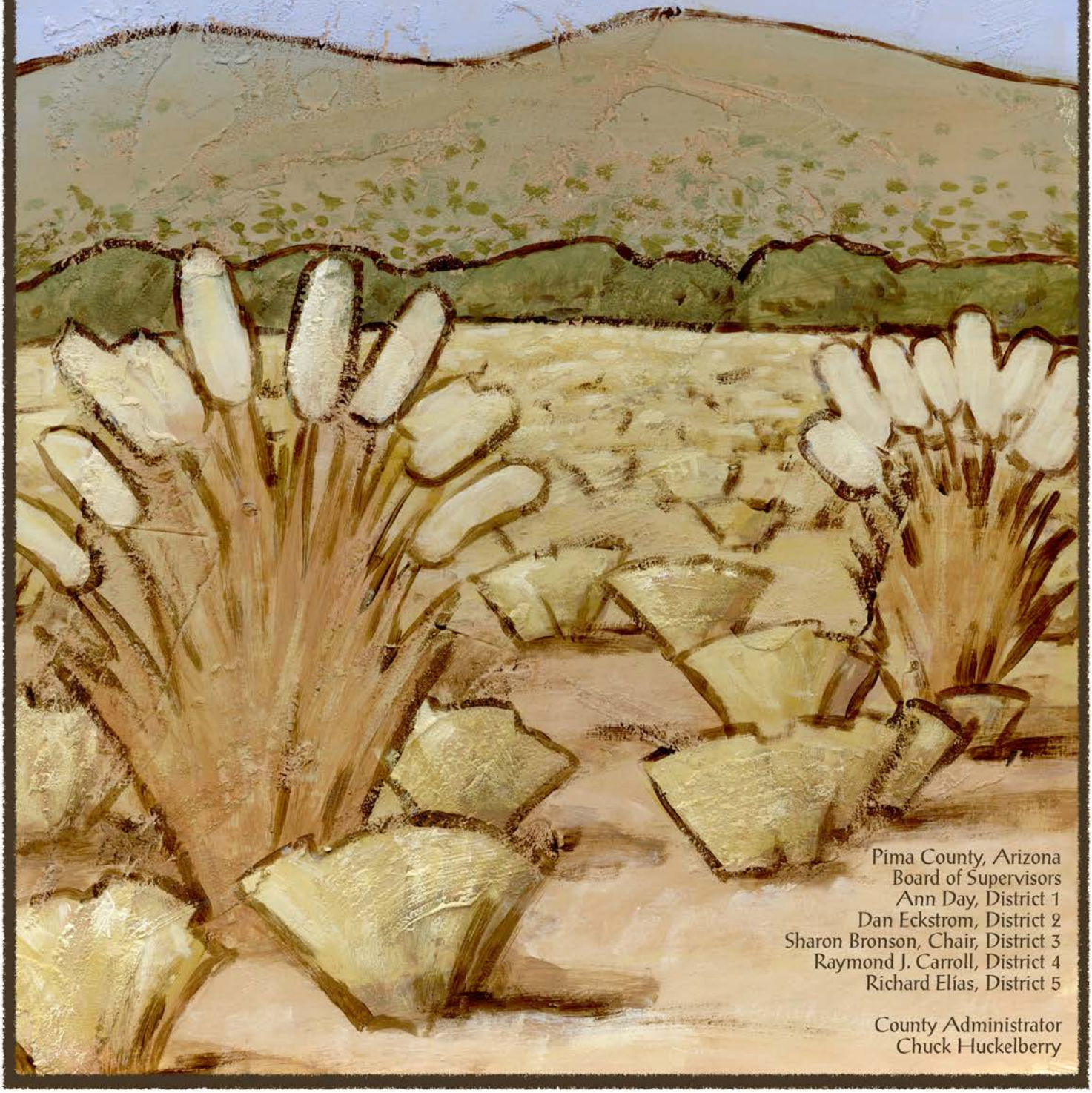
Invasive Species E.I.S. Issue Paper

Sonoran Desert Conservation Plan

2002



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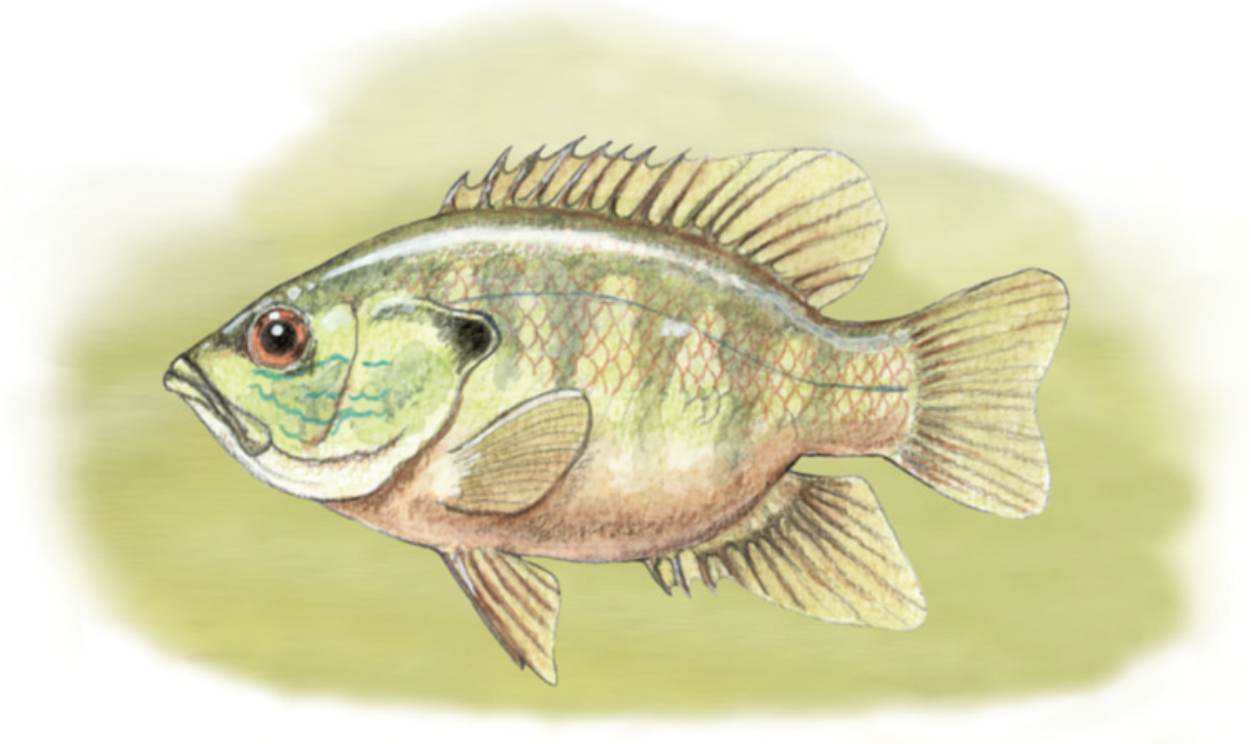
Potential Impacts of the Sonoran Desert Conservation Plan on Invasive Species in Pima County

A Report for the Pima County Sonoran Desert Conservation Plan 2002



Coronado National Forest and Arizona Game and Fish Department personnel successfully killed hundreds non-native green sunfsh in the lower portion of Sabino Creek in an effort to protect the habitat for native fish. The sunfish are voracious eaters of smaller fish. Drawing: George Maleski.

The Issues

Invasions by non-native species cause serious problems in many parts of Pima County as they do throughout the world. Kudzu vine has taken over vast tracts of land in the American southeast, covering buildings and large trees. Zebra mussels have created havoc with water intake and shipping facilities in the Great Lakes. Imported insects have devastated thousands of mature trees in the Middle West. In Hawaii, few native species remain in the face of introduction of non-native snakes and other creatures. West Nile virus threatens both human health and native bird species in many parts of the United States.

Closer to home, saltcedar has become the dominant tree along major stretches of the Gila River and the prickly camelthorn dominates beaches along the San Juan River in Utah. In places in the Grand Canyon National Park, Bermuda grass and more than fifty other invasive species crowd out the natives. Virtually all Arizona native fish species have either been extirpated or are endangered, in part because of competition from invasive non-native fish, crayfish, and frogs, Only a few watercourses in Pima County have thriving native fish populations instead of invasive species.

In 1999 President Clinton issued an Executive Order that, among other things, directed federal agencies to consider the impacts of invasive species when taking a variety of actions. One result of this order was the establishment of the Federal Interagency Committee on the Management of Noxious and Exotic Weeds. Membership of the committee

Figure 1. Red brome grass Photo: Barbara Tellman

Figure 2. Buffelgrass. Drawing: Bill Singleton

represents all federal agencies involved in activities with invasive species impacts and some non-governmental groups working on invasives issues. Most of these government agencies, in turn, have developed plans for invasive species prevention and control by those agencies. Keeping noxious weeds and insect pests out of the United States is a major effort of the U.S. Department of Agriculture's APHIS program. Control and prevention of invasive species are major concerns for the U.S. Fish and Wildlife Service, the Bureau of Land Management, and other agencies. Many millions of dollars are spent annually throughout the United States in dealing with invasive species problems.

