

Natural Heritage Resources Fact Sheet

Rare Crustacea in Virginia Caves, Rye Cove Isopod (*Lirceus culveri*)

Description

In the cool dark of a cave stream, a tiny, pale, half-inch creature clings to a rock. Nearly blind, it waits for particles of organic matter and bacteria to flow within its reach. The Rye Cove isopod is known only from the aquatic habitats of one cave system in the Rye Cove karst area of Scott County, Va. It holds its place in the subterranean stream and sweeps up its food with eight pairs of legs. The number of its appendages defines it as a crustacean, more akin to crawfish than any insect.

Distribution

In western Virginia, linear belts of limestone and dolomite underlie the valleys and ridges between the Blue Ridge Mountains on the east and the Appalachian Mountains on the west. The bedrock has weathered and dissolved over hundreds of thousands of years to form a hollow landscape known as *karst*. Virginia's karstlands contain thousands of caves inhabited by unusual communities of plants and animals. Water moving through these caves to springs and rivers form underground drainage systems, or "groundwater basins," which may or may not be easy to identify on the surface. Some species, such as the Rye Cove isopod, are especially adapted and limited to isolated underground environments and are found only in caves and cavities within a single groundwater basin.

Habitat

Cave ecosystems evolved in relative isolation to form a simple yet intricate system that involves relatively few organisms. Food is scarce in caves and is generally limited to organic nutrients

that wash or filter in through cracks and crevices, and animals that die or are preyed upon in the cave. Organisms that dwell their entire lives in the inner part of caves are adapted to continuous and utter darkness, combined with high humidity and constant temperature. The disruption of interdependent ecological relationships can cause sensitive species to disappear or decline.

Values

The isopod plays an important role in the ecosystem by removing bacteria and fine organic matter from the aquifer. It provides a food source for salamanders, fish and crawfish. Cave isopods also serve as natural indicators of water quality in that they can survive in only the cleanest karst systems. Karstlands are often integral sources of domestic groundwater supplies and stream recharge, therefore the health of the cave community is directly linked to water quality.

Karst areas are especially valuable for the unique diversity of plants and animals that inhabit them. Caves and karstlands comprise a complex, interwoven system of terrestrial and aquatic communities. Often certain plant and animal species in these areas are endemic or completely limited to a specific karst area.

Threats

Extinction is a natural process that has been occurring since long before the existence of man. New species normally develop at about the same rate other species become extinct. Extinctions now occur at a greater rate, however, because of environmental changes.



Rye Cove Isopod (*Lirceus culveri*)

The Rye Cove isopod is threatened by contamination of the groundwater flowing into its habitat. In cave country, or *karstlands*, surface water sinks quickly into underground channels with minimal natural filtration. Contaminated runoff from land-clearing activities can introduce fertilizers, pesticides, herbicides and sediment into the cave system that can travel downstream for thousands of feet, and even for miles. Threats to the water supply also exist from chemical spills, septic systems, leaking fuel tanks, and debris and trash dumps.

Conservation

The Rye Cove isopod is listed by the United States Fish and Wildlife Service as a *species of concern*. In Virginia it is listed as a *special concern species* based on its rarity. Protection of isopod habitat is also protection for an important human resource. Therefore, community leaders, state and federal agencies, students, and landowners are teaming up to stop further pollution of caves and water supplies. The goal is to



Department of Conservation & Recreation
CONSERVING VIRGINIA'S NATURAL AND RECREATIONAL RESOURCES

For more information, contact
Department of Conservation and Recreation
203 Governor Street, Richmond, VA 23219
(804) 786-7951; <http://www.state.va.us/~dcr/vaher.html>

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improve the habitats of cave creatures and ensure safe drinking water for people through community outreach and conservation programs.

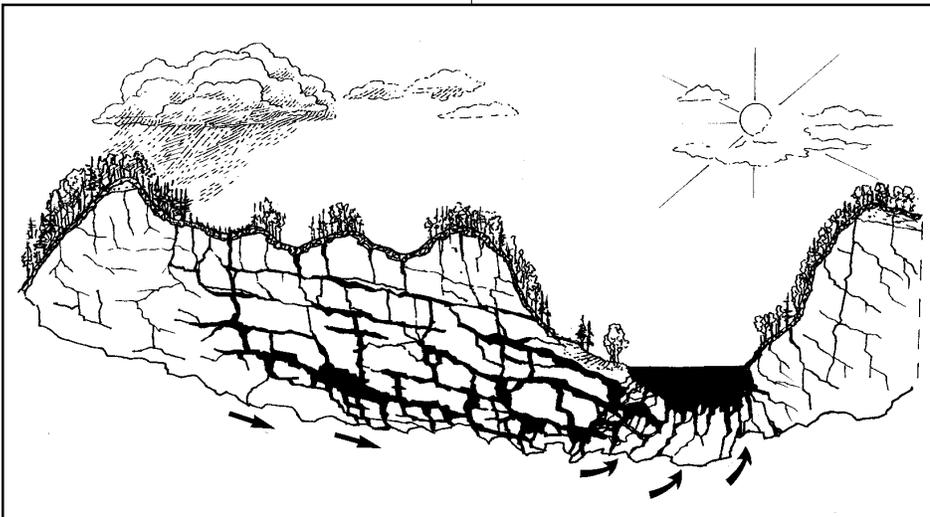
Remember, in cave country, whatever is put on land may eventually enter drinking water aquifers, springs and rivers. Toxic chemicals have killed aquatic life in many surface streams. Because the Rye Cove cave isopod is only found within a very limited groundwater basin, this species could also be easily lost to pollution.

Be careful with the use of pesticides and fertilizers, used motor oil and other chemicals, especially near any sinkhole, spring or creek, no matter how small or

dry. Septic tanks should be inspected regularly by a licensed professional and pumped every three to five years. Farm, household and commercial wastes should be separated for recycling or properly disposed of in a permitted landfill.

Siltation is another major problem for aquatic life. Increased siltation may cause a decline in the available oxygen and food supply for aquatic organisms. A wide buffer strip of natural vegetation along waterways and around sinkholes helps filter contaminants from disturbed lands. Livestock and associated wastes should be kept out of waterways and away from stream

banks. Erosion control measures should be used and maintained at construction sites. Sinkholes should not be filled with trash, debris or soil. People in the Rye Cove community draw their drinking water from springs and wells fed by karst groundwater - the same groundwater that supports cave life. Talk to and work with your neighbors. Frequently observe and be concerned with the quality of the water supply. Report illegal dumping of waste and unusual water color and odors to the Department of Health or Department of Environmental Quality.



To learn more about Virginia's rare plant and animal species and rich biological communities write to the following: *Plant and Insect Species* - Virginia Department of Agriculture and Consumer Services, Office of Plant Protection, P.O. Box 1163, Richmond, Virginia 23209; *Animal Species* - Virginia Department of Game and Inland Fisheries, P.O. Box 11104, Richmond, Virginia 23230; *Plants, Animals or Biological Communities* - Virginia Department of Conservation and Recreation, Division of Natural Heritage, Main Street Station, 1500 East Main Street, Suite 312, Richmond, Virginia 23219. Visit the Virginia Natural Heritage Program on the World Wide Web at http://www.dcr.virginia.gov/natural_heritage/



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