

Land Conservation and Revenue Generation on Trust Land in Arizona

*Opportunities for Managing Arizona State
Trust Land for Conservation Outcomes*



Prepared for:
The Lincoln Institute of Land Policy
and Sonoran Institute
Joint Venture on State Trust Lands

Arizona State Land Department

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1. INTRODUCTION

1.1 PREFACE

The U.S. Army Corps of Engineers (USACE) is responsible for implementing Section 404 of the Clean Water Act (CWA), which regulates impacts to wetlands and other waters of the United States (U.S.). The U.S. Fish and Wildlife Service (USFWS) is responsible for implementing the Endangered Species Act (ESA), which regulates impacts to federally listed Threatened and Endangered species and their habitats. When impacts to these resources cannot be avoided, they must be minimized. The CWA and ESA require that any loss that occurs be compensated or offset through other actions. These obligations create opportunities to develop and capitalize on ecosystem marketplaces.

An ecosystem marketplace provides a network of offset solutions. Developers and others with offset obligations need effective and efficient solutions, while land owners with existing or potential natural resources whose protection and restoration can qualify as offsets can sell “credits” to those with such obligations. When regulatory structures are in place, the marketplace functions as a credit trading forum. After completing a transaction, a developer can proceed with a development project, knowing that offset obligations have been satisfied. This process provides numerous efficiencies for developers, local jurisdictions, transportation departments, etc. because the simple purchase of credits (rather than performing project-by-project mitigation) removes mitigation activities from the project delivery critical path.

Offset obligations stemming from growth-related impacts are providing real opportunities to develop ecosystem-based markets in Arizona. These opportunities may provide additional revenue generation options for the Arizona State Land Department (ASLD), allowing it to meet its Trust Land management responsibilities while conserving Trust Land that possesses significant ecological values.

This report has been prepared on behalf of the Lincoln Institute of Land Policy and Sonoran Institute Joint Venture on State Trust Lands. It is intended to advance the conversation regarding the expansion of existing ASLD practices to enable the use of Trust Land to permanently protect environmental features, and to do this in a manner that is fundamentally consistent with ASLD’s fiduciary obligations. The potential benefits from this type of management option include:

- Generating revenue for Trust Land beneficiaries.
- Providing internal mitigation for ASLD impacts to natural resources through ASLD’s other revenue generating activities (i.e. residential and commercial development).
- Continuing to foster strong relationships with city and county partners, many of whom also need mitigation opportunities.
- Building upon existing resource agency goodwill.
- Protecting Arizona’s open spaces and natural resources for future generations, including habitat and species recovery.

Initially, this study sought to assess opportunities to utilize Trust Land for Section 404 mitigation banking (a cornerstone of any ecosystem marketplace) in the Hassayampa and Agua Fria watersheds. These watersheds were selected because of the significant local growth and mitigation demand anticipated over the next 15-20 years. After a preliminary assessment, however, this study was expanded to evaluate more completely mitigation demand drivers in Pima and Pinal Counties, as well as to generally explore other opportunities to generate revenue through land conservation practices.

1.2 GROWTH AND MITIGATION DEMAND

1.2.1 Moving Forward in Arizona

Since 1960, Arizona has tripled in population, and it continues to grow three times faster than the nation as a whole. The Arizona Department of Economic Security projects that the state's population will increase from 4.7 million in 1998 to 7.4 million in 2020, a growth increase of 54%. Past growth has resulted in unavoidable impacts to natural resources, and future impacts are inevitable. Thus, the need for meaningful natural resource mitigation will only increase as the state continues to grow.

Lands held in trust by ASLD have the potential to play a significant growth management role, largely because many of them are located at the urban-rural interface. It is estimated that up to 30% of the land located in the path of Phoenix and Tucson metro area development is Trust Land. ASLD's mission and fiduciary obligations require that this Trust Land be managed to maximize revenue for the Trust's 14 beneficiaries. The primary revenue-generating management strategies employed by ASLD to date have included land sales and leases associated with residential and commercial development.¹

On June 12, 1998, then Governor Jane Dee Hull named a 15-member Growing Smarter Commission (Commission). The Commission established eight subcommittees, involving more than 100 citizens, to study issues relating to growth and provide an annual findings report. Following the release of the Commission's final report in September 1999, Governor Hull called a special legislative session in February 2000; at this session, the legislature passed the Growing Smarter Plus Act.

The Arizona Growing Smarter Oversight Council (Council), which includes Governor appointed volunteers and key state agency representatives, has been given the responsibility of assessing the effectiveness of the 1998 and 2000 Growing Smarter Acts. In 2004, Governor Napolitano requested that the Council initiate a statewide process to develop a vision for Arizona growth and to develop a set of Guiding Principles to help ensure "quality growth." These principles place a strong emphasis on local input and control over land use decision-making.

Two specific observations gathered from public input during development of the Guiding Principles concern the management of Trust Land:

- State and local agencies should work together to plan for the development of Trust Land, including the conservation of some Trust Land as open space, consistent with local planning objectives and the mission of the Trust to earn revenue.

¹ "In the 88 years since statehood, the State has disposed of, or exchanged, about 1,628,079 acres of Trust lands. A total of 9,228,787 acres of Trust Land remains. Almost all of the lands are under one or more leases for natural resource uses and commercial development purposes." Accessed at: <http://www.land.state.az.us/history.htm>.

- Appropriate tools, including financing mechanisms, should be developed to facilitate the preservation of some State Trust Lands as open spaces.

A related observation also speaks to the relationship between conservation and economic value:

- Local planning efforts need to better recognize wildlife, its habitat (natural landscapes and corridors), and accessible open spaces for active recreation as having important economic value, especially for tourism and community quality of life, and need to emphasize development to preserve and enhance these opportunities.

Nine years later, after the Growing Smarter Commission was established, Governor Napolitano further addressed the topic of growth in Arizona, during her ‘State of the State’ speech:

As I’ve said, Arizona is the fastest growing state in the Union. And although we cut taxes last year, there is still one that needs to go: it’s the “time tax” we pay, every time we sit, stuck in traffic that should be moving. Last year, we agreed to direct an additional \$300 million toward accelerating highway construction. With these new monies, we’ve been able, for example, to speed up work on new lanes for I-17 north of Phoenix, and on I-10 in Pima and Pinal counties. Now, by changing the way we finance the terms of existing bonds – as many states already have done – we can raise money this year for critical transportation projects, and do even more. By simply extending the terms from 20 to 30 years, we will free up more than \$400 million above our current budget to relieve traffic congestion.

Clearly, pragmatic policy solutions for addressing environmental impacts will continue to be critical to enable this infrastructure development and the associated municipal, commercial, and residential expansion. While mitigation will be needed to accommodate impacts, it can be part of a thoughtful land use planning strategy that enables development transactions to simultaneously protect needed ecosystem services, including water recharge, endangered species habitat, aquatic features, and recreational open space.

1.2.2 Financial Impacts of Mitigation Demand

While unavoidable impacts to natural resources will come from residential, commercial, and municipal development, impacts from transportation-related projects are likely to be the most consistent and predictable mitigation driver.

The financial impact of providing transportation-related mitigation will be significant for the State of Arizona. A recent study commissioned by the American Association of State Highway and Transportation Officials (AASHTO) suggests that expenditures for environmental mitigation costs for all projects, (excluding right-of-way acquisition costs), regardless of location average 7.5 percent of total project costs, and range between 2 and 12 percent for the typical project.² If one assumes that this 7.5 percent average is valid for Arizona, then the cost for environmental mitigation for the projects currently in the Arizona Department of Transportation’s (ADOT) \$5.8 billion Five-Year Highway Construction Program would be in the range of \$435 million.³

While the study is careful to underscore its status as a preliminary analysis based upon a fairly small study sample of 29 projects, it is nonetheless indicative of a national trend. In his chapter entitled *The Gray and the Green: The Built Infrastructure and Conservation Investment in “Walden to Wall Street”* (Levitt, et al), Jeffrey

² Right-of-Way and Environmental Mitigation Costs – Investment Needs. NCHRP Project 20-24(54)B, National Cooperative Highway Research Program. Transportation Research Board. 2006.

³ According to ADOT, funding for the current Five-Year Highway Construction Program totals \$5.8 billion. Primary funding sources for the Program are derived from federal highway trust funds, transportation excise tax monies, and state highway user revenues.

More details the way in which highway spending has resulted in conservation investment. He states, “The Intermodal Surface Transportation Efficiency Act of 1991, known commonly as ISTEA, set in motion a new approach for meeting our nation’s transportation and conservation imperatives.” More goes on to describe the magnitude of the conservation commitment in Federal highway legislation.

ISTEA called for 10% of all Surface Transportation Improvement Program (STIP) dollars to be set aside for transportation enhancement activities, including the mitigation of damage to ecosystems and habitat, wetland banking, the acquisition of scenic easements, and the preservation of lands identified as critical habitat by states and metropolitan planning organizations. That 10% of STIP funding equaled an investment of \$2.4 billion over six years. The successor to ISTEA, called the Transportation Equity Act for the 21st Century (TEA-21), retained the provisions that set aside 10% of STIP dollars for transportation enhancements, providing approximately \$3.3 billion for enhancement projects between 1998 and 2003.

Nationally, mitigation for unavoidable transportation impacts is accomplished through a variety of strategies, including mitigating on the site of the impact and off-site when a more suitable location exists. This mitigation occurs on both private and public lands. In some cases, ADOT has mitigated impacts to federally regulated resources off-site and on private and public land. As ADOT continues to generate unavoidable impacts, additional cost-effective mitigation strategies help the agency continue to improve the quality of its mitigation and its transportation project delivery processes. The availability of cost-effective mitigation alternatives will also facilitate continued growth and development in local communities.

2. MITIGATION AND CONSERVATION BANKING IMPLEMENTATION STRATEGIES

2.1 BANKING

2.1.1 Background

Compensatory offset obligations (i.e. mitigation) are an inevitable aspect of development. However, many project proponents are finding that traditional approaches to mitigation (i.e., on-site, in-kind, and project-specific) have failed to be ecologically sustainable due to the piece meal nature of the activities or cost-effectives given associated time delays and costs which are disproportionately high compared to the economies of scale achieved through programmatic solutions rather than project-by-project solutions.

⁴ Multi-Species Conservation Plan. Pima County. 2006.

ADOT Mitigation on Public Lands

In the Yuma area, ADOT spent \$4 million to mitigate impacts to the flat-tailed horn lizard. ADOT’s mitigation, which involved permanent habitat protection and other on-site measures, was performed on Bureau of Land Management (BLM) property. BLM lands have also been used to offset ADOT impacts to desert tortoise habitat in the Kingman area.

Pima County – Pima Pineapple Cactus Mitigation Credit Demand

Pima County faces significant development pressure involving lands that include listed species habitat. In an attempt to prevent future resource conflicts, the County developed a proactive land management strategy focused on concentrating growth in areas with the least likelihood of negatively affecting the numerous species identified in its Multi-Species Conservation Plan (Plan).⁴

However, this strategy was not able to provide adequate protection for the Pima pineapple cactus, because this species’ habitat requirements are essentially opposite those of most species included in the Plan. The Pima pineapple cactus prefers habitat characterized by semi-desert grassland and Sonoran desert scrub between an elevation of 2,300 and 5,000 feet. It is found on open, flat areas between washes – precisely where development tends to occur. In an effort to balance watershed-wide conservation and development priorities, Pima County ultimately designated existing pineapple cactus habitat south of Tucson as suitable for development.

