CONSERVATION BANKING OVERVIEW AND SUGGESTED AREAS FOR FUTURE ANALYSIS

DOI OFFICE OF POLICY ANALYSIS

September 2013

Golden-Cheeked Warbler (Photo Credit: USFWS)

INTRODUCTION

The U.S. Fish and Wildlife Service (USFWS) describes conservation banks as permanently protected lands that contain natural resource values, which are conserved and permanently managed for species that are endangered, threatened, candidates for listing as endangered or threatened, or are otherwise species-at-risk (USFWS 2012). Conservation banking is a market-based program that provides "credits," or units of trade related to habitat or species of interest at the bank site, to landowners that undertake conservation activities, which they may then sell to parties that need to mitigate unavoidable impacts to a species. Conservation banks in the United States are regulated by state or federal government agencies. At the Federal level, conservation banking is regulated by the USFWS (for terrestrial and freshwater species and some marine mammals) and the National Marine Fisheries Service (for marine and anadromous species). The USFWS began approving conservation banks in the early 1990s, and 105 banks have been approved as of March 2013.

Understanding the organization of the conservation banking program, and reviewing its performance can provide critical information needed to facilitate the development of additional banks in the future. This document is the first step of an analysis to review conservation banking data, identify impediments to conservation bank creation, investigate and find areas for potential program efficiencies, and develop options to encourage the expanded use of conservation banking. This paper provides an introduction and background information important to understanding how the USFWS conservation banking program operates, and insights into factors that may facilitate or hinder the development of more robust conservation banking markets, as well as suggestions for areas of future analysis.

ESA-ASSOCIATED MITIGATION REQUIREMENTS

The U.S. Endangered Species Act (ESA) (along with similar State laws) is the primary legal driver for the creation and use of conservation banks. The ESA prohibits "take" of fish and wildlife species[1] officially listed as endangered or threatened, but can permit otherwise lawful activities that violate these prohibitions through Section 7(a)(2), for federal agencies, and Section 10(a), for private entities. The implementation of ESA Sections 7(a)(2) and 10(a) create the need for mitigation to offset impacts to listed species and their habitat (Ruhl 2005). Habitat conservation banks provide one option for project proponents to mitigate for their impacts resulting in unavoidable incidental take.

Section 7(a)(2) requires federal agencies to consult with USFWS to ensure that actions they carry out, fund, or authorize do not "jeopardize" the continued existence of listed species or "adversely modify" their critical habitat. Under Section 7 of the ESA, federal project proponents are required to avoid or minimize incidental take of species. Although the USFWS Section 7 consultation handbook states that it is not appropriate for the USFWS to require mitigation for the impacts of incidental take in formulating reasonable and prudent measures as part of the Incidental Take

[1] Although "take" does not apply to plants, mitigation/offsets for plants is achieved under section 7 through conservation measures that federal agencies include as part of the project description and through multi-species HCPs that choose to cover listed or other at-risk plant species.

Statement (ITS), the project proponent may include conservation measures (including mitigation) as part of the proposed action and the beneficial effects of the conservation measures are taken into consideration for both jeopardy and incidental take analyses (USFWS 1998). If the USFWS determines that the proposed action has unavoidable impacts that will not jeopardize the species' survival but will result in "take," it issues an ITS allowing the applicant to carry out the proposed action, subject to conditions outlined in a biological opinion. The conditions are based on USFWS's considerations of what is necessary or appropriate to "minimize" impacts to the species. The federal applicant may choose to include in the proposed action the purchase of conservation bank credits (if available) or use alternative conservation measures – implement their own mitigation (often referred to as permittee responsible mitigation) or pay into an in-lieu fee program (if available) – to offset the estimated "take."

