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Ensuring a Healthy Funding Environment in Ocean Sciences

My graduate students' notes from their fluid dynamics class are eerily familiar. I recognize their anxiety about oral qualifying exams, and also their glee about a snow day. The camaraderie they share along their trek through graduate school brings back great memories, as does the delight of a research breakthrough after weeks, maybe even months, of frustration. What is different is the concern about research funding that seems to permeate the graduate school experience today. Apparently, the graduate student trek is now a bit steeper.

My graduate school journey began at the University of Washington School of Oceanography in 1984. There was certainly talk about funding then, just not the lack of it. The availability of research funding was simply an element of the graduate school experience, along with classes, cruises, exams, and that thing called a dissertation. Thirty years is a fair stretch of time, and over those years, much about ocean research has changed. Today's graduate students can access vast amounts of ocean data collected by sophisticated instruments developed over those years. Ocean circulation models have made dizzyingly impressive strides, and their output has helped to break down the fairly stout barrier between observational and modeling studies that existed in 1984. International partnerships are easier to come by, enriching students' experiences. All in all, these advances have widened the window of research opportunities for graduate students in the twenty-first century. It is hard to imagine another time when oceanographers addressed such relevant and compelling research questions. And yet, graduate students, post-docs, and certainly early career oceanographers see the window of opportunity narrowing, not widening. How so? It is because all those ideas, data, and computational resources need funding to convert their potential to advances in ocean science.

Veteran oceanographers may differ on the merits of the individual recommendations contained within the newly released National Research Council report, *Sea Change: 2015–2025 Decadal Survey of Ocean Sciences* (<http://www.nap.edu/catalog/21655/sea-change-2015-2025-decadal-survey-of-ocean-sciences>), but there is one sentiment that likely unites all of us—the desire to ensure that young scientists with creative ideas and research promise look at ocean research as a place of opportunity. As a member of the committee that wrote the NRC document, I can report that while each committee member brought his or her own envelope of concerns, there was one

common concern: the impact of growing infrastructure costs on the ability of the National Science Foundation's Division of Ocean Sciences to maintain a healthy funding environment for all oceanographers, but in particular for those entering the field. The meaning of a “healthy funding environment” was certainly debated. What was not debated, though, was that the current funding environment is not healthy, and that we certainly aren't headed in a direction that will improve it. Hence, the committee's recommendation to substantially cut infrastructure costs—we did not see another way to move in the direction we desired.

The bulk of the committee's discussions focused on finances. Readers of the report will likely focus on the recommended cuts to infrastructure and the potential for research program funding. But ultimately, it is our intellectual resources that drive us forward, and they must be continually renewed in order for our field to remain vibrant. In order to attract bright investigators, they must see a future, a wide window of opportunity in ocean sciences.

At the end of the report, there is a short paragraph titled Looking Ahead. It reads:

Attaining the visionary goals presented at the beginning of this report will require a diverse and talented group of researchers; rapid adoption of new technologies to measure the ocean in novel and cost-effective ways; elimination of the barriers to interdisciplinary and interagency research; enhancement of cost-shared partnerships across funding agencies, national borders, and sectors; and innovative educational programs that are aligned with this vision. The committee strongly believes that the ocean sciences community (including researchers and program management) [is] prepared to strategically meet these challenges and emerge with an even more innovative and compelling future for the ocean sciences.

That compelling future requires funding so that our science can attract the diverse and talented group of researchers who will chart the future course for our field.



M. Susan Lozier, TOS President