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Task 2 Report: Setting the Stage for Statewide Advance Mitigation in California

January 2015

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Statewide Advance Mitigation Funding and Financial Strategies
Study for the California Department of Transportation

Task 2 Report:
Setting the Stage for Statewide Advance Mitigation in California

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1. Executive Summary

Advance Mitigation and the Role of Transportation Funding in its Realization

Advance mitigation can be defined as a process in which the impacts from one or many transportation projects are estimated and addressed before or during the planning phase. Further, advance mitigation involves assessment of the mitigation that will likely be required and, potentially, mitigation activities to satisfy those requirements. Advance mitigation is characterized by several key attributes:

1. ***Strategic Planning*** and assessment of what impacts multiple future transportation projects may have in a region and of mapped regional priorities for conservation/restoration, here called a Greenprint.
2. ***No Temporal Loss*** to ensure that the required compensatory mitigation is in place before actual impacts to the environment occur, preventing any temporary loss of biological or ecological resources.
3. ***Advance Funding*** to support mitigation activities early or prior to construction of transportation projects, and hence even prior to projects being programmed.

This study, the Statewide Advance Mitigation Funding and Finance Study (SAMFFS), acknowledges that advance mitigation requires that mitigation must be considered, purchased, and implemented early in the project planning process, well prior to construction. Within Caltrans' own project delivery process, advance mitigation would be undertaken before the Project Initiation Document (PID) milestone, rather than after it; as is conventional in current practice.

The current approach to funding projects and mitigation together presents a significant roadblock to mitigating environmental impacts early and comprehensively. In California and most other U.S. states, funding for transportation improvements and mitigation of their impacts is tied directly to individual projects themselves. Under normal circumstances, the budget of a single transportation project is what pays for the acquisition, design, restoration, construction, enhancement, and even long-term management of its mitigation sites.

Funds budgeted or anticipated for a specific project are available for actual expenditure only once the project is "programmed," when the time available before construction would begin is relatively short and frequently inadequate for addressing mitigation needs, often leading to cost escalation and delay. Further, tying mitigation funds to single-project budgets makes it difficult to entertain mitigation activities scaled to satisfy the needs of multiple projects at once, limiting opportunities to achieve economies of scale and employ conservation strategies.

To overcome this roadblock, funds for mitigation are needed prior to projects being programmed. This indicates that funds for advance mitigation may need to be programmatic, rather than being funded from projects, as is the usual method of conducting mitigation. Thus, the SAMFFS study aims to identify and assess ways to programmatically fund statewide advance mitigation of California transportation projects.

This report, "*Setting the Stage for Statewide Advance Mitigation in California,*" provides a review of the financial approaches to funding advance mitigation that have been used in local, state, and national efforts. The material will inform later SAMFFS tasks and ultimately Caltrans' own considerations in developing options to implement this innovative approach.

Key elements of this report include:

1. **Discussion of impetus for and potential benefits of advance mitigation**, indicated in the literature;

2. **Review of significant California experiences** with advance mitigation;
3. **Review of prominent national experiences** with advance mitigation; and
4. **Highlights of current national and state policy shaping the context for advance mitigation**.

Studies Address Impetus for and Potential Benefits of Advance Mitigation, Not Its Funding

Our review of the literature reveals:

- that advance mitigation as an approach has received wide recognition;
- that many studies of advance mitigation have come from the ecological sciences;
- that a number of transportation agencies are now using advance mitigation, and some savings have been reported; ***but***
- that **the funding mechanisms supporting those programs are not clearly explored or detailed.**

Funding details are sparse. In spite of interest in advance mitigation, few studies or reports of these efforts detail the architecture of funding mechanisms. Some program evaluations show savings are available through such an approach, with many detailed in other sections of this report. However, details on the sources of the funding, and whether funding derived from project funds, was programmatically allocated by a transportation agency, or was derived from an external source, are scarce.

Interest in advance mitigation has come largely from ecologists. The majority of studies informing the practice of advance mitigation have come from the ecological sciences, and from the emerging subdiscipline of road ecology. These works address the adverse impacts of transportation infrastructure on the natural environment, including mortality to species hit by vehicles, reduced dispersal capacity, and impediments to gene flow. Road use increases the spread of invasive species, generates noise that affects breeding birds, generates greenhouse gas emissions, and contributes to such indirect effects as the road effect zone and landscape fragmentation. Finding a balance between infrastructure development and preservation of open space for biodiversity conservation, ecosystem processes, agriculture, and other needs is most effectively addressed at a landscape (regional) level.

Vivid figures suggest advance mitigation may offer financial benefits. In addition to ecological motives, the literature suggests compelling practical reasons for transportation agencies to engage in advance mitigation. Vivid numbers emerge from various sources about the potential for improving efficiencies and economies of scale over current project-based mitigation practice, lowering costs and delay:

- In one national study, **65% of DOTs surveyed had experienced environmental-related delay.**
- The **median delay from environmental factors was 12 months.**
- In a study of 4,090 Caltrans projects programmed from 2002-2004, **projects were more likely to have an environmental allocation (44%) than an actual environmental expenditure (35%).**
- Of projects incurring such expenditures, **61% expended more for environmental than allocated.**
- The **cost of environmental delays to Caltrans was calculated in 2004 as $59 million per year.**
- The **exact length of and causes of environmental review related delay are not well understood,** but some reports suggest these **processes may add up to 10 to 15 years to project delivery.**

Some states that have undertaken more comprehensive **or advance mitigation report savings.**

- **Programmatic permitting of bridges**, via establishment of standards, an environmentally proactive approach, and up front planning, has **saved $72 million in Oregon**.
- Michigan Department of Transportation (MDOT) **reduced the cost of wetland mitigation from previously typical costs between $75,000 and $150,000 per acre to roughly $25,000 and $30,000 per acre**, using statewide wetland mapping and a mitigation site suitability index, and by funding mitigation separately from projects (Environmental Law Institute 2010).
- **By establishing three wetland mitigation banks** and restoring one larger site instead of many smaller sites, Washington State Department of Transportation (WSDOT) achieves **economies of scale cost savings between 30% and 80% over the cost of traditional, project-by-project, mitigation**.

California Experiences with Advance Mitigation

The Caltrans Staff Working Group (SWG) identified a set of 10 in-state efforts to undertake mitigation on an advanced basis. We performed a detailed review of each effort to uncover:

- the funding, revenue sources, or financial options used to support advance mitigation;
- administrative, legislative, or institutional actions that facilitated advance mitigation;
- data, where available, on costs or benefits attributed to an advance mitigation approach; and
- lessons learned from the project or experience.

Categories of Approaches in California. While the individual project histories represented in these 10 efforts are diverse, three natural groupings emerge as a way to consider broad similarities among them.

1. **Caltrans-led initiatives, undertaken for Caltrans' projects and characterized by:**
   - attempts to provide early, more comprehensive mitigation to service one or more projects, albeit within Caltrans' traditional framework for project-based mitigation;
   - an ad hoc, opportunistic approach, with strategic land purchases or easements pursued under favorable circumstances, or with excess land in Caltrans possession exploited for mitigation;
   - being located largely in Northern California;
   - being modest in scale, compared with county-led efforts, with only one mitigation initiative exceeding 500 acres and with costs ranging from $2 million to $13 million;
   - uneven success in delivering mitigation for projects intended; and
   - **almost exclusive reliance on funds from the budgets of projects they would mitigate**.

2. **Large scale advance mitigation efforts, led by county or regional entities and distinguished by:**
   - sheer scale of the effort, both in terms of land area and dollar resources involved;
   - dollar amounts reserved or planned for mitigation expenditures that range from tens of millions to over $4 billion;
   - plans to mitigate a mix of both Caltrans' and locally sponsored transportation projects;
   - use of habitat conservation plans (HCPs), which address threatened and endangered species under the federal Endangered Species Act (ESA), or similar efforts that identify large areas needed for conservation, that are informed by priorities for conservation of preserving unique natural resources, habitats, species or landscapes, and that could serve aligned mitigation needs;
   - their location in highly urbanized or rapidly urbanizing regions of Southern California;
   - **reliance on a variety of funding sources, most prominently local sales tax measures** that support transportation investment, but also including local development fees, bond issues, and conservation-based grants;

- mitigation expenditures (and underlying projects) **planned over very long time periods, and hence subject to considerable uncertainty; and**
- Caltrans own commitment to contribute to these efforts varies enormously. Whereas the San Diego and Orange County mitigation programs rely largely on local sales taxes, not Caltrans contributions, to support the early mitigation effort, the HCP efforts in Coachella and Western Riverside do involve sizable Caltrans obligations to make or fund significant land purchases and endowment contributions.

3. **Early stage conservation planning effort, featuring:**
   - a predominant focus on early establishment of conservation priorities;
   - some preliminary engagement with transportation agencies;
   - yet undeveloped linkages to specific transportation projects needing mitigation; and
   - mitigation funding sources that have yet to be identified to support it.

California Experiences with Advance Mitigation:

Scale, Cost, Mitigation Mechanisms, and Key Institutional Partners

	County-Led/Funded Efforts				Caltrans-Led/Funded Efforts				
	Coachella Valley MSHCP	W. Riverside County MSHCP	Orange Cty. Env't'l Mit. Program (OCTA EMP)	San Diego SANDAG TransNet	Beach Lake Mitigation Bank	Elkhorn Slough Early Mit. Project	California SR 149 (Butte 149)	Cottonwood Conservation Area	Honey Lake Wetlands Mit. Bank
Size of Planning Effort (acres)	1.1 million acres	500,000 acres	10,000 acres of direct & indirect impacts	2,352 acres	NA	NA	NA	NA	NA
Size of Completed / Targeted Acquisition	1,965 acres; 5,791 acres	153,000 acres	NA	2,352 acres	142 acres	167 acres	38 acre marsh; vernal pool	574 acres	300 acres
Total Mitigation Cost (Estimated)	$35 million+ (Caltrans only)	$4.2 billion	$243 million + $55 million bond	$650 million + $200 million	$2 million	$6.5 million	$13 million	easement - NA; endowmnt. - $432,000	$2.9 million
Adjacency to established conservation land / public land	☑	☑			☑				☑
Mitigation Mechanism (anticipated / used)								☑	
title purchase	☑	☑							
easement purchase			☑						
title/easement transfer to non-Caltrans entity	☑	☑			☑	☑	☑	☑	☑
entity accepting title / easement transfer									
endowment payment(s)	☑			☑					
Key partnering entity (non-Caltrans)	CVCC (JPA)	WRHCA (JPA)	?	?	USFWS	Elkhorn Slough Foundation	BCAG (JPA)	RCD	CDFW
Available Funding Information	Med	Med	High	High					

California Experiences with Advance Mitigation:

Lead Entities, Funding Sources, and Sponsoring Entity of Mitigated Projects

	County-Led/Funded Efforts				Caltrans-Led/Funded Efforts					Planning Efforts	
	Coachella Valley MSHCP	W. Riverside County MSHCP	Orange Cty. Env'tl Mit Program (OCTA EMP)	San Diego SANDAG TransNet	Beach Lake Mitigation Bank	Elkhorn Slough Early Mit. Project	California SR 149 (Butte 149)	Cottonwood Conservation Area	Honey Lake Wetlands Mit. Bank	Santa Cruz Consrvtn. Blueprint	
Lead Entity/Entities of Mitigation Effort											
Caltrans					☑	☑		☑	☑		
MPO / COG	☑	☑		☑			☑				
Local Transportation Agency			☑	☑							
Local Conservation Authority / Organization								☑		☑	
Funding Sources - Mitigation Implementation											
Transp. Project-based Funding, via Caltrans	☑	☑			☑	☑	☑	☑	☑		
Local Option Sales Tax Measure	☑	☑	☑	☑							
Local Development Mitigation Fee	☑	☑									
Bonds - backed by any revenue stream			☑								
Conservation-oriented grants (e.g. Sec 6)	☑	☑	☑	☑						☑	
Transportation Projects Mitigated											
Caltrans-sponsored projects	☑	☑		☑	☑	☑	☑	☑	☑		
Locally-sponsored projects	☑	☑	☑	☑							

Individual Project Histories and Tabular Summaries

For readers interested in the details of one or more specific efforts presented in the tables above, Section 4 of the full report includes a brief history and description, as well as a tabular overview, of each initiative. These profiles were developed by interviewing key personnel about the history of each effort and specific features of the advance mitigation planned or undertaken. Additionally, informant-based reports were augmented where possible with documents and reports of each initiative, located on public agency websites, in downloadable agency reports and legal documents, and in online newspaper articles.

Observations about the California Experiences

Taken together, these case studies present a series of general observations about efforts to undertake advance mitigation in California. More full discussion of each observation is included in the full report.

1. **Caltrans restrictions on land ownership can challenge advance mitigation efforts.** Caltrans policy against land holding can complicate its pursuit of advance mitigation and undermine its ability to act on large-scale mitigation purchases. Caltrans operates at a disadvantage if it cannot purchase land outright, and more easily, in early stages of project planning.

2. **Collaboration itself—and in particular with a JPA or other locally empowered entities—may facilitate Caltrans' mitigation efforts.** Across efforts of all scales, advance mitigation initiatives were aided when a JPA or other local entity participated, as such entities often provided greater flexibility for implementing the land conservation and acquisition strategy.

3. **Advance mitigation properties adjacent to conservation areas or public lands are advantageous.** Using mitigation land next to existing reserves may help Caltrans find an ultimate land holder for its mitigation land and also to receive a more favorable mitigation ratio due to conservation economies of scale.

4. **Existing large-scale conservation efforts can offer structure and momentum for advance mitigation planning.** Comprehensive large-scale conservation efforts provide a pre-determined guide for some of Caltrans' mitigation needs, and mitigation efforts like HCPs allow Caltrans to spread mitigation costs among all projects in the plan area, reducing the time and cost of environmental clearance on a per-project basis. Note that Caltrans' mitigation obligations derive from several sets of regulations, not all of which are covered in HCPs.

5. **Planning for advance mitigation inevitably involves future planning uncertainties.** By definition, preparing mitigation in advance of projects exposes Caltrans to uncertainty. The long time horizon of advance mitigation plans means that the trajectory of a planned transportation project and estimation of its mitigation costs are subject to change.

6. **Flexibility is needed to accommodate timing issues that arise with advance mitigation.** Caltrans can amortize the costs for a larger advance mitigation project across multiple projects. But delays in the implementation of advance mitigation or unexpected changes in to-be-mitigated projects require that Caltrans approach multiple project mitigation with flexibility.

National Experiences with Advance Mitigation

Similar to the review of California experiences, we performed a detailed review of five national efforts to undertake mitigation on an advanced basis. For each, we uncover:

- the background or motivation behind the effort;
- the funding, revenue sources, or financial options used to support advance mitigation;
- unique features or actions that facilitated advance mitigation; and
- data, where available, on costs or benefits attributed to an advance mitigation approach.

Overview of National Experiences

The North Carolina Ecosystem Enhancement Program (NCEEP) and the **Florida Department of Transportation** (FDOT) have established trust funds that provide flexibility both in purchasing lands in advance of project construction and in that payment into and out of such a fund can be from and to several different sources. Under North Carolina's program, the North Carolina Department of Transportation (NCDOT) conducts an annual assessment of the next seven years of TIP projects, and makes payments into the NCEEP fund ($23 million for 2013-2014), used for all aspects of anticipated mitigation. The fund required a startup capitalization from NCDOT of $9.5 million and is cooperatively run with several other state agencies.

The Florida example actually has two programs. First, Florida Department of Transportation (FDOT) has a cooperative arrangement with Watershed Management Districts (WMD) which can perform mitigation work for FDOT. On a yearly basis FDOT identifies projected impacts for the next three years, and can put money into the State Transportation Trust Fund. The WMDs then work up mitigation plans and have them reviewed by the environmental agencies, and use the funds from the trust to implement. Nearly $170 million has been invested from 2007-2011, with about $20 million scheduled for the 2012-2013 fiscal year. However, while this program is regional, advance mitigation work is not permitted. Second, to address this issue, FDOT recently initiated an annual $5 million fund to start in 2015, "for purchase of advanced mitigation of wetlands and other surface water impacts and species impacts of transportation projects and for ecosystem or environmental management projects" (Florida DOT, 2013, Part III, Chapter 11, p. 5).

The program with the most federal ties and subsidy is the Balcones Canyonlands Conservation Plan (BCCP), near Austin, TX. This project was one of the first large-scale HCP efforts, and has over $60 million invested by the federal government. In addition the city of Austin has contributed over $20 million, supported through a bond measure, while the associated county has had less success in raising its share of funding commitments. The HCP covers 633,000 acres and 25 transportation corridors, as well as other types of development within city and county limits, and targets 30,500 acres for conservation. As such this represents regional planning with a collaborative mitigation approach. Under the HCP, transportation projects have been able to move forward by contributing mitigation funds to the implementation of the conservation needs.

In Washington State, the WSDOT had an initiative to create the **Advanced Environmental Mitigation Revolving Account (AEMRA)**. This program allows for mitigation for wetlands, fish habitat and passage, and flood management. Seed funding for this fund came from the state's motor fuel account, and loans may be taken from the account to conduct mitigation. Loans are then repaid from transportation project funds. The amount in the fund appears to be insufficient to accommodate much mitigation, but little information was available as to the amount.

Detailed Summaries of Individual Initiatives. Full descriptions of the national programs summarized below are found in the full report in Section 5. These profiles were developed from publicly-available internal reports from each state, legal documents, academic literature and interviews with key personnel.

National Experiences with Advance Mitigation:

Motivation, Features, and Funding

	Motivation				Features					Funding					
	Promote Watershed-based Mitigation	Alleviate Project Delays	Save Money	Part of a Wetland Management Strategy	MOA	Established Trust Fund	Revolving Fund	Mitigation Implemented by Entity Outside DOT	Habitat Conservation Plan	Federal Funding	State DOT Funds	Local Bond Measures	Grants	In-Lieu Fees	Donations (money or prope
North Carolina Ecosystem Enhancement Program (NCEEP)	☑	☑	☑	☑	☑	☑					☑			☑	☑
Balcones Canyonlands Conservation Plan Habitat Conservation Plan (BCCPP		☑	☑						☑	☑		☑	☑	☑	☑
Florida DOT Wetland Mitigation Program	☑			☑		☑		☑			☑				
Florida DOT Advance Environmental Mitigation (General)			☑	☑		☑		☑			☑				
Washington Advanced Environmental Mitigation Revolving Account (AEMRA)	☑		☑	☑			☑			☑	☑				

National and State Developments and the Context for Advance Mitigation in California

Here, we scan current developments at the national and state level that are shaping or may shape the context for funding and implementing advance mitigation in California. The intent of this section is to provide an overview of the types of programs and funding that are active, while recognizing that many may not currently fund Caltrans' needs. While not an exhaustive survey, we highlight significant policy and other developments of interest either as possible models for how advance mitigation might be funded, or as potential way to identify possible funding for advance mitigation and to collaborate with partners.

FEDERAL SCAN

2012 Moving Ahead for Progress in the 21st Century (MAP-21) & its Reauthorization

1. **The authorization law provides various federal encouragements for advance mitigation:**
    - Says states or Metropolitan Planning Organizations (MPO) may develop programmatic mitigation plans within the statewide or regional transportation planning process.
    - Details potential scope and content of programmatic mitigation plans.
    - Details processes for integrating programmatic mitigation plans with other plans, including growth management and land use plans, an important linkage for California's regional planning framework established in SB 375.
    - Makes Transportation Alternatives Program (TAP) funds eligible, *but not reserved*, for expenditure on "any environmental mitigation activity." State DOTs and MPOs cannot receive TAP funds, but can partner with others (e.g. local governments, local/regional transportation authorities, and resource or public land agencies) to use them. SB 99 (2013) pools California's TAP dollars ($72 million, FY 2013) with other funds in the Active Transportation Program.

2. **Specific federal direction for implementing or funding advance mitigation is absent in MAP-21. Stakeholders are looking for further clarification in federal guidance or the reauthorization.**

FHWA's Eco-Logical & the Strategic Highway Research Program (SHRP, SHRP2)

1. **These two federal initiatives provide grant support to develop tools and implementation strategies for ecosystem-scale mitigation.**
    - To date, the Federal Highway Administration (FHWA) has awarded grants for developing Eco-Logical tools to 12 states; California is not among them. FHWA also provided 14 implementation grants to state DOTs and MPOs; the Southern California Association of Governments (SCAG) received one such award. These programs are focused on developing capacity to conduct advance mitigation, and on ways to streamline the environmental review process, and have not funded actual implementation of advance mitigation directly. These programs are potentially financially beneficial because of the savings to transportation agencies due to increased efficiencies in the environmental phase of projects. A possible use for Caltrans is the inclusion of the Eco-Logical 9-step Integrated Ecological Framework (IEF) (AASHTO, 2014) to new proposals and contract negotiations with FHWA, which would indicate alignment with their objectives.
    - Federal funding for research on impact assessment capacity has come through the Transportation Research Board's (TRB) Strategic Highway Research Program (SHRP). The most recent SHRP cycle (SHRP2) funds projects C40A & B, which focus on development of a national geospatial impact scoping tool and include two pilot projects in California.

2. **By monitoring the direction of such programs, Caltrans can assess opportunities for federal support to complement its own efforts on comprehensive advance mitigation.**
    - The SHRP2 program (SHRP's second phase) is drawing to a close, and a new round of calls for proposals may emerge from FHWA in 2014. Although official announcements to this effect have not been made and although it is unknown whether such calls would directly fund advance mitigation, FHWA and American Association of State Highway and Transportation Officials (AASHTO) are seeking to make more widely available the most useful SHRP2 components. These include the 9-step Integrated Ecological Framework used to provide transportation agencies a way to engage in advance mitigation planning. Any such support made available to state transportation agencies would be of interest to Caltrans.

Transportation Infrastructure Finance and Innovation Act (TIFIA)

The TIFIA program provides Federal credit assistance (via secured loans, loan guarantees, and lines of credit) to nationally and regionally significant surface transportation projects. Although TIFIA has not yet supported advance mitigation efforts and although its continued incorporation in the MAP-21 reauthorization is uncertain, it remains of interest for two reasons:

1. **TIFIA may support other elements of projects that are subject to advance mitigation requirements, thereby freeing state resources for those efforts.**
2. **Amendments to TIFIA have been proposed which would make advance mitigation an eligible TIFIA expense.**

Water Infrastructure Finance and Innovation Act (WIFIA)

The **Water Resources Development Act (WRDA) of 2013** was passed by the Senate in October 2013 and is awaiting action in the US House of Representatives, under the jurisdiction of the House Transportation and Infrastructure Committee, also responsible in the House for MAP-21reauthorization.

1. **The WRDA provides for a new program, the Water Infrastructure Finance and Innovation Act (WIFIA)** which is directly modeled after TIFIA, and **which may include funding that could be used for habitat acquisition.**

2. **This bill should be monitored closely, given Caltrans' efforts to identify funding sources for advance mitigation.** Although its relevance to transportation and Caltrans is difficult to assess since it has not yet been enacted and is subject to further amendment, Habitat Conservation Plans or similar efforts that incorporate mitigation for both transportation and water projects could qualify under this bill for loans that might be used for habitat acquisition. Advance mitigation efforts with cross-sector participation could contribute to economies of scale for both Caltrans and any collaborators.

Blumenauer Gas Tax Proposal

In early December 2013, Rep. Earl Blumenauer (D-OR) introduced a bill to the House of Representatives that would increase the federal gas tax by 15-cents over three years and index it to inflation. While its prospects of garnering sufficient Congressional support appear slim, any change in the federal gas tax would impact the amount of federal transportation funds California receives, and could influence whether and what resources the state might use to support an advance mitigation program.

