

# Importance of Riparian Ecosystems: Economic Considerations<sup>1</sup>

Kel Fox<sup>2/</sup>

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Efforts to preserve riparian habitat must recognize man's growing demands to put this area to other uses. Economic pressures, at conflict with environmental concerns, pose an inevitable threat to vegetation and wildlife. A compromise in the balance of preservation and development must be maintained.

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Everyone here today feels the riparian zone is important, or we would not be holding this symposium. Most of you want to preserve it. A few of you will admit, grudgingly, that it needs to be managed. We all can agree that huge areas of riparian habitat have been removed by development-oriented pressures. But few will admit, in this age of environmental concern, that the same economic realities of past decades still pose a threat to much of the remaining habitat. These threats are direct, as, for example, through conversion to farming or residential use, or indirect, as through lowered groundwater levels due to pumping.

These are the general conclusions reached by the staff of the Arizona Water Commission, who helped in the preparation of this paper. Now let's examine them in detail.

When the white man first came to this country, the low deserts were broken by oases along the major rivers. To farm he had to irrigate and the bottom lands were the closest to water. Mesquite bosques and cottonwood thickets

were cleared and put into production. Southern Arizona hasn't been the same since, but that's not necessarily bad. The major metropolitan areas, wouldn't be here but for the pioneering efforts of those early farmers.

Clearing the riparian<sup>3/</sup> zone for agriculture is not a historic phenomenon; it still goes on. The bulk of the clearing is of phreatophytes, and most of that is along the Colorado River, below Davis Dam on Indian lands. The Indian reservations along the river in Arizona and California have decreed rights that allow the consumption of 546,000 acre-feet primarily for irrigation. In 1961 there were 80,000 acres of prime arable land on these reservations that were covered with phreatophytes. Clearing will no doubt continue as the tribes develop lands to use their water.

If Senator Kennedy has his way with the Indian water rights bill, 250,000 acres of land on the Gila River Indian Reservation will be irrigated. It is a safe bet that some of the new development will be on areas now in phreatophytes.

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<sup>1/</sup> Paper presented at the symposium on Importance, Preservation and Management of Riparian Habitat, Tucson, Arizona, July 9, 1977.

<sup>2/</sup> Kel Fox, Chairman, Arizona Water Commission, 222 North Central Avenue, Phoenix, Arizona 85004

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<sup>3/</sup> In this paper, riparian is used in reference to vegetation which occurs in or adjacent to drainage ways or their floodplains which may be perennial or ephemeral. Phreatophytes are those riparian plants which habitually obtain their water supply either directly or through capillary fringe, from the zone of saturation.

There are concentrations of private land along all of the desert rivers. Much of this land is suitable for agriculture and is subject to clearing.

Farther up the watershed, the higher elevation riparian zone tends to be immune from these pressures. Much of it is locked up in federal administration. It probably will remain unchanged. That small fraction that is in private hands is often too rough, too stony or otherwise unsuited for agriculture. But that doesn't mean it's safe from development pressures.

It's prime country for subdivisions. Pick up a map of a National Forest in Arizona. Those white spots along the major headwater streams are private land, turn-of-the-century homesteads. When the ranchers retire, those places will be up for sale. In a land where small lots in the pines sell for thousands of dollars to greenery-starved desert dwellers, lots in and along a creek bottom, with real running water, are pure gold. And cost as much. Pave the road to the homestead and it's good-by habitat, hello homesite.

Most of the headwater streams are protected from this pressure by ownership and topography. The mid-elevation streams, however, are as a rule, totally exposed. Privately owned bottom lands along Oak Creek, Tonto Creek, the Verde River and the upper San Pedro are now actively being offered for sale and converted into retirement homes.

And what phreatophytes the farmers didn't clear along the Colorado River are subject to clearing or encroachment by the subdivisions sprouting up there for winter visitors.

Water yield improvement projects have taken most of the blame for removal of riparian habitat. However, if you were to analyze the areas cleared, you would find that the large majority of the clearing was a result of direct development pressures; it was the land that was needed for other purposes, rather than the water. Clearing and/or conversion for downstream water yields was much in vogue in the 50's and 60's, however.

The Los Angeles report of the Phreatophyte Subcommittee of the Pacific Southwest Inter-Agency Committee of August 1969 listed nearly two dozen major clearing projects in Arizona. A multitude of benefits were listed, but the common thread was water. The biggest of these was the 42,000 acre project of the Bureau of Reclamation along the Colorado River from Davis Dam to the Mexican boundary.

The project was designed to salvage water to enhance the supply available to the C.A.P. The Bureau surveyed the floodplain in this reach of the river in 1961, identifying 155,000 acres of phreatophytes. Environmental concerns have stalled the project, as it has most of the others, and it is not now being actively pursued. That doesn't mean that clearing of the floodplain won't be accomplished however. Of the nearly 65 percent of surveyed habitat, 98,000 acres, was on private, state, or Indian lands. About half of the proposed clearing program, 20,000 acres was on nonarable Indian lands. All of this is subject to clearing for irrigation or homesites. Only 6,000 acres were in wildlife refuges.

