SURFACE WATER WITHDRAWALS & LOW FLOW PROTECTION POLICY

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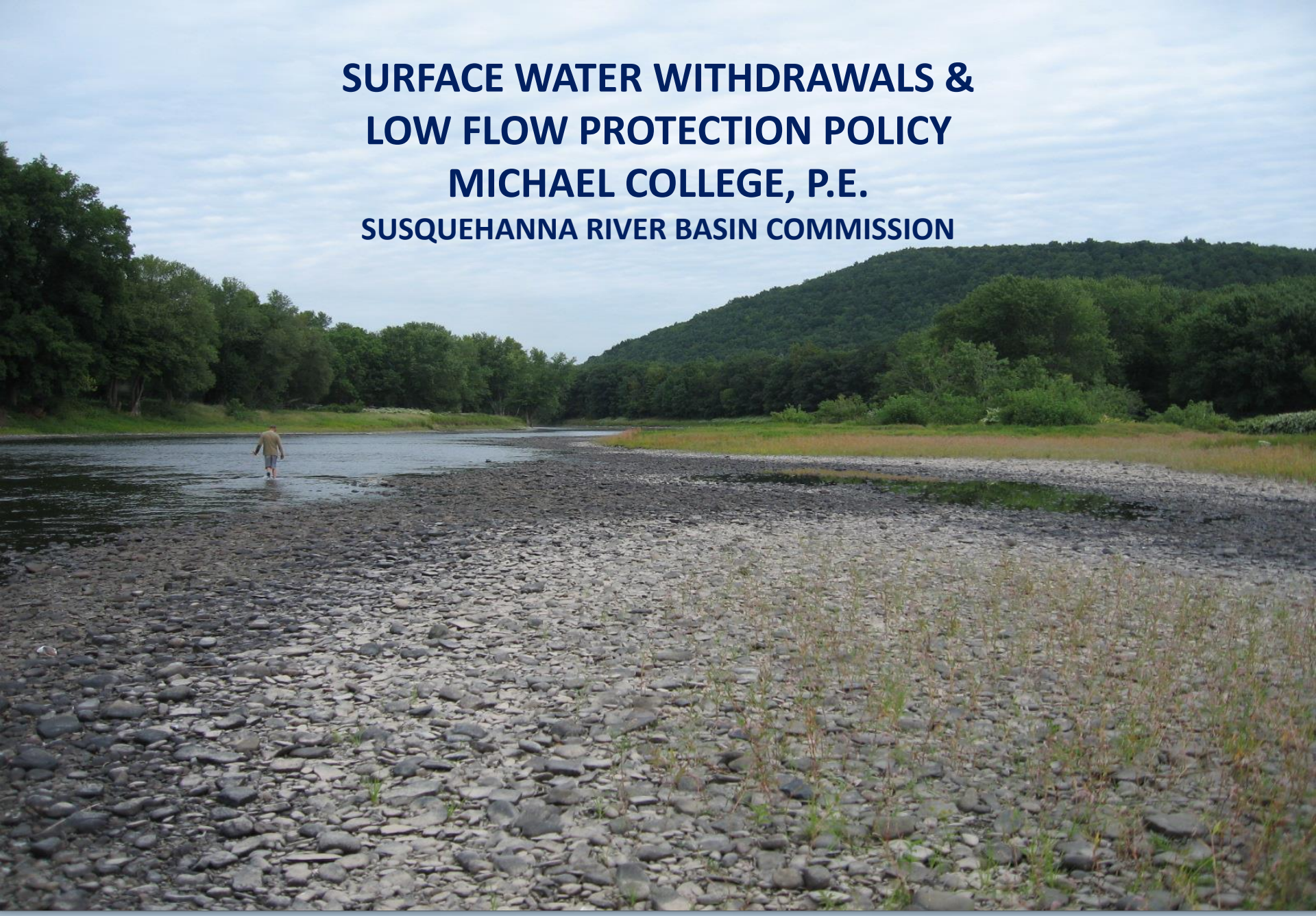
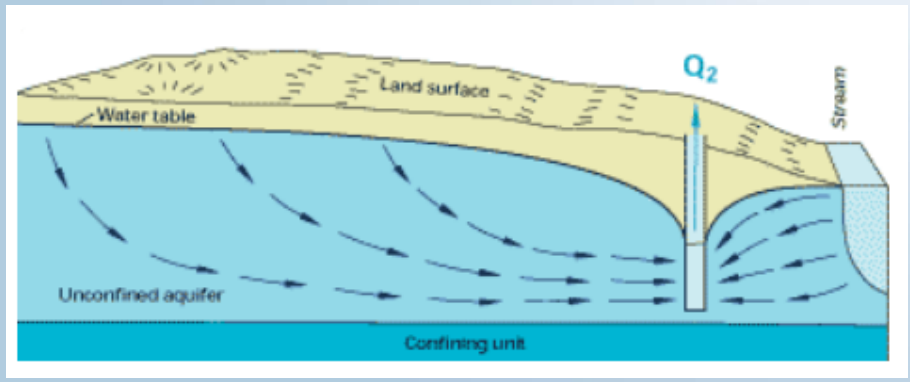
SUSQUEHANNA RIVER BASIN COMMISSION



