



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2002NH1B

Title: Linking Lakes with the Landscape: The Fate of Terrestrial Organic Matter in Planktonic Food Webs

Project Type: Research

Focus Categories: Ecology, Models, Surface Water

Keywords: lakes, dissolved organic matter, food webs, zooplankton, fish, carbon, nitrogen, phosphorus, stoichiometry

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Congressional District: N/A

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Abstract: Ecologists often view lake ecosystems as being fueled primarily by photosynthesis. However, accumulating evidence suggests that inputs of terrestrially-derived dissolved organic matter (DOM) may be important energetic subsidies for lake food webs. In this proposal we outline a research plan that will assess the importance of terrestrial DOM for New Hampshire lakes. To accomplish this goal, we focus on three factors that we believe influence terrestrial carbon flow DOM quantity and quality, food web structure, and lake trophic state. Terrestrial DOM can only enter lake food webs via bacterial metabolism. Therefore, we will determine the extent to which bacterial metabolism is regulated by terrestrial DOM quantity and quality (C:N and C:P ratios). We will then incorporate this information into a food web simulation model, which will in turn, generate predictions about terrestrial carbon flow in lakes with contrasting food webs and trophic states. It is essential to consider differences in food web structure because not all members of the plankton community are capable of consuming bacteria. Finally, we will test predictions from the simulation model by surveying lakes along a terrestrial DOM gradient to assess the extent to which terrestrial material is incorporated into zooplankton and fish. Results from

this study will clarify the energetic importance of terrestrial DOM subsidies to NH lakes and provide important information for decision makers regarding land use activities that modify carbon export to lakes.

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