ESTABLISHMENT RECORD

for

WEST CLEAR CREEK RESEARCH NATURAL AREA

within

Coconino National Forest

Yavapai County, Arizona

SIGNATURE PAGE

for

RESEARCH NATURAL AREA ESTABLISHMENT RECORD

Rocky Gulch Research Natural Area

Coconino National Forest

Coconino County, Arizona

Prepared by_____Date_____
Mark H. Cochran, The Arizona Nature Conservancy
Andrew W. Laurenzi, The Arizona Nature Conservancy

Recommended by_____Date_____
Mike Howard, District Ranger,
Beaver Creek Ranger District

Recommended by_____Date_____
Neil Paulsen, Forest Supervisor,
Coconino National Forests

Recommended by_____Date_____
John W. Russell, Chairman,
Southwestern Research Natural
Area Committee

Recommended by_____Date_____
Sotero Muniz, Regional Forester
Southwestern Region

Recommended by_____Date_____
Charles M. Loveless, Station Director
Rocky Mountain Forest and Range
Experiment Station

INTRODUCTION

The West Clear Creek Research Natural Area (WCCRNA) comprises approximately 1180 acres (478 hectares) in the Beaver Creek Ranger District of the Coconino National Forest in Yavapai County, Arizona, on reserved public domain National Forest land. West Clear Creek, and the attendant riparian forest vegetation, have long been recognized for their exemplary natural area qualities (Smith and Bender, 1974; Martin, 1979; Laurenzi, 1986). The entire RNA is located in the West Clear Creek wilderness area designated by Congress in 1984.

LAND MANAGEMENT PLANNING

The current Coconino National Forest planning documents, the Environmental Impact Statement and Forest Plan (USDA Forest Service, 1987a/1987b), include the West Clear Creek RNA. The environmental analysis conducted as part of the planning process supports the recommendation to establish this Research Natural Area.

JUSTIFICATION STATEMENT FOR ESTABLISHMENT OF AREA

The WCCRNA was identified as an outstanding example of mixed broadleaf Interior Riparian Forest (USDA Forest Service, 1984). The need for representation of this forest type was identified in the Southwestern Regional Guide (USDA Forest Service, 1983).

The objectives for establishing this RNA are:

1. To provide greater representation of mixed broadleaf Interior Riparian Forest types within the Southwest Regional RNA system.
2. To serve as as baseline area for measuring long-term ecological changes in riparian ecosystems.
3. To help insure the protection of genetic diversity in mixed broadleaf riparian forests.
4. Monitor effects of resource management techniques and practices in riparian ecosystems.

PRINCIPAL DISTINGUISHING FEATURES

The WCCRNA is located within a spectacular portion of West Clear Creek Canyon. The stream supports an outstanding closed canopy, deciduous broadleaf riparian forest, which is dominated by a diverse assemblage of deciduous broadleaf tree species. The area is noteworthy for the diversity of tree species present in the area. All six of the characteristic deciduous broadleaf tree species, that are associated with mixed broadleaf Interior Riparian Forest (Minckley and Brown, 1982), are found within the WCCRNA.

Bald Eagles (Halieaatus leucocephalus), a federally endangered species, are known to winter along this section of stream (Greg Goodwin, Forest Biologist, pers. comm.). The stream contains roundtail chub (Gila robusta), a candidate species, (category 2), for Federal listing as threatened or endangered (USDI Fish and Wildlife Service, 1985). River otters (Lutra canadensis), a State listed threatened species, were recently reintroduced into the Verde River and they have been sighted along West Clear Creek. A pair of black hawks (Buteo anthracinus), also State listed (AZ Game and Fish Commission, 1982), are known to nest in the area.

LOCATION

The WCCRNA is located within the Beaver Creek Ranger District of the Coconino National Forest in Yavapai County, Arizona (Figs. 1 & 2). The area is at latitude 34°32′ north and longitude 111°41′ west. Specifically the area lies in portions of sections 12 and 13 of T.13N R.6E, and sections 7, 8 and 18 of T.13N R.7E on the USGS Walker Mountain 7.5′ topographic quadrangle (Fig. 3).

