

American Fisheries Society
Southern Division
RESOLUTION ON
THE INCLUSION OF HYDROLOGIC ALTERATION AS AN
IMPAIRMENT IN STATE WATER QUALITY STANDARDS

Adopted January 25, 2019

Whereas, aquatic resources are facing ever-increasing threats, including urbanization, changing and warming climate, population growth, and increased water demand, perhaps the most detrimental of these threats is insufficient water in lakes and reservoirs and insufficient flow in streams and rivers;

Whereas, the Southern Division, American Fisheries Society (SDAFS) and the American Fisheries Society (AFS) adopted resolutions on the development of instream flow programs in 2007, and 2008, respectively (SDAFS 2007, AFS 2008);

Whereas, state water quality standards are important criteria that are used to stipulate water quality parameters that protect the designated use classifications, including that of providing for fishable and swimmable waters;

Whereas, historically state water quality standards have focused on water quality (e.g. dissolved oxygen and temperature) and pollutants by specifying criteria for water chemistry parameters and maximum pollutant levels in either quantitative (numeric) or qualitative (narrative) terms;

Whereas, we recognize and acknowledge the importance of setting concentration limits of such constituents in our waters. Scientific research has documented that water quality standards which lack the incorporation of environmental or natural flows and sufficient water levels result in inadequate and incomplete standards. These standards merely provide for an impaired or an unattained beneficial use criteria for fish and wildlife populations (see Annear et al. 2004). Such state water quality standards are inadequate for providing and protecting the amounts and quality of lotic and lentic habitat needed for sustaining healthy, functioning, resilient, and viable, aquatic ecosystems. Such deficient standards compromise and violate the intents and purposes of establishing such standards;

Whereas, some states utilize a drought flow statistic, such as the 7Q10, to provide minimum flows in their water quality standards, there is no direct relationship between 7Q10 and aquatic life protection (Camp Dresser & McKee 1986). The main purpose of these design flows is to determine pollutant discharge values or limits rather than to support the flow requirements of aquatic ecosystems (USEPA 1991);

Whereas, the AFS adopted Policy Statement #9 – Effects of Altered Stream Flows on Fisheries Resources which states “The concept of ‘minimum flows’ and other low flow standards based on statistical records instead of biology (whereby it is assumed that needs of stream fishes can be met as long as some water remains) are seriously outdated” (AFS n.d.);

American Fisheries Society
Southern Division
RESOLUTION ON
THE INCLUSION OF HYDROLOGIC ALTERATION AS AN
IMPAIRMENT IN STATE WATER QUALITY STANDARDS
Adopted January 25, 2019

Whereas, the USEPA (USEPA 1997) defines “flow alteration” as “frequent changes in flow or chronic reductions in flow that impact aquatic life”. The USEPA has stated (Best-Wong 2015) that the examples of “hydrologic alteration” include: “a perennial water is dry; no longer has flow; has low flow; has stand-alone pools; has extreme high flows; or has other significant alteration of the frequency, magnitude, duration or rate-of-change of natural flows in a water”;

Whereas, we recognize the difficulties of aggregating adequate and representative streamflow data and biological data and establishing relationships between streamflow and biological data. We recognize that some agencies are reluctant to deem a water body impaired because of “no data” or “more information is needed”. A lack of data should not deter state agencies as USEPA guidance (Best-Wong 2015) states that the “EPA recognizes that it is possible to have an impaired or threatened designated use that may not be determined through the assessment of available numeric and narrative criteria alone. There are many types of information that could be readily used to identify threatened or impaired waters. This includes basic visual assessments of habitat alteration or flow alteration by field personnel”;

Whereas, literature reviews summarizing the biological responses to altered flows (Bunn and Arthington 2002; Petts 2009; Poff and Zimmerman 2010; Carlisle et al. 2011) show among other responses, overall reduction in the abundance and diversity of fish and macroinvertebrates, excessive growth of aquatic vegetation, reduced growth of riparian vegetation, and shifts in aquatic and riparian species composition;

