APPENDIX F

RESEARCH NATURAL AREAS

One of the keystones of ecosystem management is "adaptive management." Adaptive management recognizes that management decisions need to be made, even though the knowledge needed for making these decisions and their consequences is incomplete or uncertain. Under adaptive management, managers decide the best course with the available information, but monitor to ensure that the original decision has the desired effect. Research Natural Areas (RNAs) are key components of adaptive management, because they represent ecosystems in a natural condition. RNAs serve as reference areas to allow managers to assess the consequences of management on other similar areas. RNAs are also used by scientists to understand how ecosystems function, and are important for conserving biodiversity.

The first Forest Service RNA was established in 1927 on the Coronado National Forest in Arizona. Since then, the RNA system has grown to approximately 300 established RNAs nationwide with an additional 300 or more proposed for establishment. Forest Plans will propose additions to the RNA network, because of the essential role of RNAs in ecosystem management, and because the ecosystem types in the Rocky Mountain Region are poorly represented. Currently, there are 13 RNAs in the Rocky Mountain Region (Colorado, Kansas, Nebraska, South Dakota, and part of Wyoming).

What RNAs Represent: The goal of the RNA program is to represent the ecological diversity that occurs on National Forests and National Grasslands so that we can assess the impacts of management and conserve biodiversity. An ecosystem can roughly be defined as the plants, animals, and environment of a given area. Some of the major ecosystem types that help define this ecological diversity on the Arapaho and Roosevelt National Forests and Pawnee National Grassland include spruce-fir, lodgepole pine and ponderosa pine forests, shrublands, montane grasslands, shortgrass prairie, alpine, and aquatic and riparian (streamside) ecosystems. At a finer scale, ecosystem types can be defined by several of their dominant plant species, such as the ponderosa pine/mountain mahogany and blue grama/buffalo grass types. At this level, ecosystem types are referred to as plant associations or community types. Over 500 plant associations and community types have been identified on National Forests and Grasslands within the Rocky Mountain Region, and few of these are represented in RNAs.

Broad geographical differences in ecosystems are also recognized by targeting for RNA designation different ecosystem types within each Ecoregion Section (see Hierarchy of Ecological Units in the Overview of Biological Diversity in Chapter Three of the Environmental Impact Statement. Variations in geology, soils, landform, and climate influence the kinds of plants and animals that live in different regions and can also be used as features for establishing a representative RNA system. The climatic differences that occur between the east and west sides of the Continental Divide affect ecosystems and thus are typical of the kind of significant

ecological differences that the RNA system can try to represent. RNAs can also be used to provide extra protection for populations of Threatened and Endangered and Sensitive species.

Function of RNAs: RNAs serve at least three important functions for the Forest Service:

1. Reference Areas: RNAs serve as benchmarks or reference areas for monitoring and evaluating the sustainability and impacts of land management practices on lands with similar ecosystem types. To determine the impact of management on a specific area, it is desirable to have a similar area maintained in natural condition for comparison. By serving as a representative system of controls for land managers, RNAs make one of their most important contributions to ecosystem management.

2. Biodiversity: RNAs provide protection for biodiversity. A representative RNA system provides some degree of assurance that a wide array of plant and animal species are being given a high degree of protection for the future. This protection may be most important for the forms of biodiversity that ecosystems often depend upon the most and about which we know the least, such as soil microorganisms, fungi, and insects. RNAs can also be selected to provide a high degree of protection to specific populations of Threatened, Endangered and Sensitive species.

3. Research: RNAs provide sites for research into how ecosystems function. This research is often best accomplished in areas such as RNAs where ecological and evolutionary processes are functioning as naturally as possible. RNAs serve as sites for monitoring long-term change in ecosystems, including global climate change and shifting patterns in the landscape resulting from natural disturbances such as fire, floods, and insect epidemics. When scientists perform a variety of research projects in an identified area, such as an RNA, the cumulative results can greatly increase our understanding of particular ecosystems. One of the meanings of ecosystem management is that lands will be managed with the best information available; over the years, scientific research has helped provide that information. RNAs also serve an important educational role by providing excellent examples of ecosystems in relatively natural condition with functioning ecological processes.