Section 10(a)(1)(B) requires non-federal project proponents (those with no federal nexus), whose actions may incidentally "take" a listed species, to obtain an incidental take permit (ITP) from the USFWS before proceeding with their proposed project. The first step in obtaining an ITP involves non-federal project proponents submitting a habitat conservation plan (HCP) along with their application for an ITP to USFWS for review. The HCP includes surveys of the property's existing habitat, a plan for minimizing and mitigating any take of a listed species, a plan for continued monitoring, and funding to implement the plan. If the USFWS determines that the proposed action has unavoidable impacts that will not jeopardize the species' survival but will result in "take," it issues an ITP identifying the amount of species habitat or the number of each species (individuals or breeding pairs) that are expected to be "taken" by the proposed project. The USFWS also identifies the available alternative mitigation options, which may include the use of conservation banks. Conservation bank credits, if available, must be acquired prior to initiating the project.

MITIGATION ALTERNATIVES

As mentioned above, conservation banking is one of three primary mitigation options available to project proponents whose activities might result in the "take" of listed species or adverse impacts to other species-at-risk.[2] The stated overall program goal is to "offset adverse impacts to species", and to "…provide an economically effective process that provides options to landowners to offset the adverse effects of proposed projects to listed species" (FWS 2003 p. 3, 4). The mitigation options include:

1. **Conservation Banking** – Credits can be purchased at a USFWS-approved bank appropriate for the species. The bank sponsor takes on the liability of the success of the mitigation.
2. **In-Lieu Fee Program** – Permittees pay a fee to an USFWS-approved compensation fund in lieu of implementing their own mitigation. The in-lieu fee sponsor provides the mitigation when sufficient funds have been collected to implement a mitigation project and takes on the liability of the success of the mitigation. This option is used only if appropriate for the species and no existing mitigation opportunities are available.

[2] A fourth option, recovery crediting systems (RCS), only applies to a very small percentage of project proponents (federal agencies) that receive incidental take authorization under section 7. Currently, the only RCS in existence is a pilot project at Ft. Hood, TX.

3. **Permittee-Responsible Mitigation** – Permittees implement their own mitigation projects, either on-site or offsite, often through third party providers. The permittee is always responsible for the success of the mitigation, regardless of who does the work.

These alternatives may also be combined to complete required mitigation, for example, a combination of permittee-responsible mitigation and banking credits or third party mitigation may be appropriate for a particular project (Kucera 2012).

While this document focuses on conservation banking in particular, a comparison of the different mitigation options, as shown in Table 1, can provide important information to consider when analyzing supply and demand for conservation banking. This comparison is limited to compensatory mitigation in the form of habitat conservation. Habitat conservation can include preservation of existing habitat, habitat restoration and/or enhancement, and habitat establishment.

TABLE 1: COMPARISON OF MITIGATION ALTERNATIVES

	Mitigation Option		
Attribute	**Conservation Bank**	**Permittee responsibility**	**In-lieu fee program**
Purchasers	Public and private	Public and private	Public and private
Liability transfer	Banks transfer liability from project proponents to bankers, who are obligated to conserve and manage the lands in perpetuity.	Liability for the success of the mitigation remains with the project proponent.	Liability for the success of the mitigation is transferred from the project proponent to the in-lieu fee program sponsor.
Advance mitigation	Bank mitigation occurs in advance of impacts, reducing ecological risks of failure.	Mitigation usually occurs concurrently with project implementation.	Mitigation is accomplished after project impacts. However, the in-lieu fee program can include a mitigation "jump-start."
Perpetual management	Banks' habitat protection and management do not expire. After all of a bank's credits are sold, the property is permanently managed for the conserved species.	Mitigation in the form of permanent habitat should be held to the same standard as conservation banks. In practice this can be difficult to accomplish due to inefficient economies of scale at the single project scale.	Mitigation in the form of permanent habitat should be held to the same standard as conservation banks.
Ecological efficiencies	Banks, which generally preserve and manage larger tracts of high quality habitat with connectivity to other preserved sites, are more likely to recover species.	Single project mitigation is generally not ecologically efficient or sustainable long-term with the exception of very large impact projects that provide large mitigation sites.	In-lieu fee programs collect funds from multiple projects to accomplish larger scale conservation efforts on the landscape similar to conservation banks, but should consider ecological effects of the temporal lag between project implementation and mitigation implementation
Conservation incentives	Banks create incentives for entrepreneurs and others to	Some projects may provide incentives for third parties that	In-lieu fee programs provide incentives for third parties that

