

New York Marine Sciences Consortium
Report Card on Excess Nutrients in the Marine Environment:
How Are We Doing?
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Title of Presentation: **Nitrogen and Phosphorus Pathways and Sustainability**

Author: David A. Vaccari, Ph.D., P.E., BCEE
Title: Professor
Affiliation: Dept. of Civil, Environmental and Ocean Engineering, Stevens Institute of Technology
Address: Hoboken, NJ 07030
Phone: 201-216-5570

ABSTRACT

Where does all that nitrogen and phosphorus ultimately come from? Most of it is from our food, and therefore from agricultural fertilizer. Their production is also linked to nonrenewable resources such as sulfur and energy. Global and national trends in nitrogen and phosphorus production and consumption are examined in comparison with identified resources in order to understand the sustainability of those resources. The tool of substance flow analysis (SFA) is used understand the relationships among the resources and their uses, and to identify places in the biogeochemical cycles that provide opportunities for conservation and recycling.

BIOGRAPHY

David A. Vaccari, Ph.D., P.E., is a Board-Certified Environmental Engineer. He is a professor of environmental engineering and Director of the Department of Civil, Environmental and Ocean Engineering at Stevens Institute of Technology in Hoboken, NJ. He has a bachelor, master and Ph.D. degrees in environmental science, and a master degree in chemical engineering, all from Rutgers University.

Dr. Vaccari is a specialist in the modeling and control of biological wastewater treatment and in modeling the fate and transport of pollution in rivers and streams. This work has led him to develop a method for nonlinear analysis called Multivariate Polynomial Regression (MPR). He has applied MPR in work for NASA and DARPA, and is currently working with student teams in computer science to commercialize the software used to implement MPR. His work in pollution control and in long-term life support systems for NASA led him to an interest in phosphorus resources, for which he is engaged in modeling material flow analyses and in forecasting resource supply and demand.