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An alternative form of mitigation, known as “banking,” has become a popular option in many parts of the country.⁸ Banking allows mitigation for many projects to be consolidated on a smaller number of larger sites, thereby avoiding multiple, expensive, “postage stamp” projects with less ecological value given their often isolated and fragmented nature. Mitigation banking provides the flexibility to establish mitigation in places where greater ecological benefits can be achieved (e.g., adjoining protected open space).

The benefits of mitigation banking are summarized in federal guidance issued by USFWS and USACE:⁹

- As noted in the USFWS conservation banking guidelines, “by encouraging collaborative efforts, it becomes possible to take advantage of economies of scale (both financial and biological), funding sources, and management, scientific, and planning resources that are not typically available at the individual project level.”¹⁰
- As noted in the USACE mitigation banking guidelines, the consolidation of resources made available using banks “can increase the potential for the establishment and long-term management of successful mitigation that maximizes opportunities for contributing to biodiversity and/or watershed function.”¹¹ The USACE “favors the use of approved mitigation banks...in cases where they result in more regional or watershed benefit than on-site compensatory mitigation.”¹²

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In order to offset the projected future Pima pineapple cactus impacts and implement the Plan, Pima County would like to acquire other habitat areas for conservation.⁵ The County’s high priority acquisition areas happen to be Trust Land; however, the County is not in the position to purchase the property. If ASLD were to create a mitigation bank for Pima pineapple cactus on Trust Land and sell credits and development rights to the County and/or others, the County would achieve its ecological and economic development goals and the ASLD could meet its fiduciary responsibilities.⁶ Additionally, the ASLD could use credits to satisfy its own mitigation obligations and contribute to species recovery, while continuing to foster its strong relationships with the County, cities, resource agencies, and the conservation community.⁷

⁵ The County’s mitigation needs are anticipated to exceed mitigation credits currently available from other sources (e.g., the Palo Alto Ranch Conservation Bank). In addition, the demand for pineapple cactus credits could be significantly impacted by a pending Supreme Court decision, *Defenders of Wildlife v. EPA*, 420 F.3d 946, 952 (9th Cir. 2005). *cert. granted*, (U.S. January 5, 2007) (No. 06-549; No. 06-340). On April 17, 2007, the Supreme Court heard oral arguments on a case out of the Ninth Circuit that challenged EPA’s ability to delegate the National Pollutant Discharge Elimination System (NPDES) program to the State of Arizona without proper consideration of ESA issues. Depending on the outcome of the case, there could be an increase in the number of projects that are obligated to conduct Section 7 consultation, with a concomitant increase in mitigation obligation.

⁶ A variety of scenarios exist for how this arrangement, or others, could be structured.

⁷ If ASLD is unable to use the land for mitigation and conservation purposes, coordination with the County before sale for other purposes would create opportunities to align goals where feasible.

⁸ In this report, we use the term mitigation banking when referring both to banks established in connection with Section 404 of the Clean Water Act as well as in the context of the Endangered Species Act, the latter often called Conservation Banks.

⁹ A complete set of federal regulations governing wetland banking is available at: <http://www.epa.gov/owow/wetlands/regs/index.html>. The USFWS guidance governing conservation banking is available at: <http://www.fws.gov/endangered/policies/conservation-banking.pdf>

¹⁰ Guidance for the Establishment, Use, and Operation of Conservation Banks. U.S. Fish and Wildlife Service. May 2, 2003.

¹¹ 1995 Federal Guidance for the Establishment, Use, Operation of Mitigation Banks. 60 FR 58605 et seq.

¹² Mitigation Guidelines and Monitoring Requirements. U.S. Army Corps of Engineers.

Developing a watershed-scale approach to mitigation, using tools such as banking, allows for large areas of land to be managed in a 'best use' manner. Thus, a single mitigation bank may be developed to simultaneously protect, enhance and restore, multiple natural resources on the bank site, as well as contribute to a larger landscape vision of conservation.

Banking creates an opportunity for ASLD to meet its Trust Land obligations in several ways. First, if Trust Land property is used for conservation (i.e. protection, enhancement and restoration) purposes, ASLD can be financially compensated in the form of mitigation credits, which account for the value of the property, and its long-term stewardship by ASLD or a partnering organization.¹³ These credits can be sold to a variety of entities, including ASLD's sister agencies such as ADOT, local partners, private landowners or others with mitigation needs. Second, ASLD can use Trust lands or these credits to satisfy its own mitigation obligations, thereby reducing its own mitigation costs and regulatory delays.

2.1.2 Regulatory Agency Perspectives On Banking

In order to assess the regulatory climate and interest in mitigation and conservation banking in Arizona, the three primary agencies involved with bank approval were interviewed to ascertain agency positions on the mitigation banking option.

USACE Perspective

Section 404 of the CWA establishes a program to regulate the discharge of dredged or fill material into waters of the U.S., including wetlands. The USACE is the federal agency charged with administering this program, while the Environmental Protection Agency (EPA) has oversight authority. Regulated activities in waters of the U.S. include fill activities associated with development, construction of water resource projects (such as dams and levees), infrastructure development (such as highways and airports), and mining projects. Section 404 requires that a permit be obtained before dredged or fill material may be discharged into waters of the U.S., unless the activity is exempt from Section 404 regulations (e.g., certain farming and forestry activities). In Arizona, particularly in the Sonoran Desert ecoregion surrounding Phoenix and Tucson, the jurisdictionally delineated waters of the U.S., for which most 404 permits are issued, are usually defined as a stream channel(s) and the frequently inundated (1-2 year flood event) floodplain area adjoining the stream.¹⁴

Under USACE rules, a project applicant for a Section 404 permit is first encouraged to avoid, then minimize before determining that the impact is unavoidable. Once it is determined that the project will entail some level of unavoidable impact to waters of the U.S., several options exist for a project proponent to obtain a permit to offset the impacts. This offset for unavoidable impacts is the mitigation component of the permitting process. USACE staff responsible for mitigation in Arizona have varied individual preferences regarding the type of mitigation desired, and there is internal Agency debate regarding the appropriateness of on-site versus off-site mitigation. The potentially available mitigation options are summarized below.

¹³ Pending ongoing legal review.

¹⁴ All natural drainages, whether perennial, intermittent or ephemeral, are included in the delineation for permitting purposes.

- On-Site Mitigation

On-site mitigation is mitigation that is provided on the same site (or nearby). It is generally performed by the project applicant, and the applicant is responsible for all aspects of the mitigation, including ensuring site success through a monitoring and maintenance period (generally a minimum of 5 years). On-site mitigation has a track record of being unsuccessful and costly; however, regional USACE staff have indicated that some of the Agency's project managers (permit application reviewers) prefer on-site mitigation, especially in the Phoenix area.

- In-Lieu Fee Mitigation

In-lieu fee mitigation is mitigation that is provided by a third party, often a non-profit organization. Under this program, the project applicant typically pays a fee to the USACE and the USACE distributes the funds to a previously approved wetland restoration project. The applicant's responsibilities end with payment to the USACE. Although this can be a cost-effective solution, conversations with recent applicants indicate that the in-lieu fee program in Arizona is becoming increasingly difficult to use, due to evolving USACE criteria and uncertainty regarding draft EPA and USACE regulations that may result in changes to the program.

In Arizona, USACE staff indicate that restoration projects in the in-lieu fee program are rarely completed entirely from in-lieu fee funding (fees paid by the developer). These projects are funded in part by in-lieu fees and in part by other sources of funding such as grants given to non-profit project sponsors. This means that the in-lieu fees paid by developers to offset impacts under Section 404 of the CWA represent only a fraction of the actual cost of offsetting those impacts. The net result of this cost subsidy for projects in the in-lieu fee program is that mitigation costs are lower than would otherwise be expected. In addition, it is unclear what level of restoration occurs and whether or not the agency's no-net-loss goals are met. To date, many in-lieu projects have involved preserving existing habitat (typically of higher value than that which is lost) and have not included a habitat restoration component.

In-lieu fee mitigation appears to be the USACE mitigation staff's preferred option. To date, the in-lieu fee program has worked well for the Agency and has been more ecologically successful than on-site mitigation.

- Mitigation Banking

As previously mentioned, mitigation banking occurs when an entity identifies a suitable enhancement/restoration project, obtains regulatory mitigation bank certification, and then sells 'credits' to project applicants who have a mitigation obligation. Mitigation work is performed in advance of project impacts, and success criteria must be met for credits to be available for sale. Mitigation banking is similar to in-lieu fee mitigation for the project applicant in that the applicant's responsibilities end with regulatory agency approval to purchase credits from the bank and an exchange of funds with the bank sponsor. The bank sponsor is responsible for the long-term success of the habitat mitigation project.

Mitigation banking is garnering significant support throughout the U.S. due to the large-scale restoration opportunities it creates and the quality of the mitigation work performed. However, conversations with USACE staff have indicated that Section 404-related banking is not currently recognized as

a viable mitigation alternative in Arizona due to concerns regarding potentially insufficient credit demand, the difficulties associated with certifying banks, and the potential financial and ecological risks associated with bank failure.

The Agency is willing to consider banking on a case-by-case basis if a proposal is submitted to the Agency that clearly documents the proposed project's financial viability and the bank sponsor's willingness to assume all risks associated with potential bank failure.

USFWS Perspective

The USFWS is charged with implementation of the Endangered Species Act (ESA). The ESA regulates development activities through Sections 7, 9 and 10 of the Act. Section 7 requires that federalized activities must ensure that the activity will not "jeopardize" a listed species. There are a variety of mechanisms through which a project becomes federalized. The most common is the need for a federal permit, such as a Section 404 permit from the USACE for impacts to wetlands and waters of the U.S. The other common federalization trigger is project funding that has come from a federal source. For example, most large ADOT projects are federalized through Federal Highway Administration (FHWA) funding. Section 9 specifically prohibits the taking of a listed endangered or threatened animal species while Section 10 allows for the attainment of an "Incidental Take Permit" (ITP) in which otherwise lawful activities are permitted in the event of an incidental take of a listed animal species.

Federal guidance has been provided on conservation banking in the context of these sections of the ESA:

"Section 7(a)(1) of the ESA requires that all Federal agencies ...in consultation with and with the assistance of the [Service], utilize their authorities in furtherance of the purposes of [the ESA] by carrying out programs for the conservation of [listed species]. Section 7(a)(2) of the ESA also requires each Federal agency to consult with the Service regarding effects of their actions to insure that the continued existence of listed species will not be jeopardized and that designated critical habitat will not be destroyed or adversely modified. Impacts to listed species are minimized by including conservation measures for the listed species in the Federal agency's project description". Typically the federal agency will pass on these conservation measure requirements as part of their permitting activity in the case of the Section 404 permit program or as a condition of receiving federal funds. These conservation measures could include, if appropriate, protection of off-site listed species habitat through purchase of credits in a conservation bank.

"Section 10(a)(1)(B) of the ESA authorizes the Service to issue to non-Federal entities a permit for the incidental take of endangered and threatened species whose take is specifically prohibited under Section 9. This permit allows a non-Federal landowner to proceed with an activity that is legal in all other respects, but that results in the incidental taking of a listed species. A habitat conservation plan, or HCP, must accompany an application for an incidental take permit. The purpose of the HCP is to ensure that the effects of the permitted action on covered species are adequately minimized and mitigated and that the action does not appreciably reduce the survival and recovery of the species. Mitigation may include off-site protection of the listed species and its habitat and may take the form of purchasing credits in an approved conservation bank. Credits must be acquired by the permittee prior to commencement of actions authorized by an incidental take permit and intended to be mitigated by those credits." Accordingly, USFWS becomes involved in project offsets, and potentially conservation banking, if an entity is seeking an Incidental Take Permit (ITP) as part of a HCP, or if the entity's project is federalized and requires a biological consultation under the provisions of Section 7 of the ESA and resulting consultation recommends that certain conservation measures be attached to permitting or fund-

ing activity. USFWS has federal guidance that allows conservation banking to be used to compensate for project impacts and to further species recovery and conservation needs. Like wetland mitigation banking, conservation banking provides an opportunity to provide large-scale restoration and recovery benefits.