Research Natural Areas help the Forest Service maintain the long-term health, productivity, and diversity of lands entrusted to its management by the public.

Condition of RNAs: Because RNAs represent ecosystems in their natural condition, RNAs should be located in areas with a minimum amount of impact from human use. RNAs should also contain good examples of the ecosystem types they represent. For some ecosystem types, no areas could be found without significant human impact. In these cases, RNAs are selected from the best condition sites available. On the Arapaho and Roosevelt National Forests a concerted effort was made to select sites as potential RNAs that would have minimal conflicts with existing public uses of National Forest land. Therefore, potential RNAs were primarily selected from lands that are roadless and in vacant or closed grazing allotments. Because virtually all of the Pawnee National Grassland is grazed by livestock, it was recognized that, if a

representative RNA system was to be created, it would need to be done with land in active allotments. Grazing associations' concerns have been considered in proposing the locations and size of proposed RNAs on the Pawnee National Grassland.

Size of RNAs: To serve as benchmarks, to conserve biodiversity, and to serve as research areas, RNAs must be large enough to maintain the natural processes that sustain ecosystems. For example, many of our forest, grassland and shrubland ecosystems evolved with fire as an important natural process. Fire and other natural disturbances produce a landscape that is a mosaic of patches of various sizes and ages since last disturbance (successional stages). These patches can vary from tens to thousands of acres in size. To maintain ecological processes in many of our fire dependent ecosystems, we prefer land areas several thousand or more acres in size to incorporate a mosaic of successional stages or to allow for their development in the future. Current ideas in conservation biology also recognizes the potentially harmful influence of some outside land uses on the ecological integrity of small natural areas. Small natural areas may degrade easily and suffer species loss.

Larger natural areas also provide greater representation for the range of natural variability which occurs in most ecosystem types and makes RNAs potentially more valuable as benchmarks or controls for ecosystem management. Many of the questions relevant to managing National Forests concern landscape patterns and processes. Some RNAs that represent these patterns and processes are desirable. Where possible, complete watersheds have been selected for potential RNAs, this was done partially in order to maintain intact and naturally functioning aquatic and riparian ecosystems.

Management of RNAs: The Management Area Prescription provides an outline for how RNAs will be managed. The intent of RNA management is to minimize human impacts that will affect the ecosystem and to maintain biodiversity and natural processes. Therefore, most potential RNAs were selected from areas that are roadless, in vacant or closed grazing allotments, in areas that have not experienced timber harvesting, and in areas that were not the highest use recreational areas on the National Forest. Road building and timber harvesting are not compatible uses for RNAs. Some degree of livestock grazing can be used to maintain grassland ecosystems found on National Grasslands, but livestock grazing is not a compatible use within RNAs on the Arapaho and Roosevelt National Forests, where native ungulates (elk, deer and bighorn sheep) maintain healthy populations. On the Pawnee National Grassland, it is anticipated that a scientifically-based management plan will be developed in the future that will probably use livestock grazing and fire as management tools to simulate presettlement bison (and other native herbivore) grazing and natural fire patterns. In the near term, some rest from current livestock grazing is possible for RNAs on the National Grassland.

Recreational Management: Most of the potential RNAs on the Arapaho and Roosevelt National Forests were selected in areas that do not receive heavy recreational use. However, it is inevitable that varying degrees of recreational use will occur in all these areas. As human populations grow, recreational use will likely increase. Because RNAs serve as baselines or benchmarks and heavy recreational use can alter species populations and affect ecosystem function, recreational use is not encouraged (but not prohibited) in RNAs. For example, use of

existing trails in RNAs is permitted, but no new trails will be constructed unless necessary to correct resource damage from existing trails. Existing recreational trails often provide desirable access to RNAs for research, administrative, and educational purposes.

