

Fish abundance is closely correlated to habitat

We classified fish habitats into riffle, run, glide and pool, and evaluated the amount of streamside plants. The fish abundance associated with habitat types and the streamside plants was analyzed, and the quantitative correlation between them was confirmed.

There are large amounts of fish in the riffles and pools, and smaller amounts in the runs and glides. Although the coverage by streamside plants affects the fish abundance, the effect is less than that caused by the availability of riffles and pools

Even in small-scale streams, such as experimental streams, there were significantly more fish in the riffles and pools than in the other habitats. This result implies that riffle-pool sequences are indispensable to river rehabilitation.



Researcher in charge
Yuichi Kayaba

River Restoration Team,
Water Environment Research Group,
Public Works Research Institute

Abundant fish in riffles and pools

The relationship between habitat and the amount of fish was analyzed (Figure 2). The figure shows the wet weight of fish per unit area, which was calculated by dividing the total wet weight of fish captured during three trials in each reach by the area of the survey reach. The dominant species in the summer were *Carassius*, *Gnathopogon elongatus*, and *Zacca platypus*. The wet weight of fish per unit area was high in the pools and riffles and low in the runs and glides. The difference between these was very large, and there were 10 to 20 times more fish in the pools than in the runs and glides.

The relationship between wet weight of fish per unit area and vegetation coverage for runs and glides is shown in Figure 3. The larger the vegetation coverage, the larger the wet weight of fish. In October, for example, the wet weight in the "over 20%" category was about five times greater than that in the "less than 10%" category.

The analysis showed a specific relationship between habitat and the fish abundance. There were more fish in survey sections that were densely covered by plants than in sections with few plants. However, the fish abundance was small in the runs and glides compared to the amount in pools and riffles, even when the streamside were covered by dense vegetation.

Not only the riverside but also the shape of the riverbed affects fish.

Alignment such as straightening causes riffles and pools to disappear, and concrete revetments make it difficult for plants to grow along the stream side. This study was conducted using experimental streams, thus the results may not be universally applicable. However, it is obvious that the disappearance of riffles and pools can cause a reduction in fish abundance. Not only the riverside but also the riverbed morphology should be considered for river rehabilitation projects.

Column

Changes of alignment such as straightening conducted in streams in Japan have caused the disappearance of habitats such as riffles and pools. Although projects to rehabilitate the habitats should involve re-meandering, it is very hard to execute such projects in a short period because of the high density of population and land use in Japan. For the time being, biological diversity should be maintained by installing underwater structures, such as deflectors, to reproduce habitats that have disappeared, and we should combine this methodology with the change of alignments including re-meandering.

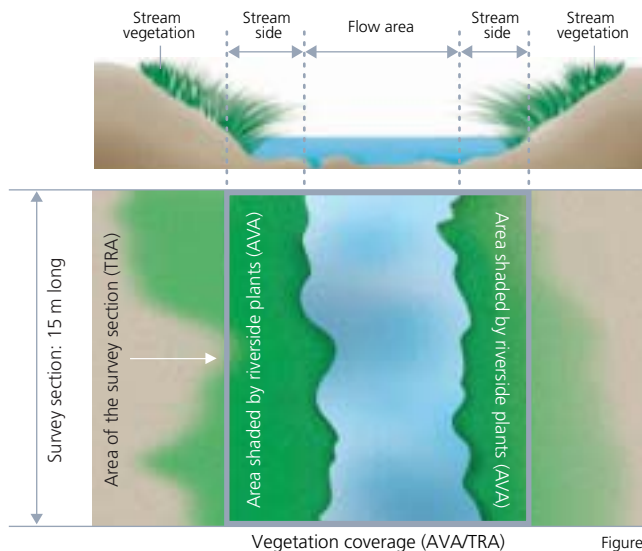


Figure 1

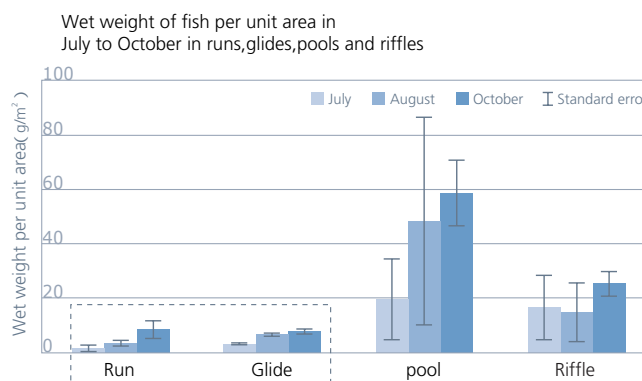


Figure 2

Since pools and riffles account for a small percentage of all experimental streams, there were no sections with minimal vegetation

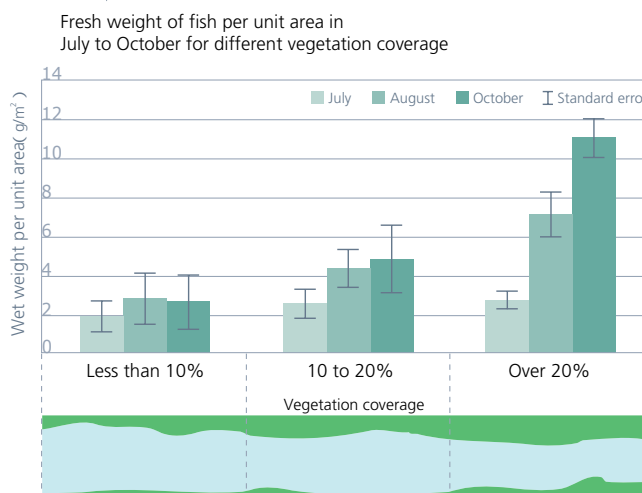


Figure 3