Australia's coastal wetlands 'need room to move'

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(Phys.org)—As sea levels climb, Australia's coastal wetlands will be increasingly trapped between urban development on land and the rising ocean, imperilling the survival of their unique plants, birds and fish, leading ecologists warned today.

Researchers at the ARC Centre of Excellence for Environmental Decisions (CEED) say Australia's planners and coastal communities need to think up to 100 years ahead to ensure the survival of mangroves, salt marshes, sedge lands and melaleuca swamps and their wildlife.

"Sea levels are currently predicted to rise by up to 1 metre during this century – and there are indications they may be rising even faster than this," says Dr Jonathan Rhodes of CEED and The University of Queensland.

"In past periods of rising sea levels, coastal wetlands have coped by migrating inland as the salt waters rose – but today, especially along the east coast of Australia, they are likely to run into urban development on and behind the coast.

"Unless we can make room for them to move, there is a risk they may go locally extinct – along with the bird, fish and other wildlife they support, and the services they provide to humans."

Dr Rhodes and his colleagues Ms Rebecca Runting and Dr Morena Mills have been using a computer model called SLAMM (Sea Level Affecting

Marshes Model) to identify areas where coastal wetlands would naturally retreat to as the ocean comes up – and where existing or future urban development may clash with this.

"It isn't just about looking at the land contours – you also have to factor in changes in erosion and sediment deposition, in salinity levels and the effects of man-made structures, if you want to work out where mangroves and salt marshes could move to in the future," Ms Runting says.

"These models give you a much better idea of what is going to happen than the so-called 'bath-tub' models that only account for water level. Importantly too, if you're a coastal planner or conservation manager, it makes planning decisions much more cost-effective."

Dr Rhodes says that while many Australian coastal cities and towns now take steps to conserve their existing mangroves and salt marshes, these may prove in vain if they don't look and plan a century or more ahead to account for rising sea levels, which will bring dramatic change to coastal landscapes.

"It's true you can build a one kilometre long sea wall at a cost of about $7-8 million per metre in height and put urban development in behind it – but the reality is that we're not going to be able to defend the entire Australian coastline with such measures, as sea levels will keep on rising as long as the climate is warming and the polar ice melting," Dr Rhodes said.

This process may last for centuries and eventually even raise sea levels by tens of metres, scientists fear.

"It means that low-lying communities and their native ecosystems are going to have to move – and we should begin planning right now for

where they might move to."

The team's research indicates that under sea level rise, mangroves may be initial winners and salt marshes losers in the struggle for new places to survive – but if the rise accelerates, even mangroves may fail to keep up, and require human assistance to translocate and protect them.

The same applies to threatened native animals such as the false water rat, which suffers from cat predation as its mangrove habitat becomes increasingly impacted by urbanisation.

Dr Mills says that many cities and towns are proud of the way they are managing to incorporate native Australian landscapes, vegetation and wildlife into their plans for the future. Now, for sea-side communities, these plans need to take account of the area of land needed to accommodate coastal wetlands displaced by the rising tides.

Dr Rhodes added "Potentially, lowlying suburbs that become increasingly flood-prone under climate change may need to be abandoned as the cost of defending them becomes too high – but if these were highly urbanised, it may be very difficult to return some of these areas to natural wetlands".

"Sea level rise means that anyone and anything that lives along the coast has to be ready and willing to move – and our research is helping provide the answers about where they might move to, in plenty of time to do something about it."

Provided by University of Queensland