Application of Geospatial Ecological Tools and Data in the Planning and Programming Phases of Delivering New Highway Capacity: Proof of Concept—Contra Costa County Transportation Authority

DETAILS

0 pages | 8.5 x 11 | PAPERBACK

ISBN 978-0-309-43301-3 | DOI 10.17226/22260

AUTHORS

Gray, Mary; Richey, Craig; Reynolds, Yolanda; and Kyle Glen

SHRP 2 Capacity Project C40B3

Application of Geospatial Ecological Tools and Data in the Planning and Programming Phases of Delivering New Highway Capacity: Proof of Concept—Contra Costa County Transportation Authority

SHRP 2
STRATEGIC HIGHWAY RESEARCH PROGRAM
Accelerating solutions for highway safety, renewal, reliability, and capacity

TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

SHRP 2 Capacity Project C40B3

Application of Geospatial Ecological Tools and Data in the Planning and Programming Phases of Delivering New Highway Capacity: Proof of Concept—Contra Costa County Transportation Authority

Mary Gray, Craig Richey, Yolanda Reynolds, and Kyle Glen

Parsons

TRANSPORTATION RESEARCH BOARD
Washington, D.C.
2015
www.TRB.org

ACKNOWLEDGMENT

This work was sponsored by the Federal Highway Administration in cooperation with the American Association of State Highway and Transportation Officials. It was conducted in the second Strategic Highway Research Program, which is administered by the Transportation Research Board of the National Academies.

NOTICE

The project that is the subject of this document was a part of the second Strategic Highway Research Program, conducted by the Transportation Research Board with the approval of the Governing Board of the National Research Council.

The Transportation Research Board of the National Academies, the National Research Council, and the sponsors of the second Strategic Highway Research Program do not endorse products or manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to the object of the report.

DISCLAIMER

The opinions and conclusions expressed or implied in this document are those of the researchers who performed the research. They are not necessarily those of the second Strategic Highway Research Program, the Transportation Research Board, the National Research Council, or the program sponsors. The information contained in this document was taken directly from the submission of the authors. This material has not been edited by the Transportation Research Board.

SPECIAL NOTE: This document IS NOT an official publication of the second Strategic Highway Research Program, the Transportation Research Board, the National Research Council, or the National Academies.

Photos: Mary Gray.

THE NATIONAL ACADEMIES
Advisers to the Nation on Science, Engineering, and Medicine

The **National Academy of Sciences** is a private, nonprofit, self-perpetuating society of distinguished scholars engaged in scientific and engineering research, dedicated to the furtherance of science and technology and to their use for the general welfare. On the authority of the charter granted to it by Congress in 1863, the Academy has a mandate that requires it to advise the federal government on scientific and technical matters. Dr. Ralph J. Cicerone is president of the National Academy of Sciences.

The **National Academy of Engineering** was established in 1964, under the charter of the National Academy of Sciences, as a parallel organization of outstanding engineers. It is autonomous in its administration and in the selection of its members, sharing with the National Academy of Sciences the responsibility for advising the federal government. The National Academy of Engineering also sponsors engineering programs aimed at meeting national needs, encourages education and research, and recognizes the superior achievements of engineers. Dr. C. D. (Dan) Mote, Jr., is president of the National Academy of Engineering.

The **Institute of Medicine** was established in 1970 by the National Academy of Sciences to secure the services of eminent members of appropriate professions in the examination of policy matters pertaining to the health of the public. The Institute acts under the responsibility given to the National Academy of Sciences by its congressional charter to be an adviser to the federal government and, upon its own initiative, to identify issues of medical care, research, and education. Dr. Victor J. Dzau is president of the Institute of Medicine.

The **National Research Council** was organized by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the Academy's purposes of furthering knowledge and advising the federal government. Functioning in accordance with general policies determined by the Academy, the Council has become the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in providing services to the government, the public, and the scientific and engineering communities. The Council is administered jointly by both Academies and the Institute of Medicine. Dr. Ralph J. Cicerone and Dr. C.D. (Dan) Mote, Jr., are chair and vice chair, respectively, of the National Research Council.

The **Transportation Research Board** is one of six major divisions of the National Research Council. The mission of the Transportation Research Board is to provide leadership in transportation innovation and progress through research and information exchange, conducted within a setting that is objective, interdisciplinary, and multimodal. The Board's varied activities annually engage about 7,000 engineers, scientists, and other transportation researchers and practitioners from the public and private sectors and academia, all of whom contribute their expertise in the public interest. The program is supported by state transportation departments, federal agencies including the component administrations of the U.S. Department of Transportation, and other organizations and individuals interested in the development of transportation. **www.TRB.org**

www.national-academies.org

Contents

CHAPTER 1
Executive Summary

There is a clear need for a tool or tools to assist environmental planners in assessing potential effects from both new alignments as well as highway expansions. This project tested the integrated, geospatial ecological screening tool Eco-Plan for early effective transportation planning, as well as several other tools designed by federal agencies. The team compared the effectiveness of these web tools by utilizing the integrated approach used with the Contra Costa Transportation Authority (CCTA) TriLink study. This feasibility study approach and data analysis were compared with existing environmental web tools and the newly developed Eco-Plan web tool. The goal of this pilot was to assess the effectiveness of tools available to transportation planners in providing ecological information early in the planning process, which would help inform alternative selection.

The C40B3 pilot utilized the SR 239 TriLink connector feasibility study being done by the CCTA as a test case for the new web tool as well as the other available web tools. The TriLink feasibility study was done to select the ultimate concept and alignment for a new route and therefore was an excellent test for tools that provided data early in the environmental process.

The potential new corridor alignments would cross significant amounts of open space and prime agricultural land. In addition, there is the potential to impact wetlands and threatened and endangered species, as well as county habitat conservation areas. CCTA's main objective and vision is to develop a new corridor that will be ecologically sound through collaborative partnerships and the development of a shared vision.

The testing of Eco-Plan found that it was redundant to existing and emerging tools and data sets for doing environmental analysis in transportation planning, corridor planning, and programming. There are many emerging tools, and the team found that EnviroAtlas, developed by the Environmental Protection Agency, really helps users investigate, identify, and obtain data and other information useful for environmental screening in transportation planning.

The team also assessed six web tools that are currently being provided by three federal agencies: the Federal Highway Administration (FHWA), the Environmental Protection Agency (EPA), and the U.S. Fish and Wildlife Service (USFWS).

These tools were developed to meet the particular agency's mission. In addition, many of them use the same sources of information. What sets these tools apart from each other is their ease of use, the ability to add layers, and whether project data can be added. In addition, some tools such as EnviroAtlas and eNEPA, IPaC, NEPAssist, and the ESA Webtool have agency support for updates and hosting.

Each of the tools provided the team with useful information. However, the ability to save the layers, particularly with the project area included, was sometimes difficult. So the tool with the most information and easiest to use will become the go-to site in the future. Also, the tools

developed by FHWA are specifically designed to be used during the National Environmental Policy Act (NEPA) document phase but are definitely helpful earlier.

The team's assessment of the tools is summarized in Table 1.1.

Table 1.1. Web Tool Summary

Tool	Ease of Use (Scale 1 to 5*)	Applicability	Used for Initial Feasibility Study	Useful During Development of EIS (Scale 1 to 5*)
FHWA ESA Webtool	5**	Yes	No	5
USFWS ECOS	3	No	Yes	3
EPA NEPAssist	3	Yes	Yes	4
FHWA eNEPA	4***	No	No	5
USFWS IPaC	5	Yes	No	4
EPA EnviroAtlas	5****	Yes	No	5
Eco-Plan	4	Yes	No	3

* 5 is the highest score.

** This tool is extremely easy to use. It was not helpful to this project because there were no existing Biological Opinions/Biological Assessments [BO/BA(s)] entered in the database for this project area. FHWA also offers periodic web-based training.

*** This tool will be very helpful during the preparation of the environmental document but is really not applicable to this stage of project analysis.

**** This is still being beta tested but will be a valuable source of information to environmental planners.

CHAPTER 2
Background Overview

The genesis of this project dates to 2006 with the publication of *Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects (Eco-Logical),* which was signed by the Federal Highway Administration and eight other federal agencies. It proposed an ecological approach to environmental protection, specifically considering entire watersheds and habitats when mitigating the effects of development.

Eco-Logical established the theoretical framework for the new approach. In 2008, the second Strategic Highway Research Program (SHRP 2) conducted two research projects to advance the *Eco-Logical* approach in the long-range planning, corridor planning, and programming phases of transportation delivery:

- C06A. Integration of Conservation, Highway Planning, and Environmental Permitting Using an Outcome-Based Ecosystem Approach; and
- C06B. Integration of Conservation, Highway Planning, and Environmental Permitting Through Development of an Outcome-Based Ecosystem-Scale Approach and Corresponding Credit System.

The C06 projects recommended a nine-step Integrated Ecological Framework (IEF) to guide the conduct of an ecological approach. These projects are now complete and the final reports are in the publication process.

Integration of the many new and evolving tools and data sets that are emerging has not happened yet and is the goal of C40. An ecological approach should always be conducted for a region in which one or more projects are planned, not just a project area itself, so that a regional look at the projects' effects can be done.

This type of web tool is needed to access data from various systems and to allow planners and engineers to better avoid critical resources in the early planning stages or to minimize the impacts of adding highway capacity and to support regional conservation activities with strategic mitigation investments.

The *Eco-Logical* signatory agencies are making progress in implementing ecological principles and are at various stages of developing and releasing national-level tools to assist in transportation planning. These evolving tools and data sets are works in progress. When trying to apply ecological principles in the planning and programming phases of transportation project or program delivery, transportation agencies face the following problems:

1. Lack of geospatial screening tools and readily available natural resource data (e.g., threatened and endangered species, sensitive species, habitats, wetlands, and aquatic resources) needed to incorporate natural resource conservation into the planning phases of highway projects or programs.

2. Reaching agreement on conservation priorities in advance of challenges from transportation or other development projects. The federal, state, and local agencies with jurisdiction need to develop a regional information and collaboration structure, similar to Steps 2 and 3 of the Integrated Ecological Framework, that can support regional cumulative effects assessment and effective, proactive mitigation planning. Agreement on priorities is Step 5 of the IEF. Geospatial screening tools alone cannot achieve agreement, but they are an essential element.
3. Many geospatial tools are becoming available from public agencies: EPA, USFWS, FHWA, United States Geologic Survey (USGS), and the United States Army Corps of Engineers (USACE). Most of the national-level tools are new, not populated with data in all states, or widely available. The timing is ripe to develop a tool that leverages these products and targets them for transportation planning. There is a clear demand for something as close as possible to a one-stop-shopping solution that supports transportation planning and decision making.
4. Scale of available data: Many geospatial data sets that are currently available nationally are sometimes perceived to lack the level of resolution considered adequate for transportation planning. Conversely, data of a fine resolution do not generally exist for large geographic areas, and their development would be cost-prohibitive.

The primary objective of C40B was to contribute to the development of the tool and to undertake a test of the tool with feedback to the C40A contractor, as well as testing other available web tools.

There are many emerging tools, but none appear to meet this objective. The tool should, at a minimum, help users investigate, identify, and obtain data and other information useful for environmental screening in transportation planning.

The C40B3 pilot utilized the SR 239 TriLink connector feasibility study as a test case for the new web tool. The feasibility study is to determine the ultimate concept and alignment for a new route.

The Contra Costa Transportation Authority (CCTA) recognizes the importance of the triple bottom line, which has led the agency to focus on ecological concepts first developed by the Federal Highway Administration and eight other federal agencies in 2006. CCTA's main objective and vision is to develop a new corridor that will be ecologically sound, through collaborative partnerships and the development of a shared vision. More details on the outreach efforts will be provided below

The TriLink (or SR-239) project is a legislatively approved but unconstructed route on the state highway system. The 15- to 25-mile-long transportation corridor would connect SR-4 in Brentwood (Contra Costa County) with I-205 west of Tracy (San Joaquin County). The proposed corridor also crosses a portion of Alameda County.

The corridor's proposed study area specifically includes parts of the three counties, along with the city of Brentwood and the unincorporated community of Byron in Contra Costa, and the City of Tracy and unincorporated community of Mountain House in San Joaquin County.

The potential new corridor alignments would cross significant amounts of open space and prime agricultural land. In addition, there is the potential to impact wetlands and threatened and endangered species, as well county habitat conservations areas.

Integrated Ecological Framework

The team assessed the effectiveness of their integrated approach through the comparison of the TriLink data integration in the feasibility study with other existing environmental web tools and the newly developed Eco-Plan web tool. The goal of this pilot is to accurately assess methods available to transportation planners early in the planning process to incorporate ecological principles into the development of transportation choices.

Table 2.1 summarizes the nine steps of the Integrated Ecological Framework and how this pilot is able to implement the steps as part of the pilot.

Table 2.1. Integrated Ecological Framework

Steps	Purpose	Pilot Implementation
Step 1: Build and strengthen collaboration and partnerships and vision	Build support among relevant stakeholders to achieve a statewide or regional vision and planning process that integrates conservation and transportation/infrastructure planning	The TriLink project has a very extensive outreach program and visioning process which is highlighted throughout Tasks 1 and 4.
Step 2: Create a Regional Ecosystem Framework (REF)	Develop an overall environmental conservation strategy that integrates conservation priorities, data, and plans, with input from and adoption by all conservation and natural resource stakeholders, that addresses species, habitats, and relevant environmental issues and regulatory requirements agreed upon by stakeholders	There are already two habitat conservation plans and one conservation strategy within the project areas. These plans have been reviewed, and their coordinators are part of the stakeholder group. At this point, the breath of these plans, which is presented in Task 1, is very comprehensive and the parameters are incorporated into the assessment of options. In addition, existing conservation banks have been identified as potential sources of needed mitigation credits.
Step 3: Define transportation and infrastructure development framework	Integrate existing, proposed, and forecasted development, transportation/infrastructure, and, optionally, other plans into one or more scenarios to assess cumulative effects on resources	The purpose of this pilot is to test the ecological web tool. Simultaneously, a feasibility study is being done which incorporates into this options assessment all available ecological data that has informed the placement of proposed alignments and is in Task 1. This assessment will be compared with the data analysis that the team can do with the web tool.
Step 4: Create an ecosystem and infrastructure development framework	Integrate environmental conservation and transportation infrastructure data and plans to support the creation of an ecosystem and infrastructure development framework	Within Tasks 1 and 4 the team has integrated ecological data into the development of alignment options to minimize effects to valuable natural resources. The team also looked at existing environmental web tools (Task 5) to determine how much these would help in doing an ecosystem assessment; and in Task 6, the team assessed the benefits of the newly developed web tool.
Step 5: Establish and prioritize ecological actions	Establish mitigation and conservation priorities and rank action opportunities using the assessment results from Steps 3 and 4	This project is in the very early planning stages. Valuable ecological resources have been mapped (Task 4) and have been applied during the developed of the proposed alignments (Task 1).
Step 6: Develop crediting system	Develop a consistent strategy and metrics to measure ecological effects	An extensive list of existing and future mitigation areas, as well as habitat conservation plans and conservation strategies, addresses this step very adequately.
Step 7: Develop programmatic consultations	Take advantage of identified regional conservation and restoration objectives	There are already programmatic consultations which must be adhered to, or a separate project consultation will be needed.
Step 8: Deliver conservation and transportation projects	Design transportation/infrastructure projects in accordance with ecological objectives	The feasibility study has attempted to do this, and this pilot has assessed the usefulness of existing online environmental tools and the new eco-data tool to enhance this effort.
Step 9: Update regional ecosystem framework scenarios and regional assessment	Maintain a current REF	Future effort

CHAPTER 3
Feasibility Study

Introduction

CCTA has tasked Parsons to prepare a detailed project feasibility study. The feasibility study is being used as the basis for preparing as assessment of how well the current process meets the nine-step Ecological Framework and what would help enhance and expedite the process. Integrated and very important to the study is the incorporation of community and governmental agency input throughout the development of this assessment. Great effort went into ensuring that there would be a broad base of input, including environmental groups, industry, elected officials, and local governmental staff. This SHRP 2 project incorporates the federal resource agencies and the California Department of Transportation (Caltrans) into the process as well.

The tools that were initially thought to be helpful in preparing this feasibility assessment did add value but there still was no “one-stop” assessment tool. An assessment of each of the tools is provided below. CCTA was hopeful that these tools would be effective early in the process in helping with the avoidance strategies. As will be discussed below, some of the tools are designed to be used during the project development process. ECOS and IPaC have good information. However, ECOS is cumbersome and time-consuming to utilize. NEPAssist has the greatest potential, but the team was unable to load geographic information system (GIS) files into this web tool. Key components on the IPaC site are still under development. These components will greatly enhance the usefulness of the site. EPA’s EnviroAtlas is still in the beta-test phase but will be a very useful assessment tool. Even though these tools individually provide good specific data, the lack of integration is problematic for an end-user. This effort would greatly benefit from being able to obtain the needed biological data layers from one source.

It is important to realize that that there are always other factors/constraints that must be considered when designing transportation, which will be highlighted in the project description below, along with the needs that must be met.

The team resorted to utilizing separate GIS layers that were obtained from a variety of sources such as state, local, and federal agencies; subcontractors; and local organizations. This approach is very time-intensive but does provide a good basis for assessing the different potential impacts to biological resources from the proposed alternatives. However, an integral part of this process has been an ongoing check-in with all the different interest groups and committees to ensure that what is being produced reflects the wants and needs of the community.

A detailed project description based on this approach is provided below, along with details on the extensive outreach process. Chapter 6 will provide details on the team’s efforts to use existing online tools and the limitations that were encountered.

Project Description

CCTA has initiated the TriLink study to evaluate multimodal transportation alignments in the State Route (SR) 239 corridor linking SR-4 near Brentwood to I-205 or I-580 west of Tracy in San Joaquin County. This facility could potentially improve access for those who live and work in the region and support interregional goods movement operations that create jobs locally. The TriLink planning study area, shown in Figure 3.1, is focused on five key areas that were identified during the stakeholder outreach process:

- Regional Connectivity
- Planned Development and Job Realization
- Roadway Safety
- Emergency Response
- Goods Movement

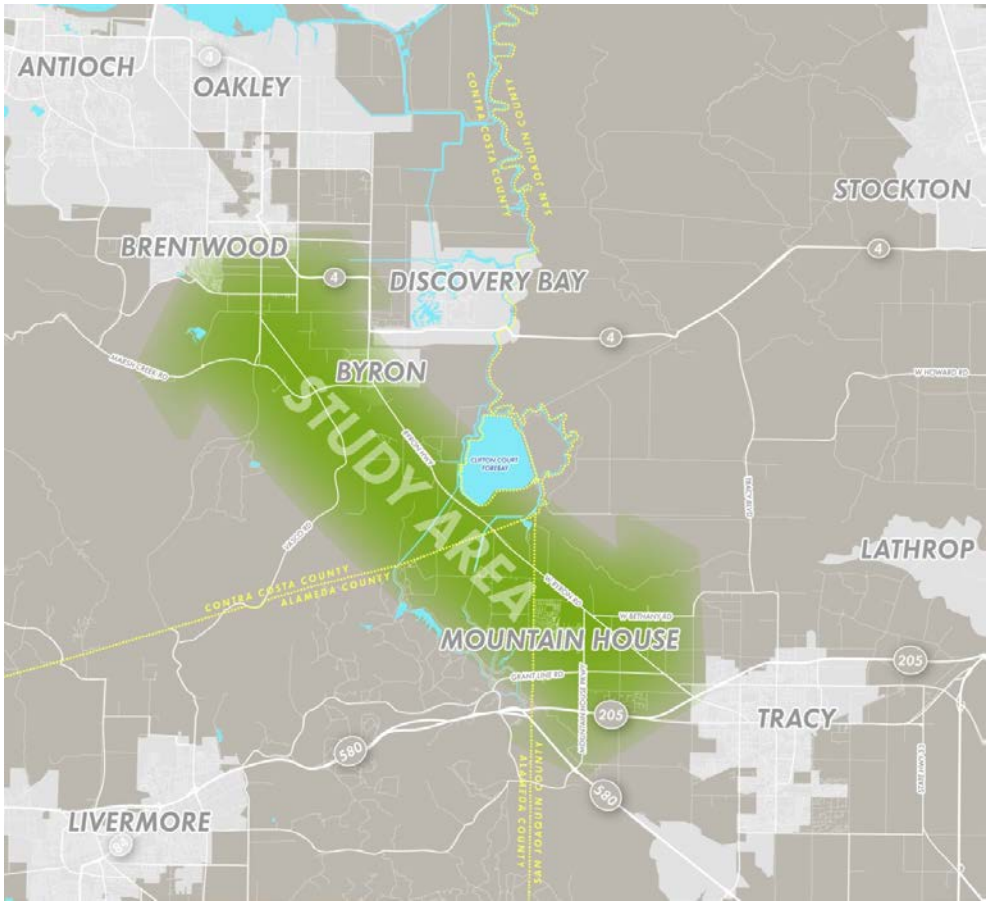


Figure 3.1. The TriLink study area.

In partnership with the stakeholders and constituents along the corridor, the team is working to address these five key areas, by developing a range of multimodal alignments, with the ultimate objective of establishing consensus on the proposed corridor alignments. This was

accomplished through a robust public outreach process including a Technical Advisory Committee (TAC), a nongovernmental organizations committee (NGO), a Policy Advisory Committee (PAC), an executive steering committee, a virtual workshop, general public workshops, and council presentations.

Various alignment options were developed for each corridor element. The goals during the development of the alignments included using existing transportation infrastructure and right-of-way (ROW); providing direct connections to provide efficient solutions and reduce vehicle miles traveled (VMT); minimizing the impact to existing non-transportation infrastructure and facilities; and avoiding impacts to various planning considerations, in particular planning considerations without mitigation opportunities.

Five corridor elements in the TriLink program of improvements were studied as potential connections between Brentwood and Tracy. These five corridor elements include the Airport Connector, South Link, North Link, I-580 Link, and a transit link. The Airport Connector and South Link would provide improvements to existing infrastructure and support local connectivity and mobility. The North Link and I-580 Link together would comprise a freeway connection between SR-4 and the I-580/I-205 interchange west of Tracy. These elements would facilitate goods movement into, out of, and within the study area; relieve congestion; and provide better access to existing and planned development. The corridor elements and alignment options for the North Link and I-580 Link are described below.

Description of Options Evaluated

Airport Connector

The proposed Airport Connector is a four-lane major arterial facility that is 2.7 miles long, following the existing alignment of Armstrong Road and extending it westward to connect with Vasco Road. The cross-section shown in Figure 3.2 shows the dimensions. The Airport Connector would improve the connection between Vasco Road and Byron Highway, as well as improve accessibility to the Byron Airport.

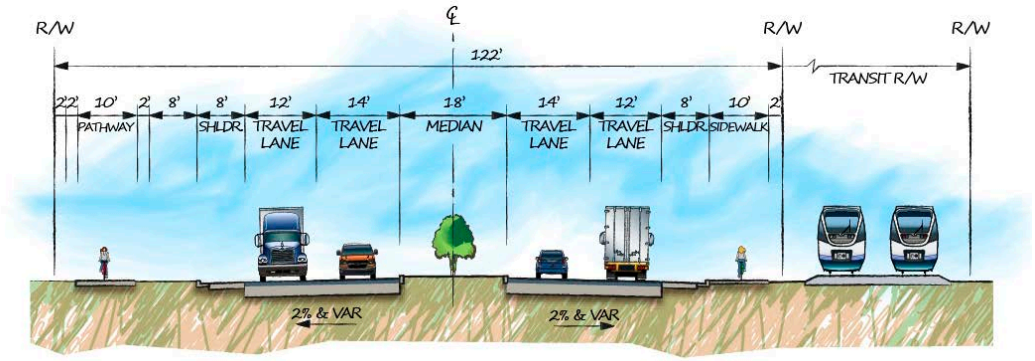


Figure 3.2. Airport connector cross-section.

South Link

The proposed South Link is a four-lane major arterial facility that is 7.9 miles long, providing a connection between the Airport Connector, the Mountain House development, and the City of Tracy. The South Link would run along Byron Highway from the existing at-grade crossing with the Union Pacific Railroad (UPRR) Mococo rail line to the planned Interstate 205/Lammers Road/Eleventh Street interchange in the City of Tracy. The South Link cross-section is shown in Figure 3.3.

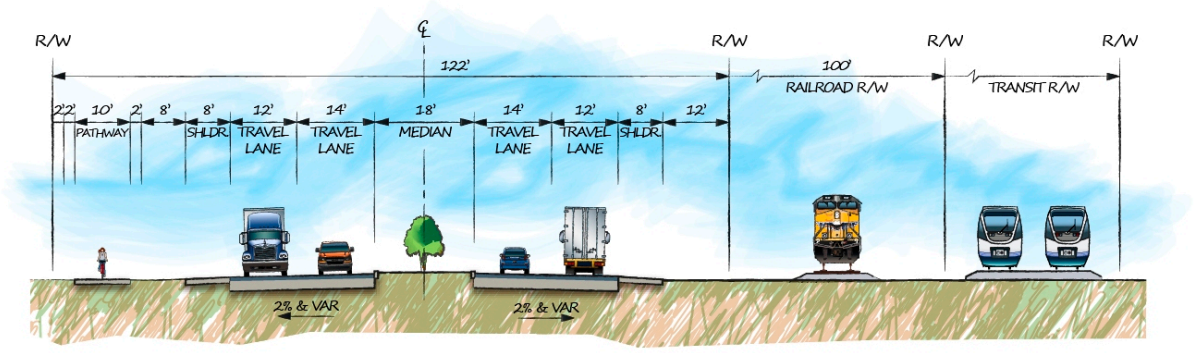


Figure 3.3. South Link cross-section.

North Link

The proposed North Link is a freeway facility connecting to the planned State Route 4 improvements at the Vasco Road and Walnut Boulevard intersection and then connecting to the Airport Connecter. There are two potential alignment options for the North Link corridor element:

1. Option 1: A 4.1-mile-long, four-lane freeway facility that could be expanded to six lanes. The proposed alignment would continue from the end of the proposed State Route 4 improvements on Vasco Road at Walnut Boulevard to the south and connect to the Airport Connector and the I-580 Link west of the Byron Airport.
2. Option 2: A 5.2-mile-long, four-lane freeway facility that could be expanded to six lanes. The alignment would continue from the end of the proposed State Route 4 improvements on Vasco Road at Walnut Boulevard to the point where Vasco Road turns to the south. From here, the North Link Option 2 diverges from Vasco Road and proceeds east, passing north of the Byron Hot Springs before turning south, crossing Byron Hot Springs Road, and connecting with the Airport Connector and I-580 Link Options 2a or 2b to the east of the existing Armstrong Road. A new interchange would be constructed at the divergence from Vasco Road.

The North Link cross-section is shown in Figure 3.4.

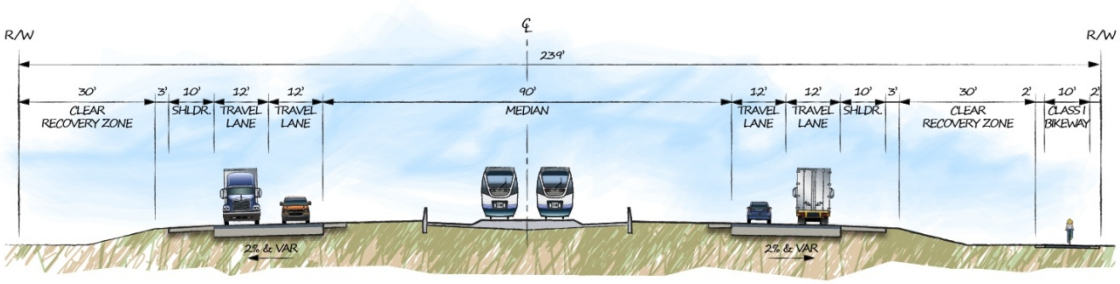


Figure 3.4. North Link cross-section.

I-580 Link

The proposed I-580 Link (cross-section shown in Figure 3.5) is a freeway facility connecting the Airport Connector to the existing I-580/I-205 interchange in eastern Alameda County. The I-580 Link is a continuation of the North Link, continuing the progression of improvements from State Route 4 to the North Link and completing the freeway connection through eastern Contra Costa County and eastern Alameda County. The I-580 Link, in conjunction with the North Link, would provide a direct freeway connection from State Route 4 and the eastern Contra Costa County communities of Brentwood, Pittsburg, and Antioch to the I-580/I-205 interchange, the City of Tracy, and points to the south and east in the San Joaquin Valley. There are three alignment options for the I-580 Link:

1. Option 1: A 9.2-mile-long, four-lane freeway facility that continues from the end of the North Link West alignment along existing Vasco Road south, passing to the west of the Byron Airport. From there the alignment turns to the southeast, entering Alameda County and passing to the southwest of the Mountain House School, before turning south and connecting to the existing I-580/I-205 interchange.
2. Option 2a: An 8.1-mile long, four-lane freeway facility that continues from the end of the North Link East alignment to the east of Byron Airport, and proceeds south into Alameda County, where it follows the same path as the West alignment, to the southwest of the Mountain House School and south to the I-580/I-205 interchange.
3. Option 2b: An 8.7-mile-long, four-lane freeway facility that continues from the end of the North Link East alignment; just south of the interchange with the Airport Connector, the Byron alignment veers to the southeast and runs either adjacent to or using the same alignment as the existing Byron Highway. Once into Alameda County, the alignment turns south and continues to the I-580/I-205 interchange.

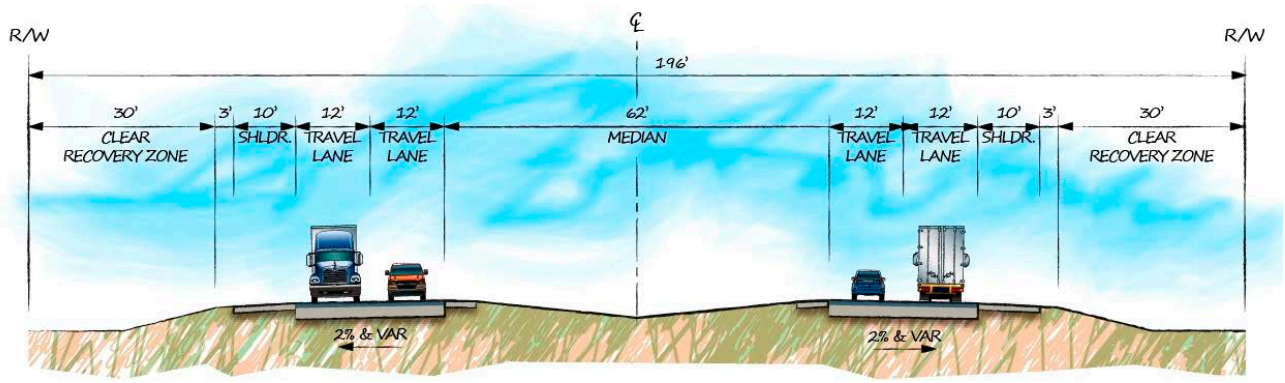


Figure 3.5. I-580 cross-section.

Transit Link

The Transit Link is anticipated to follow the TriLink alignments, either in provided median space or adjacent to the roadway of the North Link, Airport Connector, and South Link in order to connect the residential and job hubs of Brentwood, Mountain House, and Tracy. The Transit Link could be provided in one of many forms, including express bus service, bus rapid transit (BRT), East Contra Costa County Bay Area Rapid Transit (eBART), Bay Area Rapid Transit (BART) or an Altamont Commuter Express (ACE) rail line. There are three alignment options for the Transit Link:

1. Option 1: This transit component is proposed in the median of the North Link Option 1 alignment, to the north of the Airport Connector, and to the north of the South Link, either within the current UPRR right-of-way if possible, or to the northeast of the UPRR right-of-way.
2. Option 2: This transit component is proposed in the North Link Option 2 alignment, to the north of the Airport Connector, and to the north of the South Link, either within the current UPRR right-of-way if possible, or to the northeast of the UPRR right-of-way.
3. Option 3: This transit component would be located to the north of the South Link within the current UPRR right-of-way.

Existing and Proposed Bicycle Paths and Routes

These paths and routes are shown in Figure 3.6. The TriLink project is being designed as a multimodal project, and therefore the inclusion of bike paths is integral to the project purpose and need.

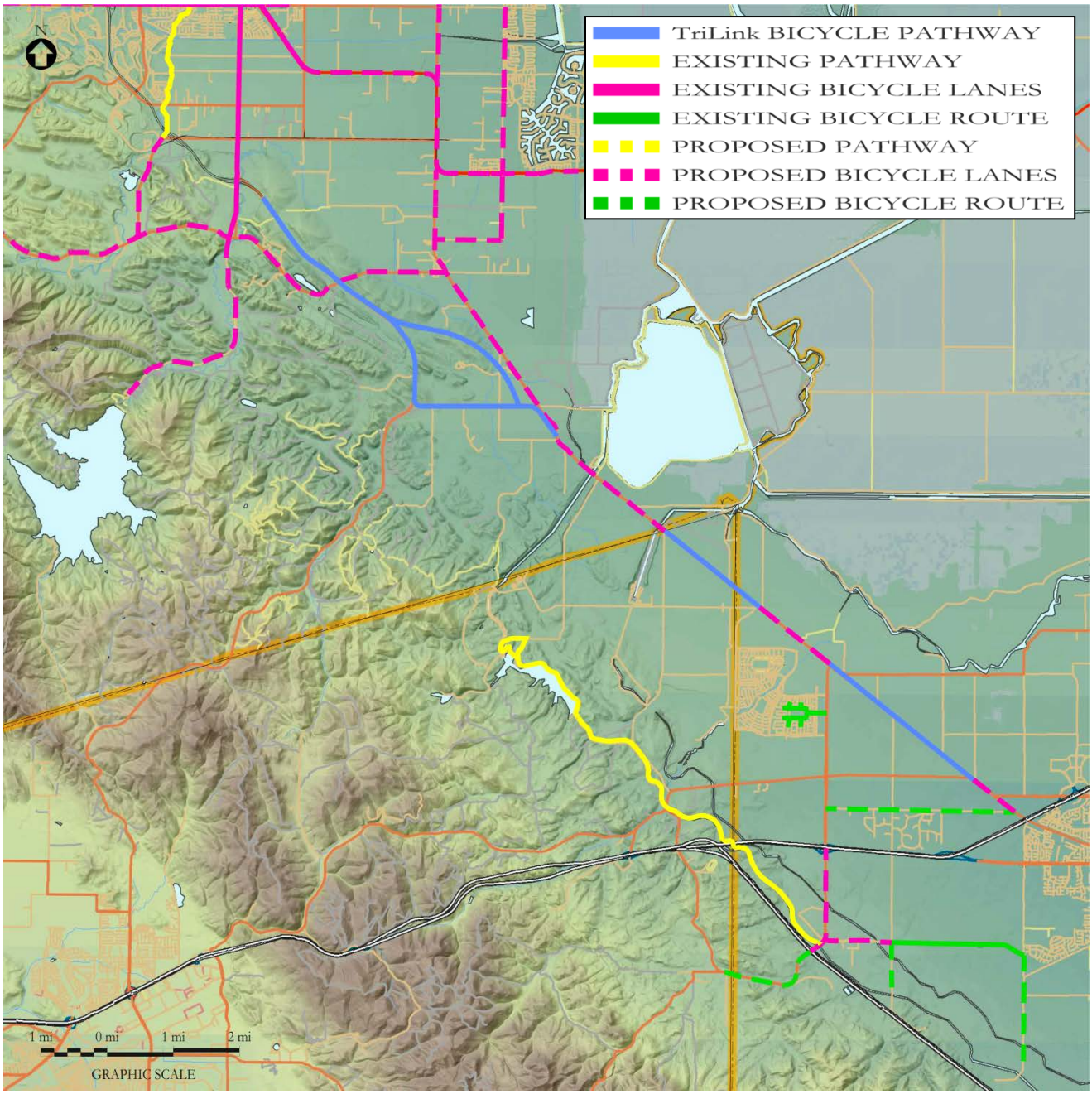


Figure 3.6. Existing and proposed bicycle paths and routes.

