

additional occurrences of the species and to assess habitat conditions. These entities are fully aware of the distribution, status, and habitat requirements for these mussels, as currently known. However, the designation may provide additional information to individuals, local and State governments, and other entities engaged in long-range planning, since areas essential to the conservation of the species are more clearly defined and, to the extent currently feasible, the primary constituent elements of the habitat necessary to the survival of the species are specifically identified. Accordingly, we withdraw our previous determination that the designation of critical habitat will not benefit these five mussel species. Therefore, we determine that the designation of critical habitat is prudent for the Cumberland elktoe, oyster mussel, Cumberlandian combshell, purple bean, and rough rabbitsfoot and propose to designate critical habitat for these mussels. At this time, we have sufficient information necessary to identify specific areas as essential to the conservation of these five mussel species and are therefore proposing critical habitat (see "Methods and Analysis Used to Identify Proposed Critical Habitat" section below for a discussion of information used in our reevaluation).

Methods and Analysis Used To Identify Proposed Critical Habitat for Five Mussel Species

As required by section 4(b)(2) of the Act and its implementing regulations (50 CFR 424.12), we used the best scientific information available to determine critical habitat areas that contain the physical and biological features that are essential for the conservation of these 5 mussels. We reviewed the available information pertaining to the historic and current distributions, life histories, host fishes, habitats of, and threats to these species. The information used in the preparation of this proposed designation includes our own site-specific species and habitat information; recent biological surveys and reports and communications with other qualified biologists or experts; Statewide Geographic Information System (GIS) species occurrence coverages provided by the Kentucky State Nature Preserves Commission, Tennessee Department of Environment and Conservation, and Tennessee Valley Authority; peer-reviewed scientific publications; the final listing rule for the five mussels; and our draft agency recovery plan for these mussels. We considered all collection records within the last 15 years from streams currently

and historically known to be occupied by one or more of the species (see "Taxonomy, Life History, and Distribution" section above).

As discussed in part under the "Summary of Decline" section of this rule and the agency draft recovery plan (Service 2003), the five mussels are highly restricted in distribution, generally occur in small populations, and show little evidence of recovering from historic habitat loss without significant human intervention. In fact, the draft recovery plan states that recovery for the five mussels is not likely in the near future because of the extent of their decline, the relative isolation of remaining populations, and varied threats to their continued existence. Therefore, the recovery plan emphasizes protection of surviving populations of these five mussels and their stream and river habitats, enhancement and restoration of habitats, and population management, including augmentation and reintroduction of the mussels.

Much of what is known about the specific physical and biological habitat requirements of these five mussels is summarized above in the "Background" section of this rule and in the agency draft recovery plan. In determining which areas to propose as critical habitat, we are required to base critical habitat determinations on the best scientific data available and to focus on those physical and biological features (primary constituent elements) that are essential to the conservation of the species and that may require special management considerations or protection, in accordance with sections 3(5)(A)(i) and 4(b)(1)(A) of the Act and regulations at 50 CFR 424.12. Such requirements include, but are not limited to, space for individual and population growth and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding; and habitats that are protected from disturbance or are representative of the historical geographical and ecological distribution of a species.

On the basis of the best available information, we include the following as primary constituent elements essential for the conservation of the five mussels:

1. Permanent, flowing stream reaches with a flow regime (*i.e.*, the magnitude, frequency, duration, and seasonality of discharge over time) necessary for normal behavior, growth, and survival of all life stages of the five mussels and their host fish;

2. Geomorphically stable stream and river channels and banks (structurally stable stream cross section);

3. Stable substrates, consisting of mud, sand, gravel, and/or cobble/boulder, with low amounts of fine sediments or attached filamentous algae;

4. Water quality (including temperature, turbidity, oxygen content, and other characteristics) necessary for the normal behavior, growth, and survival of all life stages of the five mussels and their host fish; and

- f. Fish hosts with adequate living, foraging, and spawning areas for them.

In considering and identifying primary constituent elements, we have taken into account the dynamic nature of riverine systems. We recognize that riparian areas and floodplains are integral parts of the stream ecosystem, important in maintaining channel geomorphology; and providing nutrient input and buffering from sediments and pollution and that side channel and backwater habitats may be important in the life cycle of fish that serve as hosts for mussel larvae.

We considered several factors in the selection and proposal of specific areas for critical habitat for these five mussels. We assessed the recovery strategy outlined in the agency draft recovery plan for these species, which emphasizes: (1) Protection and stabilization of surviving populations (2) protection and management of their habitat (3) augmentation of existing small populations (4) reestablishment/reintroduction of new populations within their historic ranges, and (5) research on species biology and ecology. Small, isolated populations are subject to the loss of unique genetic material (genetic drift) (Soulé 1980; Lacy *et al.* 1995) and the gradual loss of reproductive success or fecundity due to limited genetic diversity (Foose *et al.* 1995). They are likewise more vulnerable to extirpation from random catastrophic events and to changes in human activities and land-use practices (Soulé 1980; Lacy *et al.* 1995). The ultimate goal of the agency draft recovery plan is to restore enough viable (self-sufficient) populations of these five mussels such that each species no longer needs protection under the Act.

In the agency draft recovery plan, we selected the number of distinct viable stream populations required for delisting of each of the five mussels on the basis primarily of the historic distribution of each species (Table 1). For example, the rough rabbitsfoot is narrowly endemic to the upper Tennessee River basin. It historically occupied only three river reaches and, therefore, its conservation can be