Access to the WCCRNA is from Interstate 17. Take the Camp Verde exit and proceed east into the town of Camp Verde. Continue south from town, along the General Crook Trail, (FS Highway 9), approximately 6 miles (9.7 km) to the junction with unpaved FS Road 618. Turn north and travel 1.8 miles (2.9 km) to the junction with FS Road 215. Take this road 3.4 miles (5.5 km) east to it's dead end. At the dead end is a conspicuous fence and gateway to the Bullpen Ranch property. Walk around the fenced property, approximately 1.5 miles (2.4 km) along West Clear Creek, to reach the western edge of the RNA boundary.

AREA BY COVER TYPES

Information on cover types was obtained from the Southwest Region RNA Progress Report (USDA Forest Service, 1984), field reconnaissance and Laurenzi (1982, 1986).

Küchler

The mixed broadleaf riparian forest is not covered by Küchler's Potential Natural Vegetation types (1964). The adjoining upland slopes are Juniper-Pinyon Woodland (K-021).

Society of American Foresters

The mixed broadleaf riparian forest is not covered by SAF cover types (Eyre, 1980). The adjoining upland slopes are Pinyon-Juniper (SAF 239).

Habitat Types or Plant Associations

The USFS Southwest Region has not developed habitat types for riparian vegetation or woodlands south of the Mogollon Rim. Existing information indicates that the riparian forest community

is best referred to as Interior Riparian Forest, mixed-broadleaf series as proposed by Brown et al., (1980). Two cover types within this riparian forest community are described by Laurenzi (1982): an Arizona alder (Alnus oblongifolia) - velvet ash (Fraxinus pennsylvanica var velutina) - Arizona sycamore (Platanus wrightii) cover type and an Arizona sycamore - velvet ash - Utah juniper (Juniperus utahensis) cover type. The adjoining north and south-facing slopes support Great Basin Conifer Woodland (Brown, 1982) present in several fasciations.

Becuase of the limited areal extent of the riparian forest, a community a map is not presented which delineates the riparian corridor from the adjoining upland slopes. In general the riparian forest averages 200 feet (70m) in width centered on the main stream channel.

Table 1. Estimated areas of vegetation cover types in the WCCRNA.

Type[1]	SAF Type[2]	Kuchler Type[3]	Surface Area Acres	Hectares
Mixed Broadleaf	Interior Riparian 235?		98	60.8
Great Basin Conifer woodland	239	K-021	1082	670.8
		TOTAL	1180	731.6

1 Biotic Communities of the Southwest, Brown et al. (1980).
2 Society of American Foresters Cover Type, Eyre (1980).
3 Potential Natural Vegetation Type, Küchler (1964).

PHYSICAL AND CLIMATIC CONDITIONS

West Clear Creek RNA is located in a relatively wide valley, which is deeply incised within Miocene volcanic rocks that cap underlying Coconino sandstone (Wachter et al., 1976). The perennial stream of West Clear Creek is a 3rd or 4th order stream with a 6 percent gradient. It is similar to streams in the eastern United States with pronounced riffle-pool development, rubble streambottoms, and slow-to-moderate currents (Minckley, 1973). Channel geomorphology along the riparian stretch is diverse. There are scour and overflow channels within the active transport zone and a variety of bars, terraces, and intracanyon alluvial fans that adjoin the active zone of the river.

Elevations in the RNA range from 3660 feet (1200 m), along the river, to 5200 feet (1585 m) at the canyon rim on the southern boundary. North and south-facing slopes are steep and talus slopes occur at the base of the basalt cliff that define the canyon. The Trewartha climate type is hot steppe (USDA Forest Service, 1986). Mean annual temperature on north slopes and the valley floor is 64°F (17.7°C) and 200 days are frost free. On south slopes mean annual temperature is 66°F (18.9°C) and 210 days are frost free. Precipitation averages 20 inches (50.8 cm) annually, 52% of which falls between May and October as thunderstorms which originate on the canyon rim and the remainder as winter storms. Mean annual snow fall is 12 inches (30.5 cm).

