

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Bureau of Point and
Non Point Source Management

# Ionic Composition of Pennsylvania's Surface Waters and Chloride and Sulfate Toxicity Testing

April 11, 2014

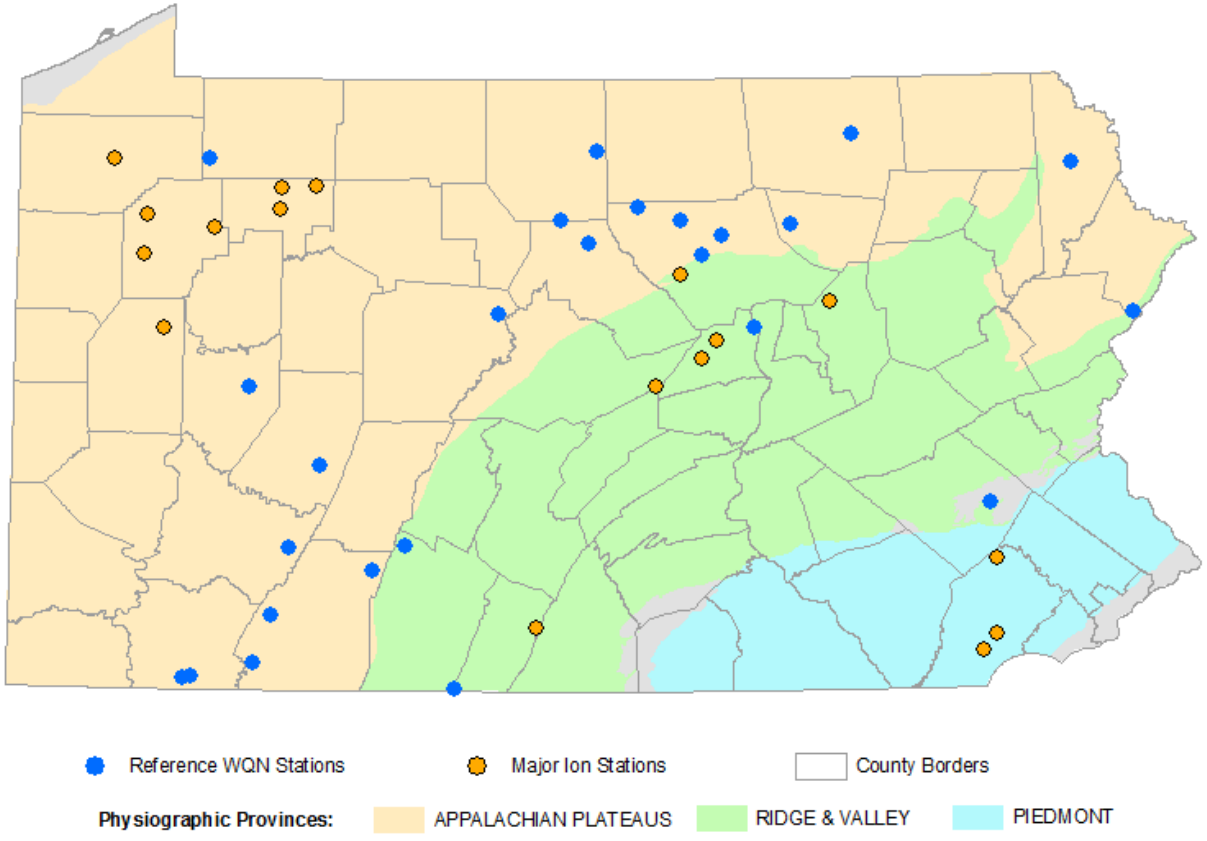
Water Resources Advisory Committee

# Background

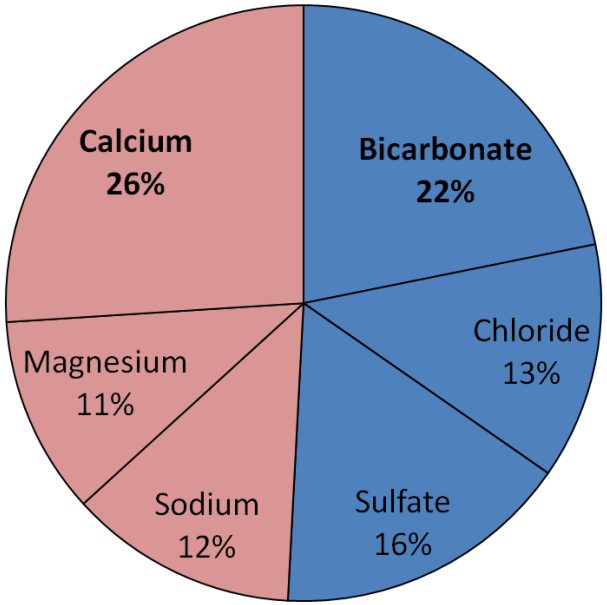
- Inorganic solids dissociate in water forming positive cations and negative anions
  - Major Cations: Calcium, Magnesium, Sodium
  - Major Anions: Bicarbonate, Chloride, Sulfate
- The mixture and concentrations of ions influence the toxic effects of individual species of ions
- Necessary to know the natural ionic composition to develop chloride and sulfate criteria

# Ionic Composition of Typical Pa Streams

- Goal is to measure the ionic composition of 125+ least impacted typical streams spread across the three major physiographic provinces.
- Presently have collected a limited number of samples as collection was put on hold until ice melt and road salting ended.
- Samples collected so far:

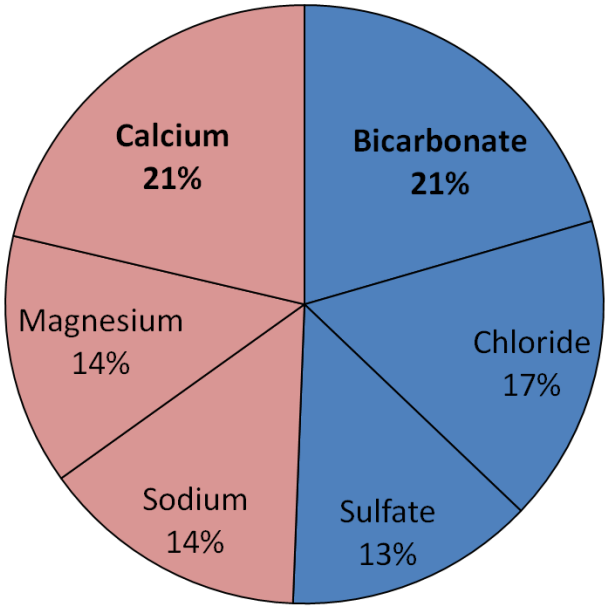


