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CALIFORNIA'S INTEGRATED APPROACH TO COLLABORATIVE CONSERVATION IN TRANSPORTATION PLANNING

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Abstract: California's unique biodiversity in the context of strong growth pressures, limited resources and disseminated land use authority creates a unique challenge. That challenge is to integrate conservation planning into complex transportation decisions as necessary to effectively participate in the preservation and recovery of the state's 309 federally listed species, rare habitats, anadromous fisheries, fragmented wildlife and related natural resources while delivering a multi-billion dollar transportation improvement program.

This challenging environment also creates a strong desire and opportunity to learn about the roles of integrated planning, tool development and partnerships in creating a common thread to successfully address regional and national issues. Good decision-making and planning efforts are predicated on the rigor of science, sound engineering and good policy, using innovations such as predictive modeling tools for analyzing such large-scale issues. These show great promise to effectively integrate conservation planning and transportation decisions.

The Department's anadromous fish passage, animal vehicle collision reduction and advanced mitigation planning efforts illustrate challenges, approaches, tradeoffs and lessons learned as programs are developed and implemented. The role of partnerships with stakeholders, universities and resource agency partners provides a foundation for transitioning from accommodation to true stewardship. This collaboration results in better transportation decisions, resource conservation, and common advancement of science as illustrated by related presentations at the 2007 International Conference on Ecology and Transportation (ICOET) and this unifying presentation of integrated approaches.

The California Challenge: Infrastructure Demand in a Natural Diversity Context

The State of California has a rich and unique geology and geography with varied climates that provides for one of the most biologically diverse areas in the Continental United States. The state's ten distinct bioregions with many microclimates and areas of unique soils has resulted in numerous endemic plants, animals, and invertebrates that occur in relatively small populations that are uniquely adapted to local conditions or dependent upon movement across the landscape.

The same rich and unique geology and geography that contribute to the State's biodiversity also attracts increasing numbers of people from around the country and the world to live and trade. As a major port of entry for international trade and movement of goods the opportunity for many invasive species to be established each year further attenuates natural systems flexibility and distribution as local populations receive pressure from new competitors. The state's population of slightly over 37 million people is projected to increase 23% over the next 20 years, resulting in up to \$500 billion of infrastructure needs. This includes increasing the current 10+ billion transportation programs with an additional \$19 billion of bond funds and leveraged local financing of up to \$100 billion.

The natural rarity and population growth in part explains why over 800 species are considered at risk and over 300 species are state and federally listed as threatened or endangered. The state's endemic rarity, population growth pressure, and need for transportation combine to create unprecedented challenges in conservation and transportation planning at local, regional, and statewide scales. Corresponding conservation efforts have also been growing with recent passage of \$15.5 billion in conservation related bonds although not at the same rate as infrastructure. With a broad distribution of rare species and habitats across the state and a transportation system that crosses nearly every habitat type from tidal wetlands to high alpine to redwood to deserts to grasslands, the frequency of interaction between rare species and projects is common and of strategic importance for both transportation and natural resources.

Seeking Quality of Life

California has twin goals of meeting infrastructure needs and maintaining natural resources for a high quality of life. Sometimes this leads to an apparent conflicting set of expectations for local, state and federal government officials, particularly when one department or agency is only responsible for one portion of the overall quality of life mission. This becomes apparent as California's population (individual citizens and nongovernmental organizations) actively participates in public involvement processes and seeks to reinforce both natural resource and transportation goals. Complicating the dichotomy of expectations is that complex funding and planning processes for each aspect are not intrinsically integrated.

California's strong economy and support for these potentially competing goals provides great opportunity to seek approaches and solutions that meet the public's expectation. The opportunity is particularly fruitful where leaders of agencies, nongovernmental organizations, and communities look beyond the sub-set of goals assigned by their public and seek to use their authority to further the common goals of quality of life. This is the transition from compliance to true stewardship. However, to do so, it is critical that "guiding principles" and "common approaches" be employed to ensure each party is both meeting their mandate and broader expectations of the public.