SCENARIOS

Direct withdrawal from surface water (SW):

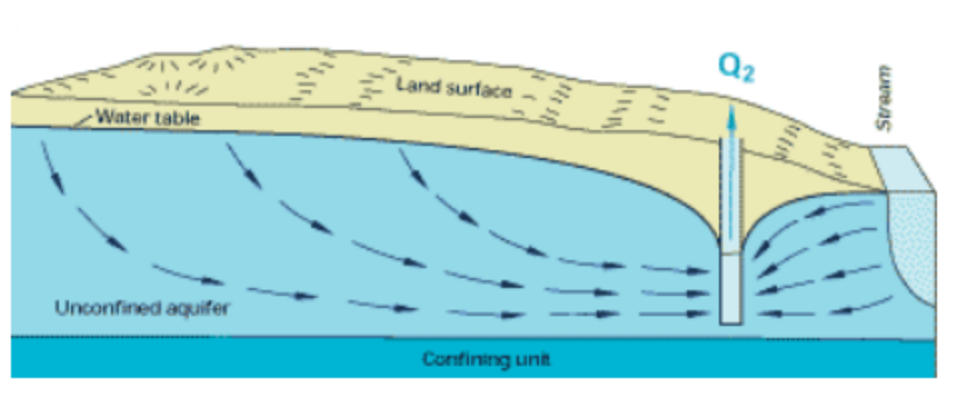
- PA – MOU w/PADEP
- NY – MOU w/NYSDEC
- MD – No existing MOU



Groundwater (GW) withdrawal with surface water impacts:

- Coordinated review with SRBC groundwater staff

GW WITHDRAWAL IMPACTING SW



SRBC Low Flow Protection Policy (LFPP)

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TERMINOLOGY

- Passby Flow:
  - Prescribed quantity of (water) flow that must be allowed to pass the anticipated point of impact at all times during which a withdrawal is occurring.
  - The amount of water that has to “pass by” the point of withdrawal during low flow events.
  - Think ‘interruptible’ withdrawal.
  - Is <u>not</u> meant to supplement naturally occurring low flow conditions.

TERMINOLOGY

- P Values (Percent Exceedance Values):
  - What's a P value?
    - Example – a P95 flow is the flow that is exceeded 95% of the time
  - Low flow / high flow:
    - P5 is a high flow event
    - P95 is a low flow event
  - Sources of data:
    - USGS Gages (flow values to calculate P values)
    - LFPP Appendix E (calculated P values)

P VALUES

- 5/13/2016, 8:00 AM) @ SRBC Building
  - 32,800 CFS =
  - P55 for May

P VALUES

- Same flow (32,800 cfs) in different months:

Month	Pxx
Jan	40
Feb	40
Mar	75
Apr	80
May	50
Jun	20
Jul	10
Aug	5
Sep	5
Oct	10
Nov	25
Dec	40

SRBC Low Flow Protection Policy (LFPP)

