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Policy Number: **Policy No. 2020-01**

Title: **Consumptive Use Mitigation Policy**

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Authority: Public Law 91-575, 84 Stat. 1509 *et seq*., Sections 3.1, 3.4(2), 3.5(1), 3.10, 4.1, 4.2, 7.1, 7.2, 12.2, 14.1, 14.2, and 15.1, 18 CFR §§ 801.0, 801.5, 801.6, 801.9, 806.4, 806.5, and 806.22.

Policy: The Susquehanna River Basin Commission (Commission or SRBC) established regulatory requirements for consumptive uses of water at Part 806. Section 806.22(b) specifies that all project sponsors whose consumptive use is subject to review and approval shall mitigate such consumptive use. Mitigation may be provided by one or a combination of methods listed, including other alternatives approved by the Commission. Some methods require operational changes during low flow periods designated by the Commission for consumptive use mitigation. Section 806.22(c) gives the Commission sole discretion for determining the acceptable manner of mitigation to be provided by project sponsors.

Through its consumptive use mitigation requirement, the Commission intends to address reductions in water availability during critical low flow periods to help protect public health and safety, avoid water use conflicts, prevent water quality impacts, sustain economic production, and support ecological flow needs throughout the basin. The Commission strives to encourage and undertake consumptive use mitigation projects through the administration of its regulatory program and its own activities funded by consumptive use mitigation fee payments. This includes pursuit of traditional water storage and low flow augmentation projects, as well as alternative methods including water conservation and reuse, groundwater recharge, and water quality improvements.

Purpose: This policy outlines the Commission's fundamental objective of consumptive use mitigation, defines contemporary standards for planning and implementing mitigation projects, provides insight into factors considered in determining an acceptable manner of mitigation, and expands the scope of alternatives for Commission initiated mitigation projects.

Applicability: This policy applies to the review of all consumptive use applications, including applications for new projects, project modifications proposing to increase consumptive use, project renewals, and notices of intent. The document has been developed to provide guidance to the regulated community and Commission staff regarding consumptive use mitigation requirements of the Commission. It may also be used by the public to gain information and insight on the Commission's approach to consumptive use mitigation.

Disclaimer: The policy outlined in this document is intended to supplement existing requirements. Nothing in this policy shall affect regulatory requirements. The policies and procedures herein are not an adjudication or a regulation. This document establishes the framework within which the Commission will exercise its administrative discretion in the future and provides guidance for how the Commission will fulfill its regulatory review requirements. The Commission reserves the discretion to deviate from this policy statement if circumstances warrant.

Page Length: 21 pages.

I. Introduction

The Susquehanna River Basin Commission has broad authority for water resources management under Articles 3, 4, 7, 14 and 15 of the Susquehanna River Basin Compact (SRBC, 1971). This includes a duty to adopt and promote uniform and coordinated policies for water resources conservation and management in the basin. The Commission also has the power to acquire and operate projects for the storage and release of waters, for the regulation of supplies of surface and ground waters of the basin, for the protection of public health, management and control of stream and water quality, economic development, fisheries, recreation, watershed management and other purposes. These obligations have been the impetus for development of the Commission's consumptive use management program.

The Commission first adopted consumptive use regulations in 1976. Consumptive use is generally defined as the loss of water due to a variety of processes by which the water is not returned to the basin undiminished in quantity. The Commission's intent is to ensure consumptive uses of water do not pose significant adverse impacts to water supply, water quality, and the environment, particularly during low flow periods. Accordingly, project sponsors whose consumptive use of water is subject to review and approval are required to mitigate such use. Mitigation may be provided by various methods outlined in the regulations.

In 1992, the Commission formally adopted a policy allowing monetary payment by project sponsors, in lieu of in-kind compensation, to permit the Commission to purchase water storage to provide consumptive use mitigation. While some sponsors have developed physical mitigation projects, the majority comply with the mitigation requirement via fee payment. This is driven by the limited scope of mitigation options, difficulty developing large-scale water storage, ease of compliance, and low mitigation fee. While the result is an increasing burden on the Commission to develop consumptive use mitigation projects, it is also an opportunity for uniform and coordinated low flow management in the basin.

The Commission's Comprehensive Plan (SRBC, 2013) includes a specific goal to manage consumptive use to mitigate impacts to the basin's water resources. Identified actions needed include implementing recommendations in the Commission's Consumptive Use Mitigation Plan (SRBC, 2008) and, in the absence of adequate water for local mitigation, restricting new water use to avoid impacts to vulnerable watersheds. Since its adoption in 2008, several recommendations in the plan have been addressed. The Commission's Cumulative Water Use and Availability Study (SRBC, 2016) provides a comprehensive assessment of water use and availability for basin watersheds, including consumptive use offsets from mitigation projects. These efforts have been instrumental in informing the Commission's contemporary approach to consumptive use mitigation.

Due to the ongoing evolution of this long-standing program, there is a need to define contemporary standards for planning and implementation of a cohesive network of mitigation projects. There is also a need to remove existing regulatory obstacles and expand the scope of mitigation alternatives to enable project sponsors and the Commission to develop more physical consumptive use mitigation projects with tangible benefits. These reflect the primary purpose and need for developing this policy.

A. Definition of Consumptive Use

Commission regulations define consumptive use as the "loss of water transferred through a manmade conveyance system or any integral part thereof (including such water that is purveyed through a public water supply or wastewater system), due to transpiration by vegetation, incorporation into products during their manufacture, evaporation, injection of water or wastewater into a subsurface formation from which it would not reasonably be available for future use in the basin, diversion from the basin, or any other process by which the water is not returned to the waters of the basin undiminished in quantity" 18 CFR § 806.3. Specific examples of consumptive use include the following:

- Transpiration due to irrigation, such as athletic fields and golf courses;
- Incorporation into products, such as concrete, food and beverage products;
- Evaporation, such as power plant cooling and losses from industrial processes;
- Subsurface injection, such as hydraulic fracturing; or
- Out-of-basin diversion, such as public water supply systems with a point of return (e.g. wastewater treatment plant discharge) located outside the basin.