Any current or future HCPs prepared in the state should be considered for their ability to drive conservation banking opportunities. In cases where an HCP is not anticipated to be prepared, conservation bank viability will depend on the potential for a sufficient number of Section 7 consultations to occur within the bank's service area.¹⁵

USFWS' experience with conservation banking in this region has been positive. USFWS staff support the concept of conservation banking as a meaningful way to address project impacts and species needs. The agency would be supportive of an ASLD conservation banking initiative.

Arizona Game and Fish Department Perspective

The Arizona Game and Fish Department (AZGFD) becomes involved in projects when the opportunity is provided by either the USFWS or, voluntarily, by project proponents. USFWS provides AZGFD with an opportunity to review and comment on projects with a federal nexus. AZGFD and USFWS have an agreement in place that allows for the cooperative management of Threatened and Endangered species and that provides AZGFD with an opportunity to review Biological Assessments and be involved in development of Biological Opinions. Recent modifications to the federal transportation bill "Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)" are anticipated to create additional opportunities for the agency to become involved in any project receiving federal highway funds. This opens the door for the agency to participate in 5-year and 20-year planning efforts.

AZGFD staff support mitigation and conservation banking concepts. The agency sees opportunities to collaborate with ASLD and create meaningful habitat conservation projects.

3. HASSAYAMPA AND AGUA FRIA WATERSHED INVESTIGATION

Informed by state and local agency opinions on the topic of mitigation and conservation banking, a brief evaluation was performed for the Hassayampa River and Agua Fria River watersheds to determine if banking is a viable conservation-based management strategy in the West Phoenix area (Figure 1). As part of the evaluation, property in ASLD ownership was identified to provide an idea of whether mitigation on those properties might be possible in watersheds facing development pressure (Figure 2).¹⁶ The primary areas evaluated, the lower Hassayampa and Agua Fria watersheds, were selected because significant development-related impacts are anticipated to occur over the next 15 to 20 years.

3.1 WATERSHED DESCRIPTIONS

3.1.1 Hassayampa Watershed

Habitat

The area is characterized by a perennial water supply, unique geology, wetlands, intact riparian forests, and habitat for a variety of neotropical migratory birds, big game, and listed species. The watershed contains a

¹⁵ Ongoing decisions about USACE jurisdiction over arroyos and the nature of State implementation of Section 402 of the Clean Water Act will greatly affect the future need for conservation banks.

¹⁶ Prior to determining the appropriateness of this technique and the potential application on Trust Land, further investigation would be warranted.

Figure 1: Hassayampa and Agua Fria Watersheds (3rd and 4th Field HUCs)

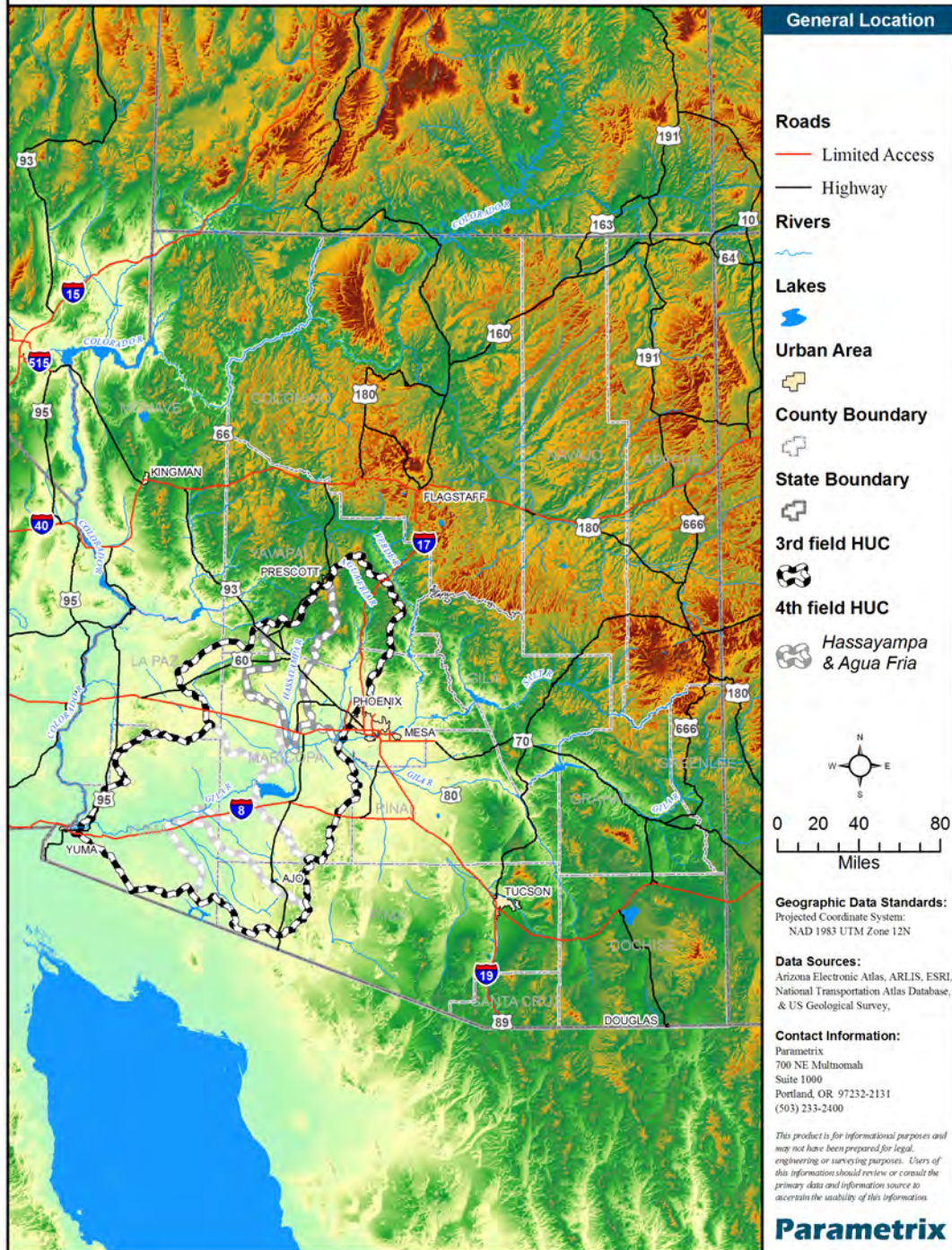
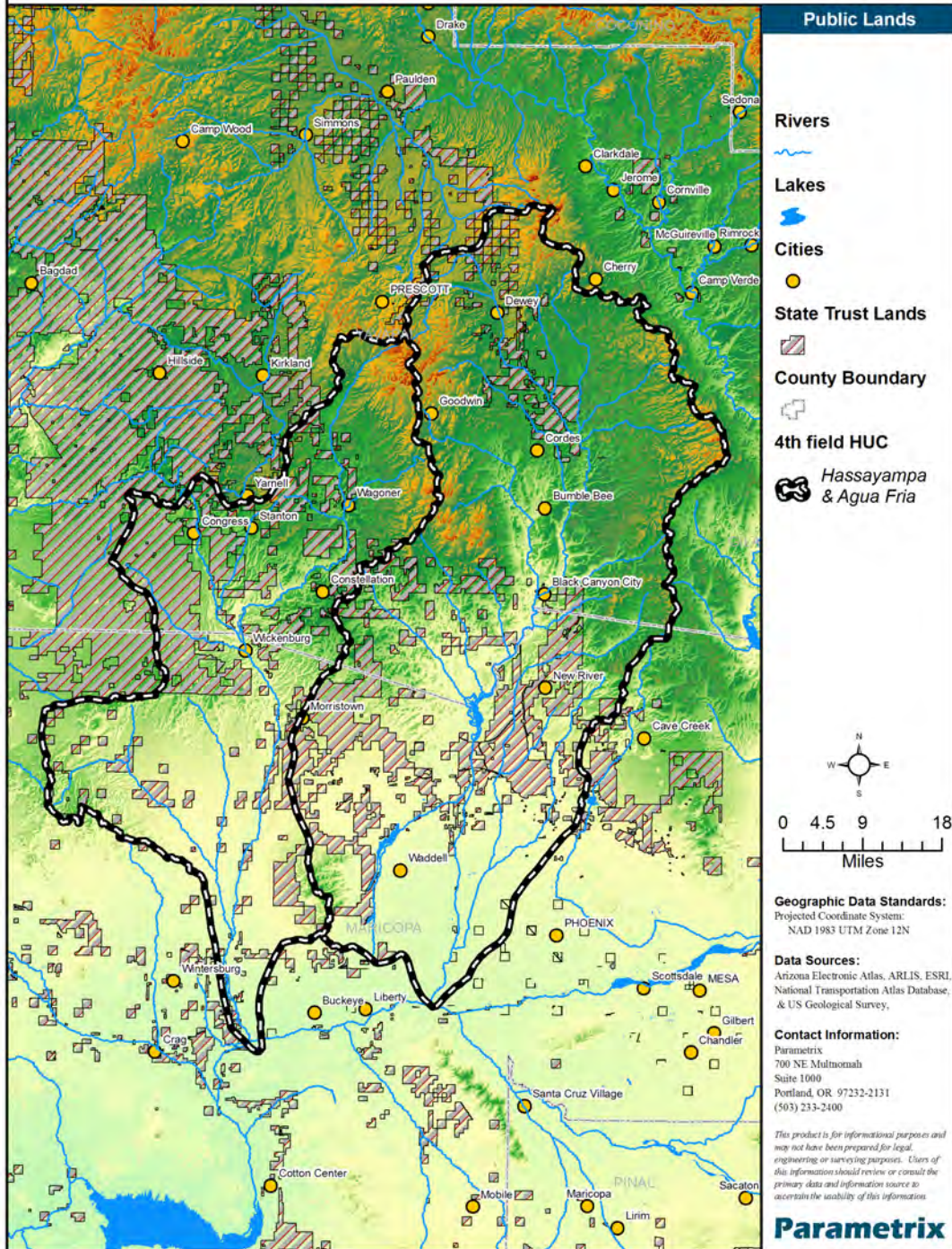


Figure 2: State Trust Lands in Hassayampa and Agua Fria Watersheds



mixture of Petran montane coniferous forest, semi-desert grasslands, Arizona upland Sonoran Desert scrub, and Lower Colorado River Sonoran Desert scrub (Figure 3). Between the headwaters and river mouth, the habitats potentially capable of supporting listed species include:

- Native southwest brush habitat with scattered cottonwood in riparian areas
- Mature forests of white pine, Douglas fir, and ponderosa pine
- Steep slopes and canyons with rocky cliffs
- Shallow, freshwater marshes containing dense stands of cattails and bulrushes
- Springs and small streams with shallow areas and soft substrates
- Rivers with pools and eddies of warm, often heavily silted, swiftly moving waters
- Seasonally inundated floodplains – shallow, swift waters of mid-channel sandbars during the summer and slow runs, slack waters, and eddies in the winter.¹⁷

Species

The federally listed Threatened and Endangered species identified by the Arizona Natural Heritage Program as potentially occurring in the Hassayampa watershed include: SW Willow Flycatcher, Yuma Clapper Rail, Mexican Spotted Owl, Desert Pupfish, Bonytail, Gila Topminnow, and the Razorback Sucker (Table 1). With the exception of the Mexican Spotted Owl, which occurs in forested areas, these species are associated with perennial streams and associated aquatic, wetland and riparian habitats. Because of the limited amounts of these habitats in the lower watersheds, there are currently only limited anticipated impacts to endangered species in the project area.