	Mitigation Option		
Attribute	**Conservation Bank**	**Permittee responsibility**	**In-lieu fee program**
	conserve and protect habitat.	seek mitigation project contracts.	seek mitigation project contracts.
Economic efficiencies	Purchasing bank credits from existing banks generally reduces time and costs for project proponents compared to conducting their own on- or off-site mitigation.	Small projects generally cannot provide mitigation that is economically efficient. Very large projects can generally compete with the economic efficiencies provided by banks and in-lieu fee programs.	In-lieu fee programs can be economically efficient if administrative costs are reasonable.
Permanent easement	Yes, or other equivalent land protection instrument appropriate for land ownership.	Permanent easements should be required, but in practice it can be difficult to find easement holders for small mitigation sites.	Yes, or other equivalent land protection instrument appropriate for land ownership.
Endowment fund	Yes	Yes or other equivalent funding mechanism. However, in practice this is difficult to attain and is rarely secured. Lack of economies of scale can drive up the per acre cost for managing and monitoring small mitigation sites.	May or may not be a requirement of the program.
Performance measures	Yes.	Yes, but these may be relaxed or not well enforced due to lack of economies of scale on small mitigation sites and lack of agency staff available to conduct compliance on mitigation sites.	Yes.
Administrative complexity	There are economies of scale in USFWS's review, approval, monitoring and enforcement requirements. Banks generally	Varies depending on the size and complexity of individual projects, and the adequacy of the mitigation proposed by the project	In-lieu fee programs generally benefit from the same economies of scale as banks.

	Mitigation Option		
Attribute	**Conservation Bank**	**Permittee responsibility**	**In-lieu fee program**
	require less time than reviewing a multitude of individual on-site and offsite mitigation.	proponent. Each project requires a separate negotiation.	

THE FISH AND WILDLIFE SERVICE'S CONSERVATION BANKING PROGRAM

DESCRIPTION AND HISTORY OF THE PROGRAM

The USFWS conservation banking program began in the early 1990s, approving banks for a number of federally listed species. Many of these banks were set up in cooperation with other federal agencies or the State of California. Banks are permanently protected land that is managed for endangered, threatened, or other at-risk species. The number of credits associated with a given bank varies and is determined by considering habitat condition, size of parcel, location, and other factors. Credits can be defined in several ways, including: (1) an acre of habitat for the species under consideration; (2) the amount of habitat necessary to support a breeding pair; (3) a wetland unit with its supporting uplands; and (4) another measure of habitat or its value to the listed species (USFWS 2012).

Banks may be located on state and local government, private, or tribal lands; federal lands can be considered, but must be reviewed by the USFWS for applicability for mitigation and consistency with other regulations and policies. Banks located on federal lands are generally single-user banks established by an agency for its own use. Bankers can be corporations, individuals, companies, utilities, government agencies, non-profit organizations, and land trusts (Mead 2008). Buyers of bank credits include private sector entities (e.g., individual property owners, housing developers, energy developers, and non-profits) as well as public sector entities (e.g., state highway departments) (Hudson 2007, Bauer 2004). Single-client banks are established to meet the mitigation needs of a specific project proponent rather than general commercial sales. Conservation banks may allow other uses, beyond species conservation, as long as they are compatible with the primary purpose for which they were created. A 2005 survey of 32 banks found that 66% of the banks surveyed allowed cattle grazing, hunting, biking, horseback riding, hiking, and fishing (Fox and Nino-Murcia 2005).

CONSERVATION BANKING GUIDANCE

Although the USFWS has not issued any regulations for its conservation banking program, it did issue a guidance document titled "Guidance for the Establishment, Use, and Operation of Conservation Banks" on May 2, 2003. This document was influenced at least in part by the "Official Policy on Conservation Banking" issued by the State of California in 1995. The guidance was intended to help USFWS personnel (1) evaluate the use of conservation banks to meet the conservation needs of listed species; (2) fulfill the purposes of the ESA; and (3) provide consistency and predictability in the establishment, use, and operation of conservation banks.