Within Arizona, invasive species control is also a concern. The Arizona Department of Agriculture has long maintained an Insect Pest Control Program and a Noxious Weed Control Program. In spring 2002 the Department began the process of adding many more species to the official Noxious Weed List, including species of concern in ecologically sensitive areas. Some of the new species proposed, such as Malta starthistle (Centaurea melitensis), are or have the potential to become significant problems within Pima County. In addition, the Arizona Game and Fish Department is actively working to control and prevent problems caused by invasive fauna, especially in riparian areas and wetlands.

Control of invasive species must be an important element of the Sonoran Desert Conservation Plan if some of its goals are to be achieved, as discussed below. In some cases the invasive species are already present in problematic

Figure 3. This young saguaro is surrounded by buffelgrass and a prime candidate for devastating fire. Photo: Todd Esque, U.S. Geological Survey.

Figure 4.. This saguaro and the yuccas have been destroyed by fire fueled by non-native grasses growing around them. Photo: Todd Esque, U.S. Geological Survey

numbers in Pima County and programs to eliminate the problem or at least reduce the impacts are needed. In some cases they are problems in some parts of the county and not others. In these cases efforts are needed to be prevent their introduction into new areas and to deal with the areas already invaded. Finally, there are some species that are not yet problems in Pima County, but are liable to become problems unless preventive measures are taken.

In all cases, it is clear that invasive species do not respect political or land ownership boundaries and cooperative efforts are needed if real prevention

Figure 5. Invasive Fountain grass has become a major problem in Sabino Canyon and many other places. Drawing: Bill Singleton.

and control are to be effective. This is also necessary in most cases where reintroduction of native species, such as leopard frogs, depends on control of invasive bullfrogs, crayfish, or non-native fish. The Pima Invasive Species Council, founded with Pima County assistance in the fall of 2000, serves as a coordinating group among federal, state, county governments and nonprofit groups working on invasive species issues.