In general, recreational standards for wilderness are applicable to RNAs. Because of the desire to select minimally-impacted areas that are excellent representations of ecosystem types, some RNAs are selected from within wilderness areas. Large RNAs are valuable because they represent a large range of ecosystem conditions. Because existing wilderness-compatible recreation occurs in most large areas and because this recreation currently has an insignificant impact on ecosystem function in the proposed RNAs, no restrictions will be placed on current hiker, backpacker, outfitter and guide, horseback, hunting and fishing use. In certain instances some of these uses have value from a natural areas perspective, because through hunting they provide more natural regulation of elk, deer, and other ungulate populations by helping to replace extirpated predators. Outfitter and guide use will continue to be allowed, subject to possible changes arising from future carrying capacity analysis. For larger RNAs, where the impacts of nonmotorized recreation are primarily confined to narrow trail corridors, significant areas of land within the RNA will be essentially free of impacts. Larger RNAs also have the advantage of providing more flexibility in accommodating recreation use.

National Forest travel management plans have identified some parts of the National Forest as restricted to nonmotorized use. This is as appropriate for RNAs as it is for wilderness. However, in order to accommodate some existing motorized and mechanized uses on certain highly desirable RNAs not in wilderness, exceptions may be made in the management area prescription. These are site-specific decisions made by the Forest Service, based on environmental issues, level of existing use, and public concern. An example of this on the Arapaho and Roosevelt National Forests is on the proposed Bowen Gulch RNA where the established practice of snowmobile use in the Congressionally-designated Bowen Gulch Protection Area will continue to be allowed within the RNA.

Other aspects of recreational management in wilderness are also appropriate to RNAs. For wilderness management, a Limits of Acceptable Change process is available for monitoring and evaluating the impacts of increased recreational use on the wilderness resource. In some instances where recreational impacts in wilderness have increased above an acceptable level, methods have been implemented to lessen these impacts, such as placing restrictions on camping near water sources or establishing a permitting system. This process of monitoring and evaluating recreational impacts is also desirable for RNA management. For newly established RNAs, existing levels of recreational use will be allowed unless specific restrictions have been identified in the management area prescription. Existing permits with commercial recreation providers such as outfitters and guides will continue to be honored, subject to the normal permit review processes that apply to all National Forest System lands.

Fire Management: Natural fire frequencies are desirable on RNAs. However, excessive build-up of fuels from decades of fire suppression, valuable resources outside RNA boundaries, and special old-growth or other values inside some RNAs may preclude allowing some natural fires to burn. Site-specific fire management plans may need to be developed for some RNAs in

order to identify circumstances in which natural fires can be allowed to burn freely and to design specific management-ignited prescribed fires to mimic natural fires.

Exotic Species Management: Exotic (nonnative) species are not desirable on RNAs. Some particularly invasive and unpalatable plant species, such as knapweed and Canada thistle, would be good targets for control in RNAs and elsewhere on public and private lands. However, some nonnative weedy plant species, such as Kentucky bluegrass and cheat grass, have become almost naturalized into many western landscapes and may be prohibitively expensive or almost impossible to eradicate. Decisions on the threats of exotic plant species to RNA values and possible control techniques, including the potential use of herbicides, will need to be made on a site-specific basis. The Colorado Division of Wildlife has introduced into parts of Colorado some game species such as mountain goats, which are found further north in the Rocky Mountains but are not known to be native to Colorado. The presence of these species is not desirable in an RNA; however, their presence may be inevitable in some areas that would be very valuable additions to the RNA system.

As with the management of all public lands, the management of RNAs should be based on a firm scientific basis with concern for long-term sustainability, ecological values, and public uses. These are some of the central tenets of ecosystem management. Research Natural Areas are an important natural legacy for the future and need to be managed accordingly.

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