



# Carolina Heelsplitter

## *The Federal Endangered Species Act*

*The Endangered Species Act of 1973 (Act) recognizes that many of our nation's valuable plant and animal resources have been lost and that other species are close to extinction. The Act provides a means to help preserve these species and their habitats for future generations. Only six populations of the Carolina heelsplitter (*Lasmigona decorata*) are presently known to exist. To help secure its continued existence, the U.S. Fish and Wildlife Service designated this mussel as an endangered species on June 30, 1993.*

### Description, Biology and Habitat

The Carolina heelsplitter was first described in 1852. It has an ovate, trapezoid-shaped shell. The outer surface of the shell varies from greenish brown to dark brown in color; and shells from younger specimens have faint greenish brown or black rays. The nacre (inside surface) is often pearly white to bluish white, grading to orange in the area of the umbo. However, in older specimens the entire nacre may be a mottled pale orange. The shell of the largest known specimen of the species measures 4.6 inches in length.

As a group, North American mussels are considered to be the most endangered group of animals on the continent. The Carolina heelsplitter is considered to be one of the rarest and most critically endangered mussels of the Atlantic slope creeks and rivers. The Atlantic slope includes all the creeks and rivers in the Eastern United States that drain into the Atlantic Ocean. Historically, the Carolina heelsplitter occurred in several locations within the Catawba and Pee Dee River systems in North Carolina and the Catawba, Pee Dee, Saluda, and Savannah River systems in South Carolina. Today, only six populations are known to survive. The species still occurs in two small streams in North Carolina—one in the Catawba River system and one in the Pee Dee River system. In South Carolina there are four remaining populations—one each in the Pee Dee and Catawba River systems and two in small tributary streams in the Savannah River system.

The Carolina heelsplitter requires cool, clean, well-oxygenated water.

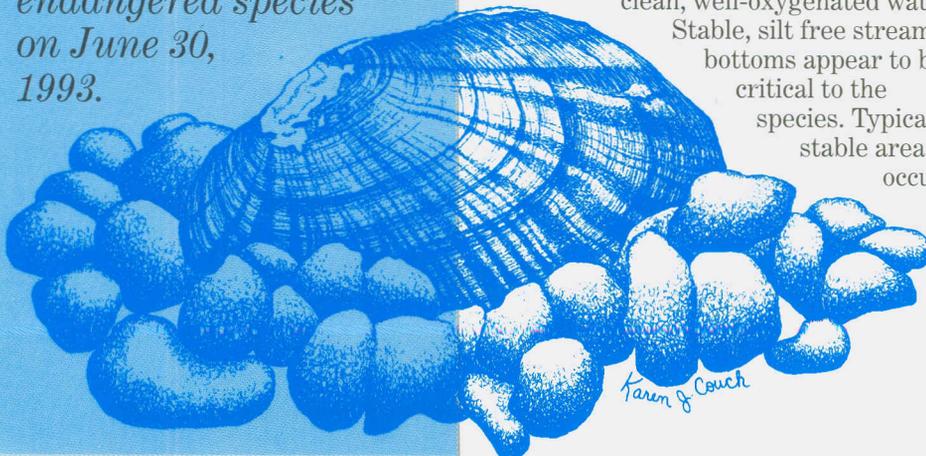
Stable, silt free stream bottoms appear to be critical to the species. Typically stable areas occur

where the stream banks are well-vegetated with trees and shrubs. Like other freshwater mussels, the Carolina heelsplitter feeds by siphoning and filtering food particles from the water column.

The reproductive cycle of the species is similar to other native mussels. Males release sperm into the water; the eggs are fertilized when the sperm are taken in by the females through their siphons during feeding and respiration. The females retain the fertilized eggs in their gills until the larvae (glochidia) fully develop. The glochidia are released into the water and must attach to the appropriate species of fish. They remain attached to their "fish host" for several weeks, drawing nourishment from the fish while they develop into juvenile mussels. They do not hurt their "fish host." The juvenile mussels then detach from the "fish host" and drop to the bottom of the stream where they continue to develop, provided they land in a suitable place with good water conditions. This dependence on a certain species of fish increases the mussels' vulnerability to habitat disturbances. If the fish host is driven off or eliminated because of habitat or water quality problems, the mussels cannot reproduce and will eventually die out.