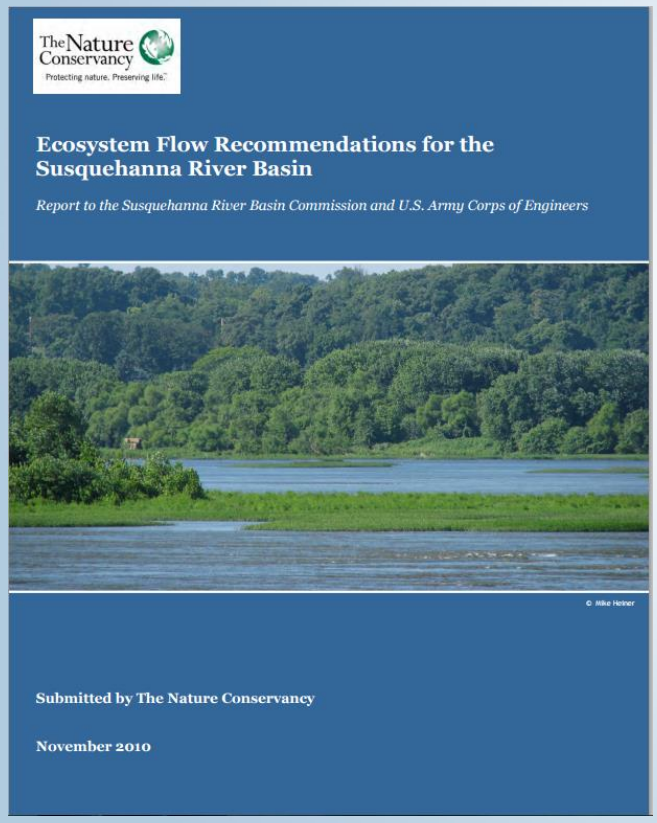
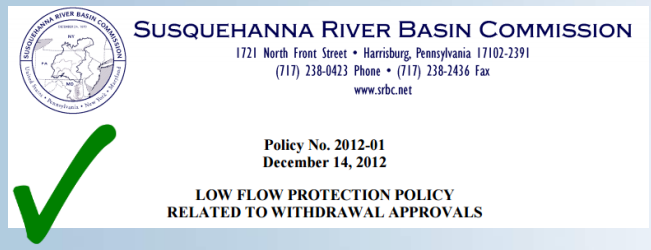


Table 5.2 Flow recommendations for the Susquehanna River ecosystem.

Season	Flow Component	Flow Statistic	Flow Recommendations		
			Headwater streams < 50 sq mi	Streams and small rivers (50 – 200 sq mi)	Major tributaries and mainstream (>200 sq mi)
Annual and Interannual Events	High Flows	Large flood	Maintain magnitude and frequency of 20-yr flood	Same for all streams	Same for all streams
		Small flood	Maintain magnitude and frequency of 5-yr flood	Same for all streams	Same for all streams
		Bankfull	Maintain magnitude and frequency of 1 to 2-yr high flow event	Same for all streams	Same for all streams
All Months	High flows	Monthly Q10	< 10% change to magnitude of monthly Q10	Same for all streams	Same for all streams
	Seasonal flows	Monthly Median	Between 45th and 55th percentiles	Same for all streams	Same for all streams
		Monthly Range	≤ 20% change to area under curve between Q10 and Q75	Same for all streams	Same for all streams
	Low flows	Monthly Low Flow Range	No change to area under curve between Q75 and Q99	≤ 10% change to area under curve between Q75 and Q99	≤ 10% change to area under curve between Q75 and Q99
		Monthly Q75	No change		
		Monthly Q95		No change	No change
Fall	High flows	Frequency of events > Monthly Q10	NA	NA	Maintain 1-5 events
Summer		Frequency of events > Monthly Q10	Maintain 2-8 events	Maintain 2-8 events	Maintain 2-8 events

LOW FLOW PROTECTION POLICY



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Policy No. 2012-01
December 14, 2012

LOW FLOW PROTECTION POLICY
RELATED TO WITHDRAWAL APPROVALS

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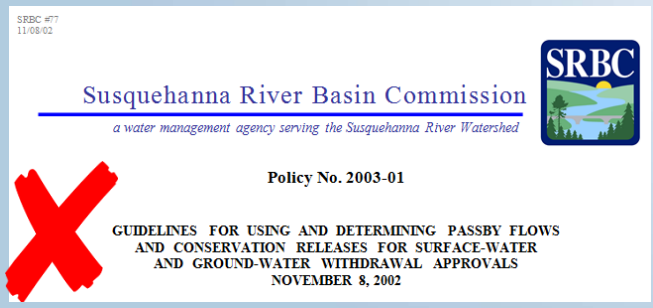
TECHNICAL GUIDANCE FOR LOW FLOW PROTECTION
RELATED TO WITHDRAWAL APPROVALS
Under Policy No. 2012-01



SRBC #77
11/08/02

Susquehanna River Basin Commission
a water management agency serving the Susquehanna River Watershed

Policy No. 2003-01

GUIDELINES FOR USING AND DETERMINING PASSBY FLOWS
AND CONSERVATION RELEASES FOR SURFACE-WATER
AND GROUND-WATER WITHDRAWAL APPROVALS
NOVEMBER 8, 2002

- Policy:
  - SRBC Policy No. 2012-01 - Low Flow Protection Policy Related to Withdrawal Approvals
- Technical Guidance:
  - Technical Guidance for Low Flow Protection Related to Withdrawal Approvals
- Supersedes:
  - SRBC Policy No. 2003-01 – Guidelines for Using and Determining Passby Flows and Conservation Releases for Surface-Water and Ground-Water Withdrawal Approvals.

