APPENDIX F.

WILDLIFE SUBCOMMITTEE REPORT

Report

Bill Williams Corridor Planning Technical Committee:

Subcommittee for:

Threatened and Endangered Species

Neotropical Migratory Birds

Other Sensitive Species

Waterfowl

and Other Wildlife

JULY
~~June~~ 1993

ADDENDUM TO THE JUNE 1993 WILDLIFE SUBCOMMITTEE REPORT
MAY 3, 1994

SECTION 7 CONSULTATION

Section 7 consultation is appropriate for any situation where dam operations may affect listed species such as the bald eagle and Yuma clapper rail. Changes to the Corps of Engineers Operating Manual would require consultation where listed species may be affected. Deviation from the Operating Manual could also require consultation.

High lake levels which inundate bald eagle nests (the current lowest elevation nest is approximately 1135 feet) would be addressed through Section 7 Consultation between the U.S. Fish and Wildlife Service and Army Corps of Engineers.

The Bald Eagle Protection Act and Migratory Bird Treaty Act also prohibit take of bald eagle nests. As with requirements of the Endangered Species Act, any parties involved in possible destruction of nests should coordinate with the Fish and Wildlife Service, outside of the Technical Committee forum, to ensure their responsibilities are met.

ADDITIONAL REQUIREMENTS FOR MAINTAINING THE BALD EAGLE

The Wildlife Subcommittee does not recommend construction of artificial nest structures at Alamo Lake. Suitable nest trees are available in the lower reaches of the Big Sandy and Santa Maria Rivers. These cottonwood trees are well within the distance bald eagles would fly to forage at the lake. Also, the live cottonwood trees may provide thermal protection and shelter that snags on the lake do not. Further, nests located up either of the rivers would remove eagle nesting activities from potential disturbance by human activity at the lake. Finally, the recent construction of a cliff nest near the confluence area indicates these eagles are capable of adapting to the inevitable loss of cottonwood snags for nesting in the upper lake. It has been suggested that construction of artificial foraging perches around the lake (e.g. simple wooden poles) may be important replacements for the decaying cottonwood snags, which are used extensively for this purpose.

I. Introduction

The Bill Williams River Corridor (BWRC) subcommittee for threatened and endangered species, neotropical migratory birds, other sensitive species, waterfowl, and other wildlife (Wildlife Subcommittee) was charged with identifying management objectives and habitat requirements for these species at Alamo Lake and the BWRC. The Wildlife Subcommittee was also charged with identifying potential habitat restoration, maintenance and enhancement opportunities through various lake level management prescriptions and stream flow regimes.

The Wildlife Subcommittee met on April 6 and May 18, 1993, to discuss recommendations for flow regimes that would best benefit the species groups it was requested to consider. The group began by reviewing its assigned goals. The broad scope of the Wildlife Subcommittee's assigned concern prompted the group to discuss a priority system, should water flow needs of various species groups ever conflict (*e.g.* waterfowl versus endangered species). However, the group ultimately found little or no conflict between habitat needs and optimal flow regime needs of threatened and endangered species, neotropical migratory birds, other sensitive species, waterfowl, and other wildlife. Further, the Wildlife Subcommittee determined that the greatest net benefit for all species and species groups would be gained through a single management strategy (see "Executive Summary," below). Ultimately, what few management priorities exist are imposed by law [*e.g.* the Endangered Species Act of 1973, as amended (ESA)]. Therefore, the Wildlife Subcommittee defined no species management priority system.

II. Executive Summary

The Wildlife Subcommittee determined that overall, all threatened and endangered species, neotropical migratory birds, other sensitive species, waterfowl, and other wildlife would best benefit from the creation and maintenance of a healthy riparian ecosystem along the Bill Williams River corridor below Alamo Dam. The Wildlife Subcommittee determined that only under extreme, prolonged drought conditions would water management needs of species at Alamo Lake conflict with maintenance of a healthy Bill Williams River riparian ecosystem. The Wildlife Subcommittee believes the recommendations of the Riparian Subcommittee will benefit all species and species groups within its assigned scope of concern. The Wildlife Subcommittee therefore endorses the Riparian Subcommittee's "preliminary flow recommendations for riparian resources." The Wildlife Subcommittee determined that, for the optimum benefits for all wildlife species, management should emphasize the habitat that makes the area special southwestern lowland riparian habitat.