DESCRIPTION OF VALUES

Flora

Two distinctive riparian forest cover types are present. These cover types are associated with two fluvial landforms: the lower and upper flood terraces (Laurenzi, 1982). The low flood terrace, located immediately adjacent to the main stream channel and inundated annually by high streamflows, is dominated by Arizona alder (Alnus oblongifolia) with Arizona sycamore (Platanus wrightii) and velvet ash (Fraxinus pennsylvanica var velutina) as major canopy associates. Bonpland's willow (Salix bonplandiana) is of secondary importance within this community. Woody shrubs are rare.

Adjacent to, and elevated above, the lower flood terrace is the upper flood terrace. Forest vegetation associated with these landforms is distinct from the adjacent lower terrace vegetation. Arizona sycamore, and velvet ash are the major canopy dominants with Utah juniper (Juniperus osteosperma) present as a major associate below the forest canopy. Shrub species diversity is much greater relative to the lower flood terrace with a total of sixteen shrub species identified on the upper flood terraces.

In general, the south-facing upland slope is dominated by red-berry juniper (Juniperus erythrocarpa) and associated shrubs, while the north-facing upper slope is dominated by Colorado pinyon (Pinus edulis) and red berry juniper, along with several shrubs. Interior Chapparal (Pase and Brown, 1982) dominated by scrub oak (Quercus turbinella) occurs on steep talus slopes at the base of the basalt cliffs which form the rim of the canyon. Several perennial grasses are common on both slopes.

The following preliminary plant list was compiled by Dr. Arthur Phillips and Ms. Mary Butterwick of the Arizona State Natural Areas Advisory Council on a September, 1984 field trip.

Preliminary Plant List for the WCCRNA

Latin name	Common name
TREES	
Celtis reticulata	
Prosopis velutina	
Platanus wrightii	
Fraxinus pennsylvanica var velutina	
Sapindus saponaria var drummondii	
Salix gooddingii	
Salix bonplandiana	
Populus fremonti	
Acer negunda var interius	
Alnus oblongifolia	
Juglans major	
Juniperus osteosperma	
Juniperus erythrocarpa	
Juniperus deppeana	
Pinus edulis	
Pinus ponderosa	
Quercus arizonica	
Quercus emoryi	
SHRUBS AND SUCCULENTS	
Mendora scabra	
Happlopappus gracilis	
Yucca baccata	
Simmondsia chinensis	
Viguiera annua	
Rhamnus crocea	
Ceanothus greggii	
Fouquieria splendens	

Cordylanthus sp.
Brickellia californica
Rhus trilobata
Quercus turbinella
Aloysia wrightii
Cercocarpus betuloides
Acacia greggi
Opuntia phaeacantha
Baccharis salicifolia
Amorpha fruticosa var occidentalis
Rhamnus californicus
Eriogonum wrightii
Berberis haematocarpa
Brickellia atractyloides
Echinocereus triglochidiatus
Canotia holacantha
Atriplex canescens
Lycium pallidum
Zizyphus obtusifolia
Parthenium incanum
Abutilon parvulum
Acacia constricta
Vitis arizonica
Baccharis sarothroides
Parthenocissum inserta
Mimosa biuncifera
Ephedra viridis
Garrya wrightii
Solidago wrightii
Conyza canadensis
Nolina microcarpa
Guiterrezia sarothrae
Hymenoclea monogyra

FORBS

Penstemon pseudospectabilis
Arabis perennans
Plantago patagonica
Solanum elaeagnifolium
Baileya multiradiata
Ericameria laricifolia
Artemesia ludoviciana
Oenothera hookeri
Lythrum californicum
Lobelia cardinalis
Lotus rigidus
Stephanomeria pauciflora
Ambrosia psilostachya
Verbena goodingii
Xanethium strumarium
Mirabilis sp.
Meliotus albus

Verbena bracteata
Amaranthus
Galium microphyllum
Euphorbia sp.
Allionia incarnata
Erigeron flagellaris
Heterotheca sp.
Mentha sp.
Phaseolus angustifolia
Datura meteloides
Helianthus annus
Machaeranthera sp.
Penstemon barbatus
Artemesia dracunculus
Pellaea truncata
Castilleja sp.
Gnaphilium sp.
Perityle sp.
Hedeoma sp.
Dalea sp.
Evolvulus sp.
Polanisis dodecandra
Rumex crispus

GRASSES AND GRASS-LIKE PLANTS

Bothriochloa barbinodus
Bouteloua curtipendula
Bouteloua eriopoda
Bouteloua hirsuta
Bouteloua gracilis
Hilaria berlangeri
Echinochloa sp.
Setaria sp.
Juncus sp.
Bromus rubens
Equisetum arvense
Erioneuron pulchellum
Polypogon sp.
Typha sp.

