

# Discovery of invisible nutrient discharge on Great Barrier Reef raises concerns

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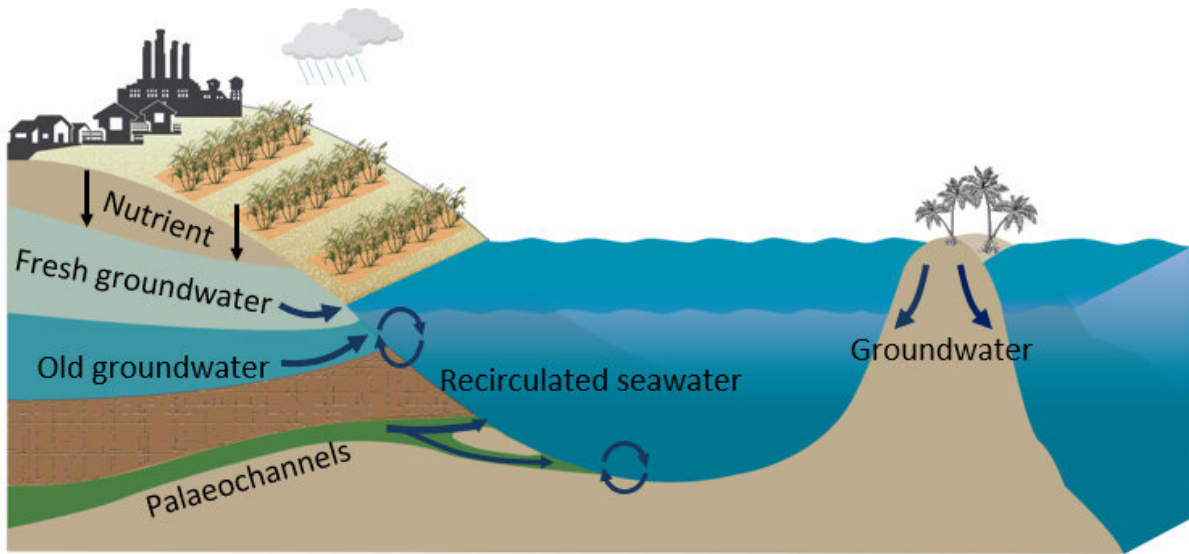


Diagram showing groundwater sources on Great Barrier Reef. Credit: Douglas Tait

Scientists using natural tracers off Queensland's coast have discovered the source of previously unquantified nitrogen and phosphorous that are having a profound environmental impact on the Great Barrier Reef.

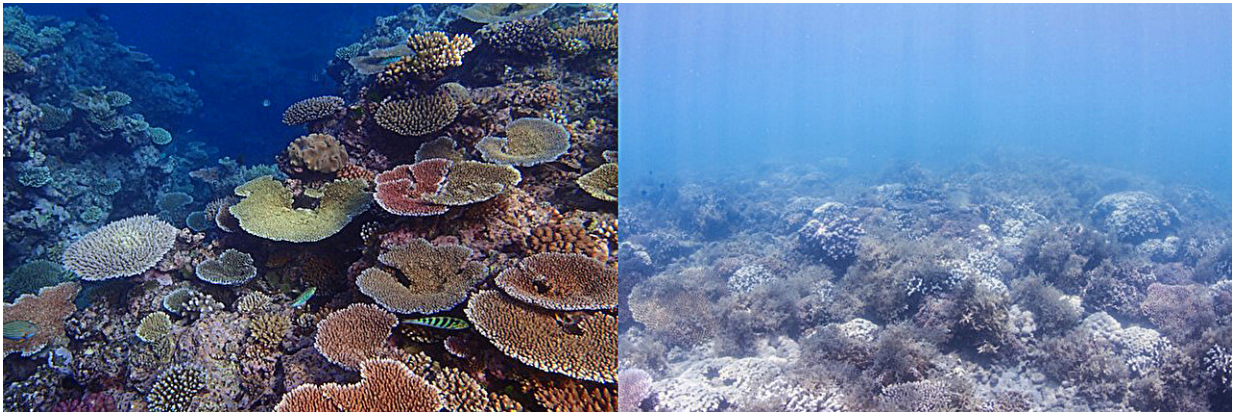
The findings, published today in *Environmental Science & Technology*, indicate current efforts to preserve and restore the health of the Reef may require a new perspective.

Southern Cross University's Dr. Douglas Tait leads the study, "Submarine groundwater discharge exceeds river inputs as a source of nutrients to the Great Barrier Reef."

Submarine groundwater discharge is any water released to the ocean below the waterline from various sources, including underground aquifers and the seafloor.

The research team, which also includes CSIRO, AIMS and Gothenburg University (Sweden), collected data from offshore transects, rivers and coastal bores in an area from south of Rockhampton to north of Cairns. The use of radium isotopes allowed the scientists to track how much [nutrient](#) is transported from the land and shelf sediments via invisible groundwater flows.

Southern Cross Professor Damien Maher said the team's work showed that groundwater discharge was 10–15 times greater than river inputs, something previously unaccounted for.



Composite showing pristine coral alongside eutrophied coral on Great Barrier Reef. Credit: Ashly McMahon

"Groundwater discharge accounted for approximately one-third of new nitrogen and two-thirds of phosphorous inputs, indicating that nearly twice the amount of nitrogen enters the Reef from groundwater compared to river waters," Professor Maher said.

Professor Maher added that the lion's share of efforts to mitigate the impact of nutrients on the Reef were focused on outflow from river systems.

Lead author Dr. Douglas Tait said, "Nutrients are essential to support the incredible biodiversity of the Great Barrier Reef. However, an excess of nutrients can lead to detrimental issues such as [harmful algal blooms](#), crown-of-thorns starfish outbreaks, and fish diseases, which have been on the rise in the Reef over the past few decades.

"Our study underscores the need for a strategic shift in management approaches aimed at safeguarding the Great Barrier Reef from the effects of excess nutrients."



Eutrophied coral on Great Barrier Reef. Credit: Ashly McMahon

Dr. Tait said unlike river outflow, nutrients in [groundwater](#) could be stored for decades underground before being discharged into [coastal waters](#), meaning research and strategies to protect the Reef needed to be long-term.

"This study sheds new light on the complex nutrient dynamics within the Great Barrier Reef," Dr. Tait said. "Our understanding and ability to manage the sources of nutrients is pivotal in preserving the Reef for generations to come."

**More information:** Submarine Groundwater Discharge Exceeds River

Inputs as a Source 2 of Nutrients to the Great Barrier Reef,  
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Provided by Southern Cross University

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