Threats

Readily available information on the Hassayampa watershed indicates that annexation and associated development pressure resulting from transportation, infrastructure, and commercial and residential development will be significant in the years ahead. This is particularly true in the Buckeye area of the lower Hassayampa watershed where local land entitlements can accommodate another 600,000 residents. In order to address future needs early in the process, each natural resource and regulatory agency interviewed for this assessment expressed the desire to see habitat conservation occur in the Hassayampa watershed.

3.1.2 Agua Fria Watershed

Habitat

The area is characterized by unique geology, wetlands, intact riparian forests, and habitat for a variety of neotropical migratory birds, big game, and listed species. The watershed contains a mixture of Petran montane coniferous forest, Great Basin conifer woodland, plains and Great Basin grassland, semi-desert grasslands, Arizona upland Sonoran Desert scrub, and Lower Colorado River Sonoran Desert scrub (Figure 3). Between the headwaters and river mouth, the habitats potentially capable of supporting listed species include:

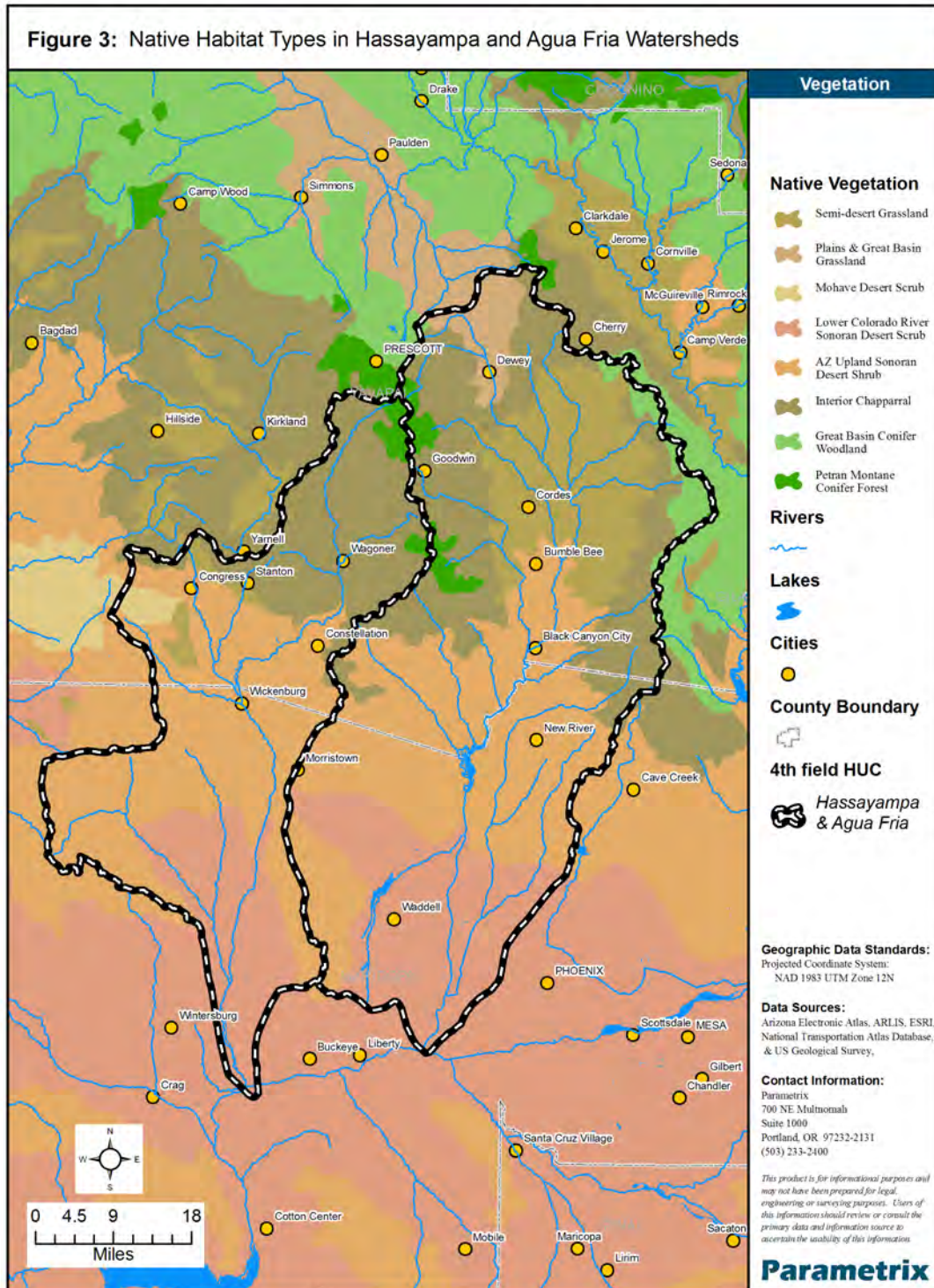
- Native southwest brush habitat with scattered cottonwood in riparian areas

¹⁷ Arizona Natural Heritage Program.

Table 1. Federally Listed Species w/in the Hassayampa and Agua Fria Watersheds

WATERSHED	TAXON	SCIENTIFIC NAME	COMMON NAME	FEDERAL ESA STATUS	HABITAT REQUIREMENTS
Agua Fria	Bird	<i>Empidonax traillii extimus</i>	SW Willow Flycatcher	Endangered	Native SW brush habitat w/scattered cottonwood overstory near riparian areas
Agua Fria	Bird	<i>Haliaeetus leucocephalus</i>	Bald Eagle	Threatened	Riparian habitat along coastlines, rivers, lakes
Agua Fria	Bird	<i>Haliaeetus leucocephalus (winter population)</i>	Bald Eagle	Threatened	Mature, old growth trees associated with food sources such as waterfowl and fish
Agua Fria	Bird	<i>Strix occidentalis lucida</i>	Mexican Spotted Owl	Threatened	Mature, old-growth forests of white pine, Douglas fir, and ponderosa pine; steep slopes and canyons with rocky cliffs
Agua Fria	Fish	<i>Cyprinodon macularius</i>	Desert Pupfish	Endangered	Springs, small streams, margins of large bodies of water - shallow areas, soft substrates, can adapt to extreme conditions i.e. high water temps (up to 45°C), low dissolved oxygen and salinities nearly twice that of seawater
Agua Fria	Fish	<i>Gila intermedia</i>	Gila Chub	Endangered	Headwater streams of the Gila, Santa Cruz, and San Pedro river systems
Agua Fria	Fish	<i>Poeciliopsis occidentalis occidentalis</i>	Gila Topminnow	Endangered	Shallow, warm, quiet waters w/in dense mats of algae and debris along stream margins or in eddies below riffles, typically over sandy substrates covered with organic mud and debris
Hassayampa	Bird	<i>Empidonax traillii extimus</i>	SW Willow Flycatcher	Endangered	See above
Hassayampa	Bird	<i>Rallus longirostris yumanensis</i>	Yuma Clapper Rail	Endangered	Shallow, freshwater marshes containing dense stands of cattails and bulrushes
Hassayampa	Bird	<i>Strix occidentalis lucida</i>	Mexican Spotted Owl	Threatened	See above
Hassayampa	Fish	<i>Cyprinodon macularius</i>	Desert Pupfish	Endangered	See above
Hassayampa	Fish	<i>Gila elegans</i>	Bonytail	Endangered	Big, or mainstream rivers - pools and eddies of warm, often heavily silted, swift moving waters - also occur in reservoirs
Hassayampa	Fish	<i>Poeciliopsis occidentalis occidentalis</i>	Gila Topminnow	Endangered	See above
Hassayampa	Fish	<i>Xyrauchen texanus</i>	Razorback Sucker	Endangered	Backwaters, sloughs, oxbow lakes, seasonally inundated flood plains - shallow swift waters of mid-channel sandbars during the summer, and slow runs, slack waters and eddies in the winter

Figure 3: Native Habitat Types in Hassayampa and Agua Fria Watersheds



- Mature forests of white pine, Douglas fir, and ponderosa pine
- Steep slopes and canyons with rocky cliffs
- Springs, small streams, and margins of large water bodies with shallow areas and soft substrates
- Headwater streams of the Gila, Santa Cruz, and San Pedro river systems
- Shallow, warm, quiet waters with dense mats of algae and debris along stream margins or in eddies below riffles, particularly waters with sandy substrates covered with organic mud and debris.¹⁸

Species

The listed species identified by the Arizona Natural Heritage Program as potentially occurring in the Agua Fria watershed include: SW Willow Flycatcher, Bald Eagle (including winter population), Mexican Spotted Owl, Desert Pupfish, Gila Chub, and the Gila Topminnow (Table 1). As in the Hassayampa watershed, these species are associated with forests or year round stream systems. Because of the limited amounts of these habitats in the lower watersheds, there are currently only limited anticipated impacts to endangered species in the project area.

Threats

Readily available information on the Agua Fria River and watershed mirrors information on the Hassayampa watershed. Development pressures resulting from transportation, infrastructure, and commercial and residential development are the most significant issues facing the natural environment. Much of the growth will occur in the lower watershed area in association with Phoenix metro area growth. However, the upper watershed, along Highway 69 from Dewy to Prescott, can expect to see similar growth impacts in the years ahead. Each natural resource and regulatory agency interviewed for this assessment expressed the desire to see habitat conservation occur in the Agua Fria watershed.

3.2 POTENTIAL MARKETS IN THE HASSAYAMPA AND AGUA FRIA WATERSHEDS

3.2.1 Local Agencies

While a range of natural resource impacts requiring mitigation are expected to result from population growth, the most significant and centralized impacts are primarily associated with local agency capital improvement projects. Many of these projects are primarily related to infrastructure development, particularly road construction.

As an example, the Maricopa County Department of Transportation's (MCDOT) capital projects tend to be fairly small (less than \$100 million). The Department typically needs mitigation for wetlands/waters and listed species; impacts are generally small (less than 0.1 acre) and occur at the rate of one or two every 2 years. MCDOT has historically used on-site and in-lieu fee mitigation options, but on-site mitigation projects generally fail and are not seen as a viable option. As a result, MCDOT has been using in-lieu fee mitigation almost exclusively; however, the process is becoming increasingly complicated and uncertain.

¹⁸ Arizona Natural Heritage Program.

Traditionally, using the in-lieu fee program, MCDOT has paid between \$15,000 and \$40,000 per acre of mitigation. However, the process for determining the amount of mitigation required is changing, along with the associated cost. Historically, the cost per acre was determined by the USACE's submittal of the project proponent's application to one of the three approved in-lieu fee recipients. The potential recipient would then reply to the USACE with a restoration project proposal and a budget.

This process was fairly flexible and allowed mitigation costs to be identified early in project budgeting efforts. Currently, however, the USACE requires the development of standing inter-governmental agreements (IGAs) or memoranda of understanding (MOU) between the agency and the in-lieu provider before a mitigation proposal for use of an in-lieu fee site can be approved. The result of this process is that the project applicant may have to wait for an agreement to be negotiated before finding out if a given project will qualify for use of the in-lieu option. This lack of certainty adds to project delivery delays and tends to reduce the available mitigation options.

