



SUSQUEHANNA RIVER BASIN COMMISSION

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LOW FLOW PROTECTION POLICY RELATED TO WITHDRAWAL APPROVALS

I. PURPOSE

The purpose of the Low Flow Protection Policy (Policy) is to provide implementation guidance to Susquehanna River Basin Commission (Commission) staff, project sponsors, and the public on the criteria, methodology, and process used to evaluate applications for water withdrawal projects consistent with the standards set forth in 18 CFR §806.23. Furthermore, it will be utilized to establish limitations or conditions on withdrawal approvals issued by the Commission to ensure that any flow alteration related to such withdrawals does not cause significant adverse impacts to the water resources of the basin, or to support a denial of any such application request where such standards cannot be met.

The Policy is grounded in contemporary science and will add clarity, transparency, and predictability to the project review and approval process under the Commission's regulatory program. The development, use, and stewardship of the basin's water resources requires the balancing of a range of interests and objectives, as outlined in the Susquehanna River Basin Compact. Through this Policy, the Commission intends to strike an appropriate and reasonable balance between both protection and use of basin water resources in its regulation of withdrawals.

II. INTRODUCTION

Withdrawals subject to review under 18 CFR §806.4 and the water withdrawals standards set forth in 18 CFR §806.23 may be limited, conditioned, or denied to avoid significant adverse impacts, including adverse cumulative impacts, to the water resources of the basin. In its consideration of potential adverse impacts, the Commission may consider factors, including but not limited to, the following: lowering of groundwater or streamflow levels; rendering competing supplies unreliable; affecting other water uses; causing water quality degradation that may be injurious to any existing or potential water use; affecting fish, wildlife, or other living resources or their habitat; causing permanent loss of aquifer storage capacity; or affecting low flow of perennial or intermittent streams.

In its review of withdrawal applications, the Commission establishes appropriate limitations, conditions, and mitigation to allow for reasonable water use, including conjunctive water use, while minimizing impacts from regulated withdrawals on downstream uses, including instream uses. Consistent with 18 CFR §806.23(b)(3), conditions may include, but not be limited to, the following:

1. Restrictions of the quantity, timing, or rate of withdrawal;
2. Limitations on the level of drawdown in a pond, lake, reservoir, stream or well; and
3. Streamflow protection measures.

Furthermore, the project sponsor may also be required to adhere to an operations plan that minimizes the potential for adverse impacts, including cumulative adverse impacts to water resources, investigate and provide for additional water sources and storage to meet the project's water demand, or prepare and implement a water resource development plan.

Protection of water resources from adverse impacts, including cumulative adverse impacts, from withdrawals extends to protecting the aquatic species, natural communities, habitat, and key ecological processes throughout the Susquehanna River Basin. Based on the assumption that population losses for species are proportional to habitat losses, the Commission uses the Instream Flow Incremental Methodology (IFIM) to predict habitat losses and determine low flow protection levels for applicable cold water streams in Pennsylvania and Maryland (SRBC, 1998). In the absence of specific, documented responses to flow alteration that could translate to quantitative thresholds of flow needs for the variety of species and habitats present in a basin as large as the Susquehanna, the Commission has evaluated how aquatic systems can be sustained by preservation of the long-term natural hydrologic variability of streams through ecosystem-based flow goals.

The Nature Conservancy (TNC), in cooperation with project stakeholders, including staff from the Commission and its member jurisdictions, conducted an Ecosystem Flow Study that culminated in the preparation of the "Ecosystem Flow Recommendations for the Susquehanna River Basin" report in November 2010¹. In the report, TNC presented a set of recommended flows to protect the species, natural communities, and key ecological processes within the various stream and river types in the Susquehanna River Basin. One of the most critical findings of the study is that seasonal flow recommendations are preferred to year-round flow recommendations as ecosystem flow needs are naturally seasonal. These flow recommendations, based on the Susquehanna River Basin ecosystem, are one of the original motivations that triggered revisions to the Commission's existing policies related to instream flow protection.

In consideration of the aforementioned study, further review of related environmental flow science, and in consultation with its member jurisdictions, the Commission adopts this Policy to provide specific implementation guidance governing the determination of passby flows and conservation releases to meet the standards set forth in 18 CFR §806.23, particularly that related to low flow protection contained in 18 CFR §806.23(b)(3). In doing so, the Commission recognizes that the science associated with low flow protection, and any technical guidance implementing that science, is subject to change and adaptation over time.

This Policy replaces Commission Policy No. 2003-01, *Guidelines for Using and Determining Passby Flows and Conservation Releases for Surface-Water and Ground-Water Withdrawal Approvals*, previously adopted in 2003.

