

Nutrient circulation and biological production from forests to coastal waters

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We studied the effects of land-use and human activities on the circulation of nutrients and biological production in rivers and coastal waters in three watersheds in Kyoto and Oita prefectures. In Kyoto's Yura River dissolved phosphorus, dissolved nitrogen and dissolved iron densities did not show a clear relationship with forested area, but had significant positive correlations with farm lands and urban areas. Phosphorus limited phytoplankton production in the river waters and nitrogen in coastal waters. Dissolved iron was not a limiting factor of primary production in river or coastal waters. With regards to carbon utilization, some macrobenthos with cellulase consumed terrestrial organic matter in downstream and shallow coastal areas. In addition, carbon stable isotope ratio ($\delta^{13}\text{C}$) analysis suggested that seabass juveniles that migrated into the downstream areas grew on a trophic chain connected to terrestrial plants. We compared Oita's Katsura River, with a high forested area, and the Iroha River with low forested area. Nutrients, biodiversity and biological productivity tended to be higher in the Katsura River than in the Iroha River. It is possible that nutrients are supplied by forests within the Katsura River system. These results suggest that the structure of ecological linkage from forests to coastal waters is different in each watershed system.

Keywords: nutrient circulation, biological production, watershed