Invasive plants are so pervasive in Pima County and spread so rapidly that very little mapping been done. There are many reports of the spread of invasive plants, especially along roadsides and washes. In general, invasive species tend to follow human activities - land clearing, transportation and utility corridors, and hiking and 4-wheel drive trails, for example. Escape of landscape plants from government or private property is a very significant avenue of movement of invasives. Mapping of the existence of invasive aquatic fauna is farther developed since the number of susceptible perennial water bodies and ponds is relatively small in Pima County.

Flora

Grasses

Non-native grasses present some of the most challenging problems in Pima County because of their aggressive nature and the fire hazards they present in the Sonoran Desert. The desert proper did not evolve with fire so plants such as the saguaro are not adapted to burning. When these grasses invade the desert they provide fuels for fires that can kill cacti and other desert species. Large tracts of land north of Phoenix and others west of Globe experienced major fires in recent years in which almost all the saguaros, barrel cacti and other native plants burned and died. All of these fires were fueled by non-native grasses. It will take many years for cacti to grow in these areas and it is likely that non-native grasses will instead predominate in the long term. Such a fate is highly probable for similar areas in Pima County unless invasive grasses are controlled. (See Figures 3 and 4).

These fires can also impact native aquatic species when sedimentation from newly burnt land flows into streams and pools, filling them and eliminating native fish and frogs. This happened in the mid-1990s when a fire fueled largely by the non-native red brome grass, Bromus rubens, in Saguaro National Park East burned thousands of acres. Ash and sediment resulting from the fire filled

a number of pools important to native aquatic species, making it impossible for them to survive there.

The U.S. Soil Conservation Service introduced buffelgrass, Pennisetum ciliare, for cattle forage in the 1950s in Arizona and Sonora but was not recognized as a serious problem until the late 1980s. (Figure 1). In parts of Sonora, bufflegrass has completely transformed the thornscrub areas from ecosystems rich in a variety of cactus and other native species into near monocultures of this African grass. Fires have increased a thousand-fold near Hermosillo, for example, necessitating replacement of wooden fence posts and utility poles with metal structures.

In Pima County, the problem is so severe that a group of volunteers, the Tucson Mountain Weedwackers, in cooperation with the National Park Service and non-profit groups including the Arizona Native Plant Society have devoted thousands of person-hours to removal of the grass from Tucson Mountain Park and Saguaro National Park West. More recently their activities have extended into eradication projects in other areas. Staff at Organ Pipe National Monument have also mounted a major campaign utilizing volunteers to eliminate bufflegrass from the monument. The international border is a major source of introduction, especially along travel corridors. Here it invades both disturbed and non-disturbed desert areas. If bufflegrass were allowed to become prevalent, the organ pipe cactus and other native species would be seriously impacted by wildfire. This is a continuing effort since each year new invasions occur.

Other pervasive non-native grasses in Pima County include Lehmann's lovegrass Eragrostis lehmannii), Boer's lovegrass (Eragrostis Curvula var. conferta), and Johnson grass (Sorghum halepensis), all of which can present fires hazards. Where these grasses grow in areas that were historically grasslands, however, the fire danger is not as significant since these areas traditionally burned periodically. The prevalence of non-native grasses in historic grasslands however, does has the impact of reducing biodiversity. Lehmann's lovegrass, for example, forms the vast majority of the plant life on the lowland areas of the Santa Rita Experimental Range. While a range of native species persists here, their numbers are very small compared to what they are in a native grassland.

Figure 6 Rhus lancea, African sumac, once considered a harmless landscape tree has recently become invasive along washes in the foothills and other locations. Photo: Barbara Tellman.

Other problematic weeds include several varieties of mustard and Malta starthistle, Centaurea melitensis. These plants can rapidly take over large regions, often starting along roadsides and other disturbed areas. They may also create fire hazards when the dried plants remain. None of the plants mentioned here is considered an attractive landscape plant that anyone would plant for aesthetic value.

Escaped landscape plants

Some of the invasive species entered the region as landscape plants. While few people would consider planting the weed species mentioned above, certain landscape species are attractive. It is often difficult to predict which landscape plants will become invasive, although the ones mentioned below have already demonstrated this tendency. Since invasiveness is difficult to predict and since

once a plant has become a problem it may be too late for effective control, caution with non-native species is necessary, especially in plantings on county-owned land such as parks, roadsides and utility rights-of-way near natural areas. The impetus towards xeriscape (low water use) planting while serving an important water conservation function, also means that more landscape species will probably escape into the desert because many of the desert-adaptation characteristics that make a plant a good xeriscape plant also make it a good candidate for becoming invasive in the desert, or at least in areas with a little more water, such as along roadsides or in washes.

Fountain grass, Pennisetum cetaceum, is an example of an attractive landscape plant whose invasive properties were not considered when it was first introduced. Even after it had begun to become invasive, landscapers and plant nursery owners argued that it was not a problem. Finally, when problems were clearly identified, the county outlawed planting all but a variety considered nonfertile. Fountain grass, however, escaped from cultivation and is becoming common in certain washes in the Catalina Foothills and Tucson Mountains. It has spread to such an extent in Sabino Canyon that the Forest Service has been utilizing the help of dozens of volunteers to eradicate it from the area. This grass crowds out native species and presents a serious fire hazard. Pampas grass has the potential to cause similar problems. Although it has naturalized in some areas, it has not yet become invasive and it is difficult to predict whether or not it will some day be a problem.