Appalachian Plateau Province

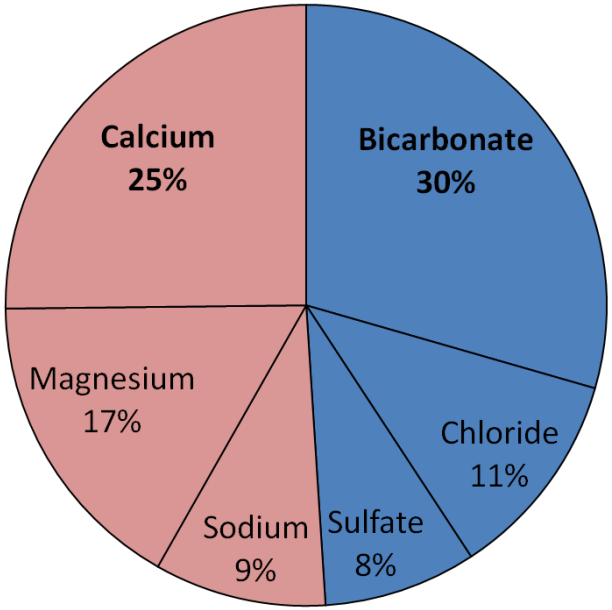



*Calcium & Bicarbonate are the major ions in all 3 provinces.*

Ridge and Valley Province




Piedmont Province



# Chloride Toxicity Testing

Study being conducted by
Stroud Water Research Center


- Multiple species of sensitive Pennsylvania mayflies used in the acute and full life cycle chronic tests.
- Test water will be taken from Pennsylvania reference streams of typical ionic composition and varying hardness levels.
- Goal is aquatic life acute and chronic chloride water quality criteria recommendations for Pennsylvania streams.

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# Sulfate Toxicity Testing

Possible Future Studies to be conducted by
Stroud Water Research Center

- If the chloride testing is successful, the studies will be repeated the following year using sulfate instead of chloride.
- Goal is aquatic life acute and chronic sulfate water quality criteria recommendations for Pennsylvania streams.

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