STATE SCAN

Sustainable Communities and Climate Protection Act of 2008 (SB 375)

California's Sustainable Communities and Climate Protection Act of 2008, SB 375, uses an innovative regional-local policy framework for reducing automobile reliance and transportation-related greenhouse gases (GHGs). Under the law, California's Metropolitan Planning Organizations (MPOs) must plan for meeting specific future GHG reduction targets, and identify land use, housing and transportation planning strategies to achieve them.

1. **Regional planning principles suggested by SB 375 are closely compatible with comprehensive habitat- and landscape-level mitigation and preservation, making this law of interest to advance mitigation proponents and the SAMFFS study.**

2. **Regional scale advance mitigation in California has begun to find a place in the Sustainable Communities Strategy (SCS) required of MPOs under SB 375.** Orange County's SCS illustrates the symbiotic alliance between regional GHG reduction strategies and comprehensive advance mitigation: a natural lands acquisition strategy focusing on carbon sequestration and avoidance was incorporated and adopted into the SCS in June 2011—California's first SCS conservation policy and complements the existing and separate Orange County Transportation Authority (OCTA) Environmental Mitigation Program (EMP).

3. **Federal law recognizes the potential synergy between growth management, land conservation, and comprehensive mitigation efforts.** MAP-21 Section 1311(e) provisions encourage programmatic mitigation plans and their integration "with other plans, including…growth management plans, and land use plans" (FHWA 2014c). The Orange County SCS has already made this integration real. The Orange County SCS planning does not currently address mitigating biological impacts under the various environmental laws. Funding for and implementation of the program currently does not exist. Nonetheless, integrating GHG initiatives to the mitigation of biological impacts is an avenue that deserves further consider in the SAMFFS effort.

Greenprinting Efforts

Increasingly, throughout the state, counties, cities and non-profit organizations are developing conservation plans which can be used to identify critical conservation areas and compensatory mitigation parcels. Called Greenprints, these efforts include but are not limited to California Natural Community Conservation Plans (NCCPs) and Habitat Conservation Plans (HCPs). HCPs are required for incidental take permit applications under the federal Endangered Species Act (US Committee on Environment and Public Works, 2002). They are underway in greater Los Angeles, the San Francisco Bay Area (Bay Area Lands, 2014), and statewide via Caltrans' Essential Habitat Connectivity Project. While such efforts may not provide direct funding sources, they may offer potential savings to Caltrans from expedited environmental review and from potential bundling of multiple projects' mitigation obligations.

1. **Caltrans' engagement with such efforts can facilitate advance mitigation.**
   - Caltrans can benefit from conservation and resource data that has already been collected and that has stakeholder support among groups active in the Greenprint's development. Leveraged in mitigation planning, such information offers efficiency savings.
   - Caltrans' involvement in Greenprints may nurture collaboration with non-profits committed to strategic land acquisition for conservation purposes, such as the Trust for Public Land.

High Speed Rail (HSR) in California

Planning for the construction of a new high speed rail system connecting California's major metropolitan areas is underway. The scale and location of the proposed system—planned to have over 20 stations and cover over 700 miles—present potential for significant negative environmental impacts, including impacts to wetlands and biological resources, farmlands, cultural resources, park land, and water quality.

Caltrans and the California High Speed Rail Authority (HSRA) – the entity responsible for the system's planning, design, construction, and operation – are independent, it is in the Department's interest to remain informed and involved in HSRA plans for assessing, funding, and meeting its mitigation needs.

1. **Given the potential for HSR impacts and mitigation obligations, the HSRA has signaled interest in addressing environmental mitigation prior to construction and in funding such activities through bond sales.**
2. **Further, the HSRA has made funds available to support a full-time senior position within California's Strategic Growth Council (SGC) to coordinate advance mitigation efforts.** One possible goal of coordinative efforts may be to establish a multi-agency task force that would evaluate and plan advance mitigation opportunities for future HSR segments.
3. **If convened, a multi-agency group could be an important venue for Caltrans participation, as such a group may provide a forum for exploring cross-agency mitigation needs and solutions, as well as collaborative approaches to funding for large-scale advance mitigation planning and implementation** (Statewide Advance Mitigation Funding and Financial Strategies, 2013).

California Department of Water Resources

Caltrans may wish to assess the success of the Department of Water Resources (DWR) in establishing modest funding for advance mitigation efforts through bonds. While the reasons for bond funding would be different, the DWR funding approach may prove a useful model for Caltrans:

- California DWR has obtained $25 million in Proposition 1E bond funding, to be allocated to environmental stewardship projects supporting the Central Valley Flood Protection Plan.
- The DWR must identify what it would fund, and the Department of Finance will sell the bonds. Funds would be received by DWR's FESSERO (FloodSAFE Environmental Stewardship and Statewide Resources Office) account (California Department of Water Resources, 2014a).
- DWR has used these funds to issue Request for Proposals for lands that could offset anticipated impacts in the Central Valley. Two mitigation parcels have been financed and are being established by contractors; a number of other projects have been identified (California Department of Water Resources, 2014b).

Cap-and-Trade Program of the California Air Resources Board (ARB)

California's newly established Cap-and-Trade Program yields auction revenues to be invested in support of greenhouse gas (GHG) reduction. A dedicated state fund receives Cap-and-Trade revenues, and the Legislature may make appropriations from it to support GHG reduction efforts, as guided by a 3-year investment plan prepared by the Department of Finance. The program is relevant to Caltrans' efforts to establish a more systematic, strategically funded advance mitigation program in California.

1. **Expenditures supported by Cap-and-Trade revenues must demonstrate first that they can facilitate GHG reductions, and second, if feasible, that they can support related state goals.**

2. **It is possible for a statewide advance mitigation program to be structured in such a way as to support not only the primary aim of mitigating transportation project impacts on natural lands and habitats, but also the related goal of reducing GHG emissions in California.** The Orange County SCS provides such an example.

3. **Under a program structure supporting *both aims*, advance mitigation efforts could:**
   - be connected with the regional Sustainable Communities Strategies required under SB 375.
   - be eligible to compete for a place in the Cap-and-Trade Investment Plan.

4. **A key factor in establishing this nexus is documentation that land conservation or other strategies pursued for advance mitigation would contribute to measurable GHG reductions, as required by the Cap-and-Trade Expenditure Plan.**

5. **Of the further ancillary goals to be supported by Cap-and-Trade investments, several may be served by advance mitigation efforts.**

2. Introduction

When developing or improving transportation infrastructure in ways that impact ecosystems, habitats, and species, Caltrans—and its local and regional agency partners—have the responsibility through compensatory mitigation to offset these impacts with the conservation and restoration of regional natural resources. The development of transportation infrastructure involves a long planning, funding, and implementation cycle that can take over a decade. Typically, associated compensatory (here referred to as environmental) mitigation is planned and implemented late in this process and on a project-by-project basis.

There is wide acknowledgment that early, more comprehensive assessment of habitat-level impacts and early planning for mitigation thereof, across multiple rather than individual infrastructure projects, promises potential benefits. These benefits may include: reduced project delays; reduced mitigation and transaction costs; and improved mitigation quality. However, the degree to which advance mitigation may be implemented is restricted by the availability of funds to support the process within existing modes of the business of transportation development. Examples of where funding has been procured are available, but at the level of state government in California, there has not been a single approach identified which could be adopted as a suitable funding mechanism for the needs of the California Department of Transportation (Caltrans).

To identify and assess approaches to the funding of statewide advance mitigation of transportation projects, Caltrans has engaged a University of California Davis-based team of research scientists and senior professionals to undertake the Statewide Advance Mitigation Funding and Finance Study (SAMFFS). The study has three core research tasks:

1. to develop a background report establishing context for the effort;
2. to examine the business case for advance mitigation by identifying and quantifying its potential costs and benefits; and
3. to evaluate potential way the planning and implementation of comprehensive mitigation initiatives could be funded and financed far in advance of the typical project delivery time-line.

This report, titled "*Setting the Stage for Statewide Advance Mitigation in California,*" submitted in fulfillment of Task 2 of the SAMFFS effort, provides a review of the financial approaches to funding advance mitigation that have been used in other local, state, and national efforts. The material is meant as reference, which Caltrans can use when considering the preferred options for its advancement of this innovative approach. This report is organized into six sections:

1. an executive summary;
2. this introduction;
3. an overview of advance mitigation and with a focus on how it has been funded and/or implemented;
4. review and analysis of significant California experiences with advance mitigation to date;
5. review and analysis of significant national experiences with advance mitigation to date; and
6. highlights of the current national and state policy environment in which funding and implementation of advance mitigation are embedded.

3. Overview and Literature

This section provides an overview of advance mitigation with the intention of grounding the funding and financial aspects involved in implementing advance mitigation in various contexts. What emerges from this review is that advance mitigation as an approach has received wide recognition, that a number of transportation agencies are now using this strategy, that some savings have been reported, but that the funding mechanisms of those programs are not clearly detailed. In addition, literature in science journals has focused on the ecological impacts of roads and the ecological benefits of a regional advance mitigation approach, with little to no reviews of the architecture of funding mechanisms.

This overview has five parts, intended to provide reference and citations relevant to advance mitigation and organized as follows:

1. Defining Advance Mitigation
2. Motivations for Transportation Agencies to Engage in Advance Mitigation
3. The Need for Programmatic Mitigation Strategies and Funding
4. The Environmental Impacts of Roads: A Basis for Environmental Review and Regulation
5. Current Initiatives

What is Advance Mitigation?

Advance mitigation can be defined as a process in which the impacts from one or many transportation projects are assessed early in the timeline of the projects, as well as assessment of the mitigation that will likely be required, and potentially the satisfaction of those requirements. Advance mitigation for transportation projects has been recognized as a desirable practice for transportation agencies at international (Gunn & Noble 2011; Partidário 2000), national (Brown 2006; United States HR 4348, 2012), state (California Department of Transportation et al 2010; Department of Water Resources 2014c) and county levels (San Diego Association of Governments 2014; Orange County Transportation Authority 2014).

There are several parts to advance mitigation. These include:

Strategic Planning: Strategic plans needed for advance mitigation include both assessments of what impacts multiple future transportation projects may have in a region; and, the development of mapped regional priorities for conservation/restoration, here called a Greenprint. The Greenprint can be used for both assessment of impacts from the transportation projects, and also for identifying sites for mitigation. Combining these two types of plans allows for the merging of conservation and infrastructure planning, which can be done at landscape or regional scales (Thorne et al. 2009).

Funding: Advance mitigation requires that the mitigation be purchased early in the planning of and well prior to the construction of transportation projects. Yet, mitigation funds are currently linked to individual projects. Funds become available only when planning for a project is mature enough to be programmed for funding, at which point the time before it goes to construction is short and may be insufficient for putting mitigation in place. Thus, funds are needed prior to projects being programmed, pointing to the need fund mitigation programmatically across projects rather than individually for single projects.

No Temporal Loss: An additional goal of advance mitigation is that the mitigation be in place prior to actual impacts to environment occurring, meaning that there will be no temporary loss of biological or ecological resources when the impacts of construction begin.

A way to differentiate advance mitigation from current business practices can be seen in Table 1, which also shows a midway approach where some elements of advance mitigation are implemented at an ecological and economic benefit, even if a full commitment to advance mitigation cannot be achieved.

Mitigation Approach	Landscape / Ecosystem Considerations
Traditional	• compensation sites are proposed on a project-by-project basis • sites are selected based on best professional judgment and with little/no analysis of landscape or watershed functional needs • sites chosen more to minimize costs to the permittee, where possible, than to maximize environmental outcomes • purchases made as needed reduce leverage in cost negotiations
Midway	• some evaluation of the landscape setting, but do not include holistic watershed- or landscape-scale planning • more than one project may be considered • funding may come from alternate source
Advance	• multiple projects in a region are assessed together • mitigation site design and selection is strategic and analytic • compensation choices made based on robust analysis of data on the watershed/landscape in which the mitigation project is proposed • site and design of mitigation projects are intended to improve the overall condition of a hydrologic or ecological unit • funding is provided in advance of project mitigation

Table 1. This table shows some of the characteristics of mitigation under current practice by transportation agencies, and some of the differentiation among partially advance, and fully advance mitigation practices. (Adapted from Cambridge Systematics Inc., 2011).

Motivations for Transportation Agencies to Engage in Advance Mitigation

There are several reasons for transportation agencies to engage in advance mitigation, which can be classed as *Financial*, *Ecological*, and *Sociological.*

Financial Motivations:
Perhaps the most compelling reasons for transportation agencies to engage in advance mitigation are the financial benefits that could be achieved. These fall into two categories: improving efficiencies in current practice, thereby lowering the costs associated with delay; and, economies of scale.

Efficiencies

A study funded by the National Highway Cooperative Research Program (Transtech Management, Inc., 2003) examined the causes and extent of environmental delay among state DOTs. It found that 65% of the DOTs surveyed had experienced delay due to environmental factors, and that the median delay attributable to such factors was 12 months. This work, however, did not attempt to monetize the value of that delay with respect to the various projects (Transtech Management, Inc., 2003). In California, an internal Caltrans report (Byrne 2004) assessed 4,090 programmed projects from 2002-2004. He found 44% had an environmental allocation and 35% had an environmental expenditure, and, of the 35%, 61%

expended more than the budgeted environmental line item. These expenditures were calculated equivalent to $59 million per year, as the costs of environmental delays to Caltrans.

The potential for reducing the delay associated with preparing environmental documentation in transportation project delivery, in securing environmental approvals and permits, in performing project-specific mitigation, and in responding to litigation, represents a significant potential advantage to be won from early assessment and fulfillment of regional or state mitigation needs. The exact length of and causes of delay due to environmental review are not always well understood, but in some cases, these processes can add as much as 10 to 15 years to the delivery timeframe for some infrastructure projects. In a recent hearing before the U.S. House of Representatives Transportation and Infrastructure Committee, Thomas Margrow, Chief Executive Officer of the Transportation Corridor Agencies in Orange County, testified that the federal environmental review process added 15 years to development of State Route (SR) 241 in California (Bergstein & Mo 2012).

Savings related to improved environmental processing have been estimated by a number of state DOTs under various advance mitigation frameworks. The Oregon Department of Transportation, reports that a programmatic approach to permitting bridges, through establishment of standards and an environmentally proactive approach, including up front planning, saved $72 million from 2003 to 2012 (Dietrich 2012). The Michigan Department of Transportation (MDOT) has implemented a programmatic wetlands advance mitigation approach which brought down the costs of wetland mitigation from $75,000-$150,000/acre to $25,000-30,000/acre through the use of statewide wetland mapping and mitigation site selection tool, and by funding the wetland mitigation separately from the transportation projects. MDOT now uses their selection tool to screen out poor mitigation sites, and regulators now approve 95% of the sites they are shown on the first review; previously, it took regulators and MDOT staff 4 to5 site visits to determine suitability (Environmental Law Institute 2010b). In addition, delays have been reduced, with 66% of all permits processed in 30 days by the Michigan Department of Natural Resources (Environmental Law Institute 2010a).

These examples show that the advance mitigation process can reduce project delays and associated costs due to environmental processes and can potentially provide savings to the department.

Economies of Scale

Economies of scale can be an important component of the financial motivation for advance mitigation. If similar mitigation needs are identified from multiple projects, this permits the possibility that fewer, larger, parcels might be acquired to satisfy the mitigation requirements. Reducing the number of real estate transactions needed in a region can potentially offer significant savings. In addition, on average, larger parcels cost less on a per acre basis than smaller parcels (Thorne et al. 2009), so the purchase of larger parcels may also permit a savings on this basis.

Ecological Motivations:
Ecologically, significant gains can be made by treating mitigation on a regional or ecosystem basis. Larger mitigation parcels can contribute to regional conservation and sustainability, a goal that has been identified for conservation areas subject to lower edge effects (Murcia 1995). Larger parcels can also be placed to promote landscape connectivity for plant and wildlife movement needs as well as ecosystem processes (Spencer et al. 2010; Taylor et al. 1993), and can be selected from identified targets for regional sustainability and conservation, here called Greenprints (Marcucci & Jordan 2013). The combining of ecological and transportation planning offers benefits to both interests, as found in a recent review:

> "It is in the transportation community's interests to actively facilitate green infrastructure planning because it creates a more predictable environmental review context. On the other hand, for landscape-level green infrastructure, transportation planning and development is much more established and better funded and can provide a means of supporting green infrastructure planning and implementation, thereby enhancing conservation of ecological function" (Marcucci & Jordan 2013, 182).

In addition, advance mitigation offers the opportunity to improve the ecological effectiveness of the mitigation because, in regions where transportation (and other) development is having ongoing cumulative impacts on the natural environment, the mitigation may be implemented while larger tracts of land and ecosystem benefits still exist (Wilkinson 2009), and to consider offsets for the cumulative impacts. This is one of the reasons why there is a growing emphasis from conservation interests on landscape-level habitat preservation rather than species-specific interventions or protections, and a growing emphasis on combining efforts directed at multiple goals as well as leveraging multiple resources (Scarlett et al 2013; Brown 2006). From an ecological perspective, it is increasingly understood that:

> "[c]onservation problems unfold at large scales, and solving them requires combined public and private actions across human-made boundaries. These challenges put a premium on developing tools for cross-jurisdictional, public–private, and private–private coordination and cooperation" (Scarlett et al 2013, 25).

Sociological Motivations:
The process of advance mitigation works best with ongoing communication between action agencies, regulatory agencies, and other stakeholders. The relationships and communication developed through these meetings can serve transportation agencies well in the event. Examples that are specifically recognized include Oregon's programmatic bridge 'Ecosystem Approach,' wherein a programmatic approach to the permitting process depended on collaboration among eleven state and federal agencies.

> The interactions facilitated by the Bridge Delivery Program have continued to strengthen interagency trust and communication, and set a precedent for future collaborations and increased efficiencies and effectiveness in environmental protection efforts. (Dietrich 2012, 4).

The Need for Programmatic Strategies and Funding

Few advance mitigation efforts have detailed the architecture of funding mechanisms. Some program evaluation of savings through the use of such an approach are available, with many detailed in other sections of this report. However, details on the sources of the funding, and whether that funding derived from project funds, was programmatically allocated by a transportation agency, or was derived from an external source, are scarce. In order to determine how best to position advance mitigation in Caltrans on a programmatic basis, more detail and an array of strategic options are necessary. A review of some of these options emerges from the California and other state project profiles compiled in the following chapters of this report.

Impacts Associated with Roads: A Basis for Environmental Review and Regulation

Many studies that inform the practice of advance mitigation have come from the ecological sciences, and from the emerging subdiscipline of road ecology (Forman et al. 2003). These works address the adverse impacts of transportation infrastructure on the natural environment (Trombulak and Frissell 2000; Forman et al. 2003; National Research Council 2005). Among the impacts recognized in the literature are direct and cumulative mortality to species hit by vehicles (Riley et al. 2006; Seo et al. 2013), reduced dispersal capacity (Forman and Alexander 1998), and impediments to gene flow (Epps et al. 2005; Riley et al. 2006). Road use increases the spread of invasive species (Gelbard and Belnap 2003), generates noise that affects breeding birds (Reijnen et al. 1995), generates greenhouse gas emissions (Fuglesvedt et al. 2008; Kennedy et al. 2009), and contributes to a variety of indirect effects including the road effect zone (Bissonette and Rosa 2009), and landscape fragmentation (Jager et al. 2005; Girvetz et al. 2008). Finding a balance between infrastructure development and preservation of open space for biodiversity conservation, ecosystem processes, agriculture, and other needs is most effectively addressed at a regional level (Kark et al 2009; Huber et al. 2010; Gordon et al. 2013; Moilanen et al. 2013). Documentation of these impacts, as well as overarching environmental protection laws, have produced a complex regulatory framework that aims to limit negative impacts of transportation projects but that also increases the cost and time required to develop infrastructure improvements.

Current Initiatives

A wide range of programs are trying to implement advance mitigation, through a variety of approaches, many of which are detailed in subsequent chapters of this report. Recent reviews of this field include a synopsis of three state programs and the San Diego *TransNet* Environmental Program (Greer and Som 2010), and a yet unpublished technical report to the Transportation Research Board (TRB) by Venner that discusses the business case for advance mitigation to FHWA. Further, a review of the benefits of developing green infrastructure plans that permit more responsive transportation plans and a streamlined environmental review process has recently been published (Marcucci and Jordan 2013). In addition, several ongoing conferences have focused sessions on the planning, partnerships, and ecological information, including the biannual International Conference on Ecology and Transportation[1] and the Annual Transportation Research Board meeting.[2] The 2014 TRB meeting featured Session 500 titled "Balancing Economic and Environmental Objectives: Accelerated Project Delivery and Environmental Stewardship Streamlining Opportunities in MAP-21 and Beyond," that includes a presentation on California's experiences.

The concept of advance mitigation has been adopted in Law (Ecological and MAP-21), and is promoted through the US Federal Highways Administration through the program 'Eco-Logical' (US Federal Highway Administration 2006; Brown 2006), which posts a yearly update on progress being made in various locations around the nation. In addition, the TRB has supported efforts to develop the concepts and in some cases implement them through two cycles of funding under the Strategic Highways Research Program (SHRP1 & 2; the capacity and reliability themes), which are currently focused on increasing capacity to conduct the impact assessments.

The next sections of this report provides profiles of the funding mechanisms and related policies used in mitigation projects that have been conducted in California and in projects in other states. These are intended to illustrate a variety of funding strategies that have been employed in different contexts, and to permit the development of a list of those approaches.

[1] http://www.icoet.net/ICOET_2013/index.asp
[2] http://www.trb.org/AnnualMeeting2014/AnnualMeeting2014.aspx

4. California Experiences with Advance Mitigation

Rationale for Studying California Efforts

What broad choices and strategies must Caltrans consider to implement, fund, and manage a statewide program for advance mitigation of its transportation infrastructure investments? The SAMFFS answers this question in part by scanning how advance mitigation needs and opportunities have been addressed in California to date. The experiences shed light on how future advance mitigation efforts may unfold.

The Caltrans Staff Working Group (SWG) identified a set of 10 in state efforts to undertake mitigation on an advanced basis. We performed a detailed review of each efforts to uncover:

- the funding, revenue sources, or financial options used to support advance mitigation;
- administrative, legislative, or institutional actions that facilitated advance mitigation;
- data, where available, on costs or benefits attributed to an advance mitigation approach; and
- lessons learned from the project or experience.

For this study, key personnel involved in each effort were interviewed to collect information about the history of the effort and the specific features of the advance mitigation planned or undertaken. Additionally, these informant-based reports were augmented where possible with documented reports of each initiative, located on public agency websites, in downloadable agency reports and legal documents, and in online newspaper articles. Gathering information from multiple sources provided for greater accuracy. In-person informants are better able to recollect key facts about recent projects, yet in some instances the Research Team needed to consult agency staff about efforts they had worked on ten or more years ago. In such cases, it is fortunate that the appropriate key personnel were still available to provide background details and institutional knowledge of the effort.

Advance Mitigation Approaches in California and Their Funding

While the individual project histories represented in these 10 efforts are diverse, some natural groupings emerge as a way to consider broad similarities among them. One group consists of Caltrans-led initiatives undertaken for Caltrans' projects. These efforts attempt, some more successfully than others, to provide early, more comprehensive mitigation to service one or more projects, albeit within Caltrans' traditional framework for project-based mitigation. They are modest in scale when compared with county-led efforts, with only one mitigation initiative exceeding 500 acres and with costs ranging from $2 million to $13 million. Most of these Caltrans' initiatives are located in Northern California and are characterized by an ad hoc, opportunistic approach, where strategic land purchases or easements are pursued as opportunities arise. Caltrans may initiate the purchase, but ultimately seeks another party to be the long-term deed or easement holder, often necessitating complex land transfer arrangements. These efforts rely almost exclusively on funds from the budgets of projects they would mitigate, or of projects the location and timing of which makes them good candidates for supporting the mitigation effort. Not purely "advance mitigation," these efforts often involve mitigating a project that is already approaching construction, and then using that effort to undertake a more ambitious, advance conservation and/or restoration effort that can serve to mitigate future projects.

