

# Balancing Economic Development & Environmental Impacts in the Susquehanna River Basin

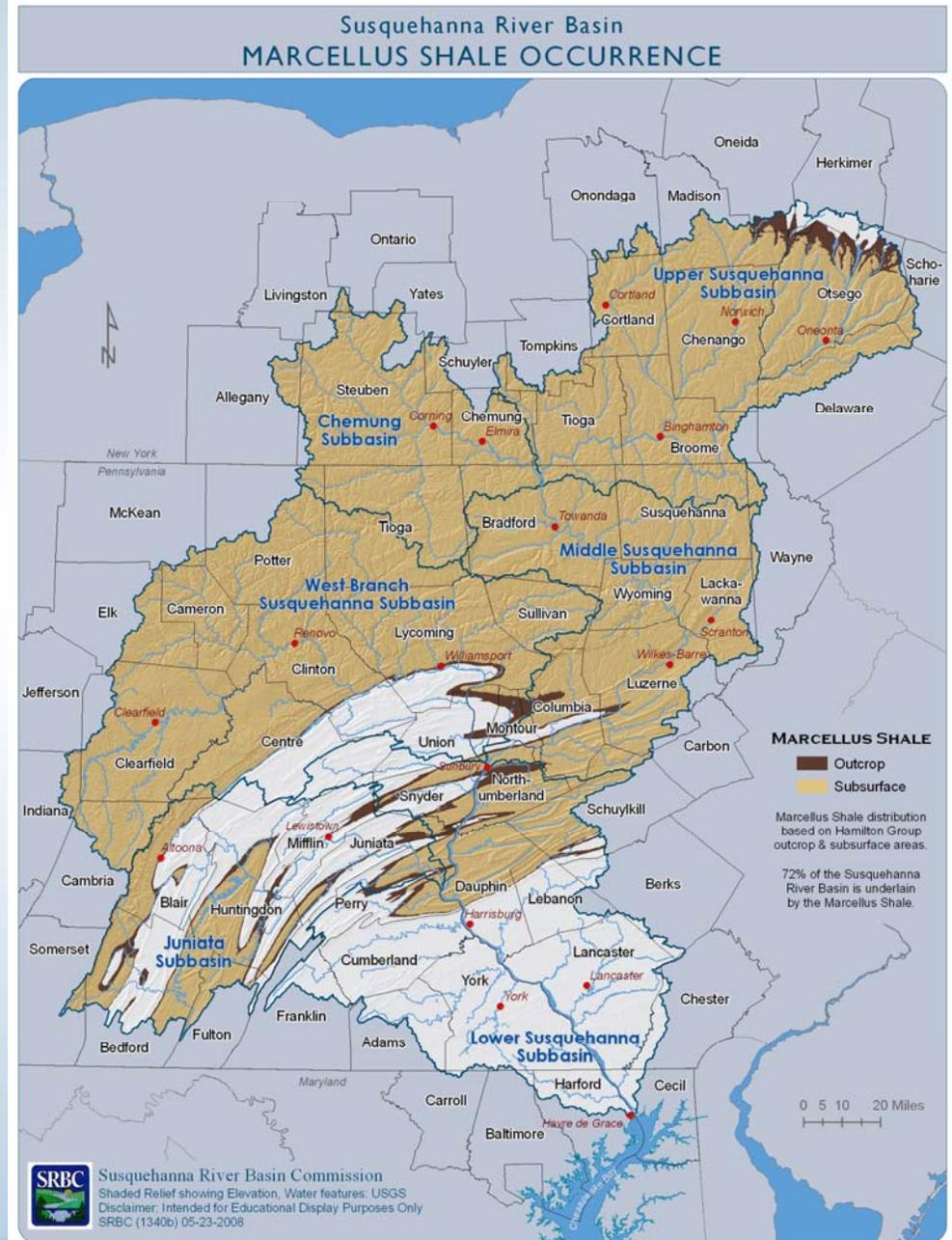


December 11, 2008

Pennsylvania Natural Gas Summit

# Geographic Location

- Appalachian Basin Province
  - NY to PA, OH, MD, WV and VA
  - Trending northeast, spans a distance of approximately 600 linear miles, and 54,000 square miles
  - 72 percent of the Susquehanna River Basin is underlain by the Marcellus Shale



# Commission Regulation (cont'd)

- Consumptive water use definition (§806.3)
  - 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 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 other process by which the water is not returned to the waters of the basin undiminished in quantity.

# New Rulemaking

- Natural gas well development projects are regulated on a drilling pad basis.
- All consumptive use approvals will occur pursuant to an Approval by Rule process.
- The new Approval by Rule process is applicable to all water sources utilized for consumptive use, not just public water supply systems.
- It allows for the use of wastewater discharge, mine pool water and other lesser quality waters, as well as other approved sources.
- Project sponsors must file a Notice of Intent with copies to the host state, county and municipality, contiguous property owner notification and publish notice locally.

# New Rulemaking

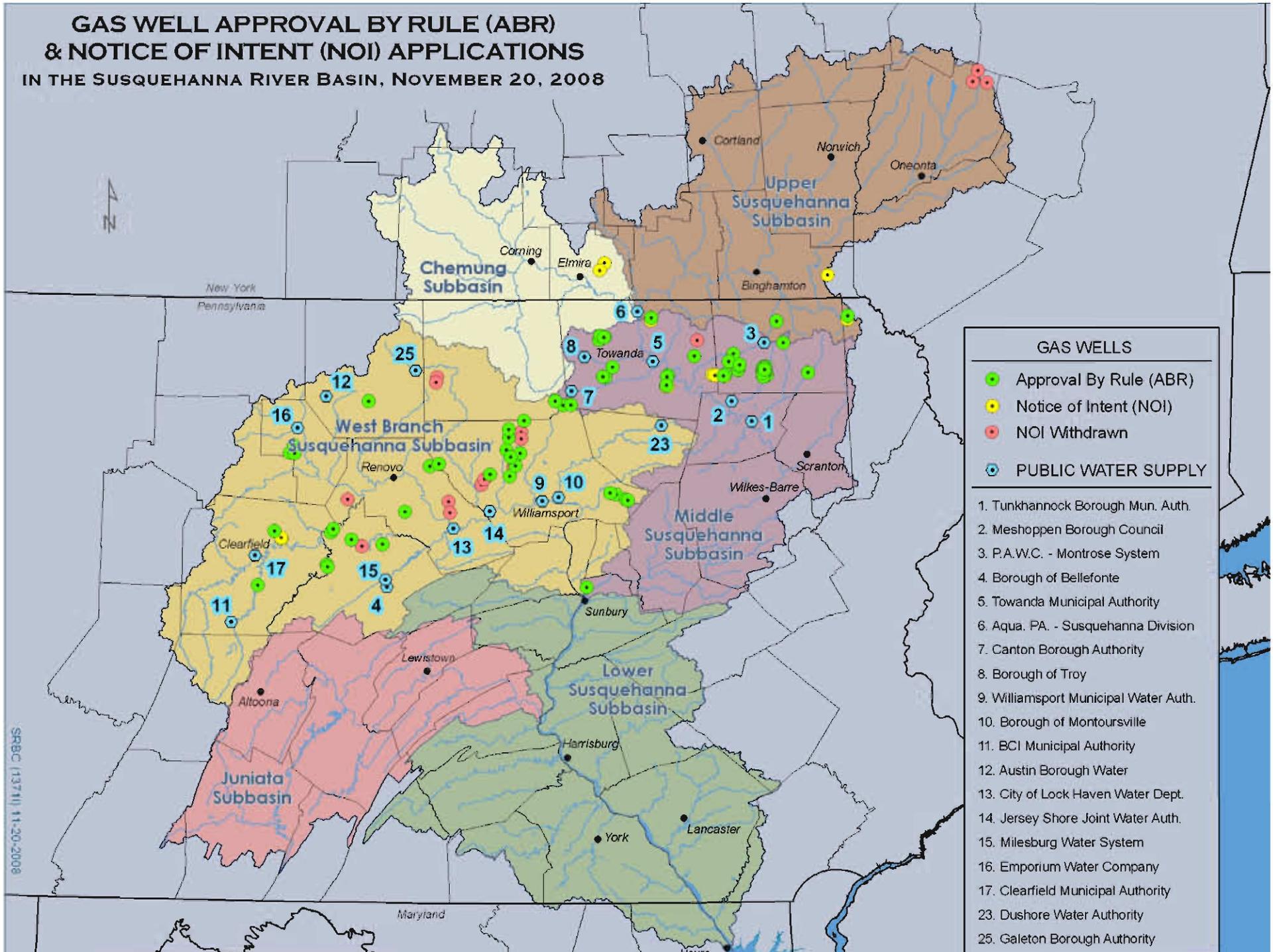
- Approvals will require metering, daily use monitoring and quarterly reporting, and must comply with the Commission's consumptive use mitigation requirements.
- Production fluids and brines utilized for subsequent fracs are accounted for, but not included in the consumptive use calculation so as to incentivize re-use.
- Projects are required to demonstrate compliance with state and/or federal law for the treatment and disposal of flow-back or produced fluids.
- Any withdrawal approval issued by the Commission after issuance of the ABR could be added as a source for the project.
- Approvals would have a term of five (5) years
- Transition of existing area wide approvals over during 2009