Problematic landscape trees and shrubs include African sumac, Rhus lancea, saltcedar or tamarisk, Tamarix ramosissima and tree of heaven, Ailanthus altissima. All of these species tend to outcompete native plants, especially in riparian areas, including xeroriparian washes. While tamarisk has long been considered a severe problem in riparian areas, the sumac and tree of heaven were generally considered benign until the 1990s. Sumac grows along washes in the Catalina Foothills, for example, where in some cases it is becoming the dominant tree, replacing the natives. This tree is highly aggressive and birds spread it easily over long distances. It produces thousands of seeds annually and is very difficult to eradicate once established. It is also highly allergenic for some people. Pima County has used this tree as a landscape plant in linear parks along the rivers and other parks from which they persist and spread.

Tree of heaven can be found in yards throughout the urban area and has became a problem species along streams such as the Verde River and Sonoita Creek. In Pima County it has escaped into xeroriparian washes, but is not yet a threat in areas such as Cienega Creek. Saltcedar is a serious problem throughout the Southwest and Sonora, especially in watercourses where the natural stream functions have been altered. Another variety of saltcedar, Tamarix aphylla, has been used as a landscape plant in Tucson for more than one hundred years. This species has naturalized along the lower Colorado River but has not been a problem in Pima County.

Fauna

The Arizona Game and Fish Department and others introduced non-native fish, bullfrogs, Rana catesbieana and crayfish for sport purposes starting in the early 1900s. Their fish hatcheries produced tens of thousands of fish annually, mostly for use at higher elevation spots such as streams in the White Mountains or Rose Canyon Lake in the Catalina Mountains. It was not until the 1980s that people recognized that these introductions were responsible in part for the loss of native fish species. The Forest Service recognized green sunfish as a problem in Sabino Creek in the late 1990s and programs to eliminate this fish began at the end of the decade.

Similarly, although bullfrogs and crayfish were widely introduced starting in the 1920s it was not until the 1980s that scientists such as Cecil Schwalbe

determined that they too were reasons for the loss of native fish, frogs, and snakes. They determined that bullfrogs were also killing native water snakes, bats, birds and other creatures. Schwalbe, Phil Rosen, and others developed programs to eliminate bullfrogs, with extensive programs in Pima County at Buenos Aires National Wildlife Refuge. They determined that efforts to reintroduce native species were not liable to be successful unless the invasive creatures were effectively eliminated or kept severely in check, especially along streams and in ponds where the natural flow processes were degraded or destroyed.

The major avenues of spread today are by humans who dump unwanted aquatic fish and snails into ponds such as at Agua Caliente Park, who move creatures from one location to another in bait buckets or fishing equipment, or who host species such as bullfrogs in their backyard ponds from which the frogs may escape to other aquatic locations, since bullfrogs can travel several miles overland in search of a new home.

The U.S. Fish and Wildlife Service has major concerns about the ability of the Central Arizona Project to spread nonnative aquatic species unintentionally to watercourses near its path. In Aravaipa Canyon, for example, the Service has spent millions of dollars building fish barriers in an attempt to prevent nonnative fish from invading areas upstream with native fish. Similar barriers are proposed in Pima County upstream of the CAP terminus north of Green Valley. The Service is concerned about the use of untreated CAP water for riparian projects, such as use in the Rio Nuevo project through downtown Tucson. It is concerned about fish as well as invertebrates such as snails. Although barriers may succeed in halting mature fish, they are less useful for microscopic life. The Service is also concerned that any open bodies of water serve as attractants to people who knowingly or unwittingly dump unwanted aquarium plants and animals in them.

Other problematic species include feral dogs and cats that can kill or wound native lizards, rodents, and birds. Feral dogs also serve to spread parasitic worms, giardia, tick fever, and rabies into wild populations of coyotes. Feral dogs have been a problem at San Xavier District, for example. Feral pigs cause problems for native species along the San Pedro River in Pima County.

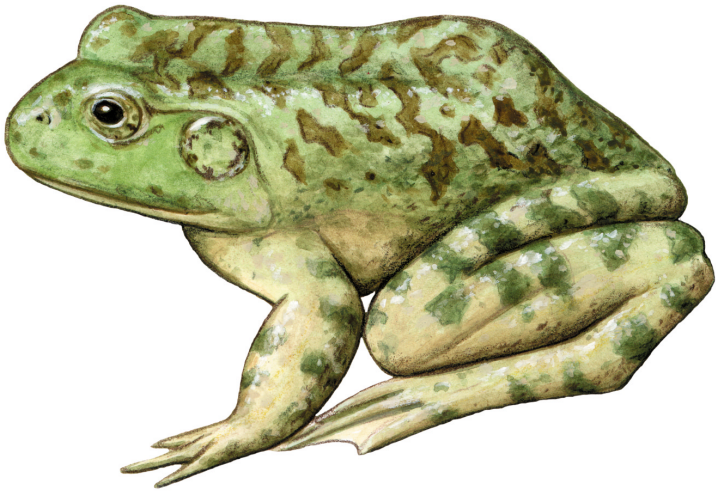


Figure 7. Bullfrogs are voracious eaters of native creatures including fish, frogs, snakes, bats, and birds. Drawing by Bill Singleton.