The California Approach

Guiding Principles

Collaborative efforts and priorities can be guided by unified principles that define essential outcomes and methods through which they may be achieved. These serve to properly frame questions and issues in a manner that provides adequate specificity to initiate action while retaining the broader concept for understanding and integration across programs. They also help potential public agencies consider problems in the context of their mandates.

Five fundamental principles drive transportation investments in stewardship and influence policy implementation in California:

1. *Resolve strategic project delivery issues with the rigor of science, sound engineering, effective policies, and strong partnerships.*

Apparent conflicts between transportation and ecology provide unique situations that challenge our understanding of the underlying science and engineering as well as the effectiveness of related policy. Public expectations and institutional responsibilities can drive agencies to resolve substantive issues on accelerated timeframes. However, it can also lead to expensive positional entrenchment and redirection of limited resources that detracts from agency objectives when conducted in a tactical setting with individual projects at stake.

Effective solutions and progress can be accomplished where a strong partnership is formed where people work together to distinguish between validated science and perceptions, challenge engineering limitations; and seek pragmatic policies. This is most effectively accomplished where a specific defined issue that affects a set of planned actions can be addressed in a strategic context where the importance remains high but stakeholder risks can be managed.

Examples of strategic issues under study include: fish passage; invasive species control; aquatic barotraumas; and wildlife movement.

2. *Improve stakeholder options and understanding by advancing science and sharing innovations.*

The greater number of valid solutions available, the more likely an acceptable solution will be available when problems occur to the benefit of all parties. It is essential to broaden the range of options and inform and educate stakeholders about those options so they can understand what is feasible and prudent.

Examples of stakeholder option improvements include: supporting TRB, NCHRP, AASHTO and other research; supporting working groups; synthesis studies; agency partnership; and resource specific studies.

3. *Increase the breadth and depth of ecological expertise and leadership in the planning, permitting, implementation, and maintenance of transportation.*

Effective leadership to resolve issues and make wiser decisions must include input and participation by a broad range of participants. This includes related road ecology education and reinforcement of wise leadership by recognizing positive outcomes and developing an environment where lessons can be learned. Most importantly, this includes outreach to people outside natural resource specialties.

Examples of increases in ecological expertise and leadership include: participate and support of the UC Road Ecology Center; support of the California Biodiversity Council, sponsorship of ICOET; Annual Meeting of California's 150 State road ecologists; and training of local & resource agencies on SAFETEA-LU 6001.

4. *Improve stewardship through better planning, implementation, monitoring and follow-up of restoration, enhancement, avoidance, minimization, and mitigation.*

Stewardship requires ensuring resources entrusted to any public entity are cared for and enhanced while under their action and authority. This requires careful consideration of processes and procedures used to consider resources and ensure compliance with commitments. This element guides roughly \$20-30 million of road ecology related studies each year in California.

Examples of stewardship improvements include: programmatic agreements; reimbursed agency liaisons; improved commitment tracking; and environmental management systems.

5. *Achieve conservation by integrating resources into all program and project decisions.*

Each California state agency considers ways to conserve rare species, habitats and other resources consistent with their authority. While substantial conservation actions are only directly funded for resource agencies, other agencies may also participate provided it is consistent with their mission and funding authorities.

Examples of conservation efforts include: integrated right of way management for rare species; participation in Section 6 programs; and grant program work for fish passage.

Stepwise Approach

The identification, resolution and implementation of solutions pursued under any of the five driving principles occur in three general phases: situational analysis; foundational formation; and implementation. This process can be very formal or loosely implemented over a few months to several years without definitive end points. A brief summary of the phases is as follows:

Situational Analysis. The most critical stage in ensuring a successful effort and partnerships is situational analysis of the challenge. The problem must be clearly identified, driving forces and the relative risks for conservation and transportation considered. This requires stakeholder input and background research to determine the depth and extent of the issue as well as possible benefits and costs across a range of concerns.

A clear problem statement and analysis of risk then provides justification for participation by partners and stakeholders as well as adoption by sponsoring funding agencies and programs within those agencies. Framed within driving principles the sponsor and partners can match needs to related programs and concerns to develop common goals and objectives that can be used to compare alternatives within available processes and resources.