A primary concern in the past has been management of the lake level with regard to the bald eagle (*Haliaeetus leucocephalus*). The Wildlife Subcommittee reiterates, but clarifies, previous recommendations to maintain a minimum elevation of 1100' for bald eagles. Considerable flexibility is available within this recommendation (See "Threatened and Endangered Species," below). The Wildlife Subcommittee recommends that, following runoff events, water collected in Alamo Lake be released gradually, in a manner which maintains but does not damage riparian habitat, and also not with an intent to return Alamo Lake to previous, perhaps minimum levels.

III. Discussion: Riparian Habitats and Wildlife

Large scale losses of southwestern wetlands have occurred, particularly cottonwood-willow riparian habitats [Carothers 1977, Rea 1983, Johnson and Haight 1984, Katibah 1984, Johnson *et al.* 1987, General Accounting Office (GAO) 1988, Szaro 1989, Dahl 1990, State of Arizona 1990]. The effects these losses have had on riparian-obligate wildlife in the Lower Colorado River Valley are extensive (Anderson and Ohmart 1984 and

1990, Hunter *et al.* 1987a, Ohmart *et al.* 1988, Rice *et al.* 1980 and 1983). These losses are due to urban encroachment, water diversion and impoundment, channelization, livestock grazing, off-road vehicle and other recreational uses, and hydrological changes resulting from numerous other land uses. However, despite abundant documentation of the importance of riparian habitats to native wildlife, recovery efforts are often slow, and some destruction continues.

Since the 1930s, the large cottonwood-willow forests along the Lower Colorado River have largely disappeared. Although greatly reduced, the Bill Williams River contains the last extensive native riparian habitat in the lower Colorado River area. However, construction of Alamo Dam in 1968 altered water flows in the Bill Williams River, consequently affecting downstream vegetation, especially recruitment of cottonwood and willow trees (Fenner *et al.* 1985). Although other factors, such as groundwater pumping and wildfires, have contributed to the decline of native vegetation, a proper flood regime could override these factors and begin to restore the riparian habitat.

Tamarisk (*Tamarix* sp.), an introduced species better able to survive the altered flow conditions, is rapidly replacing the native riparian vegetation. It is well documented that many native wildlife species do not use tamarisk (also called saltcedar). It is believed that tamarisk may not provide the essential thermal protection of native, broader-leaved species (Hunter *et al.* 1987b, Hunter *et al.* 1988). Also, tamarisk may support a significantly different insect fauna (Kerpez and Smith 1987), which could affect occurrence of insectivorous birds. Some avian species will apparently nest in tamarisk at higher elevations, but not at lower elevations like the BWRC. Further, tamarisk supports a generally lower level of biological diversity overall, compared with native riparian vegetation. At upper Alamo Lake, tamarisk may be outcompeting cottonwoods, which are important as potential bald eagle nest sites.

Destabilization of stream courses by flash flooding is required for significant reproduction and recruitment in Fremont cottonwood (Asplund and Gooch 1988, Stromberg *et al.* 1991). Historically, the riparian vegetation in the Bill Williams watershed was subject to flash-flooding events which coincided with seed dispersal in February-March. Flash floods created large, unshaded, moist alluvial deposits, ideal for the establishment of cottonwood and willow seedlings (Asplund and Gooch 1988, Reichenbacher 1984, Stromberg *et al.* 1991). Both are fast-growing trees which produce large quantities of seeds capable of wide dispersal. However, seeds lose viability within one to five weeks after dispersal (Fenner *et al.* 1984). The seeds need a suitable moist substrate at or soon after dispersal, and moist soil conditions must persist until seedling roots grow to depths where moisture is more constantly available than near the surface (Asplund and Gooch 1988, Fenner *et al.* 1984, Mahoney and Rood 1991). If these conditions are not met, opportunities for the invasion of saltcedar increase, and the opportunities for cottonwood-willow recruitment is essentially lost.

