Current methods cannot predict damage to coral reefs

April 6 2016

The potentially devastating effects of ocean acidification on coral reefs are well reported. However, the methods used to evaluate the potential harm are often focused on individual species, viewed in isolation. According to an international research team led by Peter J. Edmunds of California State University, Northridge, this simplistic approach neglects broad-scale inter-species and inter-population dynamics that may have unforeseen consequences for ecosystems.

"Most studies address the effects of ocean acidification on single species of corals and calcified algae in tanks," write the team members in an article for the journal *BioScience*. This approach, they argue, will be inadequate for evaluating the emergent properties of acidification-afflicted reef ecosystems. Answering the wider question of whether reefs will grow or dissolve "requires a consideration of scaling effects."

Differences across scales—from organisms to populations, to communities and ecosystems—have "particularly strong implications for coral reefs," say the authors. At the narrow scale, species-specific responses to acidification are highly variable, a result of corals' varied protective tissue layers, differing skeletal solubilities, and numerous other factors. Such differences have far-reaching implications at broader scales. For instance, differently responding symbiotic genotypes (zooxanthellae) could have major effects on a reef's community structure—and, ultimately, on the health of the reef as a whole.

To address these neglected dynamics, the authors propose an approach

that combines empirical evidence with traditional biological scaling models and computer simulations to achieve a broader understanding of acidification effects. Only by synthesizing theory and existing empirical practices, they say, will it be possible to ascertain "how the population-level impacts of ocean acidification sum to community- and ecosystem-level impacts."

Despite the promise of their work, the authors caution that "we should not expect a 'grand unifying theory' of the effects of ocean acidification on coral reefs to emerge." Rather, they report that the best hope for unraveling the complex web of ocean acidification effects lies in the deployment of a diverse "suite of complementary modeling approaches."

Peter J. Edmunds will appear on the podcast *BioScience* Talks on 11 May 2016.

Provided by American Institute of Biological Sciences

Citation: Current methods cannot predict damage to coral reefs (2016, April 6) retrieved 18 April 2024 from https://phys.org/news/2016-04-current-methods-coral-reefs.html