¹ The Nature Conservancy (TNC). 2010. Ecosystem Flow Recommendations for the Susquehanna River Basin: Report to the Susquehanna River Basin Commission and U.S. Army Corps of Engineers. Harrisburg, Pennsylvania.

III. LOW FLOW PROTECTION REQUIREMENTS

A. General Overview

As noted above, the Commission may limit, condition, or deny an application for water withdrawal to avoid significant adverse impacts, including adverse cumulative impacts, to the water resources of the basin.

The associated “Technical Guidance for Low Flow Protection Related to Withdrawal Approvals” (Technical Guidance) will be used in the review of such applications related to streamflow protection measures specifically related to low flows and to support Commission determinations related thereto. In the review of applications, the Commission will utilize the aquatic resource classification system set forth in the Technical Guidance to classify the subject stream or river related to the withdrawal request and undertake hydrologic analyses at representative U.S. Geological Survey (USGS) stream gages to establish appropriate protective conditions.

Unless it determines that a proposed net withdrawal (e.g., the proposed withdrawal minus return flow in proximity to the point of withdrawal), considered both individually and cumulatively, is too low in magnitude in comparison to the natural or continuously augmented flow of a stream or river to have any appreciable effect, the Commission will impose a passby flow or conservation release condition in its approval. Specificity concerning the quantitative standards to be applied in that evaluation process is provided in the Technical Guidance. Each proposed water withdrawal will be evaluated: (1) individually as a maximum daily and instantaneous rate of withdrawal; and (2) cumulatively as the net maximum daily withdrawal in the drainage area upgradient of and including the proposed withdrawal.

Passby flows, conservation releases, and withdrawal limits as described in the Technical Guidance will be utilized by the Commission to protect streamflows and minimize impacts caused by regulated withdrawals during predetermined low flow conditions. In the event individual member jurisdictions have adopted more stringent requirements as part of their water withdrawal regulatory programs, the Commission will utilize said requirements pursuant to an administrative agreement with that member jurisdiction.

Passby flows, conservation releases, and withdrawal limits provide for low flow protection at the point of withdrawal, or in the case of groundwater withdrawals, at the point of impact on surface water flow. Requiring passby flows and conservation releases for low flow protection, coupled with withdrawal limits to maintain ecological limits of hydrologic alteration for seasonal and high flow protection, provides a comprehensive approach to meeting environmental flow protection objectives.

The return of more natural flow conditions when withdrawals are suspended ensures that water is available for downstream uses, including instream uses. Note that like consumptive use mitigation releases², passby flows and conservation releases are generally not intended to

² Consumptive use mitigation releases are complementary to passby flows and conservation releases; the Commission’s conceptual standards for consumptive use mitigation are described in the *Consumptive Use Mitigation Plan* (SRBC, 2008).

augment flows in such a way as to provide more flow to the waterway than would be expected to occur naturally. Low flow periods and drought events are natural occurrences and native resident species are adapted to periodic low flows. Ecosystem flow goals recognize that the entire flow regime, including the natural variability, is important in maintaining the diversity of the biological communities in streams and rivers. Resident species, however, are not necessarily conditioned for the more frequent low flow periods and severe flow alteration that could result from uncontrolled withdrawals.

B. Passby Flows

A passby flow is generally defined as a prescribed streamflow below which withdrawals must cease. The Commission uses passby flows for defining an operational limit in its approval of withdrawals, essentially making the withdrawals interruptible at a particular flow threshold(s) during periods of low streamflow.

Passby flows are associated with surface water and groundwater withdrawal approvals under 18 CFR §806.23. Passby flow requirements mandate that, while water is being withdrawn, a specified amount of water must be allowed to pass the point of withdrawal, or in the case of groundwater withdrawals, at the point of impact on surface water flow. Passby flow requirements are prescribed in the withdrawal approval and are site specific.

Surface water withdrawals from small impoundments, intake dams, continuously flowing springs, or other intake structures in streams and rivers may include conditions in the Commission's approval that require passby flows. Groundwater withdrawals that may cause a significant adverse impact to streamflow or other surface water features such as springs, wetlands, lakes and ponds, also may include conditions that require passby flows.

C. Conservation Releases

Reservoirs and large impounding structures can capture low, seasonal, and high flows and completely alter the flow regime of a stream. A conservation release is defined as a prescribed quantity of flow from an impoundment structure that must be continuously maintained downstream of the impoundment for low flow protection. Conservation releases are intended to prevent water quality degradation and adverse lowering of streamflow levels downstream of the impoundment, thereby protecting aquatic resources and other users. Conservation releases provide flow from storage, not only during the traditional dry season, but throughout the life of the reservoir, including the wet season when the reservoir is replenishing its storage during refilling.

