RESEARCH PROBLEM STATEMENT #EV-502

I – Problem Title

Highway Median Barrier Impacts on Wildlife Movement and Mortality – State of the Practice Review and Gaps Analysis (EV4)

II – Research Problem Statement

Highway median barriers cross thousands of miles of North America, constituting solid walls that potentially block wildlife movements. Median barriers may also increase hazardous wildlife-vehicle collisions by causing wildlife to remain on the road longer, confused or searching for a place to cross. Caltrans and other State transportation departments construct highway median barriers with virtually no information on their impacts to wildlife movement and life histories, wildlife-vehicle collisions, and mortality. There is a growing need to know the current state of the practice and to identify data gaps in order to better focus future research. Lack of knowledge on wildlife related impacts of median barriers is causing project delays and increased costs in California and other states. This project will help the department meet its goals of Safety and Performance.

III – Objective

The project will be limited to ungulates and other large mammals. It will consist of an exhaustive search, review and synthesis of:

1) peer-reviewed and gray literature on wildlife and median barriers,
2) contacts with other DOTs on the types of median barriers that they use and their experiences related to wildlife movement issues, and
3) contacts with Caltrans, California Highway Patrol, California Department of Fish and Game, U.S. Forest Service, National Park Service, Bureau of Land Management, non-profit organizations, private professionals, and others in California, to determine their questions, issues and experiences related to median barriers and wildlife, and will
4) analyze the information gathered in numbers 1,2 and 3 and provide Caltrans with a detailed synthesis of the current knowledge base and state of the practice, identify information and techniques that could be immediately implemented by Caltrans, identify gaps in the current knowledge base that need to be addressed by additional research and provide Caltrans with a prioritized set of research problem statements addressing the identified gaps, the suggested research will focus on solving this problem in California.

IV – Background

Roads represent a serious obstacle to maintaining ecological connectivity and viable wildlife populations. Highways can be major barriers to wildlife movement. Increasingly, transportation departments are installing concrete median barriers to separate lanes of traffic and increase motorist safety. How these barriers might affect wildlife movement and fragmentation of populations, the rate of wildlife-vehicle collisions, level of motorist safety, and effects on wildlife and human mortality are not well understood.

Transportation biologists and resource managers and have identified this as a severe shortcoming that needs immediate attention. A recent Transportation Research Board report[1] highlighted the urgent need to better understand how wildlife respond to and

potentially impacted by highway barriers. Currently, some median barriers and their configurations are being designed to facilitate cross-highway movement of wildlife, e.g., gaps in barriers, scuppers etc. It also will be important to know whether these new designs are effective at mitigating the potentially harmful effects of median barriers.

V – Statement of Urgency and Benefits

Numerous highway projects nationwide have concrete median barriers in place and their numbers are growing. Local wildlife biologists believe these structures present formidable barriers for almost all wildlife species. The current perception in many transportation departments is that in wildlife linkage zones concrete median barriers should not be placed unless serious consideration is given to how wildlife will be affected and unless provisions have been made for wildlife crossings.

This lack of information can delay projects in California and other states. Examples include median barrier installations on Highway 1 in Morro Bay, which the City of Morro Bay delayed for six months in part due to wildlife crossing concerns, and similarly, Highway 156 in San Juan Bautista.

Recently the Montana Department of Transportation (MDT) installed median barriers along I-90 between Lookout Pass and St. Regis, Montana. Before the project was initiated, MDT stated that there were no biological concerns and the project would have no effect on threatened or endangered species. After some of the barriers were installed, the US Fish and Wildlife Service (USFWS) did not agree with the original finding of no effect and stated that the highway median barriers have the potential to impact wildlife crossing opportunities in a key wildlife linkage zone. The Federal Highway Administration and the USFWS requested a more detailed biological assessment from MDT and has curtailed project funding until a proper assessment of median barrier impacts is complete.

Near Bend, Oregon, concerns about deer and elk migration impacts and increased collisions with animals delayed a median barrier project for one year on Highway 97. There is a perception that animals trying to traverse highways with median barriers may spend more time on the highway resulting in an increased number of collisions.

This study would be a first and important step in assessing the potential impacts of median barriers on wildlife movement and mortality. It will provide Caltrans with the best available information regarding how median barriers affect wildlife movement mortality and animal vehicle collisions in a short period of time. Further, the identification of knowledge gaps and prioritizing immediate research needs will aid Caltrans in meeting its obligation to expedite the decision process of median barrier installation in transportation projects and improve driver safety.

VI – Related Research

Forman et al.[2] state that roads create “impermeable barriers (e.g. solid Jersey barriers) to animal movement” but cite no studies. A study in Colorado[3] found that mule deer, elk, mountain lions, coyotes, lagomorphs, foxes, bobcats, weasels, and other species all

focused highway crossings in areas with the fewest barriers, including concrete median barriers and concrete guardrails. Animals crossed more frequently at culverts, bridges, and at-grade crossings with no guardrail or median barrier. The same study found that animals did not cross concrete guardrails to enter roadways. This suggests that animals would also be reluctant to cross guardrails encountered in the median (median barrier), but this is the only study that touched on the subject of guardrails as wildlife barriers. One report from the Ontario Ministry of Transportation[4] discussed study designs to assess impacts of median barriers on animal movement.

VII - Deployment Potential

This would be the first effort to gather, review and synthesize knowledge of median barrier impacts on wildlife in California. Some of the information gathered in the synthesis should be immediately useful to Caltrans and can be disseminated through the Division of Environmental Analysis. This will result in a significant advancement in state of the practice from which to base median barrier project impact analyses. This work will develop research problem statements to address critical management questions regarding median barriers that could not be completed by this initial project. Ultimately, Caltrans will need science-based guidelines for future transportation projects that involve the placement of highway median barriers.

Footnotes:

[1] Transportation Research Board, 2002. Environmental research needs in transportation. Conference proceedings 28. National Academy Press, Washington, D.C.

[2] Forman, R.T.T., D.Sperling, J.A. Bisonette, A.P. Clevenger, C.D. Cutshall, V.H. Dale, L. Fahrig, C.R. Goldman, K. Heanue, J.A. Jones, F.J. Swanson, T. Turrentine, and T.C. Winter. 2003. Road ecology: science and solutions. Island press, Washington, D.C. USA.

[3] Barnum, S.A. 2003. Identifying the best locations along highways to provide safe crossing opportunities for wildlife. Colorado Department of Transportation Research Branch report number CDOT-DTD-UCD-2003-9.

[4] Hubbs, A.H. and R. Boonstra. 1995. Study design to assess the effects of highway median barriers on wildlife. MAT-94-03. Research and development branch. Ontario Ministry of Transportation, Toronto, ON, Canada.