# Approval By Rule

Notices of Intent (NOI) / Approvals By Rule (ABR)	Month Issued - Number
NOIs - 106	July - 22
ABRs - 73	Aug - 28
Pending - 18	Sept - 2
Combined - 3	Oct - 16
Withdrawn - 15	Nov - 5

**More than 80 percent approved within 45 days**

**GAS WELL APPROVAL BY RULE (ABR)  
& NOTICE OF INTENT (NOI) APPLICATIONS  
IN THE SUSQUEHANNA RIVER BASIN, NOVEMBER 20, 2008**



GAS WELLS	
<span style="color: green;">●</span>	Approval By Rule (ABR)
<span style="color: yellow;">●</span>	Notice of Intent (NOI)
<span style="color: red;">●</span>	NOI Withdrawn
<span style="color: blue;">○</span>	PUBLIC WATER SUPPLY

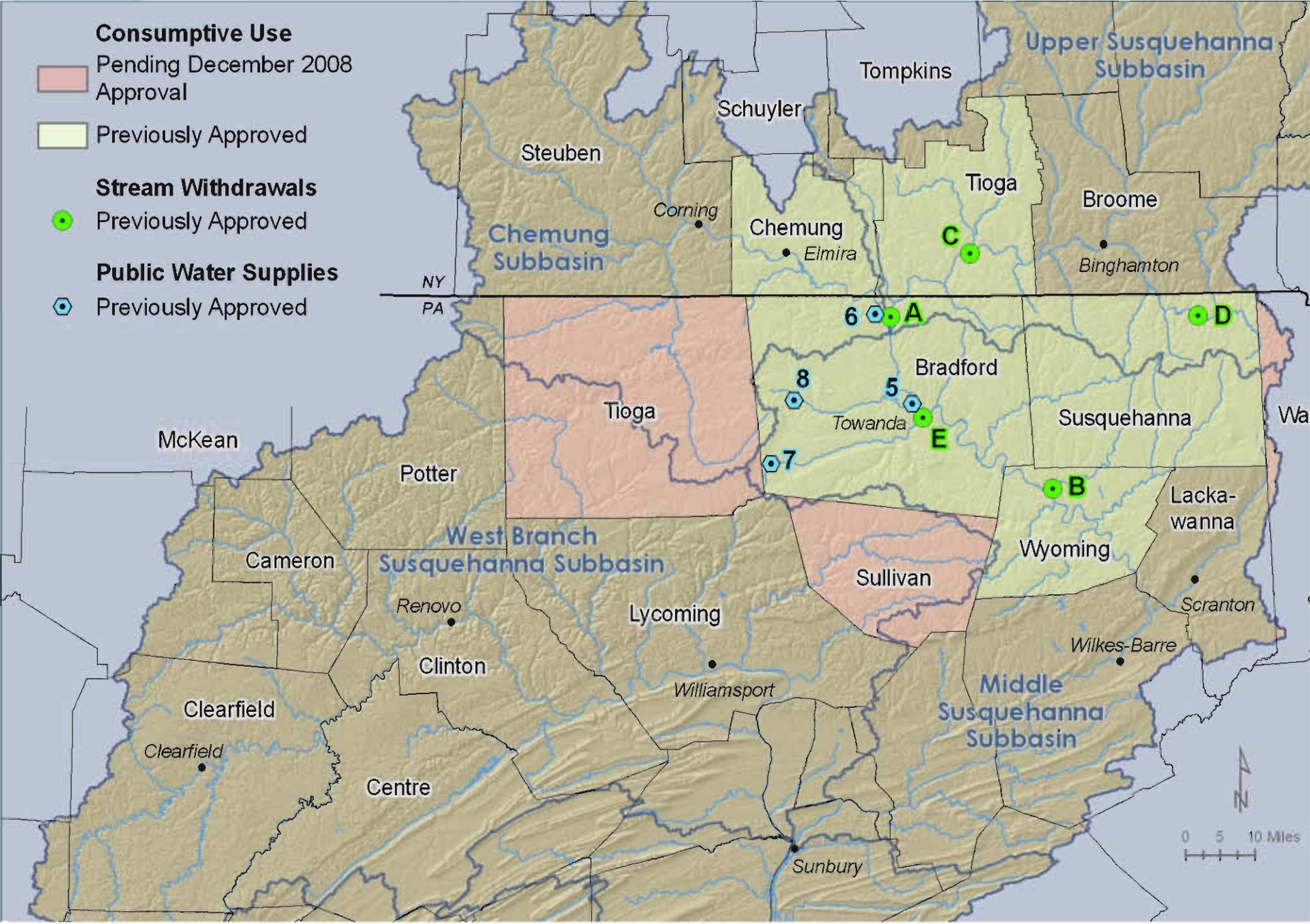
1. Tunkhannock Borough Mun. Auth.
2. Meshoppen Borough Council
3. P.A.W.C. - Montrose System
4. Borough of Bellefonte
5. Towanda Municipal Authority
6. Aqua. PA. - Susquehanna Division
7. Canton Borough Authority
8. Borough of Troy
9. Williamsport Municipal Water Auth.
10. Borough of Montoursville
11. BCI Municipal Authority
12. Austin Borough Water
13. City of Lock Haven Water Dept.
14. Jersey Shore Joint Water Auth.
15. Milesburg Water System
16. Emporium Water Company
17. Clearfield Municipal Authority
23. Dushore Water Authority
25. Galeton Borough Authority

# Withdrawal and Consumptive Use

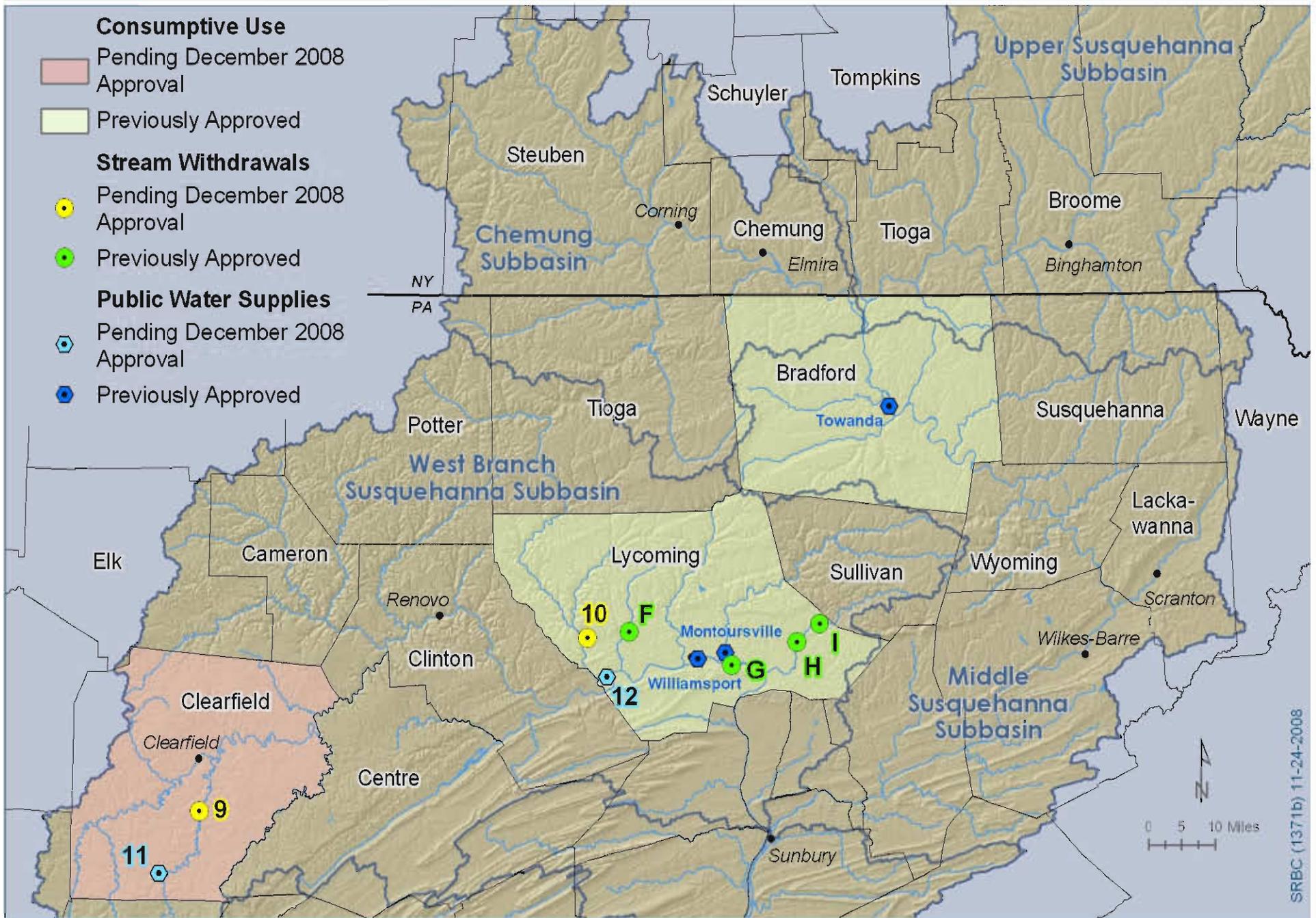
Water Withdrawal Applications	Consumptive Water Use Applications
Total Submitted: 95	Total Submitted: 20
June Approvals: 6	June Approvals: 4
September Approvals: 34	September Approvals: 7
December Approvals: 16	December Approvals: 9
Total Approved: 56	Total: 20
Pending: 22	Pending: 0