Although cottonwood and willow are dependent upon flooding for successful reproduction, prolonged inundation during the growing season can be detrimental. Roots of riparian trees are unable to draw in soil nutrients or oxygen when inundated for a period of months (Hook and Crawford 1978). There is a shortage of information on exact lengths of time that cottonwood and willow can be inundated before mortality actually occurs, but many sources (published and personal communications) suggest a period of one or two months as a limit that should be adhered to (see Reichenbacher 1984, Hunter *et al.* 1987a; B. W. Anderson, Revegetation and Management Center, Blythe, CA; D. Patten and J. Stromberg, Arizona State University Center for Environmental Studies; C. Hunter, FWS, Atlanta; D. Busch, Bureau of Reclamation, Boulder City, NV, pers. comm.). Effects of prolonged inundation may not be immediate; trees may be weakened and die over a period of years. Due to the stress of prolonged inundation, trees may be particularly susceptible to insect infestation or drought. Unnaturally prolonged high flows may also expose, undermine, and/or scour roots, or otherwise weaken trees, to the point that they fall down. In any event, the riparian habitat on the BWRC has already been compromised to such an extent that at this point and in the future, we should err on the side that benefits riparian habitats.

Benefits of a healthy riparian ecosystem to wildlife, from the bottom of the food chain up, cannot be understated. Cottonwood-willow habitat supports the highest arthropod biomass for more taxa than any other habitat in the area across all seasons (Ohmart *et al.* 1988). In mid-June, Apache cicada emerge in riparian vegetation, which coincides with peak breeding period for many bird species in cottonwood-willow communities. Invertebrate taxa are among the most prevalent food items found in the diets of vertebrates (Minckley 1979). An example of the importance of this food source is provided by the yellow-billed cuckoo (*Coccyzus americanus*), 40% of whose diet may consist of cicadas (Rosenberg *et al.* 1991).

Approximately 32 species of reptiles and amphibians also occur in aquatic and/or riparian habitats in the BWRC area, almost all highly dependent upon the large insect population for food (Ohmart *et al.* 1988). An equal number of mammal species are found in the area and occur in riparian habitat (See Section VI).

Riparian habitats are also likely to be of value to species that are not riparian obligates. Riparian areas may serve as travel corridors, water sources, and areas where these non-riparian species occur in higher abundance.

IV. Threatened and Endangered Species

The following are species currently listing under the authority of the ESA. For each species or species group, a brief discussion is provided regarding habitat/flow regime needs.

Fish

Bonytail chub	(*Gila elegans*)
Razorback sucker	(*Xyrauchen texanus*)
Humpback chub	(*Gila cypha*)
Colorado squawfish	(*Ptychocheilus lucius*)

These "big river fishes" are now and may historically have been associated with the Bill Williams River, primarily in the delta area or historic Bill Williams/Colorado confluence area. However, availability of above-ground flow in the Bill Williams River may provide important recovery opportunities. Therefore, rehabilitation and maintenance of riparian habitat is important.

Desert pupfish	(*Cyprinodon macularius*)
Gila topminnow	(*Poeciliopsis occidentalis*)
Woundfin	(*Plagopterus argentissimus*)

These small fishes have been reduced to very small, widely dispersed populations throughout their former ranges. They are generally tolerant of higher salinity, temperature, and/or turbidity. The Bill Williams River may provide important recovery habitat for these fishes. Therefore, rehabilitation and maintenance of riparian habitat is important.

Birds

Brown pelican (*Pelecanus occidentalis*) Occurs as an uncommon transient, chiefly along lower Colorado River, potentially along Bill Williams River and at Alamo Lake.

Yuma clapper rail (*Rallus longirostris yumanensis*): Occurs primarily in Bill Williams River delta area, which is near the northern edge of its range. This delta area is of minor importance in maintaining the species; 21

birds found in 1972, 21 in 1993, generally 6-15 in recent years. The delta habitat is influenced primarily by the level of Lake Havasu, which is not affected by flows from Alamo Dam.