Key principles addressed in the USFWS Guidance include:

1. **Bank Creation** –Banks can be created through the acquisition of existing habitat; protection of existing habitat through conservation easements; restoration or enhancement of disturbed habitat; creation of new habitat; or prescriptive management of habitat for specified biological characteristics.

2. **ESA Authorities** – Conservation banks can be appropriate mitigation under both sections 7 and 10 of the ESA.
3. **Credits** – Bank credits are available in advance of development impacts, and lands within the bank are permanently protected with legally established land use restrictions set in perpetuity. Acres of habitat occupied by the species and the number of individual or breeding pairs generally provide the metrics used to quantify the credits. The same system must be used to measure both biological values of the bank and the adverse impacts of the development for which the credits will be used as mitigation.
4. **Service Area** – The geographic area within which bank credits may be bought and sold is generally the species' recovery unit(s), as identified by the USFWS.
5. **Adaptive Management** – All bank agreements must include a long-term management and monitoring plan identifying the type, condition, and function of the resources to be perpetually conserved with provisions for adaptive management.

PROCESS FOR CREATING A CONSERVATION BANK

The process of conservation bank establishment and approval by the USFWS involves a number of steps. The time required for approval can vary significantly depending upon the experience level and workload of USFWS staff, as well as the complexity of the banking agreement (Department of the Interior 2007). Further details on the process are provided in the 2003 USFWS conservation banking guidance. Leon and Mead (2010) outline the steps a potential banker must take as follows:

1. Contact the USFWS office with jurisdiction over the proposed bank to determine if there is a conservation banking program that covers its resources.
2. Provide the information necessary for evaluating the property's eligibility. This will likely include biological survey results for certain species on the property, a title report to assess encumbrances, and other information.
3. Begin developing a conservation bank agreement in cooperation with USFWS, and possibly other government agencies, if the proposal also includes credits for resources regulated by other agencies.
4. Grant a perpetual conservation easement to an eligible organization.
5. Develop an adaptive management plan for the long-term stewardship of the property.
6. Fund an endowment to cover the long-term stewardship of the property, including monitoring and management of the site.
7. Once all parties have agreed to the terms and conditions of the conservation bank agreement and the document is executed, USFWS will release the credits in accordance with the agreement.

Before the USFWS approves a conservation bank and determines the number of credits the bank can sell within a designated service area, agreement on the bank's operating and management conditions must be reached (step 7 in the list above). These requirements, based on FWS Guidance, are embodied in the following documents and agreements (Department of the Interior 2007):

1. Conservation banking agreement;
2. Conservation easement granted to an eligible third party;
3. Long-term management plan; and
4. Financial assurances and endowment funds for managing, monitoring, and reporting.

CURRENT STATUS OF THE USFWS CONSERVATION BANKING PROGRAM

The USFWS regulates federal conservation banks in accordance with the ESA for terrestrial and freshwater species and some marine mammals. This section provides information on the conservation banks that have been approved by the USFWS to date, obtained from the RIBITS (Regulatory In lieu fee and Bank Information Tracking System) database (http://geo.usace.army.mil/ribits/index.html).[3]

As of March 2013, USFWS has approved 105 conservation banks in 10 states and Saipan (Figure 1). Ninety-three of these banks are active, and the remaining twelve are sold-out. Approximately 76% (80 out of 105) of approved and sold-out banks are located in California. Other states with multiple banks include Florida with 8% (8 out of 105), Texas with 6% (6 out of 105), Utah with 3% (3 out of 105), and Oregon with 2% (2 out of 105). Other locations shown in Figure 1 each have one bank. Of the 105 banks, 12 have sold out, including 1 in Maryland and 11 in California. An additional four banks were suspended or terminated (all in California). There were ten additional conservation banks pending approval as of March 2013.

The majority of conservation banks in California were located within the jurisdiction of the Sacramento Field Office, with 50 active and 8 sold-out banks. Most of the remaining banks were under the Carlsbad Field Office, with 16 approved and 3 sold out banks; 2 banks were located within the jurisdiction of the Ventura Field Office, and 1 within the SF Bay-Delta Field Office.

