

## The impact of forest operations on P levels in surface water.

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### Introduction

Until now, research in the field of forestry ecology has not clearly shown whether forestry operations such as clearfelling or activities linked with subsequent planting have an adverse effect on water quality of local watersheds. The main objective of this research, conducted on the Ballinagee River, Co. Wicklow was to evaluate water quality at monitoring points geographically above and below a forested catchment, especially in terms of phosphorus, an element often linked to water eutrophication.

### Material and Methods

The study site is typical of upland forestry in the River Liffey catchment, on land of poor agricultural potential. A significant percentage of this catchment, including the Ballinagee River catchment, Co. Wicklow was felled and replanted 1997 and between 2000. Monitoring of this study site began in October 2002. Autosamplers with datalogger were installed in monitoring points on the banks of the river geographically above and below the forested area and on bank of the right-hand side tributary (F on Fig.1) due to possible contamination through the leakage from a waste disposal system. The mouth of the pipe connecting the autosampler with flowing water was fixed in the middle of the riverbed. Daily composite water samples were collected at hourly interval at each sampling point. Chemical analysis involved total phosphorus (TP), total reactive and dissolved reactive (TRP and DRP) phosphorus and other variables that could be influenced by the former forestry operations.

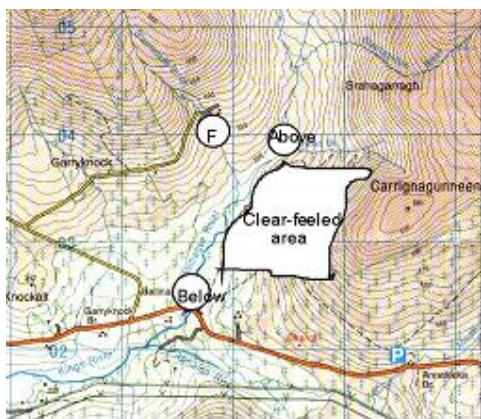


Fig. 1. The catchment of Ballinagee River and sampling sites.

Concentration medians of phosphorus were computed from a minimum ten samples taken at intervals of four weeks (Anon, 1977; Anon, 1998).

*F* test was used to compare two variances of sample standard deviations and *t* test to test the difference between two sample means.

### Results and Discussion

The concentrations of P varied during the monitoring period in line with local climatic conditions. However, TRP concentrations (Fig.2) never exceeded the recommended limit of  $30 \mu\text{g l}^{-1}$  (Anon, 1998). The main factors influencing the P concentrations were rainfall intensity and flow rate. Enhanced concentrations were also recorded after a long period of dry weather. The higher amounts of P are usually carried into watercourse, when a clearfelling is followed sediment input and increased erosion (Giller, Johnson and O'Halloran, 2002).

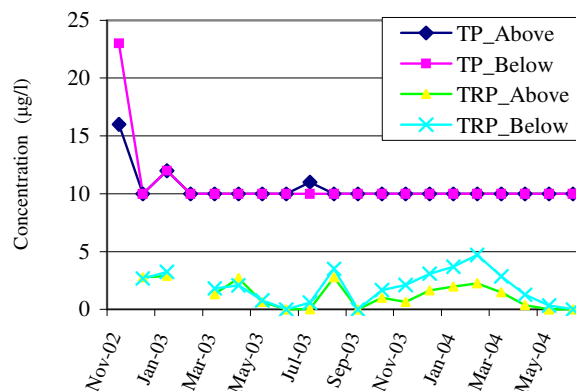


Fig 2. Concentrations of total and total reactive P in the Ballinagee river samples

### Conclusion

The differences between P concentrations above and below the forested catchment are not statistically significant ( $P < 0.05$ ). Preliminary results do not support the claim that clearfelling increases phosphate concentrations in runoff from a forested area, at least in the short term, prior to extensive biological regeneration (Amstrom, Aaltonen & Koivusaasri, 2002).

### Acknowledgements

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### References

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