Fauna

The aquatic environment supports both non-native and native fish, including roundtail chub, a candidate species, (category 2), for federal listing as threatened or endangered (USDI Fish and Wildlife Service, 1985). Historically, both spikedace (Meda fulgida) and loach minnow (Tiaroga cobitis), two federally listed threatened species, were collected from West Clear Creek (Minckley, 1973), but are now believe extirpated. Razorback suckers (Xyrauchen texanus), a candidate species, (category 2), for federal

listing, were introduced into the Creek at Bullpen Ranch located 1.5 miles (2.4 km) downstream from the RNA boundary. This effort is presumed a failure as subsequent sampling has not located any surviving individuals. River otters which were recently reintroduced into the Verde River have been sighted along West Clear Creek.

Twenty two species of breeding birds have been recorded at Bullpen Ranch, which is located mile (1.6 km) downstream (Carothers et al., 1974). A pair of black hawks, a State listed threatened species, is known to nest along the river upstream of the Ranch. Wintering populations of bald eagles can be found foraging in the area in late winter after open water sites above the Mogollon Rim have frozen over.

The following animal list was derived from the RUN WILD III computer-stored data base (Lehmkuhl and Patton, 1982) for Riparian Deciduous Forest biome, Mixed Broadleaf series (223.100) and Great Basin Conifer Woodland biome, Pinyon-Juniper series (224.100) with the exception of the breeding bird list which was reproduced from Carothers et al., (1974).

An Abbreviated Animal List For WCCRNA

Common name	Latin name
Birds	
Dove, Mourning	
Hummingbird, Back-chinned	
Woodpecker, Gila	
Woodpecker, Ladder-backed	
Kingbird, Western	
Flycatcher, Brown-crested	
Phoebe, Black	
Flycatcher, Gray	
Peewee, Western Wood	
Titmouse, Bridled	
Verdin	
Wren, Bewick's	
Vireo, Bell's	
Warbler, Lucy's	
Warbler, Yellow	
Chat, Yellow-breasted	
Oriole, Hooded	
Tanager, Summer	
Cardinal	
Grosbeak, Blue	
Finch, House	
Towhee, Abert's	

Mammals

Bat, Allen's Big-eared	Idionycteris phyllotis
Bat, Big Brown	Eptesicus fuscus
Bat, Brazilian Free-tailed	Tadarida brasiliensis
Bat, Hoary	Lasiurus cinereus
Bat, Pallid	Antrozous pallidus
Bat, Townsend's Big-eared	Plecotus townsendii
Bobcat	Felis rufus
Chipmunk, Cliff	Tamias dorsalis
Deer, Mule	Odocoileus hemionus
Elk	Cervus elaphus
Gopher, Botta's Pocket	Thomomys bottae
Lion, Mountain	Felis concolor
Mouse, Brush	Peromyscus boylii
Mouse, Cactus	Peromyscus eremicus
Mouse, Deer	Peromyscus maniculatus
Mouse, Northern Grasshopper	Onychomys leucogaster
Mouse, Pinyon	Peromyscus truei
Mouse, Plains Pocket	Perognathus flavescens
Mouse, Western Harvest	Reithrodontomys megalotis
Mouse, White-footed	Peromyscus leucopus
Myotis, California	Myotis californicus
Myotis, Little Brown	Myotis lucifugus
Myotis, Long-legged	Myotis volans
Peccary, Collared	Tayassu tajacu
Pipistrelle, Western	Pipistrellus hesperus
Porcupine	Erethizon dorsatum
Prarie Dog, Gunnison's	Cynomys gunnisoni
Pronghorn	Antilocapra americana
Rat, Hispid Cotton	Sigmodon hispious
Rat, Ord's Kangaroo	Dipodomys ordii
Shrew, Desert	Notiosorex crawfordi
Shrew, Merriam's	Sorex merriami
Skunk, Striped	Mephitis mephitis
Skunk, Western Spotted	Spilogale gracilis
Squirrel, Golden-mantled Ground	Spermophilus lateralis
Squirrel, Harris' Antelope	Ammospermophilus harrisii
Squirrel, Rock	Spermophilus variegatus
Woodrat, Arizona	Neotoma devia
Woodrat, Mexican	Neotoma mexicana
Woodrat, Stephen's	Neotoma stephensi
Woodrat, White-throated	Neotoma albigula