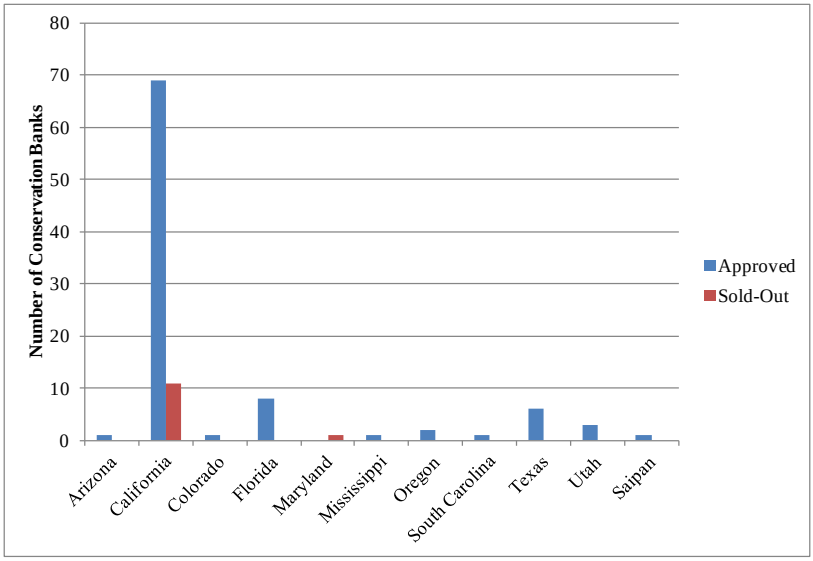

FIGURE 1. USFWS APPROVED AND SOLD-OUT CONSERVATION BANKS, BY STATE

[3] Conservation banks regulated by States or the National Marine Fisheries Service (NMFS) are not included in this discussion unless they are joint banks with the USFWS. Similarly, wetland mitigation banks regulated by the Army Corps of Engineers are only included if the bank is a joint mitigation/conservation bank.

Figure 2 shows the number of conservation banks approved per year by the USFWS from 1994 to 2012.[4] Ten or fewer banks have been approved annually over the time period. Since 2005, a greater number of banks have been approved annually than in the early years of the program. Until 2002, all approved banks were located in California. Conservation bank establishment outside of California has increased in recent years, with 41% of all banks approved since 2008 located in other states.

