

Magnitude and patterns of herbivory in aquatic and terrestrial ecosystems

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HERBIVORES can consume a sufficiently large proportion of primary production to regulate plant biomass in some environments¹⁻³. Little is known, however, about how rates of herbivory vary among ecosystems and how herbivores influence the global distribution of vegetation. Patterns of herbivory in terrestrial ecosystems have been summarized recently^{4,5}, but comparisons with aquatic systems are uncertain because past generalizations about herbivory in aquatic systems are based on surprisingly few data⁶⁻⁸. Herbivory is thought to be higher in aquatic than in terrestrial ecosystems⁹⁻¹¹ and the impact of herbivores in aquatic systems is believed to decrease with increasing primary productivity¹²⁻¹⁵, a pattern opposite to that in terrestrial systems^{4,5}. Here we examine these hypotheses using data from 44 aquatic sites. Herbivore biomass and herbivory rates increase at similar rates with increasing primary productivity in aquatic and in terrestrial systems. For a given level of primary productivity, aquatic and terrestrial herbivores reach similar biomass, but aquatic herbivores remove on average 51% of annual primary production, three times more than terrestrial herbivores. Mass-specific rates of herbivory are greater in aquatic than in terrestrial systems.