MCDOT has indicated that the agency would be excited about having banking solutions available in the county and would likely be a strong proponent. MCDOT projects anticipated for 2007-2011 are listed in Table 2.

3.2.2 State Agencies

The Arizona State Transportation Improvement Program (STIP) Regional Transportation Plan calls for expenditures of \$2.61 billion during fiscal years 2007-2010.¹⁹ Impacts to natural resources that require mitigation are likely to result from some of the projects in Maricopa and Yavapai Counties (Table 3). This assumption is supported by feedback from MCDOT, which noted that ADOT would be the largest consumer of credits. In the past, ADOT has purchased mitigation credits and, in fact, was the first customer of a private conservation bank in Pima County.

ADOT's use of mitigation credits is consistent with the approach taken by many Departments of Transportation across the country. These solutions have been utilized more in recent years, due to their advantages in providing clear transfer of liability and reduction in environmental permitting-related delays that occur when mitigation is not provided in advance of a project.

ADOT's Office of Environmental Services includes an Environmental Planning Group and a Natural Resources Management Group. In preliminary conversations with representatives from these groups, ADOT expressed interest in learning more about the opportunities to utilize ASLD property to provide timely and meaningful mitigation for the impacts that will inevitably occur as the result of large scale infrastructure development projects.²⁰

3.2.3 Private Developers

The most extensive impacts to habitat both from the standpoint of CWA compliance and ESA compliance are associated with residential and commercial development. The Maricopa, Pinal and Pima County corridor is one

¹⁹ Arizona Surface Transportation Improvement Program report, Fiscal Year 2007 – 2011: http://tpd.azdot.gov/pps/z_misc/stip.pdf.

²⁰ Bruce Eilerts and Siobhan E. Nordhaugen, Arizona Department of Transportation, Office of Environmental Services - Personal Communication.

Table 2. Maricopa Department of Transportation 2007-2011
(Projects that may impact waterways, riparian areas, fish and wildlife)

LOCATION	TYPE OF WORK	DATE	POTENTIAL IMPACTS (If resources are present)
(PHOENIX) 51st Avenue - Baseline Road to South of Broadway	Roadway widening - two additional lanes (1.8 miles)	NA	Crosses Salt River
Alma School Road - McLellan Road to McKellips Road	Strengthen scour protection to protect against flooding (0.75 miles)	2007	Crosses Salt River
(Peoria - Sun City) El Mirage Road to 111th Ave	Construct roadway and bridge (109 miles)	NA	Crosses Agua Fria River
(Mesa) Usery Pass Road to Stewart Mtn. Dam Road	Roadway widening for bike lanes (4.6 miles)	2008	Parallel to and crosses Salt River
(Phoenix) Camel Back Road	Increase bridge capacity and approach roads (2.0 miles)	NA	Crosses Agua Fria River
(Queen Creek) Chandler Heights Road	Construct a five lane bridge (0.5 mile)	2008	Crosses Sonoqui Wash
(Goodyear) Cotton Lane Bridge	Construct roadway and bridge (0.5 mile)	2007	Crosses Gila River
(Sun City West - Peoria) Deer Valley Road Bridge	Construct a bridge (2.6 miles)	2011	Crosses Agua Fria River
(Scottsdale - Mesa) Dobson Road Bridge	Construct a bridge (3.0 miles)	NA	Crosses Salt River
(Sun City West) El Mirage Road	Construct a new 6-lane roadway (2 miles)	2011	Adjacent to Agua Fria River
(Glendale) Glendale Avenue at Agua Fria	Construct a bridge (1 mile)	NA	Crosses Agua Fria River
Mingus Road	Replace undersized culvert	2007	New River Basin
(Glendale) Northern Parkway: SR 303 to Grand Ave	Major arterial improvement (12.4 miles)	NA	Crosses Agua Fria River
Old U.S. 80 Bridge	Bridge repair (0.5 mile)	2009	Crosses Gila River
(Peoria) Olive Avenue	Construct a bridge (1 mile)	NA	Crosses Agua Fria River
(Tonto National Forest) Box Bar Trail	Pave dirt roads (2.8 miles)	2007	Adjacent to VeRoade River



MSLT: Denny

Table 3. Arizona Department of Transportation (STIP 2007-2011)
(Projects w/in Maricopa and Yavapai Counties)

COUNTY	LOCATION	TYPE OF WORK	YEAR	CURRENT COST (x \$1,000)	POTENTIAL IMPACTS (If resources are present)
Maricopa	Bullard Avenue TI	Construct TI	2007		Unknown
Maricopa	Peoria Avenue to Greenway Road	Drainage improvements	2007	17,000	Water Quality
Maricopa	SR 101L to Carefree Hwy (SR 74)	Reconstruct and widen	2007	64,200	Unknown
Maricopa	Jomax/Dixileta TI	Construct new TI	2007	40,000	Unknown
Maricopa	SR 74 TI, Carefree Hwy	Reconstruct TI	2007	17,000	Unknown
Maricopa	99 th Avenue – 83 rd Avenue (Including New River bridge)	Widen roadway and bridge	2007	6,500	Water Quality; Riparian; Fish and Wildlife
Maricopa	MP 139.01 – MP 141.71	Construct roadway	2007	17,300	Unknown
Maricopa	MC 85 to Southern Avenue	Construct roadway	2007	8,500	Unknown
Maricopa	Forest Boundary to New Four Peaks	Shoulder widening, median crossovers, TI construction	2007	15,000	Unknown
Maricopa	Wickenburg by-pass	Construct by-pass	2007	29,000	Unknown
Maricopa	64 th Street TI	Construct new TI	2007	23,000	Unknown
Maricopa	Sarival Road to Dysart Road	Construct HOV/GPL	2008	50,000	Unknown
Maricopa	Dysart Road to 101L (Agua Fria)	Construct HOV/GPL	2008	51,000	Unknown
Maricopa	MP 130.71 – MP 137.00	Construct roadway	2008	20,900	Unknown
Maricopa	40 th Street – Baseline Road	Construct CD roads	2009	50,000	Unknown
Maricopa	SR 202L (Santan) to Riggs Road	Construct HOV/GPL	2009	42,000	Unknown
Maricopa	MP 120.54 – MP 122.99	Construct roadway	2009	9,100	Unknown
Maricopa	MP 149.40 – MP 152.01	Reconstruct and widen	2009	16,200	Unknown
Yavapai	Cement Plant road – Black Hills Drive	Reconstruct roadway	2007	9,800	Unknown
Yavapai	North Forest Boundary to Sedona	Construct roadway	2007	30,200	Unknown
Yavapai	Cordes Jct. TI	Reconstruct TI	2008	23,725	Unknown
Yavapai	Western Drive to Hayfield Draw	Construct new WB roadway	2008	5,250	Unknown
Yavapai	Intersection of SR 89 and SR 69	Construct new TI	2009	20,379	Unknown
HOV = High Occupancy Vehicle					
GPL = General Purpose Lane					
TI = Traffic Interchange					

of the largest and fastest growing metropolitan areas in the U.S. In the next 15 to 20 years, much of that growth is projected to occur in the lower Agua Fria and Hassayampa River areas in North Phoenix, Peoria, Surprise, Buckeye, Goodyear, and unincorporated Maricopa County. Contact with the development community is needed to assess land developer interest. As a first step, a conversation was held with the Sonoran Institute staff to identify potentially interested parties. The following list of names was provided for future reference:

- Vanderbilt Farms
- Stardust Tartesso Homes
- Homelife Communities
- Gilligan Sun Valley
- Pulte
- Sun Corp
- WSWE Holdings
- Lennar Communities
- Sunbelt Holdings
- Cherry Properties
- Hacienda Builders
- Communities SW
- Engle Homes
- Diamond Ventures

Sonoran Institute staff provided additional recommendations regarding developer contacts, namely, Millennium Properties and the Lyle Anderson Development Company. These organizations, plus Diamond Ventures and Pulte were contacted regarding their potential interest in mitigation banking opportunities.

Millennium Properties – Cipriani Master Plan

Millennium Properties is currently working with the City of Buckeye, Arizona to obtain development approval for a 2,500 acre master plan on a tributary to the Hassayampa River. The project will impact jurisdictional waters, and compensatory mitigation is being provided using the in-lieu fee program, due in part to the lack of other available, viable options in the west valley. In fact, due to the lack of options in the Hassayampa watershed, the developer indicated that the USACE is currently allowing other project's impacts to be mitigated in another watershed.

Millennium Properties stated that the in-lieu fee program is working well for its needs and that the project to be funded will have excess capacity. If needed, the project will be able to accommodate the mitigation needs of other projects and developers in the area. However, the developer would consider banking a desirable solution if available. Relief from the long, complicated process would be provided and would be beneficial to the company's bottom line.

The Lyle Anderson Development Company

In conversation, The Lyle Anderson Development Company indicated an interest in banking as a mitigation solution if it is proven to be more cost-effective and timely than other mitigation options. Currently, the developer performs its own on-site mitigation and turns the projects over to the Home Owners Associations when constructed.

Pulte

Pulte currently has two large-scale development projects in progress in the Hassayampa watershed, and uses a combination of on-site and off-site mitigation to meet its compensatory obligations. Pulte has also purchased sensitive property and donated it to TNC for long term management, funded by Pulte contributions. The developer indicated that a demand for mitigation credits currently exists and that the organization would be interested in mitigation banking options that are more cost-effective and less time-consuming than their current practices. However, the developer offered a precautionary note, stating that other local developers are becoming accustomed to managing their own mitigation projects and that the market for credits “might shrink” as they learn how to self-perform compensatory mitigation.

Diamond Ventures

Verbal contact with Diamond Ventures was not established in time for this report. However, preliminary e-mail contact indicated that Diamond Ventures is “definitely interested” in exploring the potential for mitigation banking solutions in the west valley area.

Finally, although contact with Tartesso could not be established during preparation of this report, an active Section 404 permit application on record with the USACE indicates that the Tartesso East Master Planned Community anticipates 43.63 impacts to ephemeral waters. The development intends to use on-site and in-lieu fee options to meet mitigation obligations.

3.3 POTENTIAL PARTNERS IN THE HASSAYAMPA AND AGUA FRIA WATERSHEDS

Opportunities to leverage other conservation-related efforts for maximum resource benefits appear to exist in the Hassayampa and Agua Fria watersheds. A few potential partners are discussed below.

3.3.1 The Nature Conservancy of Arizona

Conversations with Arizona Game and Fish indicate that The Nature Conservancy (TNC) is potentially interested in acquiring Trust Land in the vicinity of existing TNC holdings in the Hassayampa watershed. TNC has established a formal in-lieu fee program with the USACE which would assist with land acquisition costs. It is conceivable that, with sufficient management funding, the TNC would explore managing the bank stewardship responsibilities if the lands were in proximity and ecologically associated with the Hassayampa River Preserve, located outside of Wickenburg.

3.3.2 Maricopa Association of Governments

The Maricopa Association of Governments (MAG) is charged with permitting wastewater discharges under Section 208 of the CWA. The MAG has little direct need for mitigation; however, it provides a good resource for assessing the area’s rapid growth, based on its processing of permit applications. The MAG noted that it is tracking a large increase in permit requests in the Buckeye area; this is a good indicator of development intensity in the region.

MAG staff also indicated that water is being used for recharge or reuse in the region currently and that water banking might be of interest. The recharge option requires an Arizona Department of Water Resources hydrology study, and one has been completed recently for the Hassayampa watershed. There may be opportunities to create multi-use facilities that incorporate water storage and recharge functions with aquatic and wetland mitigation banking.