B. Regulation of Consumptive Use

Commission regulations require all consumptive use projects subject to review and approval under § 806.4, § 806.5, § 806.6 or § 806.17 to submit an application or Notice of Intent and to be subject to the standards set forth in § 806.22. Except for out-of-basin diversions, public water suppliers are exempt from the consumptive use requirements. However, individual consumptive users using 20,000 gallons per day (gpd) or more connected to any public water supply are considered consumptive use projects and are required to meet consumptive use mitigation requirements. With the completion and operation of specific low flow augmentation projects at several locations in the basin, agricultural water use projects are not subject to consumptive use requirements where there is no out-of-basin diversion.[1]

Generally, projects that meet any of the following criteria are required to submit a consumptive use application to the Commission.

- Any project initiated on or after January 23, 1971, involving consumptive use of an average of 20,000 gpd or more in any consecutive 30-day period.
- Any project that existed prior to January 23, 1971 that: (1) registered its grandfathered consumptive use and increases that use by any amount over the quantity determined under § 806.44; (2) increases its consumptive use to an average of 20,000 gpd or more in any consecutive 30-day period; or (3) fails to register its consumptive use in accordance with § 806.41.
- For projects previously approved by the Commission for consumptive use, any project that increases its consumptive use above the previously approved amount.

[1] Agricultural water use projects are not currently subject to consumptive use mitigation requirements because SRBC member states have contributed to the purchase and operation of mitigating low flow augmentation projects on their behalf.

- Any project, regardless of when initiated, involving a consumptive use of an average of 20,000 gpd or more in any 30-day period, and undergoing a change of ownership, unless the project meets an exemption under § 806.4(b).
- Any unconventional natural gas development project in the basin involving a withdrawal, diversion or consumptive use, regardless of the quantity.

C. Objective of Consumptive Use Mitigation

The fundamental objective of the Commission's consumptive use mitigation program is to implement mitigation for regulated consumptive use during critical low flow periods to offset reductions in water availability in order to help protect public health and safety, avoid water use conflicts, prevent water quality impacts, sustain economic production, and support ecological flow needs throughout the basin and its watersheds. The overall intent of the program is not to fully offset the water resource and environmental impacts of droughts, which occur naturally in varying degrees of severity, but rather to address significant adverse impacts of Commission approved uses during crucial low flow conditions so water supplies, stream systems, and aquatic life remain functional and supportive of societal priorities during drought conditions.

In furtherance of this objective, the Commission strives to undertake and encourage consumptive use mitigation practices, projects and facilities both through the administration of its regulatory program and through its own activities funded by the consumptive use mitigation fee. To that end, the Commission will pursue the following traditional practices, projects and facilities for consumptive use mitigation:

- Identification and development of water storage for the purpose of surface water augmentation during low flow periods.
- Encouragement of the use of reservoirs or other stored waters, the operation of which does not unacceptably deplete surface water resources.

Recognizing that there may be insufficient water storage available in the basin to meet all mitigation needs, and that many project sponsors will not have access to storage or be able to secure it in smaller watersheds, the Commission intends to pursue achieving full or partial mitigation through alternative means, including but not limited to:

- Reduction of usage during low flow periods to quantities below regulatory thresholds on a peak day basis.
- Discontinuance of surface water withdrawals at low flow thresholds pursuant to the Commission's Low Flow Protection Policy.
- Implementation of projects that lead to greater water conservation, water reuse or recycling, or increased groundwater recharge.
- Implementation of projects or efforts that lead to enhanced resiliency of surface water resources through appropriate water quality improvements.

D. Standards for Consumptive Use Mitigation

Section 806.22(b) requires that all project sponsors whose consumptive use of water is subject to Commission review and approval mitigate their consumptive use. Mitigation may be provided by one, or a combination of the following methods:

- During low flow periods as may be designated by the Commission for consumptive use mitigation:
  - Reduce withdrawal, in an amount equal to the project's consumptive use, and utilize water from alternative surface water storage or aquifers, or underground storage facilities from which water can be withdrawn for a period of 45 continuous days such that impacts to nearby surface waters will not likely be at a magnitude or in a timeframe that would exacerbate present low flow conditions.
  - Release water, in an amount equal to the project's consumptive use, for flow augmentation from surface water storage or aquifers, or other underground storage facilities from which water can be withdrawn for a period of 45 continuous days such that impacts to nearby surface waters will not likely be at a magnitude or in a timeframe that would exacerbate present drought conditions.
  - Discontinue the project's consumptive use, which may include reduction to less than 20,000 gpd (peak use).
- Use, as a source of consumptive use water, surface water storage that is subject to maintenance of an acceptable conservation release.
- Provide monetary payment for actual consumptive use throughout the entire year in an amount and manner prescribed by the Commission.
- Implement other approved alternatives.

The Commission will approve the acceptable manner of mitigation to be provided by project sponsors whose consumptive use of water is subject to review and approval. Such determinations will be made after considering the project's location, source characteristics, anticipated amount of consumptive use, proposed method of mitigation, and other pertinent factors. Criteria pertinent to each of these consideration are discussed in Section VII.

II. Consumptive Use Mitigation Quantity

Commission regulations require project sponsors to mitigate their consumptive use. This refers to regulated consumptive use and does not extend to grandfathered consumptive use or consumptive use not subject to Commission review and approval. Over time, as changes in project ownership and consumptive use demands occur, regulated consumptive use quantities are expected to increase and necessitate additional mitigation. The Commission's Cumulative Water Use and Availability Study and Tool provide a mechanism for continued tracking of consumptive use and mitigation needs throughout the basin and its watersheds.

For projects providing mitigation by using water storage to satisfy project consumptive use or make flow augmentation releases to offset project consumptive use during low flow periods, the required mitigation quantity is equal to the project's actual consumptive use rate during those periods. This is intended to incentivize use reductions, as well as ensure water storage sources and releases are commensurate with actual use. Recognizing this quantity may

often be less than the project's approved peak day consumptive use amount, and vary daily due to operational and weather conditions, average monthly consumptive use quantities are to be used. For existing projects, these quantities are based on Commission required reported consumptive use data. For new or modified projects, these quantities are to be based on projected consumptive use data subject to verification and adjustment predicated on future reported data. For projects providing mitigation by monetary payment, the required mitigation quantity is equal to the project's actual consumptive use volume throughout the course of the year. This is intended to allow for a lower consumptive use mitigation fee applied over a calendar year.

