In-Stream Flow Requirements (Newsletter)*

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The concept of minimal in-stream flows dates from at least the mid-1970s. It is an important issue to everyone who withdraws ground or surface waters, injects water underground, or adds water to streams and rivers, particularly in the drought-stricken western US. At the federal level, the US EPA funded a grant to define ecological and related flows and create methods to measure them and the US Geological Survey developed measurement methods. Several years ago Oregon established statutory requirements that peak and ecological flows be maintained in any projects funded by state grants or other assistance. New Zealand, Denmark, India, and other countries either have incorporated such stream and river flow requirements in national laws or are in the process of doing so. Consideration of these flows is now a requirement for funding by the World Bank. This makes water allocation decisions even more difficult.

The major problem is not a lack of science behind this idea but the plethora of science that easily overwhelms non-technical decision-makers. The lack of consensus on methods to define, measure, or model ecological and related stream and river flows is a reflection of the highly site- and organism-specific considerations. Regulatory impacts include water right allocations, discharge permit approvals, and diversions between basins or from surface waters to ground water storage and subsequent withdrawal.

Two scientific issues and one technical consideration are involved in addressing peak, ecological, and other flow requirements. The scientific subjects are aquatic biology/ecology (organism flow requirements by life cycle stage and interactions of the biotic and abiotic ecosystem components) and fluvial geomorphology (channel and sediment size/quality shaping and maintenance). These two are very tightly linked and must be considered as a single subject. The technical (but not scientific issue) is that of resource allocations; policy decisions such as water rights that are difficult to make because of other competing, valid interests such as crop irrigation, livestock and wildlife watering, and recreation.

In both agency rule-making and permit application decision processes, these flow issues will play large roles in the timing, cost, and uncertainty of environmental permitting and other regulatory approvals. It is reasonable for us to anticipate that groups opposed to natural resource operations will use the

inherent high variability of biotic and channel structure requirements to delay or deny operations. The political and legal issues of water right grants and water resource allocations are complex and difficult to decide. The scientific issues are very complex both in themselves and in explaining them clearly and effectively to non-technical decision-makers. Because this is a concern for natural resource industries it would be beneficial for operators to consider its implications for Clean Water Act, Endangered Species Act, and National Environmental Policy Act permit issuance and compliance monitoring. Planning, including gathering relevant data, correctly analyzing it, and using sound information for informed operational decisions could have very high value and reduce risk for investors and lenders. Knowing the dynamics of streams and rivers in the vicinity of operations not only supports operational decisions but can provide effective response of project or operational adverse impacts on water quality, fish, or wildlife.

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