4. Watauga River basin

Priority aquatic species in the Watauga River basin:

<table>
<thead>
<tr>
<th>Group</th>
<th>Scientific name</th>
<th>Common name</th>
<th>State status (Federal status)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish</td>
<td>Notropis photogenis</td>
<td>Silver Shiner</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Percina aurantiaca</td>
<td>Tangerine Darter</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pimephales notatus</td>
<td>Bluntnose Minnow</td>
<td></td>
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<tr>
<td>Mussels</td>
<td>Lasmigona subviridis</td>
<td>Green Floater</td>
<td>E</td>
</tr>
</tbody>
</table>

A. Location and condition of basin (see Maps 5B.4a, 5B.4b):

The Watauga River watershed drains northwest into Tennessee where it flows into Watauga Reservoir. The Watauga River is a tributary of the Holston River, which is a major tributary of the Tennessee River. The Watauga River watershed in North Carolina encompasses 205 sq. miles, including 270 stream miles in Avery and Watauga counties, and is entirely within the Blue Ridge physiographic province. The Elk River is a major tributary.

Land use in the basin is 87% forest/wetland, 13% pasture/managed herbaceous, and >1% urban (NCDWQ 2002). Most development and agricultural activities are located in the valleys due to abundance of steep slopes within the watershed. However, development (primarily home construction) is rapidly increasing on steeper slopes. Major land ownership is private with <10% in public lands (Pisgah National Forest and the Blue Ridge Parkway). There are no major impoundments within the North Carolina portion of the basin. There is one run of the river hydro-electric facility on the Watauga River (Ward Mill Dam). There are several small impoundments on tributaries, including Beech Mountain Reservoir on Buckeye Creek (drinking water reservoir).

There are no designated impaired waters within the basin (83% fully supporting, 17% not rated) (NCDWQ 2002). Overall, water quality in the Watauga basin is very good. The primary water quality concerns stem from non-point inputs, primarily siltation.

B. Problems affecting species and habitats:

While water quality conditions are generally very good at present, past pollution events may have had a profound effect on the extant aquatic fauna in the Watauga River. Local accounts indicate that a tannic acid factory near Valle Crucis caused severe pollution in the early 20th century and may have lead to the extirpation of many native species. Apparently, no extensive surveys for aquatic species were made prior to this period of degradation and the extent of species loss is unknown. Presently, excessive erosion and sedimentation from non-point sources is the primary problem affecting species and habitats. Narrow riparian corridors or total lack of riparian vegetation along portions of the Watauga River and many tributaries have lead to excessive stream bank erosion and loss of habitat to sediment deposition and over-widening of channels. Impacts from row-crop agriculture and poorly managed livestock pasture (sedimentation from runoff and stream bank erosion) are also significant. As residential development increases (vacation homes, golf courses, etc.) stormwater run-off is a major contributor to sedimentation and other non-point problems.
The area appears to be experiencing an acceleration of development and threats to water and habitat quality are increasing. Christmas tree farming is also increasing in the basin. Relatively large amounts of herbicides and pesticides are used in this form of silviculture. Impacts of runoff from tree farms is unclear, but should be monitored for potential effects. Impacts from non-native species (e.g. margined madtom) are unknown, but could be a negative impact on native fish communities.

Little is known of the extent to which non-native aquatic species have become established in the Watauga basin in North Carolina. Non-native trout species (rainbow and brown trout) are well established. As identified in previous basin accounts, non-native vegetation can also negatively impact native aquatic animal communities. This includes both aquatic and riparian plant species and non-native plant pathogens that can alter riparian vegetation and affect aquatic habitats (e.g., hemlock wooly adelgid).

C. **Priority research, survey, and monitoring efforts needed to identify factors to assist in restoration/conservation of species:**

### Inventory: distributional and status surveys

- General surveys are needed to complete the distributional status for aquatic snails, crayfish, mussels, and fish (in order of general need). (Partners include: NC Division of Water Quality, Tennessee Valley Authority, NC Department of Transportation, US Forest Service, National Parks Service (Blue Ridge Parkway), Appalachian State University).
  - Review existing data and determine information needs for all taxa (cooperate with NC Museum of Natural Sciences).
  - Snails - inventory primary distribution; determine potential habitats and distribution surveys for hydrobiids.
  - Crayfish - complete primary distribution and status surveys.
  - Determine distribution of non-native species.

### Taxonomic resolution: support species descriptions and diagnoses

- Formal descriptions for known or putative undescribed species, as well as investigations aimed at resolving taxonomic or evolutionary status of locally variable forms are needed.
  - Crayfish - support description and species diagnosis of all crayfish species in the basin. At least one putative undescribed species is presently known (cooperate with NC Museum of Natural Science).
  - Snails - support identification and description of all species in the basin.

### Research to facilitate appropriate conservation actions

- Research should generally focus on life history of priority species. Specific questions to be addressed include: habitat use/preferences, spawning location and timing, fecundity, population dynamics, population genetics, feeding, competition, predation. Research must also be conducted to determine vulnerability of priority species to specific threats, particularly as related to our permit review and conditions responsibilities. Studies should provide recommendations for mitigation and restoration.
• Support life history and habitat requirement studies for green floater, especially focused on factors that may limit populations in the Watauga River.
• Continue cooperation with Appalachian State University to investigate potential impacts of seasonal delayed harvest trout stocking on native cool-warm water communities in Watauga River.
• Support investigations into potential impacts to aquatic systems from intensive silvicultural applications of pesticides.
• All other priority species:
  - Review available information and support life history investigations where lacking.
  - Support investigation of potential for reintroduction of extirpated species to Watauga River.
  - Support investigations of population response to stream restoration projects (especially in priority areas).