Amphibians and Reptiles

Treefrog, mountain	Hyla exima
Kingsnake, Sonoran Mountain	Lampropeltis pyromelana
Lizard, Collared	Crotaphytus collaris
Lizard, Side-blotched	Uta stansburiana
Lizard, Tree	Urosaurus ornatus

Rattlesnake, Western Diamondback	Crotalus atrox
Snake, Blackneck Garter	Thamnophis cyrtopsis
Snake, Narrowhead Garter	Thamnophis rufipunctata
Whiptail, Desert Grassland	Cnemidophorus uniparens
Whiptail, Plateau Striped	Cnemidophorus velox
Whiptail, Western	Cnemidophorus tigris

Geology

West Clear Creek Canyon has cut through a series of basalt flows into the underlying Coconino Sandstone (Arizona Department of Transportation, 1972). The Coconino Sandstone is a fine- grained white quartz sandstone with large sweeping cross-beds. Shallow, recent alluvial deposits are found on the canyon floor.

Soils

Soils are quite variable at taxa higher than the subgroup (USDA Forest Service, 1986). Sandbars and lower positions are occupied by Aquic Ustifluents. Slightly higher positions are occupied by Typic Ustifluents and the highest stream terraces and fan terraces are occupied by Fluentic Ustochrepts.

Cultural

To be provided by the Beaver Creek Ranger District.

IMPACTS AND POSSIBLE CONFLICTS

To be provided by the Beaver Creek Ranger District.

ADMINISTRATIVE RECORDS AND PROTECTION

Administration and protection of the West Clear Creek RNA will be the responsibility of the Coconino National Forest. The District Ranger, Beaver Creek Ranger District, Flagstaff, AZ has direct responsibility.

The Director of the Rocky Mountain Forest and Range Experiment Station, or his designee, will be responsible for any studies or research conducted in the area, and request to conduct research in the area should be referred to him. He, or his designee, will evaluate research proposals and coordinate all studies and research in the area with the District Ranger and RNA research coordinator. All plant and animal specimens collected in the course of research conducted in the area will be properly preserved and maintained within university or federal agency herbaria and museums, approved by the Rocky Mountain Station Director.

Records for the WCCRNA will be maintained in the following offices:

Regional Forester, Southwestern Region, Albuquerque, NM

Rocky Mountain Station, Fort Collins, CO
Coconino National Forest, Flagstaff, AZ
District Ranger, Beaver Creek Ranger District, Flagstaff, AZ

REFERENCES

Arizona Game and Fish Commission. 1982. Threatened native wildlife in Arizona. Ariz. Game and Fish Dept. Publ. 12 pp.

Arizona Department of Transportation. 1972. Arizona Materials Inventory of Yavapai County. Arizona Highway Division, Phoenix, AZ.

Brown, David E. 1982. Great Basin Conifer Woodlands. Pp. 52- 57. IN: D.E. Brown (Ed.) Biotic Communities of the American Southwest-United States and Mexico. Desert Plants Vol. 4(Nos.1-4) Special Issue. 324 pp.

Brown, David E., N.B. Carmony and R.M. Turner. 1978. Drainage map of Arizona showing perennial streams and some important wetland. Arizona Game and Fish Department.

