

Research Extracts on Climate Change: Adaptation and Resilience

Session 14: Ecosystems and our ecological infrastructure

Key Question:

What needs to be done to scale up work on restoring
and building South Africa's ecological infrastructure
to enhance climate resilience?

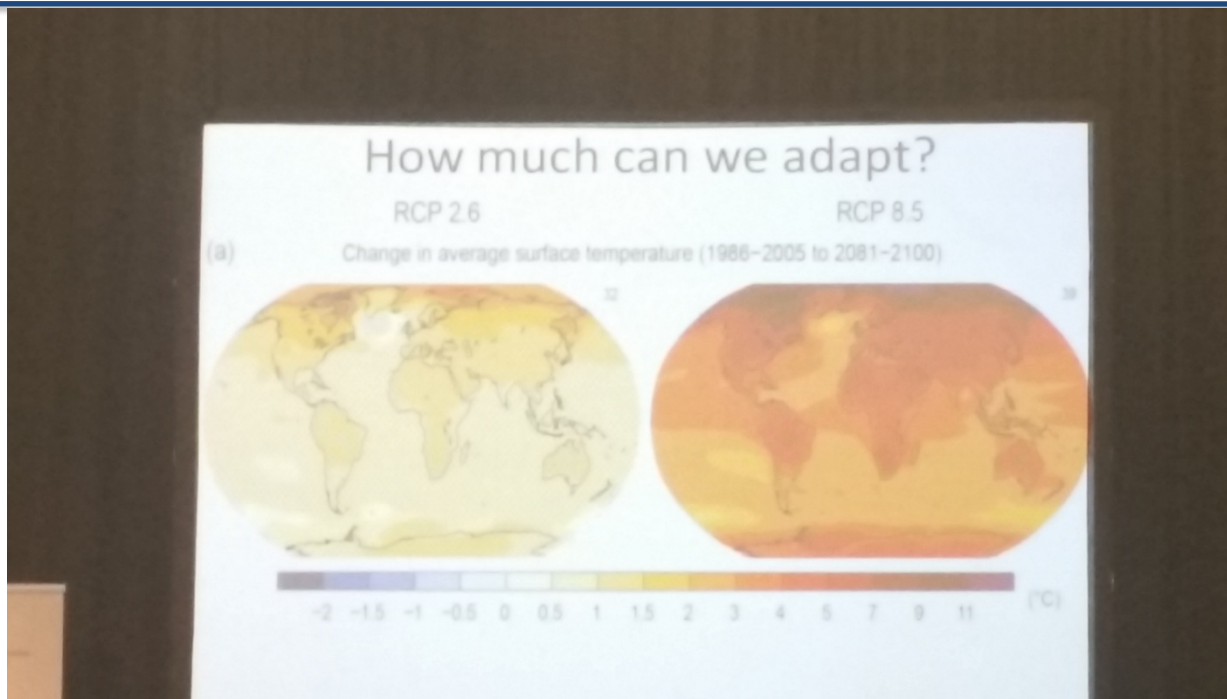
By

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12 Nov 2014



Data: Estimated funded research on CC



- More than 95 reports dealt with climate change, on various aspects, including municipality and water boards needs
- More than 30 projects initiated and concentrated under a Climate Change Lighthouse (flagship) programme

Freely Available From: www.wrc.org.za



Data: Basis for informed decision making- *investigating water temperature in rivers and biotic response –K5/1799*



- 92-river sites were monitored for 2-years using *in-situ* Hobo UTB1-001 TidBit V2 loggers, and 47 air temperature stations were monitored
- This provides real time data, critical for planning,
- It provides temperature tolerance limits, especially for biodiversity protection

Data: Basis for informed decision making- Fish Biotelemetry for real time data-K5/2111

HOW IT WORKS:

The **FISHTRAC** programme makes use of radio telemetry tracking techniques developed by Wireless Wildlife to track the location, movement, activity and habitat use of fish tagged with small transceivers (tags). These "smart" tags can receive and transmit information obtained by components that are built into the tags. This allows the tag to transmit digital coded messages which are used to locate the tags or fish, monitor the movement of the fish and the water temperature and depth use profiles of the tagged fish. The tagged fish can be tracked manually or remotely using Wireless Wildlife technology from 1 to 3 years! Due to the size of the tags fish larger than 500g are usually used in the **FISHTRAC** programme. Water quality and depth monitoring tags or probes that use of the same technology are also usually used in **FISHTRAC** studies. This allows the method to be used to evaluate the effects of changing water quality and depth in real time!