### Why is the Carolina heelsplitter so rare?

- The surviving populations of the Carolina heelsplitter, with such low numbers and such a small range, are extremely vulnerable to being wiped out by a single catastrophic event or the cumulative effects of many other seemingly insignificant activities.
- Poor water quality and habitat conditions have led to the decline and loss of populations of the Carolina heelsplitter and threaten the remaining populations. Studies have shown that freshwater mussels, especially in their early life stages, are extremely sensitive to many of the pollutants (chlorine, ammonia, heavy metals, etc.) commonly found in municipal and industrial wastewater releases.





- Impoundments (dams), channelization projects, and in-stream dredging operations directly eliminate habitat. These activities also alter the quality and stability of remaining stream reaches by affecting the water flow, temperature, and chemistry.
- Agriculture (both crop and livestock) and forestry operations, roads, residential areas, golf courses, and other construction activities that do not adequately control soil erosion and water run-off contribute excessive amounts of silt, pesticides, fertilizers, heavy metals, and other pollutants that suffocate and poison freshwater mussels.
- The alteration of flood plains or the removal of forested stream buffers can be especially detrimental. Flood plains and forested stream buffers help maintain water quality and the stability of streams by absorbing, filtering, and slowly releasing rainwater. This also helps recharge groundwater levels and maintain flows during dry months.

### Why should we be concerned about the loss of species?

All creatures, including humans, are interconnected in the web of life. Native mussels rely on certain fish species in order to reproduce. In turn, these mussels provide numerous benefits to fish and other aquatic organisms. They continuously siphon and help purify the water by filtering and removing large quantities of organic particles and contaminants from the water column, much like tiny sewage treatment plants. They are a staple in the diets of many fish, birds, turtles, muskrats, and other small mammals. Their shells provide cover, nesting, and/or rearing habitat for aquatic insects, crayfish, and bottom-dwelling fish species, like darters and madtoms (a major prey item of many game fish species). As mussel populations decline and disappear, other aquatic species are affected and decline, impacting even more species. If enough of these living connections are broken, the delicate balance of the entire system can be forever altered.

We depend on the diversity of plant and animal life for our recreation, nourishment, many of our life-saving medicines, and the ecological functions they provide. Each time a species disappears, we lose not only those benefits we know they provided but numerous other benefits, no doubt, that we have yet to realize. For instance, around 50 percent of our pharmaceuticals are derived from plants and animals, yet only a small fraction of plant and animal species have ever been screened to determine their potential medicinal value. Mussels are generally long-lived animals. Individuals of some species are believed to have lived for more than a hundred years, yet researchers have never detected any evidence of tumors in mussels. Perhaps the treatment for certain types of cancers or some other human affliction lies in a species like the Carolina heelsplitter, but once it is gone its values and benefits are gone forever.

Endangered species are indicators of the health of our environment—an early warning system. Their decline alerts us to the fact that the quality of some of the basic elements of our environment—air, land, and water—are being compromised. Because native mussels, like the Carolina heelsplitter, are excellent indicators of water quality, their decline and loss from our streams often indicate that water quality has become very poor.

Although extinction is a natural process, scientists now estimate that current extinction is occurring at approximately a thousand times greater than the normal rate. Under normal conditions the rate of extinction would roughly correspond to the rate of speciation, the process through which new species develop to take the place of the species that disappear. Virtually all of the documented historical extinctions are due to direct or indirect environmental changes caused by humans. Most often these changes are too new, too rapid, and too destructive to allow species a chance to adapt to the changing environment.

### What you can do to help

- Establish and maintain forested stream-side buffers. **Several Federal, state, and private programs are available to assist landowners, both technically and financially, with restoring and protecting stream-side buffers and eroding streams.**
- Implement and maintain measures for controlling erosion and storm water during and after land-clearing and disturbance activities.
- Be careful with the use and disposal of fertilizers, pesticides, and other chemicals. Remember, what you put on your land or dump down the drain may eventually wind up in nearby waters.
- Support local, state, and national clean water legislation.
- Report illegal dumping activities and erosion and sedimentation problems. These activities do affect you.
- Recycle as much as you can. As landfills become full, new ones are often placed in uninhabited areas, causing the destruction of hundreds of acres of wild habitat.

Wild lands and the plant and animal life that inhabit unique natural places are now dependent on us for survival. We can enjoy and benefit from these natural places with their diversity of life. With our help, they will be there for future generations.

### For technical and financial assistance contact:

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