Whereas, a meta-analysis of research in the South Atlantic United States (McManamay et al. 2013) showed that fish, macroinvertebrates, and riparian vegetation often responded negatively to induced flow alterations;

Whereas, flow alteration can be a primary contributor to the impairment of water bodies that are designed to support aquatic life (Novak et al. 2016). A USGS study (Carlisle et al. 2011) found that anthropogenic hydrologic alteration is extensive in the US and may be a primary cause of ecological impairment in river and stream ecosystems;

Whereas, the US Environmental Protection Agency (USEPA) and the US Geological Survey (USGS) have described the effects of flow alteration on designated uses in streams and rivers; provided examples of states (Kentucky, Missouri, New Hampshire, New York, Rhode Island, Tennessee, Vermont, and Virginia) and Indian tribes (the Bad River Band of the Lake Superior Tribe of Chippewa Indians and the Seminole Tribe) that have narrative flow criteria in their water quality standards; and provided a nonprescriptive framework that can be used to quantify flow targets to protect aquatic

American Fisheries Society
Southern Division
RESOLUTION ON
THE INCLUSION OF HYDROLOGIC ALTERATION AS AN
IMPAIRMENT IN STATE WATER QUALITY STANDARDS

Adopted January 25, 2019

life from the effects associated with hydrologic alteration (Novak et al. 2016). Missouri's water quality criteria states "Waters shall be free from physical, chemical, or hydrologic changes that would impair the natural biological community". New York's water quality criteria states "There shall be no alteration to flow that will impair the waters for their best usages". Virginia's water quality criteria states "Man-made alterations in stream flow shall not contravene designated uses including protection of the propagation and growth of aquatic life";

Whereas, the USEPA has provided guidance (Best-Wong 2015) to the states when waters are impaired due to "pollution not caused by a pollutant" (i.e. Category 4C), such as hydrologic alteration caused by, for example, water diversions, impoundments, and extreme high flows leading to loss of habitat, or impacts from such to designated uses but no narrative or numeric water quality criteria can be assessed. The USEPA states that "data and/or information documenting significant hydrologic or habitat alteration could be used to make a use attainment decision for an impairment due to pollution not caused by a pollutant and should be collected, evaluated, and reported as appropriate":

Therefore, Be It Resolved, that the members of the Southern Division of the American Fisheries Society assembled here on the 25th day of January 2019, in Galveston, Texas at their annual business meeting do hereby:

Strongly urge that state fish and wildlife agencies, federal agencies and tribal agencies recommend that state environmental quality agencies incorporate either numeric or narrative flow criteria in all future revisions of their state water quality standards as required under the Clean Water Act section 303(c) to protect aquatic ecosystems from the effects of hydrologic alteration; and

Strongly urge that state fish and wildlife agencies, federal agencies and tribal agencies recommend that state environmental quality agencies follow and use the guidance provided by the USEPA to incorporate either numeric or narrative flow criteria into their state water quality standards as soon as possible.

Literature Citations
For the Southern Division, American Fisheries Society
Resolution on the
Inclusion of Hydrologic Alteration as an Impairment in State Water Quality Standards
Adopted January 25, 2019