The risk assessment, background research, and stakeholder interests can then provide a basis from which a program or effort can be planned and strategies jointly developed that consider issues such as staging, scope management and other procedural or process options.

Foundational Formation. The most resource intensive phase is developing a sound foundation for agreements or pursuit of new solutions. The step in this phase is the synthesis of available knowledge including science, engineering, policy, processes and organizational constructs.

As the synthesis is completed, stakeholders and partners are engaged to develop a clear picture of what is known, unknown and what uncertainties are most essential to understand or explore. These gaps of knowledge can then be pursued in a rigorous manner with research or policy development with stakeholder oversight and/or participation. This new knowledge then provides a foundation for developing options for adoption by the stakeholders with input from the public as appropriate.

Implementation. Complete implementation is often the toughest part. The technical challenges are often largely resolved, quick fixes implemented and funding can be limited unless well-planned. In this phase, agreements are reached, policy is generated, and education and outreach are pursued for all related activities and programs.

Programs Approach

Multifaceted issues and conflicts can represent systemic issues will usually have multiple driving principles and result in a set of problem statements and stakeholder objectives. Where justified by the magnitude of the combined risk analysis, a program approach is used. This incorporates a key set of elements including the following:

- Performance Measures: How can success be measured?
- Policies and Directives: What firm limits or requirements are necessary?
- Procedures and Guidance: How can action be effective and efficient?
- Manuals: Which written references are needed or require updates?
- Standards: Minimum thresholds or product requirements.
- Tools: Define job aids or technology needed
- Training: Knowledge skills and abilities needed to be successful
- Reviews and Approvals: What approvals must be done.
- Teams and Critical Partnership: What groups are critical to success?
- Research & Studies: What key new knowledge is needed?
- Budget & Accounting: Funding or Accounting changes +/-.

Illustrative Programs

The Department's anadromous fish passage, animal vehicle collision reduction and advanced mitigation planning efforts illustrate challenges, approaches, tradeoffs and lessons learned as programs are developed and implemented. Success requires proactive collaboration between resource agencies, transportation agencies, university researchers and non-governmental organizations.

Anadromous Fish Passage

Challenges. Declining recreational and commercial salmon fishing, due to shrinking fish populations, has resulted in the substantial loss of a \$1.2 billion west coast economy. Outside of Alaska this represents a loss of 62,750 family wage jobs and a substantial contribution to the gas tax. Regulatory Agencies believe that State Highway System road-stream crossings (culverts) are a major impediment to the recovery of salmon and steelhead. Recovery of these populations is central to recovery of coastal communities and the industries that support them.

California regulations require that road crossings do not impede or block passage of “fish” which is defined as fish, mollusks, crustaceans, invertebrates and amphibians. Anadromous fisheries such as salmon are of particular concern because of their need to move between cool inland streams and coastal waters. This movement involves multiple road crossings where blockage at one site can effectively exclude salmon from using all upstream habitats and negates the benefits of any blockage removals in those disconnected reaches of stream. Highway crossings can be particularly problematic because they are often the first crossing low in the watershed and cross tributaries as roads follow major river courses.

Careful consultation has determined that the removal or modification of barriers to allow steelhead and salmon access to historical habitat is the most cost-effective and successful method to achieve recovery of salmon and steelhead. However, the current status of passage and the proportion of road-stream crossings that represent barriers to fish passage is not readily available. The lack of blockage information, multiple landownership and limited survey/analysis funding complicates the development of statewide priorities for stream restoration and determining the relative importance of specific crossings. A lack of agreed-upon priorities also increases the difficulty in determining where very limited remediation grant funding can be applied most effectively and increases the need for detailed regulatory review of projects and onerous permit requirements.

Approach. The primary driving principles recognized were the potential to reduce potential strategic project delivery issues and the opportunity to improve stewardship. The secondary driving principles were to improve stakeholder options, understanding, and provide opportunities for improved leadership.