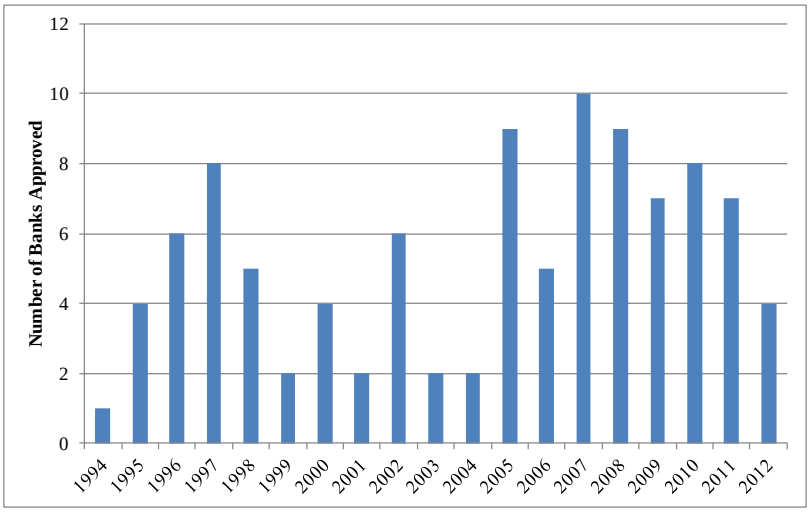

FIGURE 2. NUMBER OF CONSERVATION BANKS APPROVED, 1994-2012

Sponsorship of conservation banks can be classified into one of five categories: private commercial, public commercial, combination public/private, single-client, and private nonprofit. Private commercial banks are sponsored by a private entity and place credits for sale on the open market. Public commercial banks are sponsored by a state, local or regional government agencies and credits are used to compensate for impacts caused by their development or sold to private entities. Combination public/private banks are public/private partnerships between a government agency and a private entity. Private nonprofit banks are sponsored by nonprofit organizations who sell the credits on the open market. Single-client banks are sponsored by project proponents that use the credits for their own development. The majority (73%) of conservation banks can be classified as private commercial (Figure 3). The remainder is split between Combination Public/Private (10%), Single-Client (10%), Public Commercial (5%), and Private Nonprofit (2%).

[4] Information is shown for 101 of the 105 approved and sold-out conservation banks. Approval date was not available for the remaining 4 banks.

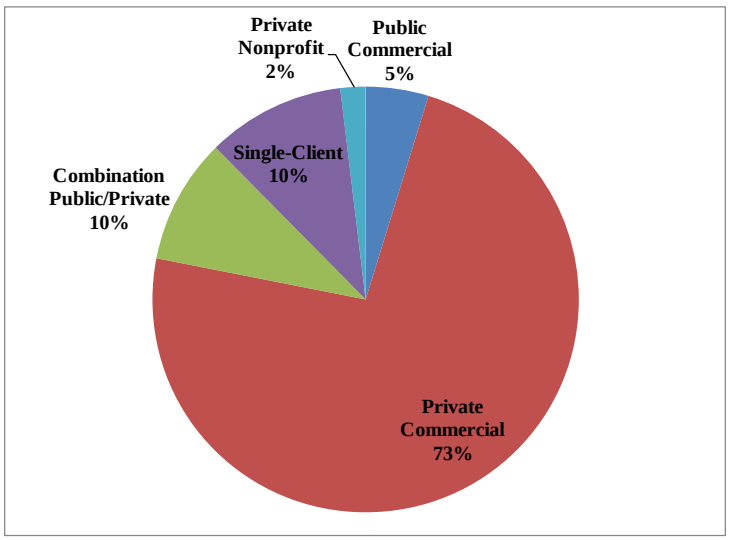

FIGURE 3. TYPE OF SPONSORSHIP FOR CONSERVATION BANKS REGULATED BY USFWS

Conservation banks vary significantly in size, ranging from approximately 8 to 4,009 acres, with an average size of 741 acres.[5] In total, the banks cover nearly 75,000 acres. Table 1 shows the range of species protected in the approved and sold-out conservation banks regulated by the USFWS. In some cases, banks protect more than one species. Vernal pool species were protected in the largest number of banks. Other species protected in a large number of banks include the California tiger salamander, San Joaquin kit fox, coastal California gnatcatcher, burrowing owl, valley elderberry longhorn beetle, bluetail mole skink, giant garter snake, golden-cheeked warbler, and sand skink. Credits for different types of habitat are also available from many banks.

[5] Based on the 102 banks for which acreage information was available.

TABLE 1. SPECIES PROTECTED BY APPROVED AND SOLD-OUT CONSERVATION BANKS

Species	Number of Banks
Alameda whipsnake	1
Black-capped vireo	1
Bluetail mole skink	5
Blunt-nosed leopard lizard	1
Burke's Goldfields	1
Burrowing Owl	6
California Red-legged Frog	4
California Tiger Salamander	18
Carolina Heelsplitter	1
Coastal California gnatcatcher	8
Contra Costa Goldfields	2
Delta smelt	1
Delmarva Fox Squirrel	1
Florida Panther	3
Florida Panther with woodstork value	1
Florida scrub-jay	3
Giant garter snake	5
Golden-cheeked warbler	5
Gopher Tortoise	1
Houston toad	1
Least Bell's vireo pairs	3
Nightingale Reed Warbler	1
Otay tarplant	1
Pima Pineapple Cactus	1
Preble's meadow jumping mouse	1
Salmonid	1
San Joaquin Kit Fox	11
Sand skink	5
Sebastopol meadowfoam	4
Southwestern Pond Turtle	1
Swainson's hawk	4
Tipton Kangaroo Rat	1
Utah Prairie Dog	3
Valley elderberry longhorn beetle	6
Vernal pool species	30