Monitoring - Long-term monitoring must be improved across species groups, habitats, and management actions. We must develop monitoring plans that coordinate with existing monitoring programs and overall goals and objectives wherever possible. (Cooperators in North Carolina include: NC Division of Water Quality, Tennessee Valley Authority, NC Department of Transportation, US Fish and Wildlife Service, US Forest Service, National Parks Service (Blue Ridge Parkway), Appalachian State University; an interstate, intrabasin cooperator is the Tennessee Wildlife Resources Agency).

• Conduct long-term monitoring to identify population trends of priority species. Establish protocol, schedule, and sites for long-term population monitoring.
• Conduct special purpose monitoring to assess performance of specific conservation actions.
  - Performance of stream restoration projects.
  - Performance of hydropower remediation.
  - Performance of species restoration projects.
• Assess non-native species impacts- monitor populations of potentially injurious non-native species and impacts on priority species.
  - Basin specific priority: margined madtom.

D. Conservation actions necessary to conserve the species and habitat and priorities for implementation:


• Identify priority areas for habitat conservation and restoration. Criteria include areas with high species diversity, rare species, and endemic species; specific areas that are critical to the survival of priority species (e.g., particular streams or spawning sites); and areas recognized by previous national and/or regional prioritization efforts.
- Priority watersheds for freshwater conservation in the Watauga River basin include (based in part on Smith et al. 2002, NC Natural Heritage Program and Commission data) (see Map 5B.4b):
  - Watauga River
- Support conservation and restoration of streams and riparian zones in priority areas (acquisition, easements, and buffers). Support stream conservation and restoration by working collaboratively with other organizations.
- Promote and support conservation and restoration efforts within the Commission.
  - Incorporate aquatic priorities into the Watershed Enhancement Program prioritization process, into Game Lands management, and into Game Lands acquisitions.

**Population management and restoration**

- Reintroduce or augment rare mollusk and fish species populations in areas where water quality and stream habitats have recovered sufficiently to support them.
- Investigate potential for reintroduction of common upper Tennessee River basin species (i.e. wavy-rayed lampmussel, rainbow) to the upper Watauga River, as habitat conditions dictate. No stocks for reintroduction are available from the basin in North Carolina – these would have to come from elsewhere in the upper Holston River system in Tennessee or Virginia.

**Data collection, management, and dissemination among agencies**

- Improve the quality of data obtained from survey permit holders (this includes capturing data from standard scientific collection permit reports, as well as endangered species permits).
- Improve data exchange with NC Natural Heritage Program.

**Partnerships**

- Support partnerships to achieve common goals, improve efficiency and prevent duplication of efforts.
  - Coordinate sampling with other resource groups.
  - Issue collection permits for research activities and educational purposes that help achieve specific conservation goals and objectives.
- Support the development and application of an aquatic nuisance species management plan with other agencies/groups.
- Participate in guidance of academic research projects to help achieve specific conservation goals and objectives.

**Education/ Outreach**

- Develop new web-based resources. Improve and maintain existing web resources (mussel, crayfish, and fish atlases, etc.).
  - When available, update crayfish and mussel atlases with presently known species occurrence and distributions in the Watauga basin.
• Develop and disseminate print media, including stand alone documents, press releases, newspaper and magazine articles, and displays.
• Direct public involvement/outreach
  - Deliver oral presentations
  - Participate in educational activities
• Seek opportunities for direct outreach throughout the basin.

Species and habitat protection efforts


• Increase efficiency and effectiveness of the technical guidance and permit review process.
• Provide technical guidance to conserve habitats for priority species.

Water quality and habitat protection

• Support strengthening of water quality protection.
  - Support water quality rules and watershed designations that conserve habitats for priority aquatic species. Outstanding Resource Water and High Quality Water designations should be supported wherever the criteria for designation are met, especially in watersheds that support priority species.
  - Support incentive and information programs that help reduce sedimentation/erosion (e.g., fencing livestock from streams, improve tilling practices), minimize pesticide and herbicide use, modernize wastewater treatment facilities, etc.

Land-use planning efforts - Improve coordination with local and regional land-use planning efforts to affect water quality and habitat conservation.

• Support establishing riparian buffers along streams, implement low impact development, and better stormwater management (e.g. secondary and cumulative impacts; NCWRC 2002) through program coordination, cooperative projects, and technical guidance.

Species protection - Support and utilize species listing processes and associated programs to conserve imperiled species and their habitats.

• Support federal and state species listing processes.
  - Focus analysis and synthesis of inventory and monitoring data and reporting to inform decision making pertaining to initial species listing and status revision.
  - When warranted, make recommendations for state listing to the Commission’s Nongame Wildlife Advisory Committee.
• Improve coordination with US Fish and Wildlife Service to focus Section 6 (US Endangered Species Act) activities on priorities for listing and recovery. Activities that
are applicable to goals and objectives of recovery plans should be tracked and recovery plans should be updated and revised as necessary.
- Coordinate with US Fish and Wildlife Service to plan and align activities for federal Candidate species and Species of Concern with specific information or management needs.

**Permitting** - Help ensure that reliable information is provided for project impact assessments by issuing endangered species and scientific collection permits to qualified applicants.

- Improve processes for reviewing applications and tracking performance of permit holders.
- Support education opportunities for potential applicants.

**Supporting References**


N.C. Division of Water Quality (NCDWQ). 2002. Watauga River basinwide water quality plan. N.C. Department of Environment and Natural Resources, Division of Water Quality, Raleigh, NC.

Map 5B.4a. Watauga River basin, political information.
Map 5B.4b. Watauga River basin, priority species occurrences and priority areas for freshwater conservation.