A second group of efforts are led county- or regional-based entities and distinguished by the sheer scale of the advance mitigation planning effort, both in terms of land area and dollar resources involved. These initiatives aim to mitigate a mixture of Caltrans' and locally sponsored transportation projects through broadly-encompassing habitat conservation plans or similar efforts informed by natural resource and land conservation priorities. The county-led efforts are located in highly urbanized or rapidly urbanizing regions of Southern California, and they have been crafted to depend on a variety of funding sources, the

most prominent being local sales tax measures approved to support transportation investment. (Local development fees, bond issues, and conservation-based grants have also been used to support these efforts.) The dollar amounts reserved or planned for mitigation expenditures are significantly greater than for Caltrans' efforts, ranging from tens of millions to over $4 billion. These expenditures are also anticipated over much longer time periods—and hence subject to far more uncertainty. Many of the underlying transportation projects that would be mitigated are also planned far in the future, making their realization similarly uncertain. Caltrans own commitment to contribute to these efforts varies enormously. Whereas the San Diego and Orange County mitigation programs rely largely on local sales taxes, not Caltrans contributions, to support the early mitigation effort, the HCP efforts in Coachella and Western Riverside do involve sizable Caltrans obligations to make or fund significant land purchases and endowment contributions.

The third kind of effort, devoted more exclusively to early conservation planning to support advance mitigation, is represented by the Santa Cruz County Blueprint. To date, this effort is not attached to specific transportation projects needing mitigation. Nor are specific mitigation funding sources identified to support it as yet.

Observations about the California Experiences

Taken together, these case studies present a series of general observations about efforts to undertake advance mitigation.

1. Caltrans practices regarding land acquisition and ownership can challenge advance mitigation efforts.

Caltrans policy dictates against keeping mitigation lands on the Department's books, as it prefers not to hold the title on mitigation properties, even temporarily. Further, when acquiring properties for mitigation, Caltrans must follow Right-of-Way acquisition procedures that make it hard to be the kind of nimble buyer required by advance mitigation efforts. These practices can complicate Caltrans' pursuit of advance mitigation and undermine its ability to act on large-scale mitigation purchases.

For example, Caltrans' advance mitigation success with Beach Lake project had to do with its ability to maintain ownership of land suitable for advance mitigation over a long period. Even so, it still took many years to successfully transfer the land to USFWS, demonstrating the challenges even when a suitable land recipient is present. Further, the San Diego EMP experience shows that buying land early in large blocks of habitat saves costs and reduces lost opportunities. These instances suggest that Caltrans operates at a disadvantage if it cannot purchase land outright, in early stages of project planning. As time passes, land costs escalate and negotiations increasingly favor the seller; Caltrans' leveraging opportunities diminish as it seeks to maintain the project timeline.

Similarly, Caltrans Right-of-Way staff suggested in Research Team consultations that Caltrans could accrue considerable support cost savings if it could act more like a regular buyer, with a less onerous appraisal process and with an agent or broker empowered to act on behalf of state. The Department could also reduce opportunity costs in this way, as it bears costs when it loses opportunities to buy strategic mitigation properties when they are available from a ready seller.

2. Collaboration itself – and in particular with a JPA or other locally empowered entities – may facilitate Caltrans' mitigation efforts.

Across efforts of all scales, advance mitigation initiatives were aided when a JPA or other local entity participated, as such entities often provided greater flexibility for the land conservation and acquisition strategy. Smaller advance mitigation efforts in the Northern part of the state included successful partnerships with a local COG for the SR-149 project and with a Regional Conservation District (RCD) for the Cottonwood Conservation Bank. In larger HCP efforts in Southern California, Caltrans participated in an HCP that was implemented by a local JPA.

Partnering with a JPA or other local entity is also useful for coordinating a collaborative effort between many stakeholders. Such coordination has been essential to the success of many of the case study efforts, and partnering with such entities may remove some of the coordination burden from Caltrans while playing on the existing institutional strengths of these organizations.

In the world of acquisitions, local agencies can move more quickly and nimbly with more freedom than can Caltrans. One approach may be to pursue advance mitigation in partnership with other agencies / entities, provided the other party serves as the lead agency for the acquisition. If Caltrans acts as the lead agency, as opposed to a supporting funder, it must follow its own acquisition (fair market valuation) rules.

The sheer scale of the larger advance mitigation efforts in Southern California has necessitated many collaborators. For the Riverside effort, for example, UC Riverside has collaborated on biological and land adaptation; the Corps of Engineers has been involved with riparian issues; and real estate developers have contributed land and planned their own developments reflecting the needs of the conservation authority.

3. Advance mitigation properties adjacent to conservation areas or public lands are advantageous.

The Beach Lake Mitigation Bank showed that using mitigation land next to existing reserves, in this case a national wildlife refuge, could help Caltrans find an ultimate land holder for its mitigation land (here, USFWS).

Further, by acquiring land next to existing conservation reserves, Caltrans may also receive a more favorable mitigation ratio due to conservation economies of scale. This was evident in the Honey Lake Mitigation Bank, and was also a defining feature of the large Southern California HCPs. San Diego negotiated for lower required mitigation rations through its EMP, which Caltrans could benefit from as an EMP participant. Similarly, the Coachella HCP capitalizes on the adjacency to existing tracts of lands in public ownership, with large swaths of the area owned by the Bureau of Land Management, Forest Service, National Park Service, and the California Department of Parks and Recreation.

4. Existing large-scale conservation efforts can offer structure and momentum for advance mitigation planning.

In addition to biological economies of scale, comprehensive regional efforts presents other benefits that make participation in such efforts worthwhile. First, comprehensive large-scale conservation efforts provide a pre-determined guideline for mitigation. This is a benefit of an HCP, or a Blueprint program like Santa Cruz.

Further, comprehensive efforts like HCPs allow Caltrans to spread mitigation costs among all projects in the plan area, providing certainty of ESA approval, and reducing the time and cost of environmental clearance on a per-project basis.

5. Planning for advance mitigation inevitably involves future planning uncertainties.

By definition, preparing mitigation in advance of projects exposes Caltrans to uncertainties. In both Coachella and Western Riverside, the long time horizon of the plans result in estimates for project planning and mitigation costs that are subject to change.

Similarly, mitigation bank development can take a very long time and is unpredictable, as evidenced by Honey Lake. Given the complexity and effort involved in establishing a USACE recognized mitigation bank for its own use, better options may be to pursue an in lieu fee or to purchase credits from existing banks when available.

6. Flexibility is needed to accommodate timing issues that arise with advance mitigation.

As evident in the Cottonwood Conservation Area, Caltrans can amortize the costs for a larger advance mitigation project across multiple projects. But, delays in the implementation of advance mitigation require that Caltrans approach multiple project mitigation with flexibility. For example, the delays in the Honey Lake Mitigation Bank resulted in the projects that planned to use it for mitigation pursuing status quo mitigation since the bank was not ready. Similarly, Elkhorn Slough was only established in time for the third of three planned projects to use it for mitigation. As a result, both of these conservation efforts wound up not being *advanced* for the planned projects, but are now existing for other as yet undetermined projects to use for advance mitigation.

Attributes of Advance Mitigation Efforts in California

	County-Lead/Funded Efforts					Caltrans-Lead/Funded Efforts						Planning Efforts	
	Coachella Valley MSHCP	W. Riverside County MSHCP	Orange Cty. Env't'l Mit Program (OCTA EMP)	San Diego SANDAG TransNet		Beach Lake Mitigation Bank	Elkhorn Slough Early Mit. Project	California SR 149 (Butte 149)	Cottonwood Conservation Area	Honey Lake Wetlands Mit. Bank		Santa Cruz Consrvtn. Blueprint	
Lead Entity/Entities of Mitigation Effort													
Caltrans						☑	☑		☑	☑			
MPO / COG	☑	☑		☑				☑					
Local Transportation Agency			☑	☑									
Local Conservation Authority / Organization									☑			☑	
Funding Sources - Mitigation Implementation													
Transp. Project-based Funding, via Caltrans	☑	☑				☑	☑	☑	☑	☑			
Local Option Sales Tax Measure	☑	☑	☑	☑									
Local Development Mitigation Fee	☑	☑											
Bonds - backed by any revenue stream			☑										
Conservation-oriented grants (e.g. Sec 6)	☑	☑	☑	☑								☑	
Transportation Projects Mitigated													
Caltrans-sponsored projects	☑	☑		☑		☑	☑	☑	☑	☑			
Locally-sponsored projects	☑	☑	☑	☑									

County Funded Multi-Project Advance Mitigation Efforts

Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP)

Description: The Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) covers 1.1 million acres, aims to conserve over 240,000 acres of open space and protect 27 plant and animal species. It's a collaboration among public and private landowners and resource agencies[3] to establish a permanent habitat reserve and perpetual land management program while accommodating for urban development and recreational use in central Riverside County. The Plan took over a decade to establish, and provides comprehensive compliance with federal and state endangered species laws, facilitating construction of roads and other essential infrastructure.

Coachella Valley Association of Governments (CVAG) led planning of the HCP. Implementation of the Plan will be overseen and administered by the Coachella Valley Conservation Commission (CVCC), a joint powers authority formed between CVAG and local Water Agencies. The CEQA lead for the entire MSHCP is CVAG. Caltrans was the CEQA lead on the completed interchange projects.

Mitigation: While most resources are focused on assembling a preserve system to mitigate covered development activities, the MSHCP would use a wide range of mitigation and conservation measures. Large tracts of adjoining lands are owned by the Bureau of Land Management, Forest Service, National Park Service, and the California Department of Parks and Recreation.

Caltrans is a co-permittee under the MSHCP and has received coverage for projects including interchange improvement, arterial widening in the area, and other planned projects in the region. While Caltrans has specific mitigation requirements for their projects, the amount has been negotiated within the context of the entire MSHCP, providing economies of scale for mitigation. As elaborated by Lederman and Wachs , the economies of scale have to do with the fact that: "Large scale HCPs allow the cost of mitigation to be spread among all development in the plan area, increasing administrative efficiency and enabling the development of landscape-scale mitigation. For developers of specific projects, including agencies responsible for transportation projects, this provides certainty of ESA approval if they meet requirements specified in the HCP, greatly reducing the time and cost of environmental clearance on a per-project basis" (2014, p. 3).

Mitigation Funding: The HCP will be funded from a combination of a local development impact fee, a conservation trust fund, and contributions from infrastructure agencies (including Caltrans). The total cost of the HCP over its 75-year permit will be over $2 billion.

Caltrans is required to contribute both land and funding to the HCP in accordance with its covered projects under the HCP. Caltrans is to acquire 1,795 acres to mitigate the interchange and associated arterial projects, and contributed $1,077,000 to the endowment for the Monitoring Program, Management

[3] Collaborators include: CVAG, the cities of Cathedral City, Coachella, Desert Hot Springs, Indian Wells, Indio, La Quinta, Palm Desert, Palm Springs, and Rancho Mirage; County of Riverside (County); USFWS; CDFG; Bureau of Land Management (BLM); U.S. Forest Service (USFS); and National Park Service (NPS) signed the Planning Agreement to initiate the planning effort. Subsequently, Caltrans, Coachella Valley Water District (CVWD), Imperial Irrigation District (IID), Riverside County Flood Control and Water Conservation District (County Flood Control), Riverside County Regional Park and Open Space District (County Parks), Riverside County Waste Resources Management District (County Waste), California Department of Parks and Recreation (State Parks), and CVMC.

Program, and Adaptive Management of those lands. Caltrans is also required under the MSHCP to maintain specific conservation measures relating to the I-10, including requirements for culvert and bridge maintenance and construction that would minimize incidental take. As of the present, these HCP requirements have not been met by Caltrans, but in order to move the project forward, CVAG contributed local money for both the project and the required mitigation.

For additional regional projects Caltrans is obligated to acquire 5,791 acres of land to mitigate its non-interchange projects. The projected cost for this is $27,875,000 (nominal dollars). These acquisitions must be accomplished in or by 2015. Caltrans must also contribute $7,600,000 towards the Endowment Fund for monitoring and management of the mitigation land.

Regional transportation projects are funded through the county transportation sales tax measure (Measure A), of which $30 million will be contributed to Plan implementation to help accomplish the Permittees' mitigation obligation.

Observations:

1. As with other advance mitigation efforts (SR-149), participation by an entity empowered as a JPA appears an advantageous institutional arrangement that facilitates mitigation implementation.
2. As in the Western Riverside case, this MSHCP effort involves Caltrans (and non-Caltrans) transportation projects planned for completion far in the future. Also, funding plans for both transportation projects and their mitigation is long-term, reliant on revenue sources that may or may not produce anticipated amounts. Thus, the projects themselves, their attendant mitigation needs, and the funding for both projects and mitigation are subject to change.
3. As with other advance mitigation efforts, the Coachella HCP capitalizes on inclusion of/ adjacency to existing tracts of lands in public ownership. Large swaths of the CVMSHCP area are owned by the Bureau of Land Management, Forest Service, National Park Service, and the California Department of Parks and Recreation.
4. For Caltrans, inclusion of its projects in the MSHCP provides economies of scale, allowing mitigation costs to be spread among all projects in the plan area, providing certainty of ESA approval, and reducing the time and cost of environmental clearance on a per-project basis.

Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) (2008 – present)

Effort & Location Description	Participating Entities / Additional Partners	Mitigation Details	Transportation Component / Projects Mitigated	Costs of Effort (Documented / Estimated)	Funding Source Details	Cost / Benefit Considerations
Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) **Riverside County, CA** **Caltrans District 8** The CVMSHCP covers 1.1 million acres, aims to conserve over 240,000 acres of open space and protect 27 plant and animal species. By providing comprehensive compliance with federal and state endangered species laws, the Plan not only safeguards the desert's natural heritage for future generations, but it also allows for more timely construction of roads and other infrastructure that is essential to improving quality of life in the Coachella Valley.	**Initial Plan Agreement:** • Coachella Valley Association of Governments - HCP planning & implementation • Cities: Cathedral City, Coachella, Desert Hot Springs, Indian Wells, Indio, La Quinta, Palm Desert, Palm Springs, and Rancho Mirage • Riverside County • CDFW • USFWS • Bureau of Land Management* • U.S. Forest Service (USFS)* • National Park Service (NPS)* • Coachella Valley Conservation Commission (CVCC) – (JPA between CVAG and local Water Agencies) oversee HCP implementation • private landowners * public landowner in the HCP **Later Participants:** • Caltrans • Coachella Valley Water District • Imperial Irrigation District (IID) • Riverside County Flood Control and Water Conservation District • Riverside County Regional Park and Open Space District • Riverside County Waste Resources Management District (County Waste) • California Department of Parks and Recreation (State Parks) • CVMC	The HCP covers 27 species (and 27 different types of natural communities that are the habitat for these species): 5 plants 2 insects 1 fish 1 amphibian 3 reptiles 11 birds 4 mammals The HCP provides an Incidental Take Permit (ITP) issued in 2008 by USFWS. In exchange for establishment of the Conservation Area, specified infrastructure and development activities (commercial & residential) have clearance under Sec. 10 of the Endangered Species Act (ESA).	The HCP permits provide Take Authorization for various Caltrans' interchange projects, including: • Indian Ave. I-10 Interchange • Palm Dr. /Gene Autry Trail I-10 Interchange • Date Palm Drive I-10 Interchange • Bob Hope Drive I-10 Interchange • Jefferson Ave. I-10 Interchange • associated local arterial widenings Also: • other regional Caltrans projects not connected with I-10 Interchanges (largely on SRs 62,74, 86, 111) Covered Caltrans projects are both outside and within the Conservation Area.	Caltrans is obligated to contribute to the HCP via acquisition of land for the Conservation Area and via cash payments for monitoring and management of the Conservation Area. For the I-10 interchange projects & related arterials: • Caltrans must acquire 1,795 acres (and conveyed to CVCC) as part of the Conservation Area / Reserve System. • Caltrans must also pay $1.077 million to the CVCC for the endowment funding ongoing monitoring, management, and adaptive management of those lands. For its additional future projects, Caltrans must: • acquire 5,791 acres of land and convey to CVCC by 2015 (projected cost: $27.875 million) • contribute $7.6 million toward the endowment for the Conservation Area	**TOTAL MIT. REVENUES (est):** $2.038 billion **REVENUE SOURCES:** **Local Sales Tax Measure** • $30 million dollars of Riverside County's Measure A ½ cent sales tax will go to Plan implementation to help accomplish the Permittees' mitigation obligation. The Measure says funds *can be* used to mitigate the direct, indirect, and cumulative effects of transportation projects on the Covered Species and conserved natural communities in the HCP. **Caltrans Contributions** • $1.077 million for endowment **Other HCP Funding Sources** $517 million - Local Development Mitigation Fee $227 million - Conservation Trust Fund $247.5 million – Eagle Mountain Env'tl Mitigation Trust $60.2 million worth of acquisitions & endowment from Caltrans ($27.875 M) and from water agencies - CVWD and IID	• enabled the acceleration of planned transportation projects in the area, as well as the related development benefits • help expedite construction of all currently planned road projects in the next 25 years • allows 75 years of Caltrans projects to be permitted and constructed without costly delays • ESA approval is guaranteed for included projects, without per-project clearance procedures Costs of establishing the HCP must be weighed against: • cost of HCP development • time required by HCP development

Western Riverside County Multiple Species Habitat Conservation Plan (WRCMSHCP)

Description: In 1999 the Riverside County Board of Supervisors and the County Transportation Commission started work on an HCP, intended to enable both continued private land development and substantial expansion of highway infrastructure. In return for establishing a conservation reserve, USFWS and the CDFW issued a 75-year take permit for endangered species. The HCP is administered by the Western Riverside County Regional Conservation Authority (RCA), a JPA created for this purpose. The plan provides mitigation for a long list of both state and local transportation projects. Caltrans played a role in developing these plans and is funding of several of the projects, along with numerous other funding sources. The CEQA lead differs per project.

Mitigation: RCA manages the assembly process, and federal, state, and local governments as well as private developers are expected to contribute either land or funding. These holdings may be acquired in fee or through conservation easements, deed restrictions, land exchanges or through flood-control easements. In addition, the plan provides for habitat management, including adaptive management, biological monitoring, and staff support for plan implementation and oversight.

The plan required 500,000 acres for mitigation, but a large portion was already in public ownership, leaving 153,000 acres to be acquired to complete the MSHCP reserve. Of the 153,000 acres, federal and state agencies are obligated to fund the acquisition of about 56,000 acres.

Mitigation Funding: The transportation projects included in the HCP were estimated to cost over $12 billion dollars in 2007-08. The cost of land needed to complete the reserve (the 153,000 acres) was estimated to be $4.2 billion. Although this schedule has not been met, when the MSHCP was adopted planners anticipated that local transportation projects would contribute $371 million (in nominal dollars) to mitigation over the plan's first 25 years:

- $64 million in local Transportation Uniform Mitigation Fees (development fees fund both transportation infrastructure and environmental mitigation thereof);[4]
- $121 million from local transportation projects funded by Measure A (an RCA resolution stipulates a 5% contribution of construction costs for local roads covered by the MSHCP); and
- $186 million from non-Measure A and non-TUMF transportation projects.

Caltrans is an HCP permittee and contributes directly to the acquisition, monitoring, and management of mitigation land.[5] In the first eight years of the plan, Caltrans is expected to acquire approximately 3,000 acres of land for $36 million to mitigate planned transportation projects, and to fund three positions or fund an endowment to support monitoring and management of conservation reserve lands. Caltrans capital construction funds come from the State Transportation Improvement Program (STIP) , and its long-term maintenance funds from the State Highway Operation and Protection Program (SHOPP).

Non-transportation funding include Local Development Mitigation Fees on new development, tipping fees from local landfills, and fees from non-transportation infrastructure. The HCP also facilitates access to other state and federal conservation grants.

Observations:

1. The JPA allows for greater flexibility in land conservation/acquisition strategy.
2. Development fee funding is highly dependent upon local economic conditions.
3. Given the long time-frame of this plan, estimates of project and mitigation costs are subject to change. Many sources of uncertainty make the revenue to be produced by fees difficult to estimate.
4. The sheer scale of the Plan has necessitated engagement with many collaborators, including: UC Riverside has collaborated with respect to biological and land adaptation; the Corps of Engineers has

[4] Apart from the HCP, WRCOG levies the fees on new development in western Riverside County and uses the funds to provide infrastructure improvements to accommodate the new development.

[5] Caltrans will also either provide the salaries for three positions for management and monitoring of conservation reserve lands, or fund an endowment to support monitoring and management.

been involved on riparian issues; and real estate developers have contributed land and have planned their own developments with attention to the needs of the conservation authority.

Western Riverside County Multiple Species Habitat Conservation Plan (WRCMSHCP) (2004 – present)

Effort Location Description	Participating Entities / Additional Partners	Mitigation Details	Transportation Component / Projects Mitigated	Costs of Effort (Documented / Estimated)	Funding Source Details	Cost / Benefit Considerations
Western Riverside County Multiple Species Habitat Conservation Plan (WRC MSHCP) **Riverside County, CA** **Caltrans District 8** In return for establishing a conservation reserve, the USFWS and the CDFW issued the county and 14 cities in Western Riverside a 75-year take permit for endangered species. The take permit allows the county and the 14 cities to approve development outside the reserve that may negatively affect 146 plant and animal species.	• Riverside County Board of Supervisors • Riverside County Transportation Commission • USFWS • CDFW • Riverside County • 14 municipalities • Caltrans **Western Riverside County Regional Conservation Authority (RCA) -** a joint powers agreement created to purchase targeted conservation lands, monitor & maintain them.	Incidental Take Permit under the Endangered Species Act for actions that would negatively affect 146 plant and animal species. Under the permit, 500,000 acres were needed for the HCP: • **Many lands already in public ownership** (248,000 acres of federal land, 34,000 acres of state land, and 65,000 acres of locally owned public or quasi-public land) • **153,000 acres still needed when permit was issued** --Federal and state agencies obligated to fund acquisition of 56,000 acres. --Local governments expected to purchase 56,000 acres from willing sellers. --Eminent domain will not be used.	The transportation plan for which the mitigation plan was intended to provide mitigation were estimated to cost over $12 billion dollars in 2007-08 and include a list of transportation projects such as: • The Mid County Pkwy • Winchester-to-Temecula Corridor • Riverside County–to–Orange County Corridor • Riverside County–to–San Bernardino County Corridor These projects represent new corridors or large capacity increases to existing corridors. Caltrans played a role in developing these plans, but the lead planning agency was the MPO. Caltrans will continue to be a funder of several of the projects, though most will be funded via numerous sources, not Caltrans alone.	Cost of land to complete the reserve (153,000 acres: **$4.2 billion**, per 2007 RAND estimate Funds have been expended to date by WRCRCA to acquire 45,775 acres (27 %) of the remaining goal of 153,000 acres. Details of individual acquisitions are publicized by WRCRCA, but prices paid for land are not.	RCA manages the assembly process, and federal, state, and local governments & private developers are to contribute land or funding. Funding for the RCA and its acquisitions comes from: • Local Development Mitigation Fee - since 2004 • Transportation Uniform Mitigation Fees – levied by the WRCOG, but RCA gets a portion - since 2008 • Other Transportation Fees/Project Funds – 5% of city & county road project costs must pay for mitigation • Tipping Fees • Various federal/state funds for conservation land acq. • Measure A – mitigation is an allowable expense. Caltrans is a permittee of the HCP and contributes to acquisition, monitoring and management of mitigation land. Its obligations: • acquire ~ 3,000 acres of land for $36 million • provide salaries for 3 positions for reserve mgmt. & monitoring / or fund endowment to do so • Caltrans funds come from the STIP and SHOPP.	No formal benefit-cost comparison has been attempted of the entire plan and program. RAND 2007 study ("stakeholder" interviews - local, state, and federal government agencies, major land developers, and environmental advocacy groups) suggests stakeholders believe HCP and RCA lead to: • reduced time in permitting • quicker approval of developments • more effective habitat preservation

Orange County Transportation Authority (OCTA) Environmental Mitigation Program (EMP)

Description: In 2006, Orange County voters approved an $11.8 billion transportation sales tax measure, Measure M2 (M2), a half-cent sales tax measure that funds freeway expansions, streets and roads, and transit between 2011 and 2041. The measure funds a freeway program that totals $4.871 billion for 13 projects and that also dedicates a minimum of 5 % ($243.5 million) of the freeway expenditures for programmatic environmental mitigation under the Environmental Mitigation Program (EMP).