Geographic Information System analysis early in the situational analysis stage indicated a large number of potential crossings based upon the intersection of USGS waterways and roadway alignments. However, this crude estimate did not identify every location and did not provide an indicator of the likelihood that individual sites may have fisheries or blockages. Background searches of culvert and fishery inventories likewise only provided partial data.

A North Coast Pilot Study was conducted by Humboldt State University under a federal research grant and produced an assessment of culvert sites for one Caltrans district. Survey procedures and protocols tailored to the State Highway System needs were developed that formed the basis for statewide assessments. Additional State Planning and Research (SPR) grants were used to scope and prioritize assessment work throughout the remaining coastal watersheds. Assessment work conducted in the southern and central coastal regions, and the San Francisco bay area has allowed refinement of the assessment procedure and an increase in production, but has also shown that we have more culverts to assess than previously recognized and that regional survey procedures are needed, especially for the dryer southern California region. Further study will complete the assessments in the coastal areas, and will begin the preliminary inventory and prioritization for the Great Central Valley and Sierra Nevada regions. Completion of these studies has involved the development of partnerships and working agreements with multiple agencies including the California State University System Department of Water Resources as well as private sector experts to increase the availability of field crews to complete surveys.

Close coordination with other partners was identified as key elements of the foundational phase of the program. Caltrans began reaching out and participating in the California Fish Passage Forum (includes California Department of Fish and Game, National Marine Fisheries Service, US Fish and Wildlife Service, US Forest Service and others) and sharing data via the CalFish Memorandum of Understanding (MOU) partnership (includes California Department of Fish and Game, California department of Water Resources and others) to share insights, priorities and data with other agencies and organizations involved in inventorying, assessing, and remediating fish passage. A critical goal of this effort is to prioritize which sites are in greatest need of rehabilitation or replacement for meeting fish passage requirements. This will help guide the Department in future development of maintenance and capitol construction projects that can then implement corrections. Additional participation on Coho recovery teams provided species-specific coordination and opportunities to share economic information. These partnerships also provide a forum for consideration of stakeholder concerns such as discussion of legislation.

Related stakeholders with interest in fisheries and water issues include the State Legislature, Caltrans Districts, Federal Highway Administration, regulatory agencies including US Fish and Wildlife Service, National Oceanic and Atmospheric Agency (NOAA Fisheries), US Army Corps of Engineers, California Department of Fish and Game, US Forest Service, National Park Service, Bureau of Reclamation, Native American Tribal Governments, California Resources Agency, California State Parks, California Department of Water Resources, California Department of Forestry and Fire Protection, California Energy Commission, California Coastal Commission, California Coastal Conservancy, Pacific States Marine Fisheries Commission, the nationally recognized California Fish Passage Forum, local governments including counties and cities and their special interest organizations such as FishNet 4C (Mendocino, Sonoma, Marin, San Mateo, Santa Cruz and Monterey Counties) and the Five Counties Salmonid Conservation Program, the Tri-County F.I.S.H. Team, local public works agencies, resource conservation districts, farm-oriented groups such as the Northern California Water Association or the Association of California Water Agencies, commercial interests such as the Pacific Coast Federation of Fishermen's Associations (PCFFA), private citizen groups including fishermen, recreationalists, environmentalists, and local watershed councils and groups, specifically California Trout, Inc., Friends of the River, Defenders of Wildlife, Southern California Steelhead Recovery Coalition, various professional groups such as the American Fisheries Society, species or region specific Technical Recovery Teams (TRTs) with interests in the Southern Oregon/Northern California Coast (SONCC), North-Central California Coast (NCCC), California Central Valley, South-

Central California Coast recovery domains, and others such as the Coho Recovery Planning and Implementation Team, the California State University System, the University of California System, various private educational institutions as well as various grade and high school environmental education programs and groups, and employers needing to provide a quality environmental setting to attract top employees.

Implementation of solutions include: policy changes to implement requirements to inventory, assessment and planning for remediation during project delivery; development of an engineering manual; integration of new design standards; progress tracking; outreach to stakeholders; and continue pursue of grant funds to complete surveys.

