Concerns About STEM Education Restructure

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Several education experts told *Eos* that they generally favored some improvements in U.S. federal science, technology, engineering, and mathematics (STEM) education, but they also expressed concern about the Obama administration's proposed STEM reorganization plan as it affects the National Oceanic and Atmospheric Administration (NOAA). John Farrington, chair of the U.S. National Research Council (NRC) panel that issued a review of the NOAA education program in 2010, told *Eos* that he is confident that a considerable amount of thought went into this proposal to consolidate the K–12 STEM efforts, that consolidation could make for greater efficiencies, and that a positive aspect of having the Department of Education (ED) as a lead is that STEM education should not be considered as separate from the education of the student as a whole.

"How much of the thinking [about reorganization] was driven by the budget crisis and how much by what is best for advancing K–12 STEM education remains to be seen," added Farrington, scientist emeritus at the Woods Hole Oceanographic Institution. "The devil is in the details. If the efforts and experiences in programs such as NOAA's Education efforts will be transferred to [ED] and NSF [the National Science Foundation], then the consolidation may make for greater efficiencies. Not knowing the details, we can only speculate."

Making the analogy that people should not rip out saplings every few years to inspect their roots' growth progress and then start all over, he said, "Unfortunately, with K–12 STEM education there has been too much 'ripping out the sapling' and starting all over again with revised or new programs. If this is what will happen with this 'consolidation,' then it is most likely an idea driven by budget concerns, dressed up in easily stated concepts such as 'consolidation,' and will be a step backwards. I emphasize again that the devil is in the details."

NRC panel member Frank Muller-Karger, director of the Institute for Marine Remote Sensing at the University of South Florida, St. Petersburg, told *Eos* that there needs to be coordination of federal education programs managed by different agencies to ensure that our nation regains its leadership position in STEM areas. "I welcome some consolidation and reorganization of programs that focus on generic STEM education, but I strongly encourage the administration to continue to use each of its agencies, and the academic research and private sector that work with those specific agencies in carrying out their mission, to help define better and more effective education programs that are informed by the disciplines critical to those specific missions. I don't think that it is a good idea to terminate education programs conducted by the separate agencies of the executive branch of government with the intent of consolidating them in only three agencies, such as the Department of Education, the National Science Foundation, and the Smithsonian Institution."

Muller-Karger added, "In terms of NOAA, the America COMPETES Act (Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science) of 2007 and its reauthorization in 2010 call for NOAA to support and coordinate formal and informal educational activities to enhance public awareness and understanding of issues related to its mission. This includes a requirement that NOAA develop a 20-year education plan. It requires enhancing the NOAA research and development portfolio to increase United States' competitiveness in oceanic and atmospheric science and technology. It is not clear to me how the proposed consolidation of education programs outlined in the FY 2014 administration's budget complies with the law as cast in the COMPETES Act."

Jean May-Brett, past president of the Louisiana Science Teachers Association, told *Eos* that she is "extremely concerned and very puzzled by" the White House budget cuts to NOAA education and other STEM programs. "It is important [for] NOAA, as a federal research agency, to continue to integrate research, exploration, and education programs and maintain their support and involvement in formal and informal learning at the K–12 level. Through efforts like the Ocean Exploration Program, Sea Grant, Teacher at Sea, NOS [National Ocean Service] education, etc., teachers and students across the country have had the opportunity to have NOAA connect their educators and scientists with the K–12 classroom," noted May-Brett, who is a member of the NOAA science advisory board. Her comments to *Eos* are her own and not an expression of an official statement made by the board.

"These educational opportunities translate into inspiration in the classroom along with authentic real world learning key to critical thinking and problem solving, essential components of 21st century STEM education. This will not continue without the funding necessary to provide the agency an interface with the education community: schools, aquariums, community programs, and professional associations partnerships," she added. "[The Department of Education] does not have staff prepared to take on the task of leading the development of a STEM-prepared workforce as insinuated by the [White House] consolidation of K–12 STEM funds. Further the Smithsonian does not have the educational infrastructure and partnerships to work with informal science education. Developing the necessary connections for success will take the Smithsonian years while NOAA has an outstanding network of partners in place," May-Brett said.

She added, "I don't see how those who pulled out the red marker and slashed away NOAA education funds could have been cognizant of the America COMPETES Act, aware of how the NOAA office of education and line offices leverage partnerships to meet mission goals, or paying attention to the data on NOAA education programs."

—Randy Showstack, Staff Writer