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Comparison of two water pricing policies in hydro-economic modeling study

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A study is presented comparing two different water pricing policies that are applied to wholesale water users throughout a river basin. The purpose of the study is to test policies that meet some of the water pricing objectives of the European Union Water Framework Directive (WFD). In the first policy, a single volumetric water price is applied to all wholesale water users throughout a case study river basin located in northern Greece. The same price is applied consistently to all surface water and groundwater users regardless of water use type and does not vary in space or time. In the second policy surface water is priced at a uniform volumetric price, while groundwater is priced using the price of energy as a surrogate for a volumetric water price. The policies are compared using a hydro-economic modeling approach in which wholesale water users are assumed to respond to water price changes according to microeconomic theory. A hydrological model of the case study river basin is used to estimate the impact of water use changes on river flow patterns, which are then used to assess the ecological status of the basin. WFD ecological status requirements are imposed as a constraint in the model, and an optimization approach is used to identify prices that meet the WFD requirements while minimizing opportunity costs (in terms of total welfare losses). Model results suggest that there is little difference between the two approaches in terms of the total opportunity costs of meeting the ecological status requirements of the WFD. However, the distribution of opportunity costs is different, with the second approach reducing the economic impact on producers of low value crops and small urban/domestic users. Because growers of low value crops will suffer the most from water price increases, the second policy offers the advantage of reducing this burden. In addition, because of difficulties associated with monitoring groundwater use, the second policy may be easier to implement in practice.