90 percent approved at next quarterly Commission meeting (approximately 90 days)

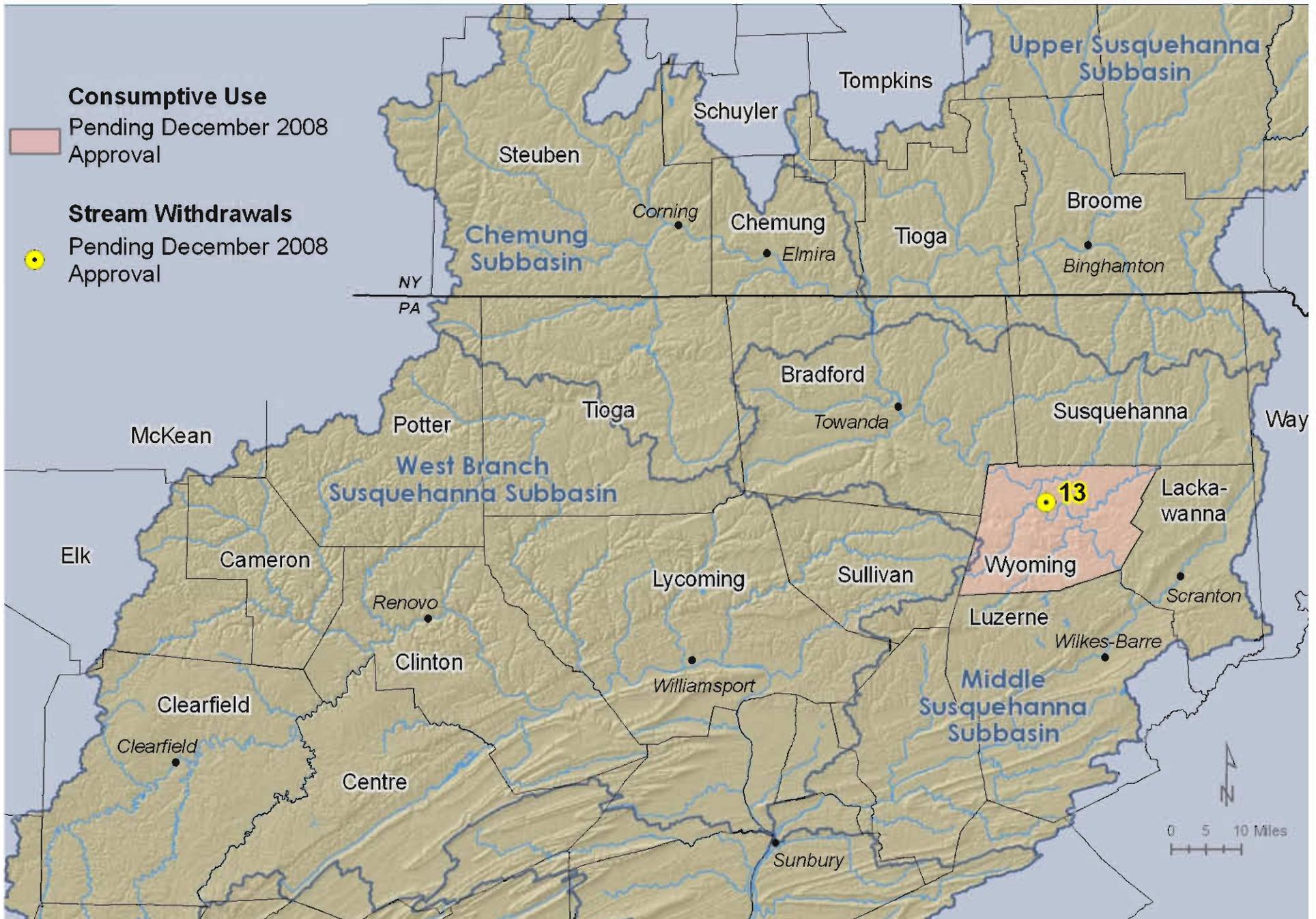
# CHESAPEAKE APPALACHIA, LLC



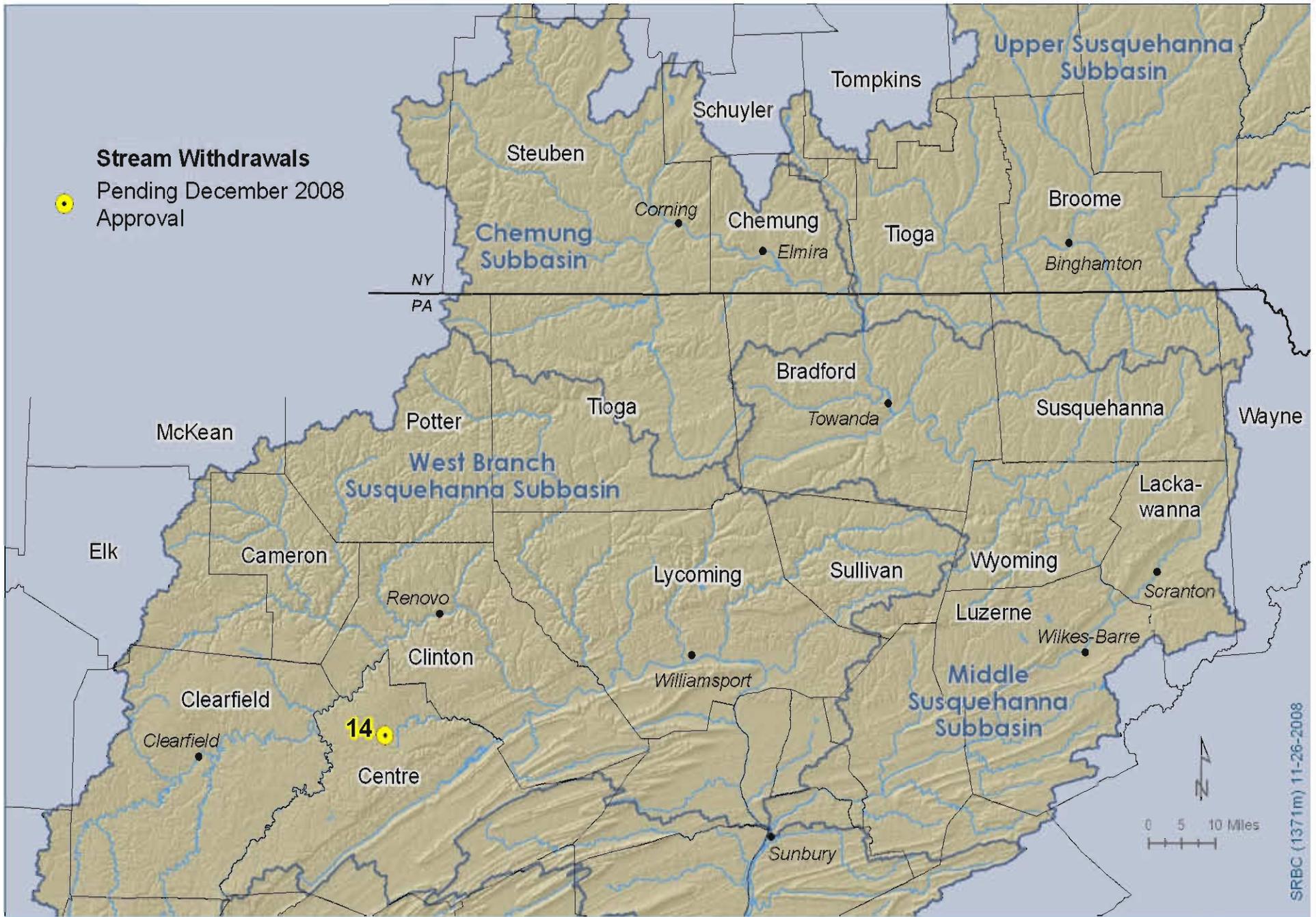