Trade-Offs. The greatest trade-offs occur in the context of procedural limitations. Often funding capital that could be used to restore sites is associated with projects that are located on low priority streams that highlights the opportunistic nature of funding and priorities. This is complicated by the potential for increased permitting time and construction costs that discourages engineers from including crossings in projects if cost and schedules are constrained.

Lessons. Partnerships and the inclusion of multidisciplinary teams have been essential to overcome limitations caused by a lack of information and apparently conflicting missions. A second key element is to recognize the level of effort to educate stakeholders and develop the institutional support for success.

Animal-Vehicle Collision Reduction

Challenge. The California planning environment lacks a base map of wildlife connectivity, methods and tools to evaluate potential wildlife crossings, and adequate collaboration on solutions. This prevents effective advanced planning resulting in increased wildlife mortality and habitat fragmentation. It also increases transportation delivery project costs, delays and frustration, as stakeholders and decision-makers deal with a lack of information on a project-by-project basis. Complicating the challenge is a lack of standard methods of data collection and analysis and questions of sustainability in a context where some stakeholders have concerns about the regulatory implications of designating corridors.

Approach. The primary driving principle for animal vehicle collision reduction is stewardship and improving stakeholder options to reduce wildlife mortality, habitat fragmentation and improve safety that are public interests. A secondary driving principle is growing concern by the public and resource agencies that may become strategic issues as it affects project consensus necessary to implement context sensitive solutions. A third critical element is to increase the depth of leadership in the planning and implementation of solutions by stakeholders that influence progress.

The goal of this program is to provide a statewide assessment of habitat and wildlife connectivity that is a critical element for including natural resource considerations in planning per Section 6001 of SAFETEA-LU. Transportation planners, biologists and resource agency staff need a comprehensive, statewide assessment of habitat and wildlife (including plants and animals) connectivity for California. This assessment will identify priority landscape connectivity utilizing the best available science, spatial analyses and modeling techniques to generate statewide connectivity GIS database and maps. Informal steering committees of public agencies and environmental protection groups are beginning to meet to address this need. The effort is being managed by Caltrans and the Department of Fish and Game to ensure that consensus is built on the approach that will be taken to conduct statewide wildlife habitat connectivity analyses. The Defenders of Wildlife is bringing a broader vision of connectivity and technical support by sharing approaches other states or nations have used. The University of California at Davis, Road Ecology Center has been providing insight and guidance on approaches and has brought in many experts from across the world to share possible technical approaches. This analysis will generate maps that would be used in transportation, land use and conservation planning. This GIS based modeling effort will identify animal vehicle collision factors for incorporation in safety improvements.

This effort is taking the following steps: form a steering committee; gap analysis and synthesis of current modeling and documented wildlife movement; base map to identify safety concerns associated with wildlife collision locations and wildlife connectivity; identify next steps and development of work plan for long term eco-region analysis efforts; analyze long term eco-regional needs; and provide training materials.

Transportation planning professionals will be involved to ensure that the products will be utilized in the Regional Transportation Plan and California Transportation Plan updates, local land use planning as well as project level analysis and advanced planning to for wildlife connectivity along highway facilities. This will also provide the data to identify safety concerns pertaining to wildlife-vehicle collisions along state and federal highways.

Stakeholders include Caltrans Division of Transportation Planning, Division of Operations (Safety), Division of Environmental Analysis, Department of Fish and Game, State Parks, USFWS, USFS, FHWA, Councils of Government, cities, counties, The Nature Conservancy, NPS, BLM, Defenders of Wildlife, South Coast Wildlands (a private mitigation banking company), University of California Conservation Biology Institute and other resource and conservation planning organizations.

The first step is to develop a statewide wildlife habitat connectivity map so that transportation, land use and resources agency staff have a common map identifying habitat and wildlife connectivity and the presence and movement of various California species. Prioritization of identified linkage areas will be identified and further analyzed at the ecoregion level. These efforts are anticipated to suit the short-term needs and identify areas where more research or analysis is needed.