Conservation releases required by the Commission are only associated with surface water withdrawal approvals under 18 CFR §806.23 if the surface water withdrawal is being drafted from, or augmented from, a large impounding structure. Any releases from large impoundments should, at a minimum, exceed the 7-day, 10-year low flow (7Q10) threshold for protection of downstream water quality from water withdrawals during drought flows. (The 7Q10 flow has typically been used as a design flow for dilution of effluent discharged from wastewater treatment facilities.) The Commission's "Consumptive Use Mitigation Plan" references the standard contained in its Comprehensive Plan, which states that flows to the Chesapeake Bay should not be diminished below the 1-in-20 monthly average flows in each of the months of

August, September, and October. Conservation releases imposed by the Commission will support these flow goals throughout the basin.

Inflow, storage, and outlet infrastructure and other site-specific constraints may prohibit implementing standard monthly or seasonal low flow protection conditions that are to be maintained year-round. Therefore, conservation releases required in an approval related to a withdrawal from a large impoundment will be determined on a case-by-case basis, with the goal of evaluating and balancing downstream needs with available storage and sustainable yield. Recommendations will be developed in coordination with the appropriate resource agencies of the member jurisdiction.

D. Withdrawal Limits

In order to preserve natural flow variability and meet seasonal flow protection objectives, the Commission may limit a proposed withdrawal rate to a percentage of the monthly passby flow or monthly median flow. This condition may be imposed when the proposed withdrawal has the potential to affect seasonal flow variability and/or result in unacceptable levels of hydrologic alteration. In establishing such a condition, the Commission will consider the ecosystem flow recommendations contained in TNC's "Ecosystem Flow Recommendations for the Susquehanna River Basin" (2010) or other related environmental flow protection scientific studies.

E. Cumulative Water Use Assessment

A proposed withdrawal, when considered in the context of accumulated net withdrawals of existing users within a watershed, may approach the threshold of adverse impact or threaten the sustainable yield of the supply. Section 3.10(3) of the Susquehanna River Basin Compact requires review of water withdrawals or uses where there is the potential for adverse cumulative impacts. The general parameters of the cumulative water use assessment currently utilized by the Commission to assess both the localized impact of withdrawals and the basin-wide implications of that use are now memorialized in this Policy and in the Technical Guidance.

F. Flow Variability

The Policy is based upon a tenet of the protection of the natural flow regime and the ecological processes it supports in the Commission's regulation of water withdrawals subject to review standards in 18 CFR §806.23. Maintaining flow regimes, and their natural variability, has been widely emphasized as a holistic approach to conserving the various ecological processes necessary to support freshwater ecosystems (Richter et al., 1997³; Poff et al., 1997⁴; Bunn and Arthington, 2002⁵). Instead of a single minimum flow, protection of the natural flow variability and the development of flow standards that provide for variable flow regimes with intra- and inter-annual variability can maintain or restore the natural form and function of

³ Richter, B.D., M.M. Davis, C. Apse, and C. Konrad. 2011. A presumptive standard for environmental flow protection, *River Research and Applications*. 10 p.

⁴ Poff, N.L., J.D. Allan, M.B. Bain, J.R. Karr, K.L. Prestegard, B.D. Richter, R.E. Sparks, and J.C. Stromberg. 1997. The natural flow regime: a paradigm for river conservation and restoration. *Bioscience* 47: 769-784 pp.

⁵ Bunn, S.E. and A.H. Arthington. 2002. Basic principles and ecological consequences of altered flow regimes for aquatic biodiversity. *Environmental Management* 30: 492-507 pp.

streams and the ecosystems they support (Annear et al., 2004⁶). TNC (2010) highlights the importance of high, seasonal, and low flows in supporting the ecological communities of the Susquehanna River Basin. Accordingly, this Policy avoids the use of a single annual passby flow/conservation release value for low flow protection and, instead, focuses on using a series of seasonal or monthly values that more accurately reflect seasonal variability with respect to streamflow and associated ecosystem needs.

IV. COORDINATION AND IMPLEMENTATION

Recommendations developed under this Policy and the Technical Guidance are subject to approval and action by the Commission. The Commission will actively coordinate with the appropriate agencies of its member jurisdictions in the review of water withdrawal applications and evaluations undertaken pursuant to this Policy and the Technical Guidance.