Evaluation Criteria

All the TriLink study alignments were developed to address the five key areas (regional connectivity; planned development and job realization; roadway safety; emergency response; and goods movement) identified during the stakeholder outreach process. Alignments that did not address these key areas were dropped from further consideration.

A qualitative evaluation has been done on the alignment options. This evaluation examined potential biological resources, water resources, cultural resources, existing infrastructure, planned infrastructure, construction cost, and right-of-way impacts.

Environmental Issues

The following figures (Figures 3.7 through 3.19) illustrate both policy concerns and physical constraints. The natural environmental constraints are the focus of this analysis. The other constraints are included to provide a complete framework of all the issues the project is addressing.

Figure 3.7. TriLink project area environment.

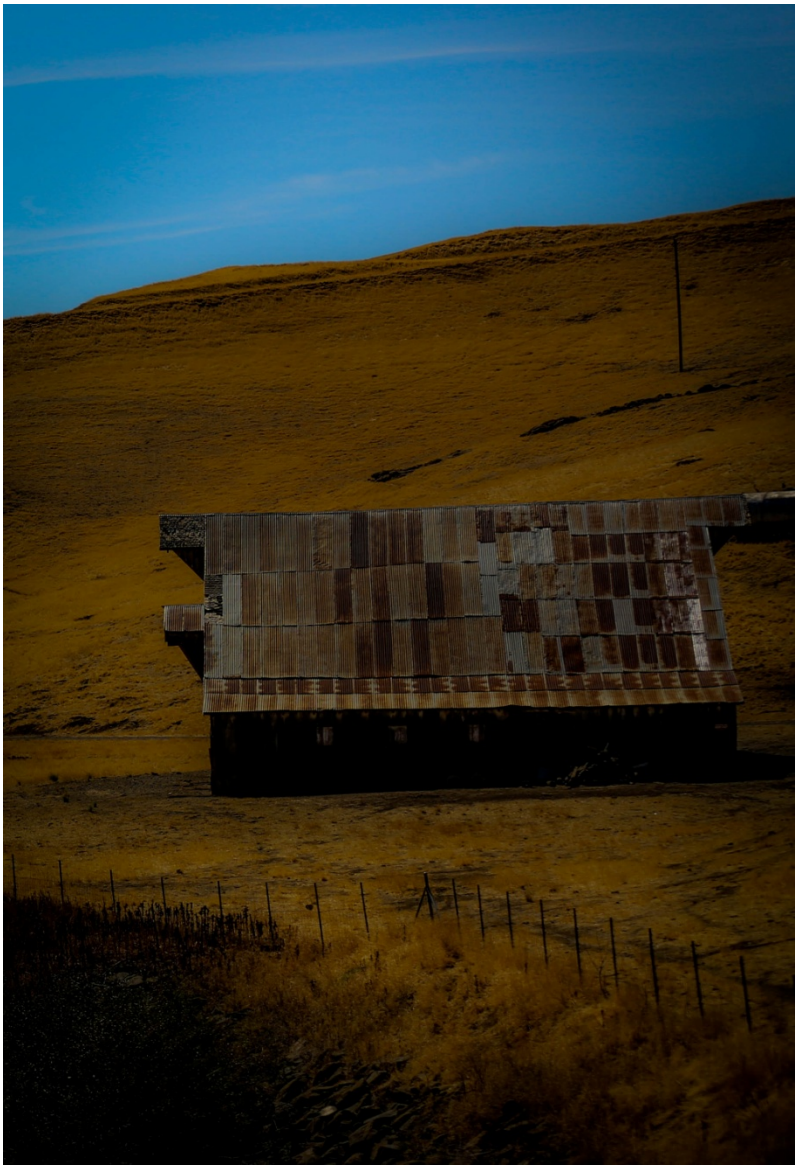


Figure 3.8. Farmland in TriLink project area.

Policy Concerns

- Prime Agricultural Land
- Habitat and Conservation Areas
- Threatened, Endangered, and Sensitive Species
- Wetlands and Riparian Habitats and Alkali Soils
- Wind Farms/Overhead Transmission Lines/Power Facilities

Figure 3.9. Bryon Airport, located in the TriLink project area.

Physical Constraints

- Corridor Termini
- I-205/Lammers Interchange
- I-580/I-205 Interchange
- Route 4 (Marsh Creek Road)
- Clifton Court Forebay and Connecting Aqueducts
- Habitat Areas
- Community Facilities, Homes, and Schools
- Byron Hot Springs (Historic)
- Byron Airport
- UPRR Mococo Line

Figure 3.10. Vasco Road.

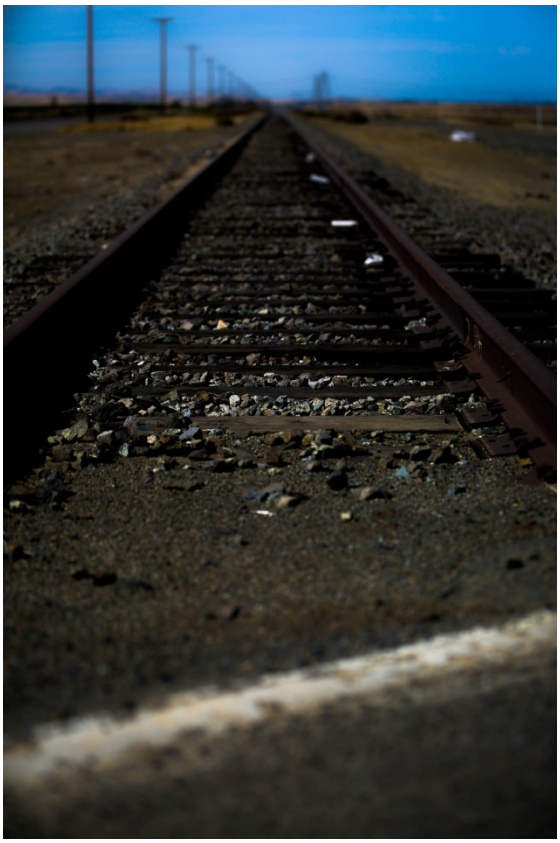


Figure 3.11. Rail Line along Byron Highway.

Biological Resources

Biological resources underlie the assessment of all proposed alternatives. A preliminary biological resources analysis of the proposed TriLink study alignments was conducted, with data from the California Natural Diversity Database (CNDDB) occurrences of rare plant and animal

species, the National Wetlands Inventory (NWI), and pertinent habitat conservation plans. The East Alameda County Conservation Strategy (EACCS), the San Joaquin Multi-Species Habitat Conservation and Open Space Plan (SJMSCP), and the East Contra Costa Counties (ECCC) Habitat Conservation Plan (HCP)/Natural Community Conservation Plan (NCCP), the Natural Resource Conservation Service (NRCS) soils data, and sensitive habitat and biological resources were evaluated to identify potential conflicts with respective alignments within the project corridor study area.

The preliminary biological resource analysis conducted for the TriLink study area included information on special-status wildlife and plant species and their approximate locations. Special-status plants are listed under state endangered or rare regulatory status and are categorized as California Rare Plant Ranks, which include plants that are rare or endangered in California and elsewhere, plants that are rare or endangered in California but more common elsewhere, or plants of limited distribution [not considered significant in the California Environmental Quality Act (CEQA)]. Special-status wildlife is listed under federal threatened or endangered status and state fully protected status, species of special concern, threatened, or watch-list regulatory status.

Most of the federally threatened and endangered species, state threatened and endangered species, state species of special concern, rare species, or locally important species within the study area are in grassland and wetland habitat. There are occurrences of species in the croplands on the valley floor, but these are typically transient species such as Swainson's hawk (state threatened) and San Joaquin kit fox (federally endangered and state threatened) that forage in those areas.

Threatened, Endangered, and Sensitive Species

As stated above, most of the species that occur in the project area are in the grasslands and wetland habitats. There are occurrences of species on the valley floor as well. These are typically transient species such as the Swainson's hawk and the San Joaquin kit fox that forage in those areas.

The area around Byron Airport in Contra Costa County extending south just across the Alameda County line is a unique landscape of vernal pools, 13 alkali wetlands, and 14 alkali meadows and scalds. This location supports several sensitive species, such as the vernal pool fairy shrimp (federally threatened), California tiger salamander (federally and state threatened), and California red-legged frog (federally threatened), as well as rare plants. The area is a Core Recovery Area in the USFWS Vernal Pool Species Recovery Plans. USFWS concern will be higher than typical for impacts to the Core Recovery Area. There are documented occurrences of vernal pool fairy shrimp in pools throughout the region. The area west of Byron Airport is a high-priority conservation area in the ECCC HCP/NCCP, largely because a long-term conservation goal specified within this plan is to create an upland habitat corridor for the California red-legged frog and the California tiger salamander from the cultivated valley floor

into the grasslands of Altamont Pass. There are occurrence records for both species in wetlands and ponds throughout the region.

San Joaquin kit fox is known to occur throughout the region, with more than 30 records of observation in the Byron Hot Springs and Clifton Court Forebay, observed from 1973 to 2002. Based on the distribution of occurrences, it is assumed by the USFWS and the California Department of Fish and Wildlife (CDFW) that San Joaquin kit fox move through the region on the low slopes between Altamont Pass and the Central Valley floor. Movement routes are likely circuitous, as kit fox negotiate numerous water projects, conveyance canals, irrigation ditches, and roadways. Retaining movement routes for kit fox is highlighted as a priority in both the ECCC HCP/NCCP and the EACCS. Southeastern Contra Costa County and northeastern Alameda County are highlighted as high-priority conservation areas for this species in those plans. Construction outside of existing road alignments has the potential to further interrupt San Joaquin kit fox movement. New roadways along existing road alignments can also provide an opportunity to increase wildlife linkage permeability in a region, if roadways are elevated or if proper-sized culverts are included in the project design.

The San Joaquin Kit fox is rare in the region but has occurred near the Byron Airport. Constructions of new alignments have the potential to disrupt kit fox movement.

There are more than 50 records of burrowing owls throughout the region observed from 1989 to 2009. Many of the occurrences were in the last 5 years of this period. There are two burrowing owl conservation banks in the study area and many other areas where burrowing owls have been documented breeding in the recent past. In addition to the wildlife species, there are several rare plant species associated with alkali meadow and scald, alkali wetland, and vernal pool habitats. The alkali habitats in the region have been surveyed often for species presence. The most important plant to note is the recurved larkspur. This plant only occurs in areas around Byron Airport and in the pockets of alkali-associated habitat types in Alameda County. The plant is more common in the southern San Joaquin Valley, but this isolated population is extremely limited in distribution; therefore, it is considered highly sensitive.

Due to the presence of habitat and species occurrences, impacts would need to be avoided, minimized, mitigated and/or compensated for, as specified by CEQA, NEPA, and the Federal and California Endangered Species Act requirements. Known wildlife species with habitat throughout the region that are expected to occur include vernal pool fairy shrimp, California red-legged frog, San Joaquin kit fox, burrowing owl, Swainson’s hawk, and nesting migratory birds. Potential impacts to these species may occur regardless of the selected alignment. Some degree of California red-legged frog, burrowing owl, Swainson’s hawk, and San Joaquin kit fox habitat encroachment is probable; therefore, preservation, compensation, and/or restoration is ultimately expected to be necessary, regardless of the selected alignment. Portions of all alignments will encroach on federally designated critical habitat for vernal pool fairy shrimp and Contra Costa goldfields.

Potential impacts to species movement need to be considered when siting and designing any roadway in either of these corridor elements.

Roadways should be designed to accommodate wildlife movement by incorporating elevated sections or wildlife undercrossing. Additionally, a preconstruction nesting migratory bird survey will need to be conducted to ensure the avoidance of active nests, should construction associated with the TriLink facility commence during the nesting season (February 1 through August 31).

Without using a tool designed for early assessment, which could provide access to prior surveys and data, there is tremendous redundancy for each new project. Also, survey information does not always capture the presence of wide-ranging species such as the San Joaquin kit fox. Table 3.1 shows a list of the potential species of concern in the project area.

Table 3.1. Potential Federal and/or State Listed Wildlife Species

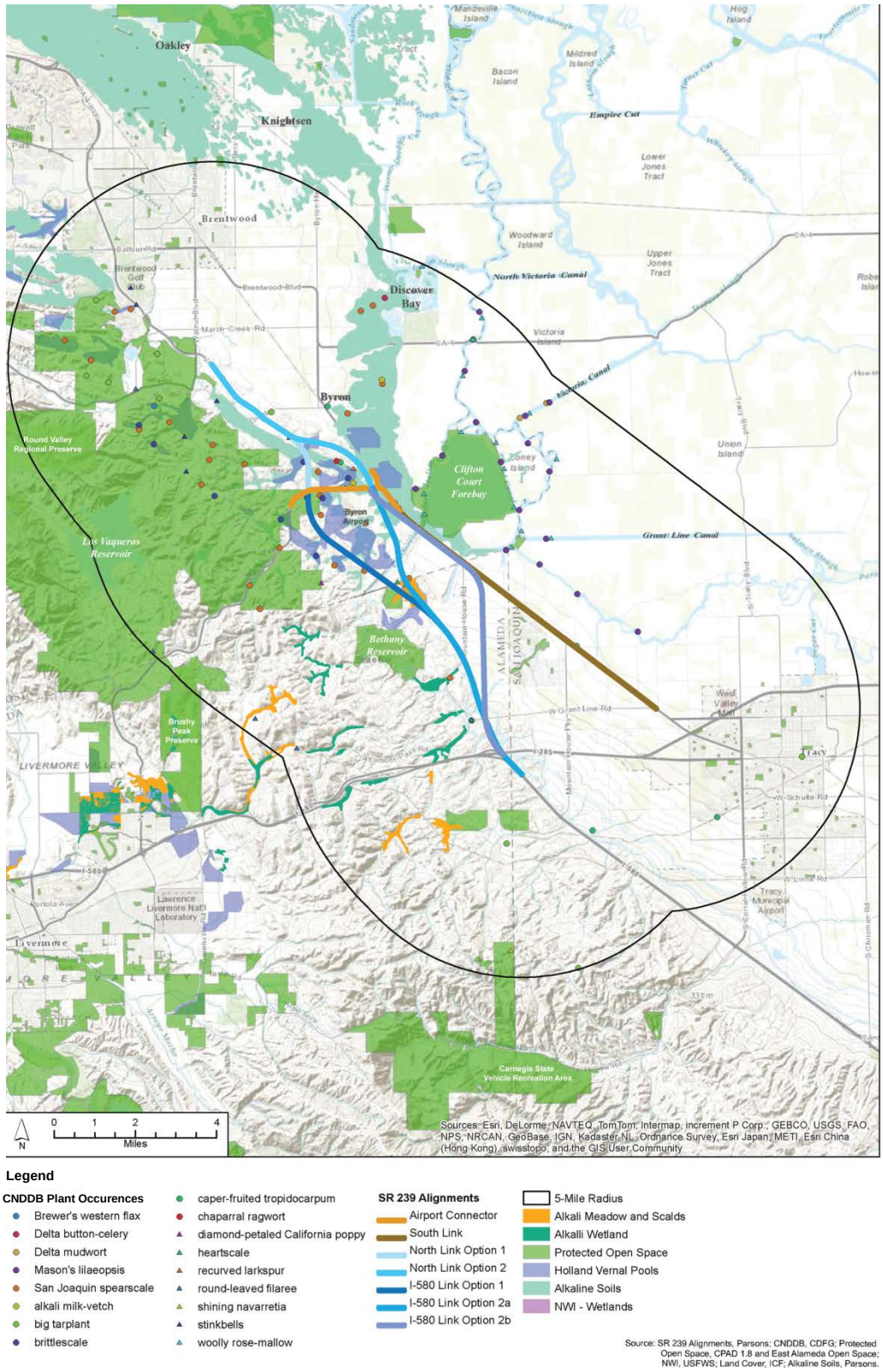
Animal Type	Species	Listing
Invertebrates	Vernal Pool Fairy Shrimp	Federally Threatened
Amphibians	California Red-legged Frog	Federally Threatened
	California Tiger Salamander	Federally Threatened
Reptiles	Coast Horned Lizard	State Listed
	San Joaquin Whipsnake	State Listed
	Western Pond Turtle	State Listed
Birds	Golden Eagle	Protected by the Bald and Golden Eagle Act
	Burrowing Owl	State Listed
	California Horned Lark	State Listed
	Ferruginous Hawk	State Listed
	Loggerhead Shrike	State Listed
	Northern Harrier	State Listed
	Swainson's Hawk	State Listed
	Tricolored Blackbird	State Listed
	White-Tailed Kite	State Listed
Mammals	American Badger	State Listed
	San Joaquin Kit Fox	Federally Endangered

Federal and State Listed Plants

As shown in Figure 3.12, there are several rare plant species associated with the alkali meadow and scald, alkali wetland, and the vernal pool habitats. The alkali habitats in the region have been surveyed fairly often for species presence. The most important plant to not affect is the recurved larkspur. This plant only occurs in areas around the Byron Airport and in the pockets of alkali-associated habitat types in Alameda County. The plant is more common in the southern San Joaquin Valley, but this isolated population is extremely limited in distribution and therefore considered highly sensitive.

Two preconstruction surveys, over two blooming seasons, for each species with potential to occur in the impact area of the selected alignment are expected to be necessary to further determine the presence or absence of each rare plant species to support CEQA and the NEPA evaluation and project permitting. Should special-status plant species be found within the impact area of the selected alignment, they would need to be avoided or relocated to suitable preserved habitat. If relocation would occur, then a monitoring plan with criteria for success would need to be developed and implemented. This is an example of where a web tool which can capture

surveys done for other projects would be very helpful, particularly when during dry years like those this area has been experiencing.



Legend

CNDDB Plant Occurences
- Brewer's western flax
- Delta button-celery
- Delta mudwort
- Mason's lilaeopsis
- San Joaquin spearscale
- alkali milk-vetch
- big tarplant
- brittlescale
- caper-fruited tropidocarpum
- chaparral ragwort
- diamond-petaled California poppy
- heartscale
- recurved larkspur
- round-leaved filaree
- shining navarretia
- stinkbells
- woolly rose-mallow

SR 239 Alignments
- Airport Connector
- South Link
- North Link Option 1
- North Link Option 2
- I-580 Link Option 1
- I-580 Link Option 2a
- I-580 Link Option 2b

- 5-Mile Radius
- Alkali Meadow and Scalds
- Alkalli Wetland
- Protected Open Space
- Holland Vernal Pools
- Alkaline Soils
- NWI - Wetlands

Source: SR 239 Alignments, Parsons; CNDDB, CDFG; Protected Open Space, CPAD 1.8 and East Alameda Open Space; NWI, USFWS; Land Cover, ICF; Alkaline Soils, Parsons.

Figure 3.12. Vernal pools, wetlands, riparian areas, and alkali soils.

Portions of all proposed alignments encroach on federal designated critical habitat for vernal pool ecosystem, cross through alkali wetlands near Bruins Road, and potentially displace wetlands near Bryon Airport. Proposed alignments also cross various natural and manmade drainages and small discontinuous areas of riparian habitat.

Wetland delineation is needed to discern the extent of wetlands and waters of the United States. In addition, waters of the state, which fall under the jurisdiction of the Central Valley Regional Water Quality Control Board, and streams and riparian habitat, which fall under the jurisdiction of the California Department of Fish and Wildlife, would need to better identified.

Alkali soils are not a regulated sensitive resource. However, these nutrient-poor soils have the potential to support a variety of endemic plants and animals (plants and animals that occur in no other habitat). These soils are also a unique land cover for alkali wetlands and grasslands. The natural rarity of alkali soils, combined with habitat loss and declines in the populations of alkali endemic species, have contributed to the need for federal and state protection. All preliminary alignments would displace alkali soils, some more than others.

Existing and Future Mitigation Areas

There are many areas that have been acquired for mitigation or conservation purposes within the study area. A particular focus of prior conservation has been in the area north and west of Byron Airport. Previously conserved areas include a combination of private mitigation holdings, private mitigation banks, and public mitigation lands. Additional research is necessary to confirm all conservation lands along the project alignments.

- In Contra Costa County, there is reportedly a Burrowing Owl Conservation Bank north of Byron Airport. There are also reportedly conservation lands on both sides of Armstrong Road. Alignments around the airport may require the conversion of some of those mitigation lands.
- The ECCC Habitat Conservancy (Conservancy) has acquired several parcels west of Byron Airport to partially fulfill its obligations under the ECCC HCP/NCCP. Those lands were purchased with a combination of HCP fees and grant monies, and they are held by the East Bay Regional Parks District. Several of these lands are bisected by select alignments. Alignments along and near Armstrong Road would result in the loss of protected open-space land associated with the Los Vaqueros Reservoir.
- In Alameda County there are several private mitigation holdings, including an area reportedly preserved as mitigation by Pacific Gas and Electric Company (PG&E), but they may not be directly impacted by certain alignments.

Table 3.2 lists all known conservation banks near the proposed project.

Table 3.2. Conservation Banks in California

Name	Contact Information	County	Notes
Brushy Creek Conservation Bank	Wildlands, Inc. 3855 Atherton Rd. Rocklin, CA 95765-3715 (916) 435-3555 Contact: Julie Maddox	Contra Costa	CLOSED
Byron Conservation Bank	J. Frank Davidson CA Dept. of General Services Real Estate Services Division 707 Third St., Ste. 6-130 West Sacramento, CA 95605 (916) 376-1826 fax: (916) 376-1833	Alameda	SOLD OUT
Haera Wildlife Conservation Bank	Wildlands, Inc. 3855 Atherton Rd. Rocklin, CA 95765-3715 (916) 435-3555 Contact: Julie Maddox	Alameda/San Joaquin	Burrowing Owl; San Joaquin Kit Fox
Mountain House Conservation Bank	Robert Fletcher Fletcher Conservation Lands 1576 Catalina Ct. Livermore, CA 94550 Email: Rob.Fletcher@sbcglobal.net (925) 447-2344	Alameda	California Tiger Salamander (CTS); California Red-Legged Frog (CRF); San Joaquin Kit Fox (SJKF); Swainson's Hawk (SWHA); Western Burrowing Owl (BUOW); Vernal Pool Fairy Shrimp (VPFS)
Ohlone Preserve Conservation Bank	Robert Fletcher Fletcher Conservation Lands 1576 Catalina Ct. Livermore, CA 94550 Email: Rob.Fletcher@sbcglobal.net (925) 447-2344	Alameda	California Red-Legged Frog; Alameda Whipsnake; California Tiger Salamander To Project Proponents: We recommend that you consult with CDFW prior to purchasing California Tiger Salamander (CTS) credits at this bank to ensure that your California Endangered Species Act (CESA) permit requirements for mitigation of impacts to CTS will be met.
Pleasanton Ridge Conservation Bank	East Bay Regional Park District 2950 Peralta Oaks Court P.O. Box 5381 Oakland, CA 94605-1417 (510) 562-7275	Alameda	Credits not yet released for sale
Springtown Natural Community Reserve	Huffman-Broadway Group Terry Huffman 828 Mission Ave San Rafael, CA 94901 (415) 925-2000	Alameda	Wetland Species Status: Active Date Established: 01/17/1997 Size: 73.73 acres Agreement Type: Management Agreement

Two conservation banks near the project area have been assessed in more detail to provide more information on potential options for mitigation.

Mountain House Conservation Bank

Mountain House Conservation Bank is located in eastern Alameda County, north of Livermore, California. The bank consists of 147 acres of grassland, seasonal alkali wetland, perennial wetlands, and pond habitat. The property is adjacent to California Department of Fish and Game's Byron Conservation Bank and is just north of the Bethany Reservoir, a state managed facility. The bank was opened for business in July 2012 and offers multi-species conservation credits for up to six special-status species. Figure 3.13 shows the Mountain House Conservation Bank and Figure 3.14 shows the California tiger salamander service area in the Mountain House Conservation Bank.

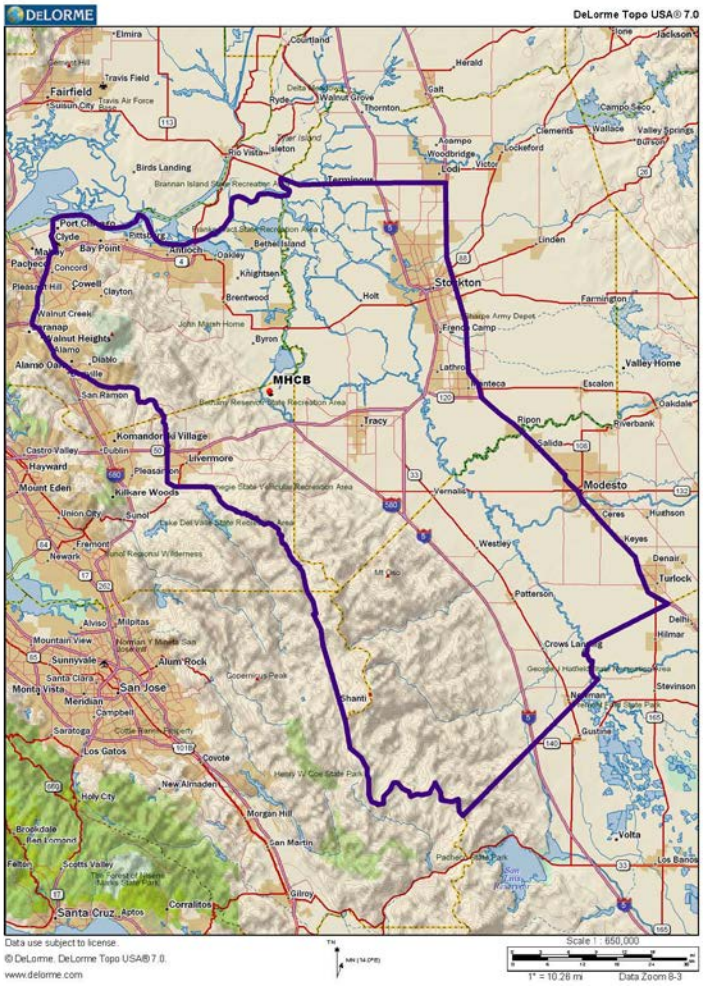


Figure 3.13. Mountain House Conservation Bank.

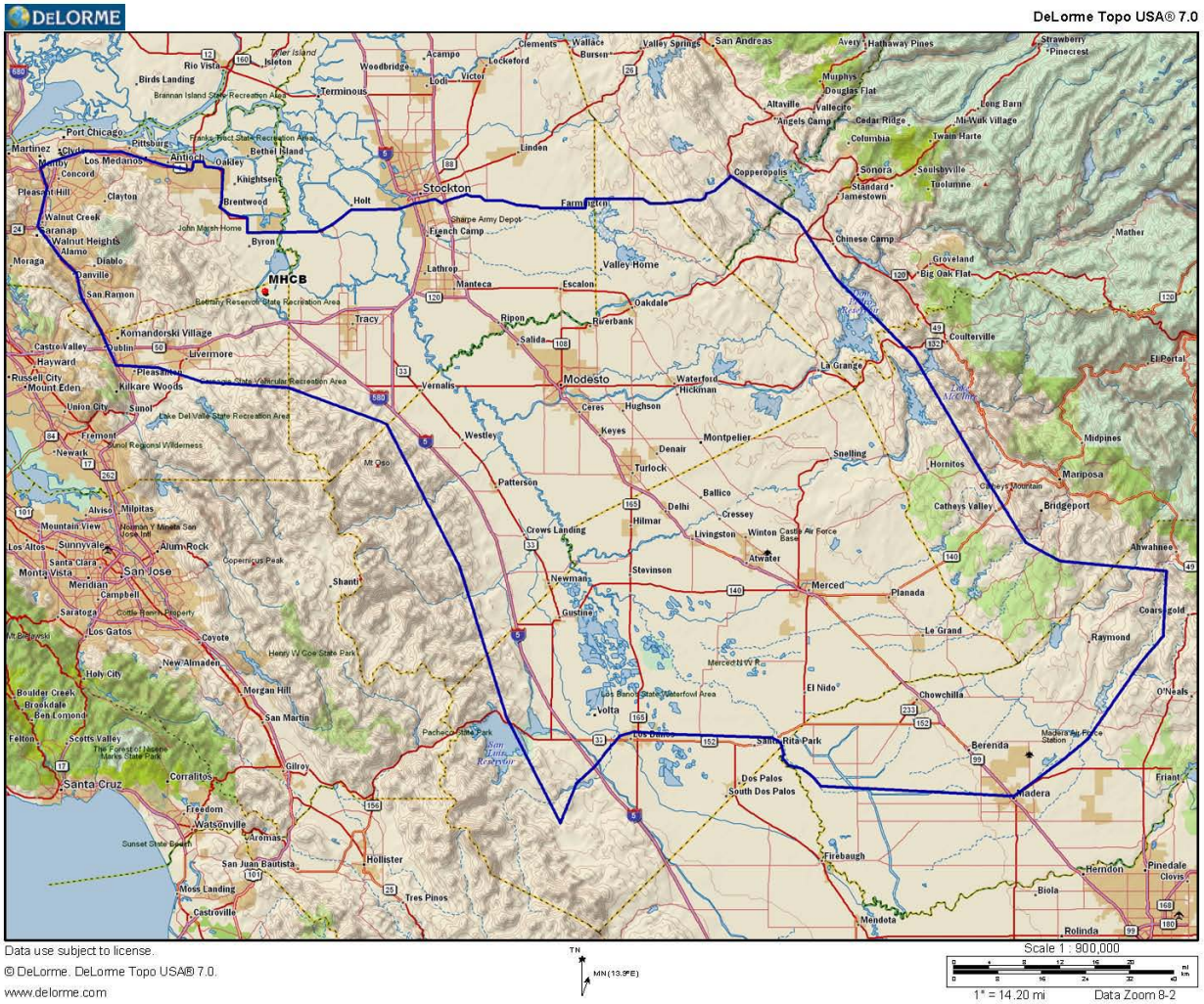


Figure 3.14. California Tiger Salamander Service Area Map, Mountain House Conservation Bank.

Springtown Wetlands Preserve

The Springtown Alkali Sink is located in the northeast portion of the Livermore Valley, north of Interstate 580, and comprises an assemblage of biotic and abiotic features that support an ecosystem unique to the East Bay, while providing core habitat to some of California's rarest plants, animals, and birds (Friends of Springtown Preserve, no date). Below are some of the contributing factors to the area's complex setting.

Vernal pools occur within the swales and depressional areas between mima mounds and support species such as coyote thistle (*Eryngium aristulatum*), downingias (*Downingia pulchella and D. cuspidata*), goldfields (*Lasthenia* spp.), and mousetail (*Myosurus minimus* ssp. *minimus*), in part. Late summer annuals include alkali weed (*Cressa truxilensis*), spikeweed (*Centromadia pungens* ssp. *pungens*) and crownscale (*Atriplex coronata* var. *coronata*).

California tiger salamander (*Ambystoma californiense*) has been found on-site (federally threatened species). California red-legged frog (*Rana aurora draytonii*) has been observed in areas directly upland of the sink preserve (federally threatened species). Vernal pool fairy shrimp (*Branchinecta lynchi)* are known to occupy local vernal pools and ponds (federally threatened species).

Figures 3.15 to 3.17 show the surrounding land uses, soil types and major property ownership around the Springtown Preserve, respectively.

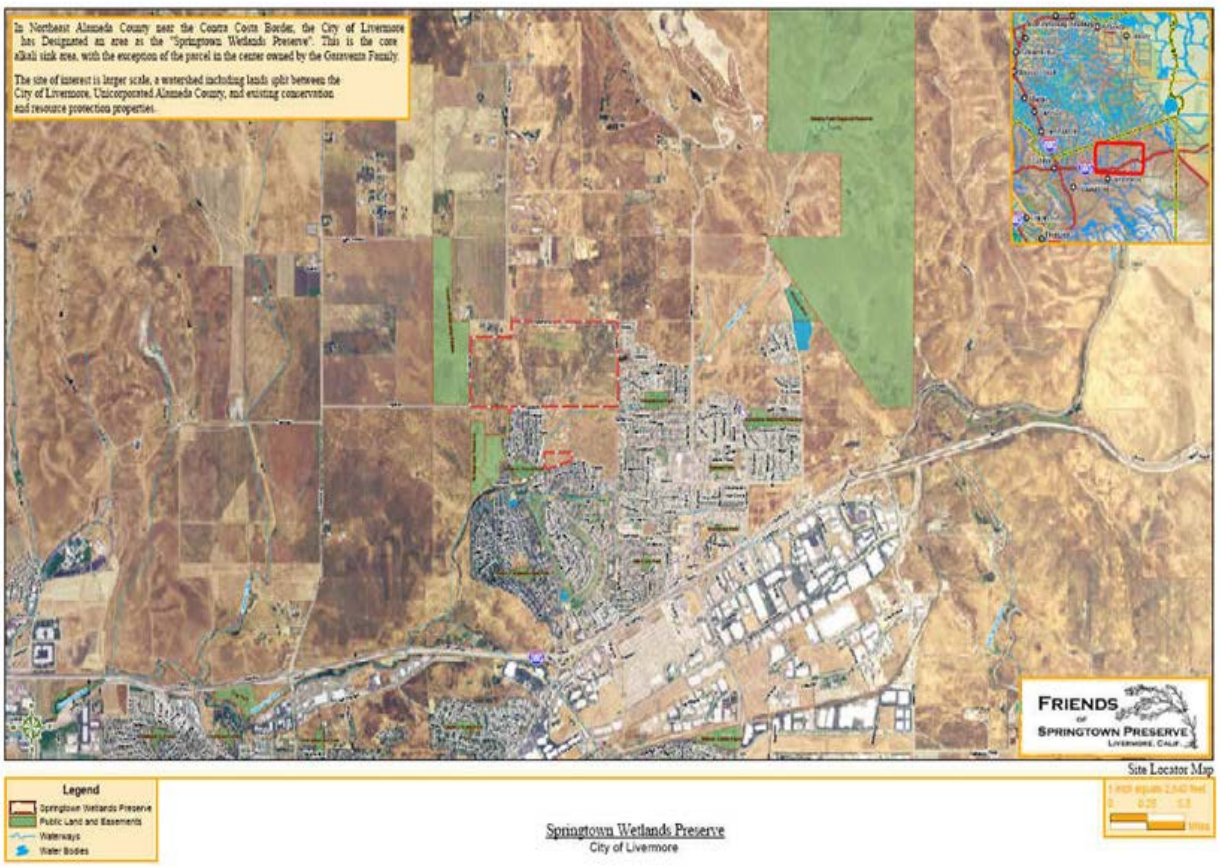


Figure 3.15. Springtown Preserve surrounding land uses.

