# Research finds mangroves being fed to death

May 19 2009

(PhysOrg.com) -- New UQ Science research has found the increase in nutrients coming out of our river systems is putting pressure on our mangrove forests and making them far more susceptible to environmental variability and climate change.

Originally thought to benefit mangrove growth, Associate Professor Catherine Lovelock's research shows the man-made rise in available nutrients from runoff or urban and industrial processes, actually decreases their resilience.

Dr Lovelock, from the Centre for Marine Studies, said this increase in nutrients could be responsible for the death of formerly healthy mangroves.

“While this increase in available nutrients initially favours mangrove growth, you get an increase in the growth of shoots relative to roots, and that's the wrong kind of growth,” Dr Lovelock said.

“This higher ratio of shoots to roots means the mangroves are much more susceptible to high salinity and drought.”

She said under such conditions, the plant needs to have as many roots as possible so that it can provide water for its shoots, however nutrient enrichment causes the exact opposite.

“Our results show that mangroves exposed to high nutrient availability suffer greater mortality during drought, and that nutrient-induced mortality is greater in sites subject to periods of low rainfall, low humidity and high salinity,” she said.

“It's particularly important in terms of climate change because droughts may become more extreme, or at least more frequent, and we could see mangrove populations collapse.

“This paints nutrient enrichment as one of the greatest threats to near shore coastal ecosystems, bringing increased mangrove mortality on top of algal blooms, coral reef degradation and loss of biodiversity and ecosystem resilience.”

Dr Lovelock and her team added either nitrogen or phosphorous based fertilisers to mangrove trees at 12 study sites around the world including Australia, New Zealand, Florida and the Caribbean.

The team then measured the growth and mortality rates for the mangroves at these sites over a period of more than three years.

The study showed a marked difference in tree mortality between sea fringing mangroves - that are flushed out by the tide - and further inland 'scrub' mangroves.

Dr Lovelock said while the increase in nutrients had little effect on the sea fringing mangroves, there was a massive increase in mortality for the 'scrub' mangrove forests.

"Scrub forests are less frequently inundated by tides, so in times of low rainfall the surrounding soil can become extremely saline and the plant cannot survive," Dr Lovelock said.

"So nutrient enrichment could have a particularly disastrous impact on ecosystem function in drier areas where scrub forests account for the majority of mangrove forest cover."

The new research, titled Nutrient enrichment increases mortality of mangroves, was published in the international journal *PLoS ONE*.

Provided by University of Queensland (news : web)