3.3.3 Maricopa County Flood Control District

Maricopa County Flood Control District (District) projects do not incur significant wetland/water mitigation obligations, and mitigation tends to be performed on-site as part of flood control projects. The District's mission focuses on floodplain and floodwater issues. Opportunities for partnerships with the District may exist, as the District has a mitigation and acquisition program for removing existing structures located within floodplains; resource leveraging strategies might help multiple entities achieve their goals. Incorporation of water storage solutions into banking efforts, to help prevent such things as the 1993 major flooding event on the Hassayampa River, which contributed to a federal disaster declaration, would be key to the District's interest in a banking program, as would the opportunity to mitigate for difficult on-site situations. The District's capital improvement project list for 2006-2010 is provided in Table 4.

3.3.4 Hassayampa Conservancy

One of the entitled master planned communities along the Hassayampa corridor, Festival by The Lyle Anderson Company, plans to include a Community Stewardship Organization called the Hassayampa Conservancy (Conservancy). It will be an independent nonprofit entity, formed to steward 11 miles of protected land located adjacent to Festival, along the Hassayampa River. Sonoran Institute staff members are currently working with The Lyle Anderson Company representatives to create the corporate structure, funding mechanisms and programs for the Hassayampa Conservancy. Once the Community Stewardship Organization is formalized, the Sonoran Institute and the Town of Buckeye will work to include protected lands from other developments along the Hassayampa in the Conservancy's scope. Due to the fact that the Conservancy's mission will reach beyond the scope of the Festival project, it will be well positioned to partner with ASLD for management of protected land in the Hassayampa corridor between the TNC's Hassayampa Preserve to the north and the Gila River confluence to the south.

3.3.5 Desert Foothills Land Trust

The Desert Foothills Land Trust (DFLT) is a regional land trust centered in northern Maricopa County. The Cave Creek and New River watersheds are included in its land trust service area. The DFLT purchases and manages natural open space, and was the only private interest to acquire Trust Land for conservation purposes under the now-suspended Arizona Preserve Initiative. While not specifically interviewed for this report, it is reasonable to assume that management of Trust Land set aside for mitigation purposes might be a partnership opportunity of potential interest to the DFLT, if the lands are located in its service area.

Table 4. Maricopa County Flood Control District (CIP 2006-2010)
(Areas west of Phoenix)

LOCATION	TYPE OF WORK	5-YEAR TOTAL (x \$1,000)	POTENTIAL IMPACTS (If resources are present)
Buckeye	White Tanks Dam #4 - #4 FRS Rehab	9,610	Unknown
Surprise	McMicken Dam – FRZR	2,665	Unknown
Buckeye/UMC	Buckeye #1 - #1 FRS Rehab	19,090	Unknown
Wickenburg	Wickenburg ADMP – Wickenburg Downtown Flooding Mitigation	6,230	Natural and urban areas
Peoria	Skunk Creek/New River – New River (Grand-Skunk Creek)	9,863	Water quality, riparian, wetlands
Glendale/Peoria	Glendale/Peoria ADMP – Rose Garden Land Channel	3,445	Water quality, riparian, wetlands
Glendale/Peoria	Glendale/Peoria ADMP – 83 rd Avenue/Pinnacle Peak Road Improvements	5,743	Water quality, riparian, wetlands
Glendale	Glendale/Peoria ADMP – 67 th Avenue Storm Drain	1,415	Water quality, riparian, wetlands
Buckeye/UMC	White Tanks ADMP – White Tanks #3 FRS Modification	15,108	Unknown
Buckeye/UMC	White Tanks ADMP – White Tanks #3 North Inlet Channel	5,452	Water quality, riparian, wetlands
Surprise/UMC	White Tanks ADMP – Reems Road Channel	6,130	Water quality, riparian, wetlands
Goodyear	White Tanks ADMP – Bullard Wash Phase II	13,673	Water quality, riparian, wetlands
Avondale/Tolleson/Goodyear	White Tanks ADMP – White Tanks ADMP/Loop 303	11,350	Water quality, riparian, wetlands
Glendale/Phoenix	Maryvale ADMP – Bethany Home Outfall Channel	25,715	Water quality, riparian, wetlands
CIP = Capital Improvement Projects			
FRS – Flood Retarding Structure			
FRZR = Fissure Risk Zone Remediation			
ADMP = Area Drainage Master Plan			

3.4 SUMMARY OF HASSAYAMPA AND AGUA FRIA INVESTIGATION

This review indicates that the primary demand for mitigation will come from projected residential and commercial development and from state and county road construction. Indications are that demand for Section 404-related mitigation will be significant in these two watersheds. Most of this demand will occur within the lower watershed areas, although significant growth pressures will continue in the Wickenburg area and east of Prescott Valley to I-17.

While the demand for Section 404-related mitigation is present and will likely increase as a result of increased growth and attendant infrastructure development, the current regulatory environment does not lend itself to mitigation banking. In Arizona, USACE believes the current permitting is working well since applicants are developing projects to avoid impacts (the principal purpose of the permitting program) and the impacts that are unavoidable have been easily addressed through the in-lieu program. While potential applicants believe that a mitigation bank could meet their needs, the lack of encouragement from the regulatory agency, coupled with the likely higher costs of mitigation credits compared to in-lieu fees, makes it unlikely that sufficient incentives currently exist to support significant investments in mitigation banking as a revenue-generating strategy in these watersheds. However, an exception to this observation exists in the transportation arena. Given the scope and scale of mitigation requirements resulting from large infrastructure projects, economies of scale can be obtained through the use of programmatic banking solutions. Transportation projects under active planning and those that will occur over the next 20 to 30 years could benefit from a streamlined permitting process in which mitigation banking could play a key role. In other regions of the country, Department of Transportation mitigation projects have catalyzed significant conservation investment by landowners and private sector investors. In North Carolina, for example the Ecological Enhancement Program operates as an ‘ombudsman procurement’ facility for the State, identifying and mitigating aquatic impacts under the CWA. This program has completed approximately 400 wetland and stream projects, and has enabled \$1.9B in transportation projects in its first two years without a single project delay due to lack of mitigation.

At present, ESA compliance issues in the Hassayampa and Agua Fria watersheds are not a significant factor beyond the procedural consultation requirements related to federal permitting or funding activities. This is not to say that endangered species impacts and corresponding mitigation alternatives are not likely, but rather that they will be localized (e.g., Arizona Cliff-rose) and of insufficient scale to provide a strong incentive for clients to have a financial interest in conservation banking alternatives.

Based on these factors, the opportunities for establishing a mitigation bank in the Hassayampa or Agua Fria watersheds that would allow ASLD to sell credits to outside clients appears to have low potential at this time.

4. MITIGATION ON ASLD PROPERTY

4.1 OPPORTUNITIES

As development pressures continue to increase in Arizona, opportunities for strategic, conservation-based management of Trust Land will grow, in alignment with the Guiding Principles of the Growing Smarter Oversight Council and presumably the recommendations of Governor Napolitano’s growth cabinet. Trust Land is

often present in proximity to rapidly developing areas, making it ideal for both development and, potentially, for off-site mitigation use.²¹ The research and interviews for this report suggest that there are a number of ways to advance the use of Trust Land to provide mitigation through permanent protection of environmental features.

ASLD has a clear fiduciary duty to maximize value from its landholdings, and Trust Land beneficiaries have every right to expect real estate development and disposition issues to be approached in that light. The development value of land containing critical environmental features, however, is often compromised by the need to comply with federal, state and local regulations that concern these features. At the same time, there is increasing recognition that these environmental features have their own financial value and, particularly when managed in combination with other strategies, can generate conservation revenue. Conservation-related management strategies also provide opportunities in situations where ASLD has its own mitigation needs or where environmental entitlement can add value for disposition. There are several considerations for assessing or implementing conservation-based management potential.

A Portfolio of Conservation Properties

As demand for mitigation to meet compliance obligations increases, ASLD has the opportunity to develop a selection of high conservation value landholdings that can address these needs. If ASLD inventories holdings with potential natural resource value, particularly in or near the urban interface, a portfolio can be developed that allows ASLD to consider potential conservation values when deciding how to manage Trust Land. In concert with this effort, ASLD can develop an understanding of ADOT and FHWA mitigation needs, which can further inform ASLD planning decisions regarding parcels for which some form of conservation may actually be the ‘highest and best use.’ This assessment needs to identify both properties with extant conservation values as well as properties that are suitable for enhancement or restoration opportunities, particularly in relation to stream and riparian habitats.

Arizona Cliff-rose Mitigation – Yavapai County

The Yavapai County Department of Transportation faces wetland/water and listed species mitigation requirements, but the impacts are generally minimal and are hard to predict. However, recently the agency was required to mitigate for Arizona Cliff-rose (Burrow Creek population) impacts associated with the Mingus Avenue project, located at the Verde River. The project required a Section 404 permit from the USACE, but no mitigation was required for impacts to waters of the U.S. However, the permit application triggered a Section 7 consultation under the ESA; as a result of the consultation, the County was required to provide mitigation for the species.

The County identified an opportunity to provide 369 acres of habitat protection for the Arizona Cliff-rose on ASLD property and began discussions with ASLD about property acquisition for conservation purposes. As required for disposition practices, ASLD put the property up for public auction at the appraised value, which did not discount the value of the land based on its limited development potential (due to the presence of listed species). The County was the only bidder, and thus successfully acquired the land. In the end, the County spent \$2 million to purchase the conservation and preservation lands, thus satisfying its Section 7 obligations. In the event of similar mitigation requirements in the future, the County would be interested in additional banking solutions if the benefits can be demonstrated.

This solution worked well for ASLD, as it allowed the agency to fulfill its fiduciary obligations and dispose of property that otherwise would have been difficult to develop. The sale of this property prevents ASLD from having to manage the land for conservation purposes without the potential for generating revenue.

²¹ Generally, proximity limitations apply when regulators consider offsite mitigation for impacts.

An Evaluation of ASLD Mitigation Needs

In addition to meeting its own impact-related mitigation needs and the mitigation needs of appropriate third parties, ASLD landholdings may be significantly more valuable for disposition if mitigation for planned development is already an integral part of the auction process. This approach can involve either addressing mitigation needs during a master planning process or facilitating “shovel ready” conditions prior to land auction. In either case, ASLD would address mitigation needs in advance of impacts. Properties faced with mitigation obligations could be sold with the provision of mitigation opportunities elsewhere on ASLD properties (assuming regulatory agency approval). Especially in cases where ASLD is considering large-scale parcel development for long-term build-out, an advance mitigation strategy that meets the overall environmental objectives of governing agencies could be a significant consideration for bidders.

Cactus Ferruginous Pygmy Owl Mitigation – Marana Preserve

Previously, the private Cottonwood development was required to provide mitigation for impacts to Pygmy owl habitat on the Tortolita Fan. ASLD entered into a long-term lease (99 years) for the property, now called the Marana Preserve, to protect habitat for this endangered species. In order to implement the conservation arrangement, ASLD was required to put the lease out for public bid. However, the lease contained a condition requiring that the property be used for natural open space preservation. This condition ensured that the property could not be leased for development and that if the Cottonwood development was out-bid, the Pygmy owl habitat would remain protected. In fact, Cottonwood was out-bid by another entity seeking to provide conservation; however, the USFWS did not support the proposed project and the lease once again became available to Cottonwood. Typically, USFWS requires property acquisition or permanent protection for conservation actions, but accepted the 99-year lease in this case. The lease option works well for the developer, but it does have escalation provisions that can be difficult to anticipate.