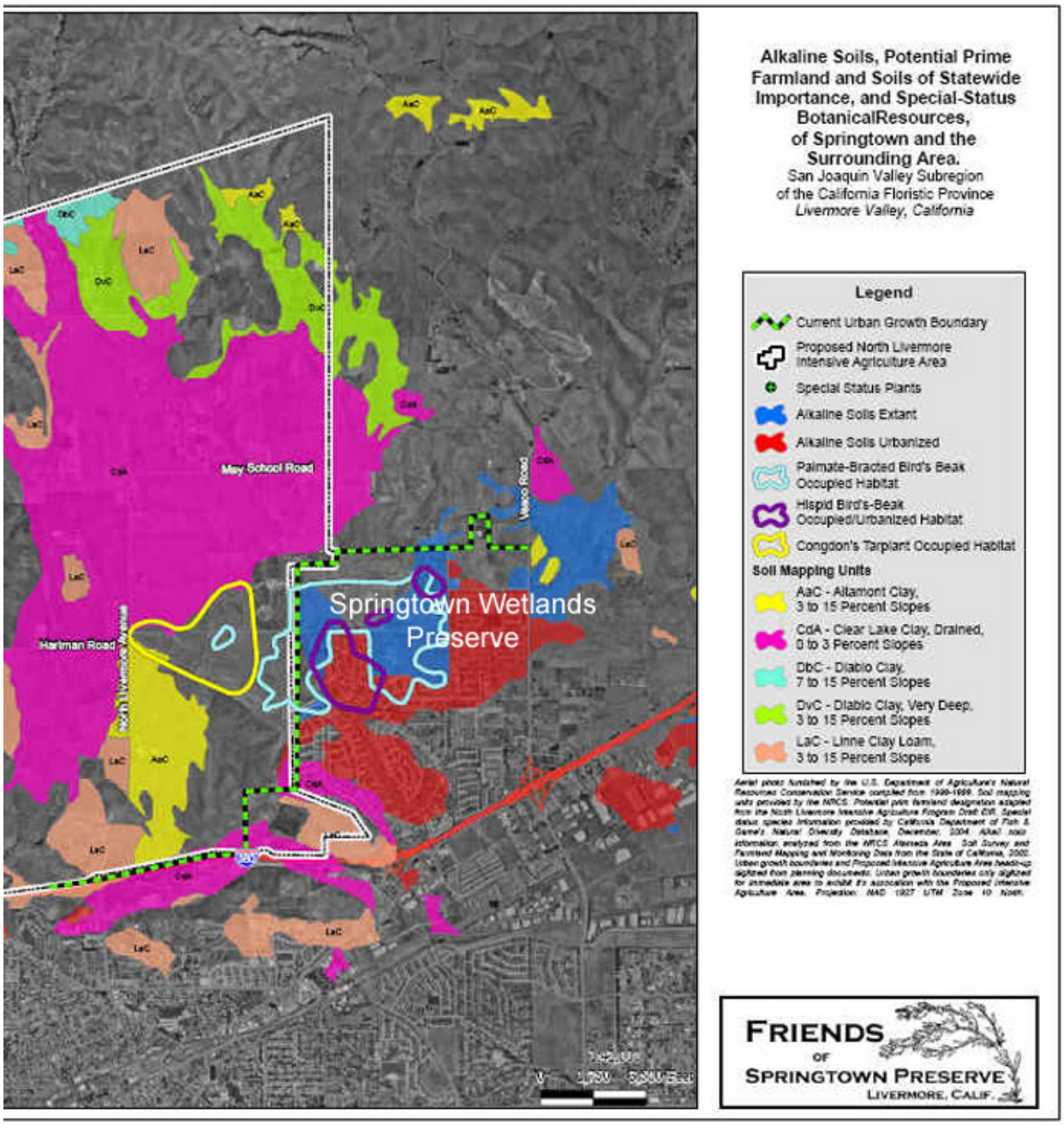


Figure 3.16. Springtown land uses and soil types.

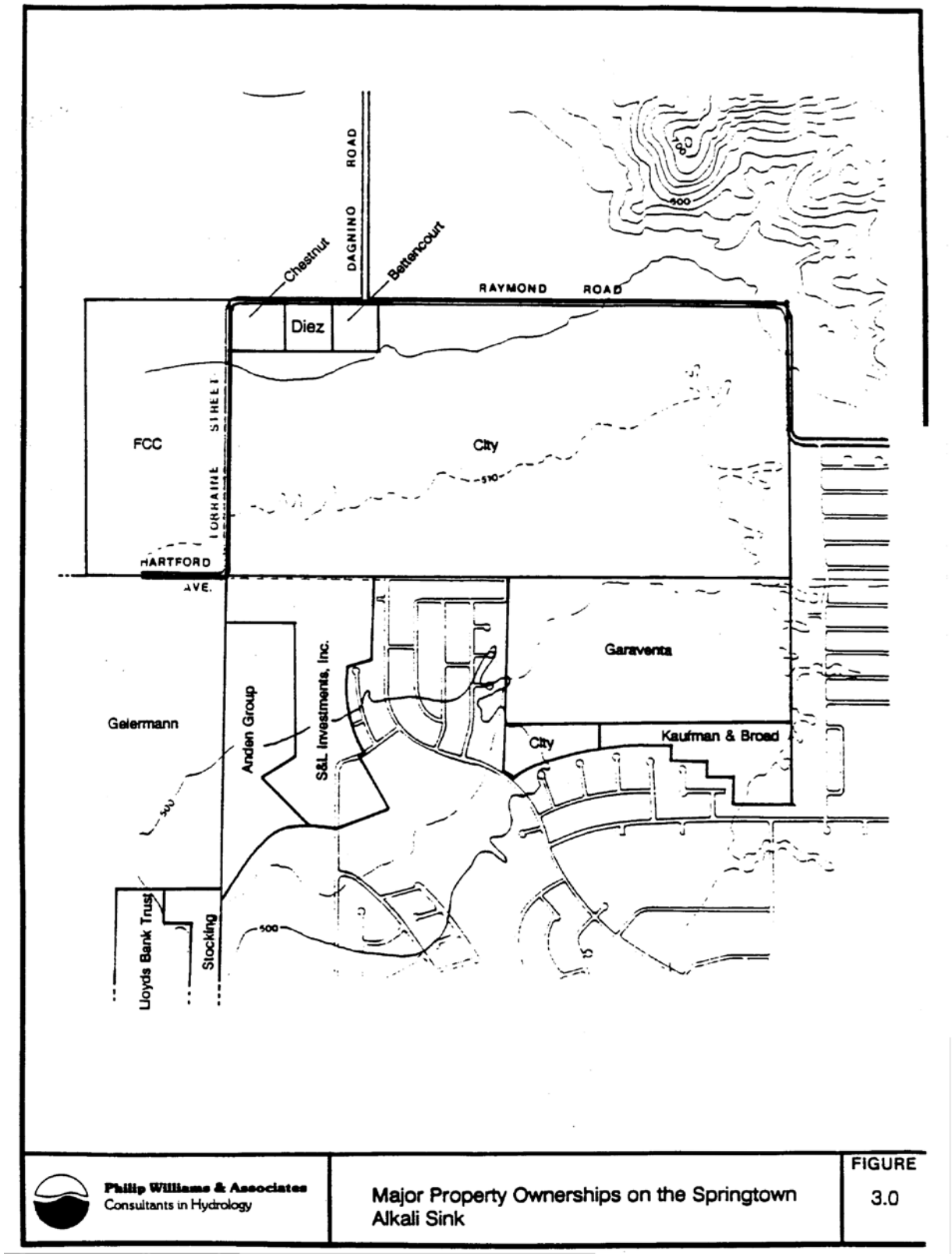


Figure 3.17. Major property ownership around the Springtown Preserve.

Conservation Plans

Conservation plans provide a framework for impacts and mitigation. There are two habitat conservation plans, a conservation strategy, and a multi-species plan, all near the project area. These efforts will help outline areas of concern based on the location of the proposed alternatives and will also assist in developing appropriate mitigation and hopefully assist with streamlining the permit process. These plans provide the project area with a robust ecological framework to integrate into the project mitigation strategy.

Construction of the TriLink facility might be considered a covered activity if the facility is fully consistent with these HCPs and conservation strategies within the study area. These include the ECCC HCP/NCCP, San Joaquin County Multiple Species Conservation Plan (MSCP) and Open Space Plan, and EACCS.

East Contra Costa County HCP/NCCP

Eastern Contra Costa County is a unique region where the Bay Area, Delta, and Central Valley meet. This part of the county is characterized by open space and beautiful vistas. The area retains a rural lifestyle while providing houses, jobs, farms, and ranches for future generations. It features a rich landscape that is home to a number of rare plants and animals. Over 150 rare species occur in the East County area, including the San Joaquin kit fox, California red-legged frog, Alameda whipsnake, western burrowing owl, vernal pool fairy shrimp, and Diablo helianthella.

The East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP) seeks to avoid such conflict, providing an opportunity to preserve these diverse ecosystems, unique species, and scenic landscapes while clearing regulatory obstacles to continued economic development and growth.

The former process of obtaining development permits and implementing habitat mitigation is inefficient and can be ineffective. Project proponents will need approvals from many agencies, which can result in major delays, uncertainty, and significant costs. Project-by-project compliance with wetland and species regulations is not always best for the resources, emphasizing species surveys while lacking a means to effectively coordinate the avoidance and mitigation requirements of distinct projects.

Under the HCP/NCCP, conservation acquisitions focus on preserving links between existing public lands and protecting wildlife corridors. One objective of the plan is the protection of a movement corridor for the San Joaquin kit fox. In addition, numerous other plants and animals will be preserved and enhanced by the plan. For example, this plan would protect species such as the Alameda whipsnake, a snake with a significant portion of its range within the plan area. Assembling the preserve system will require land acquisition from willing sellers in areas that will complement existing public land and that provide important habitat values. As the preserve system grows, it will be managed comprehensively for the benefit of species, with a focus on restoration and enhancement of natural communities. The end result will be a preserve

system of between 23,800 and 30,300 acres supporting vernal pools, native grasslands, oak woodland, savanna, streams, chaparral, and other diverse landscapes.

Goals of the plan are as follows:

- Purchase, restore, and permanently protect large, interconnected and biologically rich blocks of habitat. The HCP/NCCP will pool public and private funding to acquire land and restore natural resources. The plan will also help to ensure that conservation acquisitions are guided by sound science, development avoids the best resources in the area, habitat connectivity and wildlife corridors are maintained, and watershed and ecosystem functions (not just individual wetlands and species) are protected.
- Redirect money away from the process of permitting and toward the protection of resources. Rather than spending limited funds to incrementally assess, negotiate, and argue mitigation requirements, applicants' funds can be put to more constructive uses, such as acquiring land and restoring habitat and hydrologic functions.
- Improve regulatory certainty and permitting efficiency for regulators and applicants. The HCP/NCCP provides permits for 30 years. This gives the development community certainty about what will be required by federal, state, and local governments. At the same time, the HCP/NCCP will make the regulatory process more efficient for project proponents and regulatory agencies.
- Provide fair compensation to willing landowners for permanent protection of resources on their land. The HCP/NCCP will buy fee title or conservation easements from willing sellers to create the preserve system. This expands the market for rural land and provides landowners with more economic options.

Below are some preliminary findings about the proposed alignments and the ECCC HCP/NCCP:

- The HCP/NCCP anticipates that the SR-239 project would consist of the expansion of Byron Highway to a multi-lane freeway somewhere within the 1,500-foot-wide corridor around the existing highway. The HCP/NCCP proposes that a new alignment could be constructed between Byron Highway west and the existing railroad tracks, which are approximately 80 feet from the center of the highway, or farther east near the community of Discovery Bay. The HCP/NCCP also includes high-priority conservation areas west and south of Byron Airport.
- Some alignments would not be a covered activity under the current HCP/NCCP because these alignments are not in the area described for SR-239 in the plan and because it would cut across an area of high conservation priority for the ECCC HCP/NCCP, including some existing conservation land acquired through HCP/NCCP implementation. These alignments could be included in the HCP/NCCP as an amendment, if agreed to by

USFWS and CDFW, as this amendment would require a change in the conservation strategy for this part of the county.

- Other alignments would not be a covered activity under the current HCP/NCCP because it is mostly located west of the railroad and is not located within the 1,500-foot-wide corridor of the existing Byron Highway. These alignments may also affect priority conservation areas south of Byron Airport and vernal pools or alkali wetlands in this area.
- There are some alignments compatible with the HCP/NCCP goals in this area, as they avoid impacts to high-priority conservation and minimize potential impacts to vernal pools and alkali wetlands; however, for this to be a covered activity, it would require an amendment of the HCP/NCCP, agreed to by USFWS and CDFW.
- Any alignment along Armstrong Road could be a covered activity under the current HCP/NCCP if it complied with specific design requirements. These include an elevated viaduct design, wildlife crossings, minimum sizing for culverts, fencing designs, or median designs for wildlife, and other requirements to minimize effects on habitat and hydraulic connections in an area containing existing preservation lands. The HCP/NCCP notes that an alignment north of Byron Hot Springs might require many of these design elements, but the HCP/NCCP currently only mandates their use for an alignment south of Byron Hot Springs.

San Joaquin County MSCP

The key purpose of the MSCP and Open Space Plan is to provide a strategy for

- Balancing the need to conserve open space and the need to convert open space to non-open space uses while protecting the regions agricultural economy,
- Preserving landowner property rights,
- Providing for the long-term management of plant, fish, and wildlife species, especially those that are currently listed, or may be listed in the future under the federal Endangered Species Act (ESA) or the California Endangered Species Act (CESA),
- Providing and maintaining multiple-use open spaces, which contribute to the quality of life of the residents of San Joaquin County, and
- Accommodating a growing population, while minimizing costs to project proponents and society at large.

The MSCP is a 50-year plan. San Joaquin County's past and future growth has affected and will continue to affect the 97 special-status plant, fish, and wildlife species in the 52 vegetative communities scattered throughout San Joaquin County's approximately 1,400 square miles and approximately 900,000 acres, which include 43% of the Sacramento–San Joaquin Delft's primary zone. The MSCP encompasses all of San Joaquin County except for federally owned lands and any lands specifically not covered by this plan. Species coverage is variable

under the MSCP. Coverage will range from full coverage under federal and state law to CEQA coverage only.

The MSCP is intended to comprehensively minimize and mitigate impacts to plant, fish, and wildlife habitat and compensate for some impacts to recreational, agricultural, scenic enjoyment, and other beneficial open-space uses resulting from the conversion of 109,302 acres of open space to non-open-space uses, as projected to occur between 2001 and 2051. Highway construction and maintenance is a covered activity. If the TriLink projects opt for coverage under the MSCP, the following options are available:

- Pay appropriate fee;
- Dedicate, as conservation easement or fee title, habitat lands (in-lieu dedications);
- Purchase approved mitigation bank credits, or
- Propose an alternative mitigation plan consistent with the goals of the MSCP and equivalent biological value.

An alignment along Byron Road would likely be considered a covered activity under the MSCP. This is the only alignment that is partially within San Joaquin County.

East Alameda County Conservation Strategy (EACCS)

The purpose of the EACCS is to preserve endangered species by developing a shared vision for long-term habitat protection. The EACCS will assess areas all across East Alameda County for their conservation value and establish guiding biological principles for conducting conservation in the county. Part of that guidance will include working with willing landowners to implement long-term conservation stewardship that would offset impacts from local land use, transportation, or other infrastructure projects.

The following local agencies and resource agencies are developing the EACCS partnership.

- Alameda County Congestion Management Agency
- Alameda County Resource Conservation District
- Alameda County Waste Management Authority
- City of Dublin
- City of Livermore
- City of Pleasanton
- County of Alameda
- East Bay Regional Park District
- Natural Resources Conservation Service
- San Francisco Bay Regional Water Quality Control Board
- Zone 7 Water Agency
- U.S. Fish and Wildlife Service

- California Department of Fish and Game

The EACCS is a collaborative effort to preserve endangered species by developing and adopting a shared vision to guide long-term habitat protection. The EACCS will assess areas across east Alameda County for their habitat conservation value and establish guiding biological principles for conducting conservation in that part of the county.

There are a number of infrastructure projects planned for the eastern part of Alameda County over the coming years, and these projects will benefit from a reliable biological framework to guide environmental mitigation. The EACCS will

- Provide a blueprint for regional conservation of biological species in East Alameda County.
- Streamline the environmental permitting process; thereby reducing project delays and costs.
- Provide guidance to project proponents by focusing mitigation efforts on focal species due to future development and infrastructure improvements.
- Facilitate ongoing conservation programs by providing a coordinated approach supported by local stakeholders and regulatory agencies.

This conservation strategy is not the same as a formal Habitat Conservation Plan (HCP). The U.S. Fish and Wildlife Service and local governments and agencies agreed that preparing an HCP for east Alameda County is unnecessary because of the relatively low level of planned development that would typically justify the need for and adequately fund an HCP. As such, the EACCS will not automatically allow local agencies to approve permits for projects that could adversely impact threaten or endangered species. Instead, it provides guidance during the project planning and permitting process to ensure that impacts are offset in a biologically effective manner.

Compliance with the East Alameda County Conservation Strategy (EACCS) is voluntary. USFWS has issued a Biological Opinion for projects consistent with the EACCS. The California Department of Fish and Wildlife (CDFW) has not issued any state-level permits for the EACCS but is generally requiring projects to be consistent with EACCS as part of California Endangered Species Act (CESA) permitting.

The plan may be used to facilitate the permitting process through adherence with the EACC’s standard, although the strategy was mostly oriented to land-use development and not large-scale transportation improvements.

Alignments that would cross priority alkali meadows and wetlands along Bruns Road in Alameda County could be in conflict with the conservation priorities of the EACCS, depending on the type, size, and location of impacts.

Potential Future Protected Areas

Aside from existing protected areas, the ECCC HCP/NCCP and the EACCS have identified lands for future conservation priority. In Contra Costa County, there is a block of high-priority conservation areas west and south of Byron Airport. Those lands have been identified to protect the upland habitat corridor for the California red-legged frog and the California tiger salamander, as previously discussed. The ECCC HCP/NCCP also has obligations to protect and restore wetlands and riparian areas. Many of those future restoration efforts will be completed in the southeastern part of the county. The EACCS has identified high conservation priority areas due to their rarity. Conservation priorities include protection of known occurrences of San Joaquin spearscale and recurved larkspur and surveys of other potential habitat; enhancement and creation of additional linkages across existing water conveyance infrastructure; protection of alkali meadow and scalds, which will provide protection of habitat for San Joaquin spearscale, recurved larkspur, longhorn shrimp, and vernal pool fairy shrimp; and protection of critical habitat for California.

Other Potential Resource Impacts

There are several key areas that the team focuses on that would benefit from having existing conservation banking opportunities. Effects to these resources have the possibility of lengthy delays if appropriate mitigation is not readily available.

Wetlands and Riparian Habitats with Alkali Soils

Portions of all the alignments would encroach on federally designated critical habitat for vernal pool ecosystems. A wetland delineation will be needed to document the extent of wetlands and waters of the United States that fall under the jurisdiction of the Army Corps of Engineers as well as waters of the state, which fall under the jurisdiction of the Central Valley Water Quality Control Board, as well as streams and riparian habitat, which are under the jurisdiction of the California Department of Fish and Wildlife. The delineation will need to be submitted to the Corps for verification to receive a jurisdictional determination, which would determine the extent of federal jurisdictional waters that would be impacted by each of the proposed alignments. The state agencies will also need to concur with the delineation of their jurisdiction.

Impacts to wetlands/waters of the United States and the state will need to be mitigated (likely a minimum of 2:1 and perhaps more), monitored by a plan that would need to be developed, and subject to federal and state agency approval.

Water Resources

The proposed TriLink alignments will cross a number of creeks, aqueducts, canals, and ditches. Using United States Geological Survey (USGS) topographic maps, it can be determined that multiple named and unnamed water bodies are within the TriLink study area. The named water bodies include Kellogg Creek, Brushy Creek, Old Creek, Mountain House Creek, the Clifton Court Forebay, Italian Slough, and Old River. Other water crossings include the California

Aqueduct (Figure 3.18) and the Delta Mendota Canal, as well as several other local aqueducts, irrigation canals, and ditches.

The majority of the study area is within an undefined planning watershed in the San Joaquin Delta and an undefined planning watershed in the North Diablo Range. In addition, a small portion of the Carbona planning watershed is in West San Joaquin Valley. The Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) for Contra Costa County and incorporated areas (2009) and the FEMA FIS for San Joaquin County and incorporated areas (2009) show that there are delineated floodplains associated with several streams that are potentially affected by the proposed alignments.

Figure 3.18. California aqueduct.

Prime Farmland

The Farmland Protection Policy Act requires any project that is federally funded to determine the significance of the impact of the project. The guidance states, “consider alternative actions, as appropriate, that could reduce adverse impacts (e.g. Alternative Sites, Modifications or Mitigation).” Figure 3.19 shows an example of the types of farmland in the project area.

Figure 3.19. California farmland.

Not all the proposed alignments would impact prime farmland, but those that do will have to abide by this act. The counties are also concerned about the loss of prime farmland.

CHAPTER 4
Existing Procedures and Tools for Assessing Environmental Issues

This chapter will be presenting the procedures and tools the TriLink team used to integrate natural environment concerns into the development of proposed alignments. The team assessed the Ecological Framework, which consists of nine steps in this analysis. The TriLink project is still early in the planning phases and therefore could only have applied Steps 1 and 2. However, the team is very aware of opportunities for minimization and mitigation, because of the extensive network of conservation banks and plans. In addition, the CCTA is very proactive and will be integrating all opportunities available to them to create a sustainable project.

Application of the Ecological Framework

Step 1: Build and Strengthen Collaborative Partnerships; Develop a Vision

The primary planning region was identified and is shown in Figure 3.1. It is designed to be broad enough to ensure that the purpose and need are met, while allowing flexibility to avoid and minimize environment impacts.

The vision for this project consists of five community needs in an ecologically sensitive manner. The community needs are regional connectivity; job growth; goods movement; congestion relief; and emergency access and safety.

Regional Connectivity

East Contra Costa County has inadequate roadway connections to the east of Antioch, north, and south. Better connections exist to the west of Antioch, due to SR-4 improvements and the planning for the East Contra Costa County Bay Area Rapid Transit (eBART). West San Joaquin County also has better access to roadway connection with I-5 to the north, I-205 to the east, and I-580 to the south and west. Additionally, Byron Highway (Figure 4.1) carries approximately 9,000 vehicles per day, with 23% truck traffic. The lack of transportation capacity in eastern Contra Costa County was noted in a 1997 Caltrans study of SR-4, which stated

> Route 4 is intended to connect the Bay Area with Stockton and the Sierra. Due to geometric constraints in the San Joaquin Delta, however, it cannot adequately serve this function. Route 4, therefore, serves as a “cul-de-sac” linking Eastern Contra Costa to the Bay Area but not providing for appreciable interregional movement. Analysis needs to be taken which identifies the facility needs in the 239/Byron Highway Corridor. (Caltrans, 1997)

Figure 4.1. Byron Highway.

Transit, pedestrian, and bicycle connections are also limited in this corridor. The proposed eBART connection stops in Brentwood, but there is no proposed commuter rail connection to western San Joaquin County. Sidewalk and pedestrian paths are missing on some segments.

Access issues exist for the East County communities of Brentwood, Oakley, Antioch, Byron, and Discovery Bay, long considered a cul-de-sac in terms of highway access, because further connections to the east and south are constrained or altogether lacking. Proposed public transit and bicycle connections in the area, by providing an alternate route for traffic moving from the Tracy area and points farther east and south, could relieve congestion on I-580.

Job Growth

The feasibility of multimodal alignments developed based on the corridor elements identified during the study's visioning sessions. These multimodal alignments would provide a connection between these two subregions. The feasibility of these alignments was assessed with regard to transportation, economic, environmental, social, and financial performance considerations. This was done by evaluating a range of potential alignment options and design options using technical analysis methods and an extensive public outreach process. Finally, institutional and regulatory matters which will need to be addressed were taken into consideration.

Development in the study area is constrained by growth policies, such as the urban limit line (ULL) in the three counties; Measure D in Alameda County; Gateway Policy in the Tri-Valley; and environmental and physical planning considerations. Brentwood (Figure 4.2), Oakley, Antioch, and the unincorporated area around the Byron Airport, all of which are located in eastern Contra Costa County, have undeveloped, non-agricultural lands that are within the voter-approved ULL. These undeveloped lands are designated for commercial, industrial, or business park development. In addition, the Innovation for Green Advanced Transportation

Excellence (i-GATE) initiative, centered at the Lawrence Livermore and Sandia labs, aims to create 5,000 new jobs in the Tri-Valley region over the next 5 years.

Figure 4.2. City of Brentwood.

Cordes Ranch, in Tracy, aims to create 23,000 jobs at build-out, while Mountain House in San Joaquin County aims to create 19,843 jobs at build-out. Improved linkages to the east and south would allow the study area communities to realize current general and specific plans and support new plans to improve the jobs/housing balance, which is currently approximately 0.5 jobs per household, as shown in Figure 4.3. In particular, industrial development, which is likely to include warehouse development, would be better supported by improved throughput of goods movement in and out of the area, in addition to providing access for employees. These areas are planned for job-generating uses, such as industrial, office, retail space, and business parks, which would provide opportunities for much-needed employment growth in an area that currently has far more unemployed residents and jobseekers than jobs.

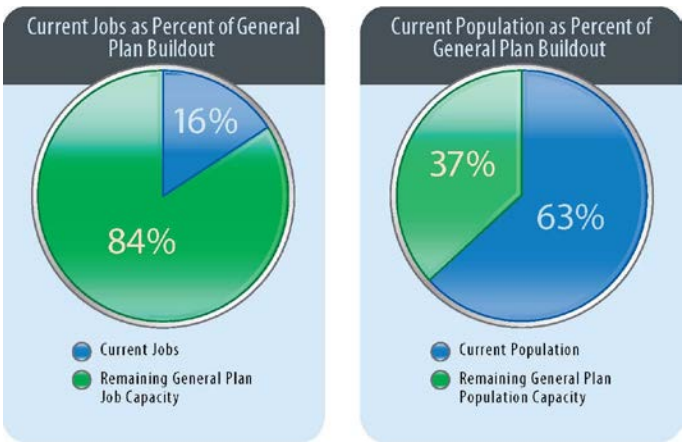


Figure 4.3. Job growth in the TriLink study area communities.

Goods Movement

In the future, manufacturing, wholesale, and transportation are expected to be among the fastest growing industries in the east Contra Costa and west San Joaquin region. Today, the Tracy area and nearby Lathrop are key regional trucking distribution centers for the Bay Area, and trucks from these centers bound for east Contra Costa County use Byron Highway (Figure 4.4) because it is the shortest route. In addition, there are significant agricultural resources around the south and southeast of Byron that use Byron Highway for distribution access.

Figure 4.4. Goods movement along Byron Highway.

The lack of an effective connection between west San Joaquin County and east Contra Costa County will affect the efficient movement of freight as freight volumes and traffic congestion increase. Vasco Road is currently at or near its capacity, while Byron Highway and SR-4 are at approximately 70% of their capacity. Preliminary traffic growth demand estimates show that, by 2040, current capacity within the corridor will be exceeded by 150% or more.

Local job growth in manufacturing, wholesale, transportation, and related sectors depends on quality roadways and connections. Ways to improve the movement of people and goods within East County and to and from the Tri-County region are being assessed.

Congestion Relief

Figure 4.5. Congestion relief.

Multiple studies have identified a need to address congestion on I-580 (Figure 4.5) and other roadways connecting the Bay Area with Stockton and Modesto. The Metropolitan Transportation Commission (MTC), which functions as both the regional transportation planning agency—a state designation—and, for federal purposes, as the region's metropolitan planning organization (MPO), is responsible for regularly updating the Regional Transportation Plan, a comprehensive blueprint for the development of mass transit, highway, airport, seaport, railroad, bicycle, and pedestrian facilities. MTC anticipates a systemwide increase in truck traffic.

Emergency Access

Figure 4.6. Emergency access.

Flooding due to heavy rain events and/or levee failure poses a significant threat to public safety. As discussed in the Contra Costa County Hazard Mitigation Plan Update (Contra Costa County, 2011), such an event would result in the need to evacuate large numbers of people who live in the low-lying areas in and around the delta. Additionally, increased storm frequency, intensity, and duration could represent a barrier to emergency response and recovery in the short- and long-term time frames. Particularly flood-prone areas within the immediate vicinity of the proposed SR-239 corridor include Mountain House, Knightsen, Discovery Bay, Oakley, and Antioch. Flooding in any of these areas would result in an immediate need to evacuate to the south and would likely preclude evacuation to the east. Figure 4.6 shows a warning sign of the typical threat to emergency access in the project area.

Roadway Safety

Figure 4.7. Roadway safety.

A study commissioned by Contra Costa County in 2004 reported 254 collisions, including seven fatal collisions, on Vasco Road, between 1996 and 2003. Recent safety improvements on Vasco Road were aimed at addressing this situation, but they did not increase capacity. Sharp curves, narrow lanes, steep grades, lack of passing options, and high traffic volumes mean that safety is still an ongoing concern for Vasco Road and other local rural roadways. Between 2008 and 2010, there were 59 collisions on Vasco Road, including three fatal collisions. The lack of pedestrian and bicycle facilities along the corridor also poses a safety concern. The same combination of design features that do not meet current standards on Vasco Road also creates safety concerns on Byron Highway. Between 2008 and 2010, there were 22 collisions on Byron Highway [Statewide Integrated Traffic Records System (SWITRS), 2010]. There are opportunities for eliminating deficiencies by implementing current design standards, which demonstrate safety benefits, and for rerouting potential future truck traffic to roadways built to a more appropriate design speed to address safety concerns in the study area. Signs and safety precautions such as the ones shown in Figure 4.7 are common in the project area.

The TriLink study is also collaborating very closely with several nongovernmental organizations (NGO) and the oversight committees for the habitat conservation plans as recommended in the Ecological Framework. These three counties are very aware of the need to improve transportation linkages and meet the five clear needs discussed above. However, they also feel very strongly about doing it in an environmentally sound manner. The NGOs that are actively engaged with this planning effort include Save Mount Diablo, the California Native Plant Society, the Greenbelt Alliance East Bay, the Sierra Club, San Francisco Bay Chapter, and the Brentwood Agricultural Land Trust. In addition, the U.S. Fish and Wildlife Service and the Environmental Protection Agency are engaged as part of the SHRP 2 study. An expanded discussion of the NGO and the other stakeholder groups will be provided below.

The team is also aware that a sound ecological approach will lead to a sustainable transportation design. This approach involves creating balanced choices among environmental, economic, and social values that will benefit current and future users. This sustainable approach looked at access (not only mobility), movement of people and goods (not only vehicles), and provision of transportation choices, such as safe and comfortable routes for sustainability. This project has a more systematic approach to planning than just addressing current and future needs. It addresses concerns about economic vitality, environmental health, and quality of life, looking at both short- and long-term consequences, costs, benefits, and tradeoffs. Sustainability, approached in this manner, encapsulates a diversity of concepts as well, including the best use of limited funding, incentives for construction quality, regional air quality, climate change considerations, livability, and environmental management systems.

In seeking a sustainable ecological approach, as shown in Figure 4.8, the TriLink study incorporates the following steps and approaches:

- Coordinate preliminary design and environmental review process as a collaborative, transparent approach, with all agencies participating as equal partners invested in the outcome of the process;
- Seek public involvement throughout the entire process;
- Go beyond minimum standards set forth by environmental laws and regulations;
- Incorporate innovative uses for the corridor (e.g., charging stations, solar, carbon sequestration, ROW use for solar energy development);
- Use innovative methods to reduce imperviousness and cleanse surface runoff throughout the corridor;
- Maximize use of existing transportation infrastructure, provide multimodal transportation opportunities, and promote ride-sharing/public transportation;
- Incorporate recycled materials to eliminate or reduce waste and reduce the amount of energy required to build the facility, and
- Achieve highest feasible sustainability rating under the Envision rating system.

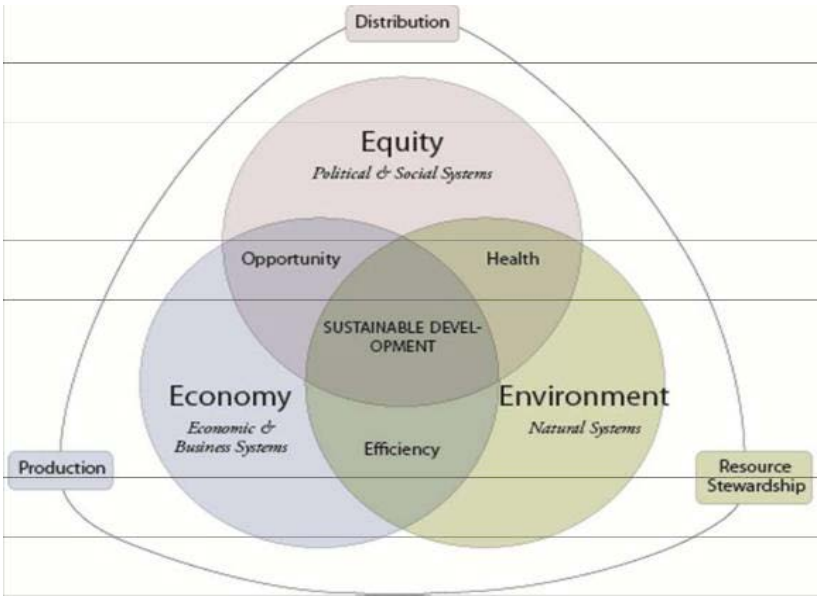


Figure 4.8. Sustainability chart for the TriLink study.

