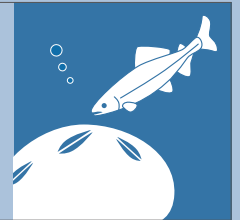




column

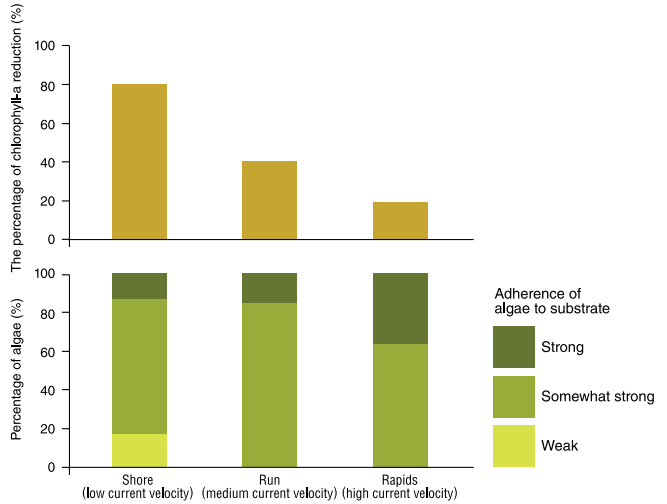
Grazing marks left by ayu

Ayu (sweetfish; *Plecoglossus altivelis*) uses its comb-like spatula-shaped teeth to scrape periphyton from stone surfaces to feed. This scraping leaves bamboo leaf-shaped marks on the stones.



Effective removal of periphyton with flush flows

Flushing flows are reported to be effective for removing periphyton from riverbed. However, in order to efficiently implement this technique, we need to understand how effects might vary according to periphyton characteristics. Based on the results of experiments, we succeeded in quantitatively demonstrating that periphyton detachment from stone surface occurred differently in shore areas, runs, and rapids in response to flush flows. These differences can be explained by the variation in adherence strength of algae to substrate and fine sediment deposition. By constructing a model with these findings, we consider it possible to predict the effectiveness of a flush discharge.

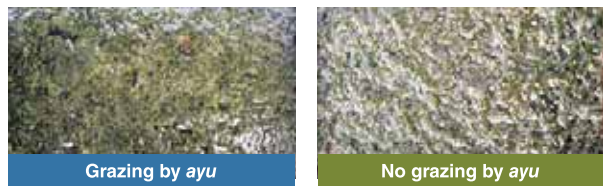


Composition of algal community in shores, runs, and rapids (adherence, bottom panel) and the percentage of chlorophyll-a reduction by flush discharge (top panel)

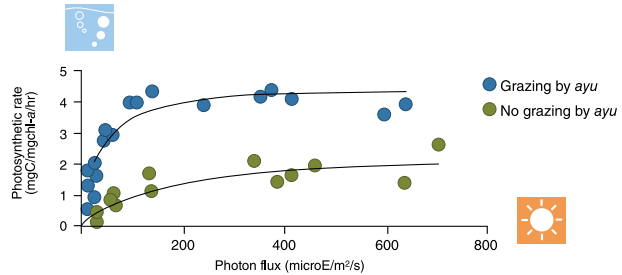


Using the functions of living creatures in the conservation of healthy riverbed conditions

This study aims to propose an approach to river flow management to sustain healthy riverbed conditions by utilizing the grazing effects of freshwater fauna, which depend on river discharges and flow regimes. In order to understand the role of herbivores on the periphyton assemblages, we examined grazing by ayu and found it to be effective in removing filamentous green algae and fine sediment and in increasing the photosynthetic rate of benthic algae. We also confirmed that feeding by ayu helps to retain the scenic value. In future studies, we will examine the effects of feeding by other fish species and macroinvertebrates and incorporate the results into a river flow management to maintain healthy ecosystems.



Grazing by ayu removes filamentous green algae and fine sediment particles and increases the photosynthetic rate of benthic algae.

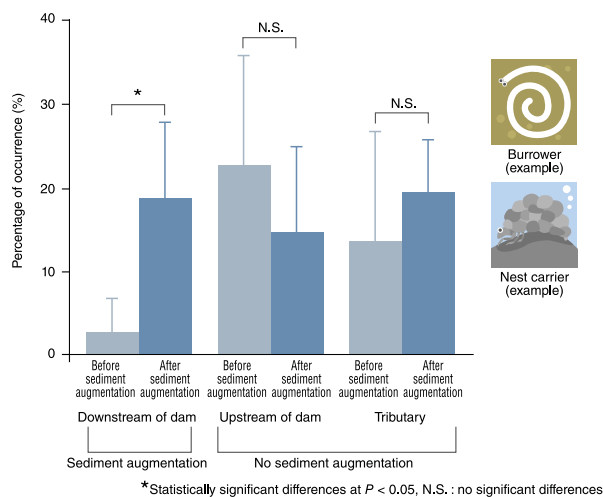


Differences in photosynthetic rates of benthic algae with or without grazing by ayu



Evaluation of the effectiveness of restoring sediment to a river and the establishment of effective restoration techniques

We are carrying out a study to establish effective techniques for restoring the environment of riverbeds by returning sediment to the river (sediment augmentation). We surveyed the dam area in which sediment was returned to the river and examined the effect sediment augmentation had on the restoration of the riverbed environment. The diagram on the right shows the proportion of the total population of the benthic macroinvertebrates that uses fine particle riverbed material (species grouped by lifestyle as "burrowers" or "nest carriers") before and after the sediment augmentation. The proportion of burrowers and nest carriers increased only in the channel downstream of the dam where the sediment had been returned to the river, to the same level as upstream of the dam and in the tributary. Based on these results, we plan to propose a method for evaluating the effects of sediment augmentation towards the development of effective restoration approaches for improved riverbed environment.



Presence of species groups that use fine particle riverbed material