ASLD Mitigation and Conservation Bank Development

A third avenue for developing financial value related to environmental features on ASLD land is the development of formal banks intended to meet the mitigation demands of a range of projects. There are currently two conservation banks in Arizona, both developed to protect the Pima pineapple cactus.

It is in this context that ASLD can utilize mitigation banking, formal development agreements, Transfer Development Rights (TDR), or alternative arrangements to enable disposition that is both responsible from a fiduciary point of view and pragmatic from a political entitlement point of view. In other words, if ASLD compromises on zoning (through up-zoning and down-zoning, as appropriate) or even places an easement on environmentally sensitive land that it cannot realistically develop within a reasonable time frame, then compromising on the right to that development is a *de minimus* loss. This is especially true if compromising on that right to develop enables highly valuable development activity on a portion of the property, or elsewhere, to move forward in a manner that improves the position and standing of ASLD and its stakeholders.

An example of this situation is the so-called “Ahwatukee 640,” a 640-acre section of Trust Land located within the city limits of Phoenix. In this case, the City wanted to maintain 200 acres of open space, while ASLD, under its State planning authority, exercised its right to zone and plan for development of the entire parcel. However, there were no bidders when the parcel was put up for auction, due to the fact that developers were reluctant to go directly against City objectives. Because of the stand-off between the environmental value of the open space and the development value of the overall parcel, the land has remained undeveloped for 20 years.

Another case might well be the Tortolita Fan in the Town of Marana. In this instance, ASLD, through its planning and zoning authority, could argue that it has the absolute right to develop this area. However, given the presence of potential listed species habitat and challenging hydrogeomorphological conditions, significant technical and regulatory process investments would be required for development to proceed. Indeed, “giving up” or transferring the right to develop might well be the preferred option from a fiduciary perspective, particularly if this enables up-zoning or other streamlined entitlements on adjacent or related lands. Cases like these point out the opportunities to use multiple mechanisms to enable both conservation and development to proceed.

In addition to meeting ASLD’s fiduciary responsibilities, the rules surrounding property disposition must be satisfied. The ability of ASLD to dispose of Trust Land for conservation purposes is a complex and unsettled issue involving a variety of fair market value and auction requirements. ASLD, through the Sonoran Institute, has prepared a legal analysis designed to clarify its authorities, obligations, and limitations pertaining to the issue of banking. This report proposes several options that would allow the ASLD to establish a model mitigation banking project.

4.2 TORTOLITA FAN – EXPLORATION OF A TIMELY, POTENTIAL OPPORTUNITY

The Town of Marana (Marana), Arizona lies northwest of the City of Tucson and is bisected by Interstate 10. Much of the land located to the east of the highway, within Marana’s town limits, is known as the Tortolita Fan. The Tortolita Fan is an alluvial formation created by streams leaving the Tortolita Mountains; it has long been recognized as having remarkable natural resource values.²² In addition to its unique geological and hydrological features, the area boasts the presence of ironwood trees, saguaros, and riparian areas that support a diverse wildlife ensemble. Species of concern known to inhabit the area, or for whom suitable habitat likely exists, include the lesser long-nosed bat (Federally Endangered), cactus ferruginous pygmy owl (State Species of Concern), Tucson shovel-nosed snake (U.S. Forest Service [USFS] Sensitive Species), ground snake (proposed Conservation Recommendations) and pale Townsend’s big-eared bat (State Species of Concern).

Marana is strongly committed to permanent protection and preservation of the Tortolita Fan and its ecological values. However, Marana’s ability to independently ensure protection of the land is limited because the majority of the acreage is owned by another party, ASLD. ASLD is also concerned about conservation of the Tortolita Fan, but because of its mission and fiduciary responsibilities as the Trust Land manager, ASLD is obligated to manage the property to generate revenue for Trust Land beneficiaries. As previously mentioned, ASLD typically achieves these revenue goals by developing, selling, or leasing lands held in trust.

In order for Marana to achieve its goal of permanently protecting the Tortolita Fan, a mutually beneficial, cooperative arrangement between Marana and ASLD is needed. This situation creates an excellent opportunity for Marana and ASLD to implement a conservation-focused land management strategy that meets the objectives of both entities and protects the natural environment for future generations. One particularly relevant, alternative revenue-generating land management approach is the use of the land for conservation banking purposes, similar to the Utah prairie dog mitigation bank approach. See page 28.

Although the structure of the arrangement could take a variety of forms, the basic concept is that Marana would use the area as mitigation for impacts to regulated species, and the money spent on mitigation would

²² Town of Marana Habitat Conservation Plan, September 2004.



Tortolita Fan: Diana Rhoades

provide the funding source needed to satisfy ASLD's fiduciary obligations. In one form or another, ASLD would receive payment for use of the land and/or its "natural products."²³ This strategy could be combined with TDR arrangements to generate an additional revenue stream for ASLD. After establishment of the conservation bank (which involves a conservation easement) and transfer (sale) of the development rights to other ASLD properties, developers, or to a TDR bank, the land would be permanently protected from future development.

The timing is ideal for exploring a potential partnership between ASLD and Marana. Since 2002, Marana has been working with the AZGFD and the USFWS to develop a regulatory solution that meets Marana's federal ESA obligations. Marana is applying for a Section 10 ITP from the USFWS. In order to receive the permit, which will allow Marana to proceed with town projects that might result in unavoidable impacts to listed species, Marana must submit a Habitat Conservation Plan (HCP) for approval by the USFWS. The HCP must identify measures designed to offset these potential impacts, including the designation of specific parcels of land to be used for mitigation and conservation purposes.²⁴

Ideally, if Marana, ASLD, and the resource agencies agree to include the Tortolita Fan in the HCP as land to be conserved for ESA compliance, all three parties and the general public would benefit. ASLD would be compensated, ASLD and Marana would be able to mitigate future ESA obligations, the species and habitat recovery objectives of AZGFD and USFWS would be addressed, and the Tortolita Fan would be protected in perpetuity for future generations.

However, in order for this approach to work, several issues need to be resolved through further investigation. Identification of a compensation mechanism that would meet ASLD's revenue generation obligation is a critical first step. Several potential scenarios for addressing the situation are presented below.

²³ "In compliance with the Enabling Act and the State Constitution, State Land Code gave ASLD authority over all Trust Land and the natural products from these Trust Lands." (At: <http://www.land.state.az.us/history.htm>.)

²⁴ The following species are proposed for inclusion in Marana's HCP: cactus ferruginous pygmy owl (Currently Delisted – State Species of Concern), burrowing owl (State Species of Concern), lesser long-nosed bat (Federally Endangered), pale Townsend's big-eared bat (State Species of Concern), Tucson shovel-nosed snake (USFS Sensitive Species), ground snake (Conservation Recommendations), tallus snail (State Species of Concern - Some have conservation agreements), Mexican garter snake (State Species of Concern), south-western willow flycatcher (Federally Endangered), yellow billed cuckoo (Federal Candidate for listing), lowland-leopard frog (State Species of Concern), desert tortoise (Federally Threatened and State Species of Concern), and Merriams's mouse (Conservation Recommendations).

Scenario 1. Sale of Tortolita Fan Properties to Marana

Description of Option:

- ASLD transfers TDRs to other ASLD property or sells them to Marana, developers, or a TDR bank as a mechanism to retire the property.
- ASLD sells the Tortolita Fan properties to Marana.
- Marana uses the property for mitigation of its ESA impacts, with or without creating a certified conservation bank.
- A conservation easement is established for site protection.

Pros:

- ASLD’s revenue generation obligations are met.
- Marana’s foreseeable mitigation needs, and potentially ASLD mitigation needs, are addressed.
- Opportunity to ensure implementation of Marana’s HCP is secured.
- Tortolita Fan is protected in perpetuity by a conservation easement.
- Resource agency goals are met.
- Public resource is protected.

Cons:

- Depending upon the approach taken, property is expensive and Marana may not be able to purchase sufficient acreage.

Utah Prairie Dog Mitigation Bank

The Utah Trust Lands Administration holds and manages Trust Lands for the people of Utah. In southern Utah, lands held in trust happen to provide prime habitat for the federally listed Utah prairie dog. These lands also happen to be in proximity to areas of significant regional growth, particularly in Iron County. In 2000, the state recognized that conflicts between development needs, its own and those of others, and the need to preserve prairie dog habitat were inevitable. In fact, development in portions of Iron County was paralyzed by the lack of a workable mitigation solution.²⁵ In partnership with the Utah Division of Wildlife Resources (DWR), the USFWS, the University of Southern Utah Extension Service, and Environmental Defense, the Utah Trust Lands Administration embarked upon creation of a mitigation bank instrument and development of a mitigation bank. The objectives of the bank are to enhance and restore habitat for the federally listed Utah prairie dog and to contribute to recovery of the species, while simultaneously providing opportunities for development to occur.

The bank was established on Trust Lands. Specific details regarding the establishment of the bank include:

- *A permanent conservation easement was transferred to DWR (although it was a no-cost transfer, the value of the transferred rights was appraised).*
- *Immediately upon bank approval, the state sold all of the mitigation credits and property development rights to Iron County,²⁶ but retained surface and mineral ownership.²⁷*
- *The credit price was established by dividing the appraised value of the transferred development rights (\$126,000) by the total number of credits available (77), thus the credit price was set at \$1,636 plus a \$200 endowment fee per credit.*
- *The Utah Trust Lands Administration received fair market value for the property; if more credits become available through an amended bank Instrument, the Trust Lands Administration will be able to sell additional credits and thus increase revenue.*

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²⁵ Pers. Comm., Kim Christy and Ron Torgerson, Utah Trust Lands Administration, 04/16/07.

²⁶ Although most sales made by the Trust Lands Administration go through an auction process – and the same was considered for this project – the sale of the easement was ultimately negotiated under the state’s regulatory authority to negotiate sales transactions, especially with other government agencies.

²⁷ Iron County assumed responsibility for sale of the credits to local jurisdictions and the private sector.

- Potentially risky if property sale has to go through an auction process before TDR; if land is developable, Marana would likely have to compete against private, high-bidding developers in an auction, a process that could result in development of the Tortolita Fan rather than protection.

Potential Variations and Things to Consider:

- Obtain up-front grants, loans, or other investment funding from conservation-focused organization or entrepreneur; repay loans over time from project mitigation budgets.
- Discount land sale price to Marana by reserving a portion of available mitigation credits for ASLD's own mitigation needs.

Scenario 2. Lease of Tortolita Fan Properties to Marana for Mitigation

Description of Option:

- ASLD would retain ownership and issue a long-term lease to Marana for use of the site as mitigation.

Pros:

- ASLD's revenue generation obligations are met.
- ASLD could reserve some areas for mitigation of ASLD impacts.
- Marana would not have to raise funds for up-front purchase of land.
- Marana's foreseeable mitigation needs potentially satisfied, if lease acceptable to resource agencies.
- Resource agency goals are met for the short term.
- Public resource protected for the short term.