Step 2: Characterize Resource Status

Current products/tools

The Contra Costa Transportation Authority currently uses geospatial tools such as geographic information systems (GIS) and will be utilizing the Caltrans Earth (CT Earth) when it is on line. Utilizing the GIS data has helped tremendously in designing the initial alignments. The challenge of not being able to use CT Earth is that the GIS layers do graphically display various resources and land-use components. However, all the data has had to be manipulated and integrated, which has taken hours of work on top of having to obtain it from many sources. Based on this experience, there is a substantial need to be able to better integrate different layers and also to have them readily accessible for other projects in the future.

The team is in the process of assembling all the natural resource layers. It will be working with the EPA to integrate them into NEPAssist in the near future, so that the team can better assess the impacts from the proposed alignments. The team is aware of other resource agencies' tools, such as ECOS, the ESA web tool, and eNEPA and will be looking for opportunities to utilize them in the planning process as well.

Stakeholder Involvement

There are four groups that have been established to provide the project with valuable input and also to serve as a conduit of information about the project to their respective groups. Table 4.1 is a listing of the members of each group; it is followed by a summary of the initial kickoff meeting. The team will be following up on all the suggestions that were provided. In addition, a website is being developed which will make available to all these groups, and to the general public, summaries of all meetings and the latest project information. Three public meetings have

been held. Literally hundreds of presentations have been given to local governments, interest groups, and the steering committees. The team believes very strongly that public outreach is critical to the success of this project.

Executive Steering Committee

The kickoff meeting with the executive steering committee (ESC) included the following discussion. All suggestions were followed up on. The committee is listed in Table 4.1.

Table 4.1.Executive Steering Committee (ESC)

Executive	Position	Agency
Julie Bueren	Public Works Director	Contra Costa County
Andrew Chesley	Executive Director	San Joaquin Council of Governments
Leon Churchill	City Manager	City of Tracy
Arthur Dao	Executive Director	Alameda CTC
Paul Eldredge	City Manager	City of Brentwood
ML Gordon	General Manager	Mountain House CSD
Rick Howard	General Manager	Discovery Bay CSD
Randell Iwasaki	Executive Director	CCTA
Bryan H. Montgomery	City Manager	City of Oakley
Cheri Sheets	City Engineer	City of Livermore
Kerry Sullivan	Community Development Director	San Joaquin County
Daniel Woldesenbet	Director of Public Works	Alameda County

Note: CSD = community services district; CTC = country transportation commission.

Project Impetus

- Committee members stated that demonstrating and quantifying the potential for TriLink to help communities in the study area realize planned job growth will be critical to the success of the study. MTC currently projects low job growth in eastern Contra Costa County, despite local general plans that seek to add employment.
- TriLink has the potential to improve the jobs-housing balance in the study area and thereby reduce greenhouse gas (GHG) emissions. These benefits dovetail well with

regional planning priorities and should be emphasized. TriLink also has potential farm-to-market benefits.
- While Brentwood and Oakley believe that improved access to the east and south through the study area is a priority, Tracy area employers are more concerned with east-west access and connections into the Bay Area than with north-south access.

Study Scope and Context

- Some stakeholders pointed out that the Bay Area's new Priority Development Area (PDA) growth strategy means that a large percentage of future regional transportation funding will primarily be channeled into PDAs. TriLink will need to consider the ramifications of this policy for funding improvements in the study corridor.
- ESC members recommended looking at the study area holistically, rather than breaking it into parts, as a regional approach will help to build consensus around the TriLink study outcomes.

Parallel Projects

In the course of the discussion, ESC members identified the following related projects underway in the same time frame as the TriLink study:

- Innovation for Green Advance Transportation Excellence (i-GATE) Innovation Hub (iHub): Livermore is leading a regional innovation hub (iHub) partnership seeking to create 5,000 new technology jobs and $1 billion in economic impact by 2015.
- I-205/Lammers Road Interchange: Located between Eleventh Street and Byron Road on I-205, this is one of several roadway projects required to facilitate developments on the west side of Tracy's sphere of influence. The project study report (PSR) of the I-205/Lammers Road Interchange project is complete and has been approved by Caltrans.
- Vasco-Byron Connector: This project is being added to the Contra Costa County General Plan Circulation Element in 2012.
- Brentwood General Plan Update: Circulation Element update ongoing in 2012.
- eBART extension feasibility study.

Additional Project Partners

- ESC members recommended inviting bus service providers to sit on the TAC: Tri Delta Transit, Wheels/Livermore Amador Valley Transit Authority (LAVTA), and City of Tracy Transit Service (TRACER).
- Recommendation was also made to reach out to environmental permitting agencies [Regional Water Quality Control Board (RWQCB), CDFG], Habitat Conservation Plan (John Copchic, Executive Director), and East Bay Regional Parks District and hold offline meetings with these agencies as part of the TriLink process.

Nongovernmental Organizations

The organizations listed in Table 4.2 have been integrated into the project feasibility team.

Table 4.2. Nongovernmental Organizations

Team Member	Position	Agency
Linda Best	President and CEO	Contra Costa Council
Ron Brown	Executive Director	Save Mount Diablo
Mack Casterman	Conservation Analyst	California Native Plant Society, East Bay
Jim Earp	Executive Director	California Alliance for Jobs
Jeff Hobson	Deputy Director	TransForm
Paul Kelly	President	Brentwood Chamber of Commerce
Gene Mangini	2nd Vice President	Contra Costa County Farm Bureau
Kathryn Lyddan	Executive Director	Brentwood Agricultural Land Trust
Bruce Ohlson	Member	East Bay Bicycle Coalition
Scott Peterson	Deputy Director	East Bay Economic Development Alliance
Doug Scheer	President	Oakley Chamber of Commerce
Matt Vander Sluis	Senior Field Representative	Greenbelt Alliance East Bay
Matt Williams	Executive Committee Member	Sierra Club, San Francisco Bay Chapter
Alicia Yandell	Chairperson	California Trucking Association - Bay Area Unit

The kickoff meeting with the nongovernmental organizations included the following discussions and suggestions:

Conservation

- Preserving open space and agricultural land in the study area was identified as a priority.
- Reaching out to the Delta Protection Commission as part of the TriLink process was recommended.
- Discussion also focused on the tools available to aid conservation and ensures that growth is channeled into areas where communities have already planned for it. The tools include
    - Urban limit lines;
    - The Agricultural Core Designation in the Contra Costa County General Plan;
    - Priority conservation areas;
    - Easements and the purchase of development rights; and
    - Limiting the number of access points to roadway facilities.

Transit and Multimodal Transportation Options

- Some stakeholders suggested that CCTA should consider how investment in existing transit infrastructure in the study area could facilitate the achievement of desired project outcomes

- CCTA reported that an eBART extension will be considered as part of the TriLink study
- Some stakeholders asked that pedestrian and bicycle improvements be considered as part of the study. Specific concerns voiced included providing east-west bicycle crossings; maintaining bicycle access to the canals and levees along the Byron Highway; and ensuring pedestrian access consistent with the Mountain House Specific Plan.

Funding

- In response to a stakeholder question, the project team explained that it is operating under the assumption that transportation improvements in the TriLink corridor will need to be paid for in the context of existing planned growth and that revenues that could be generated by additional growth over and above existing approved levels should not be considered as a means to fund improvements.
- Some stakeholders pointed out that the Bay Area's new Priority Development Area (PDA) growth strategy means that a large percentage of future regional transportation funding will primarily be channeled into PDAs. TriLink will need to consider the ramifications of this policy for funding improvements in the study corridor.
- The Trucking Association voiced a concern that tolling unfairly lays the burden of payment on trucks and that tolls have been misused in the past. The association would like to see funding options that spread that burden evenly across users.

Policy Advisor Committee (PAC)

The kickoff meeting with the policy advisor committee (Table 4.3) resulted in the following input, comments, and concerns:

- Some PAC members perceive that some East County residents are not favorable to any growth in the study area, even growth already envisioned in local general plans. TriLink will need to be sensitive to this attitude and clearly communicate that job and housing growth associated with roadway improvements will be limited to areas where it is already planned.
- The Alameda County Gateway Policy that prohibits additional capacity on I-580 and Vasco Road are intended to control unplanned growth, air quality, and VMT. The county may consider exceptions to the policy in cases where transportation improvements proposed also involve mitigation of impacts related to unplanned growth, air pollution, and VMT in Alameda County. The county would welcome actions to alleviate congestion on I-580.
- PAC members discussed the concept behind the Innovation for Green Advance Transportation Excellence (i-GATE) Innovation Hub (iHub) initiative. iHub is a state program overseen by the Governor's Office of Business and Economic Development and i-GATE is the name for the local initiative involving Livermore, Brentwood, Tracy, and several other local cities that are a part of this national program. i-GATE is to serve as an

incubator for innovative technology spun off from the Lawrence Livermore and Sandia National Laboratories. When these innovations spawn businesses, local communities hope that these businesses will choose to set up in the member communities.

- PAC members agreed that the Measure J reauthorization is a good potential source of funding for TriLink improvements. Some members also suggested that TriLink could look at the effectiveness of high occupancy toll (HOT) lanes as another potential funding source.
- PAC members requested a refresher course on the Mid-State Tolling project from the 1990s.

Table 4.3. Policy Advisor Committee

Advisor	Position	Agency
Mary Piepho	Supervisor	Contra Costa County District 3
Federal Glover	Supervisor	Contra Costa County District 5
Leroy Ornellas	Supervisor	San Joaquin County District 5
Scott Haggerty	Supervisor	Alameda County District 1
Steve Barr	Vice Mayor	City of Brentwood
John Marchand	Mayor	City of Livermore
Kevin Romick	Mayor	City of Oakley
Brent H. Ives	Mayor	City of Tracy
Chris Steele	Board President	Discovery Bay CSD
Bernice Pingle	Board President	Mountain House CSD
Linnea Juarez	Chairperson	Byron Municipal Advisory Council

Stakeholder Involvement

- PAC members recommended inclusion of the following groups on the NGO stakeholder committee: the Alameda Farm Bureau, the Audubon Society, the Center for Biodiversity, and a group like the Friends of Livermore.

Project Goals and Outreach Efforts

- Some PAC members see TriLink as an opportunity to make communities in the study area more self-sustaining and as an opportunity to move toward Complete Communities. By facilitating planned growth in local jobs, TriLink can help address the jobs-housing imbalance, thereby reducing vehicle miles traveled (VMT), relieving congestion, and furthering regional sustainability goals.
- Several PAC members noted that, in addition to congestion on regional roadways like I-580, congestion on local roads in the study area, including Vasco Road and Byron Highway, is a problem that TriLink would look to help solve.
- It was also noted that safety is a bigger concern than emergency access in the study area. Committee members agree that TriLink transportation improvements are critical for facilitating planned job growth (“job realization”) in the study area.

- PAC members also recommended conducting a range of outreach activities, including public workshops, city council presentations, and virtual meetings in the local communities within the study area.

Technical Advisory Committee (TAC)

The kickoff meeting with the Technical Advisory Committee (Table 4.4) covered the following topics and provided both suggestions and inputs.

Table 4.4. Technical Advisory Committee

Committee Member	Title	Agency
Martin Engelmann	Deputy Executive Director, Planning	CCTA
John Cunningham	Senior Transportation Planner	TransPLAN
Ellen Smith	eBART Project Manager	BART
Erik Alm	Senior Transportation Planner	Caltrans (District 4)
Lynn O'Connor	Chief for System Planning and Goods Movement	Caltrans (District 10)
Steve Kowalewski	Deputy Public Works Director	Contra Costa County
Beth Lee	Assistant Director of Airports	Contra Costa County
Firoz Vohra	Senior Traffic Engineer	San Joaquin County
Arthur Carrera	Engineering and Transportation Program Manager	Alameda County Public Works Agency
Bailey S. Grewal	Director, Public Works / City Engineer	City of Brentwood
Bob Vinn	Assistant City Engineer	City of Livermore
Jason Vogan	Public Works Director / City Engineer	City of Oakley
Kul Sharma	City Engineer	City of Tracy
Dina Breitstein	Finance Manager	Discovery Bay Community Services District
Nader Shareghi	Public Works Director	Mountain House Community Services District
Iris Obregon	Staff member for Assembly Member Joan Buchanan	California State Assembly, District 15
Mark Herbert	Staff member for Assembly Member Susan Bonilla	California State Assembly, District 11
Lisa Chow	Staff member for Senator Mark DeSaulnier	California State Senate, District 7
Brian Hooker	Staff member for Representative John Garamendi	California Congressional District 10
Gary Prost	Staff member for Representative Jerry McNerney	California Congressional District 11
Karen Basting	Chief of Staff for M. Piepho	Contra Costa County
David Fraser	Chief of Staff for F. Glover	Contra Costa County
Scott Tyrrell	Legislative Assistant for L. Ornellas	San Joaquin County
Beth Walukas	Deputy Director of Planning	Alameda CTC
Mike Swearingen	Senior Regional Planner	San Joaquin Council of Governments (SJCOG)

Project Impetus

- Technical Advisory Committee (TAC) members discussed the project impetus and its five key drivers: regional connectivity, job growth, goods movement, congestion relief, emergency access and safety. TAC members confirmed that these drivers resonated for their communities.
- Alameda County representatives also indicated that the opportunity to take traffic off rural roads would be a welcome outcome.
- San Joaquin representatives highlighted the need to provide/maintain access to agricultural lands.
- San Joaquin representatives were interested to see a quantification of projected benefits and a breakdown by region within the study area.

Parallel Projects

In the course of the discussion, TAC members identified the following related projects underway in the same time frame as the TriLink study:

- I-580 Eastbound Truck Climbing Lane: Alameda County Congestion Management Agency (ACCMA), in cooperation with the California Department of Transportation (Caltrans), is proposing to construct a truck climbing lane in the eastbound direction from Greenville Road to the summit at North Flynn Road to alleviate congestion and enhance safety.
- Innovation for Green Advance Transportation Excellence (i-GATE) Innovation Hub (iHub): Livermore is leading a regional innovation hub (iHub) partnership seeking to create 5,000 new technology jobs and $1 billion in economic impact by 2015. East Contra Costa County Economic Summit.
- I-205/Lammers Road project in Tracy. Short sea shipping/marine highway project proposed for the San Francisco Bay Area.

Additional Project Partners

- TAC members highlighted the need to consider established delta protection zones and priority conservation areas within the study area, recommending TriLink reach out to the Delta Protection Commission and the East Contra Costa County Habitat Conservation Program during the study.
- TAC members also recommended that representatives from Livermore Amador Valley Transit Authority (LAVTA), Tri Delta Transit, and Altamont Commuter Express (ACE) be invited to sit on the TAC.

CHAPTER 5
Internal Data and Methods Assessment of Existing Procedures

The internal data and methods of assessments are described, as well as how existing online tools currently available were utilized. In addition, the assessment includes the success of visioning and public engagement early in the planning process, which enhanced the identification of natural resource concerns so key to the success of the ecological process. As described in Tasks 1 to 3, this is an area in transition. It embodied many of the classic characteristics of a rural area on the perimeter of a very expensive urban center with unaffordable housing. People are choosing to move further out, and, with that, transportation infrastructure is needed. In this case, to meet the needs of the growing suburban population, options such as road expansion are being carefully assessed.

Preservation of natural resources, such as wetlands, vernal pools, and wildlife habitat, are very important. Balancing the preservation of natural resources has been under discussion for many years, and there are some plans in place. The scale of this project, depending on the alternative selected, will require mitigation, but more important to the project planners and residents is avoidance, and that is what is driving the use of the Ecological Framework principles early in the planning process.

The team, through expansion searches of existing databases, has been able to assemble a clear picture of both the resources and the conflicts that are embodied in this area. This assessment clearly illustrates both the value and the limitations of early public involvement for a project that is many years out and that, at the moment, does not have a lot of funding. In addition, the data assembled present a clear picture of constraints, which the project proponents will need to address as the project moves from planning into the environmental analysis phase.

The team is working closely with the USFWS and the EPA to get their input and concerns as well. As part of this assessment, the team reviewed tools created by the Federal Highway Administration, the Environmental Protection Agency, and the USFWS to also determine their usefulness in providing early information about natural resources that would help avoid sensitive resources.

Visioning Process

Working with all interested parties to design a project is a very important part of the ecological process. To meet this key information component, public outreach was an important focus of the early coordination process. It included public meetings, a virtual web meeting, and the development of a website to make project information available, as well as a continuous series of meetings with the various stakeholder groups.

Details of outreach efforts are provided above. However, it is important to note that two visioning sessions were held with agency stakeholders for the TriLink (SR-239) study. The TriLink study focused on five key areas that were identified by agency stakeholders.

Ongoing Outreach Sessions

Seven meeting series were completed over a 14-month period with these stakeholder groups. To summarize the reasoning for holding the meetings:

- The first meeting series served to introduce the study, while the subsequent meeting series were grouped into two separate decision-making cycles.
- The first decision-making cycle consisted of a four-meeting series, which resulted in the selection of alignment options, access points, and facility types.
- The second decision-making cycle consisted of a three-meeting series, which led to approval of the feasibility study.

A series of meetings beginning in September 2013 through early November 2013 was held to introduce the findings in the feasibility study and to get feedback and comments from the various governmental agencies, committees, boards, and councils listed below:

- Airport Advisory Committee
- Tracy City Council
- Contra Costa Board of Supervisors
- Authority Planning Committee Review
- Discovery Bay Community Services District Board
- Alameda Board of Supervisors, Planning and Transportation Committee
- Tri-Valley Transportation Commission
- Brentwood City Council
- Mountain House CSD
- San Joaquin Valley Regional Policy Council
- TRANSPLAN Committee Review
- Alameda County Transportation Commission (CTC) Policy Advisory Committee
- Authority Board Review
- Authority Technical Coordinating Committee Review
- Byron Municipal Advisory Committee
- Eastern Contra Costa Transit Authority
- Alameda CTC Full Commission
- San Joaquin Council of Governments
- East Contra Costa County Economic Development Forum
- San Joaquin County Board of Supervisors

- Livermore City Council

These efforts have assisted the team in adjusting the proposed alignments to avoid potential sensitive resources. In addition, input from these groups has also educated the team on concerns that will be raised if the project does impact a particular sensitive resource. Most important are the ideas which were provided on potential mitigations if certain resources are affected.

Web/ Media/Public Outreach

To reach out to all segments of the population, web and social media tools were used as well to publicize the TriLink study. The study website (www.trilink239.org) was launched in May 2012 and has been updated regularly as new information has become available. The study website provides an opportunity for individuals to learn about the study and get involved. Figure 5.1 shows some of the electronic media public outreach.

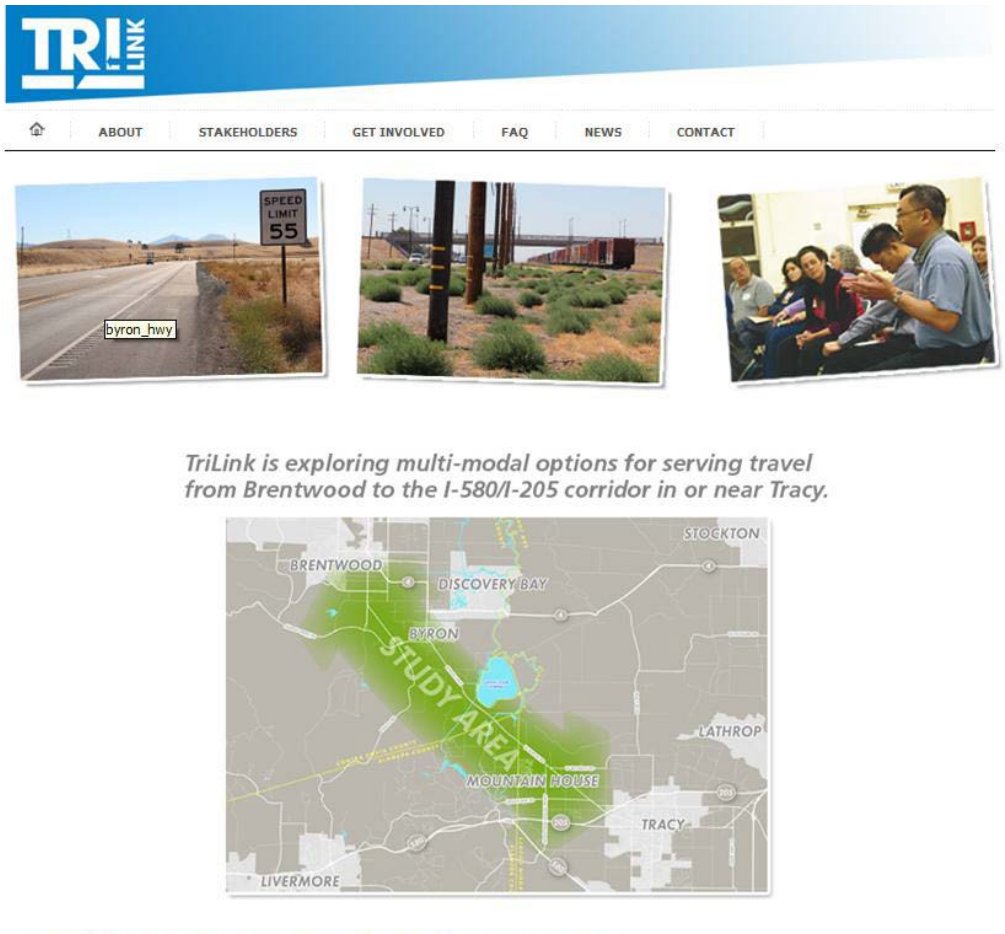


Figure 5.1. Web/Media/Outreach: TriLink Internet home page.

Social media outreach was also conducted via the City of Tracy Facebook page, the Mountain House Community Facebook page, and the MHVillages online community forum. In

addition, e-mails were sent to a list developed of study area communities and people who registered via the website to let them know about the study and the public open house meetings. Articles were also published in the *Contra Costa Times,* the *Brentwood Press,* and the *Antioch Herald.* Contra Costa television broadcasted the Brentwood public meeting on May 14 at 7:00 p.m. and May 15 at 10:00 a.m.

Three public workshops were held, one in each of the following communities: Brentwood, Tracy, and Mountain House. The meetings were conducted in an open house format, where work on the TriLink study to date was recapped, including study impetus, traffic demand modeling results, environmental and policy constraints, and potential alignments; members of the public were invited to visit stations, ask questions, and comment. Meeting materials included a PowerPoint presentation, maps, and boards. Solicitation techniques included a full-group question and answer session.

In parallel to the public open house meetings held in three physical locations, a virtual workshop using the Open Town Hall software platform was conducted. This innovative tool is specifically designed to engage people who may not otherwise be able to attend a public open house meeting in person. This interactive forum was embedded in the TriLink website and allowed interested members of the general public to view maps, presentation materials, and video clips and to provide feedback on their own time.

In summary, the outreach effort was very extensive because the team recognized the importance of engagement with the public for a variety of reasons:

- Obtain sources of data and information,
- Verify information being included,
- Ground-truth (verify), where feasible, the biological data,
- Understand the public support/lack of support for the proposed alternatives,
- Discover local concerns/issues, and
- Look for support/agreement that the project is needed.

The outreach effort would have been greatly enhanced with a tool that could consolidate and assemble data similarly to what the team had to do manually.

Public Open House Meetings

A series of three public open house meetings were held in May 2013. TriLink experts were available to answer questions and share information on the following topics: jobs and housing projections; traffic forecasts; environmental and planning considerations; potential roadway links; and transit and bicycle links. Below is a summary of the public workshops that were held:

1. Brentwood Community Center:

The first public open house meeting, held on Thursday, May 2, 2013, at the Brentwood Community Center, was attended by approximately 17 people, representing residents, community organizations, and elected officials.

2. Tracy Transit Center (Room 103/104)
   The second public open house meeting, held on Wednesday, May 8, 2013 at the Tracy Transit Center, was attended by approximately eight people, representing residents, community organizations, and elected officials.

3. Mountain House Community Services District (CSD) Board Room
   The third public open house meeting, held on Thursday, May 16, 2013, at the Mountain House CSD Board Room, was attended by approximately 13 people, representing residents, community organizations, and elected officials.

The meetings were conducted in an open house format, where work on the TriLink study to date was recapped, including study impetus, traffic demand modeling results, environmental and policy constraints, and potential alignments, and members of the public were invited to visit stations, ask questions, and comment. Meeting materials included a PowerPoint presentation, maps, and boards. Solicitation techniques included a full-group question and answer session. The attendance at these meetings was very low. The team believes there were two main reasons for the low attendance: (1) the project will not be built in the near future; and (2) there is relatively little money currently available for construction.

Virtual Meeting

This was part of the overall effort to try every way to reach the public. In parallel to the public open house meetings held in three physical locations, a virtual workshop using the Open Town Hall software platform was conducted. This innovative tool, as shown in Figure 5.2, is specifically designed to engage people who may not otherwise be able to attend a public open house meeting in person. This interactive forum was embedded in the TriLink website and allowed interested members of the general public to view maps, presentation materials, and video clips and to provide feedback on their own time. Many of these techniques will continue to be used as the projects move into the project development phase.

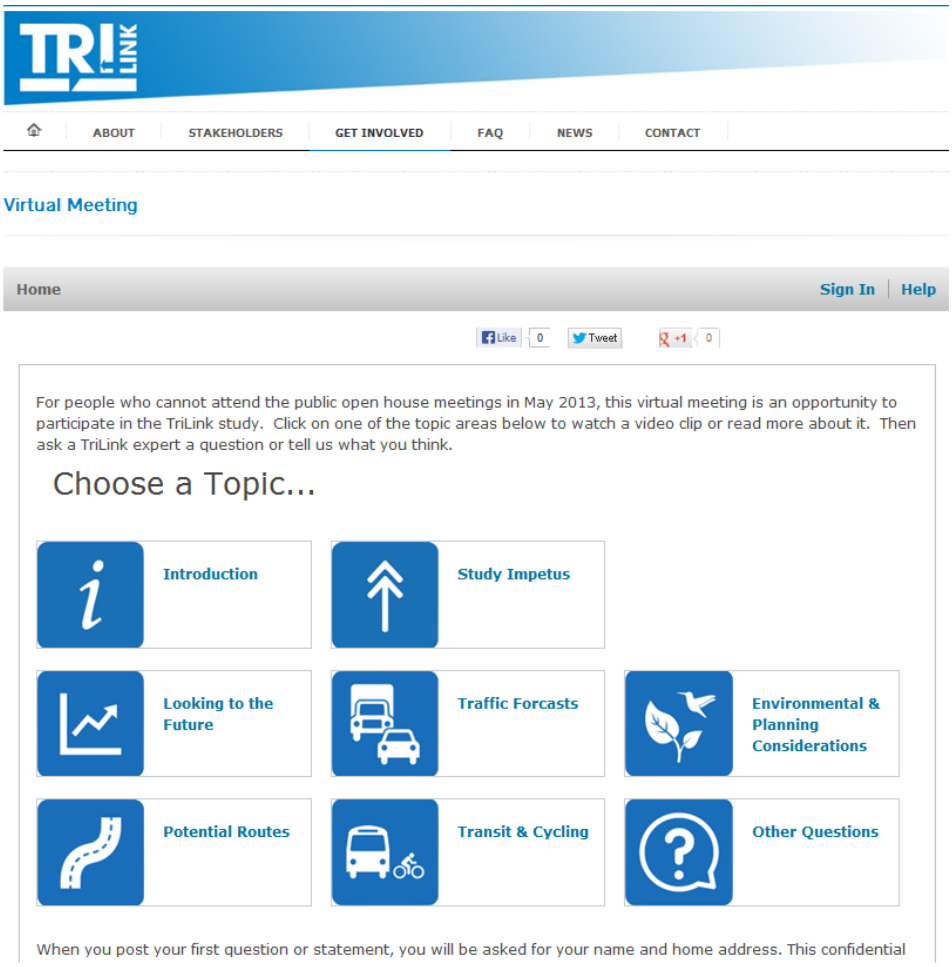


Figure 5.2. TriLink project virtual meeting home page.

Based on input from the public, agencies, and focus groups, the TriLink assessment is focused on five key areas discussed below. Missing from these key areas are the natural resource concerns, which have been integrated into the overall analysis of the alternatives to minimize the impacts to identified resources.

The team believes the outreach effort would have been greatly enhanced with a tool that could consolidate and assemble data, similarly to what the team had to do manually. Also, if the project was scheduled for construction within the next 5 years, more people would have participated. So a way needs to be found to capture the public's interest early in the planning process.

Project Schedule

The project schedule, as shown in Figure 5.3, is included to illustrate the early start the project team has gotten on assessing potential environmental conflicts. The team feels this early assessment with the available environmental data and public and agency input has really assisted the design team in developing more environmental friendly choices.

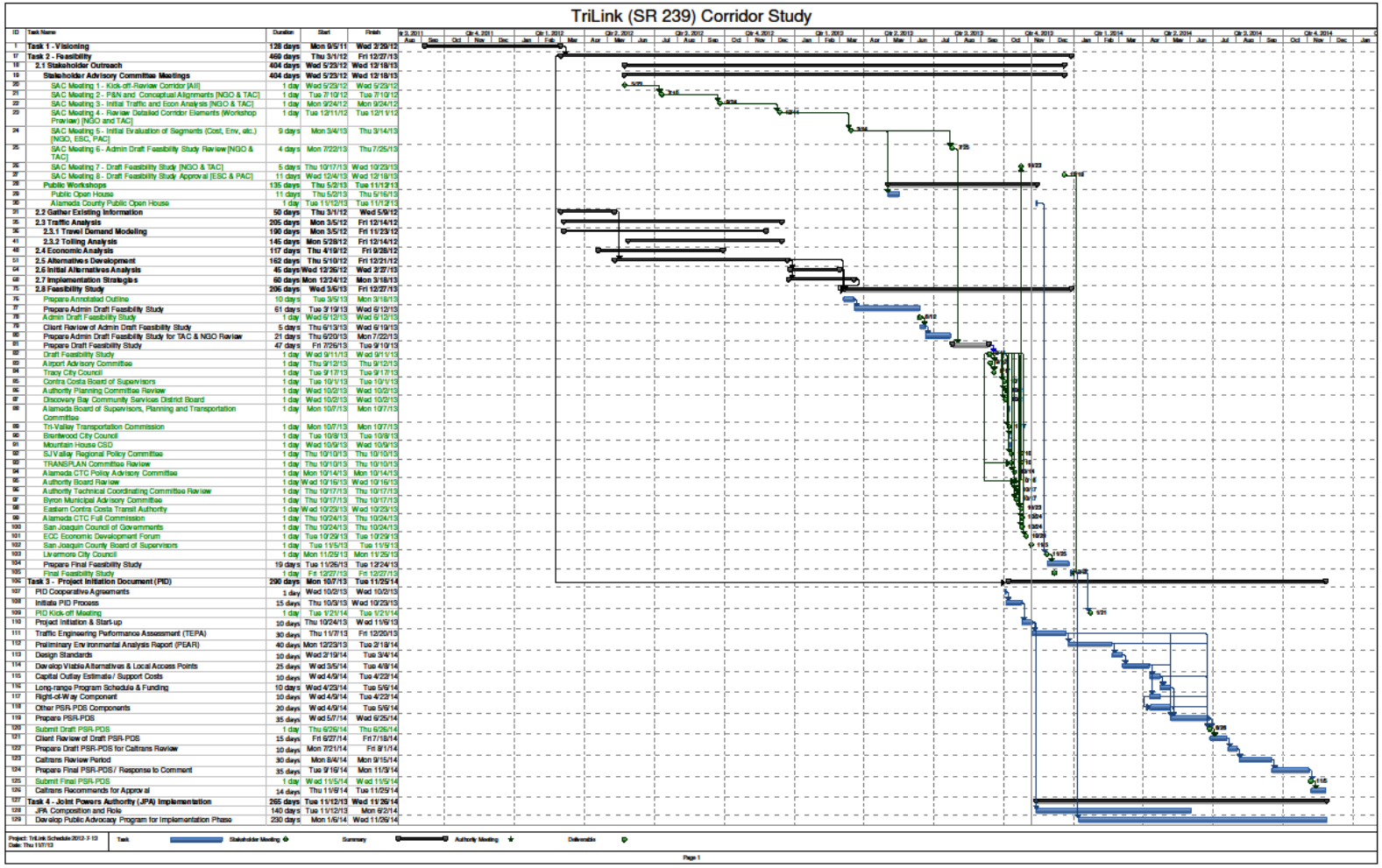


Figure 5.3. TriLink Corridor project schedule.

Assessment Methodology

All of the TriLink study alignments were developed to address five key areas (regional connectivity; planned development and job realization; roadway safety; emergency response; and goods movement) identified during the stakeholder outreach process. Alignments that did not address these key areas were dropped from further consideration. A qualitative comparison was then conducted on the alignment options. This comparison examined biological resources, water resources, cultural resources, existing infrastructure, planned infrastructure, construction cost, and ROW impacts. Alignments were developed to minimize impacts to corridor considerations whenever possible.

The potential alignments selected will minimize impacts to biological resources whenever possible. The biological resources evaluated include sensitive habitat, special-status wildlife and plant species habitat, protected open space or prime farmland, waters, wetlands, and riparian habitat. The team utilized a subcontractor who had developed the biological assessments for some of the habitat conservation plans. This is a classic example of data being available but not accessible. This is definitely the norm when attempting to understand what the biological constraints are.

The assessment methodology used can best be described as the traditional data gathering and analysis of the effects of the project through the use of overlaying GIS layers. The use of GIS layering is now fairly commonplace when assessing impacts of projects on the biological landscape.

This approach is very time- and resource-intensive, since there is no baseline or one-stop shopping available for the study team to use when attempting to analyze the potential effects from a particular alternative.

