

Allocations and Environmental Flows

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ABSTRACT

Over the past 30 years, much has been learned from strategies used around the world to establish and implement environmental flow programs. Approaches vary from highly prescriptive regulatory requirements to largely voluntary programs. These examples have shown that allocating water to the environment does not necessarily constrain human uses and can have benefits for both agriculture and ecosystems. Some efforts attempt to reduce conflict between agriculture and the environment by limiting water allocations spatially, while others attempt to reconcile competing water demands through comprehensive, regional allocation schemes that vary with climate conditions over time. Here we summarize strategies for water allocation planning and implementation that can be used to balance environmental and agricultural water needs. Effective strategies incorporate: a holistic environmental water allocation approach that focuses on protecting overall ecological structure and functions; environmental flow protections at broad spatial and temporal scales; consideration of surface–ground water interactions and the relationships between flow, sediment, temperature, and water quality. From an implementation perspective, approaches that establish a volumetric water budget for the environment based on interannual variation in water availability, integrate across programs in a transparent manner, are broadly inclusive, and incorporate traditional values and perspectives have the highest likelihood of success. Environmental flow strategies that consider technical solutions, establish clear objectives and anticipate how environmental water will be allocated under different water year types, and are sensitive to social issues and concerns will increase certainty in how much water is allocated for agriculture and the environment. Beyond reconciling conflicts between competing demands, emerging technical and institutional approaches to environmental flows can improve resiliency of water management programs to climate change by preventing the over-exploitation of water supplies, enhancing flexibility, and providing a framework for adaptation.

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