

Recommendations for Determining Regional Instream Flow Criteria for Priority Tributaries to the Sacramento-San Joaquin Delta

A Report to the California State Water Resources
Control Board

Committee Members

Cliff Dahm - University of New Mexico
Kirk Winemiller - Texas A&M
University
Marty Kelly - Southwest Florida Water
Management District (retired)
Sarah Yarnell - University of
California-Davis



March 19, 2014

Panel Recommendation – Use of a Hybrid Approach

1. stream and river classification based on geomorphic, hydrologic, geographic, and/or faunal characteristics
2. hydrologic analyses that separate the hydrograph into flow regimes (blocks) and examine historical changes
3. assessment of whether any site-specific field work is required in the catchment or river reach to address specific information gaps
4. extrapolation of understanding of flow-ecology relationships from other sites to the study catchment or segment
5. production of an environmental flow regime that meets the needs of species and ecosystem processes in the system
6. assuring clear and transparent dialogue and interaction between scientists and stakeholders
7. designing an effective adaptive management protocol with robust implementation measurements to support the decision-making process

Rivers and Flows – Scientific Foundation

- Global crisis in freshwater biodiversity – 0.8% of the Earth’s surface is freshwater with 6% of the described species (~100,000) on Earth found in freshwaters with the highest percentage of threatened, endangered, or recently extinct species (~40%)
- Diminished flows are the primary predictors of biological integrity for fish and aquatic invertebrates in the US relative to eight chemical and physical properties
- The flow regime is more than just volumes of water; magnitude, frequency, duration, timing, and rate of change of flows all need consideration

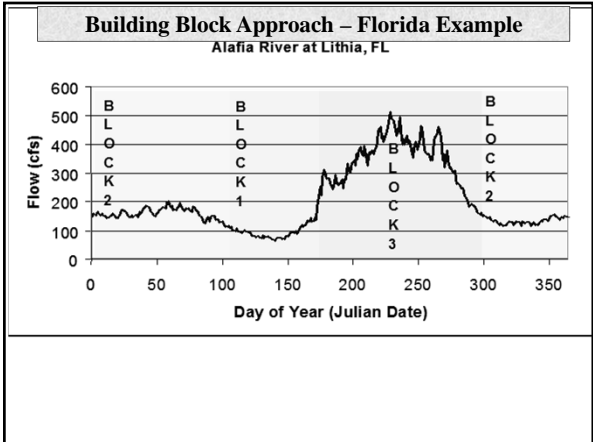
Setting Flow Criteria for Estuaries and Rivers in the Southwest Florida Water Management District (SWFWMD)

“The minimum flow for a given watercourse shall be the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area.” Section 373.042 Florida Statutes

Environmental flow is the term for the amount of water needed in a watercourse to maintain healthy, natural, ecosystems. Only a few countries, such as Australia, South Africa, and the United Kingdom have integrated the concept into water management.

Committee Charge

- Identification of methodology that is scientifically defensible, cost-effective, representative at the watershed scale and timely relative to implementation
- Input on how recommended methodology or methodologies can be augmented or refined in the future
- How to develop flow criteria that apply to the majority of the watershed within a tributary that addresses multiple species, different life stages, and different fluvial processes



Habitat Suitability Curves

- Key Non-native Fish Species
- Key Native Fish Species
- Key Aquatic Macroinvertebrates
- Dominant Riparian Plants
- Riparian Dependent Bird Species

Setting Flow Requirements – Examples from California

- Restoration of the spring snowmelt recession pattern
- Restoration of a more natural flow regime on Putah Creek
- Adaptive management and reconciliation on the North Fork Feather River

Setting Estuarine Flow Criteria in Texas (River Flow Criteria Already Adopted)

▪“basin and bay expert science team shall develop environmental flow analyses and a recommended environmental flow regime for the river and bay system ... through a collaborative process designed to achieve consensus”

▪“must consider all reasonably available science, without regard to the need for the water for other uses, and ... the recommendations must be based solely on the best science available”

▪Texas Water Code §11.02362 (m)
Senate Bill 3 - 2007



Some General Principles For Sustaining Healthy Rivers

- A modified flow regime should mimic the natural one, so that the natural timing of different kinds of flows is preserved
- Most water should be harvested from a river during wet months; little should be taken during dry months
- The seasonal pattern of higher baseflows in wet seasons should be retained
- Floods should be present during the natural wet season
- The duration of floods could be shortened
- It is better to retain certain floods at full magnitude and to eliminate others entirely than to preserve all or most floods at diminished levels
- The first flood (or one of the first) of the wet season should be fully retained

Setting Estuarine Flow Criteria in Texas (continued)

- Statewide Environmental Flows Science Advisory Committee
- Bay/Basin Expert Science Teams
- Address Seasonal and Yearly Fluctuations
- Support a “Sound Ecological Environment”
- Maintain Productivity, Extent, and Persistence of Key Habitats in the Seven Major Estuaries
- Stakeholder Committee and State Agencies