III. Consumptive Use Mitigation Periods

Commission regulation § 806.22(b)(1) assigns the responsibility to designate low flow periods for consumptive use mitigation to the Commission. Projects providing mitigation by utilizing water storage to satisfy project consumptive use, utilizing water storage to make flow augmentation releases to offset project consumptive use, or discontinuing or reducing project consumptive use are required to do so during these designated periods. Based on past project experience, and extensive analyses of consumptive use and streamflow data, the Commission has formulated specific criteria for defining low flow periods requiring consumptive use mitigation. These criteria are outlined in the following subsections. However, the Commission recognizes that safeguarding sustainable flows to our watersheds and the Chesapeake Bay may also require consumptive use mitigation management year-round.

Projects providing mitigation by utilizing a surface water storage source that maintains an acceptable conservation release, providing monetary payment for actual consumptive use, or implementing other approved alternatives are typically required to do so year-round. Thus, the Commission does not apply designated low flow periods for mitigation for these projects.

A. Low Flow Monitoring Gages

Not all regions of the basin experience identical low flow conditions during dry weather periods, which has implications regarding monitoring of streamflow conditions and designating periods requiring consumptive use mitigation. Accordingly, the Commission has adopted a subbasin approach to analyzing, monitoring, and implementing consumptive use mitigation. The strategy relies on defining a long-term United States Geological Survey (USGS) stream gage in each of the basin's six major subbasins for use in planning and operating consumptive use mitigation projects. The Susquehanna River at Marietta, PA gage was added due to its location downstream of several significant watersheds, and its role in driving low flow operations at key electric generation and water supply projects, in the Lower Susquehanna subbasin. The six subbasins and their corresponding low flow monitoring gages are listed below in Table 1.

This low flow monitoring network serves as the primary driver of consumptive use mitigation operations at the subbasin scale. However, specific project or watershed scale mitigation requirements may dictate the need for additional monitoring gages to help avoid local impacts.

Table 1. Low Flow Monitoring Gages by Subbasin

Subbasin	USGS Gage Number	USGS Gage Name
Upper Susquehanna	01515000	Susquehanna River near Waverly, NY
Chemung	01531000	Chemung River at Chemung, NY
Middle Susquehanna	01536500	Susquehanna River at Wilkes-Barre, PA
West Branch Susquehanna	01551500	West Branch Susquehanna River at Williamsport, PA
Juniata	01567000	Juniata River at Newport, PA
Lower Susquehanna	01570500	Susquehanna River at Harrisburg, PA
Lower Susquehanna	01576000	Susquehanna River at Marietta, PA

B. Trigger Flow Values

For each low flow monitoring gage, there needs to be an established set of trigger flow values for defining low flow periods requiring consumptive use mitigation. This helps ensure a consistent and aggregated approach to addressing the consumptive use mitigation and low flow management needs of the basin.

Based on the *Ecosystem Flow Recommendations for the Susquehanna River Basin* (TNC, 2010) low flow recommendation of no change to the monthly 95 percent exceedance (P95) flow for streams greater than 50 square miles, this policy adopts monthly P95 as the standard trigger flow values for consumptive use mitigation. These values are aligned with the standard passby flow thresholds for Aquatic Resource Class (ARC) 6 – Large Rivers cited in the Commission's Low Flow Protection Policy (SRBC, 2012). The monthly P95 trigger flow values are also consistent with the surface water indicator threshold for entering into drought emergency conditions for New York, Pennsylvania, and Maryland counties within the basin.

C. Critical Low Flow Months

Although consumptive use occurs year-round, it has the greatest potential for significant adverse impact during the critical low flow months. Based on hydrologic and water use analyses, the months of August, September, and October have been designated as the most critical low flow months for consumptive use mitigation. These months have historically exhibited the lowest streamflow coincident with some of the highest consumptive use. Considering the potential significance of consumptive use and low flows during July and November, this policy also recognizes these shoulder months as critical for consumptive use mitigation. Accordingly, August trigger flows should be extended to cover July low flows and October trigger flows should be extended to cover November low flows. This approach provides a balance between optimizing use of water storage, and related assets, for consumptive use mitigation and instream flow protection.

By prioritizing mitigation for the July through November timeframe, implementation of mitigation measures has the greatest potential for instream flow benefits and impact avoidance. It also ensures mitigation assets are not exhausted prior to the onset of critical low flow conditions during months in which drought impacts have historically been most severe. Nonetheless, project or industry specific consumptive use patterns, and unique source characteristics or responses to water withdrawal, may justify the need for mitigation beyond these critical low flow months to ensure impact avoidance year-round.

D. Mitigation Duration

The critical low flow months defined above span a period of 153 days. It is impractical to require project sponsors to develop, utilize, and/or release water storage, discontinue consumptive use, or implement certain other alternatives for mitigation continuously over this entire period. Furthermore, historic low flow events in the basin have not typically exhibited sustained durations of this length. Based on hydrologic analyses using the low flow monitoring gages, trigger flow values, and critical low flow months described above, a mitigation duration of 45 continuous days would cover 95 percent of historic low flow events in the basin.

Balancing the risk of not having enough mitigation to cover 5 percent of historic low flow events with the cost of securing more than 45 days of water storage for infrequent use, the Commission defines 45 continuous days as the standard consumptive use mitigation duration. Still, particular mitigation methods may necessitate operations beyond the 45 day standard mitigation duration, even year-round, to help ensure an acceptable manner of mitigation is implemented.

IV. Basinwide and Local Watershed Mitigation

The objective of the Commission's consumptive use mitigation program extends throughout the basin and its watersheds. Consumptive use mitigation is meant to modulate impacts on a watershed level and on a basinwide level affecting the quality and quantity of water to the Chesapeake Bay, the river's six major sub-basins, and local watersheds. These impacts are generally avoided or mitigated by discontinuing use and/or replacing consumptively used water during low flow periods to avoid worsening conditions beyond the natural flow regime. As noted in the Commission's 2008 Consumptive Use Mitigation Plan: "The implementation of the mitigation can be driven by local conditions to protect the local stream source, or it can be driven by conditions at a downstream location, with the goal of not reducing inflows to the Chesapeake Bay beyond the 1-in-20-year (P95) monthly flows in August, September, and October."

