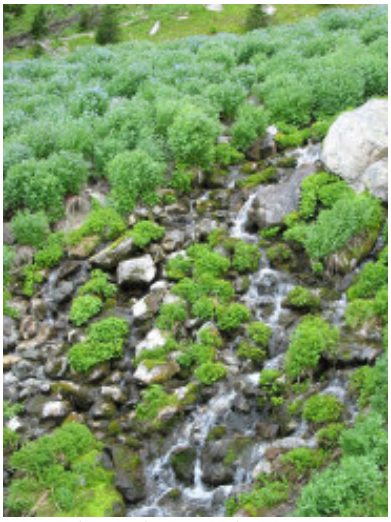
Alpine Stream



E. Fork Pintlar Creek (E001) a fishless Alpine Stream in the Anaconda-Pintlar Mountains

Hellroaring Creek (E001) a steep Alpine Stream in the Beartooth Mountains

Aquatic Ecological System Type D011, E001, E002 and E003
View key to subtypes

Community Description

Summary:

This ecosystem is found in the high elevation (>2500m) mountainous streams of the Middle Rockies and Isolated Ranges Ecoregions. These small (1st and 2nd order, average wetted width of 2m, average summer temperature <10°C) moderately flowing streams have permanent flow with variability due to melting snow pack. These streams can be directly snow pack or glacier-fed or flow from alpine lakes formed in mountain cirques. The geomorphology of these coldwater streams can vary from a high gradient, step-pool configuration with substrate dominated by boulders and cobbles with gravel in the short pools to a low gradient lake outflow dominated by cobbles and gravel.

Fish Community:

The smallest alpine creeks are steep, shallow and fishless. If fish are present in the drainage or have access to the streams from a lake outlet, they will typically be members of a single species assemblage dominated by westslope or Yellowstone cutthroat trout depending on the drainage, or the introduced golden or brook trout. This assemblage is dictated by the fishstocking history of the high mountain lakes in the area. Native species management plans are in place by management agencies, but high mountain lakes are often still stocked with introduced species. Sufficient downstream barriers (waterfalls, boulder step-drops) usually exist to prevent the dispersal of mottled sculpin into this system and impede the colonization of introduced species (brook trout) into the pure cutthroat trout areas.

Macroinvertebrate Community:

This diverse community of coldwater stenotherms consists primarily of the Mountain Stream and Medium Mountain Stream Assemblages. The community indicator species are characterized by intolerant, shredder, and scraper mayfly, stonefly and caddisfly species (*Drunella spinifera, Epeorus grandis, Yoraperla, Soliperla*, *Zapada frigida*, many *Leuctridae* and *Capniidae* species, *Oligophlebodes,* and

numerous predatory *Rhyacophila* spp. groups) and the cold-water dipterans (Thaumalidae, *Bibiocephela,* and *Glutops*). As the alpine mountain streams proceed downstream, begin to lose elevation/gradient and warm (>10 °C), a dominance shift occurs to the Medium Mountain Stream Assemblage.

Range:
In Montana, the Alpine Stream community is described from ~20 sites within the Middle Rockies and Isolated Ranges Ecoregion. These include streams in many of Montana's mountain ranges, including the Beartooths, Absorokas, Elkhorns, Big Belts, Little Belts, Crazys, Gallatin-Madison-Bridgers, Anaconda-Pintlers, Pioneers and the Big Snowy Mountains. These ecosystems typically fall within the boundaries of National Forest Service lands and wilderness areas.

Management:
Due to the high altitude nature of these streams anthropogenic disturbances are usually minimal, but may include high impact recreational use (e.g. stock use, campsites, stream crossings). This type may be threatened by global warming. The communities inhabiting these streams are glacial relicts taking refuge from the last ice age and are confined to these high elevations due to temperature requirements. If these cold-water dependent communities experience increased unsuitable temperatures from snow pack and glacier reductions they have nowhere to go. Due to the inherent inaccessibility of these systems few have been inventoried, but some may contain Species of Concern, like the western glacier stonefly (G2S1) from the glacier-fed streams of Glacier Park.

Global Rank: G5 **State Rank:** S4

Global Rank Comments:
The number of occurrences is unknown, but probably abundant. These stream ecosystems occur in the alpine zones of high mountain ranges across western North America. A state rank of S4 is warranted because the alpine systems in Montana contain unique and intolerant fauna with many Species of Concern. Inventory and long-term monitoring of these poorly understood ecosystems is recommended.