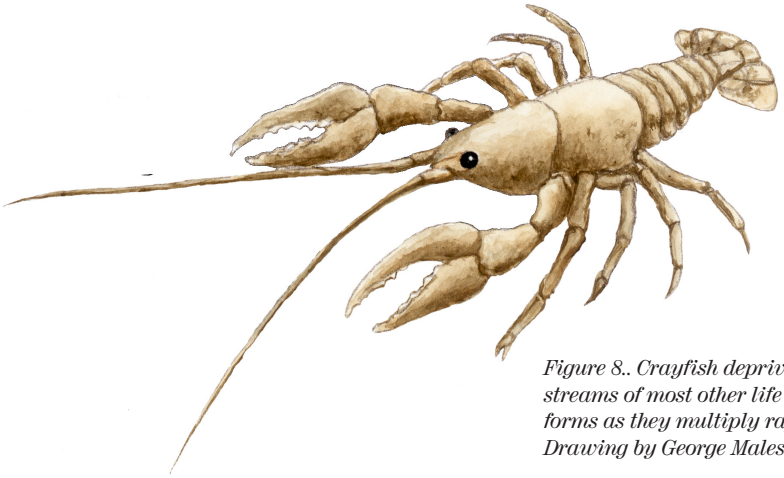


Figure 8.. Crayfish deprive streams of most other life forms as they multiply rapidly. Drawing by George Maleski.

Sonoran Desert Conservation Plan Reports

Several SDCP reports deal with invasive species issues.

Issues of Non-Native Species in Public Reserves (2000)

This report looked at invasive species issues in public preserves, including Coronado National Forest, Saguaro National Park, Organ Pipe National Monument, Catalina State Park, and various country preserves. This report discusses policies of those agencies and provides lists of non-native species detected by those agencies on their lands In Pima County.

Potentially Problematic Species in Pima County: Ecological Effects and Management Strategies, (2001)

This study identified 45 potentially problematic species in Pima County in areas prioritized for biological conservation purposes. These species of greatest concern were: bullfrog), green sunfish, western mosquitofish, red shiner, crayfish, tamarisk, fire ant, Africanized bee, non-native grasses, Asian mustard. The author recommended that problems be considered by impacts of specific ecosystems, not by individual species.

Aquatic Vertebrate Conservation in Pima County (2000) and Species Re-establishment within Pima County 2001

These reports identified the prevalence of some non-native aquatic species as significant barriers to successful conservation and reintroduction of native species. Bullfrogs and crayfish and several species of fish present the greatest problems, according to these reports. Reintroduction of certain native plants will be most successful if competing non-native plants are eliminated or reduced, along with improvement of stream conditions, which may be necessary to produce conditions that will encourage natives rather than non-natives.

Riparian Protection, Management, and Restoration (2000)

This report identified a number of issues related to riparian restoration and management, including the negative impacts of invasive species of plants and animals and discussed the need to manage for natives rather than non-natives.

Figure 9. The Tucson Mountain Weedwackers have spent hundreds of volunteer hours in removing buffelgrass and fountain grass from the Tucson Mountains. Photo: Weedwackers.

The Effects of Roads on Natural Resources (2002)

Among the many effects that roads have on natural resources, their tendency to serve as corridors for the spread of non-native species was discussed in this report.

Invasive Species Control in Pima County (2002) (in preparation),

This report provides background on invasive species problems in Pima County and presents a program for preventing new introductions and for dealing with problematic species on county land, including cooperative programs for dealing with invasive species on lands managed by other agencies or in private ownership.

SDCP Proposed Actions

The following policies are proposed and in some cases have already been adopted.

Policies on County-owned lands

1. Guidelines for landscaping on county properties including parks, wastewater rights-of-way, floodplains, roads, and waste disposal sites will call for the use of native plants unless there is an overriding reason for using non-natives. Where non-natives must be used, these species shall not have invasive characteristics.

2. Weed management practices to reduce the threat of invasive weeds on county-owned properties will help prevent the further spread of invasives. Special emphasis will be placed on those weeds that present a fire hazard to public or private property.

3. Cross-training of county employees in recognition and management of invasive species will facilitate implementation of the above policies. Employees whose work involves management of county property subject to weed invasions will receive updated information on the problems of invasives, identification of problems species, control methods, and county policies on management.

Reintroduction of Native Species

1. The recently established native plant nursery on Pima County Wastewater property will continue to provide a basic stock of native plants for use on county-owned properties.

2. Several projects are planned to reintroduce native fish and amphibians to selected watercourses in the region. Successful implementation will require removal of invasive species where they occur, especially bullfrogs, and, where needed, improvement of watershed conditions to encourage native species and discourage invasive ones.

3. Reintroduction of plant species that have been rare or extirpated in Pima County, such as Huachuca water umbel, screwbean mesquite, and arrowweed will be most successful if non-native species are controlled in conjunction with the introduction.

Policies on Private Lands

1. Landscaping ordinances and plant lists will be reviewed to assure that invasive species are not used in new commercial plantings.

2. The list of plants prohibited because of allergenic properties will be updated to assure that all invasive plants, which present pollen problems, are included.

3. An updated version of Chapter 7.33 of the County Code, which includes provisions for weed management, will encourage removal of invasive weeds from private property.