Local impacts involve the withdrawal and consumptive use of water in individual watersheds. Basinwide impacts involve the cumulative effect of multiple consumptive uses at the subbasin scale, on mainstem river flow, and on inflow to the Chesapeake Bay. The forms of mitigation recognized by § 806.22(b)(1) generally provide mitigation for both local and basinwide consumptive use. A project can essentially cease its consumptive use by either reducing its withdrawal by an amount equal to its consumptive use and using alternate water storage or discontinuing consumptive use during a Commission designated low flow period. Alternatively, a project could augment flows from storage equal to its consumptive use quantity during low flow periods or draw water from a source that has a conservation release. Lastly, a project could pay a consumptive use mitigation fee to the Commission to satisfy its local and basinwide mitigation obligations and the Commission will find the water needed to mitigation for that project's consumptive use.

However, local and basinwide mitigation needs do not always coincide. Water flows to the Chesapeake Bay and water availability across the basin may be sufficient, while simultaneously insufficient flows and availability may be experienced at the local watershed level. Through its Cumulative Water Use and Availability Study (CWUAS), the Commission

found that while water availability across the basin was generally good, "[a]vailability was less than 5 million gallons per day (mgd) for 9 percent, and less than 1 mgd for 4 percent, of watersheds." (CWUAS, 2016, p. 3). Conversely, water flows may be critical at the sub-basin low flow monitoring gages, but could be sufficient for specific local watersheds.

The Commission has developed other policies and practices that affect consumptive use mitigation, especially at the local watershed level. The Commission's Low Flow Protection Policy provides for the implementation of passby flows set at P95 or more protective and can eliminate local stream impacts of surface and groundwater withdrawals of water for consumptive use, where they are applied. Like consumptive use mitigation, the imposition of a passby flow during the low flow months of July to November, helps ensure that water is available "to provide protection to streams from undue impact." (2008 Consumptive Use Mitigation Plan, p. 24).

It is the Commission's intent to improve its consumptive use mitigation program to allow for more effective accounting of mitigation efforts at the basin, regional sub-basin and local watershed levels, as well as, develop more tools for the Commission to employ to mitigate for impacts at all levels.

V. Consumptive Use Mitigation Methods for Project Sponsors

Section 806.22(b) outlines the mitigation requirements for project sponsors seeking a consumptive use approval from the Commission. Mitigation activities for consumptive use are generally triggered during low flow periods designated by the Commission, as outlined in Section III. The Commission determines the appropriate method for mitigation. The Commission does generally prefer for the project sponsor to look at whether it can provide mitigation at the source level, including discontinuance of use or utilization of water from storage or alternative sources during consumptive use mitigation periods. The Commission recognizes that physical mitigation by the project sponsor at or near the project site provides mitigation that protects against both basinwide and local watershed impacts. The Commission also recognizes that many project sponsors prefer to mitigate by paying a consumptive use mitigation fee for the Commission to implement consumptive use mitigation efforts from the pooled resources of many projects paying into a dedicated fund, because it is often the lower cost mitigation alternative for them and provides protection from liability if the mitigation efforts fail to produce the desired result. While the Commission does not prioritize the payment of the mitigation fee, the Commission acknowledges that it may be in a better position to coordinate and facilitate consumptive use mitigation projects as a government agency, than individual project sponsors could do on their own.

A. Utilize Surface, Underground Water or Other Storage to Reduce Withdrawals or Provide Low Flow Augmentation

Sections 806.22(b)(1)(i) and (ii) provide that a project sponsor may utilize alternative surface water storage, aquifers or other underground chambers, or other facilities for the storage of water for consumptive use mitigation that can either be used in lieu of its normal withdrawal or released directly into surface waters in an amount equal to its consumptive use. The storage should cover a period of 45 continuous days of the project's consumptive use and that can be

withdrawn such that there is insignificant likelihood of impacts to nearby surface waters at a magnitude or in a timeframe that would exacerbate present drought conditions.

The storage source could be an impoundment, lake, inactive quarry pool, aquifer, flooded mine, storage tank or other source; supplied by surface water, groundwater or other water source. The storage could be owned or controlled by the project sponsor, or owned by others and contracted for by the project sponsor. In its review, the Commission will evaluate the potential daily yield, the volume of available storage, the connectivity with groundwater and surface water features, and the orientation and proximity to the project. If being used as the alternate source of water for a project's consumptive use, the quality of the stored water would have to be acceptable for purposes of the project. If being released to a stream, the quality of the water source, raw or treated, would have to meet applicable federal and state requirements regarding discharges to receiving streams in the basin. However, evaporation from on-site structures (ponds, basins, etc.) constructed for the purpose of supplying mitigation water or reducing or dampening withdrawal rates will not be subject to consumptive use mitigation requirements.

Using storage for mitigation must add water to the system to offset or compensate for losses related to the consumptive water use. Previously, the Commission looked to storage that was generally hydraulically isolated from surface waters. The Commission clarified its regulations to state that storage should not have a direct, short-term impact to surface water flows. Accordingly, a storage asset does not necessarily need to be hydraulically isolated; however, the impacts from the withdrawal during low flow periods should be such that there is insignificant likelihood of impacts to nearby surface waters at a magnitude or in a timeframe that would exacerbate present drought conditions. This could include a reduced withdrawal from a backup groundwater well sited in an aquifer with adequate storage capacity to temporarily buffer impacts to baseflow in an adjacent stream. It might also entail pumping water from a flooded limestone quarry, not in direct communication with the nearby stream, and releasing it to augment flow. There may still be some level of impact at some point in time, from the reliance on storage to withdraw or release water during low flow periods, as long as it is attenuated during the consumptive use mitigation period. The withdrawal from, or release of, storage should not divert natural groundwater discharge or augmented surface flows, or in any way further diminish natural inflow to the river systems during the consumptive use mitigation period. Any impacts from a withdrawal should occur outside of the consumptive use mitigation period, when hydrologic conditions are beginning to recover or flows have returned to normal levels, such that there is insignificant likelihood of impacts to nearby surface waters at a magnitude or in a timeframe that would exacerbate present drought conditions.

