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Title: Markets for Water Rights under Environmental Constraints

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**Abstract:**

This paper estimates the optimal allocation of surface water and pollution rights along a river with water quality constraints using alternative mechanisms for allocation. Allocation in rivers poses more complex problems than with lakes because the reallocation of flow rights between upstream and downstream users can limit the use for intermediary users. In addition, reallocating flows also affects the river's ability to manage pollution and support environmental quality. Determining permits in terms of damages is far more efficient than in terms of emissions but it still depends heavily on location of the polluter along the river.

The results of this study suggest that a permit system must be capable of providing location-specific prices for both surface water and pollution rights. In addition, impacts on water quality must be internalized in this system because quality is determined by surface flows and discharges. There is essentially two markets for permits: upstream and downstream.