Under the M2 freeway program, the Orange County Transportation Authority (OCTA) would make improvements to the state highway system of which Caltrans is the owner/operator. For the freeway program, Caltrans is the CEQA and NEPA lead (through assignment) for the environmental studies and inherits legal responsibility as the lead.

Mitigation:[6] The covered freeway projects have direct and indirect effects on a total of over 10,000 acres. The projects directly impact 3,134 acres, of which 116 acres are natural habitat, and indirect effects impact 7,268 acres, of which 484 acres are natural habitat. The OCTA Board allocated 80 % of EMP funds to land acquisition and management and 20 % to restoration over the life of the program. Decisions about properties to acquire and/or restore lands are initially made by a 12-member M2 Environmental Oversight Committee (EOC) appointed by the OCTA Board.

OCTA is in the process of completing its draft Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP). Caltrans, CDFW, and USFWS are primary partners for the NCCP/HCP, and more recently the USACE and Regional Water Quality Control Board have been contacted. Though the conservation mechanism is not yet finalized, it will likely be conservation easements or deed restriction on each of the acquisition properties, with OCTA holding the easement.[7]

Funding: The tax measure fully funds the EMP, but funds may be leveraged through other contributors and partners. For the property acquisition and restoration evaluation process, projects with confirmed or potential matching funds were ranked higher during the non-biological review. Roughly $1.5 million in matching have been received from USFWS's Section 6 (ESA), and other conservation grant programs.

To jump start mitigation activities and transportation projects before the M2 tax revenues began to accrue, OCTA issued bonds for $55 million against future sales tax receipts, funding an "Early Action Plan." Borrowing funds was more expensive, but an early start meant the program could acquire lands sooner, decreasing risk that important parcels would become developed or entitled. These tradeoffs had to be clearly articulated to and agreed upon by the conservation community, the EOC, and OCTA board.

Observations:

(1) It is both advantageous but complicated to involve many stakeholders in mitigation programs. In particular, it especially useful but difficult to receive simultaneous ESA and 404 permitting, an endeavor requiring open and frequent communication with resource agencies.
(2) Providing policy-maker flexibility with the mitigation expenditures is key to being able to shift the focus on mitigation needs. In addition, flexibility in the process is needed to shift mitigation funds when unforeseen impacts occur during the construction stage that cannot otherwise be anticipated under the conservation planning effort.
(3) Understanding the long-term management cost is key for agencies that have committed the acquired properties to a conservation plan.
(4) Regularly sharing of information with other jurisdictions that have regional conservation programs provides lesson learned as well as gaining a better understanding of conservation needs.
(5) Restoration costs go up as the program goes on. Putting restoration into effect earlier saves time and can reduce mitigation ratios because they already have a successful site.

[6] This information is not yet public. OCTA has given permission to include this content prior to the NCCP/HCP release in January 2014.

[7] To date, OCTA has purchased nearly 950 acres of sensitive lands and funded restoration of 11 sites totaling nearly 400 acres, using conservation easements and deed restrictions.

Orange County Transportation Authority's Environmental Mitigation Program (OCTA EMP) (2006 – present)

Effort Location Description	Participating Entities / Additional Partners	Mitigation Details	Transportation Component / Projects Mitigated	Costs of Effort (Documented / Estimated)	Funding Source Details	Cost / Benefit Considerations
Environmental Mitigation Program (EMP) **Orange County, CA** **Caltrans District 12** Voters approved Renewed Measure M (M2) in 2006, which included an EMP that provides landscape level conservation through acquisition, restoration, and management to mitigate the habitat impacts of 13 freeway project impacts in M2. OCTA has opted to create a Natural Communities Conservation Plan and Habitat Conservation Plan (NCCP/HCP) as the conservation mechanism for its EMP projects. Through a scientifically based process, OCTA, the Resource Agencies and Caltrans evaluated acquisition and restoration sites. As of December 2013, 950 acres have been acquired and 400 acres have been restored.	**Participating entities:** • OCTA • Caltrans • USFWS • CDFW • USACE • RWQCB • Conservation Groups **A Coalition of Conservation Groups** negotiated for this EMP, which includes $243.5M. Through an Environmental Oversight Committee (EOC) which oversees the EMP, properties are solicited, ranked, appraised, and based on strategy purchased/restored. Numerous land managers (OC Parks, State Parks, Audubon) are assisting with short-term (and eventual long-term) management of the acquired properties. Restoration sites will require deed restrictions/conservation easements to ensure long-term protected status.	Allowable Measure M2 mitigation expenditures: **land acquisition**, **habitat restoration**, and **land management**. M2 freeway projects directly impact 3,134 acres (115 acres of habitat) and indirectly impact 7,269 acres (484 acres of habitat). The soon to be released NCCP/HCP provides details about the mitigation properties and Resource Management Plans outline ongoing stewardship. **Ratios Multiplier:** Direct Effects: 2:1 Indirect Effects: 0.5:1 Preserve Implement.: 2:1 **Conservation Targets:** • Habitat Lands: 495.6 acres • Listed Plants: 116.2 acres • Listed Fish: 0.6 acres • Listed Herps: 582.8 acres • Listed Birds: 288.6 acres • Special Status Mammals: 766.9 acres OCTA's NCCP/HCP outlines direct/indirect effects, preserve implementation and conservation targets.	OCTA's EMP covers 13 voter-approved freeway projects. Projects include freeway improvements, on- and off-ramps, interchanges, etc. A complete list can be obtained in the M2 Transportation Investment Plan (TIP).	**Average Costs:** Per acre (acquisition): $26,315 Per acre (restoration): $25,259 Per acre (short term [2 yrs] management): $1055 **(Actual) Documented Costs:** Acquisition: $24,921,119 EMP Start Up: $2,658,600 Restoration: $10,078,580 NCCP/HCP Plan Development: $2,500,000 Debt Service: $37,200,000 **Estimated Costs:** Future Acquisitions: $7,362,361 Short Term Management: $8,369,965 Long-Term Management: $30,316,550 Future Restoration: $10,500,000	Voters approved $243.5M (2006 dollars) for this EMP as part of larger $11.8B sales tax (½-¢) transportation measure Further, before the M2 taxes kicked in, OCTA bonded ($55M) against future revenues to begin its "Early Action Plan" of transportation projects & mitigation actions. Acquisitions were leveraged with USFWS (Section 6)/NFWF grant: $1.5 M Matching funds have been provided for restoration from USACE, Coastal Conservancy, Nature Reserve of OC, and internal dollars from non-profit project sponsors. OCTA uses local, reg'l, state and federal dollars for its TIP: M2 sales tax revenues, Transit Development Act, Train Corridor Improvement Funds, State TIP dollars, Corridor Mobility Improvement Accounts (part of Prop. 1B), Prop. 1B, CMAQ Program, Regional Surface Transportation, Federal Transit Administration (e.g. 5307 and 5309), and Commuter Rail Endowment Fund	OCTA is too early in its EMP to have quantified its program benefits. Generically speaking it has identified the following benefits: streamlined permitting, bundled mitigation efforts, reduced staff time, reduced project delays, net environmental benefit, and support by voters and conservation groups. Though not quantifiable, relationships built and partnership/collaboration opportunities have been enormous. Those relationships with the USFWS, CDFW and non-profit conservation organizations have saved time and effort that was not seen in M1 during its individual freeway project mitigation or environmental review. OCTA will be completing its first 10 year review in November 2016.

San Diego Association of Governments' (SANDAG) Environmental Mitigation Program (EMP)

Description: In 2004, San Diego voters approved a $14 billion transportation sales tax measure, called *TransNet* that included an advance mitigation program. SANDAG is the project sponsor for the *TransNet* Transportation Investment Plan. Caltrans receives *TransNet's* local funds to help build regional freeway projects, while SANDAG provides the mitigation for Caltrans' freeway projects through its EMP. Caltrans is the CEQA lead on highway projects and plays a significant role on the real estate portion of transactions by completing Right-of-Way activities and land valuations.

Mitigation: SANDAG estimates that over 40 years they will need 2,352 mitigation acres: 226 coastal wetland (5:1 mitigation ratio), 299 non-coastal wetland (3:1 ratio), and 1,627 upland acres (2:1 ratio) to mitigate the freeway portion of *TransNet*. SANDAG's preferred method is conservation easements. They tend to have other government agencies (such as County Parks, local governments, etc.) whose mission aligns with the purpose of the EMP have long-term ownership and management roles.

TransNet has 11 Major Transportation Corridor Improvement projects funded. SANDAG has separated the mitigation from the actual transportation project, with a new Capital Improvement Project that focuses only on project mitigation and can mitigate across multiple projects at once. Decisions about properties to acquire and/or restore are made by a core team of non-political agency/resource-based individuals representing the permitting agencies and are based on the existing conservation framework of local HCPs.

Mitigation Funding: *TransNet* fully funds the EMP, and allocating $650 million for advance mitigation to support acquisition, restoration and management. The EMP allocates an additional $200 million (an estimated economic benefit of *TransNet*) to local agencies to mitigate local projects making for $850 million in total EMP funding. In general *TransNet* breaks its money up in to land acquisition, restoration, and long-term management.[8]

SANDAG also leverages *TransNet* revenue for access to a diverse array of funding sources from state to federal dollars. Generally speaking for every dollar from *TransNet*, SANDAG expects $1 in return from another source.[9] About 27% of funds are slated to come from the state, totaling $1.89 billion (see table below), with a portion of which come directly from such Caltrans programs as the State Highway Account (SHA), Corridor Mobility Improvement Account (CMIA), STIP Interregional Transportation Improvement Program (STIP IIP), Traffic Congestion Relief Program (TCRP), Trade Corridors Improvement Fund (TCIF), SHOPP, and State Oversight.

Observations:

1. Collaboration is a large part of the success of EMP. Four transportation agencies play a pivotal role: SANDAG, Caltrans District 11, Metropolitan Transit System, and North (San Diego) County Transit District. The EMP's large working group includes resource agencies (CDFW, USFWS, the Regional Water Quality Control Board and the USACE) and other regional land managers that meet frequently.
2. Success of the program is also attributed to a comprehensive GIS database, tracking of all actions taken, and emphasis on institutional knowledge.
3. The program's experience suggests that buying land early in large blocks of habitat saves costs and reduces lost opportunities. Further, cash transactions facilitate nimble acquisition of mitigation land.

[8] SANDAG has a financial system that can go to specific tasks, but it is seldom used at the program level. Consequently, none of these costs are broken out.

[9] The *TransNet* Dashboard (http://www.transnettrip.com/CashFlow.aspx) also shows an overall picture of funding sources contributing to the Early Action Program. For an example of the flexibility of funding mechanisms see http://www.transnettrip.com/ViewPopupStats.aspx?status=3&stype=1&expand=Mid-Coast+LRT+(Pre-PE)+(1041501)

4. These observations suggest that Caltrans operates at a disadvantage if it cannot purchase land outright, in early stages of project planning. As land costs escalate, negotiations favor the seller and Caltrans' leveraging opportunities diminish as it seeks to maintain the project the timeline.

Figure 1:
Overall Funding for SANDAG *TransNet* Early Action Plan

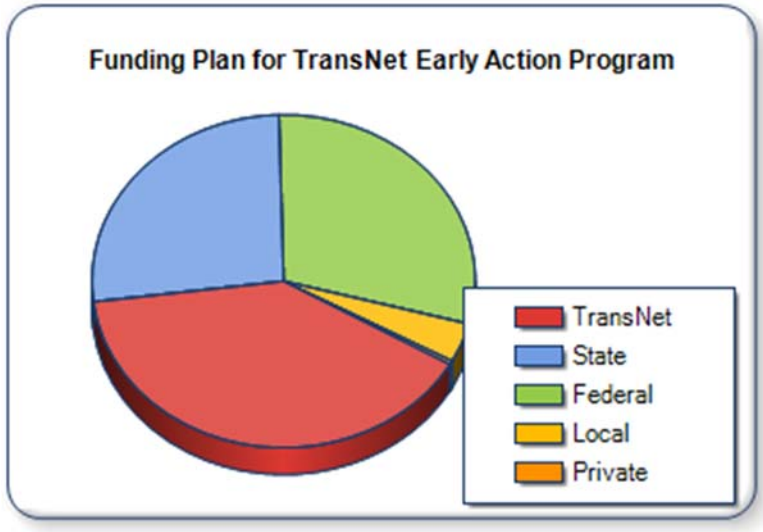

Table 1:
State Transportation Funds for Early Action Program
(Total: $1.89 billion)

State Funding Source	Amount	% of State Total
85130001 CMIA	$456,679,000	24.1%
83010001 STIP-RIP	$416,475,000	22.0%
83010001 STIP-IIP	$256,965,000	13.6%
85090001 TCRP	$230,591,000	12.2%
85130001 TCIF	$92,705,000	4.9%
85040001 SHOPP-ARRA	$92,355,000	4.9%
85040001 SHOPP	$85,319,000	4.5%
85130001 Prop 1B - SLPP	$78,306,000	4.1%
85120001 Prop 1A	$57,855,000	3.1%
85130001 Prop 1B - PTMISEA	$50,001,000	2.6%
Proposition 108	$17,615,000	0.9%
85040001 Env. Support	$13,452,000	0.7%
State (G-12)	$13,146,000	0.7%
STIP	$11,600,000	0.6%
SLPP	$8,000,000	0.4%
85020001 STA	$6,167,000	0.3%
85040001 Caltrans - State Oversight	$3,162,000	0.2%
SHA	$1,600,000	0.1%
8503002 FSP	$812,000	0.04%
85030001 FEMA	$802,000	0.04%
83010001 PTA	$537,000	0.03%
85140001 Proposition 116	$501,000	0.03%
82010000 TCI	$71,961	0.004%
8504001 Value Pricing	$45,000	0.002%
Total State Funds	**$1,894,761,961**	

San Diego Association of Governments' (SANDAG) *TransNet* (2004 – present)

Effort Location Description	Participating Entities / Additional Partners	Mitigation Details	Transportation Component / Projects Mitigated	Costs of Effort (Documented / Estimated)	Funding Source Details	Cost / Benefit Considerations
TransNet **San Diego County, CA** **Caltrans District 11** Voters approved *TransNet* in 2004, which included an Environmental Mitigation Program (EMP) that provides landscape level conservation through acquisition, restoration, and management to mitigate the habitat impacts of 11 freeway projects and numerous smaller local streets/roads projects. SANDAG has opted use conservation easements to protect mitigation lands. As of September 2013, 3,330 acres of coastal wetlands, non-coastal wetlands, and uplands have been acquired as mitigation lands.	**Participating entities:** • SANDAG • CalTrans District 11 • Metropolitan Transit System • North (San Diego) County Transit District • Conservation Groups This EMP includes $650M with another $200M for economic benefit (to cover local project impacts). Through a Working Group, decisions about properties to acquire and/or restore are made by an informal but core team of non-political agency, resource-based individuals representing the permitting agencies. Decisions are generally based on complementing the existing conservation work in the Multiple Species Conservation Plans/Multiple Species Habitat Conservation Plans. SANDAG partners with other government agencies (such as County Parks, local cities, etc.) whose mission aligns with the EMP purpose. They have long-term ownership and management roles.	SANDAG's approach does not include a project-by-project evaluation of direct/indirect impacts. SANDAG estimated over the 40 years of the freeways/highways program and then attached a multiplier based on three different habitat types. The ratios are as follows: • 2:1 for uplands • 3:1 for non-coastal wetlands • 5:1 for coastal wetlands **Mitigation Needs/Achieved:** • *Coastal Wetlands:* 226 acres needed 56 acres achieved • *Non-Coastal Wetlands:* 499 acres needed 337 acres achieved • *Upland:* 1,627 acres needed 2,940 acres achieved	The 3,333 acres acquired through the EMP includes the acquisition of the property necessary to meet the mitigation for 14 regional transportation improvement projects including Interstate 5, railroad double tracking projects, local streets and roads, and the net benefit provisions of the State Route 94 (SR-94) corridor as defined in the *TransNet* Ordinance. To date, mitigation has been secured for 36 Regional Transportation Plan (RTP) projects, and 319 acres for future local streets and roads projects.	So far SANDAG has been able to absorb the personnel requirements for this program. They have 1.5 FTE staff for the EMP. Some of the work gets distributed to other collaborators. For example, Caltrans does appraisals and acquisitions for SANDAG – they are the real estate proxy. **(Actual) Documented Costs (2006-2013 Totals):** Land Management: $15,599,239 Regional Coordination: $7,263,818 Regional Management: $3,000,000 **2014 Estimated Costs:** Land Management: $1,905,000 Regional Coordination: $600,000 Regional Management: $520,000	Voters approved $14B Transportation Investment Plan (2004 dollars) and $850M was set aside for this EMP. *TransNet* fully funds the EMP. Though the program has utilized other dollars to supplement the EMP, it is 100% fully funded already. As it relates to the EMP, the primary funding and/or collaborators are SANDAG, the permitting agencies, and Caltrans. SANDAG also uses *TransNet* dollars to match state/federal dollars. Each transportation project has a different formula, but generally speaking for every dollar from *TransNet*, SANDAG expects $1 in return from another source. The *TransNet* ordinance allows for really flexible funding mechanisms. Its *Keeping San Diego Moving* dashboard shows different funding sources for different portions of the freeways.	SANDAG has yet to quantify the benefits realized. The staff at SANDAG will determine how they are doing when the entire measure and EMP get evaluated at the 10 year anniversary (in 2018). SANDAG identified the following, as of yet unquantified, benefits: • Buying land early in large blocks of habitat saves costs/reduces lost opportunities. • Buy bigger properties in better places for better prices. • Making the process a-political or non-political has been extremely helpful. • The ability to walk away from a transaction is huge. • Work across multiple agencies and prioritize properties. • Cash is king. • Restoration costs go up as the program goes on. • The coastal zone has extensive requirements from the CA Coastal Commission.

Caltrans Led/Funded Advance Mitigation Efforts

Beach Lake Mitigation Bank

Description: The Beach Lake Mitigation Bank (BLMB), established in 1991, consists of 142 acres (including 67 acres of wetlands and 25 acres of riparian habitat)[10] and compensates for unavoidable losses to wetland resources from future Caltrans projects in 14 counties in the lower Sacramento Valley and upper San Joaquin Valley, enabling Caltrans to easily mitigate small impacts from linear projects. The site for the bank came from excess lands that Caltrans had purchased long ago for I-5 construction materials. As Caltrans prepared to sell the excess land, a Caltrans environmental staffer visited the site and recognized its mitigation value. Collaborative efforts among Caltrans, CDFW, USACE, FHWA, USEPA, and USFWS to create the bank began in 1990. The bank took five years to build and transfer of the land to USFWS completed in 2013. As of mid-2014, 43 Caltrans projects had debited from the Beach Lake bank, and six more held credits in reserve to do so, making for a total of 97.45 Beach Lake acres that have been used for mitigation. This bank was established a relatively long time ago, and current mitigation banking practices would not allow one bank to mitigate for projects over such wide geographic areas.

Mitigation Funding: The total cost was to create the bank was estimated to be $2,079,220, a price per acre of $22,600[11]:

$88,000	Reporting (staff time to write all reports done through 10 yrs. to USACE)
$132,000	Vegetation monitoring (staff time to do this)
$23,760	Bird monitoring (staff time)
$1,425,000	Construction of mitigation area
$400,000	Endowment for maintenance and monitoring paid to USFWS
$10,460	Transfer costs (note: this is uncertain)

The value of Beach Lake was estimated (in 2009 dollars) at $14.4 million by Jeff Swindle, and is a 7:1 increase in value over wetlands in the same area. Also, Beach Lake's mitigation impact is enhanced by the bank's location adjacent to the Stone Lakes National Wildlife Refuge, a fortunate coincidence. Further value accrues from the bank when maintenance projects are turned around quickly.

A 2001 Caltrans internal memo suggests there is no direct cost to projects for utilizing the Bank, but that each credit cost $19,565. Funding for the projects that have debited credits is varied, with most likely funded through SHOPP.

Land Holding and Transfer Issues: In the case of Beach Lake, one institutional factor aiding the bank's creation was that fact that Caltrans retained the excess I-5 property to begin with. Following state policy, the Caltrans Right-of-Way Division typically moves to dispose quickly of excess land deemed "surplus."

When Caltrans seeks to establish large mitigation sites, it typically looks for government entities with land adjacent to properties Caltrans might buy, or to private non-profits to do that. USFWS was a key partner in Beach Lake, as it was working on the adjacent Stone Lakes National Wildlife Refuge. Caltrans recognized this as an opportunity and sought to transfer to USFWS the fee title to the land after the bank was established. Such transactions are complex, as Caltrans ability to transfer funds and land to other parties has traditionally been constrained by state law. Also, in this case, USFWS is a desirable but complex partner for such transfers; their own ability to assume ownership of new lands is restricted, and

[10] The bank was used for both habitat and endangered species mitigation. Credits sold include: Giant Garter Snake upland habitat, Perennial Wetland Creation/Restoration, Seasonal Wetland Creation/Restoration, Emergent Marsh Creation/Restoration, Riparian Oak woodland Creation/Restoration.

[11] Figures from Jeff Swindle. Dollars are in 1999-2009 era. Sources of funds are unknown. Cost estimates also do not reflect the price of land purchase, made decades ago for I-5 construction.

the process of land transfer to USFWS was long and complex, taking 5-6 years, in part due to low priority at the DOI.

Observations:

1. It is possible that other Caltrans properties maintained as "excess lands" hold potential as mitigation sites. The Department has an established practice for evaluating this potential before selling off excess properties. Projects screened for such potential may be maintained "in inventory" if an "Environmental Hold" is established.
2. Caltrans internal policy against holding mitigation land and being responsible for its long-term management may conflict with its policy interest in advance mitigation and its ability to act on large-scale mitigation purchases. One way to lessen the conflict is to use land adjacent to existing reserves, which can facilitate ultimate land ownership transfer to reserve owners/managers.

