



$\delta^{15}\text{N}$ levels in annually-banded skeletons of gorgonians from Florida prove that sewage is taken up by reef organisms

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The last remaining healthy (somewhat healthy) coral reefs in the continental USA are located off the east coast of Florida. The State of Florida maintains several ocean outfalls that dump raw or partially-treated sewage onto these reefs. One of these, the DelRay Outfall, discharges more than 50 million litres per day of partially-treated sewage. The permit this outfall has to continue to operate in this fashion has been rejected 5 times, because the outfall is deemed to contravene the Federal Clean Water Act. The amount of money involved is immense-consequently, scientists working on these reefs are faced with the burden of “proving” that sewage harms coral reefs.

Ratios of stable isotopes of Nitrogen ($\delta^{15}\text{N}$) have been used for decades as tracers of sewage contamination, proving to be especially useful in coral reef environments. We sampled gorgonians living off the east coast of Florida, separated the skeletons into yearly bands, and analysed these bands for their $\delta^{15}\text{N}$ signals. Two of the gorgonians, sampled off Hollywood Beach, were termed Redwood Gorgonians-their skeletons span more than 60 years of record. Without exception, the gorgonians showed progressive increases over time in $\delta^{15}\text{N}$. In some cases, the increase amounted to more than 6 per mil (two trophic levels) over samples of the same species from less-contaminated areas. This would seem to constitute proof strong enough to persuade a court of law that sewage from the outfalls was being taken up by reef organisms, and underscores the potential importance of gorgonians as environmental recorders.