TABLE 2. CONSERVATION BANK CREDIT PRICES BY SPECIES

Species	Credit Price Range	State
Black-capped vireo	$5,000-$5,500	TX
Bone Cave Harvestman and Coffin Cave Mold Beetle (per acre in 'moderate impact zone')	$10,000	TX
Bone Cave Harvestman and Coffin Cave Mold Beetle (fixed price in 'irrevocable impact zone')	$400,000	TX
Burrowing owl	$5,000-$15,000	CA
California red legged frog	$15,000-$90,000	CA
California tiger salamander	$4,500-$15,000	CA
Chaparral	$8,000-$15,000	CA
Coastal sage*	$15,000-$25,000	CA
Delhi sands flower-loving fly	$100,000-$150,000	CA
Delta smelt/native fisheries	$100,000-$150,000	CA
Fairy shrimp	$150,000-$300,000	CA
Giant garter snake	$30,000 - $45,000	CA
Golden-cheeked warbler	$2,750-$7,000	TX
Gopher tortoise (relocation)	$1,500 - $3,000	SE US
Gopher tortoise	$12,000 - $20,000	SE US
Least vireo breeding pair	$125,000	CA
Salmonids	$80,000-$120,000	CA
Sandhills habitat	$326,700	CA
San Joaquin kit fox	$2,500-$15,000	CA
Swainson's hawk	$5,000-$25,000	CA
Utah prairie dog	$1,836	UT
Valley elderberry longhorn beetle	$3,500	CA
Vernal pool (preservation)	$50,000-$325,000	CA

* Non-occupied by the California coastal gnatcatcher.
Source: Madsen, et al. (2010)

CONSERVATION BANK CREDIT SALE VOLUMES AND PRICES

Information on the value of total annual habitat conservation credit sales volumes and the unit prices of credits are not readily available. Conservation bank credit statistics are also difficult to aggregate because of the many types of credits (Madsen et al. 2010). The value of habitat credits fluctuates based on economic factors, land values, competition, and market demand (Leon and Mead 2010).

One of the most robust sets of information on pricing of conservation bank credits comes from a 2010 study from Ecosystem Marketplace (Madsen et al. 2010). Their data shows a range in price from $1,836 to $400,000 per credit, with a median value of $33,027 (Madsen et al. 2010). Credit prices vary both within and across species. Price ranges for various species are shown in Table 2. The study estimated that U.S. conservation bank credits generated $200 million in yearly sales (Madsen et al. 2010). An earlier study by the Environmental Law Institute estimated that the sale

of credits, payment of in lieu fees, and costs associated with other permittee-responsible mitigation generated about $370.3 million per year over 2003-2006 (Environmental Law Institute 2007).

SUGGESTED AREAS FOR ADDITIONAL ANALYSIS

An initial literature review and interviews with several conservation banking stakeholders helped to indentify several areas for additional analysis. The areas listed below were noted as potential factors that may affect the success of current conservation banks and the creation of additional banks in the future.

Institutional Constraints –Various institutional constraints including inadequate support for conservation banking, and lengthy processing time for banking agreements could create disincentives for bank creation. Future analysis could provide information on the reasons for the variation in processing time, the extent to which processing delays deter potential bankers from applying, and the extent of support for conservation banking at various administrative levels throughout the USFWS.

Program Guidance –Although the USFWS issued conservation banking guidance in 2003, lack of clarity or variations in implementation could create problems in program administration. Additional analysis could provide information related to lack of clarity and variation in implementation of USFWS Guidance, and the extent to which this variation might affect future bank creation. In addition, analysis could provide insights into the possible advantages and disadvantages of more formal regulations such as those in place for the Corps and EPA wetland mitigation banking program.

Monitoring/Enforcement – Questions remain about the adequacy of and funding for monitoring and enforcement activities related to current conservation banks. Additional analysis could address the extent to which monitoring and enforcement activities are carried out and identify potential roadblocks for the successful completion of these activities.