# CHIEF OIL & GAS LLC



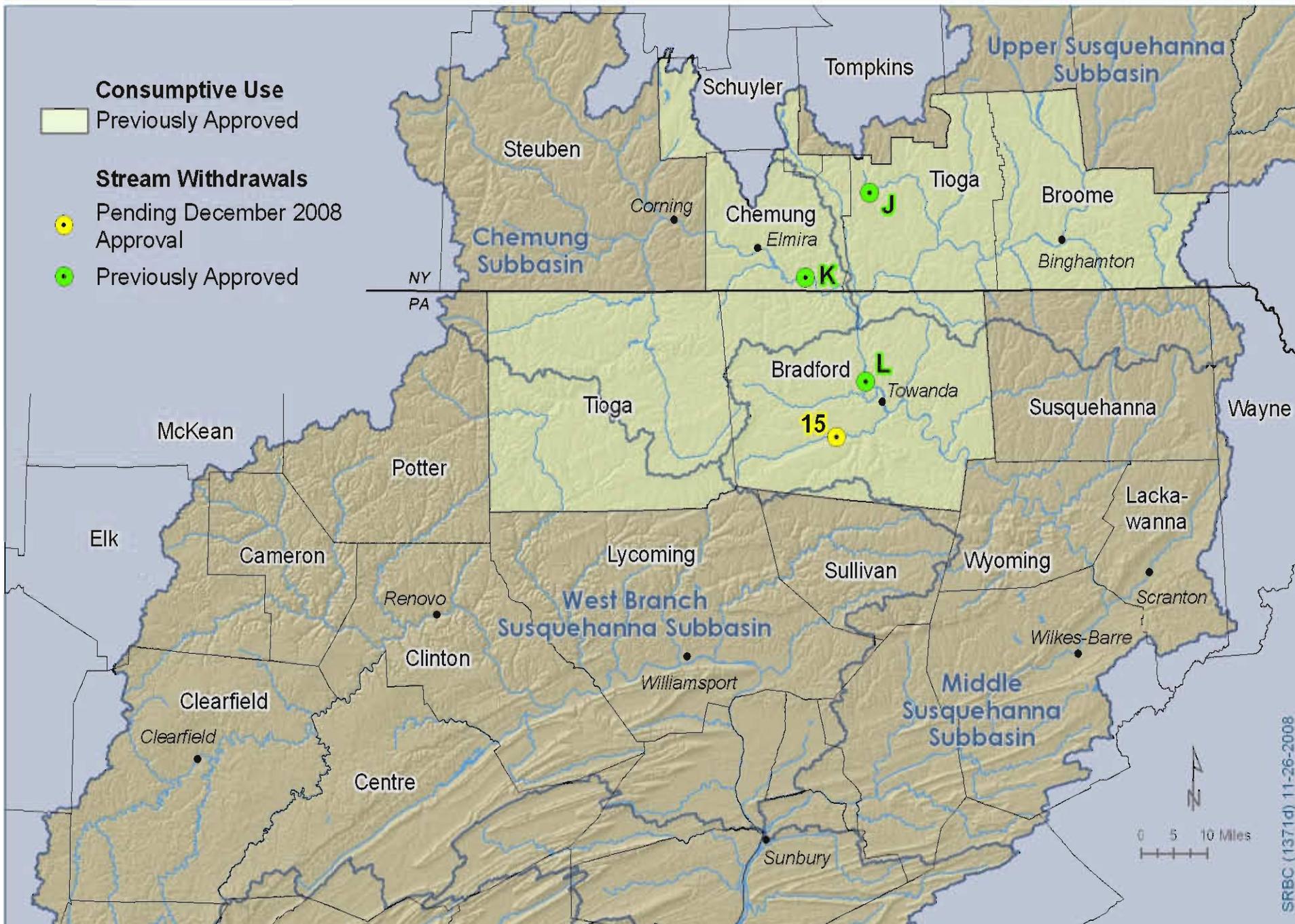
# CITRUS ENERGY



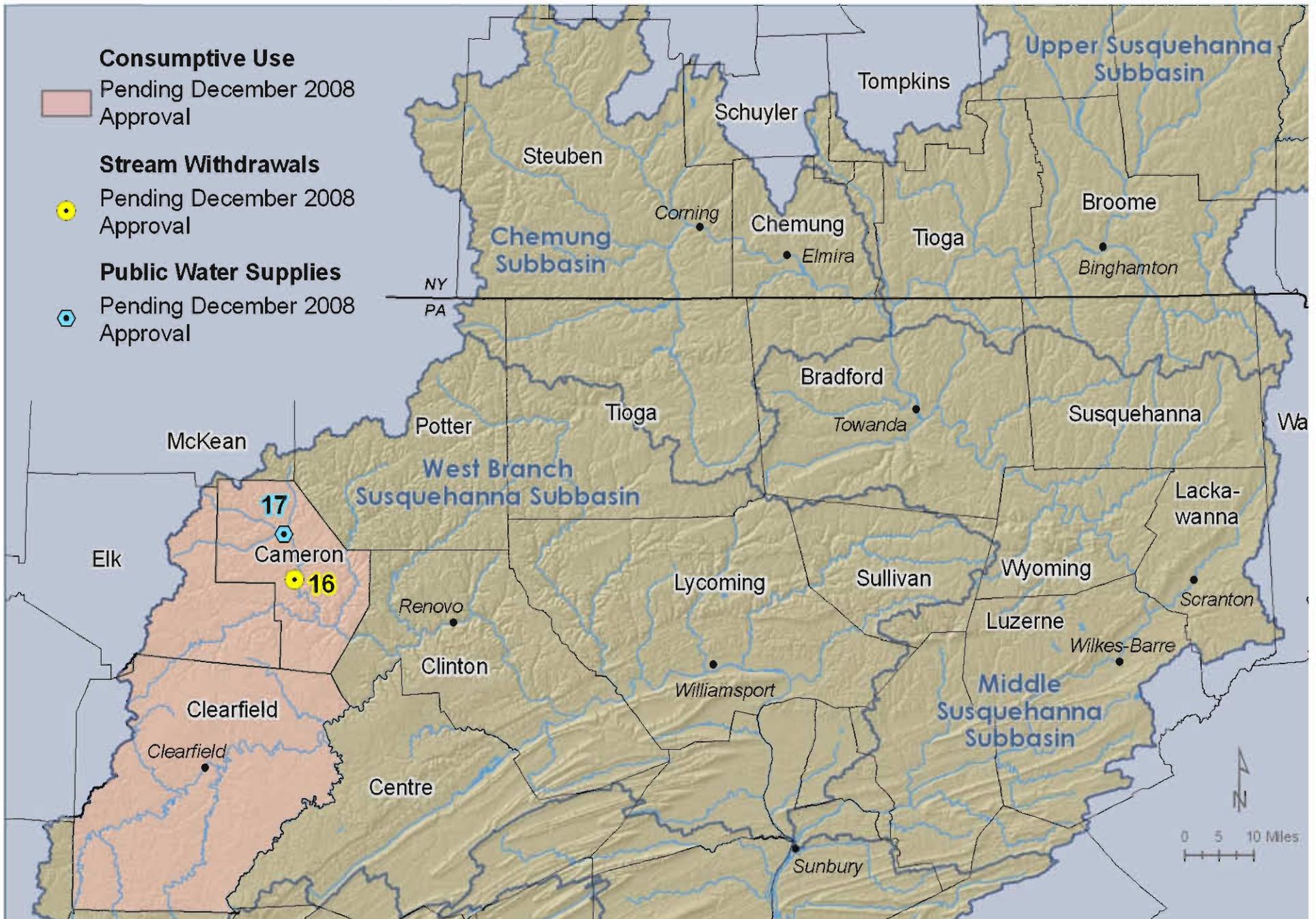
# EXCO-NORTH COAST ENERGY, INC.