Beach Lake Mitigation Bank (BLMB) – (1991 – present)

Effort Location Description	Participating Entities / Additional Partners	Mitigation Details	Transportation Component / Projects Mitigated	Costs of Effort (Documented / Estimated)	Funding Source Details	Cost / Benefit Considerations
Beach Lake Mitigation Bank (BLMB) **Sacramento County, CA** **Caltrans District 3** 67 acres of wetlands and 25 acres of riparian habitat will be established on a 142-acre Caltrans-owned parcel south of Sacramento, west of I-5. Bank will offer compensation credit for unavoidable losses to wetland resources from future Caltrans projects. The bank was established in 1991 without being tied to a specific transportation project. Caltrans owned this I-5 ROW excess for a long time. When the dept. moved to dispose of it, an environmental clearance process revealed its mitigation value to Carolyn Brown.	**Signatories to the 1991 MOA for the bank:** • Caltrans • FHWA • USEPA • USFWS • USACE • CDFW **USFWS** was a key partner in this mitigation bank, as they were working on the Stone Lakes National Wildlife Refuge next door. Caltrans worked to have USFWS receive the fee title to the land after the bank was established. Land transfer was complex. The **Stone Lakes National Wildlife Refuge Assoc.** maintains BLMB in perpetuity, using a $400,000 Caltrans endowment payment to them 20 years ago. This non-profit also manages the Stone Lakes USFWS refuge.	BLMB offers off-site mitigation of impacts from Caltrans projects in an atypically large service area ("applicable ecoregion"): the area below 1,500 ft. elevation in 14 counties in the lower Sacramento Valley and upper San Joaquin Valley. MOA provides detailed guidelines about the use of BLMB and its ongoing management. **Resources and Ratios:** • Seasonal Wetlands Creation/Restoration (2:1) • Perennial Wetlands Creation/Restoration (2:1) • Riparian Forest/Oak Woodland Creation/Restoration (3:1) • Upland Habitat – giant garter snake (ratio unspecified) **Cost per credit (2001)**: $19,565 C. Brown maintains a ledger for mitigation banks and credits. Credits from the bank are available to Caltrans only. It is not conceived that Caltrans would sell credits to other parties.	43 Caltrans projects to date have debited credits from the bank. 6 additional projects have credits in reserve. See C. Brown ledger for additional detail.	**Purchase of the land** (and likely funding source) was associated with I-5 construction in the 1960s. It would require significant effort to identify purchase price and funding source. **Bank establishment:** $2,068,760 – Caltrans' cost to establish BLMB, as estimated by J Swindle: $1,400,000 – construction of mitigation area $132,000 – veg monitoring (staff time to do this) $23,760 – bird monitoring (staff time) $88,000 – reporting (staff time to write all reports done through 10 yrs. to USACE) $400,000 – endowment for maintenance and monitoring ($10,000 – land transfer costs – an uncertain estimate)	Purchase cost and funding source for land are likely in historical records, if they exist. Funds for bank establishment came from the SHOPP, but details are unclear. Monitoring costs (staff time to deal with this) was absorbed in part by HQ – an overhead mitigation EA – and it was buried in other projects and overhead – it was just absorbed. As projects debit from the bank (i.e. 43 projects to date), it is unclear whether, how, and to what account payments for those credits are made.	The value (land) of Beach Lake was estimated at $14.4 million in 2009 by Jeff Swindle. He examined other bank property in the area and asked: How much would 46 acres of seasonal wetlands cost in 2009? He estimated is a 7:1 increase in BLMB's value, given $2.068 million estimate of set-up costs. Time savings associated with the 43 projects that have debited from the bank. The bank enables projects to be turned around quickly. The habitat value of BLMB is amplified, coincidentally, by its adjacency to the USFWS Stone Lakes National Wildlife Refuge.

Elkhorn Slough Early Mitigation Partnership

Description: The Elkhorn Slough Early Mitigation Partnership (ESEMP)[12] was a collaborative pilot program intended to develop funding strategies and conservation agreements for preserving the Elkhorn Slough watershed, which harbors the largest tract of tidal salt marsh in California outside of San Francisco Bay.[13] Agency partners and regional stakeholders worked to develop mitigation sites for sensitive resources and funding strategies for advance regional mitigation for multiple Caltrans' transportation projects in the watershed. The collaboration allowed for pooling of biological information using GIS to identify areas with the best mitigation opportunities for several transportation projects. It also advances regional conservation goals, by providing:

- a more cost-effective way to meet compensatory mitigation requirements;
- more efficient public expenditures, by making early investments while transportation projects are in planning stages to compensate for their unavoidable future impacts to sensitive resources; and
- the ability to leverage private funding for early purchase and mitigation.

Mitigation Funding: Caltrans sponsored the Partnership to set up advance mitigation for four upcoming transportation projects, but the first three projects began construction before mitigation could be established. Eventually, the Prunedale Improvement Project (PIP) presented an opportunity to buy a large parcel that Caltrans could use for its mitigation, under a conventional timeline, but that could provide surplus land for *advance* mitigation of other projects. There is, however, some uncertainty that excess land from a large parcel could be used as mitigation for other projects. In this case, the uncertainty lies in whether the same agency staff who participated in the ESEMP process and the agency staff acting as signatories on the MOU may not be the same staff involved in permitting future projects.

The PIP was a federally-funded STIP project which was budgeted to include mitigation costs. Caltrans purchased 167 acres for off-site mitigation in the form of three adjoining parcels in Monterey County (Miller-Whitehead properties) for $4,392,000. They also incurred additional costs to fix and restore the land for use as mitigation site, to pay for initial maintenance, and to fund special planning for an interagency steering committee. Caltrans will ultimately transfer the lands to Elkhorn Slough Foundation, and funds set aside for mitigation for the PIP will pay for a $1.5-2 million endowment necessary to manage the properties in perpetuity. In addition, future proposed or programmed transportation projects could provide additional funding to manage the property.

Mitigation: The identification of mitigation sites focuses on landscape-scale resource opportunities that provide potential for ecological connectivity, restoration, enhancement, and protection for many natural resources including:

- Wetlands that include both freshwater and saltwater marshes and riparian corridors;
- Oak woodland, maritime chaparral, and coastal prairie grassland; and
- Federally-listed species such as the Santa Cruz long-toed salamander, California red-legged frog, California tiger salamander, southern sea otter, Monterey spineflower and Yadon's rein orchid.

Observations: Timing is an essential factor in determining whether Caltrans can accomplish advance mitigation for intended projects; the Department must simultaneously have both available funding and property to purchase. While the ESEMP did not yield advance mitigation for the earlier projects intended, it ultimately benefited from timing in that the Miller-Whitehead parcel was available contemporaneously with the PIP and had extra land for advance mitigation of other transportation properties.

[12] ESEMP involved an MOU between CDFW and USFWS, USACE, Elkhorn Slough Foundation and UC Davis.
[13] It is not an official bank because USACE specified in the permit that it could not be used as a bank, but that the land could be used for other mitigation projects. It is unclear why.

Elkhorn Slough Early Mitigation Project (ESEMP) (2009 - present)

Effort Location Description	Participating Entities / Additional Partners	Mitigation Details	Transportation Component / Projects Mitigated	Costs of Effort (Documented / Estimated)	Funding Source Details	Cost / Benefit Considerations
Elkhorn Slough Early Mitigation Project (ESEMP) **Monterey County, CA** **Caltrans District 5** The purpose is to collaborate with partners to develop mitigation sites to account for mitigation needs from multiple Caltrans projects, including: Salinas Road, San Joan Road, the Prunedale Improvement Project (PIP) and SR-156.	• Caltrans • Elkhorn Slough Foundation • USFWS • CDFW • California Coastal Commission (CCC) • Transportation Agency of Monterey County (TAMC) • Regional Water Quality Control Board (RWQCB) • FHWA • County of Monterey • National Marine Fisheries Service (NMFS) • US EPA • University of California, Davis (additional partner support) • USACE (not a direct participant in the ESEMP process but expressed support for the concept and approved the mitigation site for off-site mitigation for wetlands for the PIP project)	Impacts included: fresh and saltwater wetlands, oak woodlands, maritime chaparral, and coastal prairie grasslands. Species included Santa Cruz long-toed salamander, California red-legged frog, California tiger salamander, southern sea otter, Monterey spineflower, and Yadon's rein orchid. **Acres of impact; Mit. Ratio:** • Jurisdic. wetland -- 5.3; 3:1 • Waters of the US - 0.3 ; 0.5:1 • Oak Woodland -- 37 ; 3:1 (also 0.5:1 restoration) • Central Maritime Chaparral -- 75 : 3:1 (also 0.5:1 restoration) • Riparian -- 0.4 ; 1:1 • Coastal Sage Scrub -- 6.5 ; 1:1 Annual Grassland -- 7.5 ; 1:1 A 167 acre property was acquired to meet the mitigation obligations from PIP. Of these, 61.7 acres were credited to the PIP, and 100 acres are available for future transportation projects. **Resources:** • Fallow agricultural lands available for restoration oak/chaparral – 19 acres • Non-native trees can be removed for restoration -- 6.5 acres	Prundale Improvement Project (PIP); San Joan Road. See N. Siepel for additional detail.	Parcel Cost: $4.39M (167 acres). Land Maintenance and endowment $1.5-2M. Planning and facilitating interagency meetings $100,000.	The ESEMP was funded through Caltrans State Planning and Research (SPR) The land and endowment were purchased with funds from PIP. The cost of PIP was over $209M.	Land acquired allows other future Caltrans projects to use mitigation credits on the property, but title will be transferred to a non-profit (Elkhorn Slough Foundation). Future accounting will be tracked by Caltrans in coordination with ESF. Benefits include Caltrans savings because spatial analyses conducted for the ESEMP including the PIP mitigation site are now being used for locating appropriate mitigation sites for Salinas, San Juan Road and SR-156. Hidden costs: staff time for land transfers & setting up the endowment; ROW resurvey for transfer; encroachment issues. While these have not been quantified, they represent ongoing costs.

California State Route 149, Butte County

Description: This project to widen a 4.6 mile stretch of SR-149 in Butte County faced Endangered Species issues, requiring preparation of an EIS and ultimately requiring Caltrans (by CDFW & USACE) to mitigate both freshwater marsh and vernal pool habitat. Initially, Caltrans sought to set up the Cottonwood site as a bank to mitigate SR-149, and to use money from the SR-149 project to do so. However, the timeline for bank development proved very long, as it involved working with USFWS to make a preservation / conservation area, requiring time to get agreements, establish crediting formulae, and settle Caltrans' & USFWS' legal issues.

Instead, as the Butte project was moving forward, Caltrans (the project sponsor) collaborated with the Butte County Association of Governments (BCAG), which viewed the road as a regional priority, to develop the required mitigations. BCAG took responsibility for soliciting a consultant/contractor to develop the Freshwater Marsh Habitat Development Plan (HDP) and getting it cleared through CEQA and NEPA, and for proceeding to build the mitigation project prior to or concurrent with roadway construction. According to interviews, BCAG was better set up to do advance mitigation because it had a less restrictive RFP process.

Mitigation Funding: The total project cost for SR-149 was $128 million, of which $13 million was for mitigation as follows: $2 million to build a marsh to replace beaver ponds that will be impacted, $6 million to create vernal pools to replace some that will be destroyed, $5 million to purchase preservation credits. Caltrans provided the mitigation funding through a cooperative agreement. The initial mitigation funding came from a preliminary deposit by Caltrans of ~$900,000 to BCAG and from BCAG's own capital reserve funds for transit (from its Transportation Development Act funding allocation), with the understanding the BCAG would ultimately be reimbursed by Caltrans.[14] Caltrans also funded an endowment to maintain the mitigation in perpetuity, a transaction handled by BCAG on behalf of Caltrans, where BCAG paid the Wildlife Heritage Foundation (WHF) for the endowment. Caltrans also purchased some of the resource lands needed and reimbursed the mitigation contractor for additional mitigation lands acquired.[15] It is unclear from what funding stream.

Marsh Project Logistics[16]:It took one year to open the Freshwater Marsh Project, which was cleared a CEQA Mitigated Negative Declaration and NEPA Categorical Exclusion. BCAG's JPA allows it to be the deed holder on the mitigation land during the initial acquisition phase. When the federal agencies deemed the land had met biological recovery success requirements, it deeded[17] the land to Restoration Resources, a private non-profit contractor with a ready-made system for developing environmental mitigation, for short-term mitigation and monitoring efforts. After five years of "adaptive maintenance," if they can demonstrate success with the mitigation project, the resource agencies will allowed the project to be managed in perpetuity by the WHF of Rancho Cordova.

Observations:

1. In North region, smaller mitigation efforts are really important, and yet the need for a mitigation bank may not be justified. In some remote areas, the mitigation needs are not large, yet the process to get them satisfied is just as complex as with bigger projects.
2. Also, in some situations, local agencies may have more flexibility to achieve advance mitigation while being funded by Caltrans. Resource agencies are open to smaller advance mitigation that are managed locally but funded by Caltrans as money becomes available.

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[14] The practice of using local funds for cash flow that is later reimbursed is not uncommon in the county.

[15] Caltrans can't deed property to private land holders, yet does not want to be the land holder.

[16] Restoration Resources also established the Vernal Pool piece of the mitigation. More information can be found at: http://www.bcag.org/Projects/SR-149-Vernal-Pool-Creation/index.html and http://www.bcag.org/Projects/SR-149-Freshwater-Marsh/.

[17] Easement restrictions do not change with such a transfer; BCAG just gives underlying ground to existing party and the easements go with it

California State Route 149, Butte County (1990 – present)

Effort Location Description	Participating Entities / Additional Partners	Mitigation Details	Transportation Component / Projects Mitigated	Costs of Effort (Documented / Estimated)	Funding Source Details	Cost / Benefit Considerations
California State Route 149 **Butte County, CA** **Caltrans District 3** When moving forward around 2003 with long planned SR-149 improvements , Caltrans was required (by CDFW & USACE, with pressure from the Butte Environmental Council - BEC) to undertake two mitigations (delivery of a freshwater marsh and a vernal pool complex) and to do so *in advance of construction*. Caltrans originally intended to develop the Cottonwood Conservation Area to mitigate SR-149 & other projects, but this was infeasible (too slow). Thus, Caltrans pursued conventional project-specific mitigation for SR-149. Still, Caltrans did partner with Butte County Association Gov'ts to get the mitigation done more quickly, pre-construction.	• Caltrans • FHWA • USFWS • USEPA • USACE • CDFW • BCAG • Butte Environmental Council • Restoration Resources – wetland contractor • Wildlife Heritage Foundation-(land managers) **Caltrans** was the project sponsor, but **Butte County Association of Governments** took responsibility to solicit mitigation contractor. **Caltrans** was the main funding partner.	Preservation, restoration and creation of a marsh and vernal pool complex required. Endangered Meadow Foam discovered during process. **Resources and Ratios:** • 40 acre marsh • Vernal pool complex, to include preserved, restored and created vernal pools and their associated species.	Caltrans was responsible for SR-149 improvements, although BCAG provided some funds. **Total cost for SR-149: $128M** • $82M construction • $13M environmental mitigation • $33 M design, right-of-way purchases, a variety of necessary studies See C. Brown ledger for additional detail.	**Estimates of cost prior to roadway construction $8-14M.** Actual cost, reported in 2006, $13M: • $2M build marsh, replace beaver ponds. • $6M create vernal pools • $5M purchase preservation credits. .	Caltrans was the primary funder of SR-149 improvements and mitigation. What was "innovative" about this was Caltrans' partnership with BCAG to accelerate delivery of the mitigation. BCAG used its own capital reserve funds (TDA money for transit) to get the mitigation started. It then submitted reimbursements to Caltrans and continued to use its reserve fund to pay costs up front and get paid back later by Caltrans. Caltrans also advanced an initial 'deposit' of $900,000 to BCAG. Caltrans paid an endowment for management in perpetuity. This early effort (began 1990) has little detail associated with the finances.	Caltrans project management attributes success of mitigation on this project to having the right organizational infrastructure and personnel in place. The partnerships developed could serve as template for other projects. This project prompted BCAG to pursue a HCP. Six years of delay on this project due to environmental issues (2000-2006). Earlier delays (1992-2000) had to do with state financial issues. Methods used for mitigation assessment predate most current practices. However, these delays pushed Caltrans to begin to seek early mitigation options.

Cottonwood Conservation Area

The Cottonwood Conservation Area is a 574-acre vernal pool conservation bank for endangered species that Caltrans operates in Butte County. It was set up to mitigate wetland impacts resulting from the Highway 70 project and SR-99 / Rio Benito rehabilitation. With essential collaboration from the Butte County Resource Conservation District (RCD), Caltrans arranged to put a conservation easement on the land, under which the landholder, a rancher, relinquished development rights.

Mitigation: The mitigation was a conservation easement on a local property held by the Butte County RCD. In this atypical case, the *landholder* is responsible for maintenance and management of the property. The RCD is long-term manager[18] and monitors whether the landholder is following the operation and maintenance plan. A contractor performs periodic biological monitoring.

Caltrans staff report that this case involved a complex set of partners. Easements have to satisfy the landholder and USFWS. USFWS has a recovery plan, as part of the USACE recovery plan. Working out a plan among this set of bedfellows (business and conservation) takes time, and the case illustrates the issues that can arise. It took the equivalent of a FTE for three years just to coordinate project, put appropriate information into reports, generate documents, work on easement language, etc. Caltrans staff has the experience—but not the time—to do this. Thus, Caltrans has an on call consultant contract for this and made use of such services in this case.

Funding: Funding from several Caltrans projects managed by the same Project Manager were creatively pooled to pay for the mitigation. For Cottonwood, Caltrans could cobble together funds for the site because 2 or 3 projects were coming out at same time, and Caltrans could take money from each of them for the Cottonwood conservation easement and endowment.

- Butte 70 Passing Lanes contributed funding to Cottonwood. The Butte 70 Passing Lanes Project involved unavoidable impacts to 0.133 acre of jurisdictional wetlands, and 2.40 acres of vernal pools. Caltrans purchased from the Cottonwood site 5.64 acres of vernal pool preservation credits, for the purchase price of $250,000.
- Highway 70 Expansion – Caltrans environmental staff argued that in lieu fees for mitigation of this project would cost $350K/acre for 5-6 acres requiring mitigation. It would be more productive, they reasoned, to put that money toward the Cottonwood site and get many more acres for same money.
- SR-99 / Rio Benito rehabilitation

Butte RCD worked with Caltrans to establish Cottonwood, and the RCD now monitors the site. Caltrans paid $432,836 to the RCD to establish the Cottonwood Endowment. The endowment generates annual income for RCD, which RCD also uses to contract out for more complex biological monitoring.

Observations:

1. Cottonwood offers an example of how costs for a conservation area can be shared, or amortized, across multiple projects.
2. The case also illustrates how collaboration with regional/local partners—both public and private—can facilitate Caltrans' efforts to develop advance, multiple-project mitigation. Here, Caltrans worked with a landholder and a RCD. Given RCDs' mission to conserve resources in their areas and their authority as "special districts" under Division 9 of the California Public Resources Code (Butte County RCD, 2014), it is possible that RCDs present good potential partners for other Caltrans' advance mitigation efforts.

[18] Typically, in such cases, the easement holder would be responsible for maintenance and management of the property, but in this case the landholder, Oppenshaw, is.

Cottonwood Conservation Area

Effort Location Description	Participating Entities / Additional Partners	Mitigation Details	Transportation Component / Projects Mitigated	Costs of Effort (Documented / Estimated)	Funding Source Details	Cost / Benefit Considerations
Cottonwood Conservation Area **Butte County, CA** **Caltrans District 3** This is a 574-acre site with a vernal pool conservation bank/area that Caltrans "owns" (has an easement over) and operates in Butte County. Caltrans originally sought to set up this site as it needed vernal pool mitigation for Butte 149. Given many delays is setting up the conservation bank/area, in part due to staff constraints and USFWS complexities, Butte 149 project went ahead without this as it mitigation.	• Caltrans • USFWS • USACE (peripheral role) • Butte County Regional Conservation District (RCD) • CDFW • Private landholder	Butte 70 passing lanes involved unavoidable impacts to jurisdictional wetlands. ***Conservation Area mechanics:*** • Title to this land is retained by a private **land holder**, who also uses it for ranching. • **Caltrans** arranged for a conservation easement on the land. • **Butte County RCD** holds the easement and is its long-term manager. • **Landowner** is responsible for maintenance and property management. • **Biological monitoring** is required periodically (inventorying species, observing vernal pools, annual photo documentation) and this is done by a 3rd party/contractor.	Caltrans dropped original plan to mitigate Butte 149 with Cottonwood Instead, the site was used to mitigate Butte 70 passing lanes. Caltrans bought from the Cottonwood site 5.64 acres of vernal pool preservation credits and 2.40 acres of vernal pools, for the purchase price of $250,000. It is possible that Ophir Rd. improvements and other projects claimed Cottonwood for mitigation.	**Easement Cost:** N/A **Monitoring endowment:** $432,836 **Staff time:** It's estimated that it took 3 years of one Caltrans FTE to coordinate project, develop reports, generate documents, and work on easement language.	**Caltrans' project monies** from the **Butte 70 passing lanes** and other projects are reported to have been used to establish Cottonwood. It is possible that funds for Caltrans' **Ophir Rd.** project and **SR-99 / Rio Benito** rehab were used. A project manager of **several projects** at the time is reported to have been instrumental in making various project funds available for Cottonwood. Caltrans paid $432,836 to Butte County RCD as **endowment** to support its monitoring role.	Cottonwood offers an example of costs for a conservation area shared across multiple projects. Time to establish the conservation area / bank was significant. More detail is needed on what and how much projects 'paid' for the development of Cottonwood. More detail is also needed on what projects have claimed it for mitigation / bought credits; how this was done; and the estimated time savings & other benefits.

Honey Lake Wetlands Mitigation Bank

Description: In 1995, CDFW approached Caltrans with the proposal of jointly making a wetlands mitigation bank. Together, Caltrans and CDFW evaluated several properties and chose one to submit in a prospectus to the USACE for forming such a bank. The property determined to be best was 300 acres within an approximately 815 acre parcel for sale near Honey Lake adjacent to the Honey Lake Wildlife Area. Caltrans developed 75 credits, and CDFW was going to develop 17 credits but ultimately decided against it. The Signatory Agencies on the Bank Enabling Instrument (BEI) are USACE, USEPA, USFWS, CDFW, and Caltrans.

Development of this bank took many twists and turns, adding considerable time to its approval. The major issues adding delay included the time needed to get USACE approval and to finalize the BEI among all parties; the lack of a Caltrans staffer who could focus full time on shepherding the bank through the process; and the several snags encountered during wetland planning and construction, including changes in the approved design and new biological discoveries at the site.

Mitigation: Of the 300 acres in the bank, 55 acres have been established as wetland for credits. As early as 1995/1996, Caltrans had a list of 14 projects for which it thought it could use the bank as mitigation, but delays ultimately resulted in only one project (SR-44 Bogard Pass Shoulder Widening and Rehabilitation project, built in 2000 at a cost of $15.4 million) using the bank's credits. Further, due to an unforeseen wetland violation during its construction, the SR-44 Bogard Pass project required almost 3 times as many credits as expected, almost using up the bank's credits. In 2011, Caltrans used 0.993 acres from the Honey Lake Bank for the Johnstonville project – a $16.2 million asphalt overlay on Route. 395. There are no specific plans to use the bank for other projects right now.

Mitigation Funding: Using SHOPP funds, Caltrans purchased the 815 acres in 1999 and transferred title of 300 acres for the mitigation bank directly to CDFW. Of those, 250 acres were transferred at no cost, and for transfer of an additional 50 acres, Caltrans paid $31,000. The remaining 515 acres were sold as excess land in two transactions: 511 acres were sold for $311,000 and 4.2 acres for $86,000. It is unclear how revenue from the sale of this excess land was accounted for within Caltrans, e.g. whether it was credited to a specific account or the District in general, or handled another way.