The storage volume should be sufficient to supply, or provide releases offsetting, the project's daily consumptive use during the consumptive use mitigation period. Non-consumptive water could continue to be withdrawn from the primary source(s); however, withdrawals from any source may not be used to contribute to storage during the mitigation period. If the mitigation resources are not sufficient to provide coverage for the entire consumptive use over a period of 45 continuous days, an additional mitigation method must be proposed to be implemented after the volume of storage has been depleted. In its review of a proposed source of storage, the Commission will also evaluate its potential to be refilled within a reasonable period of time.

B. Discontinue Consumptive Use

In lieu of providing physical mitigation water, a project sponsor may discontinue all of its consumptive use during the consumptive use mitigation period under § 806.22(b)(1)(iii). Withdrawals related to other non-consumptive project uses and operations would not be affected. Discontinuance of use is the most effective method of mitigation because it reduces or eliminates the water use during Commission low flows periods and does not depend on any further action by the Commission or project sponsor in order to be effectuated. Accordingly, in order to encourage discontinuance as a potential mitigation option for project sponsors, the Commission will consider discontinuance to include reduction in consumptive use to less than 20,000 gpd (peak day) during low flow periods. This avoids the requirement to reduce the use altogether and makes discontinuance a more viable option for project sponsors willing and able to employ the practice as consumptive use mitigation.

The Commission recognizes that some project sponsors face operational challenges where the project does not have storage and its only source(s) may be subject to a passby flow requirement. Such projects are typically put in a situation where they need to seek an Emergency Certificate to proceed with operations to preserve physical assets or viable continued operation. Some projects may be able to operate at a level of 20,000 gpd of consumptive use during low flow periods. For example, a golf course may be able to water its bentgrass tees and greens to preserve those areas during low flow periods. Where a project sponsor requests to mitigate its consumptive use by discontinuing its use below 20,000 gpd and does not have sufficient storage or alternative sources without passby flows, the Commission would consider that a pertinent factor in a case-by-case determination of whether the low flow protection requirements would strictly apply to its water withdrawal under the Commission's Low Flow Protection Policy.

In any case of failure to discontinue the project's use, in addition to any compliance action under 18 CFR Part 808, the project shall provide mitigation in the form of payment of the mitigation fee, for the calendar year in which such failure occurs, and the Commission will reevaluate the continued acceptability of the discontinuance as mitigation.

C. Utilize Surface Water Storage with Conservation Release

Pursuant to § 806.22(b)(2), a project sponsor may satisfy its consumptive use mitigation obligations by using water withdrawn from a storage impoundment that maintains a required conservation release acceptable to the Commission. A conservation release is a prescribed quantity of flow from an impoundment structure that must be continuously maintained downstream for low flow protection. Conservation releases protect aquatic resources and downstream uses, prevent water quality degradation, and significant adverse lowering of streamflow levels.

The mandated flow must be released throughout the life of the impoundment, not only during periods of low flow, but also when the reservoir is refilling to replenish its storage. The impoundment may be publically or privately owned. However, public water supply reservoirs serving as the system's primary water supply source commonly do not have sufficient storage to assure releases during extended droughts. If the conservation release is not provided, in addition to any compliance action under 18 CFR Part 808, the project shall provide mitigation in the form

of payment of the mitigation fee, for every day in the calendar year in which water was consumed, and the Commission will reevaluate the continued acceptability of the conservation release as mitigation.

The Commission has reevaluated its policy of what is an acceptable conservation release in light of the provisions of the Low Flow Protection Policy and the recent changes to the duration of the consumptive use mitigation period. Accordingly, there may be project sponsors with dockets that include conditions styled as conservation releases, passby flow releases, or other low flow releases that would qualify as acceptable conservation releases to meet consumptive use mitigation under § 806.22(b)(2), either as currently written or with some potential reductions in the quantity of consumptive use for low flow periods. For example, a project sponsor with a reservoir source that has a conservation release requirement consistent with the specifications outlined in the Commission's Low Flow Protection Policy may qualify as having acceptable consumptive use mitigation. However, the Q710 flow is not acceptable as a conservation release for consumptive use mitigation. Project sponsors with these types of conditions are encouraged to contact the Commission to determine if their mitigation provision can be revaluated.

D. Provide Monetary Payment

Project sponsors are encouraged to thoroughly evaluate the mitigation methods outlined above, as well as other alternatives described in the next section, before proposing to provide monetary payment as their means of providing consumptive use mitigation. The payment of fees for actual consumptive use over the entire year is intended to efficiently aggregate mitigation needs of individual consumptive use projects and provide funds to allow the Commission to undertake the acquisition and maintenance of large-scale mitigation projects. These projects provide releases during consumptive use mitigation periods on behalf of the consumptive use projects paying the fee. Rather than replacing the consumptive use actually occurring at that time, water is generally released according to an operational schedule to augment streamflows whenever the flow at a low flow monitoring gage drops below a specified level.

The payment, remitted to the Commission after each quarter of operation throughout the year, is based on the actual reported daily consumptive use multiplied by the mitigation rate published in the Commission's Regulatory Program Fee Schedule. The mitigation rate may be adjusted by the Commission annually. By accepting the fee, the Commission undertakes the obligation for developing and maintaining consumptive use mitigation projects and sources.

E. Implement Other Alternatives

Other alternatives may be acceptable if shown to contribute to offsetting consumptive use during mitigation periods. The Commission encourages project sponsors to evaluate alternative methods, including a blending of the mitigation methods listed above. Alternative methods might also include extraordinary water conservation measures, utilization of lesser quality waters for consumptive use, consumptive use avoidance through use of alternative types of highly efficient cooling technologies or other non-traditional means of consumptive use mitigation. As appropriate, the Commission in the future may develop criteria for the consideration of treatment

of abandoned mine discharge, floodplain protection, recharge enhancement and other best management practices as acceptable consumptive use mitigation.

