STOP FOR STREAM MAINTENANCE: WEED CUTTING

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Description

Streams have always been influenced by men. Thousands of kilometres of streams have been straightened – often to the detriment of animals and plants. Hard-handed maintenance in the form of weed cutting by machinery and excavation of stream bed and banks has further deteriorated the conditions. A stop for stream maintenance is a method that will on the longer term improve the physical conditions and both on a shorter and longer term increase the retention capacity of the stream channel for nutrients [1,2].

Rationale, mechanism of action

Streams in Europe should be expected to sustain many diverse habitats with an animal and plant life rich in species. However, the variety of animal and plant species in most streams has declined dramatically throughout the last century. This decline is partly due to pollution of the streams with wastewater from agriculture, cities and industry. The streams were transformed into sewers and diversion canals and were thus prevented from sustaining any life. However, introduction of the environmental plans has in many parts of Europe gradually solved the problem of wastewater, and the quality of the stream water has been improved year by year [3]. The stream water is once again so clean that it should be able to fulfil the goal of a large and varied population of animals and plants. However, this goal will not be reached only by reaching the goal of clean stream water. In addition, the stream itself also needs to contain as much physical variation as possible. The more diverse the environmental conditions in the streams are the more diverse animal and plant life it will hold. If the stream lacks the natural variation created by the shift between riffles and pools, the animals and plants in the stream will have fewer and less suitable habitats. Moreover, uniform streams where the weed is cut several times every summer will have a low retention capacity for nitrogen and phosphorus due to limited denitrification and depositional zones.

It is not only by active restoration that we can change the physical conditions and the shape of the streams. Changes can also be obtained if maintenance of the streams is changed or totally stopped. The streams have traditionally been maintained in order to quickly drain water from the fields. This has been achieved by cutting all vegetation several times per year and by removing gravel and stones. In that way the streams have been kept in their unnatural canal-like course to the detriment of animals and plants. With limited or no maintenance, the physical conditions of the streams will change. The vegetation functions as biological engineers in the stream and may if left undisturbed, change the physical conditions [4]. Vegetation in the stream and on its banks will relatively quickly contribute to narrowing the profile of the stream, advance the deposition of sediment and particulate phosphorus [5]. In the longer term, this will result in a more naturally meandering and elevated stream that is in contact with the surrounding riparian areas. A change in stream maintenance is a relatively cheap method and should therefore be used to a great extent in connection with the rehabilitation of varied physical conditions in streams and wetlands. In addition, if the regular maintenance is stopped, the plant community in the streams will become richer and more diverse [6]. Thereby, the capacity of the channel for retention of nutrients will increase both due to increased denitrification and sedimentation of particulate P.

Applicability

The stop for weed cutting in streams is applicable where the weed today is cut one or several times per year. The surrounding land should also be tolerated to become wetter on the longer term.

Effectiveness, including certainty
The increase in nutrient retention capacity has been shown from *in situ* studies in stream channels of particulate P deposition [2]. The increase in denitrification capacity of having macrophyte dominated stream channels has been documented from several studies [7].

Time frame
The measure will increase the retention capacity for particulate P for a number of years until the channel has reached a steady state condition. The denitrification capacity of the channel will increase during a number of years following the change to a more diverse and larger stand of macrophytes facilitating surfaces and more diverse in-stream habitats including micro-zones with low current velocities, high organic content and low oxygen.

Environmental side effects
The stop for stream maintenance in the form of weed cutting will have a positive impact on the ecological conditions in the stream.

Relevance, potential for targeting, administrative handling, control
The measure is of high relevance in many areas as stream maintenance is often conducted. It can be targeted to stream channels were the surrounding land is in extensive agricultural production, etc. It is easy to administer and control.

Costs: investments, labor
There are no direct costs involved when ceasing stream maintenance. Instead the cost of performing stream maintenance in the form of weed cutting will be earned. In Denmark the yearly costs of weed cutting are between € 500 to 1000 per km stream channel. The stop in weed cutting will, however, have a negative influence on the drainage conditions of surrounding agricultural land. A compensation of the farmer must therefore be foreseen.

References

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