Bald eagle (*Haliaeetus leucocephalus*): Nests at Alamo Lake [Alamo Breeding Area (BA)], on Bill Williams River below Alamo Dam (Ives BA), and until 1988, on the Big Sandy River just above Alamo Lake (Chino BA). Since its discovery in the mid-1980s, this "Alamo Lake complex" has been consistently successful in producing fledgling bald eagles. Since 1990, the Alamo complex has contributed approximately 20% of Arizona's annual eagle reproduction (Hunt *et al.* 1992, Beatty 1992, Beatty unpubl. data). The success of the Alamo Complex has been significantly facilitated by intensive management, including closure areas, rescue operations and other direct intervention (Hunt *et al.* 1992, Beatty 1992, Beatty unpubl. data).

The primary foraging habitat for all BAs in the Alamo Complex is Alamo Lake. The primary need is availability of adequate foraging habitat. The shallow water fishery of upper Alamo Lake, with numerous hunting perches and abundant fish is the most intensively used foraging habitat in the Alamo Complex. Lower lake levels may reduce the lake area sufficiently to impact food availability, and/or increase territorial interactions among eagles. At extreme high water, the lake can inundate the bald eagle nests and potential nest trees on upper Alamo Lake. As of 1993, Alamo BA and one Ives BA nests on the upper lake ranged from approximately 1135' to 1145'. These nests may no longer exist. Nest inundation occurred in 1993, resulting in take of the active eagle nest (eggs were rescued from the nest). Subsequently, the Alamo bald eagles built a new nest on a cliff, above any potential lake level. Further, cottonwood and willow trees are available on the Big Sandy and Santa Maria rivers above the lake, for potential alternate nests. These areas may be superior nest sites. They are removed from human activity on the lake, and the cottonwood snags on the lake are likely to fall soon. As a result, high water at Alamo Lake is no longer a serious concern for management of bald eagles, unless a nest is in danger of inundation. The primary concern remains the availability of foraging habitat.

The FWS has recommended a minimum lake level of 1100', to provide adequate foraging habitat (USFWS 1988). The Wildlife Subcommittee recommends that the FWS's recommendation of a minimum lake level remain in effect. In the past, this minimum level has apparently been misinterpreted as a target lake level, or a maximum lake level for bald eagle management. The 1100' elevation is a minimum recommended level; any lake level above 1100' is acceptable for bald eagles, as long as an eagle nest is not inundated. If a nest is to be inundated, the Corps of Engineers should exercise their options under sections 7 or 10 of the ESA. However, as siltation continues in the upper lake, this minimum recommended level may have to be revised. Finally, the Wildlife Subcommittee recommends that the Corps of Engineers resolve questions regarding effects of dam operations (both routine and emergency) on bald eagles through the ESA section 7 consultation process. Maintenance of a riparian ecosystem would also benefit the bald eagle, by providing alternate foraging habitat and nest trees (the latter important above Alamo Lake on the Big Sandy and Santa Maria Rivers.

Peregrine falcon (*Falco peregrinus*): This species is observed regularly at Alamo Lake, and more recently, along the Bill Williams River below Alamo Dam. Although surveys have found no nest sites yet (Tibbitts and D. Ward 1990, L. Ward 1993), the regional recovery of this bird makes it likely that it does or will soon breed in the area. However, the only critical habitat needs are available nesting cliffs and a prey base. These are currently available at Alamo Lake and the BWRC under all conditions, with the possible exception of prolonged, extreme drought. The peregrine is known to nest far from surface water in the Southwest, especially in woodland and chaparral habitats where jays, piciformes and other prey are abundant (Tibbitts and D. Ward 1990, L. Ward 1993). However, in very arid regions like west-central Arizona, it is likely to be more strongly tied to presence of water, probably because the associated prey abundance. Therefore, maintenance of a riparian ecosystem would likely benefit the peregrine falcon.

Plants

No listed plants are known to occur in the Bill Williams River corridor.

Reptiles and Amphibians

No listed reptiles or amphibians are known to occur in the Bill Williams River corridor.

Mammals

No listed mammals are known to occur in the Bill Williams River corridor.