Passby Flows. The Commission has developed other policies and practices that affect consumptive use mitigation, especially at the local watershed level. Implementation of passby flows set at P95 or more protective can help eliminate local stream impacts of surface and groundwater withdrawals of water for consumptive use, where they are applied. Similar to consumptive use mitigation, the imposition of a passby flow during the low flow months of July to November, helps ensure that water is available "to provide protection to streams from undue impact." (2008 Consumptive Use Mitigation Plan, p. 24). As noted in CWUAS:

> A passby flow is a prescribed streamflow at which a withdrawal must cease. The Commission uses passby flows for defining an operational limit in its approvals of water withdrawals, essentially making the withdrawal interruptible at a particular flow threshold(s) during periods of low monthly streamflow. As such, passby flows can be effective at providing instream flow protection by reducing water use during low flow conditions. (CWUAS, 2016, p. 66).

The Commission's analysis in CWUAS supports recognizing the role played by passby flow requirements during the July through November months in mitigating the local impacts at the individual watershed level. For projects that include both a water withdrawal subject to a passby flow requirement and a consumptive use mitigated through payment of the consumptive use mitigation fee, the Commission will recognize the passby flow as partial mitigation of the consumptive use, as appropriate.

Projects with passby flows do not categorically satisfy the basinwide impacts of consumptive use. This is because the basinwide triggers for low flow conditions triggering consumptive use mitigation do not completely coincide with the passby flow triggers. Moreover, even when a project is under a passby flow restriction, it is not the same as discontinuance of consumptive use. Indeed a project with a consumptive use approval and a withdrawal docket with a passby flow is still able to consumptively use water during a low flow event and may refill storage or obtain other water to use during this time, whether it be from other sources that may not be on passby flow restrictions, such as groundwater wells or other surface water sources, or from public water supplies or third party water purveyors. Accordingly, there is still a need for mitigation at the basinwide level, even though passby flow restrictions provide a level of protection for local impacts and provide consumptive use offsets for mitigation purposes.

Accordingly, the Commission will recognize passby flow restrictions of P95 or more protective for non-*de minimis* withdrawals during the months July through November as providing an alternative method of partial consumptive use mitigation for local watershed impacts. For projects paying the consumptive use mitigation fee, they will pay 50 percent of the fee as currently calculated to allow the Commission to continue to provide basinwide mitigation for the continued consumptive use during basinwide low flow events. For projects that have P95 or more protective passby flow requirements for less than the entire July-November period, the reduction of the mitigation obligation will be pro-rated as appropriate.

VI. Commission Initiated Consumptive Use Mitigation Methods

Since 1985, the Commission has maintained a "Water Management Fund" to aggregate mitigation money that "may be used to finance the cost of water supply related projects, including costs associated with the planning, engineering, design and construction phases of new projects or the reformulation of existing reservoirs, or any other project or study initiated by the Commission to address the cumulative impact of consumptive water use or otherwise to support low flow management in the Susquehanna River Basin." (Water Management Fund Policy, Policy No. 95-02, Revised June 8, 2005). Water resources are neither limitless nor equally distributed across the basin, and in some watersheds the demand for and use of water resources may be approaching or exceeding the sustainable limit, especially during low flow events. The Commission has typically relied on traditional water supply alternatives, such as the development and release of water from large storage reservoirs, or development of operational alternatives, such as conservation releases to mitigate for Commission approved consumptive uses during droughts. These traditional water supply alternatives work well in addressing the basinwide consumptive use effects on mainstem rivers and flows to the Chesapeake Bay. However, the Commission does not possess many tools to address local consumptive use impacts in watersheds that are water challenged or potentially stressed. In order to provide a more robust set of tools to address local watershed issues, the Commission is exploring other projects focused on demand modification alternatives and environmental improvement and water quality alternatives. While the traditional water supply approach will remain the backbone of the Commission's consumptive use mitigation program, the Commission adds these other alternatives to better ameliorate local impacts and improve the resiliency of basin watersheds to drought and low flow conditions.

A. Water Supply Alternatives

The Commission has a long-standing partnership with the United States Army Corps of Engineers (USACE) regarding water supply storage and low flow management in the basin. This includes a 1986 water supply agreement for nearly 23,500 acre-feet of water supply storage at Cowanesque Lake purchased to provide consumptive use mitigation for Susquehanna Steam Electric Station, Montour Steam Electric Station, and Three Mile Island Nuclear Generating Station. It also includes a 1994 water supply agreement for approximately 4,200 acre-feet of water supply storage at Curwensville Lake purchased for consumptive use mitigation in the basin. The Commission has cost-shared numerous other water supply and low flow management studies with USACE, including the recent Susquehanna River Basin Low Flow Management Study, which was initiated to assess ecosystem flow needs, particularly during low flow conditions, and evaluate consumptive use management and reservoir release alternatives to address them.

The Commission intends to continue to explore prospects for securing additional water supply storage at USACE reservoirs. Beyond traditional water supply study pathways, updates to the Water Resources Reform and Development Act and Water Supply Rule should provide additional opportunities and streamlined processes. Beyond federal reservoirs, the Commission will also continue partnering on studies and projects involving state and private owned water supply assets, ranging from state park lakes, to water supply reservoirs, to flooded mine pools and quarries. In doing so, there are numerous opportunities to partner on upgrading dam

infrastructure, enhancing recreational features, and improving ecosystem flows, while also expanding the network of water storage assets available for mitigating consumptive use during low flow periods and droughts.

B. Project Operation Alternatives

The Commission has worked with various federal, state, and private partners to implement project operation alternatives aimed at providing low flow augmentation and consumptive use mitigation. This includes an environmental improvements study at Whitney Point Lake, which resulted in the elimination of a 7 foot winter drawdown and utilization of 8,500 acre-feet of water storage for making low flow augmentation releases. The Commission and Pennsylvania Department of Environmental Protection (PADEP) partnered on the development of the Lancashire 15 Abandoned Mine Drainage (AMD) Treatment Plant, which can provide up to 10 mgd of treated low flow augmentation from mine pool storage for agricultural consumptive use mitigation. The Commission also entered into an agreement with the Pennsylvania Department of Conservation and Natural Resources (PADCNR) and Pennsylvania Fish and Boat Commission (PFBC) to coordinate planned maintenance releases from state park lakes to also provide consumptive use mitigation and ecosystem flow protection.