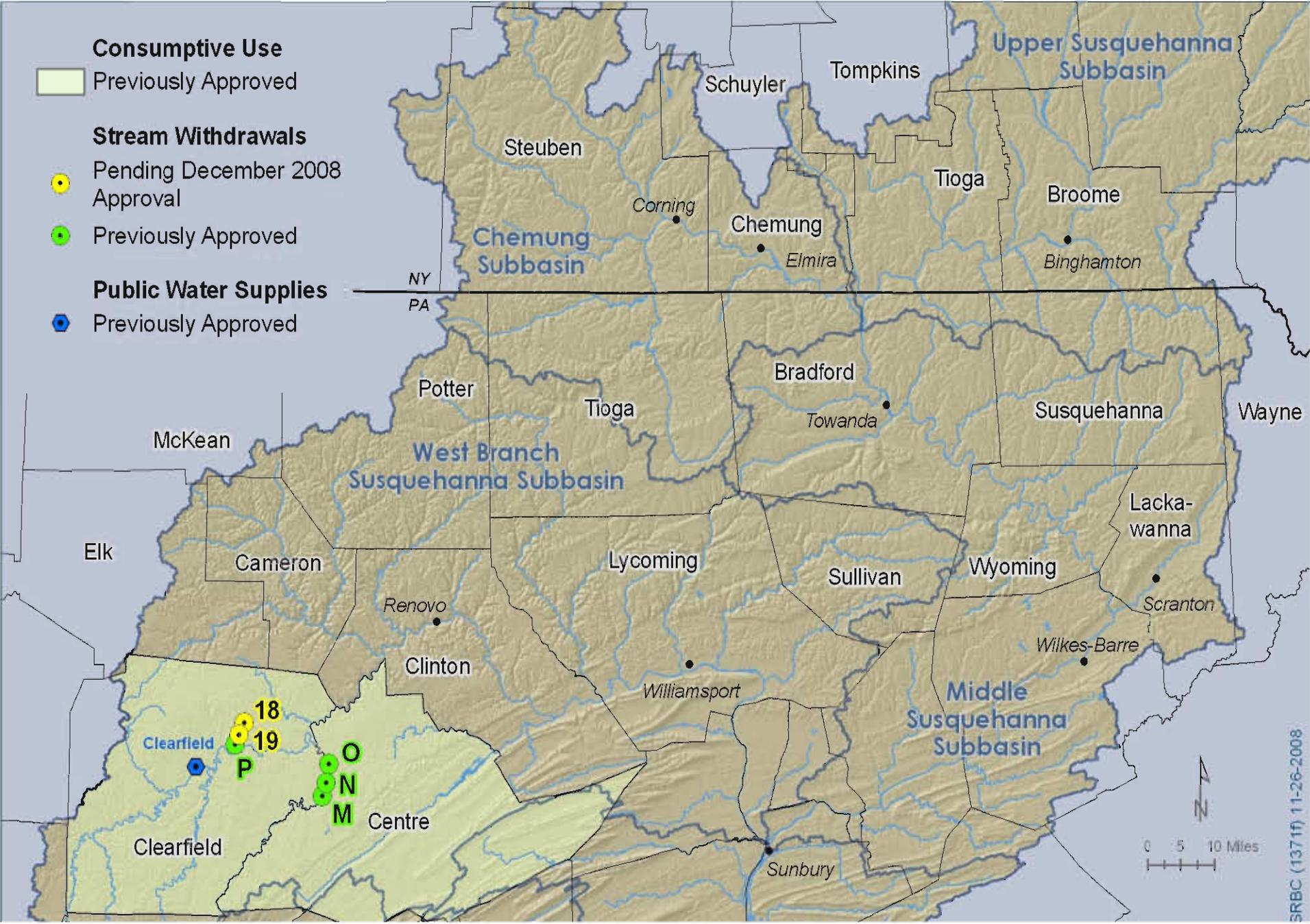
# FORTUNA ENERGY INC.



# J-W OPERATING COMPANY



# REX ENERGY CORPORATION



**Consumptive Use**

Previously Approved

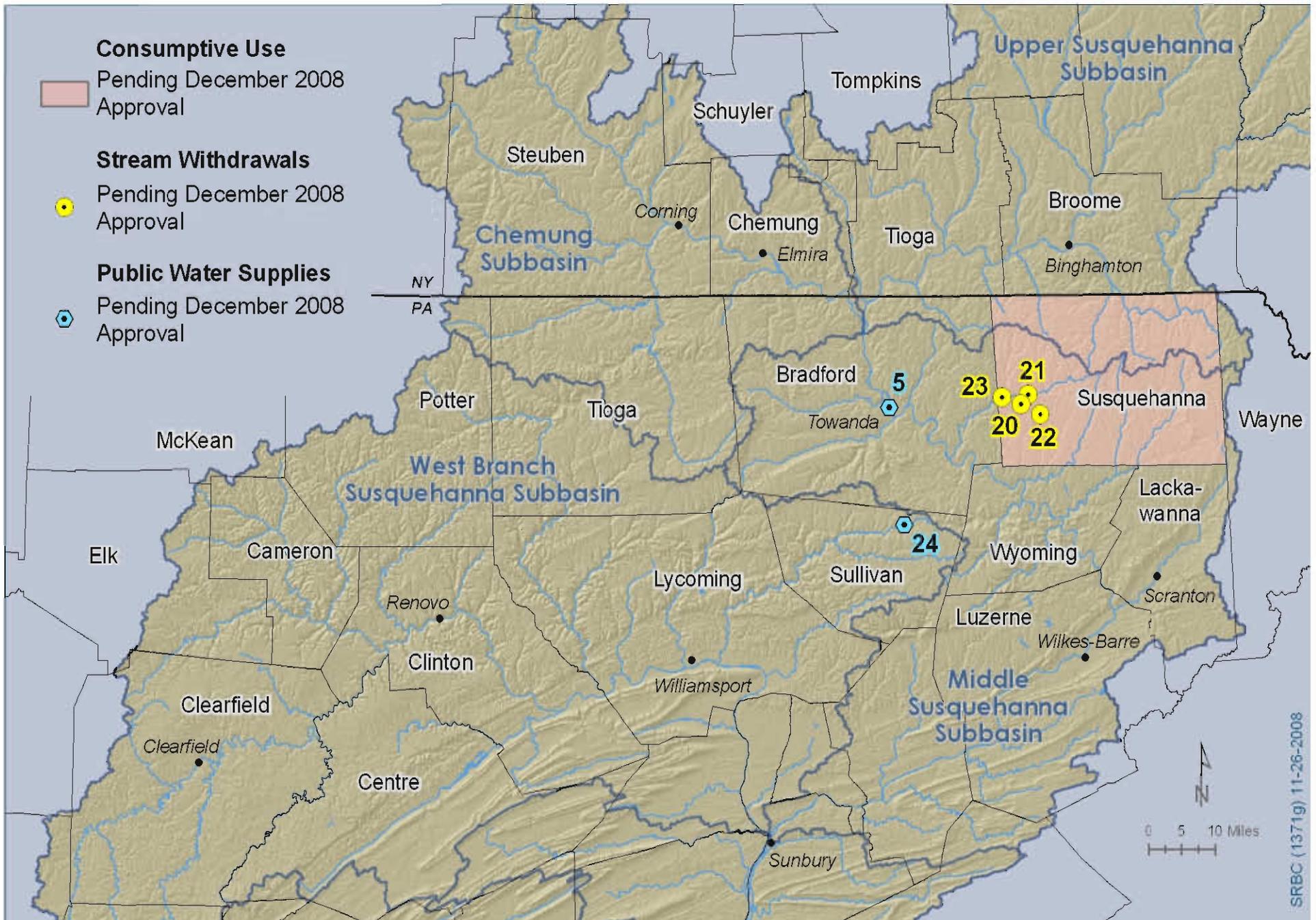
**Stream Withdrawals**

- Pending December 2008 Approval
- Previously Approved

**Public Water Supplies**

Previously Approved

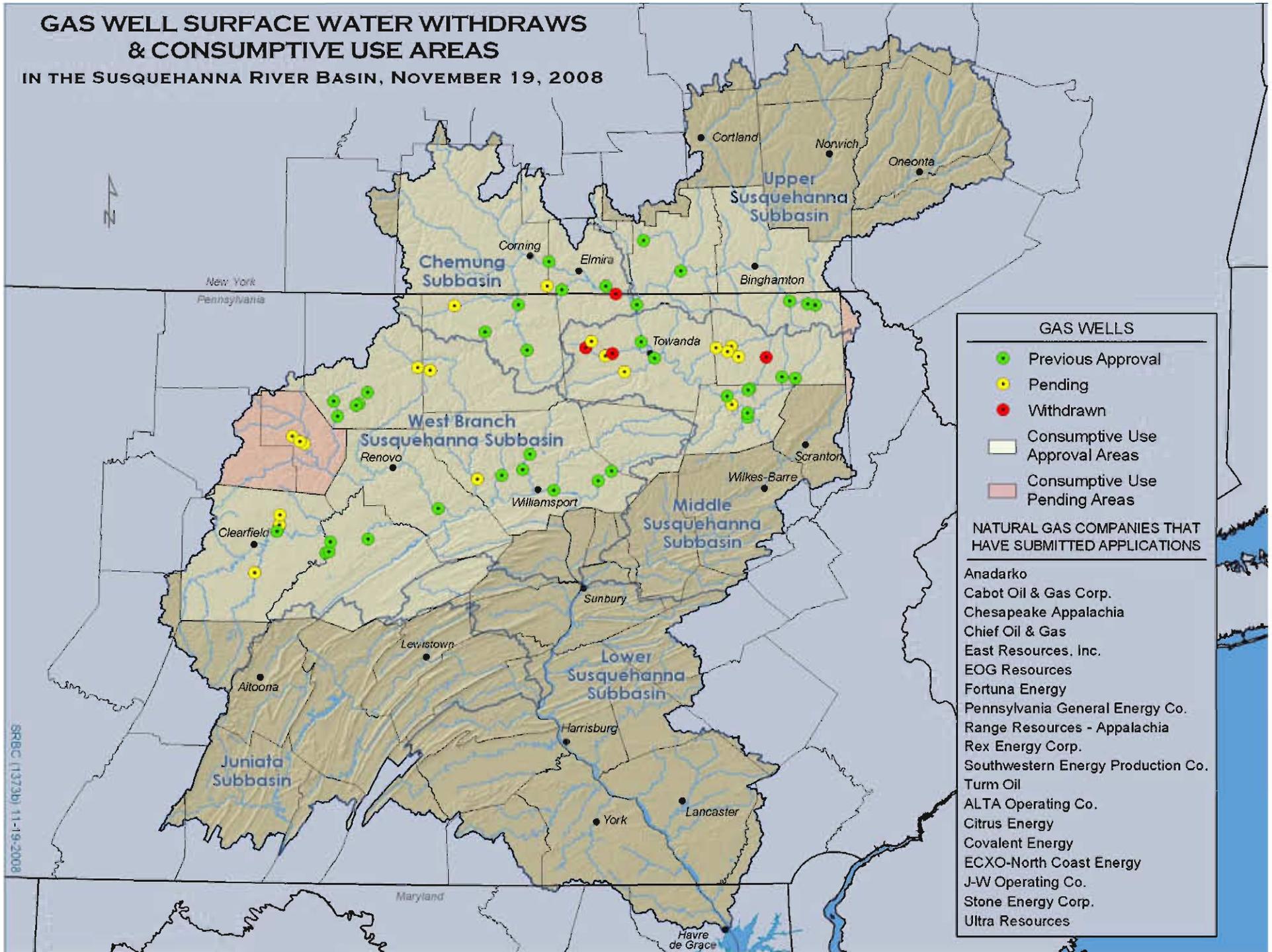
# TURM OIL, INC.