V. Neotropical Migratory Birds

In recent years, concern has been raised over declines in birds which breed in northern latitudes and winter in the neotropics - neotropical migratory birds. General areas of concern include availability and condition of breeding, wintering, and migration-route habitats. Although conclusive research is pending, riparian habitats are believed to be disproportionately important to neotropical migrants during migration (D. Krueper, BLM, pers. comm.). Riparian habitats in general are known to support relatively high densities and diversity of breeding birds, including many neotropical migrants. Southwestern riparian habitats are known to support some of the greatest density and diversity of breeding birds in North America. Given that approximately 5% of the land area in the Southwest is riparian habitat, these areas are extremely important to bird communities. Loss of the cottonwood-willow riparian forests has had widespread impact on the distribution and abundance of bird species associated with that forest type (Hunter *et al.* 1987b, Hunter *et al.* 1988, Rosenberg *et al.* 1991). Therefore, rehabilitation and maintenance of the BWRC riparian habitat is important. A list of neotropical migratory birds known and/or likely to use the Bill Williams River corridor and Alamo Lake is attached (See Appendix A). Breeders and sensitive species are highlighted. For discussion of specific sensitive neotropical migrants, see Section VI, below.

VI. Other Sensitive Species

Fish

Colorado roundtail chub	(*Gila robusta*)
Gila sucker	(*Catostomus* sp.)
Gila mountain sucker	(*Catostomus discobulus* ssp.)
Longfin dace	

Availability of above-ground flow in the Bill Williams River may provide important recovery opportunities. Therefore, rehabilitation and maintenance of riparian habitat is important.

Birds

Loggerhead shrike (*Lanius ludovicianus*) (FWS Category 2 - No AGFD designation) Not a riparian obligate, but may occur in greater abundance in riparian areas. With declines in northern portions of its range, special management considerations are warranted.

Vermilion flycatcher (*Pyrocephalus rubinus*) (No FWS or AGFD designation). Rare and local resident, has declined substantially due to loss of habitat, closely associated with cottonwoods. Rehabilitation and maintenance of riparian habitat is important.

Elf owl (*Micrathene whitneyi*) (No FWS or AGFD designation; CA endangered) Rare breeder in BWRC area. Requires large trees (cottonwood, sycamore, or large mesquite) or large cacti (saguaro) for nesting.

Southwestern willow flycatcher (*Empidonax traillii extimus*): (FWS Category 1 - AGFD Endangered) The FWS was petitioned to list this species, and has made a positive 90-day finding on the petition (USFWS 1992). The southwestern willow flycatcher is a riparian obligate species, nesting in dense thickets of cottonwood-willow, *Baccharis*, boxelder and similar vegetation. Rehabilitation and maintenance of riparian habitat is important.

Black rail (*Laterallus jamaicensis*) (FWS Category 2 - AGFD endangered, CDFG threatened) Permanent resident in BWRC in small numbers.

Yellow-billed cuckoo (*Coccyzus americanus occidentalis*) (FWS Category 3c - AGFD threatened, CDFG endangered) Recent investigation (Franzreb and Laymon 1993) renews support for recognizing the "western" subspecies, which enhances concern for cuckoos in the BWRC. Largest remaining population of breeders on lower CO are on BWR. Confined to extensive stands of cottonwood. Cicadas are 40% of their diet.

Gilded flicker *Colaptes auratus meamsii* Fairly common on BW, rare everywhere else. Associated with saguaros and cottonwoods.

Brown crested flycatcher (*Myiarchus tyrannulus*) A species of "special concern" in California. Cottonwoods and/or other larger riparian trees are necessary for nest cavities; this flycatcher also feeds heavily on cicadas. Rehabilitation and maintenance of riparian habitat is important.

Bell's vireo (*Vireo bellii arizonae*) Riparian species; more abundant and widespread formerly. Rehabilitation and maintenance of riparian habitat is important.

Common black-hawk (*Buteogallus anthracinus*) Riparian species; rehabilitation and maintenance of riparian habitat is important.

Brown-headed cowbird (*Molothrus ater*) A brood parasite, which is impacting many songbirds, some to the degree of becoming a threat to their continued existence (Mayfield 1977, Brittingham and Temple 1983). In particular, cowbird parasitism is identified as a threat to the southwestern willow flycatcher (Harris 1991, USFWS 1992). management strategies to reduce this threat include: reducing and recovering fragmented riparian habitat; removing livestock and livestock concentration areas from riparian habitat and surroundings; cowbird trapping programs.

Belted kingfisher (*Ceryle alcyon*) AGFD candidate species. Information indicates wintering only, but breeding is theoretically possible. Rehabilitation and maintenance of riparian habitat is important.

