Coconino National Forest Plan Revision

Aquatic and Riparian Ecosystems

General Description

- Aquatic and riparian ecosystems are some of the forest's most productive and diverse systems. Water tables are at or close to the surface. They usually occur in the transition between aquatic and terrestrial ecosystems but have distinct soil and vegetative characteristics.

- Aquatic ecosystems include water, their associated wet areas and flood plains. They collect and transport water, soil, and organic material from upslope and upstream. The interface between riparian areas and uplands helps filter sediment.

- Aquatic and riparian ecosystems provide a variety of recreational opportunities and are important habitats for aquatic and terrestrial species. Riparian areas are more productive per acre in biomass of plants and animals than other vegetation types and provide large amounts of edge between adjoining vegetative communities which adds significantly to ecosystem diversity.

- Natural disturbances in these ecosystems are flooding and changing climatic conditions, such as extended drought.

- Four types of riparian areas occur on the Coconino National Forest (NF). They are cottonwood willow riparian forest (cottonwood willow), Mixed broadleaf deciduous riparian forest (mixed broadleaf), montane willow riparian forest (montane willow), and wetland cienega (wetlands). The first three types are associated with intermittent and perennial water. Wetland vegetation may be submergent, hydrophytic, or neither depending on water persistence and the presence of hydric soils (soils formed with the presence of water). **Plan components for wetlands are in a separate document.**

- The five aquatic systems on Coconino NF are intermittent streams, perennial streams, wetlands, springs, and lakes, and their associated wet areas and floodplains. In addition, earthen stock tanks provide water for livestock and wildlife and some provide habitat for wildlife such as rare frog species. **Plan components for springs are in a separate document.**

Riparian vegetation descriptions

Cottonwood willow

- Cottonwood willow currently covers about 2,017 acres of the Forest. It is patchily distributed along the lower elevation reaches (2,800 and 3,600 feet) of perennial streams including the Verde River, Oak Creek, West Clear Creek, Wet Beaver Creek, Dry Beaver

Creek, and Fossil Creek. It is also located along other perennial and intermittent streams and tributaries.

- Dominant vegetation includes narrow leaf cottonwood, and a variety of willows. Various grasses and forbs are usually present. Riparian vegetation generally occurs along the stream channel. Associated higher stream terraces support a mix of riparian and upland vegetation, including mesquite and desert willow.

- The seasonality and quantity of water in floods are key factors in the germination and establishment of riparian vegetation.

- Cottonwood willow is adjacent to Cottonwood, Camp Verde, Cornville, and other communities. Much of this riparian type along the Verde River, lower Oak Creek and lower Wet Beaver Creek is privately owned or managed by Arizona State Parks. Water diversions and increasing human development in the watersheds have affected quantity and seasonality of historical flood regimes.

- In some places, cottonwood willow adjoins mesquite bosques, or woodlands. This is where mesquites from arid uplands meet riparian vegetation. Mesquites are tall because of proximity to water. Mesquite bosques function as secondary floodplains, dissipating the energy from flood events and consequently, soils are sandier here than adjoining upland soils because flood waters deposits sediments carried during high water. The combination of cottonwood willow with mesquite bosques creates a unique vegetation community favored by bird species such as the yellow-billed cuckoo. In other areas, there is an abrupt transition between cottonwood willow and arid uplands.

Mixed broadleaf

- This riparian type covers about 2,562 acres of the Forest. Found between 3,600 and 5,800 feet in elevation, it is patchily distributed across the Forest and includes higher elevation portions of West Clear Creek and Oak Creek and associated tributaries.

- It consists of a vegetation mix of riparian woodlands and shrublands with various dominant species, depending on site specific characteristics. Vegetation can include Arizona sycamore, thinleaf alder, willow, Arizona cypress, conifers, box elder, narrowleaf or Fremont cottonwoods, velvet ash and often contains oaks and conifers from adjacent uplands.

- This riparian vegetation type is adjacent to *[will list communities]*.

Montane willow

- Montane Willow Riparian is located mainly from 5,500 to 8,800 feet in elevation and scattered along perennial and seasonally intermittent streams and isolated springs at higher elevations. It covers about *[acreage to be determined]*. Trees include Bebbs willow, narrowleaf cottonwood, Arizona walnut, velvet ash, cherry and Arizona alder and dominant shrubs include red osier

dogwood, willows, and woods rose. Outlying populations of this community type may have unique genetic components.

- Intermittent drainages carry water following precipitation events or during snowmelt. *[Will insert elevation range and acres; will insert brief vegetative description including hackberry at lower elevations; will add brief function statement as well as road, other ownership, etc].*

Desired conditions

Riparian Vegetation – *[currently under development]*

Riparian ecosystems

- Riparian corridors and associated stream courses are intact and functioning across the landscape.

- Stream channels and associated flood plains are sustained, given natural flow regimes and associated landforms.

- Vegetative communities comprised of deep-rooted and hydrophytic herbaceous vegetation are present in sufficient quantity to filter sediments, stabilize streambanks, reduce flooding, and provide for ground water recharge within their natural potential.

- Riparian communities are capable of filtering sediment, capturing bedload, aiding floodplain development, improving flood-water retention, and providing ground water recharge within their natural potential. Root masses stabilize streambanks against the cutting action of water currents and filter sediments from overland flow.