The term "water salvage" has fallen from repute in describing the benefits of these projects, but the intent remains; to make more water available for man's direct use. The U.S. Geological Survey, in a study reported in the Proceedings of the 1968 Arizona Watershed Symposium, estimated annual evapotranspiration of all phreatophytes in Arizona to be about 940,000 acre-feet annually. The monumental study of Ffolliott and Thorud in 1974 indicates that water yield in the riparian habitat in Arizona might be increased as much as 600,000 acre-feet per annum by clearing and conversion. The Comprehensive Framework Study for the Lower Colorado Region estimated 435,000 acre-feet could be salvaged each year under a feasible management program from the phreatophyte habitat. No matter whose estimate you use--it's a great deal of water, a potential increase from 15 to 35 percent of the state's dependable supplies.

Increasing the dependable supplies will become more important as energy costs for pumping and groundwater levels increase. Changes in groundwater law, mandated during this session of the legislature, will no doubt be aimed at reducing groundwater overdraft. This will reduce local supplies still further, which will intensify the demand for increased dependable supplies from other sources. Under these sorts of pressures, environmental considerations will have less importance.

Flood control, or more properly, flood damage reduction, will become more important with time as development increases in or near riparian areas.

Salt cedar, with its prolific growth, will rapidly take over a bare, well watered site. Frequently, that's in the main stem of the channel, and as the stand develops, the channel's conveyance is reduced. Not that high flows, or flood waters, won't get downstream, they do, but at the expense of increased depth of flow and consequent enlargement of the inundated area.

The flows will eventually sweep out the choking vegetation but only after building up to sufficient head and unnecessary levels of damage. Clearing or maintaining a channel thus duplicates Mother Nature's handiwork, and avoids the incremental flood damage.

About a third of those two dozen clearing projects mentioned earlier claimed flood control as one of the project's benefits. The clearing of cottonwoods in the Verde Valley some years back was designed to aid in flood hazard reduction. The phenomenal growth of bottom land subdivisions in that Valley may well work to reinstitute such a program.

Environmental pressures have so far worked to set aside the Corps of Engineer clearing projects on the Gila River downstream of Phoenix. Sportsmen and hunter groups joined in that cause, and as a result of their efforts to save dove nesting and roosting cover, they have been denied hunting access to the privately owned portions of the bird's habitat. As more and more hunting areas are denied them, sportsmen may well choose to side with the Corps to work out a compromise solution.

Conservationists are getting more sophisticated with time. They had to, as increasingly they've lost habitat to esoteric causes. Mesquite bosques and salt cedar thickets have died from unseen causes throughout Southern Arizona. Not fire, flood, or pestilence. Not from developers or bulldozers or other direct threats. Still the habitat died.

The cause--a decline in water levels in response to pumpage under developed areas miles distant. Groundwater basins in southern Arizona underlie the valleys from mountain to mountain. The aquifers are quite productive, but recharge is low. This means the cones of influence from a pumping well, or more commonly, hundreds of pumping wells, spread wide, reaching seemingly protected riparian habitat.

The famed San Xavier bosque south of Tucson so died, as have large areas in the thickets along the lower Santa Cruz on the Gila Indian Reservation. It's not done yet, either.

The riparian habitat of the upper San Pedro, site of the proposed Charleston Dam, so successfully opposed by conservationists, is threatened nonetheless. The expansion of Fort Huachuca's mission has brought a subdivision boom to the area. Water level declines are accelerating, the cone of depression rapidly expanding toward the San Pedro.

As I said, conservationists have become more sophisticated, but they've yet to really embrace technology in their fights. The impact of the Fort's expansion in the riparian areas was predicted by our Water Commission in a computer model study of the Fort's groundwater supplies. No one used the information in assessing the proposed expansion. Not that it would have necessarily helped. The move had strong local support. But at least all impacts would have been discussed.

If the march of progress can't be averted, perhaps technology can be used to facilitate the necessary compromises. Recently the Maricopa County Flood Control District acquired a small tract of privately owned riparian habitat along the lower Salt River for mandated mitigation of the impacts of the county flood control program. Will that parcel eventually dry up and die as groundwater

withdrawals continue in the Valley? No one knows--the eventuality wasn't even considered. The Arizona Game and Fish Department intends similar purchases in the area. Should they utilize existing computer models to select tracts? Most assuredly, if they wish to preserve the habitat.

Recreation ranks right next to mom and apple pie as typifying the American. No where else is the pressure on the riparian habitat, and the wildlife it supports, more aptly described by the character from Pogo: "We have met the enemy, and he is us." The physical presence of people is the problem.

Those that sought to protect the eagles at the Orme Dam site enlisted the aid of the river's tubers in the fight. But the tubers themselves are a threat to the eagles, and no doubt one day these bedfellows will part.

The riparian zone is especially attractive to recreationists in this water short land. Demand for this type of recreation exceeds the supply,

causing continual pressure on the developed sites, and insuring the certainty of loss of more habitat.

So what does the future hold for riparian habitat when faced with the economic realities of life? Without a doubt, more of the habitat will be lost--there are too many pressures for it to be entirely preserved. Most of the loss will be on private and Indian lands. Here the pressures are felt most keenly, and the management goal is not preservation. Federal lands will probably be preserved to a large extent, although demands for flood control, grazing and recreation will require some concessions.

Society will come to realize that our standard of living cannot be maintained without utilization of all of our resources--today's topic of concern is no exception. Our current preoccupation with wildlands is a luxury we can afford only because the wilderness was subjugated. We must strike a balance today, if only because society did not do so in the past.