The Commission plans to continue examining options for implementing additional project operation alternatives at existing water storage assets throughout the basin. Beyond federal and state partnership projects, there are opportunities for attaining low flow augmentation and/or conservation releases at various hydroelectric, public water supply, and recreational reservoirs. Similar to water supply alternatives, these operational modifications also afford partnership opportunities for upgrading existing infrastructure, including recreational facilities. Formulating and implementing updated drought operation plans, including use of auxiliary and emergency supplies, is another project operation alternative the Commission intends to advocate for consumptive use mitigation. This could entail conjunctive use of water, in which back-up groundwater supplies are developed for use in replacing primary surface water sources during low flow periods, thus functioning as a buffer during times of limited water availability. Each of these alternatives presents opportunities to engage in partnerships and cost sharing arrangements that could ultimately increase water supply reliability while at the same time addressing consumptive use mitigation needs.

C. Demand Modification Alternatives

To further the Commission's objective to address significant adverse impacts of Commission approved uses during critical low flow conditions so streams and aquatic life remain functional and supportive of societal priorities during drought conditions, the Commission has expanded its traditional scope of mitigation alternatives. This includes pursuing the implementation of projects that lead to greater water conservation, water reuse or recycling, or increased groundwater recharge.

Generally, projects that decrease the amount of water used or amount of water that needs to be withdrawn from a watershed or that might increase the amount of water available to be withdrawn would be considered demand modification alternatives. These alternatives could include, but not be limited to:

- *Greater Water Conservation*: The Commission will explore water conservation greater than what is required by § 806.25. This may include development of water conservation best practices, water conservation education and outreach, or entering partnerships with public water suppliers and consumptive users of water to invest in water conservation technology.

- *Water Reuse or Recycling*: The Commission will consider opportunities for water reuse and recycling. This may include development of reuse or recycling projects or entering partnerships with consumptive users of water to invest in water reuse and recycling technology.

- *Increased Groundwater Recharge*: The Commission will evaluate and consider projects leading to increased groundwater recharge. This may include development, implementation and technical and financial assistance to public water suppliers and others to implement better source water protection, conversion of impervious to pervious surfaces, and installation of stormwater best management practices (BMPs) that maximize recharge.

D. Environmental and Water Quality Alternatives

To further the Commission's objective to address significant adverse impacts of Commission approved uses during critical low flow conditions so streams and aquatic life remain functional and supportive of societal priorities during drought conditions, the Commission has expanded its traditional scope of mitigation alternatives and intends to pursue, alone or in partnership with project sponsors, the implementation of projects that lead to enhanced resiliency of water resources through appropriate water quality improvements.

Environmental and Water Quality Alternatives will enhance and improve the resiliency of water resources to drought, low flow, and changing climate conditions through appropriate water quality improvements. These alternatives could include, but are not limited to:

- *Restoration of Wetlands and Naturally Flowing Waterways*: The Commission will explore and implement efforts to restore wetlands, remove legacy dams, and improve habitat in the surface waters of the basin.

- *Treatment of Abandoned Mine Drainage*: The Commission will evaluate and implement projects that treat abandoned mine drainage. The Commission will prioritize treatment projects that could add water into the systems during low flow events and projects that could improve the water quality of existing impoundments that may make them available to be supply sources for consumptive use mitigation.

- *Installation of Retrofitted Stormwater BMPs*: The Commission will work with partners to implement and install retrofitted BMPs in areas of greatest need. The Commission would prioritize stormwater projects that would increase groundwater infiltration or lead to significant water quality benefits.

- *Floodplain Preservation/Reconnection and Riparian Buffers*: The Commission will assist in development of floodplain preservation/reconnection projects and establishment and expansion of riparian buffers along the surface waters of the basin.

VII. Consumptive Use Mitigation Factors

The regulations provide that the "Commission, in its sole discretion, [shall] determine the acceptable manner of mitigation to be provided by project sponsors whose consumptive use of water is subject to review and approval." § 806.22(c). The regulations also state that the Commission may modify the manner of mitigation required in a project approval. Due to the consumptive use program's focus on basinwide impact avoidance and supporting flows to the Chesapeake Bay as well as local watershed impacts, the Commission may consider a broad scope of mitigation methods, based on individual project characteristics and constraints.

The Commission is increasingly concerned about the availability of water to meet immediate and future needs to satisfy a growing population and increasing demands for drinking water, freshwater inflow to the Chesapeake Bay, power generation, industrial activity, commercial uses, recreation and ecological diversity. In making its determination concerning the mitigation method(s) proposed by a project sponsor, the Commission will consider: the project's location; water source characteristics; anticipated amount of consumptive use; proposed method of mitigation and their effects on the purposes set forth in § 806.2; and any other pertinent factors. These factors are described below to inform various elements of project planning and preparation of a proposed mitigation method(s).

A. Project Location

The Commission recognizes that proposed facility locations in particular areas of the Basin can exacerbate issues and impacts related to consumptive use due to overall limited water availability, increasing and competing demands, and higher water quality.

Limited Water Availability. Hydrologic settings with limited water capacity available, such as Water Challenged Areas identified in the Commission's Groundwater Management Plan, Potentially Stressed Areas, areas along the Basin divide, and areas identified in the CWUAS, pose a serious challenge for securing consumptive use mitigation water. As appropriate, Resolution No. 2015-02 requires that project sponsors proposing consumptive water use for the purposes of cooling must consider the use of dry cooling technologies to reduce consumptive use.

Increasing and Competing Demands. The location of a project in an area with limited water availability will also be a factor used by the Commission in determining the manner of acceptable mitigation. Project sponsors proposing consumptive water use in these settings should consider using available technologies to avoid/reduce consumptive use.

Water Quality. Certain high quality settings with state designated use protections indicative of unique chemical and biological conditions may be particularly sensitive to water use impacts. The location of a project in areas of higher water quality will be considered in determining the manner of acceptable mitigation.