Passby flows and conservation releases other than those derived from the standard methodology in the Technical Guidance may be imposed if, after coordination on a case-by-case basis between the host member jurisdiction and the Commission, alternate passby or conservation release criteria can be established that meets the Commission's low flow protection objectives. This flexibility is intended to maximize consistency between the Policy and standards independently adopted by member jurisdictions, yet at the same time provide uniformity across the basin in meeting those objectives through a combination of withdrawal limits and passby flow or conservation release requirements.

In accordance with the Commission's Comprehensive Plan and 18 CFR §806.23, the Commission may for any project increase the passby flow or conservation release requirement above the amount determined using its standard methodology in the Technical Guidance, limit the withdrawal volume or rate, or deny a request for a new or increased withdrawal in cases where sensitive environmental resources or water quality may be adversely impacted. The Commission will not approve a proposed withdrawal that would violate an anti-degradation provision for the protection of existing water quality or would cause significant adverse impacts to the water resources of the Susquehanna River Basin. It will also consider any special designation or protection classifications adopted by its member jurisdictions in its review of specific water sources and the establishment of appropriate low flow protection standards for projects.

Pursuant to 18 CFR §806.14(b)(1)(iii), project sponsors may be required, at the discretion of the Commission, to undertake an alternatives analysis. Such analysis shall include an evaluation of whether there is an alternate source or location that: (1) meets the purposes of the project; (2) is technically feasible, economically feasible, and environmentally acceptable; and (3) would result in measurably less environmental impact than the proposed source or location.

Passby flows and conservation releases other than those derived from the standard methodology in the Technical Guidance may be imposed if: (1) an appropriate instream flow study demonstrates that lower thresholds will provide an acceptable level of aquatic habitat

⁶ Annear, T.C., I. Chisholm, H. Beecher, A. Locke, P. Asrrestad, C. Coomer, C. Estes, J. Hunt, R. Jacobson, G. Jobsis, J. Kauffman, J. Marshall, K. Mayes, G. Smith, C. Stalnaker, and R. Wentworth. 2004. Instream Flows for Riverine Resource Stewardship – Revised Edition. Instream Flow Council, Cheyenne, Wyoming.

protection; (2) in the case of an existing supply, it can be demonstrated that no viable alternative supply exists; or (3) a withdrawal from impaired waters is determined by the Commission to have overall water resource management benefits. Results of field studies conducted by the Commission, an agency of a member jurisdiction, or those pre-approved by the Commission and undertaken by the project sponsor will be considered in conjunction with the results of any Commission desktop low flow protection analysis undertaken in accordance with the Technical Guidance.

With regard to the review of an application to withdraw water from a water supply impoundment for which a member jurisdiction has issued an approval imposing a conservation release, the Commission will coordinate with the member jurisdiction to determine whether such condition is sufficient for low flow protection and otherwise meets the objectives of this Policy.

This Policy is applicable to the review of all applications for: (1) new withdrawal projects; (2) project modifications or renewals proposing to increase a surface water withdrawal; or (3) project modifications or renewals proposing to increase a groundwater withdrawal that may cause a significant adverse impact on surface water features, including streams, springs, wetlands, lakes or ponds.

This Policy is also applicable on a case-by-case basis where: (1) a project modification is proposed to physical features, operations or consumptive use that would increase its impact on streamflow or other surface water features; (2) a withdrawal project was previously unregulated but becomes subject to review and approval pursuant to 18 CFR §806.4; (3) a withdrawal project is subject to renewal; or (4) a project approval transfer is proposed that is subject to the requirements of 18 CFR §806.6(d). However, where the application of this Policy would result in the imposition of a new or modified passby flow or conservation release condition, the Commission will consider the technical feasibility, economic implications, environmental considerations, provision for water storage, flow augmentation measures, and any other pertinent factors it deems appropriate in its case-by-case determination of low flow protection requirements for such existing withdrawals.

For existing projects undergoing approval, modification, renewal or transfer, where the application of the Policy would result in the imposition of a new or modified passby flow or conservation release condition, the Commission may also establish interim operating conditions of appropriate duration on a case-by-case basis for such projects.

The Commission reserves the right, upon due notice to the project sponsor, to apply this Policy to any existing withdrawal project whenever it determines that continued operation of such project is causing, or may cause, significant adverse impact to the water resources of the Susquehanna River Basin.

In addition, nothing set forth in this Policy and the Technical Guidance prevents the Commission from varying from that guidance as specific circumstances may dictate, provided the actions comply with applicable statutory and regulatory authority. Finally, prioritization of water use during extreme low flow conditions is appropriately established by the Commission pursuant to its drought emergency powers under Section 11.4 of the Susquehanna River Basin Compact, in consultation with its member jurisdictions, rather than under this Policy.