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- *Initially, the Utah Trust Lands Administration held the conservation easement as a temporary measure, while the state legislature formally gave DWR authorization to hold the perpetual easement and manage an endowment fund.²⁸*
- *A non-wasting endowment was established to fund perpetual maintenance and monitoring of the property.*
- *Seed money to fund the endowment (\$83,000) was obtained from the Endangered Species Mitigation Fund; the interest generated by the endowment is designated for management of the property.²⁹*

The key challenges encountered by the Utah Trust Lands Administration during the development of the program include:

- *Bank establishment and approval took approximately 5 years, in part because it was the first of its kind in the nation.*
- *All parties were on a steep learning curve.*
- *Turnover of key staff slowed the process.*
- *Significant time and resources were invested by the Utah Trust Lands Administration during the 5-year process.*
- *It was difficult to identify sufficient incentives to ensure active participation by a potential conservation easement holder.*

The benefits of the program include:

- *The Utah Trust Lands Administration's fiduciary responsibilities were met while allowing for protection of a significant natural resource.*
- *An impending economic development crisis was avoided because the Utah Trust Lands Administration made mitigation credits available.*
- *If future credits become available, the Utah Trust Lands Administration will be able to either sell them or use them for its own mitigation needs.*

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²⁸ Additional features of the bank Instrument include the provision of a non-wasting endowment for monitoring and maintenance of the property, and establishment of a permanent conservation easement.

²⁹ The Endangered Species Mitigation Fund is a statutorily created fund for conservation of listed species and habitats (Section 6(d), Endangered Species Act).

Cons:

- Agencies may not allow implementation of HCP or any mitigation on lands that do not have guaranteed long-term protection, such as a conservation easement and endowment funding.
- If lease goes to auction, risk may exist if other entity wants the lease for different uses.

Potential Variations and Things to Consider:

- Immediate development pressure postponed; lease would provide opportunity to protect land while a more permanent solution is found.

Scenario 3. Sale of Tortolita Fan’s “Natural Products” to Marana

Description of Option:

- ASLD retains ownership of land.
- ASLD establishes a monetary value (per unit) for “natural products” on the property.
- ASLD sells “natural products” in the form of ecosystem services or mitigation habitat to Marana.
- ASLD transfers TDRs to other ASLD property or sells to Marana, developers, or a TDR bank as additional revenue stream and mechanism to retire the property.
- ASLD places conservation easement on property as “natural products” are sold.
- ASLD is responsible for long-term property management; sale price would include a contribution to long-term management endowment fund.

Pros:

- ASLD’s revenue generation obligations are met.
- ASLD could reserve some “natural products” for its own mitigation needs.
- Marana’s foreseeable mitigation needs are potentially satisfied.
- Marana could “pay as you go” rather than provide complete up-front funding.
- Portions of the Tortolita Fan for which “natural products” are sold are protected in perpetuity.
- Resource agency goals are met.
- Public resource is protected, at least in part.

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- *The Utah Trust Lands Administration was able to strengthen relationships with a key partner (Iron County) by providing leadership and resources to resolve a difficult issue.*
- *The Utah Trust Lands Administration’s investment in the environment is supportive of species recovery goals and provides significant ecological benefits.*
- *The Utah Trust Lands Administration’s relationships with the resource agencies were strengthened.*
- *The program resulted in permanent protection of a valuable natural resource for enjoyment by future generations.*

This example demonstrates how collaborative efforts can result in mutually beneficial solutions to complex environmental issues. In this case, the Utah Trust Lands Administration demonstrated the leadership, foresight and will to solve the problem of enabling development to occur in Iron County, while simultaneously contributing to the recovery of a listed species and ensuring fulfillment of the Utah Trust Lands Administration’s mission and obligations.

Cons:

- Potentially less certainty for Marana unless Marana secures all “natural products” up front.
 - ⇒ Marana may have to compete in an auction process with others seeking mitigation; the cost and availability of sufficient mitigation becomes uncertain.
 - ⇒ Up-front purchase of “natural products” may be prohibitively expensive.
 - ⇒ Option may or may not allow for implementation of Marana’s HCP; Marana may have to deal with mitigation on a project-by-project basis.
- Extenuating circumstances may cause ASLD to sell or develop portions of the Tortolita Fan for which “natural products” have not been sold.
- The ability of the option to satisfy resource agency goals and achieve protection of the Tortolita Fan may be only partial if the sale of “natural products” is incomplete.

Potential Variations and Things to Consider:

- Explore potential for a contingency plan (e.g., if allowable, an Intergovernmental Agreement that establishes Marana’s first right of refusal for acquisition of “natural products” might provide more certainty for Marana).

Scenario 4. ASLD Develops and Sponsors (Operates) a Conservation Bank

Description of Option:

- ASLD either develops a conservation bank or issues a Request for Proposal (RFP), potentially using a reverse auction strategy, for development of a conservation bank on the property.
- ASLD and Marana could partner to co-sponsor the bank.
- ASLD would retain ownership of the property after the bank is closed, unless it is donated or auctioned for long-term management by Marana or a conservation organization.
- If reverse auction strategy is used, the ASLD, Marana, or an entrepreneurial banker could function as the bank operator.
 - ⇒ Bankers submit a proposal for development of the bank.
 - ⇒ ASLD selects banker with most ecologically sound and cost-effective proposal.

Pros:

- Development of a mitigation bank on the Tortolita Fan is an identified use in the ASLD’s Final Draft Land Use Concept document prepared for the Marana planning area.
- ASLD’s revenue generation obligations are met.
- Marana’s foreseeable mitigation needs, and potentially ASLD mitigation needs, are addressed.
- Opportunity to ensure implementation of Marana’s HCP is secured.
- Tortolita Fan protected in perpetuity by a conservation easement.

- Resource agency goals are met.
- Public resource is protected.
- Scenario similar to Scenario 2; however, it is more formal and more likely to be acceptable to the resource agencies.
- Marana could be a bank co-sponsor.

Cons:

- Credits would potentially be expensive.
- Early agreement would be necessary for Marana to be able to secure all the credits it needs to avoid development uncertainty.
- Bank establishment and regulatory approval process is time-consuming and can be expensive.



White Tanks: Jason Meininger

4. RECOMMENDATIONS

As mentioned previously, this study originally sought to assess opportunities to utilize Trust Land for mitigation banking (a cornerstone of an ecosystem marketplace) in the Hassayampa and Agua Fria watersheds. These watersheds were selected because of the significant local growth and mitigation demand anticipated to occur over the next 15 to 20 years. After a preliminary assessment, however, this study was expanded to evaluate more completely mitigation demand drivers in Pima and Pinal Counties, as well as generally explore other opportunities to generate revenue through land conservation practices.

The following recommendations stem from three primary objectives of this study:

- Assess the mitigation demand in the lower Hassayampa and Agua Fria watersheds to determine if Trust Land may provide mitigation and conservation solutions, in the form of banking, to natural resource impacts.
- Explore the general types of mitigation demand drivers, particularly in the Tucson area, and generally assess other revenue generation opportunities associated with land conservation.
- Address the potential value to the Trust of considering mitigation banking options to meet the needs of ASLD in managing trust land, particularly associated with long-term (10 to 20) year joint venture projects that will build out over a long time frame.

Specific recommendations have been developed for ASLD as the result of this project. These are:

- 1) Cultivate and refine the ability of ASLD to make use of the growing conservation value of landholdings as an extension of, and complementary to, the value of residential and commercial development.**

It is the view of the authors that an investment in understanding the range of conservation values on ASLD property is a natural complement to developing value from residential and commercial development and disposition. A key first step in developing this understanding would be preparation of a state-wide high-value conservation property portfolio (prepared by region) to facilitate land management decisions and as a logical extension of asset management. This portfolio could be marketed to prospective agency decision-makers and potential buyers.

- 2) Continue to monitor opportunities in the Hassayampa and Agua Fria watersheds as changing Federal regulations make alternatives to mitigation banking more complex and difficult.**

It seems clear that ADOT, MCDOT, and residential development projects will have significant impacts in the Hassayampa and Agua Fria watersheds. While it was not possible to develop a quantitative assessment of the amount of impact, we recommend continuing to track this issue and dedicating additional resources to further quantify potential wetland and listed species impacts.

Currently, in-lieu fee mitigation appears to be the preferred option from the USACE mitigation staff's perspective. To date, the in-lieu fee program has worked well for the USACE and has been more ecologically successful than on-site mitigation. However, conversations with recent applicants indicate that the in-lieu fee program in Arizona is becoming increasingly difficult to use, due to evolving USACE criteria and uncertainty regarding draft EPA and USACE regulations that may result in changes to the program. The EPA and USACE have released draft regulations that would phase out the future use of in-lieu fee programs altogether and increase the difficulty of obtaining permits to impact aquatic resources through the use of on-site mitigation. Once these regulations are released in final form, ASLD would be well served by understanding the ways in which the potential use of ASLD land for aquatic resource mitigation have changed.

3) Begin to work more closely with ADOT and County Departments of Transportation to determine if ASLD properties can meet upcoming mitigation needs.

It is clear that transportation infrastructure development in Arizona will require significant mitigation in the coming decades, and ASLD lands have the potential to play a key role in meeting this demand. Other states, notably North Carolina, have significantly reduced delays in highway construction by providing mitigation well in advance of construction. ASLD could potentially provide mitigation sites that can enable more timely, cost-effective infrastructure development and drive conservation-related revenue.

A forum for exploring the potential ability of ASLD properties to meet ongoing ADOT mitigation needs may be the Arizona Wildlife Linkages Workgroup. This group, which includes members from ADOT, AZGFD, the Sky Island Alliance, the Wildlands Project, FHWA, the BLM, Northern Arizona University, the USFS, and USFWS, participated in a multi-stakeholder process to develop the state's Wildlife Linkages report. This collaborative planning effort recently won recognition as a national "Exemplary Ecosystem Initiative" as well as the "Environmental Excellence" award from the FHWA and a state "Showcase in Excellence" award from the Arizona Quality Alliance in 2006. This coalition of organizations would be in a unique, well informed position to provide input regarding the use of ASLD property to address ADOT mitigation needs.

4) Consider the creation of a mitigation bank for Pima pineapple cactus, with credits used for sale and for meeting ASLD mitigation obligations.

While there are currently two private mitigation banks for the Pima pineapple cactus, they do not have the capacity to meet future demand. Pima County faces significant development pressure. Due to the unique habitat requirements of this species, the County ultimately designated existing pineapple cactus habitat south of Tucson as suitable for development in an effort to balance watershed-wide conservation and development priorities. If ASLD were to create a mitigation bank for Pima pineapple cactus on Trust Land and sell credits and development rights to the County and/or others, it could help the County to achieve both ecological and economic development goals.

5) Consider a significant pilot project utilizing the Tortolita Fan property to meet the development goals and mitigation needs of the Town of Marana in one of several ways.

This report describes four alternative arrangements that would enable a conservation-focused land management strategy to meet numerous objectives of both the Town of Marana and ASLD. These alternative arrangements include sale or lease of land to Marana, sale of 'natural products' to Marana, or formal development of a conservation bank, similar to the Utah prairie dog mitigation bank approach.

Although the structure of the arrangement could take a variety of forms, the basic concept is that Marana would use the area as mitigation for impacts to regulated species, and the money spent on mitigation would provide the funding source needed to satisfy ASLD's fiduciary obligations. This strategy could be combined with TDR arrangements to generate an additional revenue stream for ASLD. After establishment of the conservation bank (which involves a conservation easement) and potential transfer (sale) of the development rights to other ASLD properties, developers, or to a TDR bank, the land would be permanently protected from future development.



Daisy Mountain: Jason Meininger

6) Develop endangered species habitat protection and mitigation as an 'insurance policy' to increase the value of ASLD land for potential developers.

Because endangered species habitat restrictions are a liability to residential and commercial developers, who are potentially the largest customers for ASLD property disposition, development of conservation banks to mitigate impacts *in advance of disposition* could increase property value by reducing customer risk. A 20- to 30-year time horizon for ASLD property disposition value, mirroring the long-term nature of development, along with the risk-averse nature of investment capital, indicate that addressing species-related liability could be a real value proposition.

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