IntergovernmentalAgreements (Federal, State, Tribal, Municipal)

1. Intergovernmental agreements with other governmental entities in the region will include coordination of activities to control invasive species with agencies such as the U.S. Fish and Wildlife Service, National Park Service, USDA Forest Service, The Tohono O'odham Nation, the Arizona Departments of

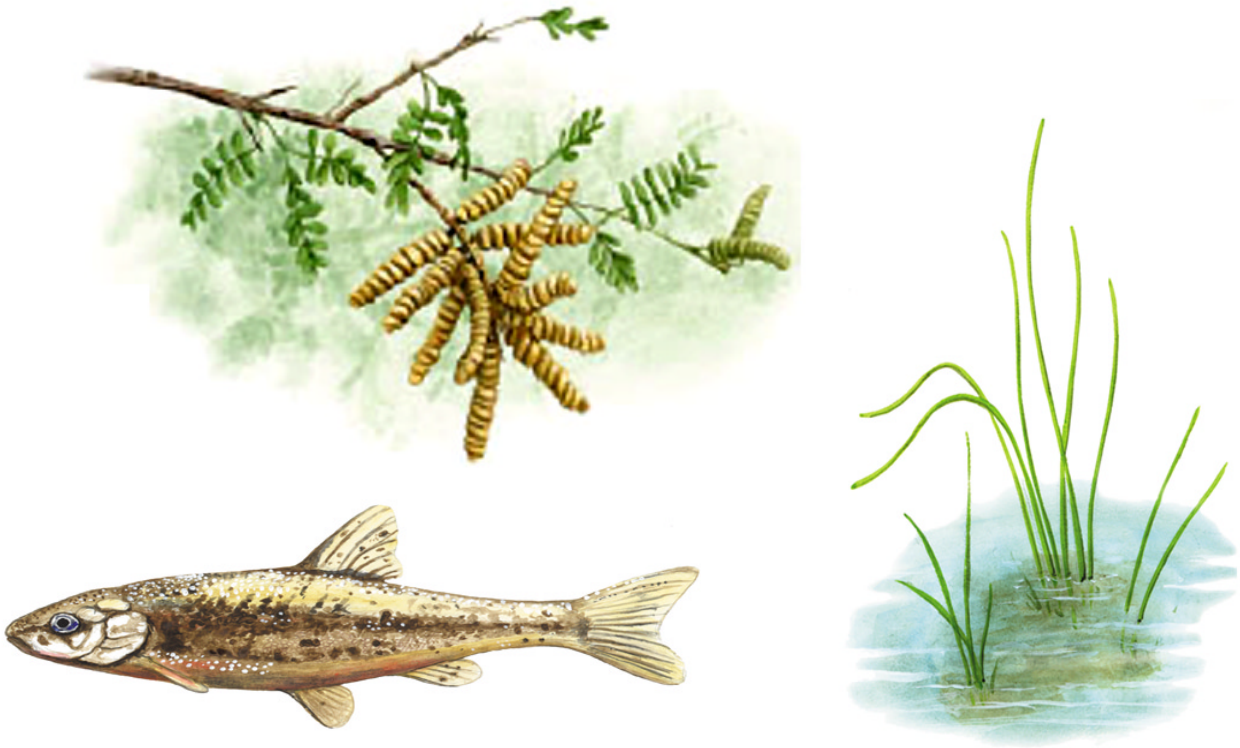


Figure 2. Reintroduction of native species such as the screwbean mesquite, longfin dace or lowland leopard frog will have the greatest chance of success if non-native species are removed from the area. Drawings by Bill Singleton.

Agriculture and Transportation and the State Land Department. .

2. Agreements on the species most in need of and susceptible to control and on feasible control methods will facilitate reduction programs. The Nature Conservancy and others are developing lists of the most problematic species, along with criteria for determining which species should be included. This list will serve as a basis for coordinated control efforts in Pima County.

Cooperative Activities with Nonprofit Groups

1. Many community and statewide groups are already working on invasive species issues. Improved communication and coordination will make these efforts more successful. These groups include the Arizona Weed Management Society, Arizona Native Plant Society, the Tucson Herpetological Society, Cooperative Extension, Tucson Botanical Gardens, the Arizona-Sonora Desert Museum, The Nature Conservancy, the Sonoran Institute, and many others.

2. Cooperative activities will involve education (as discussed below), communication, volunteer programs, weed removal projects, establishment of weed management areas, and other kinds of activities.

Educational Programs

1. Educational programs on invasive species issues are needed for various groups of people, including landscapers, homeowners groups, government employees working with outdoor facilities, and others. These programs include public speakers, web site information, volunteer weed removal programs, brochures, and other activities.

2. Education programs aimed at school children will be a part of the environmental education program currently implemented by the Pima County Natural Resources and Parks Department.

3. Pima County held a day-long workshop for professionals on aquatic exotic invasives. Additional workshops on other kinds of invasives will provide useful information for people working on these issues.

Potential Impacts under the Alternatives

Impacts under all Alternatives

None of the SDCP proposals include intentional introduction of invasive species. On the contrary, the proposals include efforts to control invasives.

If the present trend toward uncoordinated sporadic control projects continues, invasive species will be reduced or eliminated in some localized areas, but continue to expand unchecked in others.

Figure 3. Cienega Creek where native fish species still predominate and natural flow conditions occur.

No matter which land use alternative is chosen, the negative impacts of invasive species will continue to increase unless additional measures are taken.

The proposed actions above will serve to reduce the threat of new invasions, reduce or eliminate the impacts of current invasions, and facilitate the reintroduction of native species.

Since movement of new human activities into previously undisturbed areas is one of the major ways that invasive species spread, any limitation of human movements into undisturbed areas will help reduce the spread of those species. On the contrary, where new transportation corridors and land clearing are planning, invasive species are liable to spread. Maintaining large undisturbed tracts of land as reserves will have the benefit of helping to limit the spread of invasive flora and fauna.