- American Fisheries Society (AFS). n.d. AFS policy statement #9 – Effects of Altered Stream Flows on Fisheries Resources. Bethesda, Maryland. Available at: <https://fisheries.org/policy-media/policy-statements/afs-policy-statement-9/>
- American Fisheries Society (AFS). 2008. Resolution on the development of instream flow programs. *Fisheries* 33(11): 563.
- Annear, T., I. Chisholm, H. Beecher, A. Locke, P. Aarrestad, C. Coomer, C. Estes, J. Hunt, R. Jacobson, G. Jöbssis, J. Kauffman, J. Marshall, K. Mayes, G. Smith, R. Wentworth, and C. Stalnaker. 2004. *Instream Flows for Riverine Resource Stewardship, Revised Edition*. Instream Flow Council, Cheyenne, WY. 268 pp.
- Best-Wong, B. 2015. Information Concerning 2016 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions. Memorandum to Water Division Directors, Regions 1-10. United States Environmental Protection Agency, Washington D. C. Available at https://www.epa.gov/sites/production/files/2015-10/documents/2016-ir-memo-and-cover-memo-8_13_2015.pdf
- Bunn, S. E., and A. H. Arthington. 2002. Basic principles and ecological consequences of altered flow regimes for aquatic biodiversity: *Environmental Management*, v. 30, no. 4, p. 492–507. [Also available at <http://dx.doi.org/10.1007/s00267-002-2737-0>.]
- Camp, Dresser and McKee (CDM). 1986. Minimum instream flow study. Final report to the Commonwealth of Virginia State Water Control Board, Annandale, Virginia.
- Carlisle, D. M., D. M. Wolock, and M.R. Meador. 2011. Alteration of streamflow magnitudes and potential ecological consequences—A multiregional assessment: *The Ecological Society of America, Frontiers in Ecology and the Environment*, v. 9, no. 5, p. 264–270. [Also available at <http://dx.doi.org/10.1890/100053>.]
- McManamay, R. A., D. J. Orth, J. Kauffman, and M. M. Davis. 2013. A database and meta-analysis of ecological responses to stream flow in the South Atlantic region: *Eagle Hill Institute, Southeastern Naturalist*, v. 12, no. 5, p. 1–36. [Also available at <http://www.bioone.org/doi/full/10.1656/058.012.m501>.]
- Novak, R., J. R. Kennen, R. W. Abele, C. F. Baschon, D. M. Carlisle, L. Dlugolecki, D. M. Eignor, J. E. Flotemersch, P. Ford, J. Fowler, R. Galer, L. Perras-Gordon, S. E. Hansen, B. Herbold, T. E. Johnson, J. M. Johnston, C. P. Konrad, B. Leamond, and P. W. Seelbach. 2016. Final EPA-USGS Technical Report: Protecting Aquatic Life from Effects of Hydrologic Alteration. EPA Report 822-R-16-007, USGS Scientific

Literature Citations
For the Southern Division, American Fisheries Society
Resolution on the
Inclusion of Hydrologic Alteration as an Impairment in State Water Quality Standards
Adopted January 25, 2019

- Investigations Report 2016-5164. Washington, D. C. [Also available at <https://www.epa.gov/sites/production/files/2016-12/documents/final-aquatic-life-hydrologic-alteration-report.pdf>]
- Petts, G.E. 2009. Instream flow science for sustainable river management: Journal of the American Water Resources Association, v. 45, no. 5, p. 1071–1086. [Also available at <http://dx.doi.org/10.1111/j.1752-1688.2009.00360.x>.]
- Poff, N. L., and J. K. H. Zimmerman. 2010. Ecological responses to altered flow regimes—A literature review to inform the science and management of environmental flows: Freshwater Biology, v. 55, no. 1, p. 194–205. [Also available at <http://dx.doi.org/10.1111/j.1365-2427.2009.02272.x>.]
- Southern Division, American Fisheries Society (SDAFS). 2007. Resolution on the development of instream flow programs. Available at: https://sd.fisheries.org/wp-content/uploads/2018/02/SDAFS_2007_InstreamResolution_with_AFS_heading.pdf
- United States Environmental Protection Agency (USEPA).1991. Technical support for water quality-based toxics control. EPA/505/2-90-001, PB-127415. United States Environmental Protection Agency, Washington D.C., [Also available at: https://www3.epa.gov/npdes/nutrienttraining/selectingareasonablepotentialanalysis/story-content/external_files/Technical%20Support%20Document%20for%20WQ-based%20Toxics%20Control.pdf]
- United States Environmental Protection Agency (USEPA). 1997. Guidelines for preparation of the comprehensive state water quality assessments (305(b) reports) and electronic updates. EPA Doc. No. 841-B-97-002A, 4-14. United States Environmental Protection Agency, Washington D.C. [Also available at: https://www.epa.gov/sites/production/files/2015-09/documents/guidelines_for_preparation_of_the_comprehensive_state_water_quality_assessments_305b_reports_and_electronic_updates_1997_volume1.pdf]