Caltrans estimates the bank's cost to date as $2.89 million, mostly programmed in 1995-1996, including:

- $645,000 Cost of land acquisition (815 acres)
- $962,000 Endowment paid to CDFW, including:
  - $255,000 Wildlife Habitat Assessment
  - $20,000 Facilities, overhead, water for property, in lieu taxes, hazardous waste clean-up
- $430,000 Construction of the wetlands on the property
- $250,000 Remedial measures[19] (incurred in 2012)
- $601,000 Staff support

Observations:

1. The process for developing mitigations can take a very long time, especially for an USACE recognized mitigation bank. Additionally, developing mitigations can be unpredictable, taking unexpected turns. This can often delay bank implementation, making it difficult to align the bank's timing with planned projects.
2. Dedicated staff is needed to handle environmental mitigation and see the process through completion. The interagency collaboration/communication aspects and internal agency staff requirements are significant, requiring a staff person who can follow up consistently and maintain focus on the effort.

[19] Additional costs ($250,000) were later incurred for remedial work on the property. The $250K came from Minor B funds which can be used in district as the district wants, rather than competing statewide as with Minor A funds.

3. Given the complexity and effort involved in establishing a USACE recognized mitigation bank for its own use, Caltrans may be better served by pursuing an in lieu fee option or purchasing credits from existing banks when available.

Honey Lake Wetlands Mitigation Bank (1995 – present)

Effort Location Description	Participating Entities / Additional Partners	Mitigation Details	Transportation Component / Projects Mitigated	Costs of Effort (Documented / Estimated)	Funding Source Details	Cost / Benefit Considerations
Honey Lake Wetlands Mitigation Bank **Lassen County, CA** **Caltrans District 2** A joint effort between CDFW & Caltrans to make a wetlands mit. bank, begun in 1995. The depts. identified 300 acres in an 815-acre parcel for sale near the Honey Lake Wildlife Area. Caltrans purchased all 815 acres, transferred title of 300 acres to CDFW, and sold the excess lands. Bank development was complex, fraught with issues, and slow. Caltrans had 14 projects where it imagined using the bank as mitigation, but only one (SR-44 Bogard Pass project, built in 2000) actually used its credits. An envt'l violation during construction required 3 times more credits than expected, and left the bank with a large credit deficit, a situation that remains today.	• Caltrans • CDFW • USACE **Bank Enabling Instrument** (BEI) was signed by: • USACE • USEPA • USFWS • CDFW • Caltrans	Bank was available for only: Restore/enhance/create emergent wetlands Normally, such a bank would follow a schedule for release of credits. However, only 11.25 credits had been released after construction of the bank. The Bank has been in a 54.75 credit deficit for years due to the Bogard project. The deficit persists because the habitat must reach success criteria before they are released.	By 1995/1996, Caltrans listed 14 projects for which it thought it could use the bank as mitigation (mix of SHOPP, STIP and planning projects). It took so long for the bank to be finalized that most had advanced before the bank was available. Ultimately, only the Bogard Pass project was mitigated via the bank.	$2.89 M was programmed for the mitigation bank in 1995 -1996. This likely would have included: • $645,000 for the cost of **land acquisition** (815 acres) • $962,000 **endowment** paid by Caltrans to CDFW (included Wildlife Habitat Assessment - $255,000), facilities, overhead, cost of water for property, in lieu taxes, and cost for clean-up of hazardous waste. • $430,000 for **wetlands construction** on the property • $250,000 for **remedial measures** • $601,000 for **staff support**	It's unclear what **Caltrans' project funds** were used to support the bank's creation. Later, the **Bogard Pass project may have paid for its use**. In general, there is little available detail on what other sources and how many projects 'paid' for the development of Honey Lake.	Positive outcomes of the experience: • recognition by Caltrans that dedicated staff are needed to handle environmental mitigation. • lesson that developing mitigations can take a very long time – especially for an USACE recognized mitigation bank. • A "Stewardship Branch" was later created for Caltrans North Region; it did not exist when the Honey Lake Bank began. Caltrans has also tried to do this in other districts.

Advance Mitigation Planning Efforts – Unattached to Projects or Funds

Santa Cruz Conservation Blueprint

Description: The Santa Cruz Conservation Blueprint is a project undertaken by the private Land Trust of Santa Cruz County to develop a 25-year plan for conserving and enhancing the natural environment in Santa Cruz County. The plan identifies eight conservation areas as priority areas that are most likely to provide benefits to biodiversity, water resources, working lands, and recreation. The Blueprint:

- Recommends conservation priorities, recognizing that financial resources are limited;
- Provides practical suggestions to address water overdraft and sustain local farming;
- Offers new ideas on protecting the health of the forests that make up two-thirds of the county;
- Proposes means of sustaining a resource-rich environment for today's residents, as well as future generations; and
- Will guide the work of the Land Trust for the next 25 years.

No Caltrans staff are listed among the seven-member Blueprint Steering Committee or the effort's 110 Technical Advisors. Yet, among the plan's strategic recommendations and action are calls to integrate "conservation of natural areas, working lands and recreational lands into regional land use and transportation planning" and to convene collaborative working groups—including Caltrans—to facilitate planning for enhanced connectivity in wildlife corridors (Land Trust of Santa Cruz County 2011, 3).

Mitigation Funding: Planning efforts to develop the Blueprint itself, along with some of the land acquisition, was funded by the Gordon and Betty Moore Foundation, the Bay Area Conservation Initiative of the Resources Legacy Fund (which funded habitat connectivity and threat analyses), and the Land Trust of Santa Cruz County donors. If future transportation projects would use the Blueprint to guide and prioritize mitigation activities, those activities would be funded through the transportation project itself.

Observations:

1. This effort does not provide a funding mechanism for Caltrans to pursue advance mitigation.
2. Nonetheless, it may provide a valuable blueprint which the Department could use to guide its mitigation activities, whether undertaken as under the status quo framework or as advance mitigation funded in another manner. While it is unclear whether the regulatory agencies have or will approve mitigation at the recommended Blueprint sites, individuals from the following agencies are among the project's Technical Advisors: USFWS (Heather Abbey, Douglass Cooper), California Coastal Commission (Rick Hyman), CDFW (Jeannine DeWald, Jennifer Nelson). Participation by these regulatory entities signals their interest and the potential for future collaboration.
3. A key Blueprint recommendation is to increase the use of voluntary easements and incentives. While land acquisition is one model through which priority areas could be conserved, easements and other incentives "leave productive land in private hands and on the tax rolls," offering a "cost effective way of protecting natural resources and the goods and jobs working lands provide (Land Trust of Santa Cruz County, 2011)" The promotion of such approaches may influence Caltrans' own choices when it pursues mitigation in this region.

Santa Cruz Conservation Blueprint

Effort Location Description	Participating Entities / Additional Partners	Mitigation Details	Transportation Component / Projects Mitigated	Costs of Effort (Documented / Estimated)	Funding Source Details	Cost / Benefit Considerations
Santa Cruz Conservation Blueprint **Santa Cruz County, CA Caltrans District 5** The Santa Cruz County Blueprint is a map of sustainability needs in the county that will guide the work of Land Trust for the next 25 years. The document identifies conservation priorities.	• County of Santa Cruz • Santa Cruz County Land Trust • Santa Cruz County Transportation Commission	Eight conservation areas in the county have been identified as priority. These are not currently tied to any transportation projects, but future projects could target mitigation in these areas that would likely receive faster environmental review and approval	These are not currently tied to any transportation projects, but future projects could target mitigation in these areas that would likely receive faster environmental review and approval. See N. Siepel for additional detail.	Not available. Similar work in the 8 county San Joaquin Valley is costing $300,000 for development, with another $400,000 for public engagement pending from the Strategic Growth Council.	Gordon and Betty Moore Foundation Bay Area Conservation Initiative (Resources Legacy Fund) are funding habitat connectivity and threat analyses. Land Trust of Santa Cruz County donors. No costs to Caltrans to date.	Benefits of this planning exercise are that it can stabilize the mitigation process, by having clearly identified priorities for the sites of future mitigation, similar to an HCP. To date there are no indications of state and federal agency engagement in this county-level effort, but it is likely to meet with positive response from these entities. USFWS, NOAA Fisheries, California Coastal Commission, California State Coastal Conservancy, RCD of Santa Cruz County, UC Santa Cruz, California State Parks, NRCS, University of California Natural Reserves, BLM, San Jose State University all participated as Technical Advisors.

5. National Experiences with Advance Mitigation

This section presents five programs in four states that have funding mechanisms in place for regional and advance mitigation. In each effort, the respective state has developed a way to establish advance mitigation programmatically in one form or another, and importantly has found a way to fund the initiative. The approaches vary from one of the first large regional HCPs, to establishment of transportation trusts which receive non-revolving funds, to a revolving fund. All the programs predominantly target wetlands impacts. California's portfolio of potential impacts, however, will include upland habitats that may not be subject to the same sets of laws that have been the foundation of the programs described below.

The utility of this section is for Caltrans to be able to compare various programs from other states and to assess whether the approach may be suitable in California. In particular, the profiles of these nationwide experiences suggest some of the key questions that states have encountered when establishing programmatic structure and funding for advance mitigation. These questions include: What source of funds should support advance mitigation? What entities may spend them? What mitigation expenditures are eligible? How have special accounts for advance mitigation been erected and governed?

The program with the most federal ties and subsidy is the Balcones Canyonlands Conservation Plan, near Austin, TX. This project was one of the first large-scale HCP efforts, and has over $60 million invested by the federal government. In addition the city of Austin has contributed over $20 million, supported through a bond measure, while the associated county has had less success in raising its share of funding commitments. The HCP covers 633,000 acres and 25 transportation corridors, as well as other types of development within city and county limits, and targets 30,500 acres for conservation. As such this represents regional planning with a collaborative mitigation approach.

The two states that have established trust funds, North Carolina and Florida appear to be benefitting from the flexibility that such funds provide, in that payments into and out of such a fund can be from and to several different sources. Under North Carolina's program, NCDOT conducts an annual assessment of the next seven years of TIP projects, and makes payments into its fund ($23 million for 2013-2014), used for all aspects of anticipated mitigation. The fund required startup capitalization from NCDOT ($9.5 million). The program is cooperatively run with several other state agencies.

The Florida example actually has two programs. First, FDOT has a cooperative arrangement with Watershed Management Districts (WMD) which can perform mitigation work for FDOT. FDOT, on a yearly basis identifies projected impacts for the next three years, and can put money into the State Transportation Trust Fund. The WMDs then work up mitigation plans and have them reviewed by the environmental agencies, and use the funds from the trust to implement. Nearly $170 million has been invested from 2007-2011, with about $20 million scheduled for the 2012-2013 fiscal year. However, while this program is regional, advance mitigation work is not permitted. Second, to address this issue, FDOT recently initiated an annual $5 million fund to start in 2015, "for purchase of advanced mitigation of wetlands and other surface water impacts and species impacts of transportation projects and for ecosystem or environmental management projects" (Florida DOT, 2013, Part III, Chapter 11, p. 5).

In Washington State, the WSDOT had an initiative to create the Advanced Environmental Mitigation Revolving Account (AEMRA). This program allows for mitigation for wetlands, fish habitat and passage, and flood management. Seed funding for this fund came from the state's motor fuel account, and loans may be taken from the account to conduct mitigation. Loans are then repaid from transportation project funds. The amount in the fund appears to be insufficient to accommodate much mitigation, but little information was available as to the amount.

North Carolina Ecosystem Enhancement Program

Motivation: In the early 2000s, the North Carolina Transportation Department (NCDOT) was experiencing significant delays related to challenges meeting wetland mitigation obligations; 55% of its projects were being held up on such issues. The state already had a Wetland Restoration Program (WRP), operated by the NC Department of Environment and Natural Resources (NCDENR), to inventory aquatic lands and resources and to draw private contributions through an in lieu fee program, but the NCDOT had traditionally undertaken its own mitigation, outside of that program, on a project-by-project basis. To address transportation project delays occasioned by environmental mitigation requirements, the **Ecosystem Enhancement Program (EEP)** was created within the NCDENR to enable a programmatic approach to mitigation for NCDOT, and to consolidate mitigation programs for transportation and environmental agencies. The EEP Stream and Wetland Program operated for NCDOT is one of four EEP sub-programs, all of which are self-supporting.

Structure: A three-party Memorandum of Agreement (MOA) among NCDENR, NCDOT, and the USACE establishes the procedures for providing NCDOT's compensatory mitigation through the Ecosystem Enhancement Program (EEP), which aims to provide "quality, functioning, up front compensatory mitigation for all NCDOT projects for which compensatory mitigation is required," (NC MOA 2003 p. 12-13). Under the EEP, the NCDOT produces an annual estimate of its 7-year mitigation needs, based on its 7-year TIP, and transfers funds to the NCDENR to undertake needed ecological enhancement activities on its behalf. Additionally, the EEP retains the pre-existing WRP in lieu fee program, under which NCDENR also undertakes compensatory mitigation for *non-NCDOT* participants, as outlined in a separate MOA (1998 and 2008).

Funding of EEP: A key EEP component is the "Ecosystem Restoration Fund," established by N.C. General Statues § 143-214.12 to provide a dedicated account which the NCDENR can draw upon *only* to fund the restoration, enhancement, preservation, or creation of wetlands and riparian areas, provided such activities support existing basinwide water quality plans. This non-reverting (monies do not revert to their source), interest-bearing trust fund is managed in two accounts, one for payments and obligations of NCDOT, another for payments made by private and other parties under the in lieu fee program (MOA, In Lieu Fee Component, 2008 draft).

The Ecosystem Restoration Fund provides flexibility both in the "funds" it can receive (including monetary contributions, donations, dedications of interests in real property—e.g. a deed—and in lieu fee payments) and in the range of actors which can receive Fund dollars (including federal or state agencies, local governments, and private, nonprofit conservation organizations).

Payments from NCDOT to the Ecosystem Restoration Fund appear to come from N.C.'s "Highway Fund," distinct from its Highway Trust Fund. The Highway Fund draws on a variety of revenue sources, including the state gas tax, motor vehicle registration fees, title fees and federal-aid reimbursements.[20]

NCDOT payments into the NCDENR-managed Fund were initially made well in advance. However, the payment terms were changed roughly in 2007, at NCDOT's request, to reflect a cash-flow/actual-cost funding agreement. Currently, NCDOT submits quarterly payments to NCDENR to reflect actual costs, a practice which reduces the propensity for large Ecosystem Restoration Fund balances to accrue.

[20] The North Carolina DOT tracks and publishes its funding sources and uses. Download the detail at http://www.ncdot.gov/download/about/finance/2014BudgetSourcesUses.pdf; note the "transfer to the General Fund" from the Highway Fund.

Benefits: The program reports that "EEP has carried out its mission without a single transportation-project delay related to a lack of mitigation. EEP has assisted NCDOT in moving forward more than $8 billion in transportation-infrastructure improvements since its founding in 2003" (North Carolina Ecosystem Enhancement Program 2012, 1). The program has also won numerous environmental and government innovation awards.

Costs and Challenges: On the down side, one report (Information Center for the Environment. 2007) suggests that there were some concerns over transparency in how EEP was using the NCDOT dollars received each quarter. NCDOT officials felt EEP invoices were not sufficiently detailed. One NCDOT official remarked, "When you are signing invoices for millions, you want to make sure you know where the money's going" (Information Center for the Environment 2007, 2).

Further, there appear to have been wrinkles, at least earlier in the program (it's not clear if they continue), with "overages," in that EEP performed mitigations beyond what the NCDOT needed. As of 2007, NCDOT was still figuring out how to make productive use of some overages (Information Center for the Environment 2007).

Finally, accurately predicting the costs (and revenues sources) for ongoing monitoring and maintenance of EEP mitigation actions has provided some challenges. Earlier projections of EEP endowment revenue (7.5%) proved optimistic, and the fund could not afford its stewardship commitments without drawing on principal. Thus, the NCDOT and the NCDENR entered into a separate MOA in 2012 to establish protocols for funding and performing ongoing stewardship of EEP mitigation actions. The MOA defines the formula by which DENR is to calculate its annual "Stewardship Budget," taking into account:

- estimated cost for all NCDOT-funded mitigation sites to be inspected in that year;
- salary and overhead paid to the NCDENR Stewardship Director, Office of Conservation, Planning and Community Affairs; and
- direct costs for Site management and travel.

North Carolina Ecosystem Enhancement Program (NCEEP)

Effort Location Participating Entities Additional Partners	Scale / Scope of Effort (Geographic Size / Range)	Description of Effort & Transportation Component / Linkage	Total Cost of Effort (Estimated)	Funding Sources & Estimated Contribution (Transportation & other)	Funding Source Details
NCDOT co-developed the EEP to implement its mitigation needs. EEP is housed in the NC Dept. of Env. and Natural Resources (NCDENR). Funds for mitigation it undertakes for NCDOT are provided by NCDOT, deposited in a trust fund. The EEP is governed by a tri-party MOA, among the NCDENR, NCDOT, and USACE. EEP's creation was facilitated by a supportive governor, and partnerships among NCDOT, NCDENR, USACE, the conservation community, & private wetland bankers.	NCDOT provides EEP an annual mitigation request based on forecasted future impacts to aquatic resources from projects in the 7-year Transportation Improvement Program (TIP). EEP secures the mitigation needed following protocols outlined in the MOA. EEP and its partners have acquired over 50,000 acres of conservation land or conservation easements to date. Source: (North Carolina Ecosystem Enhancement Program 2013)	The NCDOT Stream and Wetland Program tracks the permitted impacts for EEP mitigation and Mitigation Requirements for each fiscal year. For 2012-2013, EEP helped NCDOT obtain permits for 97 NCDOT transportation projects requiring stream and/or wetland mitigation. For these projects, EEP provided 34,134 stream mitigation credits and 96.289 wetland mitigation credits. Source: (North Carolina Ecosystem Enhancement Program 2013)	2012-2013 expenditures for NCDOT within EEP totaled $23 million, covering land acquisition (48%), admin. (16%), credit purchases and transfers (13%), design-bid-build mitigation construction and repair (11%), stewardship (4%), and other tasks. Source: (North Carolina Ecosystem Enhancement Program 2013) 2010-11 NCDOT payments to EEP totaled $18 million; expenditures were $21 million. Source: (North Carolina Ecosystem Enhancement Program 2012)	NCDOT provided start-up funds for the EEP and watershed planning ($9.5 million) and now funds advance mitigation on an annual basis, based on projected mitigation needs. Funds are transferred by NCDOT from its Highway Fund into a separate NCDENR managed trust fund, the "Ecosystem Restoration Fund."	Annual expenditures for the NCDOT mitigation program (acct 2984) within EEP seem to run about $20 million, give or take. Cash transfers from NCDOT are made quarterly and in roughly the amount needed to cover annual expenditures. NCDOT appears to use funds from its "Highway Fund" account, subject to confirmation. Each of EEP's four sub-programs (including NCDOT's) operates solely on its own receipts, without any appropriations from General Assembly.

Balcones Canyonlands Conservation Plan Habitat Conservation Plan (BCCP HCP)

Motivation: The Balcones Canyonlands Conservation Plan (BCCP), one of the nation's largest HCPs, was created when the black-capped vireo and six karst invertebrates were listed as endangered species during a period of rapid growth in Travis County, Texas, which includes the city of Austin. The local USFWS office was unable to keep up with the demand for permits, resulting in a practical moratorium on development in the area. The USFWS suggested an HCP as a solution that would streamline permitted development and ensure protection of threatened species.

Structure: After eight years of planning, 30-year permits under the HCP were issued in 1996 to both Travis County and Austin, which manage plan implementation through an inter-local agreement. In general, Travis County handles applications by private landholders and relays development information to USFWS, while the city handles infrastructure and other public agency permitting and provides an accounting of mitigation to USFWS. The Lower Colorado River Authority additionally assists in managing the HCP.

The plan covers 633,000 acres and requires permittees to assemble and manage 30,500 acres of habitat within 20 years of issuance of the Permit (i.e. by 2016). To date, over 28,000 acres (over 92%) of the permit acreage required has been assembled.

Funding: The required mitigation land has been acquired by a combination of direct land donation, and HCP purchases funded by grants, local bond measures, and development impact fees. Similar to California efforts at Beach Lake, Honey Lake, San Diego and Coachella, the BCCP benefitted from its adjacency to the Balcones Canyonlands National Wildlife Refuge, which also contributed to conservation of the threatened species. As one of the first large-scale HCPs, the BCCP received a large amount of federal support through $60.5 million of federal Section 6 grants. Other land donations were made by Austin (2,562 acres), Travis County (4,023 acres), the Nature Conservancy (13,000 acres), the Lower Colorado River Authority (507 acres), and other sources (2,717 from Travis Audubon, University of Texas, Municipal utility districts, municipalities). The City of Austin's total contribution of preserve land under the Plan is expected to be 7,507 acres.

The City of Austin passed a $22 million general tax revenue-backed bond measure in November 1992 for land acquisition for the preservation for water quality and recreational purposes. Travis County failed to pass its own $48 million bond measure for HCP in 1993. Instead, it sold participation certificates to developers buying into the HCP in exchange for development rights outside it, which produced only modest revenue. Tax benefit (tax increment) financing provides most of the county funding; a portion of the increased property tax that results from the ability to develop a property under the plan is dedicated to mitigation.

Benefits: One study of the Balcones Canyonlands Conservation Plan (BCCP) in Travis County, Texas found that the plan would save up to $200 million compared to the cumulative cost of project-by-project consultations. It further found that the cost of ESA compliance to private landowners was significantly more without the HCP ($9,000 per acre) than under the HCP ($1,300), showing that the HCP "is a more cost effective method of complying with the Endangered Species Act than individual compliance by Travis County landowners with habitat (Gau and Jarrett 1992)."

The plan is unique among HCPs as it designated infrastructure corridors to further streamline transportation and other infrastructure permitting. Corridors were included based on existing rights-of-way or other places where the planners envisioned growth, as opposed to being taken from a regional plan or an existing list of projects. For HCP roadway corridors, the plan specifies whether widening is

allowed, whether mitigation is included in the HCP preservation lands, or whether it should not receive additional development.

Costs and Challenges: The total cost of the plan was estimated at the time of permitting to be $159 million, including $44 million preserve system management. During the course of its planning history there were periods where it almost collapsed, but it was bolstered by strong federal support as a demonstration of the large-scale HCP model.