The challenges facing the team are in “ground truthing” the data obtained. One excellent example is the GIS layer obtained for prime farmland. The local farms that examined the maps disagreed with areas that were highlighted as prime farmland. The two farmers present own much of the farmland in the project area and could provide very specific feedback on almost a parcel-by-parcel assessment. The challenge for the team remains when to use the data provided by the state agency charged with defining farmlands and when to use data provided by the farmers themselves.

Another challenge/bottleneck lies in how different groups view the use of land. An example is again with farmland. The farmers value their land for the crop value, whereas some environmental groups view these lands as potential sources of food for migratory birds. Even though these lands do have the potential of being a food source for these birds, the farmers would not agree that this is the actual value of their farmlands.

To more clearly illustrate the constraints that were evaluated, the following graphics depict not only biological but other considerations, such as utilities and wind farms that make avoidance of the biological concerns even more of a challenge. The constraints are sequentially layered.

The captions for Figures 5.4 through 5.12 include the colors representing constraints in the TriLink study area; the caption serves as a legend for each figure.

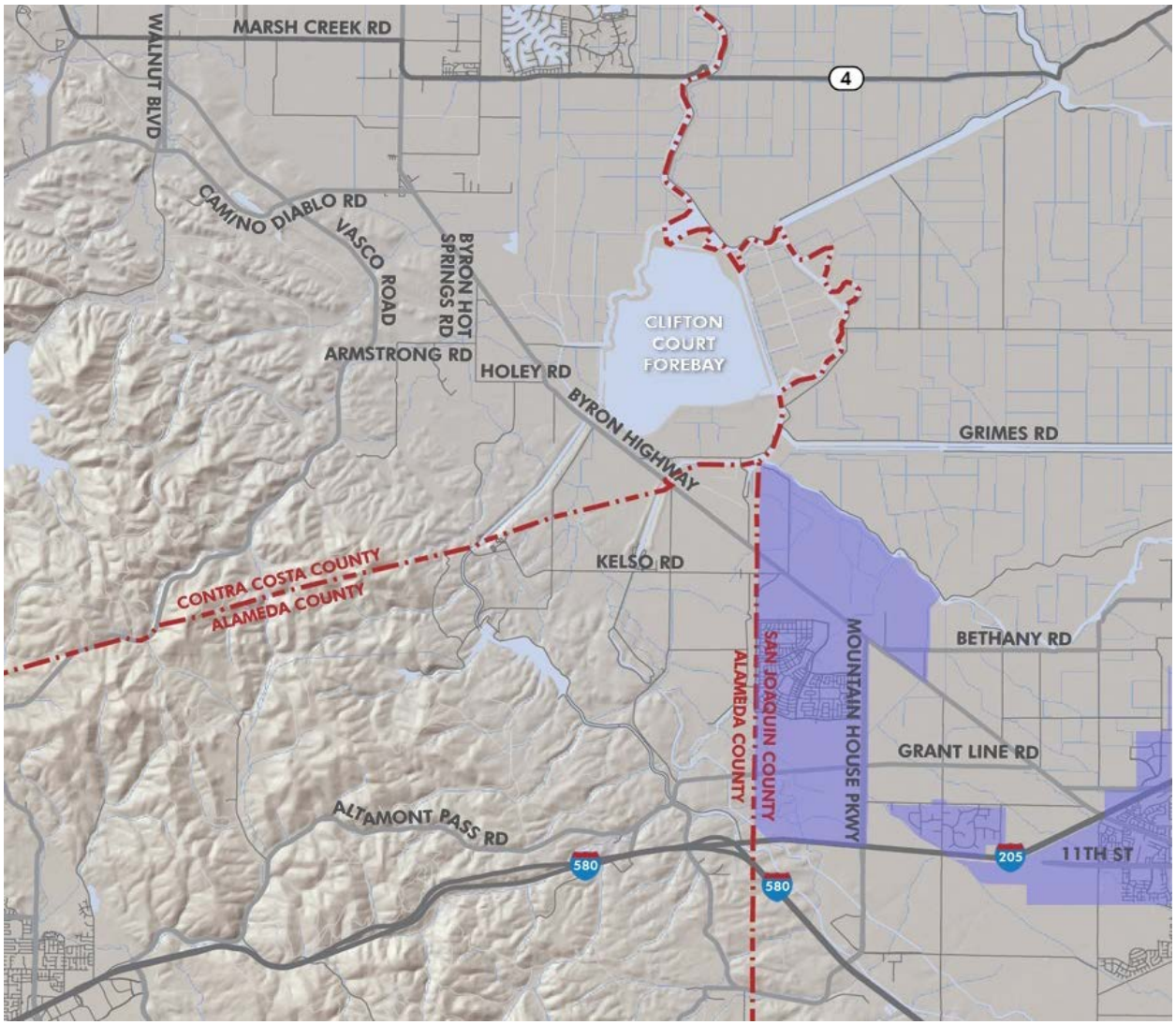


Figure 5.4. Planned development (purple) in the TriLink study area.

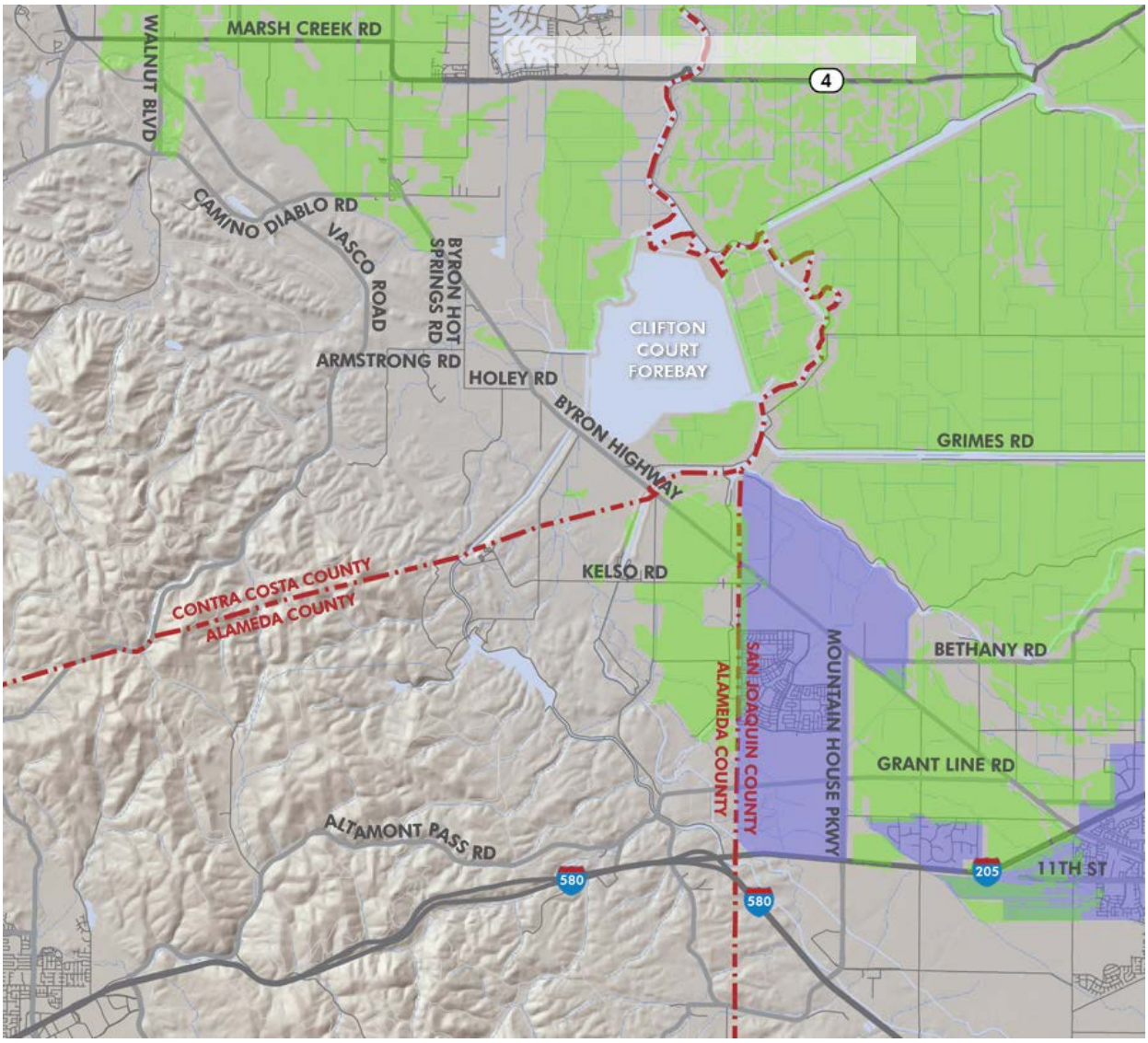


Figure 5.5. Prime farmland (green) and planned development (purple) in the TriLink study area.

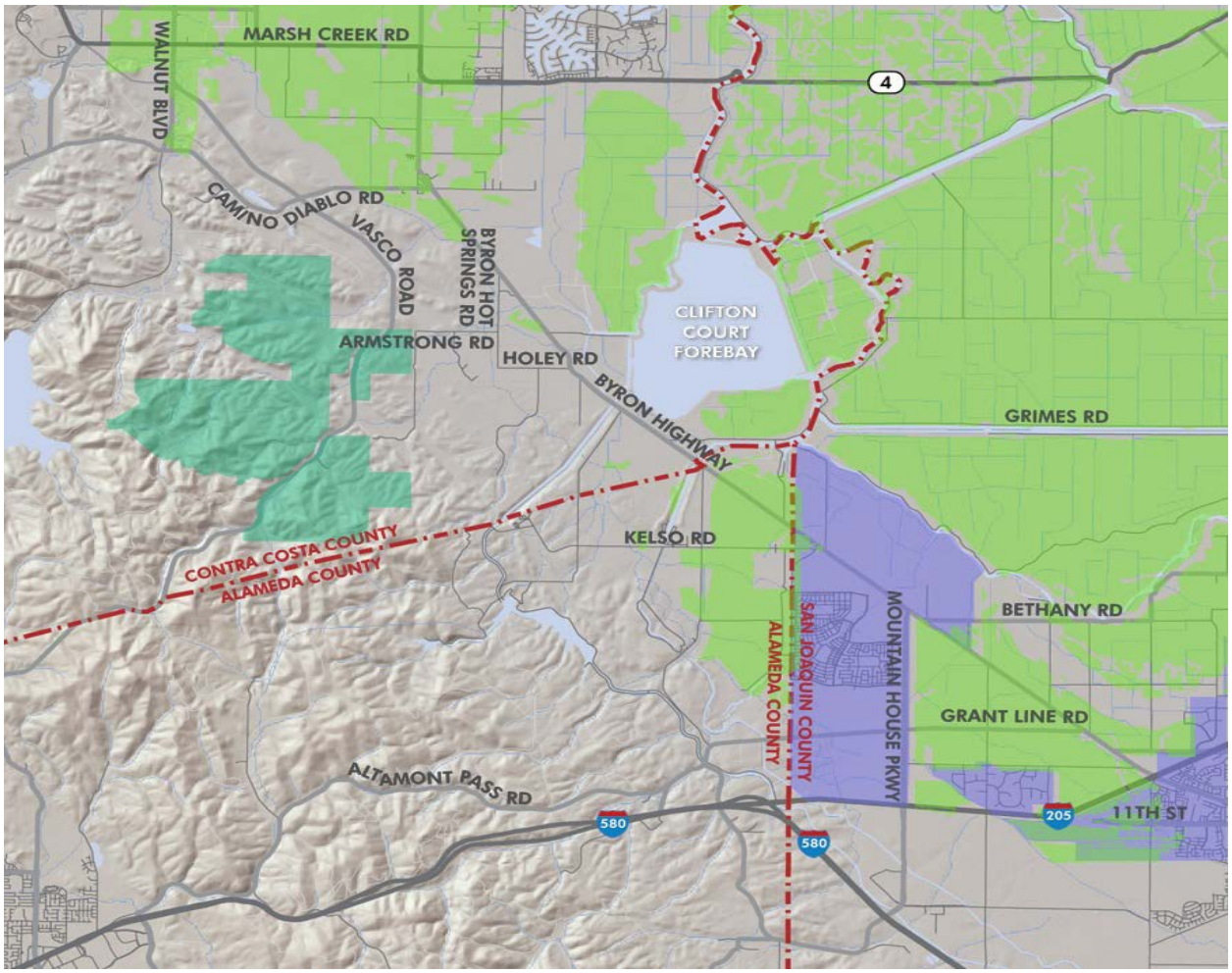


Figure 5.6. Conservation land (dark green), prime farmland (green), and planned development (purple) in the TriLink study area.

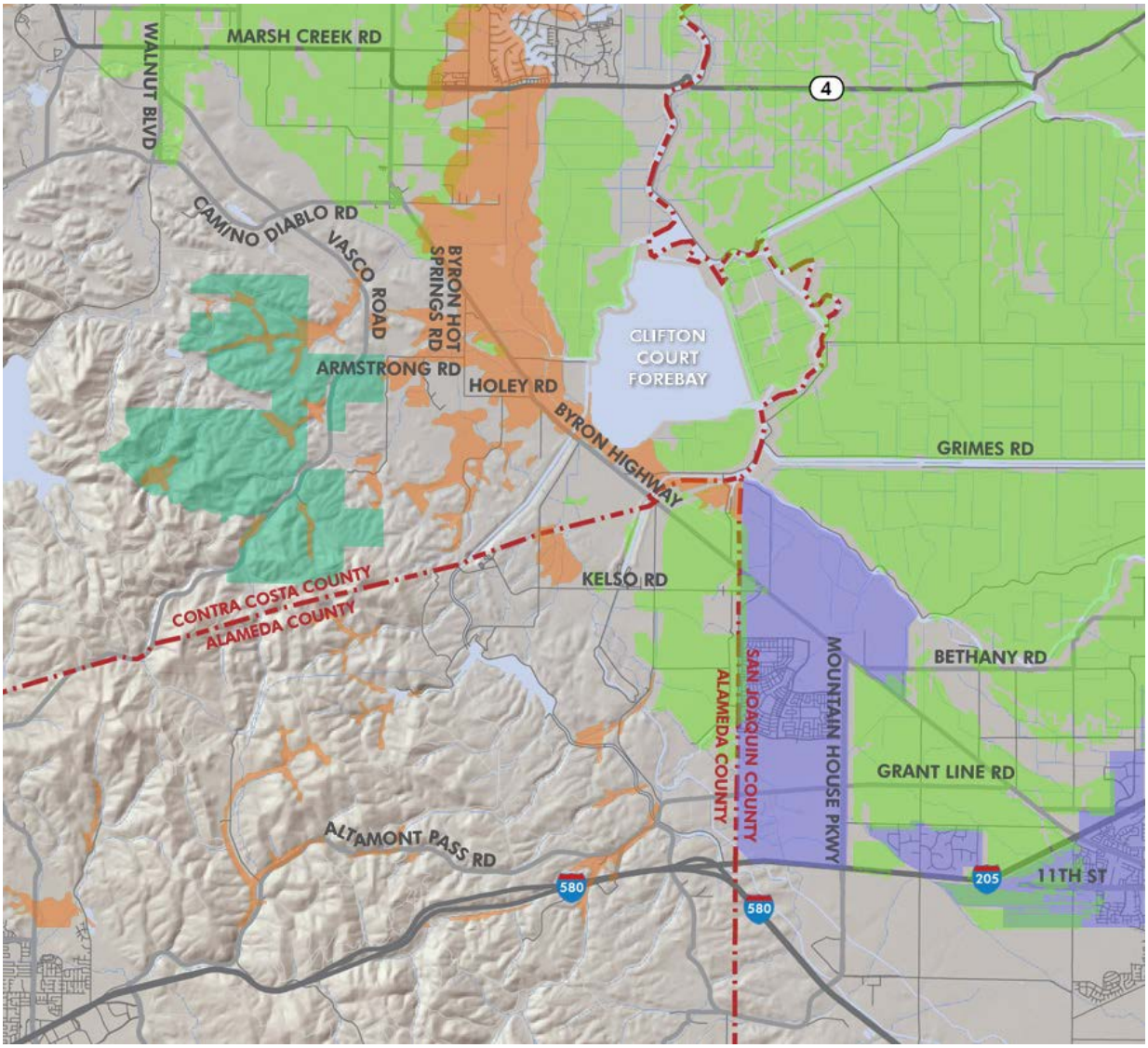


Figure 5.7. Alkali soils (orange), conservation land (dark green), prime farmland (green), and planned development (purple) in the TriLink study area.

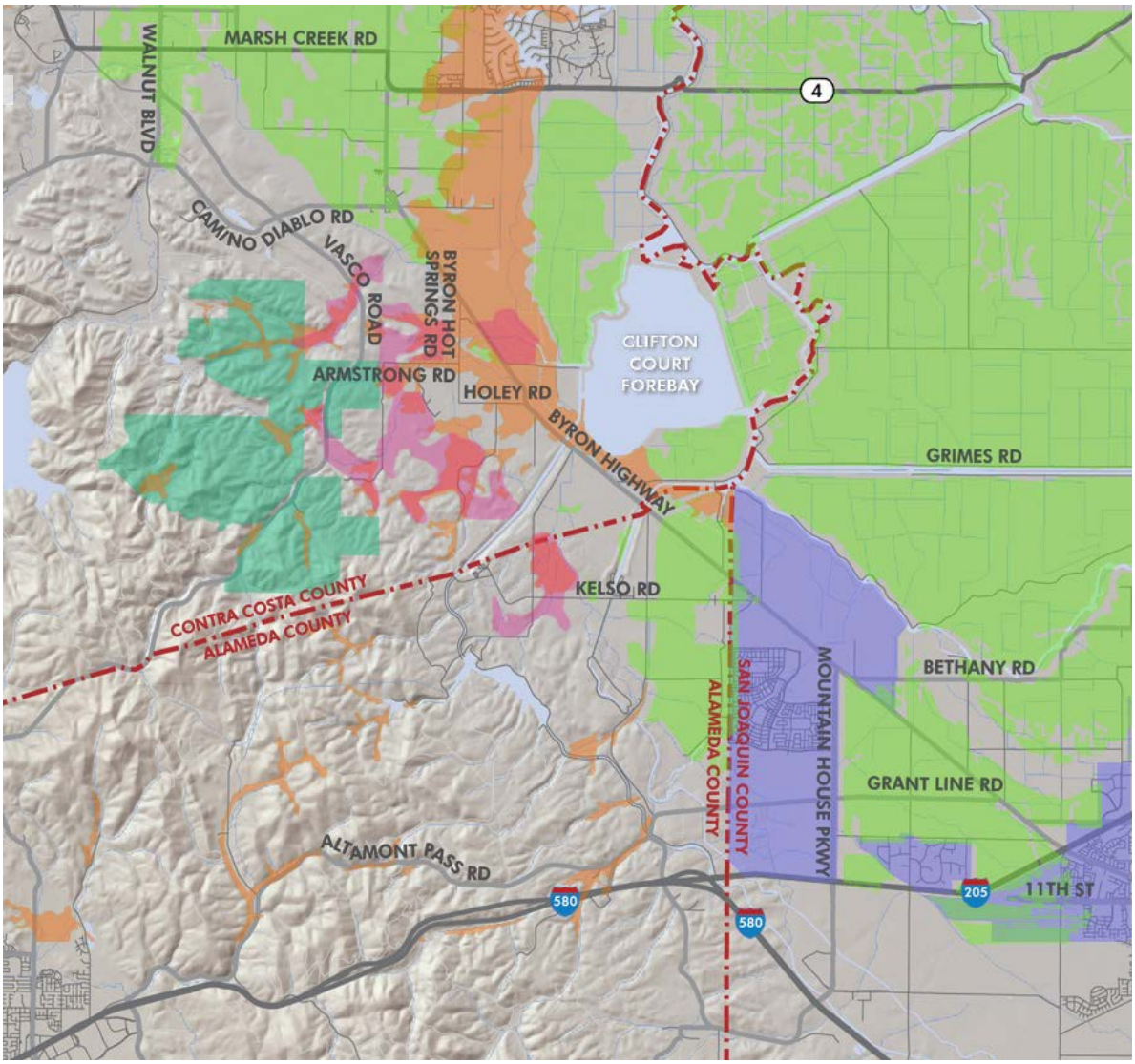


Figure 5.8. Vernal pools (pink), alkali soils (orange), conservation land (dark green), prime farmland (green), and planned development (purple) in the TriLink study area.

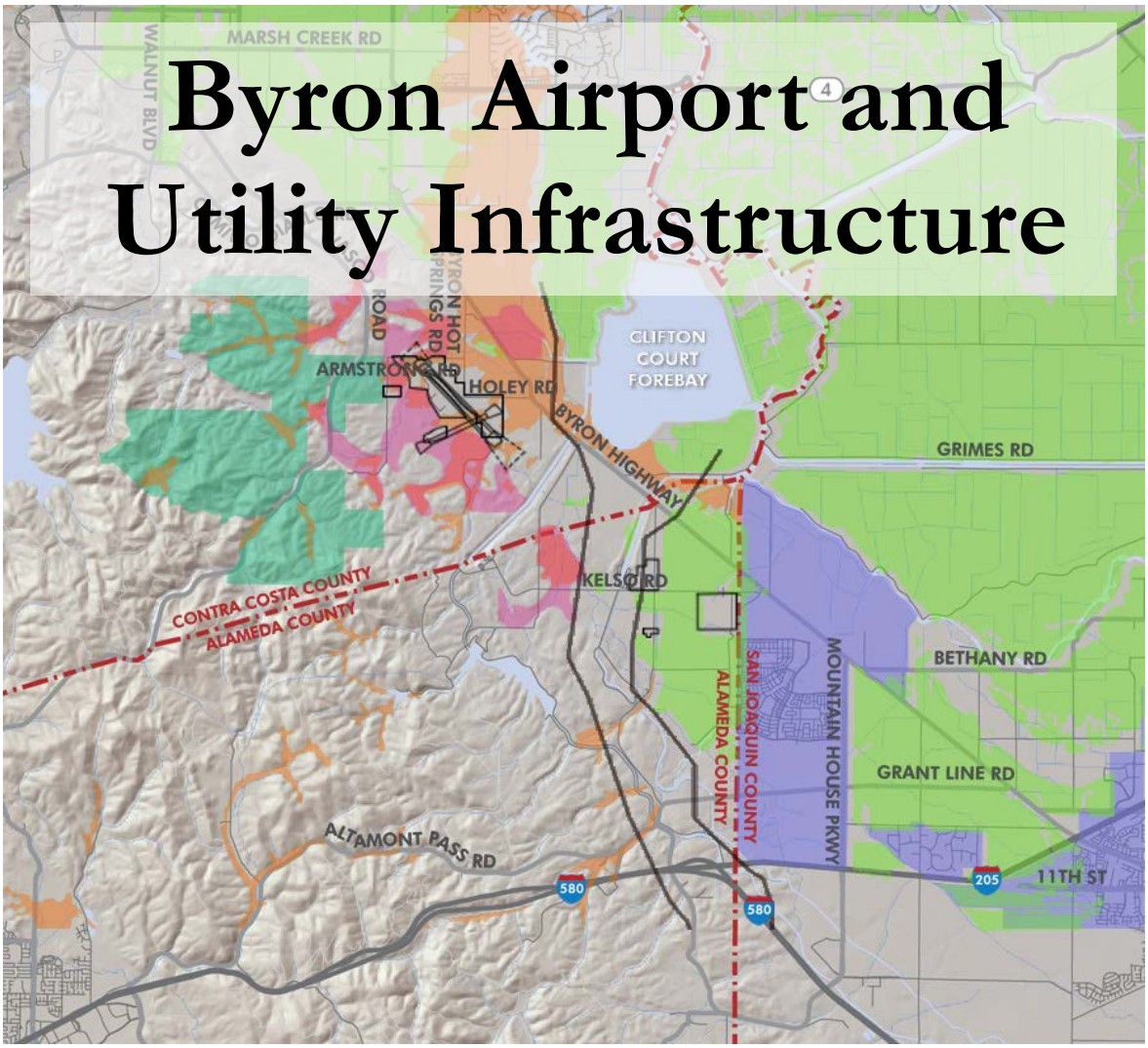


Figure 5.9. Vernal pools (pink), alkali soils (orange), conservation land (dark green), prime farmland (green), and planned development (purple) in the TriLink study area. Airport and utility infrastructures are represented by black/grey lines.

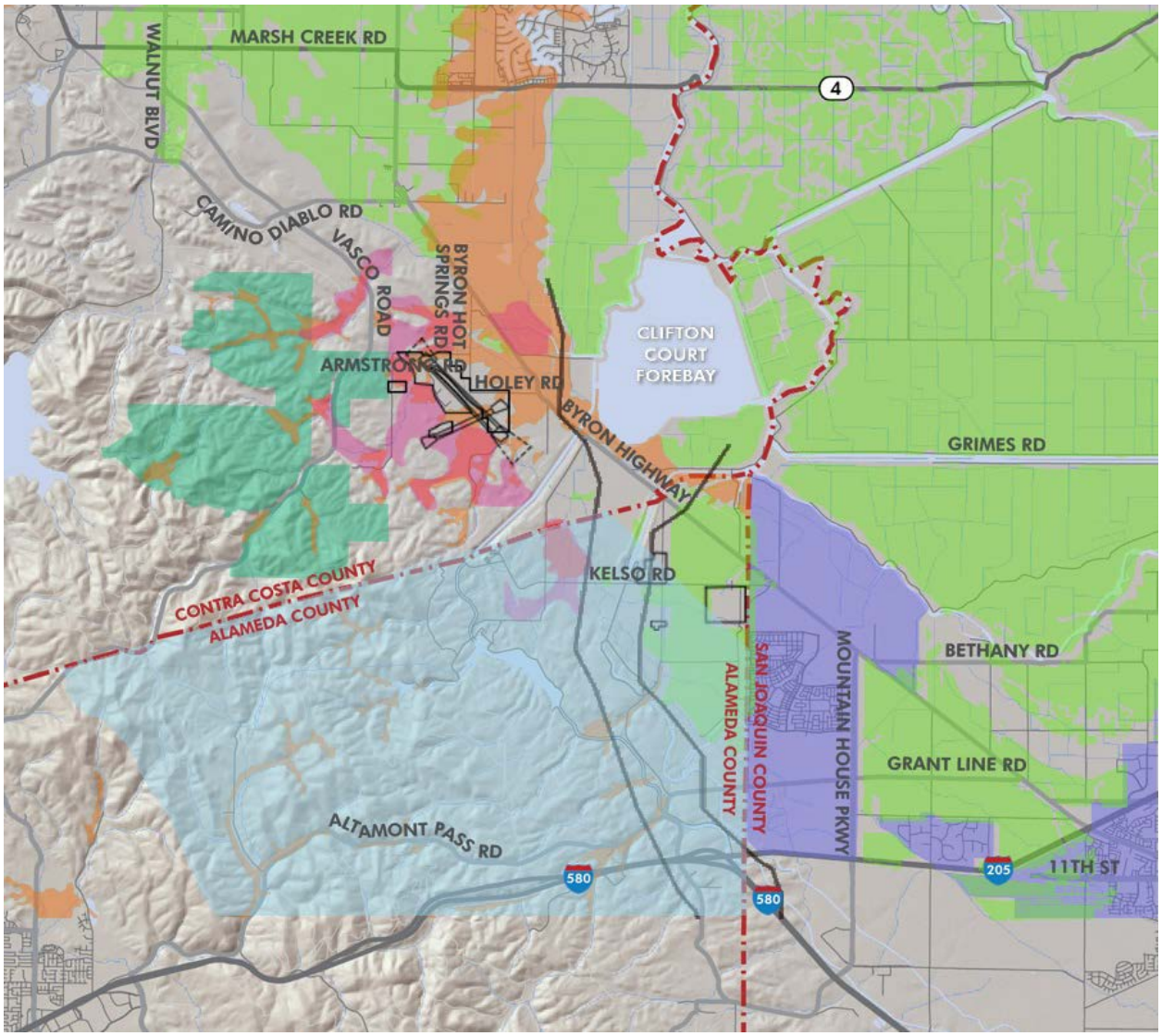


Figure 5.10. Wind resource area (blue), vernal pools (pink), alkali soils (orange), conservation land (dark green), prime farmland (green), and planned development (purple) in the TriLink study area.

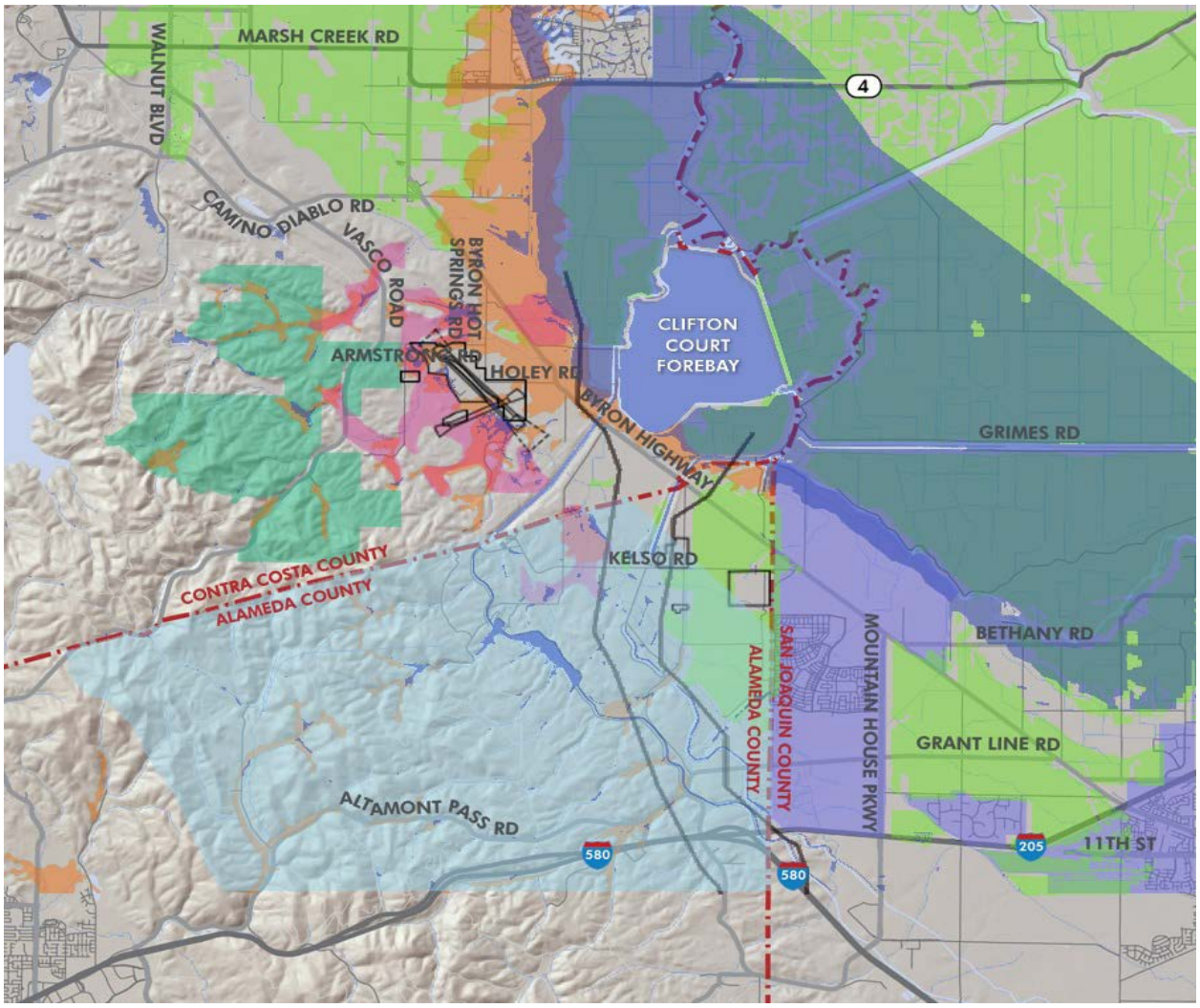


Figure 5.11. Delta protection zone and waterways (thin blue lines), wind resource area (blue), vernal pools (pink), alkali soils (orange), conservation land (dark green), prime farmland (green), and planned development (purple) in the TriLink study area.

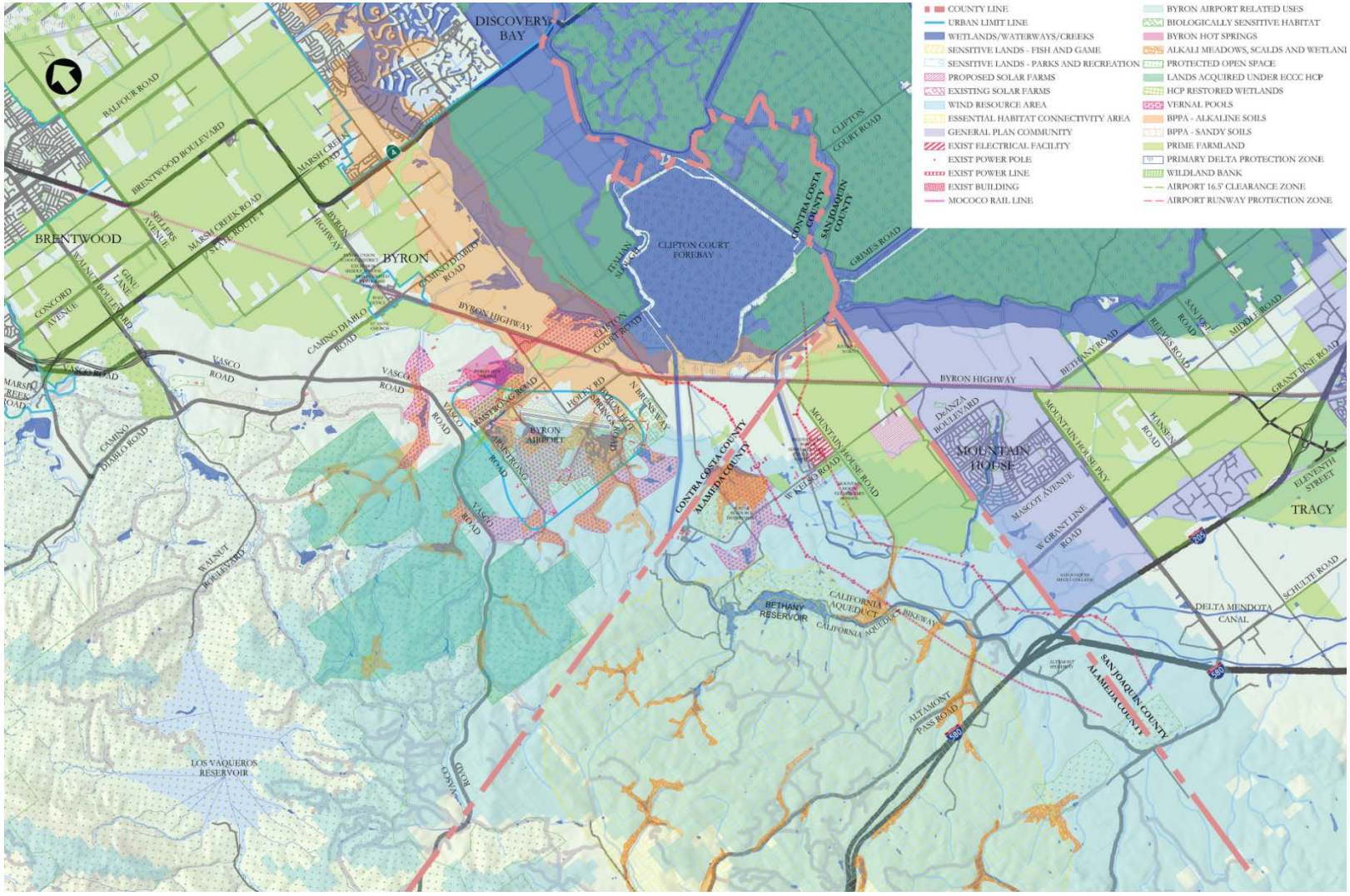


Figure 5.12. Constraints map for the TriLink study area.