After the base statewide connectivity map is completed, a second phase will be launched to develop analyses for each of California's nine eco-regions. This level of eco-regional detail is critical to making the maps and models useful in the regional transportation planning processes of the MPOs and more effective for implementation. The synthesis of statewide connectivity information will be beneficial to validate the eco-regional modeling.

This effort builds upon existing efforts of different stakeholders throughout the state that have identified this need and desire to develop information and methods for analysis and incorporation into respective planning processes. Research on identifying modeling techniques, fragmentation metric development, species behavior research, and road ecology research will compliment this effort.

Trade-offs. The most challenging trade-off is the selection of target species during analysis. The target species can substantially affect the outcome of connectivity models and affect the suitability of the output for various stakeholders. Maintaining ecological integrity may call for broader selections while animal vehicle collision safety calls for larger vertebrates while regulations focus solely on rare species.

Lessons. Internal and external partnerships are essential to seek objective approaches that can be flexible to accommodate a variety of stakeholder needs. For example, modeling must be neutral and adaptable so different target species and partners can incorporate local variation in order to maintain full participation. It is also essential to develop multiple agency support to allow associated staff time for fully support efforts.

Advanced Mitigation Planning

Challenge. The State seeks to avoid and minimize impacts to natural resources wherever practicable. However, in some cases it is necessary to also compensate for impacts through preservation, restoration, or creation of resources. Development of compensatory mitigation can be a substantial challenge. It may involve many small or one large transportation project, and must occur within a very short time frame between impact analysis and construction which causes the actual impacts. On an individual project basis, this can be more expensive and less effective due to the short timeframes and efforts that are not contiguous with or planned in concert with larger natural resource planning efforts. Further, failure to meet environmental obligations and project-specific requirements in a timely manner results in project delays, increased costs, and greater regulatory scrutiny.

Approach. The driving principles for advanced mitigation are to improve stakeholder options and understanding by advancing science and sharing innovations to allow better conservation of resources at lower costs. However, it will be critical to increase the breadth and depth of ecological expertise and leadership in the planning, permitting, implementation, and maintenance of transportation. The goal of this effort is to provide a statewide and district species assessment of mitigation needs that is a critical element for including natural resource considerations in planning per Section 6001 of SAFETEA-LU. In 2000, a team of Caltrans and Federal Highway Administration staff conducted a review of mitigation practices and processes. The Mitigation Process Improvement Team (MITPIT) in recommended a number of enhancements including taking a more comprehensive or holistic approach to mitigation planning.

The first element of the advanced mitigation effort focused on the deepening understanding of issues by compiling summary of past and on-going mitigation efforts as a baseline to project mitigation needs, costs and issues. With assistance from the University of California at Davis, data from twelve district offices were gathered and compiled with a traditional database. The effort demonstrated that traditional methods of information collection and data entry were labor intensive and difficult to maintain. The value of tracking and sharing of lessons learned, however, was apparent so a web interface was piloted in 2005 that helped define the system requirement for integration into an environmental management system under development for use on all projects beginning in 2008. This new system, being created in partnership with public and private information technology (IT) experts, will allow projection of potential needs and track current needs for programmed projects.

Concurrent with compiling information as part of the situational analysis, a second element that provides more stakeholder options, focuses on changes in the timing of funds available to implement mitigation projects. Policy developed in partnership with experts in budgeting, real estate, accounting, project management and biology now allows state-only funds to be advanced earlier in the project delivery process as a risk decision to allow more time for mitigation project development prior to final transportation project approval. The policy also now allows funds from multiple projects to be combined to unify mitigation projects that could most effectively leverage funds through volume purchases and seize upon opportunities to work with partner agencies and avoid cost escalations. By identifying needs more precisely in advance, this flexible funding provides a greater potential for private-public partnerships to provide mitigation site development services.