# ULTRA RESOURCES, INC.



# GAS WELL SURFACE WATER WITHDRAWS & CONSUMPTIVE USE AREAS IN THE SUSQUEHANNA RIVER BASIN, NOVEMBER 19, 2008

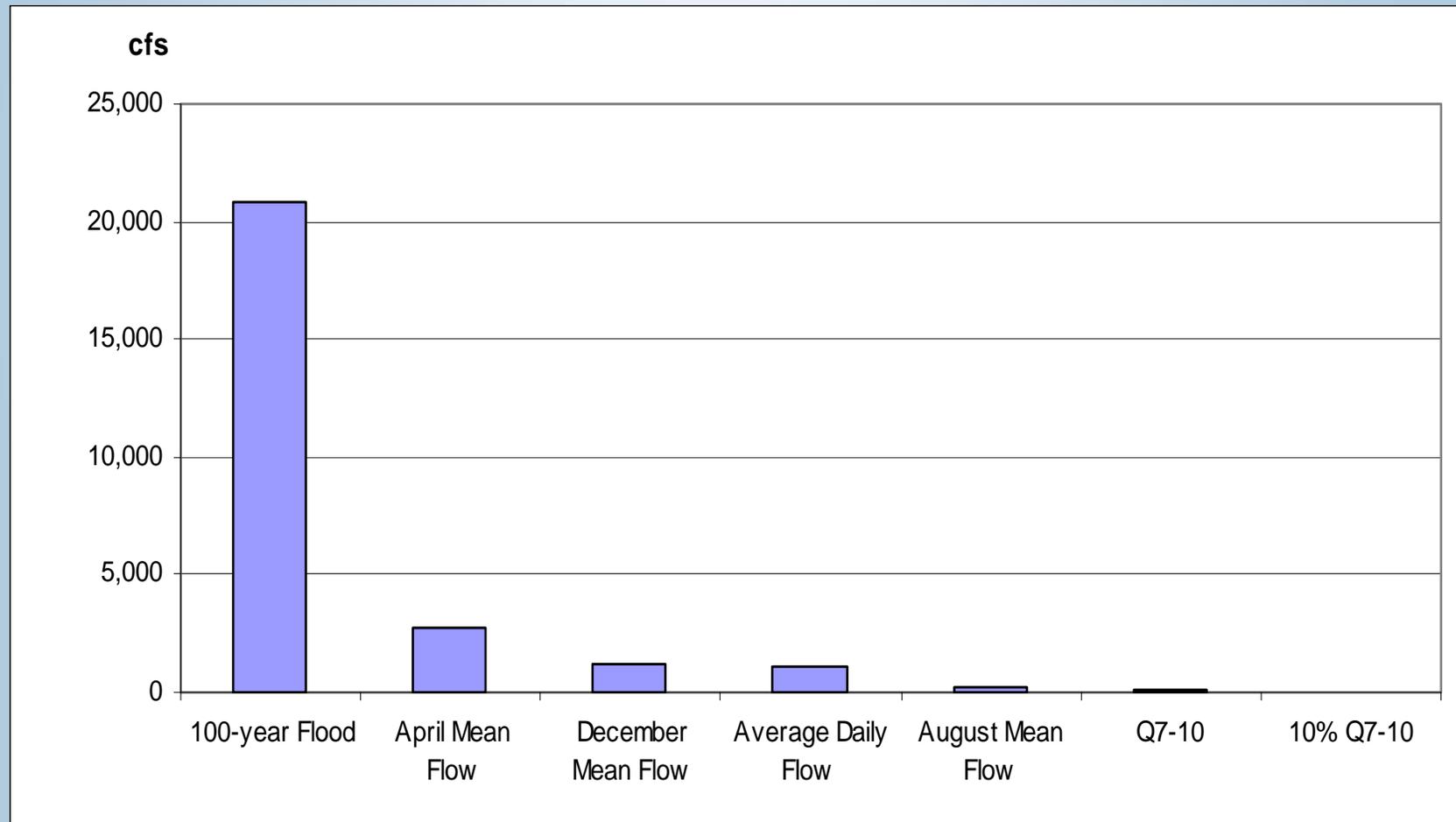


SRRC (1373b) 11-19-2008

# Affecting fish, wildlife or other living resources or their habitat



# Affecting low flow of perennial or intermittent streams



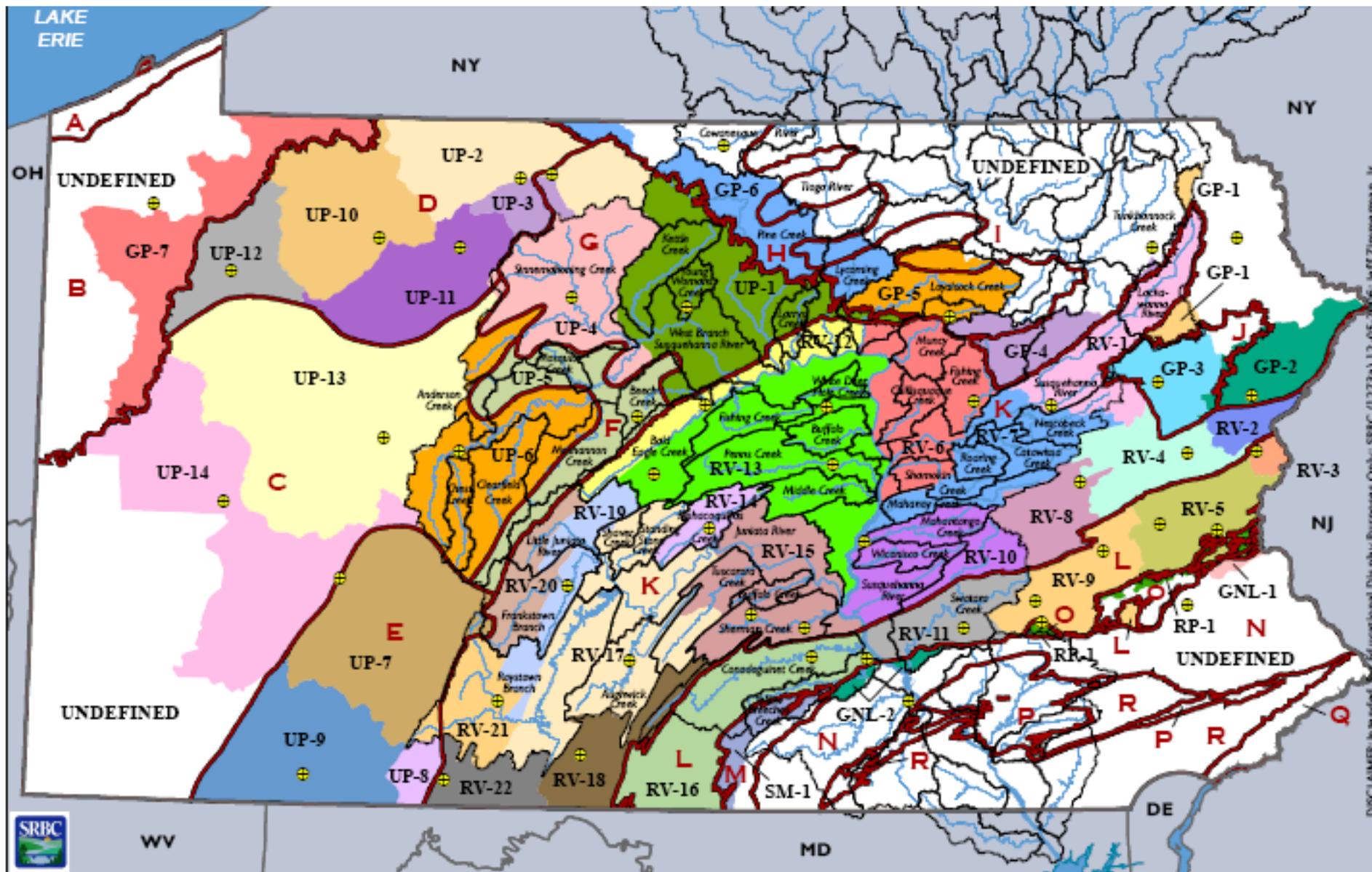
# Passby Flow Determination

- Cumulative Water Demand:
  - $\leq 10\%$  Q7-10 Passby Flow Not Normally Required
    - Uninterrupted Withdrawal
  - $> 10\%$  Q7-10, Passby Flow Required
    - Interrupted Withdrawal
      - Reduce Proposed Withdrawal Rate to  $\leq 10\%$  Q7-10, or
      - Determine Passby Flow Condition (SRBC Policy No. 2003-01)