More information on these biological resources, including rare plants, animal species, and soils, regarding their conservation designation would be very useful. The potential impacts to biological resources are described and summarized above. Planning for TriLink is still in the early stages, so it is important to identify all potential biological impacts. However, it is likely that most impacts can either be avoided through careful roadway design or mitigated through on-site or off-site mitigation. These possibilities will be considered further as project design progresses.

CHAPTER 6
Assessment of Online Tools and Databases

The team evaluated six tools that are either currently available, being beta tested, or still under construction. As background for this effort, the team completed the draft feasibility study, which focused on utilizing available data sources and creating custom GIS layers, which were used in developing the potential alternatives. Then the team began a detailed assessment of the six available web tools. A clear focus of this review was to determine how these tools could enhance the existing feasibility study and to determine the usefulness of these web tools for providing the team with additional environmental information, which would be valuable as the project moves into project development.

Tables 6.1 and 6.2 summarize the findings of the team. Detailed assessments of each web tool are also provided.

Table 6.1. Environmental Web Tools

Tool	Ease of Use (Scale 1 to 10)	Applicability	Used for Initial Feasibility Study	Useful During Development of EIS (Scale 1 to 5*)
FHWA ESA Webtool	9**	Yes	No	5
USFWS ECOS	7	No	Yes	3
EPA NEPAssist	8	Yes	Yes	4
FHWA eNEPA	8***	No	No	5
USFWS IPaC	9	Yes	No	4
EPA EnviroAtlas	9****	Yes	No	5
Eco-Plan	8	Yes	No	3

* 5 is the highest score.

** This tool is extremely easy to use. It was not helpful to this project because there were no existing Biological Opinions/Biological Assessments (BO/BAs) entered in the database for this project area. FHWA also offers periodic web-based training.

*** This tool will be very helpful during the preparation of the environmental document but is really not applicable to this stage of project analysis.

**** This is still being beta tested but will be a valuable source of information to environmental planners.

Enhancements with the Use of Geospatial Tools

These tools that have the potential to improve and enhance early environmental assessment and improve interagency coordination were evaluated. The purpose of the evaluation was to determine three things: (1) how helpful they were in early assessment of problems, issues or concerns; (2) Could GIS layers or other information be uploaded and added to the assessment; and (3) could the information be saved to add to a report or to be updated as the project progressed.

Table 6.2. Web Tool Ranking

Tool	Helpful (Scale 1 to 10)	Uploading	Saving Information
FHWA ESA Webtool	8	Yes	Yes
USFWS ECOS	7	No	No
EPA NEPAssist	8	No	No
FHWA eNEPA	8	Yes	Yes
USFWS IPaC	8	Yes	No
EPA EnviroAtlas	9	No*	No*

* In development.

ECOS

The Environmental Conservation Online System (ECOS) tool was developed by the USFWS. ECOS is a gateway website that provides access to data systems in the U.S. Fish and Wildlife Service and other government data sources. This central point of access assists USFWS personnel in managing data and information, and it provides public access to information from numerous USFWS databases.

It is linked to IPaC, and when the IPaC system produces a list of species in the project areas, it is easy to could go back to ECOS and do individual species searches for key species information, a capability which would be very useful. However, it is still somewhat cumbersome, because of the need to go from one platform to the other to get information. A report can be created in ECOS of all the species and key information, which is useful in assessing project effects. The reports are organized by county. The data is very available and is obtained directly from the USFWS, so this data source gives tremendous credibility to the results. In reviewing each species map, it became apparent that familiarity with conservation plans and other agreements could result in obtaining additional valuable information on species, species habitat, and potentially approved minimization and mitigation strategies.

The critical habitat mapping tool, which is illustrated in Figure 6.1, can provide a user with

- Critical habitat spatial data
- Critical habitat metadata
- Federal Register documents
- Fish and Wildlife Service (FWS) species profile information

Figure 6.1. Critical habitat tool.

The species list shown in Table 6.3 is accumulated by accessing the East Contra Costa County HCP. The project team compared what was previously obtained from the team that prepared the HCP(s) and this site; they were the same.

Table 6.3. Listed Species in Costa County, California

- Fairy shrimp, longhorn (*Branchinecta longiantenna*)
- Fairy shrimp, vernal pool (*Branchinecta lynchi*)
- Fox, San Joaquin kit (*Vulpes macrotis mutica*) U.S.A(CA) E
- Frog, California red-legged (*Rana draytonii*)
- Salamander, California tiger (*Ambystoma californiense*) U.S.A. (Central CA DPS) T
- Snake, giant garter (*Thamnophis gigas*)
- Tadpole shrimp, vernal pool (*Lepidurus packardi*)
- Whipsnake (striped racer), Alameda (*Masticophis lateralis euryxanthus*) Entire T

However, when checked a little further, there was a significantly longer list of threatened and endangered species that could potentially be impacted by the project. These are listed in Table 6.4.

Table 6.4. Endangered and Threatened Species Potentially Affected by TriLink Project

Endangered	Threatened
California tiger salamander	California red-legged frog
California freshwater shrimp Entire	Vernal pool fairy shrimp
Conservancy fairy shrimp	Delta smelt Entire
Longhorn fairy shrimp	Pallid manzanita
Vernal pool tadpole shrimp	Colusa grass
Contra Costa goldfields	Tiburon mariposa lily
Keck's Checker-mallow	Marin dwarf-flax
Large-flowered fiddleneck	Valley elderberry longhorn
Presidio clarkia	Alameda whipsnake
Palmate-bracted bird's beak	Giant garter snake
Contra Costa wallflower	
Antioch Dunes evening-primrose	
Tiburon jewel flower	
Tiburon paintbrush	
Lange's metalmark butterfly	
Callippe silverspot butterfly	
San Joaquin kit fox	
Salt marsh harvest mouse	

This expanded list is a very clear example of how using the available web tools can benefit a project. Without checking ECOS, the project staff might not have adequately analyzed impacts to threatened and endangered species because the initial list was incomplete.

IPaC

Background

IPaC stands for Information, Planning, and Conservation. The IPaC system is designed for easy public access to information about the natural resources for which the U.S. Fish and Wildlife Service has trust or regulatory responsibility. Examples include threatened and endangered species, migratory birds, National Refuge lands, and NWI wetlands. One of the primary goals of the IPaC system is to provide this information in a manner that assists people in planning their activities within the context of natural resource conservation. The IPaC system also assists people through the various regulatory consultation, permitting, and approval processes administered by the Fish and Wildlife Service, helping achieve more effective and efficient results for both the project proponents and natural resources.

IPaC is available to all people, whether private citizens or public employees, who need information to assist in determining how their activities may impact sensitive natural resources, and who would like to obtain suggestions for ways to address these impacts. IPaC is also designed to assist those who are charged with evaluating such impacts.

If a user has a project that may affect natural resources and the environment, IPaC can help determine what those impacts are likely to be and provide suggestions for addressing them (in the form of conservation measures). With information available early in the project development process, project proponents can often more easily incorporate it into their planning, saving time, money, and frustration.

The information received from IPaC is generated by USFWS field offices. The benefit of getting the information directly from IPaC over the Internet is that the information is available to project proponents when they need it rather than when USFWS personnel are available. IPaC can improve the efficiency of project planning, providing information to project proponents during the earliest stages of project planning.

The IPaC decision-support system is a conservation planning tool for streamlining the environmental review process. It provides partners with the ability to explore the landscape and help site projects in a way that minimizes conflicts with natural resources.

With IPaC's landscape explorer tool, users can view wetlands, Gap Analysis Program (GAP) land cover, USFWS critical habitat, and other nature resource map layers. It was not integrated at the time the project team was attempting to utilize it with the TriLink pilot.

Through IPaC, users can get a preliminary USFWS species list and, in many locations across the United States, a USFWS Official Species list. Available, too, are links to species' life history information, the USFWS Migratory Bird program, Bald and Golden Eagle Protection Act information, and more. For the TriLink project, a species list was not available. The links to the other acts were not integrated, just informational.

Project-Specific Application

The project-mapping tool is extremely easy to use and to change (see Figure 6.2). However, there was no access to threatened or endangered species lists for the specific pilot project area, and there were no conservation measures available for transportation projects, because they are still under development. If this information had been available, the team would have found it to be useful.

However, access to designated critical habitat, hydrology, and land ownership is available and can be layered so that an environmental planner can see if there are potential issues in the project area. In the case of TriLink, and shown in Figure 6.3, the proposed alignments will be going through designated critical habitat, which may be a concern, depending on the level of effect that is determined, as well as potential minimization measures that project proponents could take.

Next Steps for the Website

In the future, USFWS-recommended project design (conservation) measures will be available for all locations in the United States. Conservation measures help to avoid, minimize, or mitigate anticipated effects on proposed and listed species.

The upcoming IPaC Project Manager tool will enable details of projects, such as actions, locations, and timelines, and IPaC will provide a more narrowed and refined list of conservation measures.

With this improved level of information and input, the IPaC Project Manager will be able to assist in creating Biological Assessment and other environmental documents.

Example Maps

The team used an approximate project area to test the usefulness of the IPaC tool for providing threatened and endangered species information. Examples of maps produced in the project area are below. Figure 6.2 shows the ease with which a project area can be developed.

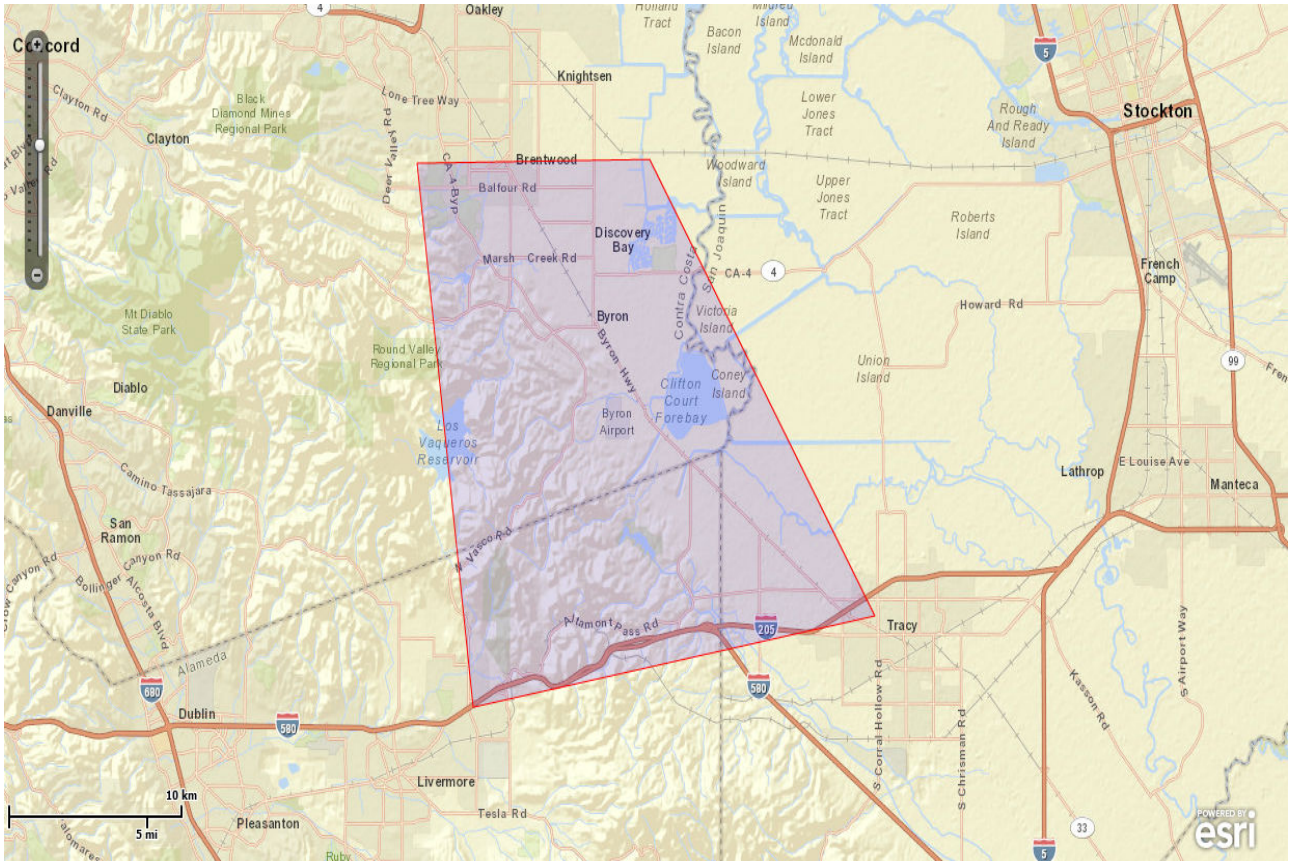


Figure 6.2. Example project area drawn in IPaC.

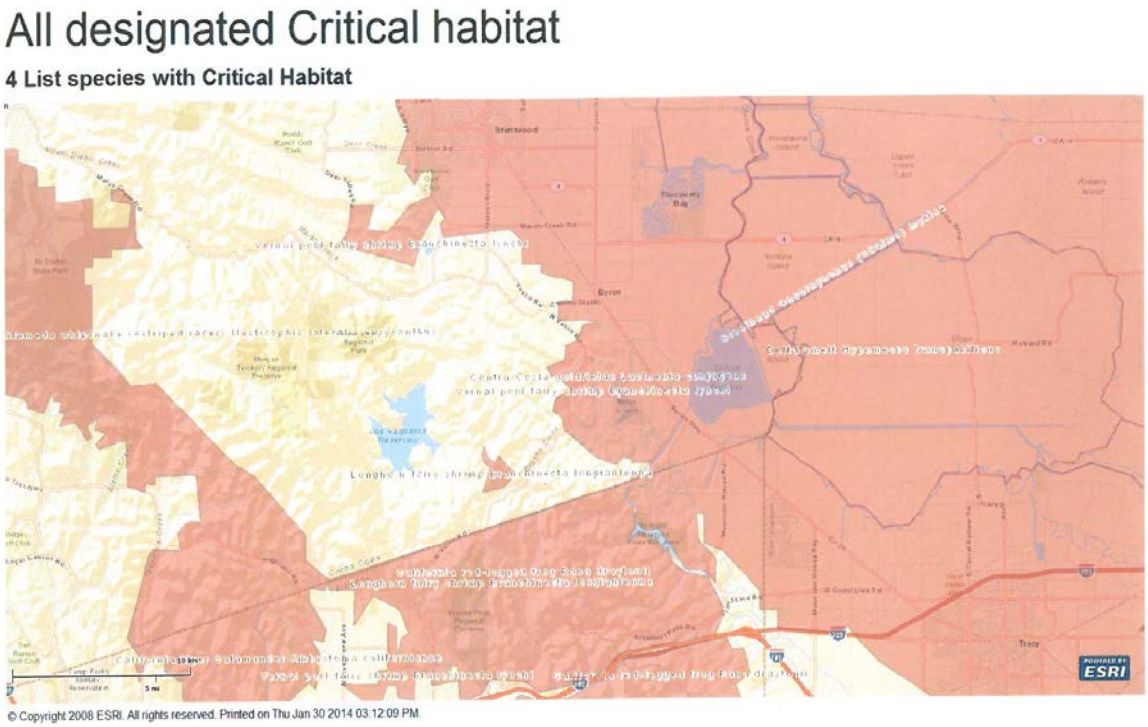


Figure 6.3. Critical habitat.

Figures 6.4 and 6.5 illustrate the type of information that is easily available on the IPaC website to quickly give a planner key information that could potentially result in revisions to proposed alignments.

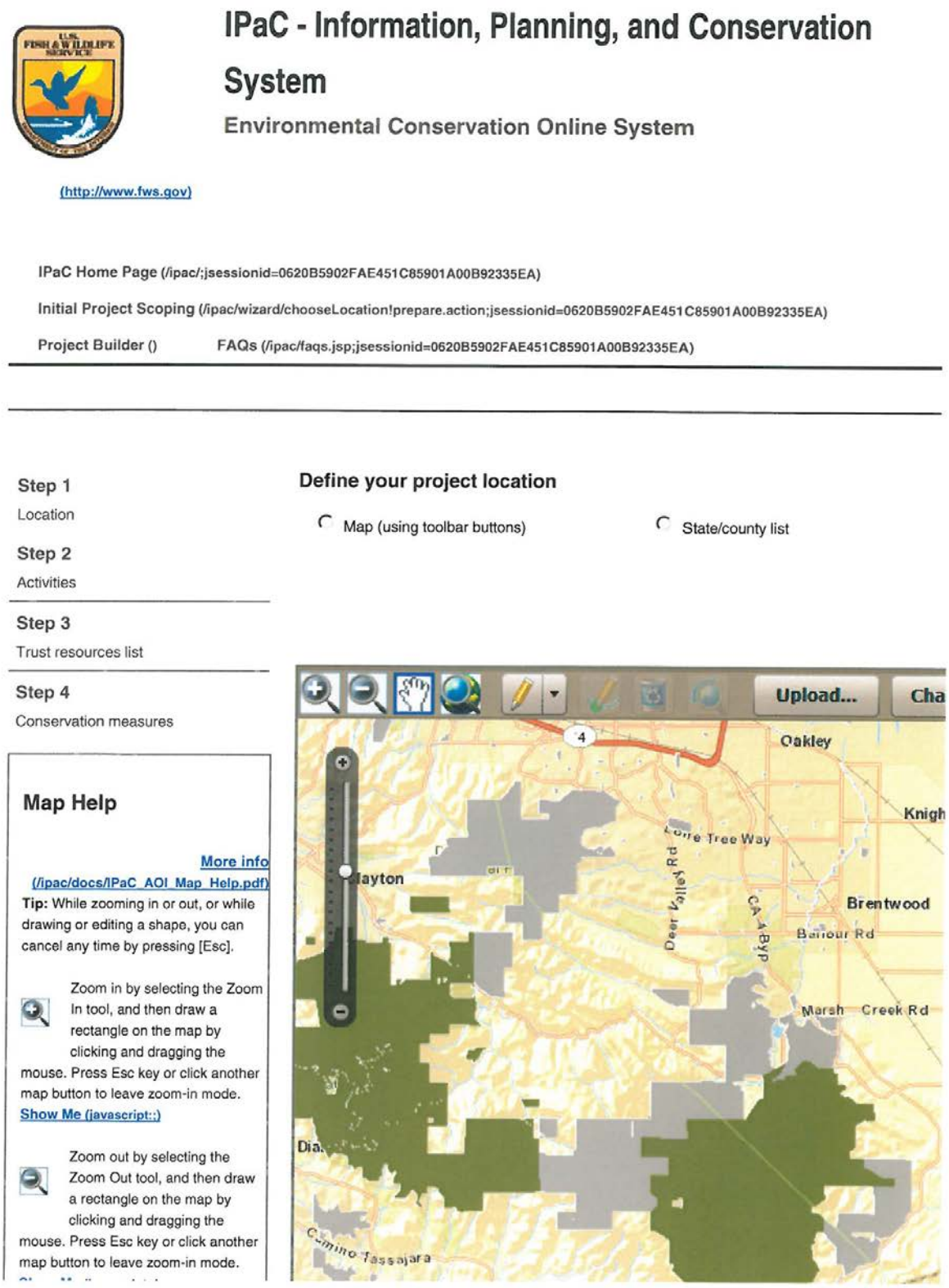


Figure 6.4. IPaC website.

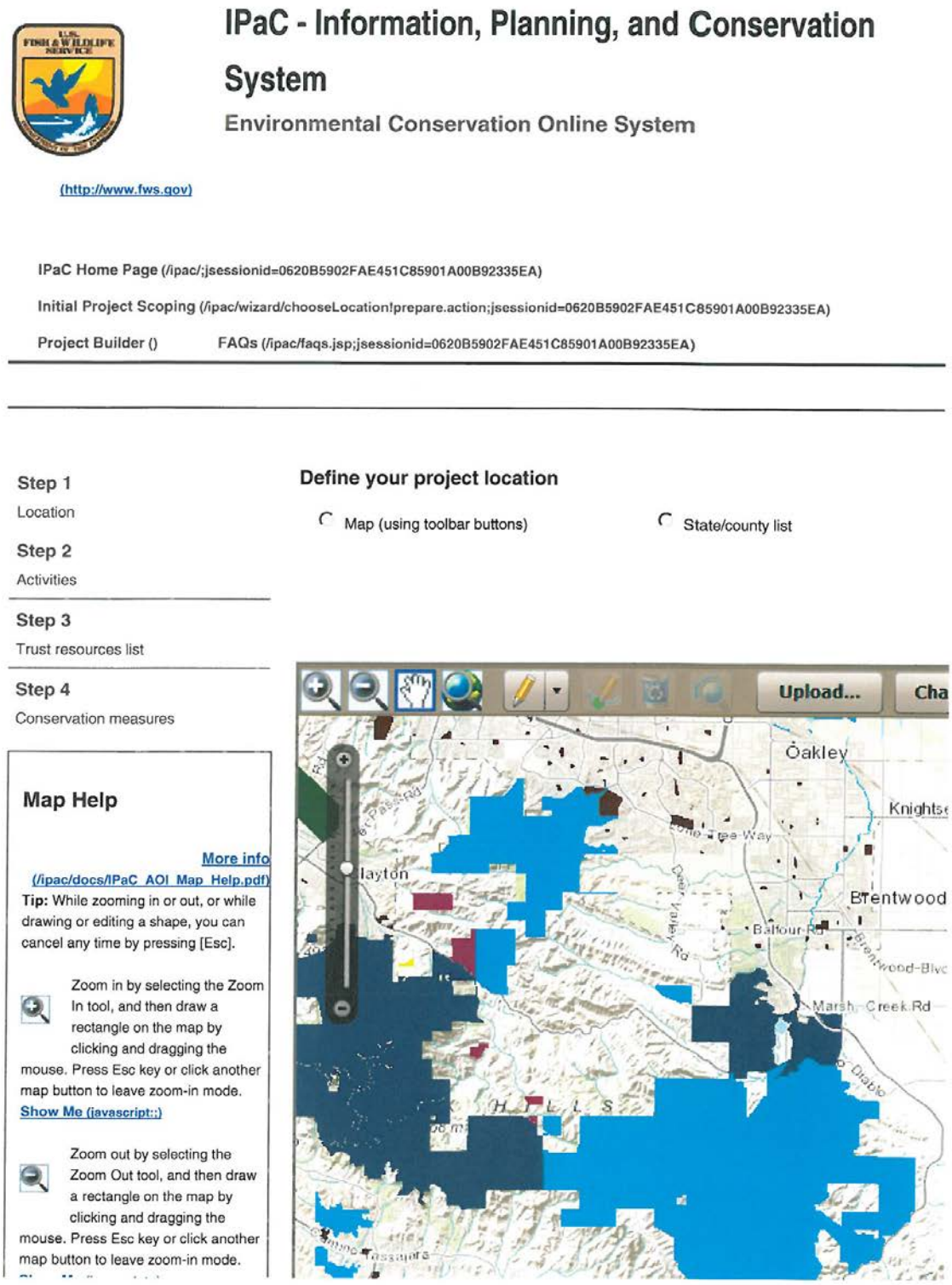


Figure 6.5. Another view of IPaC website.

eNEPA

The eNEPA web tool is part of the FHWA Shortening Project Delivery Toolkit. This web tool is designed to help accelerated project delivery and is also an executive and legislative directive. On August 31, 2011, President Barack Obama released a memorandum entitled "Speeding Infrastructure Development through More Efficient and Effective Permitting and Environmental Review." This memorandum emphasizes the importance of expediting the environmental review process and directs agencies to coordinate with each other to run reviews concurrently and efficiently, and to utilize information technology tools to assist with these responsibilities. Specifically, the memorandum directed agencies to deploy information technology tools which allow "personnel from different agencies or jurisdictions to coordinate review timelines, share data and review documents through a common, Internet based platform."

Following the August 21 presidential memorandum, the White House released Executive Order 13604 on March 22, 2012, which reemphasized the importance of efficient agency reviews and utilizing information technology to do so. The Executive Order established a steering committee on federal infrastructure permitting and review process improvement to facilitate improvements in the federal review processes in a number of sectors, including surface transportation. Furthermore, the 2012 Transportation Reauthorization Act: Moving Ahead for Progress in the 21st Century (MAP 21) took additional steps to ensure that agencies work to expedite their review time frames.

FHWA developed eNEPA to meet the goal and objective of shortening project delivery. This tool can improve interagency collaboration (Figure 6.6) and it can facilitate concurrent agency reviews, leading to issue resolution in real time, early in the environmental review process. The use of eNEPA can streamline the process while making it more transparent, thereby improving communication, leading to shortened project delivery timelines.

Figure 6.6. Project collaboration tools for state transportation agencies (FHWA website).

eNEPA is a tool that supports state department of transportation (DOT) efforts to comply with the National Environmental Policy Act for transportation projects. eNEPA supports state and federal agencies' opportunities for real-time collaboration on environmental reviews.

The development of the eNEPA web tool is the result of the longstanding FHWA priority to improve the timeliness and quality of the environmental review process. Since the Transportation Equity Act for the 21st Century (TEA-21), a central focus of the FHWA efforts to accelerate project delivery has been establishing a coordinated environmental review process with concurrent interagency reviews and established time periods. The FHWA has developed eNEPA for use by the state departments of transportation in support of interagency reviews, with the intent of creating a transparent and streamlined process across states and transportation projects.

The review of this tool suggests that it will improve the ability for concurrent agency reviews. This tool allows issues to be raised and addressed early. This tool provides a critical link between the review of environmental issues and concerns and interagency coordination, which is critical to the ultimate agreement that conclusions reached based on early review of data are shared by all agencies with permitting and regulatory authority. An example of the types of project details that can be easily shared is listed below:

- Details
- Documents
- Contracts
- Calendar
- Meeting
- Actions
- Reviews

The TriLink project can choose to utilize this tool (see Figure 6.7) during the project development process.

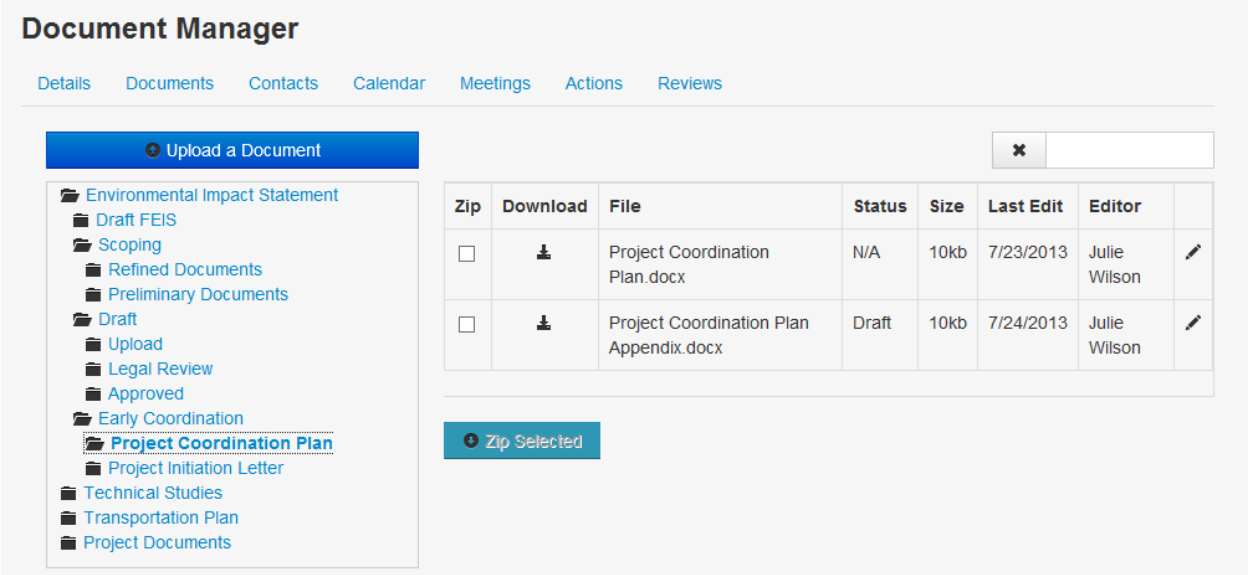


Figure 6.7. eNEPA document Manager.

Each eNEPA user is assigned one or more roles by an administrator. These roles define what users can access and what they can change. User roles, along with their capabilities within the tool, are shown in Table 6.5.

Table 6.5. eNEPA Roles

	System Administrator	Organization Manager	Project Manager	FHWA (HQ and Division)	Legal	State DOT	Consultant	Resource Agency	Transit Agency	Tribal Government	eNEPA User
Organization Administration											
Create, edit, and archive all eNEPA organizations	X										
Edit organization details for own organization		X									
User Administration											
Create, edit, and archive all eNEPA users	X										
Create, edit, and archive users for own organization		X									
Project Management											
Create and edit all eNEPA projects	X										
Create projects and edit project details / actions for own projects			X								
Manage documents, contacts, actions, and review posts for all eNEPA projects	X										
View documents, contacts, calendar, meetings, actions, and published review posts for all eNEPA projects	X	X	X	X	X	X	X	X	X	X	X
Edit document details on own projects			X								
Add and manage project contacts on own projects			X								
Add meetings (when designated as a project contact)		X	X	X	X	X	X	X	X	X	X
Contribute to document reviews (when designated as a reviewer for the project)			X	X		X	X	X	X	X	X
Contribute to FHWA legal reviews (when designated as a legal reviewer for the project)					X						
Add document review posts		X	X	X	X	X	X	X	X	X	X
Publish document review posts on own projects			X								
View documents and posts designated as “FHWA Only” access	X			X							

The ESA Webtool was launched on a pilot basis in 2008 in three states: New York (March), Washington (June), and Texas (October). In January 2009, FHWA conducted a survey of the pilot states. The responses were amazing (see the March 2009 ESA-FHWA Newsletter, located to the left in the "Library" navigation section of the page). The ESA Webtool was subsequently upgraded and launched for nationwide use in July 2009. Upgrades included

- Automatic email notification on file uploads.
- FAQ/knowledge base.
- Archive feature.
- Removed personal information from user profiles.
- Improved file upload/download capabilities.
- Enhanced navigation within site.

The ESA Webtool is an online tool to streamline preparation of biological assessments (BAs) and the consultation process under Section 7 of the Federal Endangered Species Act for projects where the Federal Highway Administration (FHWA) is the lead federal action agency. The ESA Webtool is a tool for everyone. It contains many resources designed to demystify the BA development and review process, including a library, a glossary and FAQ resources; and a downloadable National Biological Assessment Template with context-sensitive instructions, region-specific contacts and resources, and online file cabinets for BA documentation and collaboration. The online file cabinet is very innovative and easy to use. This collaboration tool has dramatically decreased consultation time frames.

Purpose

The ESA Webtool is an online tool to help project proponents prepare complete biological assessments (BAs) designed for projects where the Federal Highway Administration (FHWA) is the lead federal action agency. However, it can be used by any agency engaged in Section 7 consultation. For example, the Army Corps of Engineers has been utilizing it for some projects. The purpose of the web tool is to

- Help BA-preparers adequately prepare BAs for consultation with the federal services agencies.
- Expedite internal assurance reviews.
- Increase consistency from project to project and region to region.
- Reduce project delays from incomplete BAs and requests for additional information.

- Streamline decision-making review and transaction times, increase quality of documentation and submitted materials, and promote accountability and transparency through tracking and reporting.

Solution

The ESA Webtool was developed as an online solution to meet some of the challenges posed by paper-based development, submittal and review of BAs, including

- *BA Development:*
  Sharing and managing files can be a challenge.
  Finding good and relevant examples of prior BAs to start new BAs can be difficult.
  Researching listed species can be time-consuming and incomplete without adequate access to federal information and datasets.
  Processing and formatting requirements vary from state to state.
- *BA Submittal:*
  Mailing hard copies adds time and increases uncertainty.
  Maintaining a detailed administrative record is cumbersome.
  Documents lack consistency in structure and layout.
  Inadequate instructions lead to incomplete or incorrect BAs.
- *BA Review:*
  Review and response cycles can be long and irregular.
  Review process is not always transparent and can be inconsistent.
  Another very important feature of this tool is both the library and the region-specific information that can be obtained.

The following links on the web page will take users to practical references and tools that will help to understand and develop Biological Assessment (BAs) under the federal Endangered Species Act (ESA):

1. Introduction to ESA and Section 7
2. General BA Resources
3. Key Resources for Species, Habitat, and Background Information
4. Role of FHWA in the Consultation Process
5. Example Biological Opinions (BO)
6. Laws and Regulations
7. Common BA Topics

Much is always happening in the world of ESA. Keep up with the latest by visiting the news and media rooms of the USFWS and the National Oceanic and Atmospheric Administration (NOAA) Fisheries. The links listed below provide news sites and media portals

within the headquarters and regional offices of both the USFWS and NOAA Fisheries in the area that the TriLink project is in. In addition, updated information on listed and endangered species that could be found in the project area, such as the birds shown in Figure 6.8, is available on this site.

Figure 6.8. Some of the birds found in the project area.