Continuation of Present Growth Patterns (No Action)

If population growth continues unchecked in the region, increased spread of invasive species is inevitable unless major prevention and control programs are undertaken. Landscape plants will escape into new areas, weeds will spread along new roads, and aquatic species will escape from backyard ponds. In order to allow continued spread of subdivisions and other new construction into outlying areas without major invasive species impacts, the county would have to implement new landscape ordinances, have strict regulations on backyard ponds, carefully monitor and eliminate weeds

from roadsides and rights-of-way, use native plants only on county property such as parks, and adopt measures as described above.

Emphasis on Riparian Area Protection

This alternative offers the greatest potential for control of invasive aquatic fauna and invasive flora that do well along watercourses. Acquisition of priority riparian areas along with invasive species management activities will be very beneficial to encouraging prime riparian habitat for species preservation and reintroduction. The projects proposed for reintroduction of threatened and endangered fish and frogs and locally rare plants in parts of the region will be highly beneficial to the entire Sonoran Desert Conservation Plan. The projects involve invasive species control as appropriate. Continuing efforts, however, will be necessary to assure that activities on the periphery of these areas do not contribute to the spread of invasive species from landscapes or along transportation corridors.

Emphasis on limiting development in the unincorporated areas on the Northwest side of the metropolitan area

This alternative offers little potential for invasive species control since much of the area is already partially developed or adjacent to developed lands. This area has divided jurisdiction among Marana, Oro Valley and Pima County. Successful control efforts would require effective coordination. The potential for movement of species along transportation corridors and from landscapes is high with or without more limits on development here. Controlling the spread of invasive species will require high vigilance under this alternative.

Emphasis on Ranch Conservation

Starting in the late 1890s, non-native plant species, especially grasses, were introduced into ranch lands for cattle forage. After the droughts on the 1940s and 1950s additional species, such as Lehmann's lovegrass, were planted over many acres of land in southern Arizona. Programs of the Natural Resources Conservation Service (NRCS) have in recent years been transformed from an emphasis on new species introductions to encouragement of native species. Some ranchers in the Altar Valley, for example, work closely with the NRCS to encourage native species, although non-natives predominate in much of the area.

Acquisition of ranchlands by Pima County would have to be accompanied by cooperative management efforts in order to deal effectively with invasive species. This would be a major management challenge. Care would have to be taken to deal with problems arising from increased public access if this is part of the plan.

Agreements with ranchers for conservation easements or living trusts can result in improvements in the balance between native and non-native species, especially if these agreements include

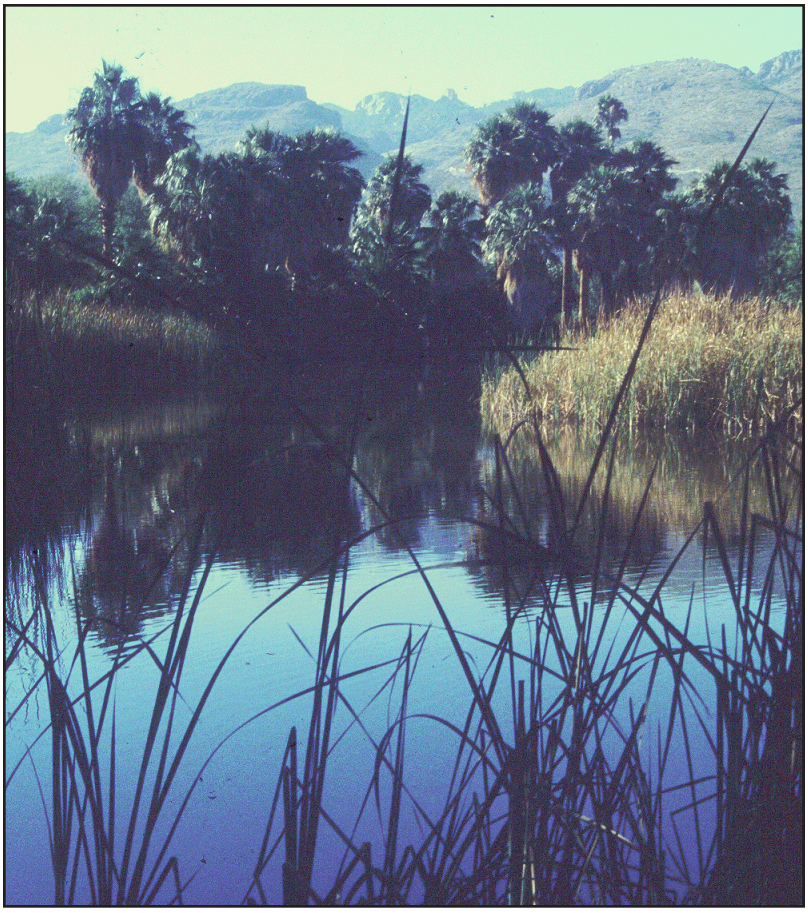


Figure 4 Agua Calienta Park where non-native fish and frog species predominate under man-made pond conditions. Photo: .

