Research Article

Association of riparian features and water chemistry with reed litter breakdown in a volcanic lake (Lake Vico, Italy)

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Abstract. To assess riparian influences on lake functioning and develop simple tools for lake health monitoring, the association of remotely-sensed riparian factors and water chemistry with the breakdown rate of reed litter was examined in Lake Vico, a volcanic lake in central Italy. The decomposition rate of *Phragmites australis* was determined as leaf mass loss from litterbags at 6 locations during summer 2000. Water temperature, dissolved oxygen, nitrogen and phosphorus concentrations, pH, conductivity, percent organic matter in sediments and effective fetch were also assessed at each site. Riparian factors (i.e. shoreline complexity, riparian vegetation cover, and distance from shoreline) were estimated from satellite images (Landsat VII). External organic loadings

largely explained spatial heterogeneity in lake metabolism. Decomposition was fastest in the northern area of the lake that drained most of the watershed, including a larger portion in wetland area. Rates correlated exponentially with soluble reactive phosphorus (SRP) concentration, and were positively associated with total-P (TP) concentration and organic matter percentage in sediments, which, in turn, were influenced by the riparian-related factors and wave-exposure (fetch). A relationship existed between the index of riparian load, RL, which combined the three riparian-related factors, and both decomposition rate and SRP, suggesting that the riparian index is a promising cost-saving tool for monitoring lake function using remotely-sensed data.

Key words. Decomposition; detritus; water quality; riparian influence; Normalized Difference Vegetation Index.

Introduction

Increasing anthropogenic pollution and water consumption for human and agricultural use require simple tools for monitoring and managing aquatic systems. Freshwater ecosystem health monitoring, which has traditionally concentrated on the use of

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