Brown, David E., C.H. Lowe and C.P. Pase. 1980. A digitized systematic classification for ecosystems with an illustrated summary of the natural vegetation of North America. USDA Forest Service Gen. Tech. Rept. RM-41. Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO. 93 pp.

Carothers, S.W., R.R. Johnson and S.W. Aitchison. 1974. Population structure and social organization of southwestern riparian birds. Amer. Zool. 14: 97-108.

Eyre, F.H., ed. 1980. Forest cover types of the United States and Canada. Society of American Foresters, Washington, D.C. 148 pp.

Harmon, Robert P. 1977. Water quality and algal associations of West Clear Creek. Unpubl. M.S. Thesis, Arizona State University, Tempe, AZ.

Küchler, A.W. 1964. Potential natural vegetation of the coterminous United States. American Geographical Society, Special Publication 36, 119 pp.

Laurenzi, Andrew W. 1982. Spatial patterns in riparian tree species distribution. Unpubl. M.S. Thesis, Arizona State University, Tempe, AZ.

Laurenzi, Andrew W. 1986. Phase III Final Report. Potential National Natural Landmarks, Mohave-Sonoran Desert Region. Submitted by The Nature Consevancy, San Francisco, CA.

Lehmkuhl, John F. and David R. Patton. 1984. Run Wild, Wildlife/Habitat relationships: user's manual for the Run
Wild III data storage and retrieval system. USDA Forest Service, Southwestern Region, Wildlife Unit Technical Report, 68 pp.

Martin, Paul S. 1979. A Survey of Potential Natural Landmarks, Biotic Themes, of the Mohave-Sonoran Desert Region. 358 pp. Heritage Conservation and Recreation Service, USDI, Tucson.

Minckley, W.L. 1973. Fishes of Arizona. 293 pp. Arizona Game and Fish Department, Phoenix.

Minckley, W.L. and D.E. Brown. 1982. Interior and Californian Riparian Deciduous Forests and Woodlands. Pp. 250-254. IN: D.E. Brown (Ed.) Biotic Communities of the American Southwest-United States and Mexico. Desert Plants Vol. 4(Nos.1-4) Special Issue. 324 pp.

Pase, Charles P., and D E. Brown. 1982. 133.3 Interior Chaparral. Pp. 95-99. IN: D.E. Brown (Ed.) Biotic Communities of the American Southwest-United States and Mexico. Desert Plants 4 (1-4):1-324.

Scarborough, Robert. 1985. Summary geology report of the Bullpen Ranch-West Clear Creek RNA, Coconino National Forest. Arizona Natural Areas Advisory Council files, Arizona State Parks Board.

Seth E.L. and G.L. Bender. 1974. Bullpen Ranch - West Clear Creek. Arizona State Department of Economic Planning and Development. Proposed Natural Area Report No. Phoenix, AZ.

USDA Forest Service. 1983. Regional guide for the Southwestern Region. USDA Forest Service, Southwestern Region, Albuequerque, NM.

USDA Forest Service. 1984. Progress report, Research Natural Areas: recommended representations for important ecosystems on National Forest System Land in the Southwestern Region. USDA Forest Service, Region 3, Albuquerque. 90 pp.

USDA Forest Service. 1986. Terrestrial Ecosystem Handbook, Appendix B. USDA Forest Service, Region 3, Albuquerque, N M.

USDA Forest Service. 1987a. Environmental Impact Statement for the Coronado National Forest Plan. USDA Forest Service, Southwestern Region, Albuquerque, NM.

USDA Forest Service. 1987b. Coronado National Forest Plan. USDA Forest Service, Southwestern Region, Albuquerque, NM.

USDI Fish and Wildlife Service. 1985. Endangered and threatened wildlife and plants; review of vertebrate wildlife; notice of review. Federal Register Vol.50 No.181:37958-37967.

Wachter, Bruce G., W.B. Bull and S.J. Reynolds. 1976. The Mohave-Sonoran Natural Region Study. Prepared for: National Park Service Center, University of Arizona, Tucson, Arizona.

APPENDIX

The following pages have been reproduced from the Coconino National Forest Plan.

WEST CLEAR CREEK RNA ca 700 ac.
Walker Mountain Quadrangle (USGS 7.5')