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Stream management: it really matters what you do on your own farm!

How farm management affect your own stream

Best farming practice to protect waterways is becoming increasingly important to safeguard market access and premium prices for New Zealand's farm produce in overseas markets. Farmers are also coming under increasing pressure from wider New Zealand society to retain and even enhance stream health.

Despite growing concern, farmers get little public support for carrying potential costs of stream care, and some farmers may think that their own inputs to the local stream is merely a drop in the bucket, especially when upstream neighbours may not be doing their bit to help. Even so, many farmers do care for their streams and want to know if and how their efforts are working. ARGOS hopes that stream care can also be rewarded and more farmers will want to learn what helps most and start to monitor stream health themselves. Therefore, ARGOS set out to discover if noticeable improvements or degradation of streams can be observed within the confines of a single farm, and to test simple monitoring tests that work for each farmer.

Monitoring methods

We used the Stream Health Monitoring and Assessment Kit (SHMAK) to measure stream characteristics, nutrient and

sediment levels, and algae and aquatic insect communities in streams on 35 South Island sheep/beef and 24 North Island dairy properties in summer 2005/2006. By comparing several stream indicators where the stream first enters and where it leaves each farm, we checked how each farm's management affected local stream health.



Fig. 1. Some farm streams are home to some rare native fish, like this banded kokopu found on an ARGOS farm in the Catlins. Banded kokopu live in small, shaded, rocky streams with good water quality, where they feed on stream insects. They can grow to over 20 cm long. They breed in the stream and the tiny hatchlings are washed out to sea, where they feed for 3-4 months and then return as whitebait. Therefore good farm stream care can not only provide economic returns for the farm, but the maintenance of good habitat for adult banded kokopu also ensures good whitebait runs for your downstream users.

Results

The importance of stock access: We derived an index of how much of each farmer's stream was accessible to stock by scoring fencing and natural barriers to the stream bed at 10 intervals throughout each farm. There was usually an improvement in

water clarity in dairy farms where stock were excluded from most of the waterway, but a rapid deterioration in clarity where they could get into the stream itself (Fig. 2).

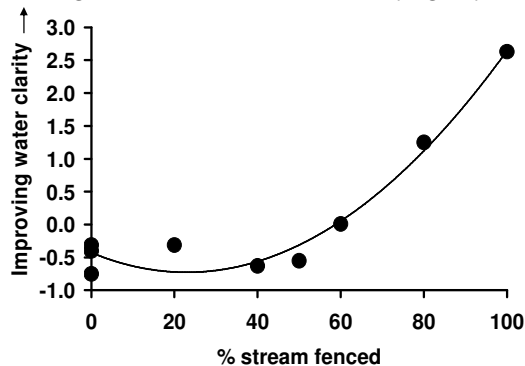


Fig. 2. Water clarity in farm streams as measured with a clarity tube from the SHMAK Kit in relation to whether dairy cows had access to the stream bed.

The importance of vegetation around the stream: If more than 60% of the banks were covered with grass, sediment levels tended to drop as the stream flowed through the farm; where less than 50% of the banks were covered in grass, there was a 3 to 6 fold increase in sedimentation (Fig. 3). Sediment clogs the small spaces between the pebbles and rocks in stream beds that otherwise support periphyton (microscopic algae) and insects, which feed the fish.

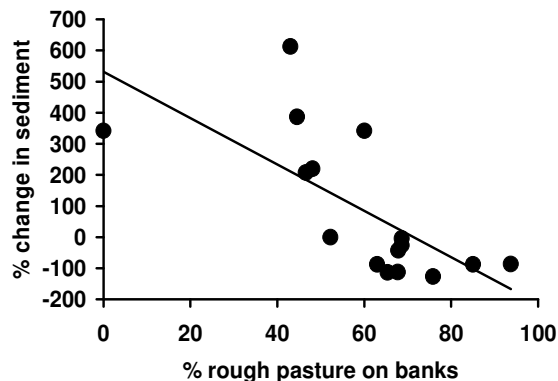


Fig. 3. The percent change in sediment on the stream bottom was linked strongly to the amount of grass covering the banks of ARGOS sheep/beef streams.

Tile drains: undercutting natural filters? Tile and mole drains may be bypassing the riparian buffer zones on some farms. One of our study farms, an Integrated Management sheep/beef farm was a real outlier. It showed a 6-fold increase in nitrogen levels in its stream, perhaps because of the

arrangement of its tile drains. We will now work with farmers to recommend drain layouts that prevent this problem.

Monitoring by farmers: None of the 60 ARGOS dairy and sheep/beef farmers used SHMAK kits or other formal ways to monitor stream health. No doubt many of them keep a practiced eye on the stream's conditions, but the pressure of many other farm tasks make detailed monitoring difficult. We will now investigate if and how the kit can work for some farmers and whether practical alternatives can be found for others. Stock and vegetation management do result in rapid changes in stream health in the space of an individual farm. Reducing stock access to streams and maintaining good ground cover in riparian areas are very effective at reducing nutrient and sediment loads in streams. Farmers can therefore directly benefit farm streams through their own actions to improve stream health.

Conclusions

Rapid local changes in stream health are detectable even within each farm that link to stock and riparian vegetation management. Rough pasture and other ground cover is obviously very effective at trapping any soil or sediment that may wash off the pasture or paddocks during heavy rain. Farmers can therefore directly benefit from their own actions to improve stream health. If wanted by the ARGOS farming families, customised stream care plans will be integrated with whole-farm plans that incorporate their economic, social and environmental goals.

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See ARGOS RESEARCH NOTE 27 for the overall rationale for stream monitoring and the study design.

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