National News

- USFWS News
- USFWS National Listserv
- NOAA Fisheries News

Regional News

USFWS Southwest Region 1

- Newsroom
- About
- Endangered Species What's New
- USFWS Regional Listservs

USFWS Southwest Region 2

- Newsroom
- Endangered Species What's New
- USFWS Regional Listservs

USFWS Pacific Southwest Region 8

- Newsroom
- Consultation What's New
- USFWS Regional Listservs

NOAA Fisheries Northwest Region

- Newsroom
- Protected Resources Division (Endangered Species)
- What's New

NOAA Fisheries Southwest Region

- Newsroom
- Protected Resources Division (Endangered Species)
- Essential Fish Habitat

NOAA Southeast Region

- Newsroom
- Protected Resources Division (Endangered Species)
- Habitat Conservation Division

The ESA Webtool is a tool for state DOTs, FHWA, and federal agencies to all collectively improve development, submittal, and review of ESA Section 7 BAs.
This tool is extremely well designed and easily to use. For this reason, its use has spread to almost all 50 states. It would be an excellent tool to link up with the early assessment tool currently being designed.

NEPAssist

NEPAssist is a web-based tool developed by the Environmental Protection Agency (EPA). It was designed to facilitate the environmental review process and to assist other agencies with project planning in relation to environmental considerations. The web-based application draws environmental data dynamically from the EPA's geographic information system databases and web services. It provides immediate screening of environmental assessment indicators for a user-defined area of interest. These features contribute to a streamlined review process for the EPA and assist other agencies in potentially raising important environmental issues at the earliest stages of project development.

The NEPAssist website provides tools for users to analyze environmental and geographic data and evaluate the potential environmental and public health impacts of proposed federal projects. More specifically, the website displays environmental and demographic data from many locations and sources on an interactive map. Site visitors can, for example, use the tools to assess the impact of highway projects on local communities, including effects on their parks and schools. Visitors can also identify the specific names of aquifers and water bodies to assess the status of compliance with the Clean Water Act in their communities.

Users can map more than 25 types of locations, such as schools, hospitals, churches, flood zones, aquifers, Superfund areas, industrial facilities, or critical habitat for plant and animal species. The location of these facilities and their position relative to each other in communities may surprise many users. In addition to mapping locations and facilities, visitors can map socioeconomic data for a selected area, including population density, per capita income, and race and ethnicity. Such functions could make it easier for environmental justice communities to identify objectionable projects. Site visitors can also generate summary reports to accompany the maps.

NEPAssist also offers its users various options for searching and viewing data. Visitors can search for a location by address, county, airport code, watershed, congressional district, or latitude/longitude coordinates. Once an area is selected, users can view data in 2D or 3D and with various overlays, including road, aerial, bird's eye (i.e., low-angle, high-resolution aerial map), or label (i.e., an overlay of streets, highways, and landmarks).

The Environmental Protection Agency (EPA) originally developed NEPAssist to provide federal, tribal, state, and local decision makers with accurate, timely maps of project areas, location of infrastructure, and data that could help address environmental compliance issues before project and permitting approvals were issued. Thanks to its inclusion in the pilot program, however, the site is now available to the public, and EPA plans to expand the number of datasets available on the site and improve its user interface.

Next Steps

Though NEPAssist provides many benefits to its users, there is room for improvement. For one, it would be useful to expand the information that is available on the interactive map. For example, NEPAssist provides links to environmental justice reports, which include health statistics, such as asthma prevalence and cancer mortality rates, but this information currently cannot be mapped.

Also, the site provides hyperlinks to background information about the data, some of which may be downloadable from external sites. However, NEPAssist does not currently allow users to download data in Excel files. Allowing site visitors to download data would enable them to conduct further analysis. In addition, some of the datasets included on the site, such as data from the U.S. Census, are significantly out of date and need to be updated.

The NEPAssist site does not have any mechanism to collect feedback and suggestions for improvements from the public. In the past, the EPA sought input from federal, state, and local agencies and other NEPA practitioners to refine the tool, and the agency should establish a similar process for the public. The feedback mechanism should also encourage users to explain how they used the site and what benefits they received from the information they found. Too often, the actual use of government information goes largely untracked and unnoticed. This knowledge would foster the refinement of existing online tools and provide a guide to agencies for future efforts.

The team was able to extract additional environmental data that will be used to inform the environmental analysis for the project. The graphics (see Figures 6.9 to 6.11) are very general but still illustrate the type of information and data that a project team would find useful.

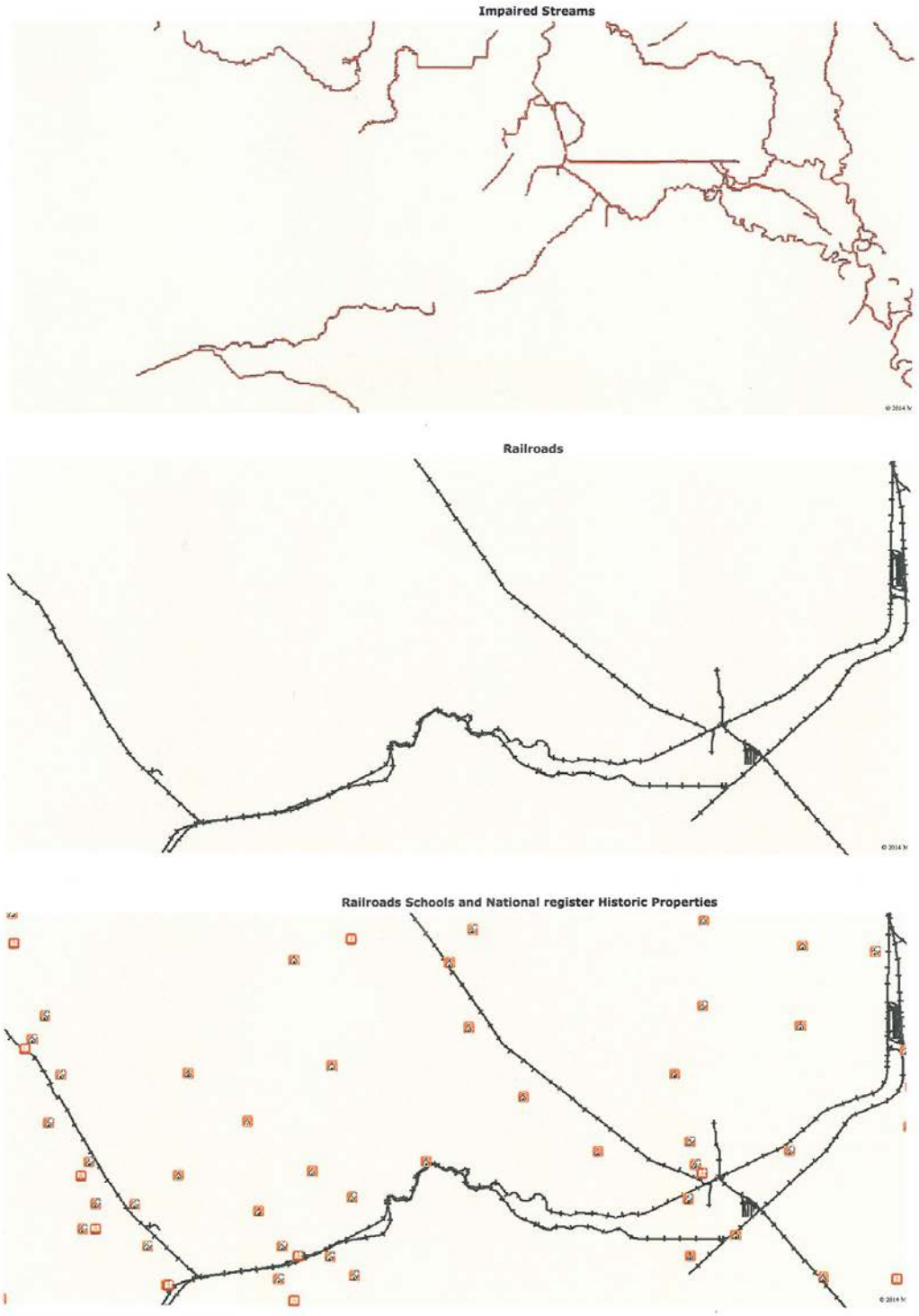
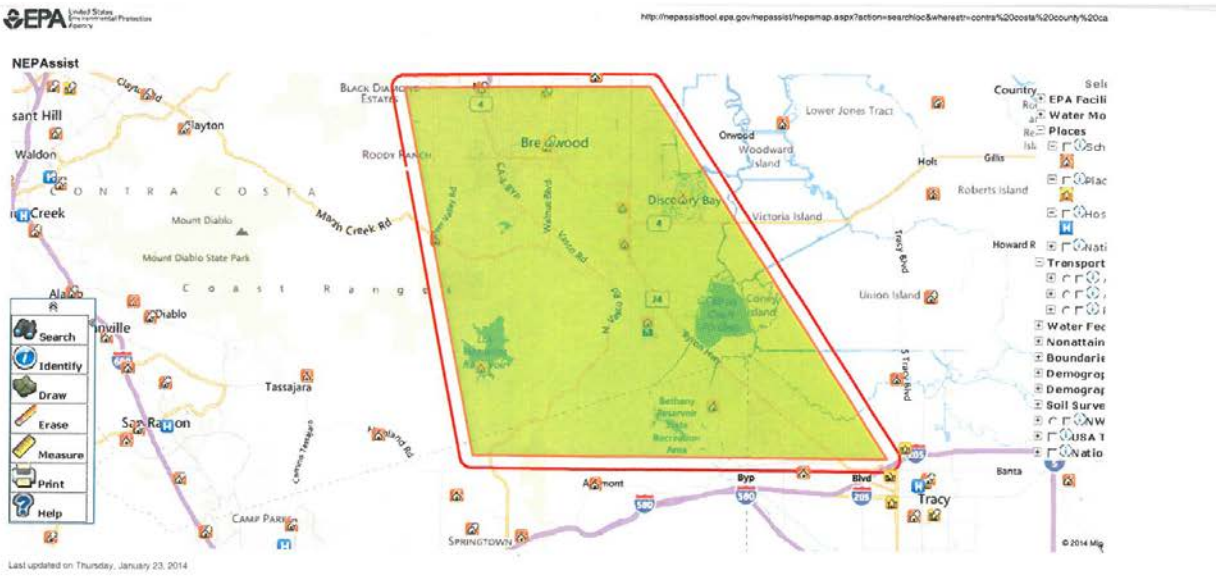


Figure 6.9. NEPAssist graphics of available information for early environmental analysis.



System	Retrieved	Posted	Update Frequency
Assessment, Cleanup and Redevelopment Exchange System (ACRES	03/14/2012	03/15/2012	Updated Monthly
Biennia			onthly
Compr Liabilit			onthly
Air Fac			onthly
Facility			ghtly.
Integra			onthly
Inform			pdate
Integra			onthly
Locatio			onthly
Permit Compliance System (PCS)	03/18/2012	03/19/2012	Updated Monthly *
Resource Conservation and Recovery Act Information (RCRAInfo)	03/12/2012	03/13/2012	Updated Monthly
RadNet, formerly Environmental Radiation Ambient Monitoring System	02/29/2012	03/01/2012	
Safe Drinking Water Information System (SDWIS)	02/07/2012	02/07/2012	Updated Quarterly
TRI Explorer	03/07/2012	03/12/2012	
Toxics Release Inventory (TRI)	03/07/2012	03/12/2012	TRI 2010 data is now available

Sites Reporting to EPA

Hazardous Waste (RCRAInfo)

Description: Hazardous waste is waste that is dangerous or potentially harmful to our health or the environment. Hazardous wastes can be liquids, solids, gases, or sludges. They can be discarded commercial products, like cleaning fluids or pesticides, or the by-products of manufacturing processes.

Source: EPA Envirofacts Data Source

Spatial Metadata: Hazardous Waste (RCRAInfo)

Date: Refer to Envirofacts Data Update

Figure 6.10. Example of a list of sites that report to the EPA.

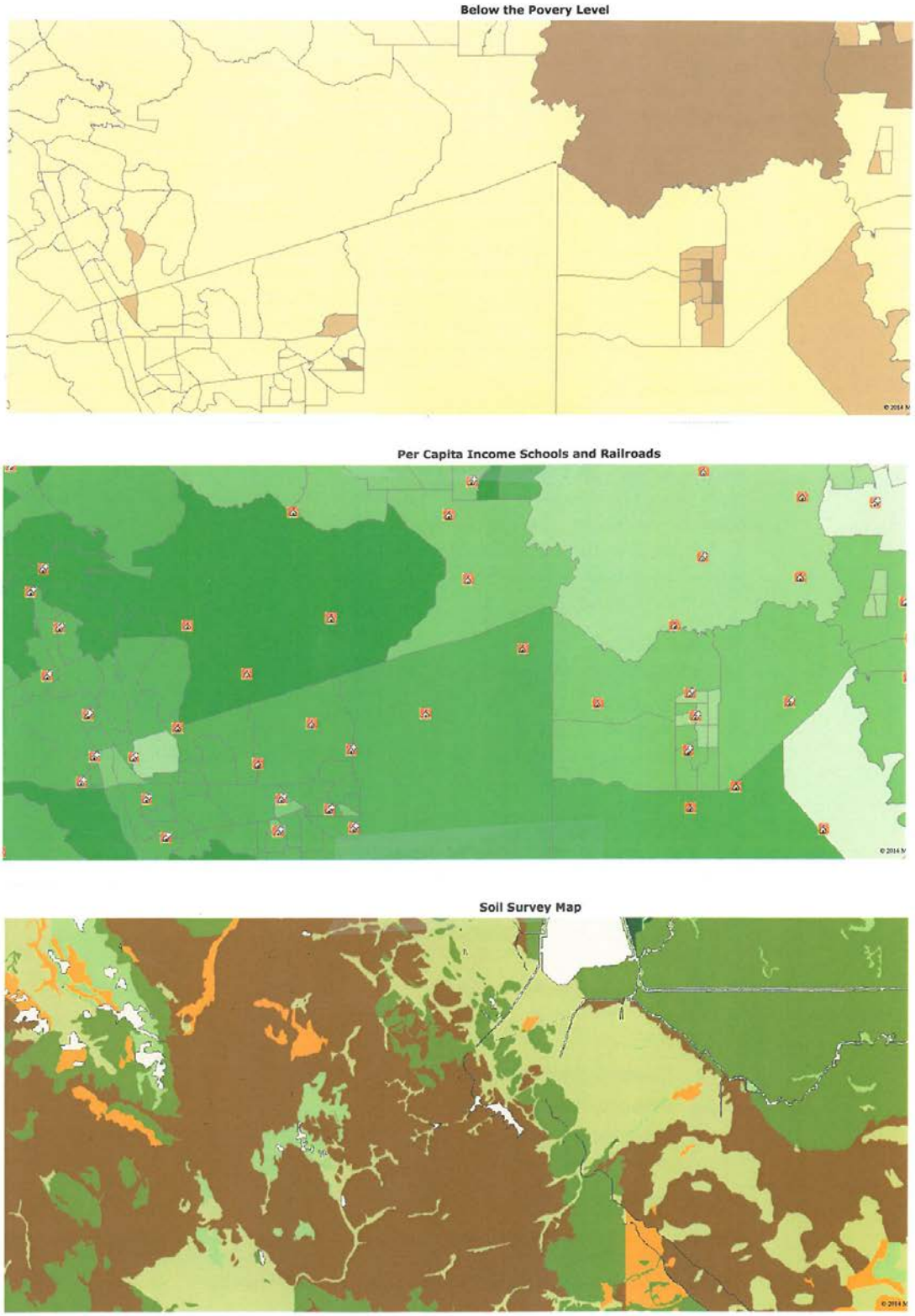


Figure 6.11. NEPAssist.

EnviroAtlas

EnviroAtlas is a collection of interactive tools and resources that allow users to explore benefits that people receive from nature, often referred to as ecosystem services. Key components of EnviroAtlas include the following:

- A multi-scaled interactive map with broad-scale data for the lower 48 states and fine-scale data for selected communities.
- The Eco-Health Relationship Browser, which shows the linkages between ecosystems, the services they provide, and human health.
- Ecosystem services information, GIS and analysis tools, and written resources.

EnviroAtlas includes an interactive map, a relational browser on ecosystem services and public health, geospatial data, GIS toolboxes, and educational materials. Much of the data in EnviroAtlas illustrates ecosystem services, the populations who benefit from these services, and the factors that may stress or influence an ecosystem's ability to provide these benefits. Information on ecosystems, their benefits, and influences, are organized into seven benefit categories: clean air; clean and plentiful water; natural hazard mitigation; climate stabilization; recreation, culture, and aesthetics; food, fuel, and materials; and biodiversity conservation. The information provided in EnviroAtlas can be used to educate, to inform policy and planning decisions, and to support future research in environmental management, planning, public health, and sustainability.

The EPA is working with other federal agencies and nongovernmental organizations to develop EnviroAtlas. EnviroAtlas continues to grow and evolve through these existing and evolving partnerships. The long-term goal for EnviroAtlas is to build decision-support tools into the interactive map that will illustrate the relative relationships between benefits received from ecosystems under existing and alternative conditions.

Data Sources and Approach

EnviroAtlas brings together data on ecology and environmental resources, community infrastructure, populations, economics, and public health to create a more complete picture of the relationships between nature, people, and well-being. Using a landscape approach, EnviroAtlas can help determine the ecological conditions that might be likely in an area, as well as the underlying reasons for those conditions. A landscape approach looks across connected geographic areas and can provide a wealth of information about a location within the context of its surroundings. Its 5,000-foot view of an area enables an understanding and visualization of important ecological values and patterns of change that may not be evident when looking at smaller, local land areas. Though it cannot replace boots-on-the-ground field measurements in terms of learning directly about the conditions at a particular site or location, a landscape approach allows for determining the likely conditions at locations where direct measurements are not available.

The environmental information derived by using this approach can be combined with other data about people and their economic, physical, and mental well-being to help evaluate the relationships between ecosystems, well-being, and the economy.

This site is still in the beta-test phase and already has lots of layers available. The site clearly lists the updates and time frames for completion. This will be a very valuable site when it becomes available to environmental planners.

Figures 6.12 to 6.15 show the same basemap with different layers, with a polygon identifying the general project area. These figures illustrate the quality of data available as well as the output from the mapping tool.

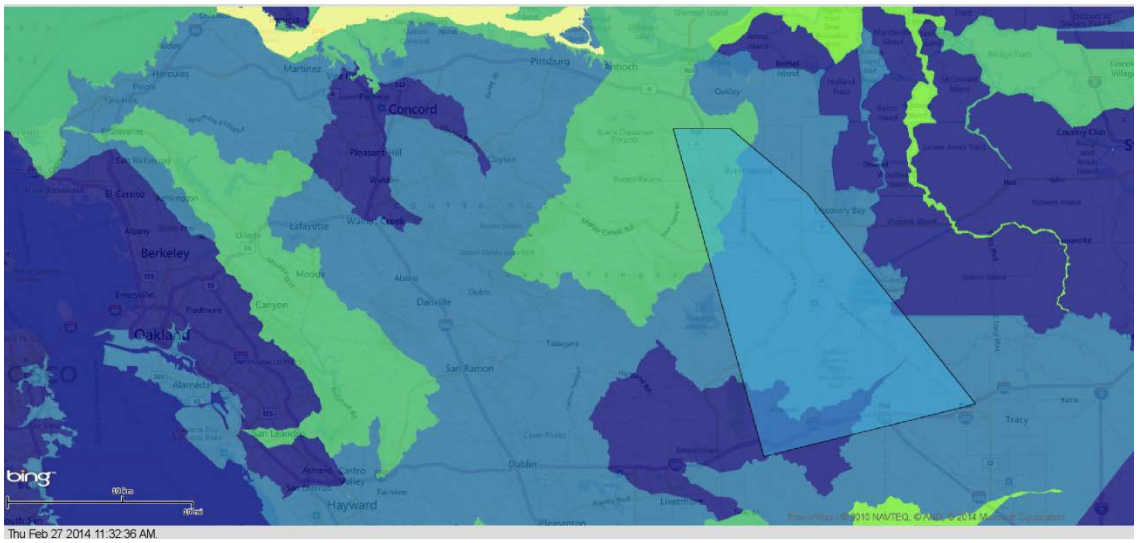


Figure 6.12. Percentage of small natural areas. Polygon identifies the general project area.

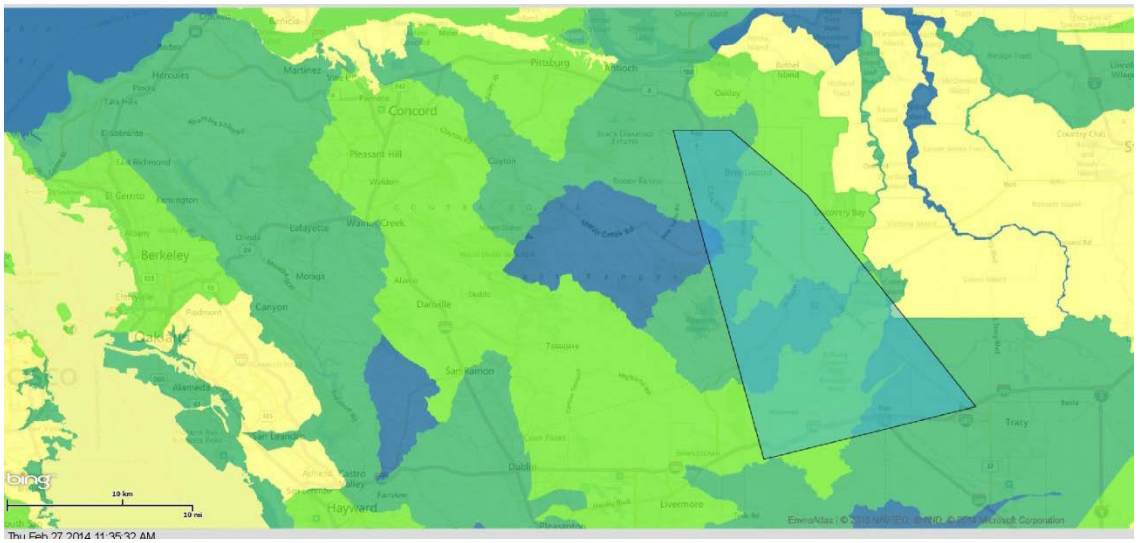


Figure 6.13. Percentage of medium natural areas.

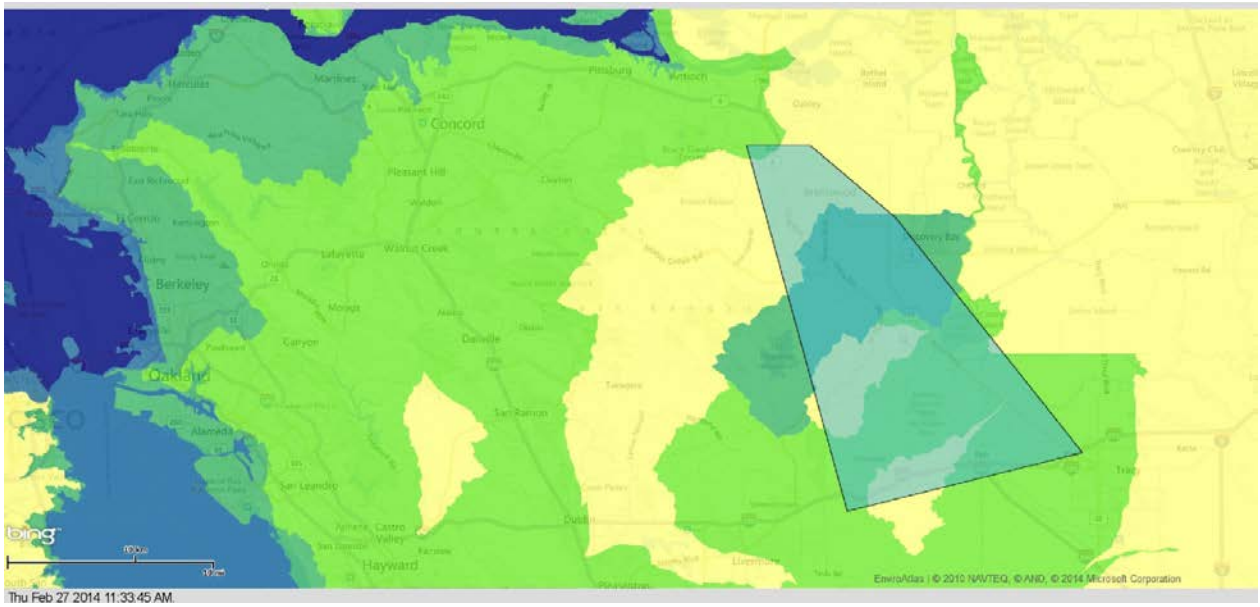


Figure 6.14. Percentage of rare ecosystem. Polygon identifies the general project area.

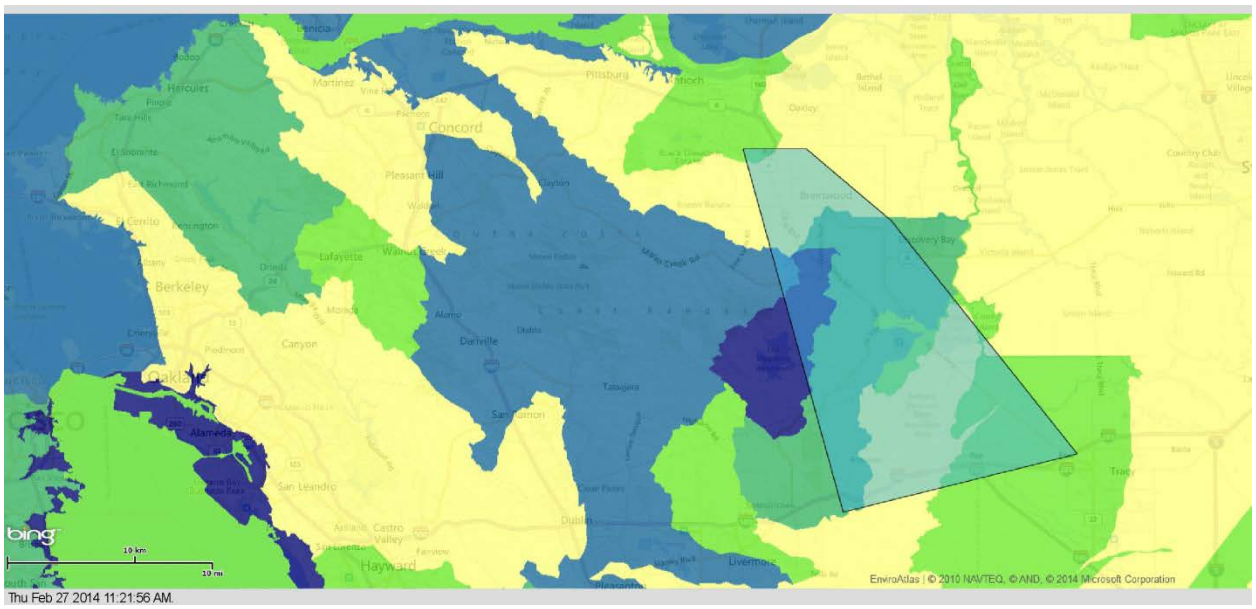


Figure 6.15. Percentage of land with any IUCN status. Polygon identifies the general project area.

Summary

These six web-based environmental tools can assist any environmental planner both early in the project feasibility phase as well as during environmental analysis. The FHWA ESA Webtool is not specifically designed for early evaluations but can be helpful. The same is true for the FHWA eNEPA tool.

Some of the tools, such as the FHWA ESA Webtool, are easier to use than USFWS ECOS. IPaC is still being developed and EPA NEPAssist is constantly undergoing upgrades. The project team anticipates that these tools will continue to become more and more useful as upgrades are completed.

EnviroAtlas was the most comprehensive, easy-to-use tool evaluated. It is very powerful and provides the user with an extremely easy format.

Beta Test of Eco-Plan

A script was provided by ICF for reviewing both Eco-plan and Eco-Plan Plus. Two team members independently reviewed each of the tools, providing feedback during each step, as well as in the questionaire. The scripts were provided directly to the ICF team for their use. The reviews were focused on highlighting improvements needed, so that is what is listed here. However, it is important to note that the site overall functioned.

Eco-Plan

- Easy access and visually well designed
- Initial map should be of the United States and not a specific location
- Critical habitat map needs to be separate from species at risk, due to the requirements of the Endangered Species Act that apply to critical habitat
- Watersheds and wetlands layer did not show wetlands
- Pre-complied maps are very narrow
- Cannot upload my transportation plan
- Unable to find address or place

Eco-Plan Advance

- Essentially ArcGIS Online
- Requires a commercial account
- Allows project information to be uploaded
- Printing maps is very easy

CHAPTER 7
Tool Usability Comparison for the TriLink Project

The team used the TriLink project alternatives, concerns, and considerations in the various environmental web tools to determine the usefulness and clarity of data for environmental decision making.

The tools are compared side by side below, through the use of maps from each site to illustrate the team's findings. The team selected species, critical habitat, protected lands, and wetlands for this comparitive assessment.

Species comparison is done using EnviroAtlas and Eco-Plan, as shown in Figures 7.1 and 7.2.

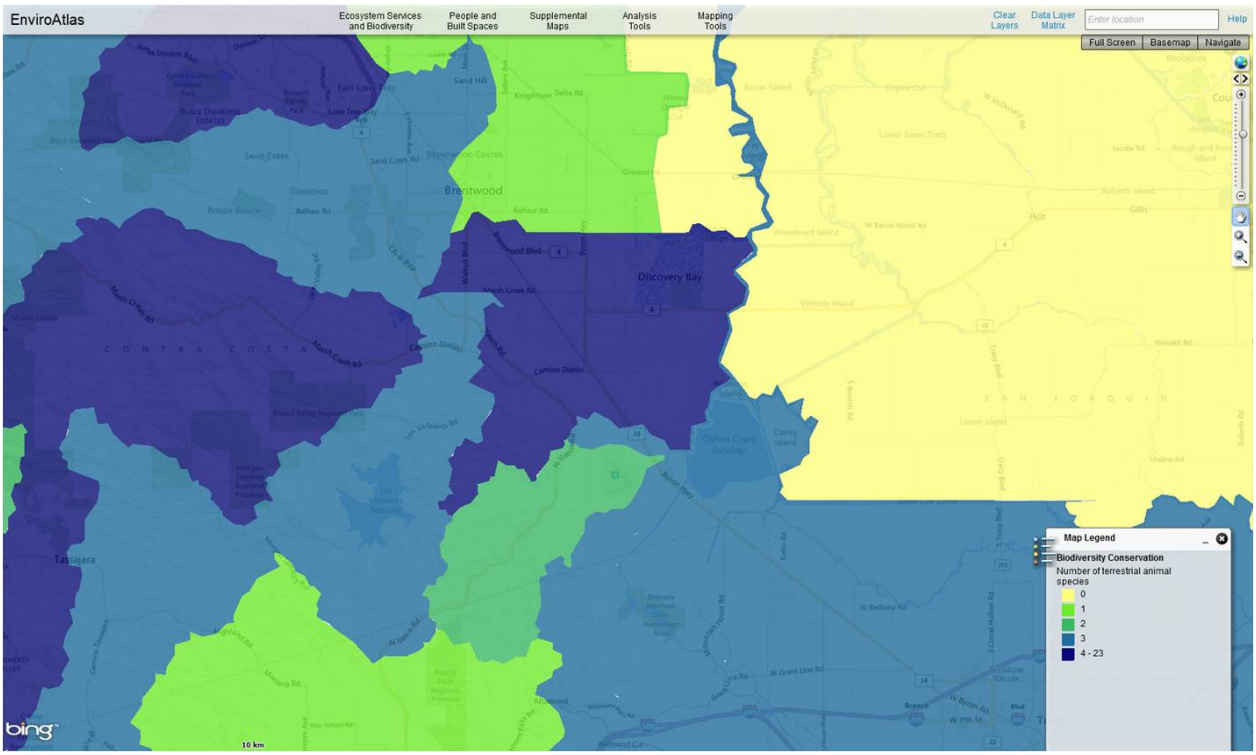


Figure 7.1. EnviroAtalas number of teresterial animal species.

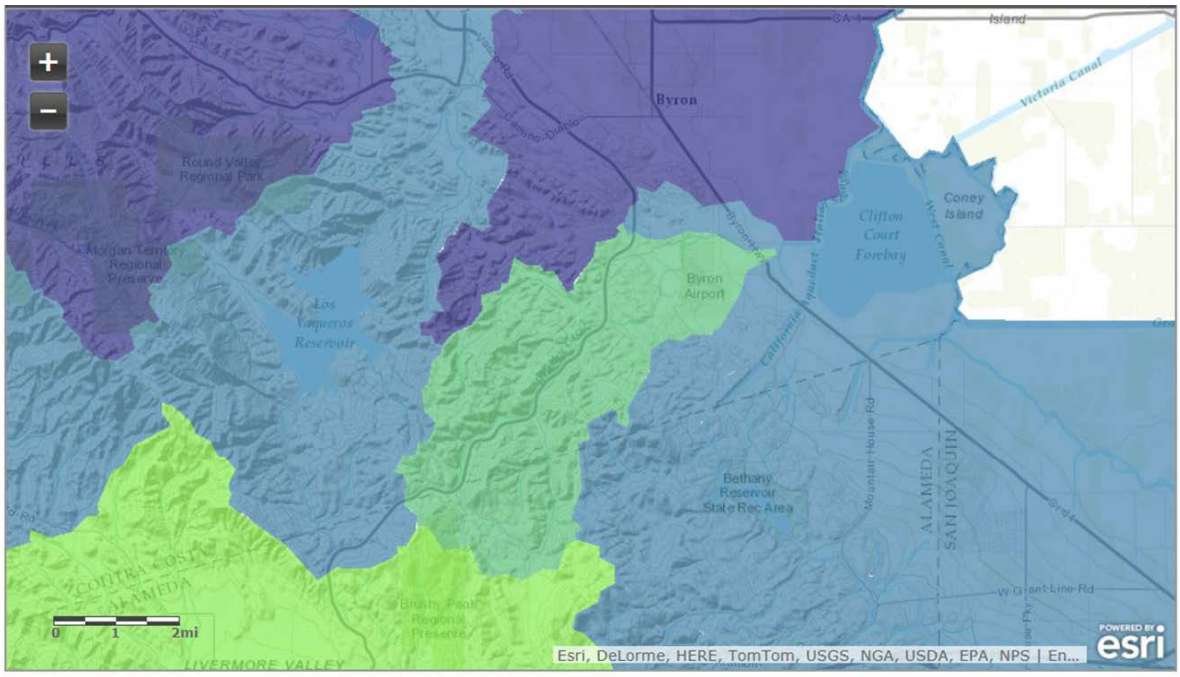


Figure 7.2. Eco-Plan critical habitat and at-risk species.