B. Source Characteristics

The specific characteristics of the water source are considered in determining the acceptable manner of mitigation. This includes the source type, surface or groundwater, and water quantity and quality.

Consumptive uses utilizing stream sources are more likely to have an immediate impact on low flow conditions than sources such as impoundments and groundwater that typically exhibit a delayed influence on low flows as a function of water storage. This would also hold true for a small withdrawal relative to the main stem river. These moderated effects due to storage dynamics may suggest that localized mitigation is not as critical as it might be for consumptive uses directly from riverine sources.

Source water quantity and quality are key factors to be considered regarding acceptable consumptive use mitigation. Larger surface water sources are less sensitive than those in areas with limited water availability to impacts from consumptive use. Sources with compromised water quality may be preferable options for consumptive use as compared to pristine sources, as described in SRBC Resolution No. 2012-01 adopting a policy for use and reuse of lesser quality waters.

C. Consumptive Use Quantity

The magnitude of the consumptive use will be evaluated as an absolute quantity, a quantity relative to the drainage area at the point of impact of the withdrawal, and a cumulative quantity of consumptive use in the hydrologic subbasin. Available and economical water conservation measures may be evaluated as appropriate to reduce the amount of consumptive use and burden of mitigation given the water availability within a particular hydrologic setting and to the proper conservation of the waters of the basin.

In addition to the *maximum* amount of water reasonably expected to be consumed on a peak day of project operation requested in an application, the Commission will also evaluate for each calendar month the average amount of water reasonably expected to be consumed, based on projections for new projects or monitoring data for existing projects. These data may be used to demonstrate the seasonality of consumptive use, capacity limitations or variability in product demand with a special focus on the July to November period.

D. Mitigation Method

Proposed mitigation methods will be evaluated for feasibility and effectiveness of consumptive use mitigation, as a local solution to potential impacts at the source, for cumulative impacts in the watershed, and mitigation for basinwide impacts.

Mitigation Location. In consideration that mitigation is based on the elimination of manmade impacts caused by consumptive use during low flows and the return to natural flow conditions, location of mitigation affects both the level of local benefits and basinwide impacts.

Regardless of the method, any mitigation located at the project site most effectively eliminates potential significant adverse impacts, locally and basinwide, and therefore is generally preferred by the Commission.

Location should be evaluated for overall proximity and the potential benefits from mitigation at a selected location. In descending order, the general desirability of mitigation locations is:

- at the project site;
- upstream of the project in the same watershed;
- downstream of the project in the same watershed;
- upstream of the project in the same subbasin; and
- downstream of the project in the same subbasin.

Consumptive Use Mitigation Sources. Proposed water sources should be feasible to develop, have sufficient storage volume to meet the needs of the project, have acceptable water quality for use or discharge, and provide mitigation that benefits the water resources of the Basin. Due to the wide variety and numerous types of potential water sources, each proposed source will be evaluated in accordance with site specific criteria in addition to the general criteria outlined below:

- Water sources should be surface water storage, aquifers or other underground storage chambers, or facilities available during low flow periods in the basin.
- As appropriate, water sources should be available for releases for flow augmentation during low flow periods in the basin, typically from July through November.
- As appropriate, water sources should have adequate storage volume for direct withdrawals that satisfy the project's consumptive use.
- Water sources should be either hydraulically isolated or capable of providing releases of water to augment streamflow such that there is insignificant likelihood of impacts to nearby surface waters at a magnitude or in a timeframe that would exacerbate present drought conditions.
- The storage volume should be sufficiently large enough to satisfy or offset consumptive use for a mitigation period of 45 continuous days, or some portion thereof.
- The quality of the water source, raw or treated, should be able to meet applicable federal and state requirements regarding discharges to receiving streams in the basin.
- Release rates from water sources should be appropriate considering the natural flow regime and hydraulic capacity of the receiving stream.

Monetary Payment. As stated previously, project sponsors are encouraged to thoroughly evaluate the mitigation methods outlined above, as well as other alternatives described in the next section, before proposing to provide monetary payment as their means of providing consumptive use mitigation. The decision to accept the consumptive use fee instead of other mitigation options is based primarily on the magnitude of the consumptive use itself, relative to the drainage area at the point of impact, and the cumulative water use in the subbasin.

Project sponsors intending to undertake large projects, generally having a consumptive use of 5 mgd or more, require substantial capital investment and benefit from project planning efforts and significant professional expertise. Therefore, it is more likely that the project sponsor also has the capability to acquire storage for consumptive use mitigation. For these projects, payment of the fee may not be acceptable as the exclusive method of mitigation.

If the magnitude of consumptive use is large relative to the size of the drainage area, the Commission will evaluate issues related to project location and the fee may not be acceptable as the exclusive method of mitigation.

E. Other Factors

With due regard for all approval standards, applicable laws, and other safeguards, the Commission may consider other pertinent factors in making its determination of the acceptable manner of mitigation to be provided by project sponsors. Although the pertinent factors will be specific to a particular project, in general, these may include:

- *Extraordinary Water Conservation, Reuse, and Recycling*: This could include consumptive use projects proposing to implement water conservation measures that significantly exceed the Commission's standards cited in 18 CFR § 806.25, use and reuse lesser quality water as a primary source as encouraged by Commission Resolution No. 2012-01, or employ dry cooling technology for power generation and other facilities as described in Commission Resolution No. 2015-02. Although not a direct offset of consumptive use, these techniques can complement other initiatives by decreasing the amount of water (or higher quality water) consumptively used, thus lessening the impact of consumptive use on the water resources of the basin.

- *Public Health and Safety*: This could include consumptive use projects involving out-of-basin diversions for legitimate public welfare considerations, remediation and treatment facilities to address groundwater contamination, spills, suppression of underground mine fires and other projects related to public health and safety.

- *Economic Significance*: This could include consideration of economic development factors and an evaluation of costs, benefits, trade-offs and drawbacks of various options for providing effective consumptive use mitigation.

- *Water Challenged or Potentially Stressed Areas*: The Commission may look for opportunities to partner with project sponsors located in areas with more limited water availability to test innovative water conservation or reduction techniques and technologies and better manage the water resources at the local watershed level.