- Effective ground cover within riparian areas occurs at a level that is at least 80 percent of potential.

- Large woody debris at least eight inches in diameter and eight feet or more in length is found in the floodplain and channel of riparian corridors within coniferous forest ecosystems and in cottonwood/willow and mixed broadleaf deciduous riparian systems.

- Resilient landscapes provide forage for browsing and grazing animals, and recreation opportunities, without negatively impacting soil and water productivity.

- Within the capability of the area, overstory and understory canopy cover shades streams to help regulate water temperature to maintain aquatic habitat. Healthy native vegetation is present in sufficient quantity along the banks to stabilize banks from erosion and dissipate the energy of floodwaters. There are multiple seral stages and age classes of native vegetation represented. Enough seedlings and saplings should be present to allow for adequate replacement and succession.

- Aquatic and riparian habitats are free of or minimally impacted by non-native plant and animal species.

- **Mesquite bosques** are open, park-like stands of the tree form of mesquites adjacent to Cottonwood willow or Mixed broadleaf riparian types. They persist on upland terraces within 45 feet of the existing water table because this is the rooting depth of mesquites. A variety of age classes are present and old trees are prominent. The understory is comprised of native grasses and forbs that support the natural fire regime. Invasive nonnative vegetation is present at levels that do not disrupt the ecological functioning of the system. Ground cover in mesquite bosques is litter and sandy soils and non-vegetative ground cover consists primarily of gravel, cobble and rock outcrops

- **Montane willow:** About one half of the montane willow community has open canopy, younger age classes and early seral vegetation. The remaining portion has all size classes of shrubs and deciduous trees with extensive canopy. At late seral stages, plant and litter canopy cover may exceed eighty percent. Native species, including mosses, are present. Dominant tree species include: Bebbs willow, narrowleaf cottonwood, velvet ash, chokecherry, and Arizona alder. Dominant shrub species include red osier dogwood, willows, and woods rose. The understory *[will add description]*. Natural events such as flooding and drought are the primary disturbances. Low severity fire occurs infrequently during extended periods of drought and as extensions from nearby ecosystems, particularly those that are fire-adapted. This helps reduce conifer encroachment. Fires occur in historic intervals in adjacent fire-adapted ecosystems so conifer encroachment into montane willow riparian areas is limited. The associated water table supports riparian vegetation and restricts non-riparian vegetation. *[Will add statement about water table, water quality and quantity; will add statement about soil condition and productivity, and spongy moist nature.]*

Streams and rivers

- Adequate quantity and timing of perennial water flows are maintained to retain or enhance ecological functions, including aquatic species and riparian vegetation. Water tables are high or elevated.

- Water quality is sustained at a level that retains the biological, physical, and chemical integrity of the aquatic systems and benefits survival, growth, reproduction, and migration of native aquatic and riparian species.

- Water quality meets Arizona water quality standards and supports designated beneficial uses and native aquatic species.

- Short-term exceedance of water quality standards, (temporary period of declining water quality), due to management activity occurs only in the anticipation of long-term improvement of watershed condition and water quality.

- Soil and vegetation functions in upland and riparian settings are retained or enhanced.

- Flooding creates a mix of stream substrates for fish habitat, including clean gravels for fish spawning and sites for germination and establishment of riparian vegetation. Native fish and other aquatic species are present, and habitat conditions are capable of providing self sustaining populations. Fish habitat is provided by overhanging banks where possible. Woody and herbaceous understory regulates stream temperatures. Native fish and amphibian populations are free or minimally impacted by nonnative predation and diseases. Habitat and ecological conditions are capable of providing self-sustaining populations of native, riparian-dependent plant and animal species. Connected riparian corridors provide low disturbance areas for wildlife species, where feasible. Stream crossings and low water crossings allow passage for aquatic organisms.

- To maintain and raise the water table, beavers are present and building dams where woody vegetation will support them.

- Links between aquatic and upland components are maintained, providing access to food, water, cover, nesting areas, and protected pathways for aquatic and upland species. Fire rarely burns through this vegetation type, and fire in the surrounding watershed periodically provides slight increases in sediment and water that cause minimal channel modifications.

- Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport. Erosion and sediment regimes are within the natural range of variability consistent with current technical guides for soil. Soils are not compacted and long term soil productivity is maintained.

Objectives – *[none currently determined]*

Guidelines

- Recreational fishing for nonnative fishes should be located in areas, such that there is no harm to native aquatic species.

- Sport fishing for native species should be emphasized where possible.

- Vegetative treatments, including those associated with permitted uses, should meet desired conditions for the location to the extent possible and as allowed under the terms of the permit.

- Reduce disturbance to Western yellow-billed cuckoos (*Coccyzus americanus occidentalis)* during the breeding season that typically runs from *[will insert dates]*. Its habitat consists of mesquite bosque adjacent to Cottonwood willow. This species is a candidate for listing as threatened or endangered by the U.S. Fish and Wildlife Service.

- Development and infrastructure within mesquite bosques should be limited so that the contiguous nature of the bosque is emphasized.

Management approach

- Coordinate with landowners and stakeholders regarding the threat of nonnative aquatic and riparian species and fertilizers to downstream resources on the Coconino NF resources.