of subsistence and recreational angling on inland fishery as well as the impact of transfer schemes on diversity were illustrated. The effects on fish populations and the benefit to local communities attracted interesting discussions.

The assessment and management of environmental pollutants remains the responsibility of government and researchers. Little work has been done on the effects of nano-particles on water quality and aquatic organisms. What is the impact of these minute particles on aquatic health? The impact of mining activities on water quality and aquatic organisms remains a serious concern. Biomarkers show great potential in future application in aquatic health assessment. Good responses found in tiger fish.

Risk assessments of pollutants are necessary and studies in accumulation, bioconcentration and biomagnification assist in toxicant risk determination.

The effect of acid rain on frogs and mining activity on ephemeral pans are new research additions to aquatic ecotoxicology.

Assessments continue on estuary health and presentations dealt with predicted effects of global warming. Global warming was clearly linked to changes in weather patterns and regular rainfall decreases will affect the volume of inflows into estuaries. This will have ecological effects. Changes in storm effects, water quality, water quantity, salinity and conductivity may occur.

What did we learn? Aspects to remember.

- Baseline studies are still important. New technologies do not have to replace traditional /tried techniques. Reference site selection relies on quality data. Morphometrics and DNA – bar coding is not in conflict but supplementary in species identification.
- Accumulation studies – Biomarkers of effects useful in assessment of toxic effects.
- Nanotechnology develops at an alarming rate and research on the effects of the materials used (ENMs) on the aquatic environment has to be studied as a matter of urgency.
- Defining resource units for biomonitoring. Water resource directed measures has to be completed. A consequence of it will be the issuing of licences based on scientific information.
- Bio-physical information/data collection should continue to develop valuable assessment indexes. Adaptation of existing to use in other regions becomes a reality– Namibia
- Assess the effects of water quality changes on different organisms – Risk assessment needs more attention.
- Increase the pool of scientific information for application in decision support.
- Fundamental research remains important to determine the adaptation and survival of organisms in specific environments. Best quality water can only be supplied with relevant data available to manage the resources. Do not stop research on specific problematic aspects. Eutrophication in the Hartbeespoort dam is a good example. Managers/researchers from government departments and researchers from the different institutions can only protect and manage the aquatic environment effectively when they engage in collaborative projects, and share expertise and experience.