# Passby Flow Determination

## Tennant Method vs. IFIM Method

- Determine Chapter 93 Existing/Designated Water Use
  - Apply IFIM Method (SRBC, 1998) for:
    - Coldwater Streams in Study Area with DA < 100 Square Miles
      - EV =  $\leq$  5% Habitat Loss
      - HQ =  $\leq$  7.5% Habitat Loss
      - CWF, Class B Trout =  $\leq$  10% Habitat Loss
      - CWF, Class C/D Trout =  $\leq$  15% Habitat Loss
      - Passby Flow Never less than Q7-10



### IFIM GAGES AND HYDROLOGIC REGIONS OF PENNSYLVANIA

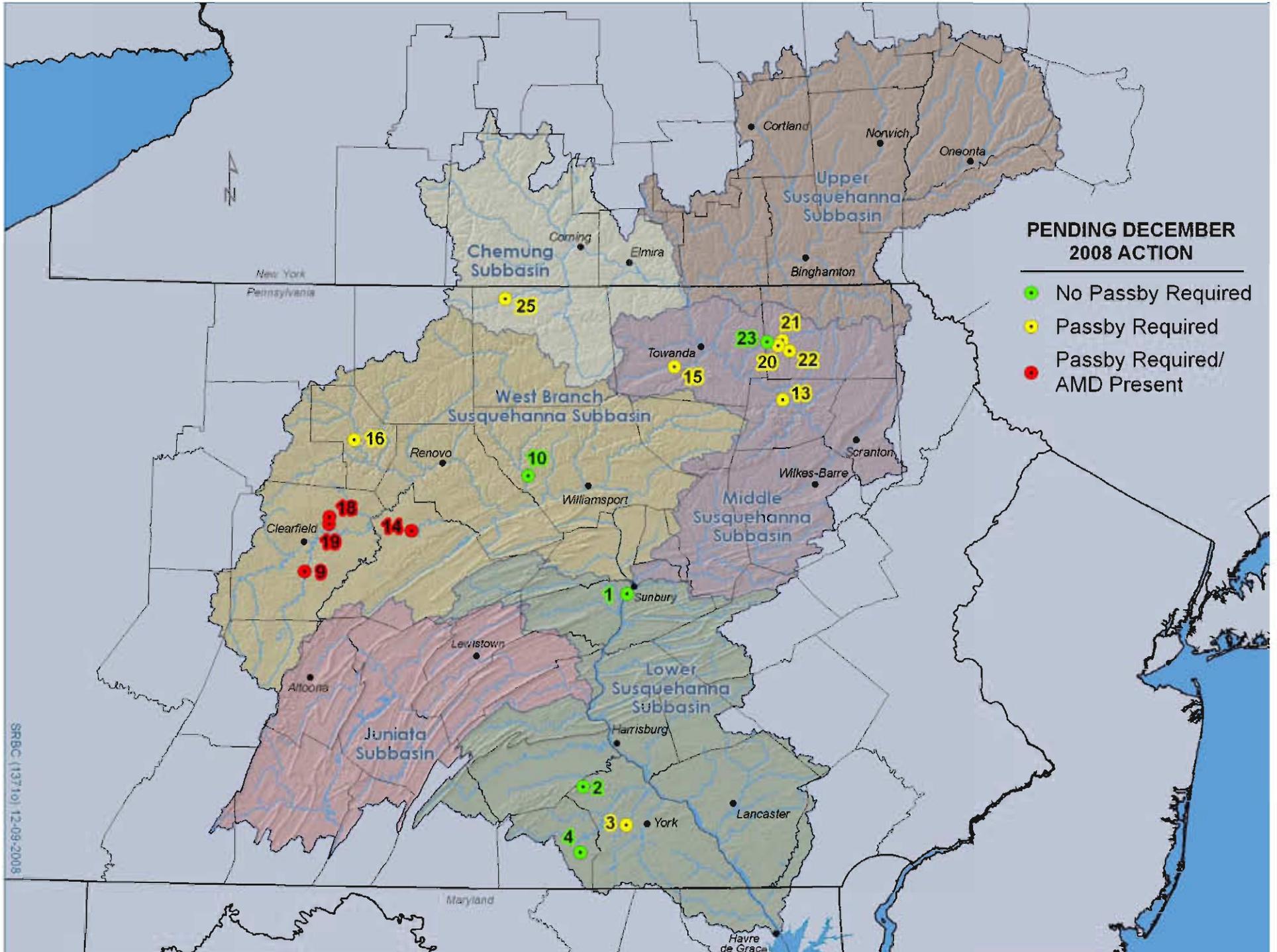
<ul style="list-style-type: none"> <li> IFIM Gage</li> <li> Major Watershed</li> <li> State Boundary</li> </ul> <p>0 10 20 Miles 1:2,000,000</p>	<p><b>PHYSIOGRAPHIC SECTIONS</b></p> <ul style="list-style-type: none"> <li><b>A</b> Great Lake Province</li> <li><b>B</b> Glaciated Pittsburgh Plateau Section</li> <li><b>C</b> Pittsburgh Low Plateau Section</li> <li><b>D</b> High Plateau Section</li> <li><b>E</b> Allegheny Mountain Section</li> <li><b>F</b> Allegheny Plateau Section</li> <li><b>G</b> Deep Valleys Section</li> <li><b>H</b> Glaciated High Plateau Section</li> <li><b>I</b> Glaciated Low Plateau Section</li> <li><b>J</b> Glaciated Pocono Plateau Section</li> <li><b>K</b> Appalachian Mountain Section</li> <li><b>L</b> Great Valley Section</li> <li><b>M</b> South Mountain Section</li> <li><b>N</b> Gettysburg-Newark Lowland Section</li> <li><b>O</b> Reading Prong Section</li> <li><b>P</b> Piedmont Lowland Section</li> <li><b>Q</b> Coastal Plain Province</li> <li><b>R</b> Piedmont Upland Section</li> </ul>	<p><b>HYDROLOGIC REGIONS</b></p> <ul style="list-style-type: none"> <li><b>GNL-#</b> Gettysburg-Newark-Lowland</li> <li><b>GP-#</b> Glaciated Plateau</li> <li><b>RP-#</b> Reading Prong</li> <li><b>RV-#</b> Ridge and Valley</li> <li><b>SM-#</b> South Mountain</li> <li><b>UP-#</b> Unglaciated Plateau</li> </ul>
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DISCLAIMER: In rendered. Ed. optional. Dis. p. ly. Purposes Only. SRBC (1273a) 12-05-2006; Jeff Zimmerman, Jr.