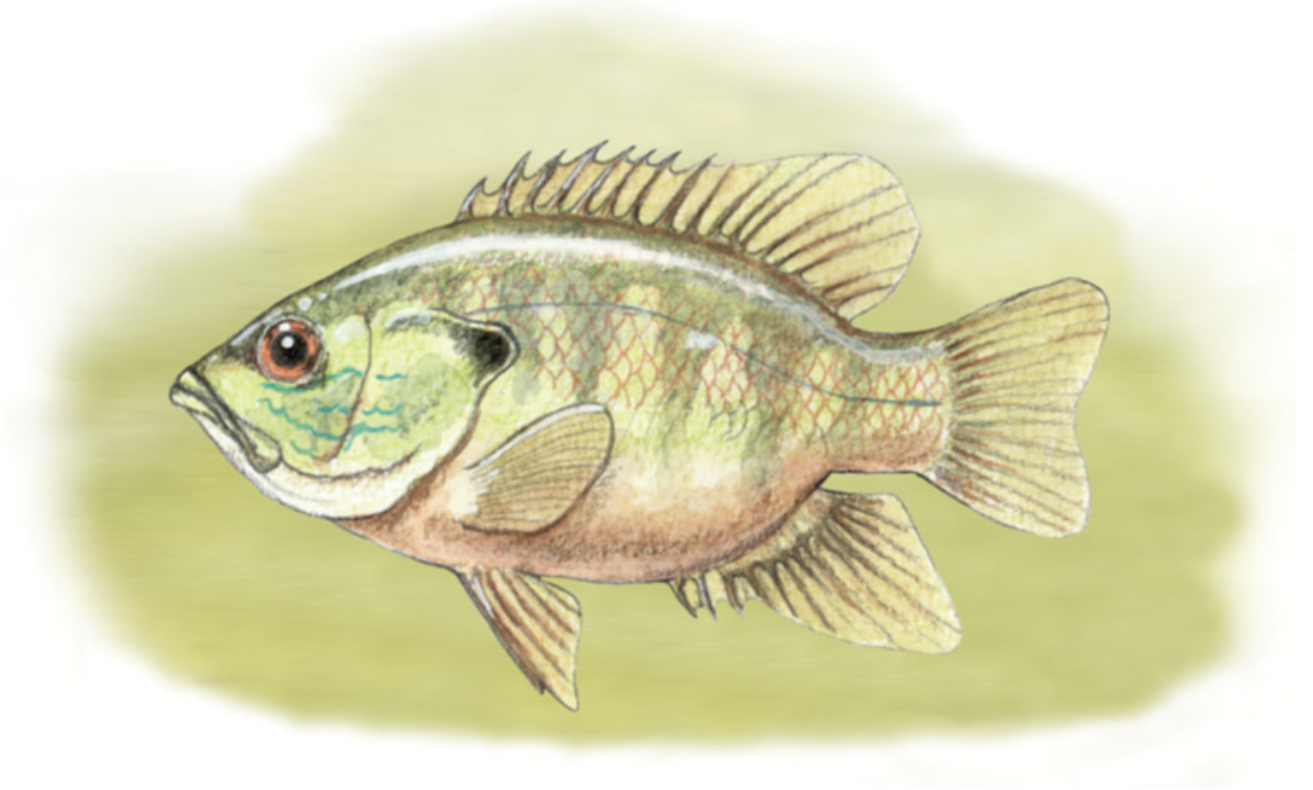


Figure 5. Coronado National Forest and Arizona Game and Fish Department personnel successfully killed hundreds non-native green sunfsh in the lower portion of Sabino Creek in an effort to protect the habitat for native fish. The sunfish are voracious eaters of smaller fish. Drawing: George Maleski.

management plans and implementation procedures for dealing with these issues.

A few streams in the Altar Valley currently have native fish or frogs. These offer an opportunity for control of invasive species that would threaten the natives. Bullfrogs have been partially eliminated from ponds on the Buenos Aires National Wildlife Refuge but still persist on some ranchlands in the area. Eradication on ranchlands through acquisition or agreements would be beneficial to natives.

Emphasis on County Park Expansion

Increasing the area of contiguous, relatively undisturbed lands will reduce the likelihood of new areas being infected with invasive species in those areas. Management of these lands, however, would have to include not expanding transportation corridors into undisturbed land to avoid spreading non-native species by horses, off-road vehicles, or hikers. Monitoring of invasives on the periphery of the parks will also be important along with elimination of new invasions if they occur.

Expansion of Tucson Mountain Park would help to reduce the threat of invasive plants from landscapes along the periphery, although monitoring and control efforts will be continually needed. Buffelgrass and Fountain grass probably present the greatest foreseeable challenges in this area. Aquatic invasives are not an issue in this area as there are no perennial or intermittent streams or springs in this region.

Expansion of Tortolita Mountain Park would have similar results and needs as Marana and Oro Valley expand nearby. Cooperative programs would be needed to prevent the spread of invasive species in this area. Aquatic species are not an issue in this area, except possibly for some isolated springs and intermittent streams.

Expansion of Colossal Mountain Park and/or Cienega Creek Preserve could be beneficial to invasive species management. These areas have the potential for invasion of aquatic species into the perennial and intermittent streams and springs in those

areas and nearby and for invasions of plants such as red brome grass. Expansion of these areas will increase the buffer area between developed areas and the original preserves and help in reducing invasive species problems.

Summary

No matter which alternative is chosen, Pima County will benefit from adopting policies and increasing coordination with government and non-profit groups to deal effectively with invasive species. The alternatives that preserve the greatest amount of undisturbed land offer the most benefits. These are expansion of preserves and riparian protection. Emphasis on the northwest area and continuation of the present growth patterns offer the least benefit. Emphasis on ranch conservation has great potential depending on management techniques.

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In addition to the SDCP reports listed above, useful references are:

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Figure 6. London rocket, one of several weeds in the mustard family that spread profusely in Pima County. Photo: Barbara Tellman.

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