Title: Toward N criteria in Coastal Waters: normalizing N loading for estuarine volume and local residence time

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One approach to developing criteria for nitrogen (N) in coastal waters has been to determine quantitative relationships between N loading and ecological effects (e.g., hypoxia) in coastal estuaries. Although this approach has met with some success, data obtained from field sites sampled randomly within and among estuaries have often been less than optimal. One problem has been that nitrogen loading is not uniformly distributed spatially within and among estuaries. A few systems may experience very high levels of nitrogen loading, exerting disproportionate effects on quantitative analyses of the load-response relationships. In addition, an assumption of uniform loading over an entire estuary does not account for variation in the amount of time water spends within an estuary: nitrogen in water retained longer within portions of an estuary may be more likely to influence ecological endpoints. In order to evaluate ecological effects across a more uniform distribution of N loadings and to account for variations in the time the N load is retained within estuaries, a sampling plan was developed for 17 estuaries along the southern New England coast using local residence times (LRT) derived from hydrodynamic modeling. LRTs, the times required for the local concentration of a constituent initially distributed evenly throughout the estuary to decline in concentration by a factor of *e*, were calculated based on tidal circulation and exchange of water between the estuary and its external water body. N loads were calculated for each estuary based on watershed land use and normalized spatially for estuarine volume and LRT. 144 sampling sites were selected within and among the estuaries, with multiple sites within each range of loading in each estuary, such that values of normalized loading for the entire set of sites would be evenly distributed over their full range. This poster will illustrate the distribution of sites sampled and the normalized loading values obtained by the sampling design. Surface sediment was collected at each site and molybdenum, postulated as a marker of frequency of hypoxia, will be measured in the sediments to examine the spatial variation of occurrence of hypoxia. These data, combined with the distribution of normalized N loadings. will produce a quantitative relationship between N load and extent/frequency of hypoxia that may be used to define and set criteria for nitrogen loading.