Plants

Cottonwood (*Populus* sp.) Fundamental component of southwestern riparian ecosystems, reduced throughout range. Rehabilitation and maintenance of riparian habitat is important.

Willow (*Salix* sp.) Fundamental component of southwestern riparian ecosystems, reduced throughout range. Rehabilitation and maintenance of riparian habitat is important.

Reptiles and Amphibians

Rana yavapaiensis: pools, permanent water, floods OK, no bass.

Bufo microscapus:

Gila monster (*Heloderma suspectum*): Tends to occur in greater numbers in riparian areas. Rehabilitation and maintenance of riparian habitat is important.

Desert tortoise (*Xerobates agassizzi*) (FWS Category 2 - AGFD Candidate) Not a riparian obligate, but impacts may be occurring due to uses within BWRC and adjacent uplands. Potential impacts include recreation, and livestock and burro use, which may significantly compete with tortoise for food.

Chuckwalla (*Sauromalus obesus*) (FWS Category 2) Not a riparian obligate, but impacts may be occurring due to uses within BWRC and adjacent uplands. Potential impacts include recreation, and livestock and burro use, which may significantly compete for food.

Garter snakes (*Thamnophis* spp.) Rehabilitation and maintenance of riparian habitat is important.

Mammals

Bats: Various bat species are likely to occur in the BWRC, including: spotted bat, red bat, hoary bat, California leaf-nosed, and others. In virtually all cases, bat populations could be expected to benefit from the rehabilitation and maintenance of riparian habitat.

Bighorn sheep (*Ovis canadensis*): Not a riparian obligate, but impacts may be occurring due to uses within BWRC and adjacent uplands. Potential impacts include recreation, and livestock and burro use, which may significantly compete for food. BWRC almost certainly used as a water source. Rehabilitation and maintenance of riparian habitat is important.

Invertebrates

VII. Waterfowl

Although there may be some limited nesting within the BWRC and Alamo lake, the Wildlife Subcommittee considered waterfowl to occur primarily as migrants and winter residents. Currently, approximately 90% of the Canada geese (*Branta canadensis*) wintering on the lower Colorado River use the Cibola National Wildlife Refuge. This concentration likely increases the probability of a disease outbreak, and increases the potential extent of such an outbreak. A wider distribution of wintering geese along the lower Colorado River and tributaries is therefore desirable. The most feasible opportunity to achieve at least a partial redistribution appears to be on the Planet Ranch, which may be acquired by the Bill Williams National Wildlife Refuge. The cultivated acreage there is currently believed to be approximately 2300 acres of alfalfa. By supplementing alfalfa with wheat, this could be reduced to 400 acres, thus reducing ground water pumping by approximately 83% and still providing sufficient forage for 5000 to 6000 geese. Attracting that number of geese would require designation of a disturbance-free (no entry) roosting area within the delta during the winter (e.g. November 15-March 1). Such a restriction would also result in an increase in duck numbers. It would take several years following implementation of management practices to realize the increase in waterfowl use.

Conversion of 25% of the crop at Planet ranch to wheat would slightly reduce demands on groundwater, and benefit several avian species, especially following dry winters when the seeds of desert annuals are scarce. White-winged doves nesting in the riparian zone would be a major beneficiary. The value of the area to geese would not be sufficiently reduced. Developing a moist soil management unit at Planet Ranch would increase the diversity and abundance of birds using that portion of the ranch. However, as the habitat diversity is increased, management may become more complex for the managing agency.

The Wildlife Subcommittee recommends maximizing the shallow-water area of upper Alamo Lake (3" to 6" deep) during the spring and summer. This will result in maximum forage availability for wintering waterfowl, primarily ducks. However, without designation of a "no entry" zone, use of the lake by geese is likely to be minimal. Maintaining a base surface flow through the BWRC, as recommended by the Riparian Subcommittee, will also benefit various duck species.

VIII. Other Wildlife

For this broad category, the Wildlife Subcommittee's determination was again that rehabilitation and maintenance of riparian habitat is important. Riparian habitats are particularly rare in western Arizona. Operation of Alamo Dam on the Bill Williams River provides opportunity for maintaining a healthy, biologically diverse riparian ecosystem in this otherwise very arid region.