Critical habitat comparison was done with ArcGis, ECOS, and IPaC (Figures 7.3 and 7.4).

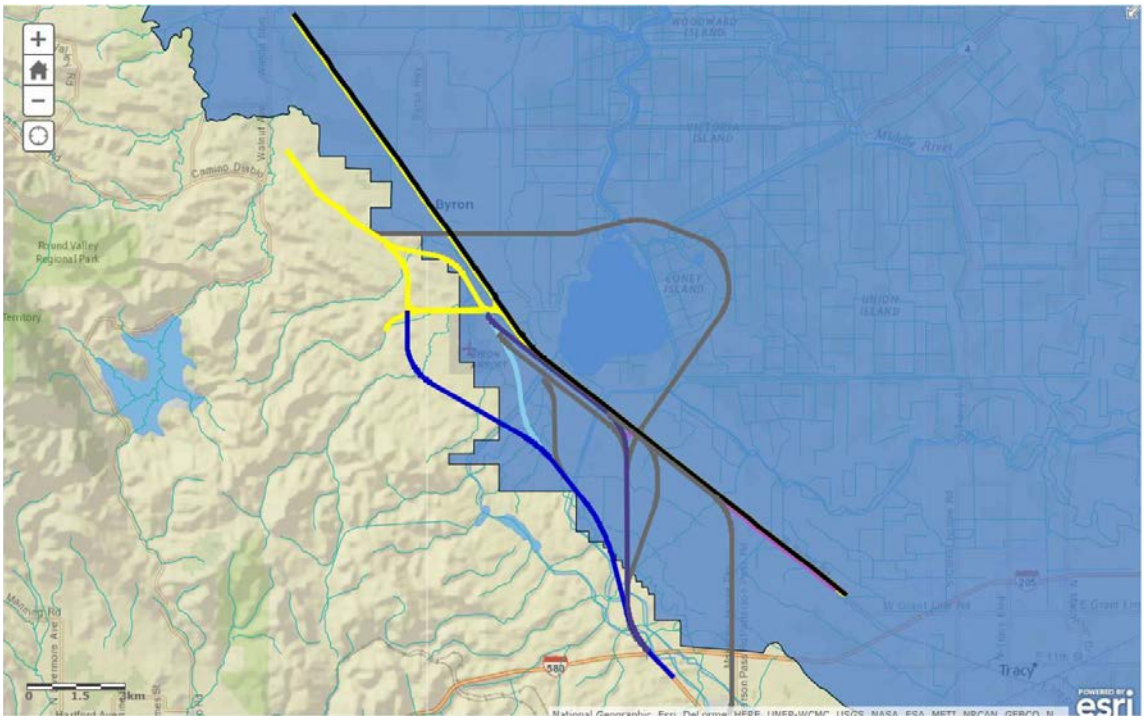


Figure 7.3. ArcGIS delta smelt critical habitat.

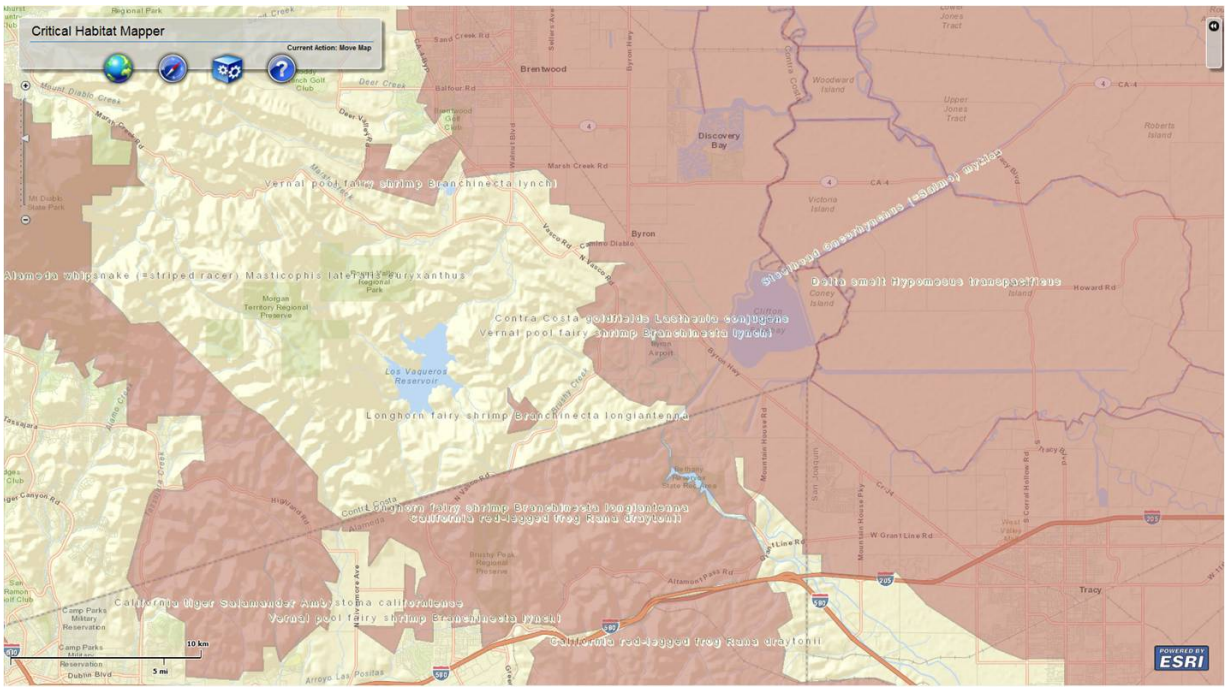


Figure 7.4. U.S. Fish and Wildlife ECOS and IPaC critical habitat.

Comparison of protected lands data was done using EnviroAtlas, IPaC, and Eco-Plan (Figures 7.5, 7.6, and 7.7) .

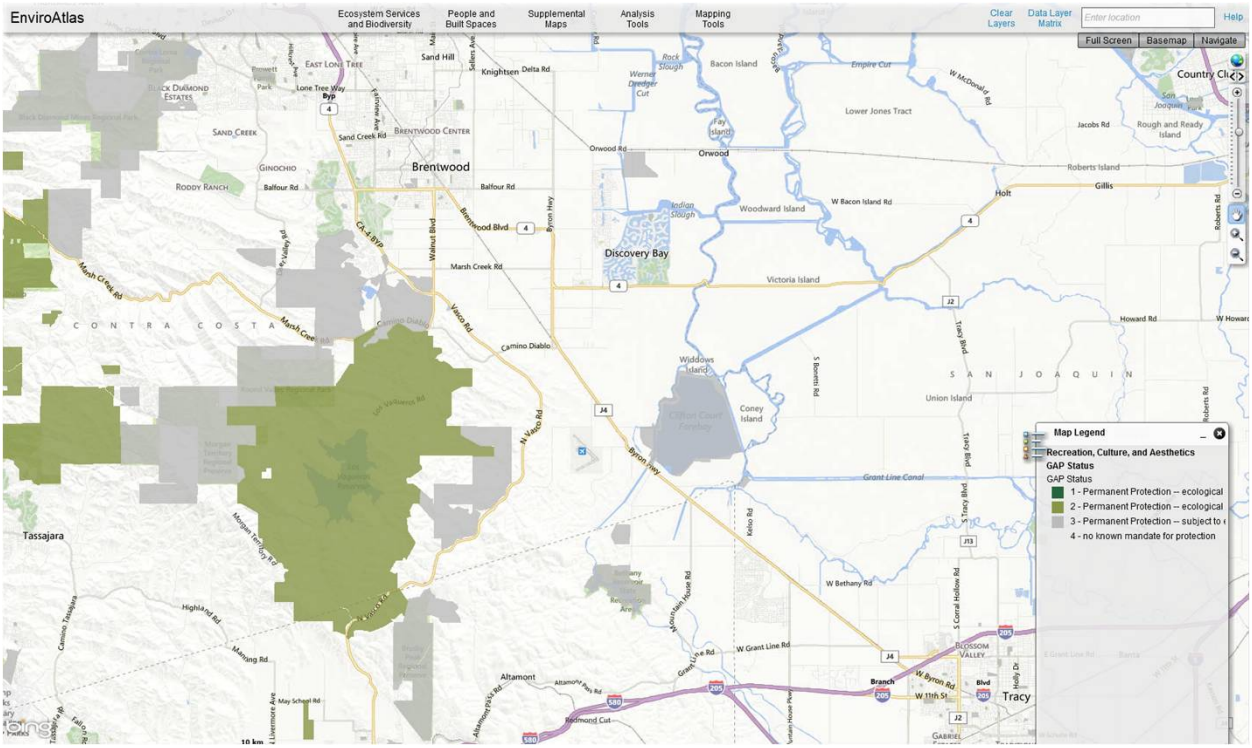


Figure 7.5. EviroAtlas protected lands.

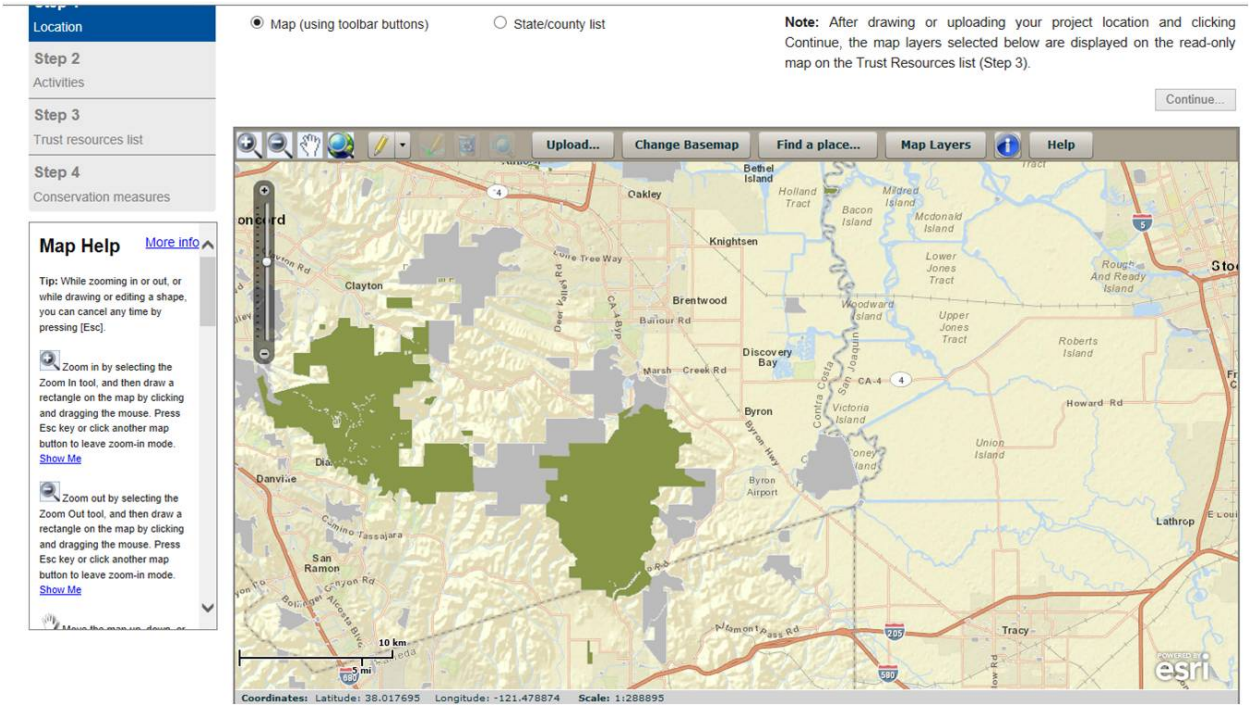


Figure 7.6. IPaC protected lands.

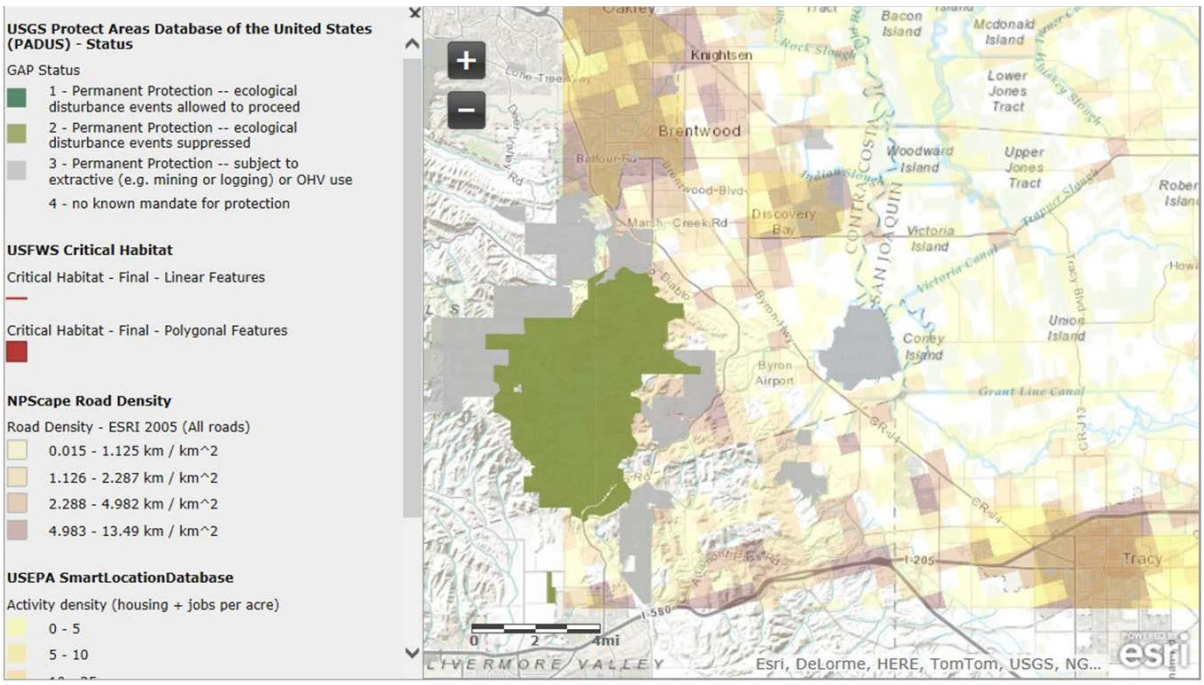


Figure 7.7. Eco-Plan protected areas and road and housing density.

Wetlands data comparison was done with ArcGis, Eco-Plan, EnviroAtlas, and IPaC (Figures 7.8 through 7.11).

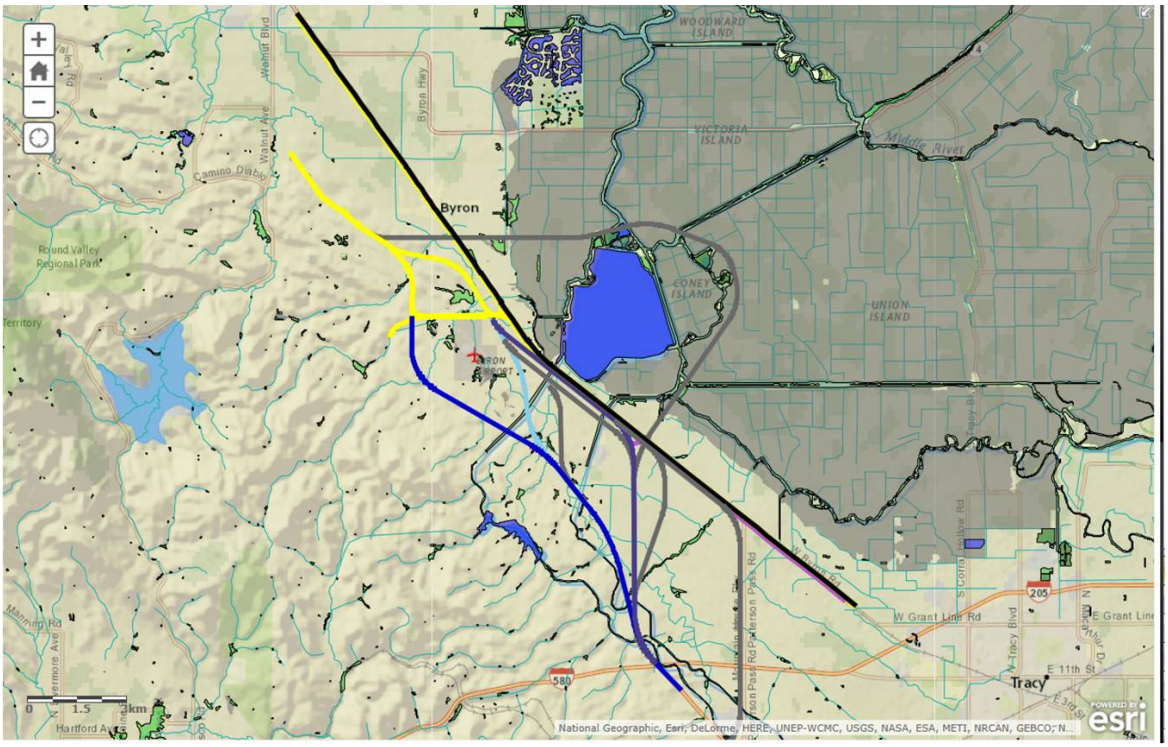


Figure 7.8. ArcGIS wetlands with proposed project alignments.

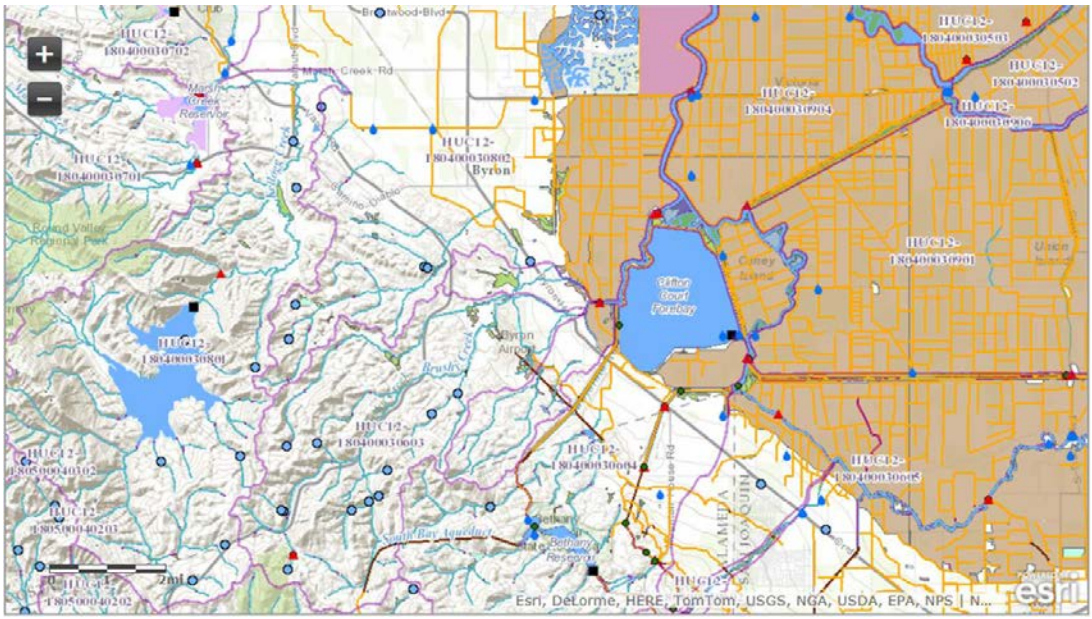


Figure 7.9. Eco-Plan wetlands.

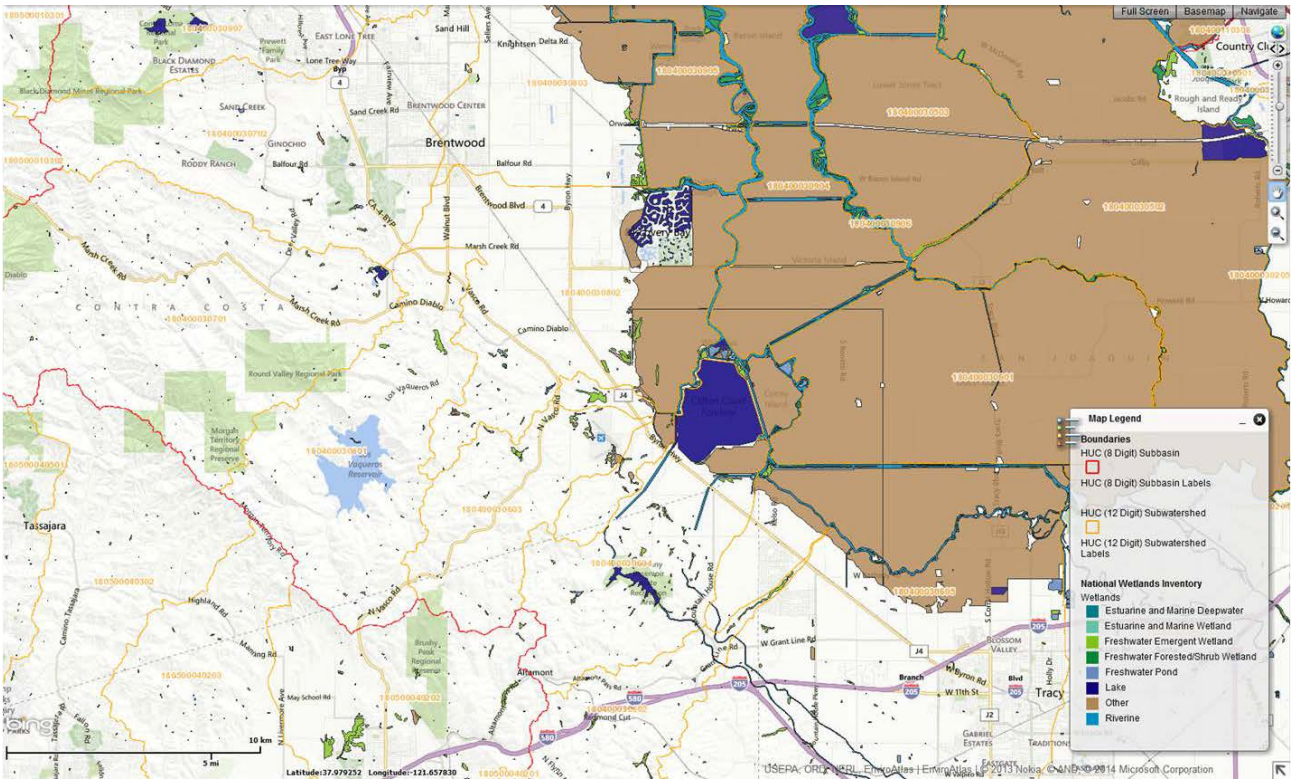


Figure 7.10. EnviroAtlas wetlands.

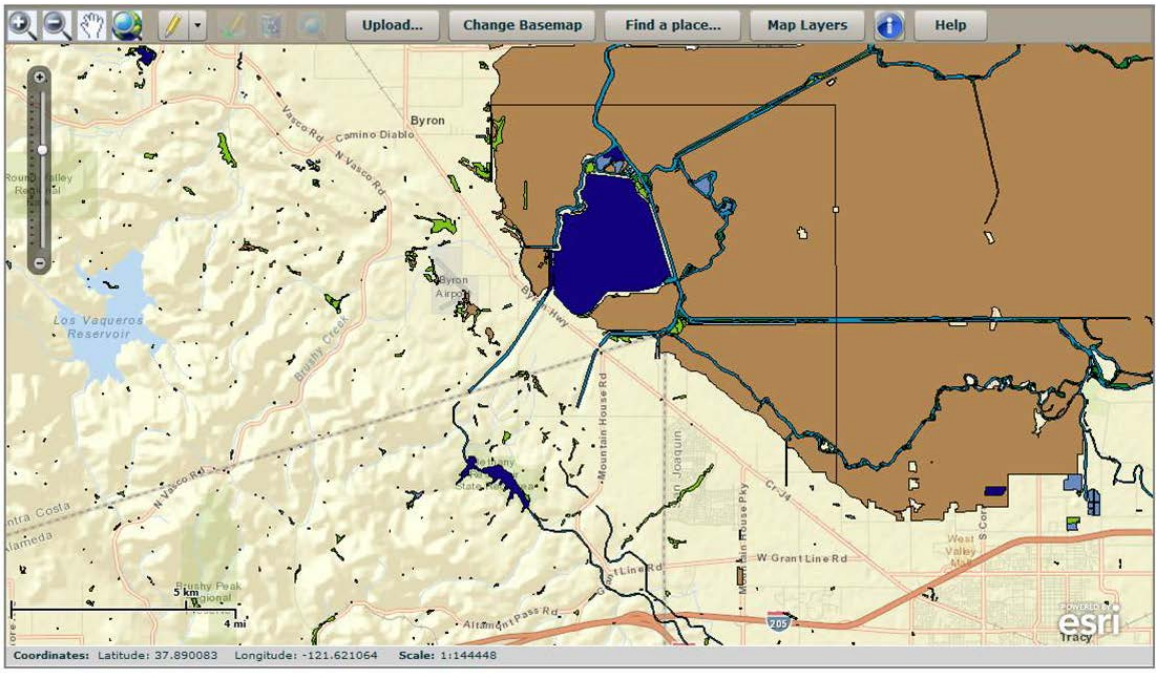


Figure 7.11. IPaC wetlands.

Summary

The reviewers found the side-by-side assessment using the TriLink project very informative, keeping in mind that each of the sites was designed to meet a particular agency mission. The team did factor in planned updates as well, since both IPaC and Envio Atlas clearly lay out future enhancements.

The key findings were

- Many of the sites use the same data,
- Ease of use was a key factor in considering future usablity,
- Free access was very important to the team,
- Presentation of data was very important,
- How the data are saved became a key issue, and
- Whether project information can be uploaded is important.

The team chose to take four key areas to compare. The four areas focused on were species information, critical habitat, protected lands, and wetlands. Effects to any of these areas, but particularly critical habitat and wetlands, have the potential to cause project delays during the NEPA process.

The results are summarized in Table 7.1. In ranking these tools on a scale of 1 to 5, five being the highest score. NEPAssist, ESA Webtool and eNEPA were not included in this summary table. NEPAssist was not included because the majority of the natural environmental data can be found in EPA's other tool, EnviroAtlas, so it seemed redundant. The FHWA ESA Webtool and eNEPA are really designed to be used during the environmental analysis phase.

Table 7.1. Usefulness to the TriLink Team

Tool	Ease of Use (Scale 1 to 5)	Saving Data	Relevance (Scale 1 to 5)	Cost to Access	Future
EnviroAtlas	5	Yes	5	Free	Certain w/ improvements
IPaC	5	Yes (not easy)	4	Free	Certain w/ improvements
ECOS	3	Yes	5	Free	Certain
Eco-Plan Advanced (ArcGis Online)	3	Yes	4	Pay to Use	Commercial Product
Eco-Plan	5	No	3	?	?

The FHWA ESA Webtool and USFWS IPaC are the only available tools that have the potential to let environmental planners know if there are federally listed threatened and endangered species in their project area. IPaC can provide a list of potential species in a project for most of the country. The ESA Webtool relies on saved Biological Opinions in a particular

project area. The availabilty of information is dependent both on other projects having been done in the area and the Biological Opinions having been uploaded to the ESA Webtool site. Information on species from EnviroAtlas is very general and Eco-Plan species at risk does not clearly distinguish between those with protection under state and federal laws and those that have been identified as being in decline but that have no legal protection.

USFWS Web Tools

The two sites developed by USFWS—ECOS and IPaC—were developed with different emphases. IPaC was developed to be used by agencies and individuals engaging in Section 7 consultation. It has a very easy, step-by-step approach. This site is still under development, so some of the most useful tools are as yet unavailable. When this site is fully operational, it will be very valuable to anyone engaged in Section 7 consultation.

EPA Web Tools

The team thought that the EPA has developed some of the very best web tools for early assessment of project effects on both the natural and the human environment. NEPAssist includes both natural and human environment concerns while EnviroAtlas, still in the beta phase, has a large breath of natural environment layers and far more potential in the future. These tools are both easy to use and an excellent source of data.

FHWA Web Tools

The team feels that the two FHWA online tools, designed to promote better intra-team and interagency coordination, particularly during the NEPA phase, will be extremely useful during the project development phase of this project.

Eco-Plan

The team found this tool to be very easy to use, but the available data was limited. Other tools, such as EnviroAtlas, use the same data sources and currently have more data available.

Conclusions

There is a clear need for a tool or tools to assist environmental planners assessing potential effects from both new alignments as well as expansions. There are now several web tools that are provided by three federal agencies: the Federal Highway Administration (FHWA), the Environmental Protection Agency (EPA), and the U.S. Fish and Wildlife Service (USFWS); and now there is the new Eco-Plan tool. A very important fact about the tools is that they were developed to meet the particular agency’s mission. In addition, many of them use the same sources of information. What sets these tools apart is ease of use, the ability to add layers, and project information. In addition, some tools, such as EnviroAtlas, eNEPA, and the ESA Webtool have agency support for updates and hosting.

The team was very impressed with the breath of tools available and the amount of information that is available. These tools were designed to help agency staff better do their job in a world with inadequate staffing and a work load that requires effective web tools to complete assessments in a timely manner.

The team believes that there are three major categories of needs: data sources, data and project evaluation tools, and a tool which assists with team communication and organization of shared data and reports.

The tools developed by USFWS ECOS and IPaC provide excellent information on threatened and endangered species and critical habitat. As IPaC progresses, it will also provide suggestions for minimizing project effects, which will be very useful. The FHWA ESA Webtool also provides information on federally listed species if a Biological Opinion or a Biological Assessment has been uploaded for the project area.

Both the EPA tools, NEPAssist and EnviroAtlas, are excellent tools with a wealth of information. EnviroAtlas is still in the beta phase but will provide excellent information to environmental planners when it is released. NEPAssist has been very useful for many years. It provides fewer natural environment layers than EnviroAtlas but includes many useful human layers as well.

FHWA ESA Webtool is widely used for Section 7 consultation with both the U.S. Fish and Wildlife Service and NOAA Fisheries. It is extremely easy to use and has streamlined the consultation process. The eNEPA tool has just been released but is well designed, and the team intends to use it during the environmental analysis phase of the project.

Eco-Plan is well laid out and very easy to use. However, the data available is very limited and can be found on several other sites, such as EnviroAtlas and IPaC. The team's main concerns were that no project data could be uploaded, and the images were very difficult to save. Also, it is not clear where this tool will be located or how it will be supported.

Each tool provides excellent information. Some, however, are not really designed to assist with early analysis, such as the eNEPA and ESA Webtool developed by the FHWA. They provide excellent platforms for communicating, sharing, and organizing information, as well as how to present and prepare documents. All the assessed tools will continue to be used on this project and other projects in the future, because data and analysis are very helpful in avoiding harm to environmental resources.

References

Alameda County Planning Department. 2011. Initial Study/Mitigated Negative Declaration: Altamont Solar Energy Center Project.

————————. 2010. Commercial Solar Case Studies: Environmental Impacts.

Association of Bay Area Governments Projections. 2009.

Atwater. 1982. Geologic Maps of the Sacramento-San Joaquin Delta, California.

Brown, J. 2006. *Eco-logical: An Ecosystem Approach to Developing Infrastructure Projects*. Federal Highway Administration, U.S. Department of Transportation, Washington, D.C.

Caltrans (California Department of Transportation). 1985. Route Concept Report: Route 239.

————————. 1997. State Route 4 Corridor Study. Caltrans District 4, Office of Transportation Planning, System Planning Branch.

CCTA (Contra Costa County Transportation Authority). 1995. Tri-Valley Transportation Plan/Action Plan.

————————. 2012. Planning Committee Staff Report, December 5.

CDFW (California Department of Fish and Wildlife). 2013. California Natural Diversity Database: Rare Find 4. Accessed February 11, 2013.

City of Tracy. 2012. City of Tracy Citywide Storm Drainage Master Plan. November.

Contra Costa County. 2011. Contra Costa County Hazard Mitigation Plan Update. May.

CVRWQCB (Central Valley Regional Water Quality Control Board). 2011. Basin Plan for the Central Valley Region. October.

East Contra Costa County Habitat Conservation Plan Association. 2006. East Contra Costa County HCP/NCCP Final Environmental Impact Statement/Environmental Impact Report, October. Accessed on May 31, 2013. http://www.co.contra-costa.ca.us

ENGEO, 2013. Geotechnical and Geologic Constraints Evaluation. May.

EPS (Economic & Planning Systems, Inc.). 2012. TriLink Socio-Economic Dataset, EPS #20040 Memorandum.

————————. 2013a. TriLink Socio-Economic Dataset. April.

————————. 2013b. Potential TriLink State Route 239 Project Alignments Cultural Resources Analysis Memorandum. April.

Friends of Springtown Preserve. no date. *Springtown Alkali Sink Ecology, Botany, and Wildlife Notes.* http://www.springtownpreserve.org/Reference_Materials/FSP-Springtown_Ecology_primer.pdf ICF International. 2013a.TriLink State Route 239 Project Alternatives Biological Resources Analysis Memorandum. April.

Metropolitan Transportation Commission. 2008. Vasco Road Median Barrier Project: Findings and Recommendations Report.

National Renewable Energy Laboratory. "Ca_50mwind." Accessed April 23, 2013. http://www.nrel.gov

SJCOG (San Joaquin Council of Governments). 2009. San Joaquin Council of Governments 2009 Projections.

————————. I-580 Interregional Multimodal Corridor Study. 2011.

State of California, Department of Conservation. 2009. "Farmland Mapping and Monitoring Program." April 21. Accessed April 8, 2013. http://www.conservation.ca.gov.

SWITRS (Statewide Integrated Traffic Records System). 2010. 2010 Annual Report of Fatal and Injury Motor Vehicle Traffic Collisions.

Sword Company. 2013. SR 239 (TriLink) References in General Plans. May.

TY Line. 2005. Byron Airport Land Use and Airport Property Drawing. March 18.

USDA (U.S. Department of Agriculture). 2011. U.S. Department of Agriculture: Natural Resources Conservation Service (NRCS), 2011. "Prime & Other Important Farmlands Definitions." December 11. Accessed April 8, 2013. http://www.pr.nrcs.usda.gov

USFWS (U.S. Fish and Wildlife Service). Vernal Pools. Accessed on May 31, 2013. http://www.co.contra-costa.ca.us

WRECO. 2013. Drainage, Floodplain, and Water Quality Memorandum. April.