

# Water in the landscape

Water is of major importance in the landscape. Environments around water are often species-rich and many plants and animals are dependent on their environment being regularly disrupted by flooding. A good environment in small brooks high up in the watershed creates conditions for life in the bigger watercourses and may even be of importance for diversity when the watercourse finally reaches the sea.

## Watercourse ecology

Flowing water and associated habitats are among the most species-rich ecosystems. Along a 200 meter section of a river we can find more than 100 different species of vascular plants. Species diversity is created by the richness of the environment, with different water velocity, varying water depth and width, changing nutrient conditions, and addition of organic material falling into the water. The species composition along the water's edge depends on, e.g., how often and how long the shore areas are flooded. This means that the species composition varies constantly along and across the watercourse.

A large number of terrestrial animals are fully dependent on watercourse's high production of insects, fish, aquatic plants and other foods. Examples are otter, beaver, bats and a number of bird species. Regular flooding creates dead wood which is beneficial to many insects and woodpeckers. For all these species, the environment offers food and protection, while the watercourse also functions as a dispersal corridor. Even species that are not so strongly

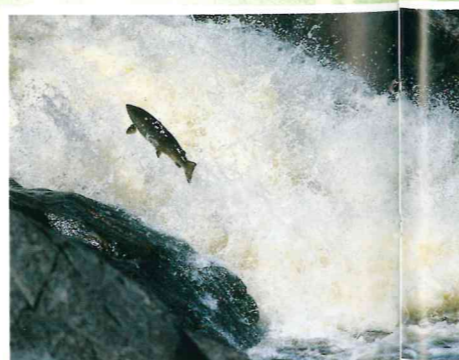
bound to the environment prefer to follow the watercourse, for instance, both predators and ungulates such as moose and roe deer.



**Pike**  
*Esox lucius*

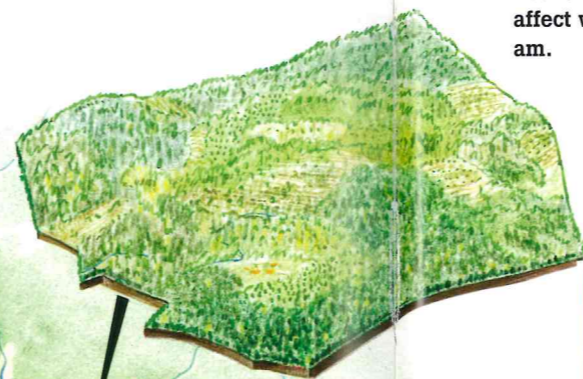


**River Pearl Mussel**  
*Margaritana margaritifera*



**Salmon**  
*Salmo salar*

The kind of conservation activities taken on this property will affect water quality downstream.



**Dipper**  
*Cinclus cinclus*



## Forest management near water

Forest management activities near water can influence surface water movements through run-off and rutting, which will change the water balance. Increased run-off may sometimes result in higher levels of organic material, higher nitrogen levels and changed pH value. This will change the conditions for plants and animals living there. Watercourses that have been affected by drainage will have fewer individuals and fewer species than unpolluted water courses.

Harvesting adjacent to watercourses leads to reduced shading of the water and reduced deposits of leaves and needles. This will affect both the number of individuals and number of species in the water. Diversity of species in small watercourses is greatest in moderately shaded sections.

Shedding of leaves from trees in a buffer zone is an important nutrient contribution to an aquatic ecosystem – often it is the driving force in the life processes. Shade is also important for smaller watercourses if unnatural variations in water temperature are to be avoided. The width of the zone to be left will vary depending on the width of the watercourse and the function of the buffer zone. Up to a tree's length may be suitable for valuable watercourses. Another rule-of-thumb is that the harvesting should not affect the area that the water influences, i.e. the whole area with hydrophilic vegetation which often is flooded by the watercourse. It is important to minimise nutrient leakage and silting near a watercourse.

## Include water systems in the planning

It may be both practical as well as biologically motivated to allow watercourses and wetlands become main components when planning forest management activities. Lakes, watercourses and bogs often naturally divide the landscape. In many instances, there may be a major environmental benefit if nature conservation inputs are concentrated on watercourses and their surrounding areas. It is often an advantage to allow watercourses link up voluntary conservation areas, woodland key habitats and other valuable parcels of land.



**Red-breasted Merganser**  
*Strix uralensis*