

TROPICAL WETLANDS WATER MONITORING

In tropical monsoonal environments such as the **Alligator Rivers Region**, water is a key pathway for the transport of solutes (ie. dissolved salts and metals) and sediment. Mining in the region introduces the potential for increasing the levels of sediment (through erosion) and mining related solutes such as uranium (U), radium (Ra) manganese (Mn), magnesium (Mg) or sulfate (SO_4) that can leach from mine waste rock. The **Supervising Scientist Division (SSD)** use a number of different methods to assess the water quality (solute and sediment levels) in creeks and billabongs surrounding the Ranger mine and Jabiluka project area to ensure that there is no detrimental impact on the environment.

Water monitoring in Kakadu

SSD manages a network of water quality and quantity monitoring stations located in the Magela, Gulungul and Ngarradj catchments. These monitoring stations measure electrical conductivity (EC), turbidity, pH, rainfall and water level at 15 minute intervals, enabling SSD to quickly detect changes in water

quality and to determine whether or not these changes are caused by mining activities. A number of the stations are equipped with automatic water samplers that collect samples when EC and turbidity levels increase. These samples are then analysed to determine what caused the increase in EC and turbidity and where the additional solutes and sediments have come from.



A continuous monitoring station measuring electrical conductivity, turbidity, pH and water level on the bank of Gulungul Creek. The station is also equipped with an automatic water sampler.



Healthy tucker

Organisms that live in water are excellent indicators of water quality, and healthy organisms provide the ultimate assurance that the quality of the water has not diminished to a point that it harms the environment. SSD collect mussels from billabongs and measures the amount of uranium and radium in their flesh in order to make sure that the mussels are safe for people to eat. SSD also monitors the health of macroinvertebrates (water bugs), fishes and snails living in the creeks and billabongs surrounding the Ranger mine site.

Snail testing

Snail toxicity tests are conducted by placing snails in Magela and Gulungul Creeks for one week periods, and then counting the number of eggs laid during that period. A change (decrease or increase) in the number of eggs could possibly indicate that the mine is having a negative impact on the organisms in the creek water. Snail toxicity testing has been carried out since the 1991/92 wet season.



Filtering a water sample in the field immediately after collection helps to preserve the sample for chemical analysis.

Macroinvertebrate and fish monitoring

If there are changes in population size, or the types of macroinvertebrates or fish in creek or billabong communities, then this might indicate that mining has had an impact. Mining effects need to be separated out from natural environmental effects that the organisms might also be sensitive to, such as the amount of rain occurring in a wet season, fires, feral animals and weeds.

After each wet season SSD looks at all of this information and is able to determine whether or not the mine has had any detrimental impact. Thirty years of comprehensive monitoring have not detected any measurable detrimental downstream impact from the Ranger mine.



A continuous monitoring station measuring EC, turbidity and pH on a pontoon in Magela Creek. The pontoon also has an automatic water sampler and tubs (floating in water at rear) containing snails for in-situ snail toxicity testing.



The logger system controlling the measurement sensors and recording the data at a continuous monitoring station. The information is transmitted via mobile phone link to Darwin