MANUAL MONITORING

Water quality & depth probe

Guaging weir

Avoided areas

Preferred areas

Habitat Cover

Depth

Substrate

Water quality & flow data

WHERE IT BEGAN:

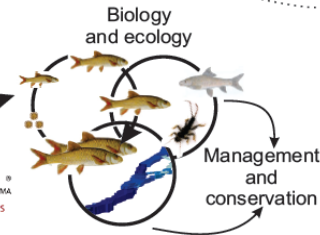
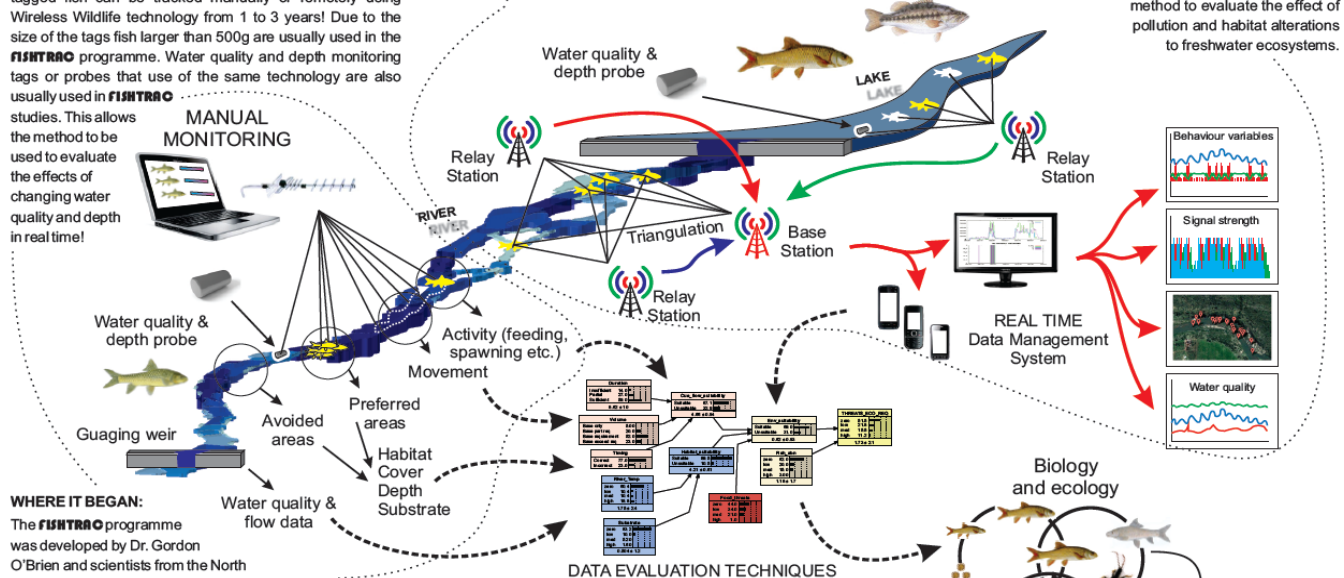
The **FISHTRAC** programme was developed by Dr. Gordon O'Brien and scientists from the North West University (Water Research Group) in collaboration with Wireless Wildlife. The programme development included a dedicated research study that was funded by the Water Research Commission of South Africa. For more information and a free copy of the final report of this study visit www.wrc.org.za.

Tags can be externally attached to the fish or inserted internally into the abdominal cavity of fish. The fish are anaesthetised during the attachment procedure and released after recovering. Remote monitoring systems can track the fish in real time using base and relay receiver stations which are deployed into the study area. These stations are solar powered and transmit data automatically to a data management system which can be accessed remotely via the internet using a smart phone, tablet or computer.

The remote monitoring data is available immediately following transmission (usually every 30 min) from tags that are in range of a station. If the fish is too deep (>2m) or out of range of a station the data is stored on the tag and downloaded when the fish moves into coverage of a station or if tracked manually.

Fish can also be manually tracked using a manual receiver from land, a boat or from the air. The **FISHTRAC** scientist then analyse the data and generate important life cycle biology and ecology information about the tagged species and can use the method to evaluate the effect of pollution and habitat alterations to freshwater ecosystems.

REMOTE MONITORING

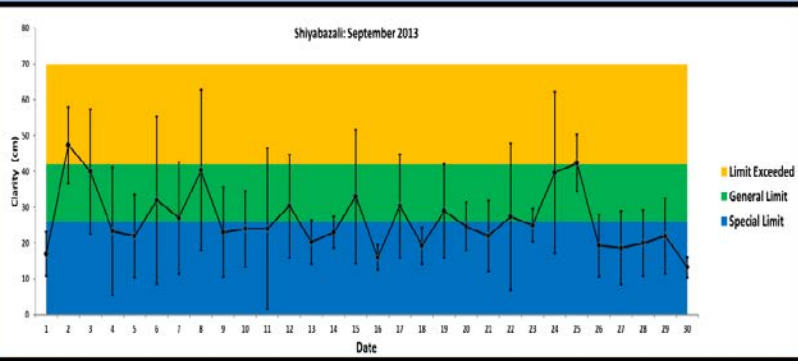


More than fifteen yellow fish and tiger fish were tagged with transceivers released and monitored over a period of up to three years. Data on water pressure, temperature, behaviour of fish, such as depth preference, movements diurnally, were monitored and received via SMS and desk computers or both by managers and researchers