Balcones Canyonlands Conservation Plan - Habitat Conservation Plan (BCCP HCP)

Effort **Location** **Participating Entities** **Additional Partners**	**Scale / Scope of Effort (Geographic Size / Range)**	**Description of Effort & Transportation Component / Linkage**	**Total Cost of Effort (Estimated)**	**Funding Sources & Estimated Contribution (Transportation & other)**	**Funding Source Details**
Balcones Canyonlands Conservation Plan - Habitat Conservation Plan (BCCP HCP) **Travis County, TX** **Travis County** administers Public Participation Process that relays info. related to development activity to USFWS and issues participation certificates to cooperating landowners **City of Austin** manages the BCCP capital improvement and infrastructure development process; maintains mitigation credit accounting system for participating agencies **Lower Colorado River Authority** Travis Audubon Society Nature Conservancy of Texas Private landowners	Permittees are required to assemble and manage 30,500 acres of habitat within 20 years of issuance of the Permit (i.e. by 2016). To date, over 28,000 acres (over 92%) of the permit acreage required has been assembled.	USFWS issued in 1996 a 30-year regional permit that allows for incidental take outside of proposed preserve lands, and provides mitigation for new public schools, roads and infrastructure projects of the participating agencies. Primarily an open space HCP. For 25 roadway corridors within or adjacent to the preserve, the HCP notes: whether widening is allowed under the HCP; whether mitigation is already figured into the HCP preservation lands or would be additionally required; if it should not receive additional development; or if it should be phased out if possible. (Balcones Canyonlands Habitat Conservation Plan, 1996, Table 2. BCCP Roadway Corridors, p.437-439). Other infrastructure activities specified within the HCP relate to electrical, cable and water utilities.		**Federal:** From 1997 to 2010, Permit Holders received $60.5 million in federal grant funds via *USFWS Section 6 HCP Land Acquisition Assistance Program,* which requires local match. Federal grants have thus provided the largest portion of funding for the BCCP HCP. **Local:** $20.6 million contributed in same period from City of Austin and Travis County, making a total of $81.2 million was spent on grant-funded BCP Preserve Acquisition. **Private:** Additional funds are collected in an on-going basis from private landowners mitigating development activity. In 2012, such "participation certificates" generated $345,475.	**City of Austin** $22 million general tax revenue-backed bonds (measure passed November 1992) for land for the preserve. Contributed 2,562 acres the city had previously held. Austin's total contribution of preserve land under the Plan was to be 7,507 acres. **Travis County** Failed to pass its own $48 million bond measure for HCP in 1993. Instead, it sold participation certificates to developers buying into the HCP in exchange for development rights outside it. These produced only modest revenue. **Other:** Land donations / easements. Nature Conservancy: 13,000 acres Travis County: 4,023 acres Lower CO. River Authority: 507 acres Other (Travis Audubon, University of Texas, Municipal utility districts, municipalities): 2,717

Florida DOT Wetland Mitigation Program

(in cooperation with Florida Water Management Districts)

Motivation: Since 1996, Florida law (§ 373.4137, Florida Statutes) has acknowledged that regional, advance mitigation planning can more effectively achieve mitigation goals than the project-by-project approach and has thus directed the state Department of Transportation (FDOT) to undertake regional, long-range planning for the environmental mitigation of wetland impacts of proposed transportation projects. This legislation does not address uplands environmental mitigation.

Structure: Every year, FDOT prepares a five-year work plan that identifies the projects and services to be provided during that period and how they will be funded. To provide for advance planning of environmental mitigation, state law requires FDOT every year to assess and submit an inventory of the environmental impacts of projects in the next three years of its work plan, to the state's water management districts (WMD). Florida's Water Resources Act of 1972 created five WMDs to administer flood protection programs, study water resources, and develop water management plans, including actions to acquire and manage lands for water management (Florida Department of Environmental Protection 2014).

The state's Water Management District "DOT Mitigation Program" has traditionally been the favored entity to carry out FDOT's required mitigation in advance, and other state-designated transportation authorities may ask the WMD to do the same. (The state Department of Environmental Protection [DEP] may also undertake advance mitigation for FDOT, but this is less common.) Upon receipt of FDOT's impact inventory, each WMD creates an annual plan stating how it will mitigate FDOT's forecasted impacts. The plan is reviewed and approved by the state's Environmental Resource Permitting program (Department of Environmental Protection), USACE, FDOT, and other transportation agencies.

Mitigation Funding: Although the WMDs can undertake mitigation on behalf of FDOT, FDOT pays for it. The WMDs can ask FDOT to reimburse the cost of preparing the annual mitigation plans. To reimburse a WMD for plan development and to fund implementation of the mitigation plan, FDOT identifies funds from the State Transportation Trust Fund (for the environmental phase of the projects budgeted by the department for the current fiscal year), and transfers funds quarterly to the WMD. Further, for any costs the WMD will incur to cover mitigation activities including, but not limited to, design, engineering, production, and staff support, the WMD can request a transfer of funds from FDOT 30 days in advance of expenditure.

Mitigation Costs: The fee structure under which FDOT makes payments to the WMD for mitigation activities is established in statute. It uses a simple lump sum of $75,000 per acre, multiplied by the number of projected acres of impact identified in FDOT's environmental impact inventory. (The fee of $75,000/acre was derived from estimates of the historical average cost per acre that FDOT had spent on project-by-project basis in the early 1990s.) State law also stipulates that the cost per acre shall be adjusted annually to reflect change in the average of the Consumer Price Index (CPI). The current CPI-adjusted costs per acre used by FDOT for making payments to DEP and the WMDs are below. (The first year is the CPI adjusted cost, and the remaining years reflect an estimate for programming future year payments.) (Florida DOT, 2013, Part III, Ch. 11.)

FISCAL YEAR	COST PER ACRE
2013/14	$ 109,599
2014/15	$ 111,426
2015/16	$ 112,810
2016/17	$ 114,669
2017/18	$ 116,756
2018/19	$ 118,912

Lump sum payments to the WMD are intended to fund all mitigation costs, "including, but not limited to, the costs of preparing conceptual plans and the costs of design, construction, staff support, future maintenance and monitoring the mitigation areas." (Florida DOT 2013, 7)

Programming Issues: Florida DOT uses a variety of programming codes to distinguish the payments made for mitigation under different circumstances, including environmental payments:

- for mitigation bank credits;
- for project mitigation performed by FDOT itself;
- to the WMD (with codes for each of the five WMDs); and
- to other governmental agencies.

Competition with Private Mitigation Banks: When the state's Water Management District-based "DOT Mitigation Program" was created, private mitigation banks were uncommon (Munson 2011), and state law favored WMD as the entity to carry out FDOT's required mitigation. In 2011, however, a new state law (CS/SB 824) required the WMDs to consider and use private mitigation banks to mitigate FDOT projects, where such banks would protect water resources as well as other mitigation efforts and also be more cost effective. Also, for FDOT projects already included in the WMD mitigation plan, the law allows FDOT to opt out under certain circumstances in favor of private mitigation banks and to release associated funds identified or held in escrow for the WMDs (Munson 2011; Florida Senate 2012).

Florida DOT Mitigation Expenditures (2007-2011)

Entity Undertaking FDOT Mitigation	Funds Received	% of Total Expenditures
WMD DOT Mitigation Program	$116,456,080	69%
Public & private mitigation banks	$38,107,600	22%
FDOT in-house mitigation	$15,357,882	9%
Total	**$169,921,562**	

(Florida Senate 2012)

Florida DOT *Anticipated* Mitigation Expenditures (2012-2013)

Entity Undertaking FDOT Mitigation	Funds Received	% of Total Expenditures
WMD DOT Mitigation Program	$10,374,303	52%
Public & Private Mitigation Banks	$9,643,929	48%
FDOT In-house Mitigation	$50,000	less than 1%
Total	**$20,068,232**	

(Florida Senate 2012)

Observations:

1. This program is designed to mitigate FDOT's wetlands impacts in advance through cooperation with state Water Management Districts. It promotes mitigation across multiple projects and more in advance than does project-by-project mitigation, but i**t does not allow for mitigation performed significantly in advance of planned projects.**

2. To allow for possibly even earlier advance mitigation, the state is developing a more general Advance Environmental Mitigation Program, coordinated by its Central Environmental Management Office (CEMO). This effort is profiled separately.

3. **A separate but related effort** to both these initiatives **is the state's Efficient Transportation Decision making Process (EDTM),** initiated in the late 1990s after the passage of TEA-21. EDTM refers more to communication and information designed to allow FDOT to work with WMDs to prioritize watershed- or basin-level mitigation needs. For EDTM, which relates to but does not fully represent the wetland mitigation program, FDOT estimated in 2009 that the process had led to $15.2 million in reduced FDOT costs and 38 years of estimated time savings (Environmental Law Institute 2010a, p. 20).

Florida DOT Wetland Mitigation Program
(in cooperation with Florida Water Management Districts)

Effort Location Participating Entities Additional Partners	Scale / Scope of Effort	Description of Effort & Transportation Component / Linkage	Total Cost of Effort (Estimated)	Funding Sources & Estimated Contribution (Transportation & other)	Funding Source Details
FDOT Wetland Mitigation State Law directs the state Department of Transportation (FDOT) to undertake regional, long-range planning for the environmental mitigation of wetland impacts of proposed transportation projects. Every year, FDOT must assess and submit to the state's water management districts (WMD) an inventory of the environmental impacts of projects in the next three years of its work plan. The WMDs undertakes mitigation on behalf of FDOT, and FDOT transfers funds to the WMDs as payment. The aims is to have WMD-provided mitigation in place before FDOT would commence a project. Under state law, FDOT can also turn to the DEP or private mitigation banks to provide its mitigation needs. While FDOT has commonly pursued WMD-based mitigation in the past, recent legislation (CS/SB 824) improves the ability of private mitigation banks to compete for FDOT business.	This is a statewide program. There are five WMDs in Florida, and FDOT districts coordinate with the WMD in their areas. There is some evidence that not all WMDs willingly provide mitigation for FDOT (Broadwell,2013.)	This program is designed specifically to meet the wetland mitigation needs of transportation projects in Florida.	Currently, FDOT spends about $20 million per year on mitigation through this program. The amount FDOT pays the WMD for mitigation activities is established in statute: a lump sum of $75,000 per acres, multiplied by the number of projected acres of impact identified in FDOT's environmental impact inventory. The cost per acre is adjusted annually to reflect change in the Consumer Price Index. In FY 2013/14 the cost per acres is $109,600. Source: flsenate.gov	To reimburse the WMD for mitigation planning and to fund implementation of the mitigation plan, FDOT identifies funds from the State Transportation Trust Fund (for the environmental phase of the projects budgeted by the department for the current fiscal year), and transfers funds quarterly to the WMD.	Funds from the State Transportation Trust Fund are used to support this effort. Underlying Trust Fund revenue sources include: fuel tax, aviation fuel tax, motor vehicle license/tag fees, rental car surcharge, documentary stamps, misc. revenue, reimbursements, interest, and federal aid reimbursements.

Florida DOT Advance Environmental Mitigation (General)

Description: In a very recent effort, the Florida DOT has reserved a small allocation of annual funding ($5 million per year) beginning in FY 2015 to support a new advanced mitigation effort, designed "for purchase of advanced mitigation of wetlands and other surface water impacts and species impacts of transportation projects and for ecosystem or environmental management projects." In particular, the program "is intended to provide funds to take advantage of mitigation opportunities in areas of the state where mitigation options are quickly disappearing or will become cost-prohibitive due to urbanization, uniqueness or competitive factors" (Florida DOT 2013, Part III, Chapter 11, p. 5).

Structure: The existence of these funds appears largely only as a line item in FDOT's Five-Year Work Plan adopted in July 2013 (FDOT 2013), and program guidelines do not appear to have been published yet. The effort is described in the Work Program Instructions, which state that the funds "can be used for research, planning, design, construction of mitigation as well as purchase of credits and management costs associated with mitigation projects," that coordination with appropriate resource agencies is required, and that FDOT's Central Environmental Management Office (CEMO) and districts will coordinate funding (Florida DOT 2013, Part III, Chapter 11, p. 5).

Funding: The department has allocated $5 million annually (beginning in fiscal year 2015) for this program. Funds come from FDOT's "Environmental Mitigation," or so-called DEM funds, which are 100 % state funds.

Observations:

1. This program has been carved from state DOT environmental funds. While modest in scale, it could provide a pilot mechanism for testing how FDOT districts might respond to the opportunity to tap funds for advance mitigation.

2. Because this program is not yet in operation, it is not possible to assess its costs or benefits.

Florida DOT Advance Environmental Mitigation (General)

Effort Location Participating Entities Additional Partners	Scale / Scope of Effort (Geographic Size / Range) (Acres? / Sq. Miles / Statewide)	Description of Effort & Transportation Component / Linkage	Total Cost of Effort (Estimated)	Funding Sources & Estimated Contribution (Transportation & other)	Funding Source Details
FDOT Advanced Environmental Mitigation A statewide program using state DEM (Environmental Mitigation) funds has been established for purchase of advanced ***mitigation of wetlands and other surface water impacts and species impacts*** **of transportation projects** and for ***ecosystem or environmental management projects***. DEM funds can be used to perform mitigation related activities, research, and to purchase land to bank for future environmental opportunities in areas of the state where mitigation options are quickly disappearing or will become cost-prohibitive due to urbanization, uniqueness or competitive factors. Source: Florida DOT 2013	Statewide, although districts will propose advance mitigation opportunities and/or projects to Central Environmental Management Office (CEMO) for determination of applicability and prioritization. Source: Florida DOT 2013	Funds can be programmed for district use in coordination with the Central Environmental Management Office (CEMO) Source: Florida DOT 2013	FDOT will provide $5 million annually for this program, starting in fiscal year 2015.	State DOT Environmental Mitigation (DEM) funds will support the program. Source: Florida DOT 2013	Reserving the $5 million/year for this program appears to have been an administrative action within FDOT.

Washington Advanced Environmental Mitigation Revolving Account (AEMRA)

Motivation: Prompted by a 1994 study (*Environmental Cost Savings and Permit Coordination Study*) undertaken for the Washington State Legislative Transportation Committee to examine wetland impact mitigation, wetland banking, and watershed-based mitigation and by ensuing state legislation (SB 5894), the Washington State DOT (WSDOT) began in 1996 to develop a comprehensive wetlands and watershed management strategy to guide its mitigation actions. The agency was committed to watershed-based wetland planning, whereby it would direct mitigation dollars toward restoration and enhancement projects as prioritized within watersheds. It also recognized that increased use of mitigation banks—either developed independently by WSDOT or in collaboration with other entities—would be important. However, WSDOT also recognized that identifying large amounts of upfront capital, separate from individual project budgets, would be needed to fund such banks, but would be difficult to access under established project-based mitigation and mitigation funding structures.

WSDOT sought and received $10 million in the WSDOT Agency Request Budget for 1997-99, to establish the Advanced Environmental Mitigation Revolving Account (AEMRA). WSDOT also sought funds from FHWA to support AEMRA capitalization, but it is unclear if these were obtained (Froehlich 1997). The $10 million was sufficient to purchase property and credits for wetland and other compensatory mitigation land in advance of receiving the mitigation funds associated with specific transportation projects. The funds were also used to help establish, maintain and monitor two of the State's three large mitigation banks.

Structure: The AEMRA program establishes a reimbursable fund that enables funding for mitigation activities in advance of project impacts. While it was first set up to facilitate wetland banking under WSDOT'S Wetland Strategic Plan, it was later expanded to aid mitigation efforts for fish habitat, fish passage, and flood management (Thomas and Deakin, 2001). Essentially, AEMRA provides loans to plan or develop an advance mitigation site before a project's construction funds are available. The loans can be used to acquire property; acquire water or air rights; develop property for environmental mitigation; pay for engineering costs necessary for such purchase and development; and to facilitate use of the mitigation sites to fulfill project environmental permit requirements.

WSDOT's current environmental procedures appear to establish a hierarchy of approaches to mitigation. Departmental guidance encourages project planners to consider using mitigation value available, first, from existing WSDOT mitigation sites or mitigation banks; and second, from a certified third party source, such as a non-WSDOT mitigation bank or in-lieu fee program. Where such options are not possible, AEMRA loans may be pursued.

Mitigation Funding: Seed funding for AEMRA came from the state's Motor Vehicle Fund. The motor vehicle fund is supported by state motor vehicle fuel taxes, vehicle registration fees, and federal grants. It is constitutionally restricted to highway expenditures, distinguishing it from the state's more flexible Highway Safety Fund and Multimodal Transportation Account (Washington State Senate Transportation Committee 2012). Loans taken from the fund are repaid from project funding. AEMRA accrues interest gained from its management. Subsequent legislation authorized the transfer of excess balance in AEMRA to the state's motor vehicle account.

When considering wetland mitigation banks in the 1990s, WSDOT sought legal clarification on whether a Washington State Constitution provision that prohibits lending or giving the State's credit to any individual, association, company, or corporation would prevent WSDOT from developing wetland/ watershed mitigation banks; selling credits in such a bank to public or private parties; or transferring title to a wetland bank to another party. The concerns surrounding these issues all proved surmountable, and the legal details are addressed in full in the *WSDOT Wetlands Strategic Plan*, p. 2. This may be of interest to Caltrans as it considers similar legal issues associated with advance mitigation options.

Observations:

1. The fund was not sufficiently used by the different transportation planning regions in the state, and in 2010 the fund was cut in half, when it had in excess of $5 million left in the fund. It is unclear the exact reasons why the regions did not utilize the AEMRA fund more, but some potential reasons include: regions did not want to pay back the loan with interest, as was required by the fund and regions could not find the type of land or credits that was needed by the specific transportation project at hand.
2. WSDOT did not want to be the landholders of additional properties, and were trying to get rid of land holdings, including mitigation sites. They are currently working with other groups regarding the management of the three large mitigation banks, such as the City of Seattle, State Parks and tribal governments.

In 2013 during the biennial budget, the AEMRA account was zeroed out, essentially ending the program. There are still incoming funds from previous mitigation obligations, but these amounts are available for general transportation purposes, not just mitigation.

Washington Advanced Environmental Mitigation Revolving Account (AEMRA)

Effort Location Participating Entities Additional Partners	Scale / Scope of Effort (Geographic Size / Range) (Acres? / Sq. Miles / Statewide)	Description of Effort & Transportation Component / Linkage	Total Cost of Effort (Estimated)	Funding Sources & Estimated Contribution (Transportation & other)	Funding Source Details
WSDOT Advanced Environmental Mitigation Revolving Account (AEMRA) An established account in which a source of funds, independent from programmed, transportation project funds, would be used to finance the purchase and development of wetland bank sites as well as other types of advanced environmental mitigation. Purchase and development of these sites would occur in advance of projects. When the transportation projects are developed and need environmental mitigation to meet permit requirements, the project can purchase credits from the pre-developed mitigation banks. Money used to purchase bank credits would go back into the AEMRA, allowing it to continue to help meet environmental mitigation needs in the future.	AEMRA funds acquisition, design, development and monitoring and maintenance for two of the three WSDOT banks.	In response to a 1994 study (*Environmental Cost Savings and Permit Coordination Study)* on behalf of the Washington State Legislative Transportation Committee, the 1995 Legislature developed and approved SB 5894, directing WSDOT to develop a long-term wetland mgmt. plan for WSDOT facilities.	$10,000,000 was the initial seed money, from the State Gas Tax revenue, received in 1997. In 2010, the fund was cut in half. There was more than $5 million in the fund at that point, largely because the WSDOT planning regions were not using the fund. In 2013 during the biennial budget, the account was zeroed out, essentially ending the program.	The fund has no more money coming in from the State Gas Tax, but continues to have funds coming in as repayment for previous obligations. The money from this account will go to the general transportation fund.	AEMRA was capitalized from the state motor fuel account in 1997, and has operated on a replenishment basis from project funds.

6. National and State Developments Shaping the Context for Advance Mitigation in California

Here, we scan current developments at the national and state level that are shaping or may shape the context for funding and implementing advance mitigation in California. The intent of this section is to provide an overview of the types of programs, initiatives, and funding that are active, while recognizing that many may not currently fund needs from Caltrans. While not an exhaustive survey, we highlight significant policy and other developments that may be of interest either as possible models of how advance mitigation might be funded in California, or for their potential to identify opportunities to pursue funding for advance mitigation and to collaborate with other partners.

National

Moving Ahead for Progress in the 21st Century (MAP-21) & its Reauthorization

The 2012 transportation authorization law, Moving Ahead for Progress in the 21st Century, called MAP-21 (U.S. House of Representatives 2012), provides federal encouragement for advance mitigation in several places. The bill adds to the legitimacy of advance mitigation planning in transportation and makes some funds eligible—but not dedicated—for supporting it. Yet, important federal direction about implementing or funding advance mitigation is vague or absent, leaving stakeholders waiting for the next reauthorization for further clarification.

On the encouraging side, Section 1311 of MAP-21 says states or Metropolitan Planning Organizations may develop programmatic mitigation plans within the statewide or regional transportation planning process. And it details the potential scope and content of such plans, and the processes for adopting and integrating them with other plans. Promisingly, the content of programmatic mitigation plans outlined in MAP-21 reflects features envisioned by advance mitigation proponents and piloted by innovators. Potential plan contents include:

- assessment of environmental resources in the plan area;
- assessment of opportunities to improve resources with mitigation of transportation projects;
- standard measures and parameters for mitigating certain impacts;
- adaptive management procedures (e.g. for mitigation monitoring and adjustment); and
- consideration of statutory requirements that apply to certain resources.

Further, MAP-21 corresponding direction for metropolitan (Section 1201) and state (Section 1202) long range transportation planning to discuss "potential environmental mitigation activities and potential areas to carry out these activities, including activities that may have the greatest potential to restore and maintain…environmental functions."

Finally, MAP-21 also makes funds from the new Transportation Alternatives Program (TAP) eligible for expenditure on "any environmental mitigation activity." The explicit availability of federal funds for advance mitigation is exciting, yet the TAP program is modest and unlikely to fully answer the need for programmatic mitigation. California's TAP apportionment for FY 2013 is $72 million. Mitigation needs face stiff competition for those funds from California bike and pedestrian projects and project proponents, as recent state policy (SB 99, 2013) pooled TAP and other federal and state funds into a single Active Transportation Program. Some groups have warned that "environmental mitigation projects can be extremely expensive and consume the entire TAP for a state, leaving little or no money for bike and pedestrian, safe routes, and other trail projects" (Transportation For America 2014) . A further wrinkle may be that state DOTs and MPOs are not eligible to receive TAP funds, although they can partner with other entities (e.g. local governments, Local regional transportation authorities; and natural resource or public land agencies) to do so. (FHWA 2014a).

With MAP-21 due for reauthorization in 2014, advocates may look to a new bill not only for more dedicated funding for advance mitigation, but also for more clear federal direction, legal, and financial structures to support it. For instance, the FHWA has not yet articulated what effect a programmatic mitigation plan may have on the environmental review process that occurs later (FHWA 2012). Nor has it specified how state or local funds used to undertake advance mitigation can be reimbursed from federal sources, particularly when mitigation activities are performed sufficiently in advance as to be disconnected from actual construction-ready projects.

FHWA Eco-Logical & the Strategic Highway Research Program

The FHWA's environmental toolkit website (FHWA 2014b) discusses the objective of accelerating project delivery through the cooperation of transportation agencies with natural, cultural and historic resource agencies, to develop realistic timelines for environmental review and development of environmental mitigation. Such coordination is "essential to meeting the mandates for highway and transit projects under MAP-21 and SAFETEA-LU" (FHWA 2014c).

The process for FHWA's system is represented as:

Figure 2 (FHWA 2014d)

To date FHWA has provided (in addition to research support), 14 implementation assistance grants to state DOTs and Metropolitan Planning Organizations, including Atlanta, Charlottesville, Idaho TD (2), Maine DOT, Michigan DOT, North Central Texas Council of Governments, Pikes Peak Council of Governments, Association of Monterey Bay Area Governments (AMBAG), Caltrans, Missouri DOT, New Hampshire DOT, Ohio Kentucky Indiana Regional Council of Governments (OKI) and Southern California Association of Governments (SCAG).

Further, 12 states have received grants from FHWA for developing Eco-Logical tools, California is not among these (FHWA 2014e). The FHWA has also produced a useful set of webinars that can be accessed at: http://www.environment.fhwa.dot.gov/ecological/eco_webinar_series.asp.

The FHA has a list of links to successes and additional collaboration tools (FHWA 2014f) that indicates that eight federal agencies have continued to promote Eco-Logical as a process for developing infrastructure. The website features updates on efforts within the USEPA (the development of a Regional Ecological Assessment Tool (REAP); the development of the USACE Watershed-Based Mitigation Program; and, the NOAA Integrate Ecosystem Assessment Approach or Ecosystem Assessment Program (EAP).