The third element of advanced mitigation currently under study is developing methods to project mitigation needs over a 20-year horizon so that those needs can be coordinated with planning for conservation such as state wildlife strategies, species recovery plans, and conservation land purchases. The Department is pursuing twin approaches of empirical and theoretical assessments with the later seeking to provide a contextual understanding of effects based on factors such as location and relative rarity. The theoretical or modeled approach also allows projected or undocumented factors to be addressed such as future land use changes, movement corridors, and undocumented species occurrences. The UC Davis Information Center for the Environment has been instrumental in adapting the latest research in ecological spatial analysis to develop new approaches that may be used.

The combination of a central knowledge base and environmental management system, flexible funding options and methods to project mitigation needs will allow the transportation and resource community to truly engage in environmental planning for the first time as full and educated partners on a broad scale. All of these efforts require close coordination with resource and regulatory agencies as well as with Caltrans' Districts to develop sustainable decisions that warrant investment based upon this planning. Success will be measured by more integrated and effective planning, improve cost effectiveness, and greater environmental protection in the long-term.

Trade-Offs. The greatest trade-off or risk with advanced mitigation is dedication of staff time and transportation capital with a degree of concern that decisions can be sustained over time so that individual projects benefit with a lower overall cost. This approach could allow better private-public partnerships to contract for service if appropriate contract methods can be developed, however, it could increase the risk of land speculation where limited resources occur if planning information is not managed well.

Lessons. The development of advanced mitigation options requires organizational change, new science & policy and most importantly the formation of long term relationships that can form the trust necessary to implement changes. This change must occur not just in the transportation agency but also at the resource or permitting agencies so that new approach can be accepted.

Conclusion

California is biologically diverse and under tremendous challenges to maintain its high quality of life as infrastructure and natural resource needs lead to conflicts where the needs of both must be considered. Through careful stepwise consideration using consideration of driving principles, it is possible to develop collaborative approaches that meet stakeholder's needs.

The role of partnerships with stakeholders, universities and resource agency partners provide a foundation for transitioning from accommodation to true stewardship and ideally on to conservation.. This collaboration results in better transportation decisions, resource conservation and common advancement of science as illustrated by related presentations at the 2007 International Conference on Ecology and Transportation (ICOET) and this unifying presentation of integrated approaches. Example presentations at this conference related to California transportation that are consistent with California's approach include:

- Web-based Approach to Compliance Reporting for Caltrans
 - Ivy Edmonds-Hess, PB San Francisco
- Impacts of Different Growth Scenarios in the San Joaquin Valley
 - Karen Beardsley, UC Davis
- Multi-Scale Context-Sensitive Statewide Environmental Mitigation Planning
 - Jim Thorne, UC Davis
- Underpass Effects on Wildlife Activity
 - David Elliott, Cal State Fullerton
- Analytical Framework for Wildlife Crossing Policy in California
 - Jim Quinn, UC Davis
- Integrating Habitat Fragmentation Analysis into Transportation Planning
 - Evan Girvetz, UC Davis

Combined these efforts will provide the proactive information envisioned for coordination under SAFETEA-LU 6001. Each represents development of new methods to analyze effects and understand the natural resource implications of decisions objectively.

Biographical Sketch: Mr. Gregg A. Erickson is Chief of the California Department of Transportation Biological Studies and Technical Assistance Office. He is a graduate of San Diego State University with 20 years of private and public service with research interests in microchiroptera in structures and systems ecology. He provides guidance and direction for the Department's team of 150 professional biologists as well as associated local agency and consultant teams. His team establishes the policy, standards and procedures necessary to deliver the State's \$10+ billion transportation program in the context of a landscape with high biological diversity and over 300 threatened or endangered species. He guides collaborative policy formation, studies, dispute resolution and research on road ecology issues within California and has served as an analyst on Governor's reviews of natural resource and infrastructure planning and organization. He assisted in the formation of the UC Road Ecology Center and provides input and guidance on issues of regional of national significance through AASHTO initiatives and as a panel member for the National Highway Cooperative Research Program on issues such as Interactions between Roadway and Wildlife, Control of Invasive Species and Evaluation of Use and Effectiveness of Wildlife Crossings. He also provides leadership on the development and implementation of environmental management systems, geographic information systems and other technologies for the Department's environmental planning program.

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