LOW FLOW PROTECTION POLICY 2012-01 (LFPP)

- Replaced previous “passby” policy (No. 2003-01).
- Ensures flow alterations related to withdrawals do not cause significant adverse impacts to water resources during low flows.
- Incorporates scientific advances in ecosystem flow protection criteria.
- Used to establish limits and conditions on withdrawal approvals or supports a denial of an application request where such standards cannot be met.

AQUATIC RESOURCE CLASSES (ARC)

Streams and rivers are placed in one of six possible classes in an effort to apply the appropriate level of protection to each surface water feature in the Basin.

The objective of having the resource classes is to generally recognize smaller stream systems and their potential sensitivity to water withdrawals and, accordingly, require higher levels of low flow protection.

Table 1. Aquatic Resource Class Criteria*

ARC	Description	Drainage Area (square miles)	Total Stream Length (miles)	Percent Composition
1	Headwaters	<=10	40,421	81
2	Creeks	>10 <50	4,357	10
3	Small Rivers	>=50 <200	2,139	4
4	Medium Tributary Rivers	>=200 <1,000	1,300	3
5	Medium Mainstem Rivers	>=1,000 <5,000	467	1
6	Large Rivers	>=5,000	582	1

* For planning purposes, maps showing generalized ARC stream designations in the Susquehanna River Basin and its six major hydrologic subbasins are provided as Attachments C1 through C7.

PASSBY FLOW

De minimis thresholds

De minimis withdrawals:

"Unless a proposed net withdrawal, evaluated both individually and cumulatively, is considered by the Commission to be too low in magnitude to have any appreciable effect on instream flows, a passby flow or conservation release condition will be imposed in the approval. *De minimis* withdrawal thresholds are stepped by ARC as previously described (see Table 2)."

Table 2. De minimis Withdrawal Thresholds by Aquatic Resource Class

ARC 1	ARC 2	ARC 3	ARC 4	ARC 5	ARC 6
None	5% monthly P95	5% monthly P95	5% monthly P95	10% monthly P95	10% monthly P95

PASSBY FLOW

When Recommended?

Individual Instantaneous withdrawal is greater than x% of P95

OR

Cumulative Water Demand = Proposed Withdrawal + Existing Upstream Users, is greater than x% P95.

1. Percent Exceedance Value Method – Used throughout the basin in rivers and streams of varying sizes, and based on ARC. Variability in climate, geology, and hydrology among physiographic provinces and states is accommodated for in the selection of representative reference stream gages or applicable regional regression equations used to compute the monthly percent exceedance values. The calculated monthly passby flow/conservation release values are the standard thresholds for low flow protection. Percent exceedance flow values are specified as the required monthly passby flow/conservation release values according to Table 3 below.

Table 3. Passby Flow/Conservation Release Schedule

ARC 1	ARC 2	ARC 3	ARC 4	ARC 5	ARC 6
monthly P70	monthly P75	monthly P80	monthly P85	monthly P90	monthly P95

LFPP – ADDITIONAL CONSIDERATIONS

- Exceptional Quality Waters
- Impaired Waters
- Monthly vs. Seasonal Statistics (Operations Impacts)
- Project Specific Instream Flow Studies
- Agency Coordination
- Sensitive Resources
- Impacts to Flow Variability (Median Flows)
- Conservation Releases (Reservoirs)
- PA-MD Instream Flow Study (PA-MD IFS) Method

LFPP – ADDITIONAL CONSIDERATIONS

- Additional Considerations (Continued):
  - Reservation:

9. Reservation – In accordance with 18 CFR §806.23, the Commission reserves the right to increase the passby flow or conservation release requirement for any project above the standards determined using the guidance in cases where sensitive environmental resources (i.e., wetlands, migratory fish) or water quality conditions (i.e., mine drainage remediation, TMDLs, National Pollutant Discharge Elimination System [NPDES] discharges, public water supply intakes) may be adversely impacted.

LFPP - DISCRETION

- Policy/Technical Guidance vs. Regulation
- Case-by-case:
  - PWS – Point of return
- Existing Withdrawal Projects:
  - Previously unregulated w/o passby flows
  - Renewals (w/o increase)
- Interim operating periods


Questions?