Finally, the FHWA continues to promote the Eco-Logical approach (FHWA 2013). Through the Second Highway Research Program (SHRP2), the FHWA, TRB and American Association of State Highway and Transportation Officials (AASHTO) held a workshop on how strategies and tactics for implementation of Eco-Logical on a national scale. The workshop produced an action plan with six strategy areas:

- *Strategy 1:* Educate agency leadership about the value and benefits of the ecosystem-scale approach to gain support for implementation activities.
- *Strategy 2:* Develop incentives or support for state and regional transportation agencies to adopt a Regional Ecosystem Framework (REF) or integrate elements of the Integrated Ecological Framework (IEF) into standard procedures.
- *Strategy 3:* Provide technical assistance to educate staff-level practitioners about techniques and tools for implementing Eco-Logical and provide opportunities for target audiences to learn from their peers.
- *Strategy 4:* With input from the user community, develop a business case highlighting the time and cost savings associated with the Eco-Logical approach.
- *Strategy 5:* Develop new tools and technologies that increase and/or enhance access to existing data and support interagency collaboration.
- *Strategy 6:* Develop communications and outreach materials to increase awareness about Eco-Logical and facilitate information sharing among potential users.

Much of the funding for research at the federal level impact assessment capacity has come through the Transportation Research Board's (TRB) Strategic Highway Research Program (SHRP), which has had two cycles, the most recent that was authorized by congress in 2005, and that will end in March of 2015. Among the funded projects in the most recent cycle are the C40A & B, which are focused on the development of a national geospatial impact scoping tool, and have two pilot projects in California that are intended to provide technical assistance in the development of the tool. As SHRP2 draws to a close, a new round of calls for proposals may emerge from FHWA in 2014. Although official announcements to this effect have not been made and although it is unknown whether such calls would directly fund advance mitigation, FHWA and AASHTO are seeking to make more widely available the most useful SHRP2 components. These include the 9-step Integrated Ecological Framework used to provide transportation agencies a way to engage in advance mitigation planning. Any such support made available to state transportation agencies would be of interest to Caltrans.

Transportation Infrastructure Finance and Innovation Act (TIFIA)

The TIFIA program (23 USC 601-609) is well known to transportation officials because provides federal credit assistance to nationally and regionally significant surface transportation projects. The program is designed to fill market gaps and to leverage substantial private co-investment by providing projects with supplemental or subordinate debt. Qualified projects are evaluated by the U.S. Secretary of Transportation and selected in competition with others based on the extent to which they generate economic benefits, leverage private capital, promote innovative technologies, and meet other program objectives. **Although TIFIA has not yet supported advance mitigation efforts, it is of interest for two reasons. First, TIFIA may support other elements of projects that are subject to advance mitigation requirements, thereby freeing state resources for those efforts. Second, amendments to TIFIA have been proposed which would make advance mitigation an eligible TIFIA expense.** These are discussed below.

The TIFIA credit program consists of three types of financial assistance, designed to address requirements throughout a project's life cycle:

- *Secured loans* are direct federal loans to project sponsors offering flexible repayment terms and providing combined construction and permanent financing of capital costs.
- *Loan guarantees* provide full-faith-and-credit guarantees by the federal government to institutional investors, such as pension funds, that make loans for projects.
- *Lines of credit* are contingent sources of funding in the form of Federal loans that may be drawn upon to supplement project revenues, if needed, during the first 10 years of project operations.

The total amount of TIFIA credit assistance may not exceed 33% of eligible project costs. The TIFIA credit instrument must be supported in whole or in part from user charges or other dedicated non-federal funding sources that also secure the project obligations. Credit assistance must be repaid within 35 years after the project's substantial completion.

Any type of project eligible for federal assistance through surface transportation programs under Title 23 or chapter 53 of Title 49, USC (highway projects and transit capital projects) is eligible for the TIFIA credit program. In addition, eligibility is specifically extended to international bridges and tunnels as well as inter-city passenger bus and rail facilities and vehicles (including Amtrak and magnetic levitation systems). Freight projects may combine private and public sector funds in private sector facility improvement.

Each project must meet objectively measurable thresholds to qualify. A project must be consistent with the state's long-range transportation plan and be included in the transportation improvement program. A project must cost at least $50 million. For intelligent transportation system projects, the minimum cost is $15M. Freight projects with a common objective of improving the flow of goods may be combined to meet project thresholds.

Because there is no explicit language about habitat preservation in the TIFIA authorizing legislation, members of the U.S. Senate (S. 826; 112th Congress) and House of Representatives (HR1907: 112th Congress) have during the past year proposed legislative changes that would make land acquisition and management to comply with provisions of the Endangered Species Act eligible for support under the TIFIA program. This proposal originated in California and was introduced in the Senate by Senator Barbara Boxer. While considered by both the House and Senate, these provisions remain proposals that have not been enacted into law.

There is active opposition, as well as support, for the incorporation of TIFIA in the MAP-21 reauthorization. The reasons most often given for opposing inclusion of TIFIA in reauthorization include failure of the USDOT to fund the majority of projects which have applied for the money while the majority of the funds allocated under TIFIA program in MAP-21 remain unused. In response, USDOT explains delays are due to staffing shortages and approval rates are expected to increase prior to serious reauthorization debates.

Water Infrastructure Finance and Innovation Act (WIFIA)

The Water Resources Development Act (WRDA) of 2013 was passed by the Senate in October of 2013 and is awaiting action in the U.S. House of Representatives, where it is under the jurisdiction of the House Transportation and Infrastructure Committee, which is also responsible in the House for the reauthorization of MAP-21. Designated as HR 3080, **the WRDA includes provision for a new program, the Water Infrastructure Finance and Innovation Act (WIFIA) which is directly modeled after TIFIA, and which may include funding that could be used for habitat acquisition. While the future progress of this legislation is uncertain, its potential inclusion of such funds makes the legislation of interest to Caltrans efforts to identify funding sources for advance mitigation.**

The program is in draft only and of course is subject to change and possibly to deletion from the bill. Currently, the draft bill includes Title X which creates two separate WIFIA pilot programs; one operated by USEPA, and another operated by the USACE. If enacted, the bill would authorize funding up to $50 million per year to each program over five years. There is no cap on the total number of projects that could be funded.

Projects eligible for WIFIA assistance through the USACE would include those for:

- levee, dam, tunnel, aqueduct, reservoir and related water infrastructure; as well as those that reduce flood risk.

Projects eligible for WIFIA assistance through USEPA would include projects for:

- repair, rehabilitation, or replacement of a treatment works or a community water system;
- brackish or sea water desalination, managed aquifer recharge, or water recycling project;
- projects to enhance the energy efficiency of a water system; and
- projects combining these elements.

The relevance of this program to transportation and Caltrans is difficult to assess since it has not yet been enacted and is subject to further amendment. It should be monitored closely since Habitat Conservation Plans that incorporate mitigation for both transportation and water projects could qualify under this bill for loans that might be used for habitat acquisition. Advance mitigation efforts with cross-sectoral participation could contribute to economies of scale for both Caltrans and any collaborators.

Blumenauer Gas Tax Proposal

In early December 2013, Rep. Earl Blumenauer (D-OR) introduced a bill to the House of Representatives that would increase the federal gas tax and index it to inflation. Blumenauer's plan would gradually increase the federal motor fuel tax 15-cents over the next three years, from 18.4-cents per gallon (the rate it has been since it was last raised in 1993) to 33.4-cents per gallon. The proposal includes a provision to index the per-gallon tax amount to inflation, allowing it to rise in step with the Consumer Price Index without Congressional approval, a measure that would shield tax revenue from continued erosion of its purchasing power.

While there is considerable political sentiment that Congressional support for such a proposal will be hard to garner, Blumenauer's initiative suggests that prospects for increasing federal transportation funding are on the minds of some. Caltrans is certain to monitor the progress of this bill in Congress. Although its prospects appear slim, any change in the federal gas tax would impact the amount of federal transportation funds California receives, and could influence whether and how the state might identify resources to support an advance mitigation program. Caltrans might work to educate the state's Congressional delegation about advance mitigation and how specific bill provisions might facilitate it, such as a set aside of funds for advance mitigation (before they are deposited into the SHA).

State

Sustainable Communities and Climate Protection Act of 2008 (SB 375)

In the absence of national climate policy, some states are moving to reduce climate impacts through planning. One example is California's Sustainable Communities and Climate Protection Act of 2008, known as SB 375, which uses an innovative regional-local policy framework for reducing transportation-related greenhouse gases (GHGs). **Regional planning principles suggested by SB 375 are closely compatible with comprehensive habitat- and landscape-level mitigation and preservation, making this law of interest to advance mitigation proponents and the SAMFFS study.**

While SB 375 provides no funds to support advance mitigation, there evidence in Orange County and in the Sacramento region that the new law may indirectly increase local governments' interest in and commitment to land conservation efforts. Where such efforts are aligned with mitigation actions and goals established through the regulatory process, potential exists to create a win-win. Conservation actions that limit development of natural lands, particularly lands on the urban fringe, have potential to reduce GHG emissions over less restrictive development scenarios. Sprawling land development patterns are associated with higher automobile reliance and, hence, more GHGs. SB 375 could be among the reasons that local governments would support certain advance mitigation actions.

How SB 375 works. SB 375 aims to reduce automobile reliance in California and resultant greenhouse gases by promoting regional land use plans and transportation improvements to help Californians drive less while traveling more by transit, cycling, and walking. Although the law refrains from terms like "smart growth" or "growth management," it is based in research suggesting that compact, center-focused land use practices that bring jobs and housing closer together can enable people to make fewer, shorter auto trips and to use non-auto modes more. California's metropolitan regions are obliged under this law to plan for meeting specific GHG reduction targets. Los Angeles, Sacramento, San Diego, and the San Francisco Bay Area, are expected to reduce GHG emissions 7% or 8% below 2005 per capita levels by the year 2020, and to meet more ambitious targets, up to 16%, by 2035.

Metropolitan Planning Organizations (MPOs) play a central role in efforts to meet these targets. SB 375 asks each California MPO to create a "Sustainable Communities Strategy" (SCS) outlining measures it will take to achieve its GHG target. The MPO's SCS is expected to include infrastructure investment and land use policies that together would reduce the amount of driving Californians do and, consequently, decrease transportation-related GHGs.

Notably, regional scale land conservation in California has begun to find a place in the Sustainable Communities Strategy (SCS). Under certain conditions, such efforts have potential to be paired with advance mitigation. In 2011, as the Orange County Council of Governments developed its own sub-regional SCS, environmental and conservation interests argued that including a conservation policy in the SCS offered GHG-benefits. As a result, a natural lands acquisition strategy focusing on carbon sequestration and avoidance was adopted into the SCS in June 2011—California's first SCS conservation policy.

Federal law recognizes the potential synergy between growth management and programmatic mitigation and land conservation efforts. Section 1311(e) of MAP-21 encourages not only the development of programmatic mitigation plans within regional transportation plans, but also their integration "with other plans, including…growth management plans, and land use plans." Orange County has begun to make this integration real. Further, the Sacramento region's MPO is developing an effort, called Working Landscapes, to quantify the value that open space and agricultural lands provide to the region in terms of wildlife protection, carbon sequestration, groundwater recharge, species habitat, and other such ecosystem services. This work could establish a business case for keeping rural lands rural. When further developed, it could be included in a future iteration of the region's SCS.

Caltrans might consider how SB 375 could provide further impetus for the state's regions to plan actively and collaboratively for strategic land preservation and restoration in ways that also meet advance mitigation interests.

Greenprinting Efforts

Increasingly, throughout the state, counties, cities and non-profits are developing conservation plans which can be used to identify critical areas for preservation. These efforts, which include California Natural Community Conservation Plans (NCCPs) and Habitat Conservation Plans (HCPs; a required part of an application under incidental take permits under the US Endangered Species Act [United States Committee on Environment and Public Works 2002]), considered the gold standard by CDFW in terms of identifying critical areas for preservation, can inform the identification and selection of compensatory mitigation parcels. Collectively referred to as Greenprints, these efforts include an ongoing effort to develop a Greenprint for the greater Los Angeles metropolitan area, a nine-county conservation plan in the Bay Area called the Conservation Lands Network (Bay Area Lands 2014), and Caltrans' Essential Habitat Connectivity Project (Spencer et al. 2010).

While such efforts may not provide direct funding sources, they may offer potential savings to Caltrans from expedited environmental review and from potential bundling of multiple projects' mitigation obligations. This type of information offers potential efficiency savings to transportation agencies, if it can be leveraged into the mitigation planning process. In addition, using this type of information has the potential to enable mitigation that already has stakeholder support among groups that have contributed to Greenprint development. Further, Caltrans engagement with such efforts could reveal opportunities to collaborate with non-profit entities such as the Trust for Public Land whose mission involves strategic land acquisition for conservation purposes.

High Speed Rail in California

Since the mid-1990s, the state of California has been considering the construction of a new high speed rail (HSR) system connecting the state's major metropolitan areas. In 2008 California voters approved Proposition 1A to issue $9 billion in general obligation bonds to support the system's construction. The system is planned to have over 20 stations and cover over 700 miles, operating on exclusive tracks for most of the system, either fully grade-separated in an open trench or tunnel, at-grade, or on an elevated guideway, determined by terrain and physical constraints. The scale and location of the proposed system presents potential for significant negative environmental impacts, including impacts to wetlands and biological resources, farmlands, cultural resources, and park land and water quality.

While Caltrans and the California High Speed Rail Authority (HSRA)—the entity responsible for the system's planning, design, construction, and operation—are independent of one another, **it is in the Department's interest to remain informed of the HSRA's plans for assessing, funding, and meeting its mitigation obligations. Given the potential for impacts and mitigation obligations, the HSRA has signaled interest in addressing environmental mitigation prior to construction and in funding such activities through bond sales. Further, it has made funds available to support a full-time senior position within the Strategic Growth Council (SGC) to coordinate advance mitigation efforts.** One possible goal of coordinative efforts may be to establish a multi-agency task force that would evaluate and plan advance mitigation opportunities for future HSR segments. **If convened, a multi-agency group could be an important venue for Caltrans participation, as such a group may provide a forum for exploring cross-agency mitigation needs and solutions, as well as collaborative approaches to funding for large-scale advance mitigation planning and implementation.**[21]

Where the HSRA would acquire lands for conservation or mitigation, one such cross-agency collaboration could involve Caltrans using remaining HSRA mitigation land to meet its own obligations.[22] Caltrans prefers not to purchase conservation or mitigation lands itself. Yet, this option has often become the default, as revealed in Caltrans own experiences developing advance mitigation for its projects. In seeking a bolder, more systematic approach to advance mitigation, Caltrans could consider arrangements

[21] Reports here are discussed in SAMFFS TAC Meeting Notes. Sept. 27, 2013.
[22] This option was discussed in the SAMFFS Meeting, Dec. 3, 2013.

where a separate agency or entity always owned and operated such lands. Other cross-agency solutions that would serve both Caltrans and HSRA could be considered and could be shaped by the land purchase and transfer mechanisms at each entity's disposal.

Currently, the HSRA is focused on starting construction for the system's first segment, planned through the San Joaquin Valley. As this first segment nears construction, opportunities to undertake mitigation for it on an advance basis will diminish, leaving later segments as candidates for such advance planning. A contract for construction of the Madera-Fresno segment was let by HSRA in August 2013. Despite recent legal challenges to the use of Proposition 1A bonds to fund the project, HSRA officials maintain that construction will commence in early 2014.

The Environmental Process for California's High Speed Rail System

Environmental documentation and review of the proposed HSR system has been undertaken in a tiered fashion, providing both programmatic and project-level review. In 2005, HSRA and the Federal Railroad Administration (FRA) prepared a programmatic Environmental Impact Report/Environmental Impact Statement (EIR/EIS) to address broad environmental consequences associated with a decision of whether to proceed with HSR or not, before undertaking more detailed and costly analysis for specific HSR segments. A second programmatic EIR/EIS (2008) evaluated and selected general alignments and station locations within the corridor connecting the San Francisco Bay Area and Central Valley. In addition to meeting CEQA and NEPA requirements, these programmatic reviews of the HST system in an early conceptual stage were thought to provide the HSRA "with the best opportunity to develop design practices and mitigation strategies to avoid and minimize identified impacts" (California HSRA 2005, p. 9).

More detailed, second-tier environmental evaluations would later be prepared for nine individual HSR system sections, to select specific preferred alignments and station locations. These project-level EIR/EIS documents are intended to satisfy state and federal environmental review requirements, enable the public and agencies to engage in review of site-specific alternatives, and help define appropriate project-level mitigation measures. To date, a final EIR/EIS has been certified for the Merced to Fresno section of the system (2012), and a Partially Revised Final Program EIR has been issued for the Bay Area to Central Valley section (2012).

To enhance coordination on the Tier 2 environmental reviews of individual segments, the HSRA has entered into an MOU with USDOT, the FRA, the USEPA, and the USACE to specify review processes integrating NEPA with Section 404 and Section 408 permitting processes and to provide processes for dispute resolution.

California Department of Water Resources

Caltrans may wish to assess the success of the Department of Water Resources in establishing modest funding for advance mitigation efforts through the use of bond funding. While the reasons for bond funding would be different, the DWR funding approach may prove a useful model for Caltrans.

The FESSERO (FloodSAFE Environmental Stewardship and Statewide Resources Office) at DWR has obtained $14 million to fund their advance mitigation projects. This fund is available through Proposition 1E bond funding, which is a General Obligation Bond, allowed by passage from voters. These types of funds must be linked to a higher state need. DWR must identify what they would like to fund, and then requests funds from the Department of Finance, who will sell the bonds. This process is assessed by DWR for funding needs a few years ahead. DWR has used these funds to issue Requests for Proposals for lands that could be used to offset anticipated impacts in the Central Valley. Two mitigation parcels have been financed and are in the process of establishment via contractors, as well as a number of other projects identified (DWR 2014d).

Cap-and-Trade

California's newly established Cap-and-Trade Program yields auction revenues to be invested in support of greenhouse gas reduction. As such, the program is relevant to Caltrans' own efforts to establish a more systematic, strategically funded advance mitigation program in California. As evidenced by Orange County's work to integrate regional advance mitigation of transportation projects with regional GHG reduction efforts under SB 375, **some advance mitigation initiatives may facilitate GHG reductions as a secondary result, while achieving the primary aim of mitigating impacts of transportation projects on natural lands and habitats.**

In 2006, California passed the Global Warming Solutions Act (AB 32), committing the state to lowering GHG emissions to 1990 levels by 2020. To identify strategies that would help the state reach the 2020 limit, the California Air Resources Board (ARB) developed a scoping plan outlining actions to reduce greenhouse gases (GHGs) in California. A cap-and-trade program was identified by ARB as one action California would undertake to reduce GHGs.

Launched in January 2012, the Cap-and-Trade Program limits or "caps" GHG emissions from specified sectors, and it enables facilities/producers subject to the cap to trade permits or "allowances" to emit GHGs. Each year, the ARB distributes emissions allowances, allocating a portion at no cost to covered entities, placing some in a cost containment reserve, and auctioning the rest (California Air Resources Board 2014). The price of auctioned allowances, beyond the ARB-established floor price, is set by the marketplace, and the auction yields proceeds that are to be reinvested for public benefit to further the AB 32's objectives. The first Cap-and-Trade auction was held in November of 2012. Auctions are conducted quarterly, and five had been held as of the end of 2013.

The framework for using Cap-and-Trade auction proceeds is defined in three pieces of 2012 legislation (see table). In brief, a dedicated state fund receives Cap-and-Trade revenues, and the Legislature may make appropriations from it to support GHG reduction efforts, as guided by a 3-year investment plan prepared by the Department of Finance. **Expenditures supported by the fund must demonstrate they can facilitate achievement of GHG reductions and, if feasible, support related state goals. Several of these ancillary goals may be applicable to advance mitigation efforts.**

If a statewide advance mitigation program were structured in such a way as to support the achievement of GHG reductions in California, possibly in connection with the regional Sustainable Communities Strategies required under SB 375 or in another way, the Department may be eligible to compete for Cap-and-Trade revenues to support it. A key factor shaping the likelihood of this nexus is whether land conservation or other strategies pursued for advance mitigation could be documented as contributing to such reductions, as required by the Cap-and-Trade expenditure plan.

The first two Cap-and-Trade auctions of GHG permits generated roughly $140 million for California, and annual revenues are projected to be over $500 million per year from 2012 through 2015 (Mulkern 2013). As proceeds from the program stabilize, and as the state gains experience in making and refining investment decisions for the proceeds, it is in Caltrans' interest to participate actively in fora addressing the expenditure of program revenues and to consider how its own statewide advance mitigation efforts might be aligned with GHG reduction and other Cap-and-Trade goals, to mutual benefit of both initiatives. Where is there potential to create a win-win?

State Legislation Governing Administration and Use of Cap-and-Trade Revenues

Bill	Key Provisions Governing Administration and Use of Cap-and-Trade Revenues
SB 1018	• creates Greenhouse Gas Reduction Fund in State Treasury to receive money from auction/sale of GHG allowances • makes Greenhouse Gas Reduction Fund available for appropriation by the Legislature • requires any state agency receiving a legislative appropriation from the Fund to prepare a record describing proposed expenditures, **how expenditures will further AB 32 purposes** and **achieve specified GHG reductions**, and **how the agency will document expenditure results**
AB 1532	• requires moneys in the Greenhouse Gas Reduction Fund to be used for specified purposes • tasks state the Department of Finance, consulting with ARB and other state entities, to develop a 3-year investment plan for the Fund moneys • requires the 3-year investment plan to include specified analysis and information • requires Department of Finance to report annually to Legislature regarding its plan & expenditures
SB 535	• requires California EPA to identify disadvantaged communities for investment opportunities supported by the Greenhouse Gas Reduction Fund • requires the 3-year investment plan developed by Department of Finance for the Fund to: ➢ allocate 25% of available Fund moneys to projects benefitting disadvantaged communities ➢ allocate at least 10% of available Fund moneys to projects in disadvantaged communities

AB 1532 outlines the specific purposes, beyond the overarching aim of GHG reduction, for which Cap-and-Trade revenues may be used. Its provisions are of particular interest to Caltrans as it evaluates how an apparent nexus between the aims of Cap-and-Trade and certain indirect results of advance mitigation strategies might be nurtured or enhanced. Highlighted below are the additional objectives specified in AB 1532 which could be served by advance mitigation actions.

Cap-and-Trade Expenditure Objectives That May Be Served by Advance Mitigation

Assembly Bill No. 1532

(excerpts, Sec. 2, Chapter 4.1, Section 39712)

(b) Moneys shall be used to facilitate the achievement of reductions of greenhouse gas emissions in this state consistent with this division and, where applicable and to the extent feasible:

(1) Maximize economic, environmental, and public health benefits to the state.

…

(3) Complement efforts to improve air quality.

…

(5) Provide opportunities for businesses, public agencies, nonprofits, and other community institutions to participate in and benefit from statewide efforts to reduce greenhouse gas emissions.

(6) Lessen the impacts and effects of climate change on the state's communities, economy, and environment.

(c) Moneys appropriated from the fund may be allocated, consistent with subdivision (a), for the purpose of reducing greenhouse gas emissions in this state through investments that may include, but are not limited to, any of the following:

…

(2) Funding to reduce greenhouse gas emissions through the development of state-of-the-art systems to move goods and freight, advanced technology vehicles and vehicle infrastructure, advanced biofuels, and low-carbon and efficient public transportation.

(3) Funding to reduce greenhouse gas emissions associated with water use and supply, land and natural resource conservation and management, forestry, and sustainable agriculture.

(4) Funding to reduce greenhouse gas emissions through strategic planning and development of sustainable infrastructure projects, including, but not limited to, transportation and housing.

…

(6) Funding to reduce greenhouse gas emissions through investments in programs implemented by local and regional agencies, local and regional collaboratives, and nonprofit organizations coordinating with local governments.

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