The Wildlife Subcommittee discussed several "other wildlife" species, and several management opportunities, in particular:

Livestock grazing: Given the importance of the BWRC riparian habitat, effects of livestock grazing warrant discussion. Present and historic overuse by livestock has been a major factor in the degradation and modification of riparian habitats in the western United States. These effects include changes in plant community structure, species composition and quantity, often linked to more widespread changes in watershed hydrology (Rea 1983, GAO 1988). Water quality may also be impacted, through increased erosion, siltation, and fecal material. Livestock grazing in riparian habitats typically results in reduction of riparian vegetation (especially palatable broadleaf plants like willows and cottonwood saplings), and is the most common cause of riparian degradation (Carothers 1977, Rickard and Cushing 1982, Cannon and Knopf 1984, Klebenow and Oakleaf 1984, GAO 1988, Clary and Webster 1989, Schultz and Leininger 1990). Linear riparian habitats in arid regions are particularly vulnerable to fragmentation. As shady, cool, wet areas providing abundant forage, they are disproportionately preferred by cattle, over the surrounding xeric uplands (Ames 1977, Valentine et al. 1988). The Wildlife Subcommittee recommends that land management agencies review livestock grazing management plans in the Bill Williams River watershed, with the above concerns in mind.

Burros: Feral burros are abundant in the Alamo Lake-BWRC region. Especially in combination with livestock, burros are having negative effects on the riparian habitat, water quality, and adjacent uplands. These impacts are likely to include excessive grazing and browsing of native plants, resulting in changes in the structure, quantity, and species composition of vegetation in riparian habitats and adjacent uplands. Water quality may be impacted, through increased erosion, siltation, and fecal material. The Wildlife Subcommittee recommends that land management agencies review burro/allotment/herd management plans, or similar plans, with the above concerns in mind.

Recreational Impacts: Various reaches of the BWRC receive recreational use which may be impacting important riparian habitat. Specifically, four-wheel-drive and off-road vehicle use is virtually uncontrolled in many areas. The Wildlife Subcommittee recommends that land management agencies review the areas where such use is allowed, with these concerns in mind.

Beaver: Beavers may be an important component of the riparian ecosystem, by creating small ponds with associated still water, shallow marsh and deep pools. However, they may face competition for young willows, from livestock and burros. Beaver may then resort to girdling and killing the remaining larger cottonwoods.

Quail:

Doves:

Javalina:

Muskrat:

Ringtail, skunk, bobcat, grey fox, raccoon, badgers.

Feral hogs at upper Alamo Lake. How do they compete with javalina?

Invertebrates
Terrabid beetles
Gastropods

IX. Management Priorities for Species Groups

The Wildlife Subcommittee recommends that the BWRC Planning Technical Committee compile, review, and synthesize existing management plans, mandates and responsibilities which are in effect at Alamo Lake, Alamo Dam, and the BWRC. Some of these mechanisms may set priorities for, or supersede, management recommendations developed by the Planning Technical Committee. These mechanisms include:

Endangered Species Act of 1973, as amended (sections 7, 9 and 10).

Bureau of Land Management's Allotment Management Plan

BLM's Burro (Herd) Management Plan

BLM's Wilderness Management Plan

Migratory Bird Treaty Act

BLM Management Plan for Planet Ranch

AGFD Alamo Lake Wildlife Area Management Plan

Alamo Lake State Park Management Plan

Comprehensive Management Plan for Lower Colorado River Refuges

Alamo Lake, Arizona, Reconnaissance Study. U.S. Army Corps of Engineers

X. Information Needs

1. To update prescriptions for maintaining habitats related to lake levels, updated lake volume data are needed. Current figures come from 1973, so they do not include significant sedimentation from the 1979, 1983 and 1993 flood events. As the lake fills in with sedimentation, higher lake levels will be necessary to maintain shallow-water habitats.

2. More specific data are needed on mortality rates of inundated cottonwood, willow and other riparian vegetation.

3. Monitoring of riparian habitats is necessary to determine the effects, if any, of any flow regimes implemented.

4. Surveys and inventories should be completed for species of special concern (*e.g.* endangered species), to determine presence, habitat use, and recovery opportunities.

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