# Passby Flow Determination

## Tennant Method vs. IFIM Method

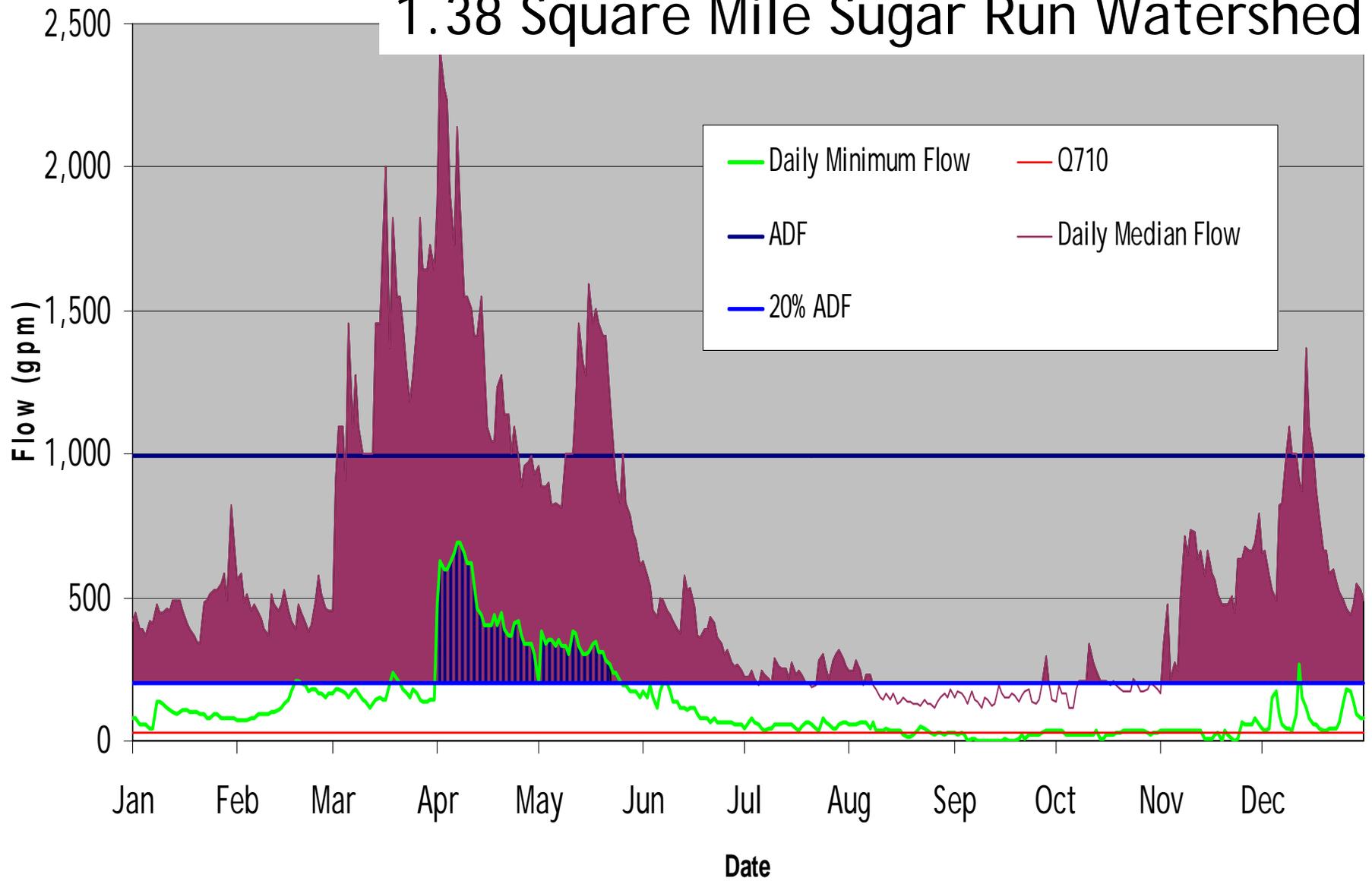
- Determine Chapter 93 Existing/Designated Water Use
- Not Covered by IFIM Method Criteria --- Tennant Method Streams
  - EV, HQ, and Wild Trout = 25% Average Daily Flow (ADF)
  - Non- EV, HQ, and Wild Trout and Not AMD-Impaired = 20% ADF
  - Partially AMD-Impaired with Some Aquatic Life = 15% ADF
  - Passby Flow Never To Be < Q7-10



0.5 miles



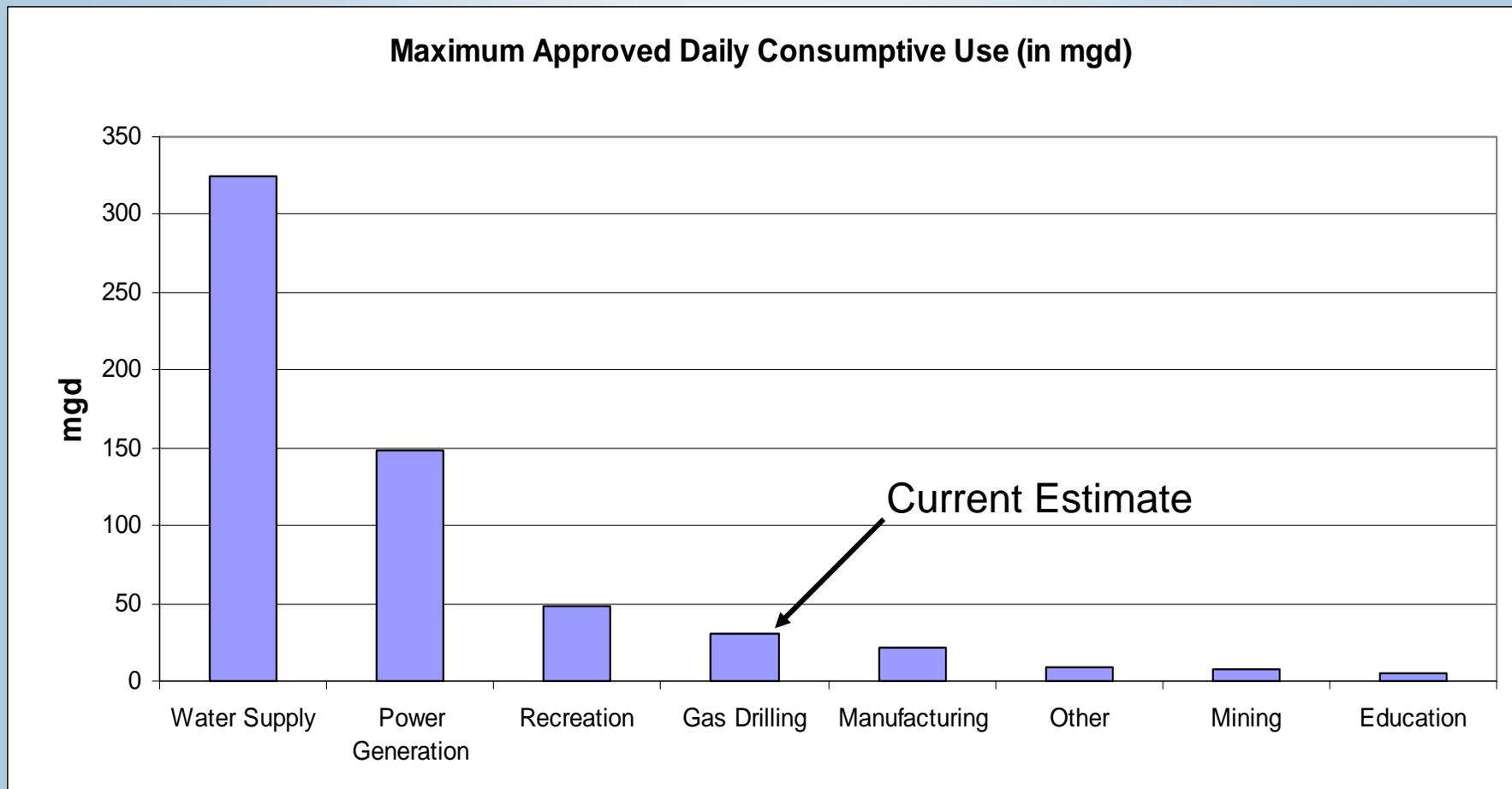
# 1.38 Square Mile Sugar Run Watershed



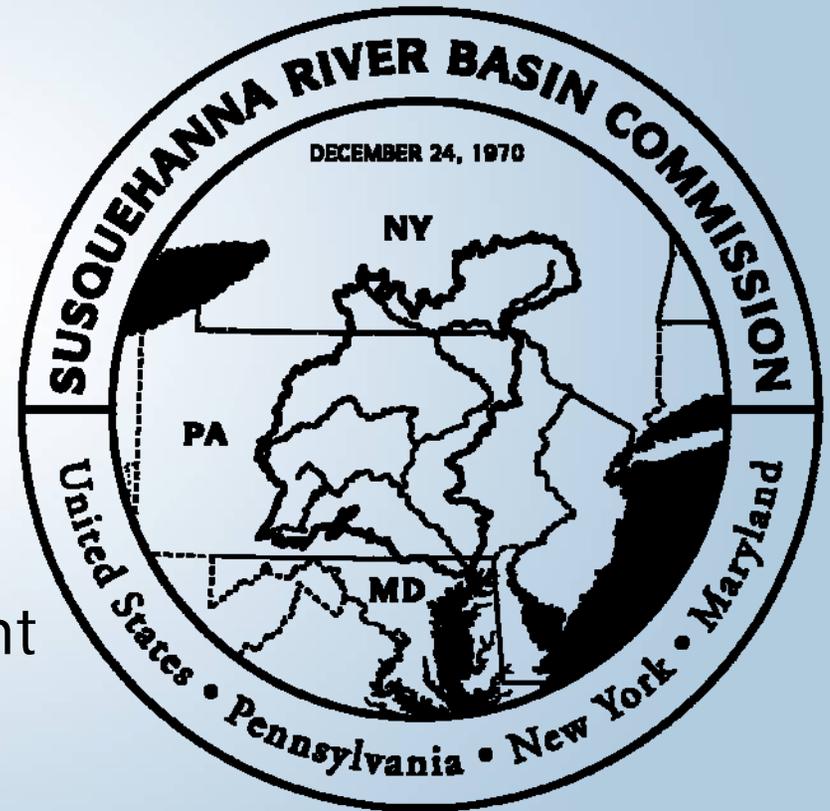




# Maximum Approved Daily Consumptive Use



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December 11, 2008

Pennsylvania Natural Gas Summit