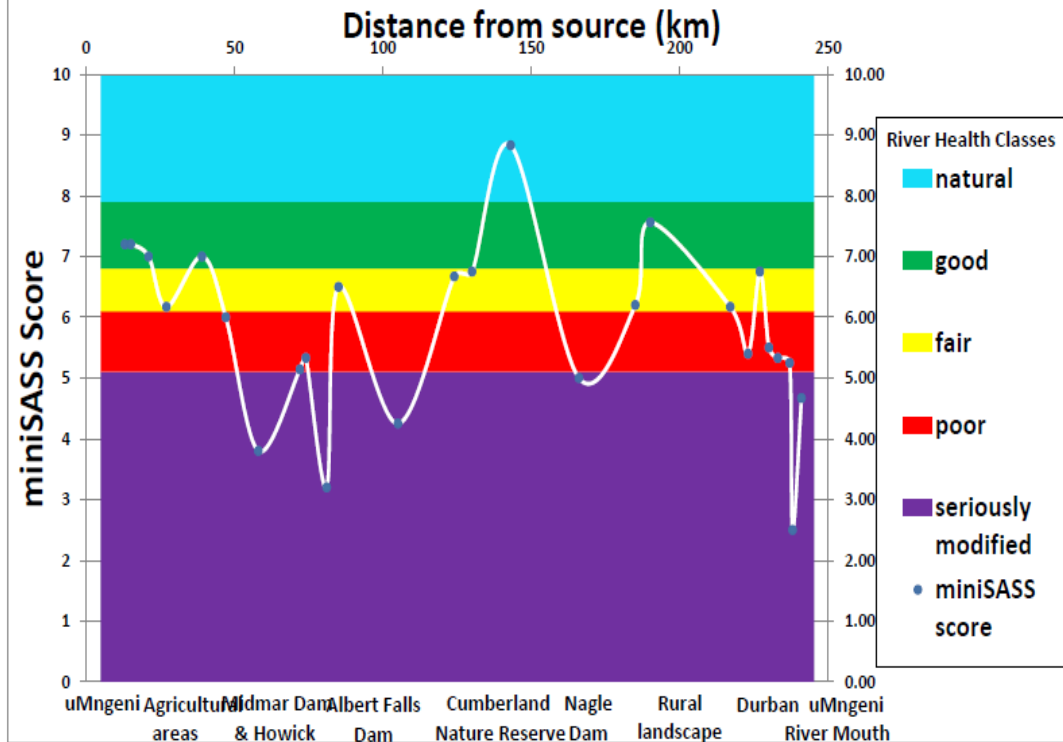
Citizens Science: Public's role in managing water resources-K5/2350

Citizen Science Case Study: Shiyabazali

Consistent
Monitoring
by
Zongile
Ngubane
=
Compliance



miniSASS river health data gathered during the May 2012 uMngeni River walk



Aim: Citizen Science to evaluate the ecological integrity of uMngeni and other rivers in SA/SADC, Transboundary

NB: Development of Mobile Phone Application (APP) - **Co-funded by DST/WRC – real time data**

Experimental investigation of indigenous wetland plants purification potential, K5/2367

APPLICATION OF HIGH THROUGHPUT GREEN LIVER SYSTEMS FOR SUSTAINABLE WATER PURIFICATION USING ENDEMIC AQUATIC MACROPHYTES,



Socio-Ecological Systems: Community Resilience and Livelihood within the green economy

- 3,7million off-grid rural communities without electricity, hence deforestation
- 95.2% of 51.7million people have water supply
- 12million are impoverished, in 27-DM
- Hard hit are woman, elderly, children and **people living with disabilities**
- Supply of free basic needs is uneconomical in rural dispersed households
- Threats of alien and invasive species spread
- Broadly not ready for **climate change**



Green Village -15 year prog underway

Water security

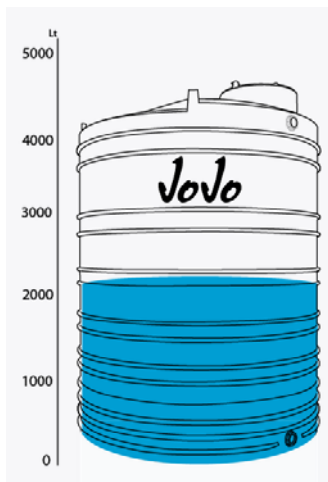


Food security



Green Innovative and appropriate solutions scaled up

- Rain water harvesting / Pit-latrines / Biodigester / Wood pellet stove / Food and fodder gardens-15yr GV
- Demonstrate benefits of ecological infrastructure-K5/2354
- Building resilient landscapes-K5/2267



A COMPLETE SOLUTION?





Establishment of the South African Society For Ecological Restoration-Africa Chapter-WRC led initiative



Land Restoration Society of Southern Africa

International Society for Ecological Restoration



Landscape restoration is central to ecological infrastructure efforts



Community driven rehabilitation
research/programme
Payment for Ecosystem Services
(PES)

“I thank You”

