

## **Mountain Stream Symposium II**

Hosted on the JMU campus on Saturday, September 21<sup>st</sup>, 2013

### Meeting Summary

- Over 100 participants in attendance plus 21 off-site viewing links via streaming video.
- 14 invited speakers plus 8 contributed posters and 2 display tables from local organizations.
- Invited speakers included academics (JMU, UVa, VT, WLU), federal agencies (EPA, NPS, USFS, USGS), state programs (VMNH) and organizations (TU, Center for Coldwaters Restoration).
- Panel members discussed the development of the proposed Center for Coldwaters Restoration in Waynesboro.

### **Continuing Challenges for Critical Ecosystems:**

#### Acidic Deposition:

- The Shenandoah Watershed Study, which began in 1979, is the longest running watershed study in the National Park system.
- After passage of the Clean Water Act atmospheric emissions have been reduced, as have wet and dry deposition of NO<sub>x</sub> and SO<sub>2</sub> across the nation. The recovery of streams and lakes is variable across the region and is dependent upon the soil buffering capacity.
- Some catchments act as sulfate 'sinks,' but can transform to 'sources' as sulfate inputs from atmospheric deposition decline in relation to stream water export of sulfate that has accumulated in soils. This tipping point is projected to occur within the next decade for many catchments in Shenandoah National Park.
- Long-term trends in stream invertebrate communities are difficult to interpret because of acid-tolerant and temperature-sensitive species.

#### Climate Change:

- Increasing water temperature trends in the region are occurring and may restrict the range of brook trout in the future.
- Thermal sensitivity is being defined as the ratio of air to water temperature rise. Some streams are less sensitive to air temperature increases due to groundwater inputs. These thermal refuges may be of critical importance for sustaining brook trout in the region.

### Habitat Fragmentation:

- Mountain streams in the region are characterized by a high level of natural variation in environmental conditions and fish production.
- Mountain streams are subject to severe disturbances, such as debris flows that can cause localized extirpations. Recovery of these systems can be rapid but requires high connectivity of populations to provide a source for recolonizers.
- Regional trends in young-of-the-year brook trout abundances are emerging and are an indicator of spawning success that is largely attributable to flooding during the incubation period.
- Fragmentation (e.g., roads and dams) has resulted in isolated populations of brook trout, which are not resilient to disturbances.
- American eels have increased in the region due to the removal of dams that previously blocked passage.
- Measuring fish movement needs to take into account distance, duration, frequency and timing, as well as the mortality risk of staying versus moving.

### Restoration:

- Programs and organizations are working to make conservation an easy choice for private landowners.
- In some streams water chemistry limitations can override physical habitat conditions for native trout production.
- Both chemical (e.g., liming) and physical habitat (e.g., wood additions) restoration are occurring on federal lands.

### Fisheries Management

- Virginia's Wild Trout Management program surveys coldwater streams, reduces the stocking of hatchery fish in streams with native trout, and has tailored fishing regulations to protect native runs.
- The interaction between hatchery and wild brook trout are being investigated with genetic tools to assess the potential for interbreeding.

### **Next Steps:**

- Continue to build partnerships to sustain interest and raise awareness of our mountain streams.
- Environmental education at all age-levels is vital.
- The Year of Water at the Virginia Museum of Natural History and the proposed development of the Center for Coldwaters Restoration can serve as a catalyst for both collaboration and education.