Information – The availability of information about conservation banking and cumulative incidental take may benefit USFWS personnel and conservation bankers. The creation of the RIBITS database has provided some information about conservation banking but additional information or improvements to the database may be needed. Additional research is needed on the information required by bankers and USFWS staff, as well as the adequacy of current data sources.

Demand – Several factors could contribute to the demand for conservation banking credits including economic development in the area, uncertainty, and the availability of other mitigation options. Additional research may be useful on several possible contributing factors for demand for credits.

Supply – Several factors could also affect the supply of conservation banking credits including the availability of start-up funding, biological factors, uncertainty, and the availability of land or habitat. Additional research is needed to determine the extent to which these and other factors affect the creation of additional conservation banks and the supply of credits.

REFERENCES

Bauer, Marybeth, Jessica Fox, and Michael J. Bean. 2004. Landowners Ban on Conservation: The U.S. Fish and Wildlife Service's Guidance on Conservation Banking. ELR (Environmental Law Reporter) News & Analysis. 34. pp. 10717-10722.

Department of the Interior, Conservation Banking/Credit Workgroup. June 25, 2007 Draft. Characteristics of Existing Federal Conservation Banks. 67 pages. Available at: http://www.fws.gov/economics/Discussion%20Papers/Discussion%20Paper%20_%20%20Conservation%20Banks.pdf

Environmental Law Institute. October 2007. Mitigation of Impacts to Fish and Wildlife Habitat: Estimating Costs and Identifying Opportunities. 117 pp. Available at: http://www.elistore.org/Data/products/d17_16.pdf

Fox, Jessica and Anamaria Nino-Murcia. August 2005. Status of U.S. Conservation Banking. Conservation Biology 19: 4. Pp. 996-1007.

Hudson, Blake. Fall 2007. Promoting and Establishing the Recovery of Endangered Species on Private Lands: a Case Study of the Gopher Tortoise. Duke Environmental Law & Policy Forum. 18:1. pp. 163-194.

Kucera, Charlotte, U.S. Fish and Wildlife Service, Austin, TX. October 17, 2012. Personal communication.

Leon, Sarah and Debora Mead. September 22, 2010. Conservation you can take to the bank: a market-based approach to conservation; Conservation Banking. U.S. Fish & Wildlife Service Bulletin. 35: 2. pp. 28 35.

Madsen, Becca, Nathaniel Carroll, Kelly Moore Brands. 2010. State of Biodiversity markets: Offset and Compensation Programs Worldwide. Washington, DC: Forest Trends. Available at: http://www.newforests.com.au/news/pdf/articles/MarketOutlookUSMitBanking.pdf

Mead, Deborah. 2008. History and Theory: The Origin and Evolution of Conservation Banking. Pp 3-31 in Conservation & Biodiversity Banking: A Guide to Setting Up and Running Biodiversity Credit Trading Systems, edited by Nathaniel Carrol, Jessica Fox and Ricardo Bayon. Earthscan, UK and USA. 298 pp.

Ruhl, J.B., Alan Glen, and David Hartman. Summer 2005. A Practical Guide to Habitat Conservation Banking Law and Policy. Natural Resources & Environment. 20:1. pp. 26-30. Available at: http://www.law.fsu.edu/faculty/profiles/ruhl/2005-HabitatBanking20NRESummer.pdf

U.S. Fish and Wildlife Service. 2012. Conservation Banking: Incentives for Stewardship. Available at: http://www.fws.gov/endangered/esa-library/pdf/conservation_banking.pdf

U.S. Fish and Wildlife Service. 2003. Guidance for the Establishment, Use, and Operation of Conservation Banks. Available at: http://www.fws.gov/endangered/landowners/conservation-banking.html

U.S. Fish and Wildlife Service and National Marine Fisheries Service. 1998. Endangered Species Consultation Handbook: Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act. Available at: http://www.fws.gov/endangered/esa-library/pdf/esa_section7_handbook.pdf