

# APPALACHIAN

## LANDSCAPE CONSERVATION COOPERATIVE



### HABITAT TYPE:

## Forested Stream and/or Seepage

Forested stream environments are typically found in the buffer zones between forested land and stream banks, often known as riparian zones. Stream headwaters and seepage areas occur where ground water percolates to the surface through muck, mossy rock, and nettles. It can also be found under rocks, among gravel, or cobble where water has begun to percolate in areas near open water. Breeding grounds are commonly found beneath mosses growing on rocks, on logs, or soil surfaces in these types of seepage areas.

Predicted climate change will largely impact changes in temperature and moisture availability in forested stream and/or seepage systems, likely having a cascading effect on a species habitat and increasing stress to many of these species. The Appalachian LCC funded NatureServe to conduct vulnerability assessments on a suite of plants, animals, and habitats within the Appalachians. These assessments can be used as an early warning system to alert resource managers about changing conditions.

Two such organisms within Forested Stream and/or Seepage that managers can use to monitor such change are...



### SANTEETLAH DUSKY SALAMANDER

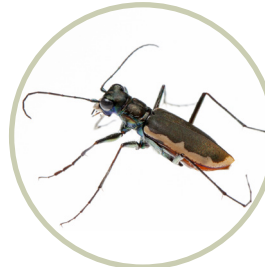
*Desmognathus santeetlah*

**Distribution:** Found in higher elevations— especially along the northwestern escarpment of the Great Smoky Mountains and throughout the southern Appalachians.

**Habitat Requirements:** Most abundant under cover in small streams and seepages in high elevation forests and where ground water percolates to surface. May be found several meters into the forest, however usually occur within a few centimeters of surface water.

**Interactions:** Not much is known about this species. It likely consumes primarily small insects, and is likely consumed by small predators.

**Conservation Concern:** Considered a species of least concern. Largely restricted to stream-headwater, their habitats are easily degraded by logging, road building, and construction. Their limited range also leaves them sensitive to stream pollution and siltation. In the Appalachian region, clear-cut logging and acid rain also pose significant threats.



### APPALACHIAN TIGER BEETLE

*Cicindela ancocisconensis*

**Distribution:** This beetle is typically found in mountain rivers in the eastern United States and Canada.

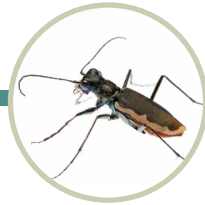
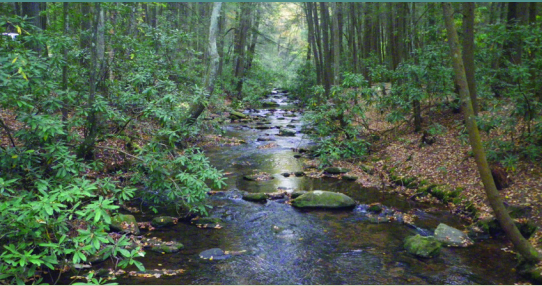
**Habitat Requirements:** Usually found along rocky mountain streams and small rivers in shaded areas such as sand banks and sandbars. They prefer to breed in sandy loam and adults are usually on sandy patches, but have been reported on clay. Most often found near the water's edge.

**Interactions:** Current research on the Appalachian Tiger Beetle is limited, we do know that display many typical tiger beetle characteristics. For example, they are most active in summer months decline around midsummer.

**Conservation Concern:** A habitat specialist, this species is threatened by a variety of riparian issues, such as dam construction and damage from urban sprawl. Alteration and destruction of habitat or habitat degradation can dramatically effect populations.

# Factors Contributing to Vulnerability from Climate Change for Forested Stream and or Seepage Species

Below is a synthesis of finding on key factors contributing to climate change vulnerability for two species found in Forested Streams and/or Seepages of the Appalachians. Results from these assessments can help natural resource managers identify other species of conservation interest that share similar habitat requirements, develop research and monitoring needs, and guide prioritization and the development of adaptation strategies.



**Appalachian Tiger Beetle**  
*Cicindela ancocisconensis*



VULNERABILITY SCORE:  
HV= Highly Vulnerable



of assessed range  
**.9 to 4.5°F increase in temperature**



of assessed range  
**7.3 to 11.9% decrease in moisture**



**Santeetlah Dusky Salamander**  
*Desmognathus santeetlah*



VULNERABILITY SCORE:  
HV= Highly Vulnerable



of assessed range  
**4.5°F increase in temperature**



assessed range  
**5 to 7.3% decrease in moisture**

## DIRECT EXPOSURE TO LOCAL CLIMATE CHANGE:

Assessed using predictions of future changes in temperature and moisture availability based on averages of global circulation models.

## INDIRECT EXPOSURE TO LOCAL CLIMATE CHANGE:

Considers predicted sea-level rise, existence of barriers to movement, and effects of alternative energy development.

## SENSITIVITY AND ADAPTIVE CAPACITY:

Assessed using a variety of factors, including dispersal capability, known sensitivity to changes in temperature and moisture, reliance on interspecific interactions, genetic diversity, and expected phenological shifts with changing climate.

Man-made barriers **do not exist** OR barriers exist but **would not** likely significantly **impair distributional shifts** due to climate change.

Natural barriers border the current distribution such that **climate change-caused distributional shifts are likely to be significantly** but not greatly or completely **impaired**.

Man-made barriers border the current distribution such that **climate change-caused distributional shifts are likely to be significantly** but not greatly or completely **impaired**.

Natural Barriers border the current distribution such that climate change-caused distributional shifts are likely to be significantly but not greatly or completely impaired.

**50-80%** of **occurrences or range is dependent on ice or snow-associated habitats;** or often found exclusively on or near ice or snow.

Species is **highly dependent** on a **highly uncommon landscape or geologic feature**.

**50-90%** of **occurrences or range are restricted to cool or cold environments** that may be **lost or reduced in response to climate change**.

**Genetic variation** reported as **low to very low** compared to related ta ??? **missing text**

