

Rural

MARCH 2013**Project Title:**

Evaluation of an Animal Warning System Effectiveness, Phase Two

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This project focused on studying the effectiveness of using animal warning systems to detect wildlife on roadsides, including measuring drivers' response to the associated animal warning signs.

Task Manager:

Nathan Loebis,
Transportation Engineer, Electrical
Nathan_Loebis@dot.ca.gov

Wildlife on the Roadside: Testing PATH's Animal Warning System

Prototype system uses break-a-beam microwave technology to detect large animals

WHAT WAS THE NEED?

Recent data shows that more than 300,000 vehicular collisions with large animals occur every year, resulting in 29,000 human injuries, 211 fatalities, and \$1 billion in property damage. These numbers are climbing steadily and are thought to be only a fraction of the actual occurrences, as many such collisions go unreported. In response, a variety of crash-reduction solutions have been discussed, from fencing and flashing systems to animal repellants and whistles. While some prototype systems have been installed in the past few years, very little long-term data exists.

WHAT WAS OUR GOAL?

The project's goal was to evaluate the effectiveness of animal warning systems to detect wildlife on roadsides and measure driver response, including speed reduction and other driver behaviors.



Installation of an animal warning sign



WHAT DID WE DO?

In September 2009, Caltrans—with supporting funds from the US Department of Transportation—installed the Partners for Advanced Transportation Technology (PATH) Animal Warning System (PAWS) along a 0.6 mile stretch of State Route 3 near Fort Jones in the Scott Valley area of Siskiyou County, one of the highest black-tailed deer kill areas in the state. PAWS uses microwave beams to detect the appearance of large animals. Animal motion through these beams triggers a transmission that illuminates warning signs on both sides of the roadside.

During the first 2.5 months of the 10-month field study, initial baseline data was collected with the warning signs covered. Throughout the remaining 7.5 months, the warning signs were in full view, and animal detection events, vehicle speeds, and warning sign activation activities were logged. Radar, video, and computer equipment monitored driver reaction via the PAWS Monitoring System and PAWS Data Acquisition System designed for this project. In addition, driver feedback was collected in a follow-up survey.

WHAT WAS THE OUTCOME?

While animal detection systems are largely experimental, associated studies suggest that they can result in lower vehicle speeds and substantial reduction in animal-vehicle collisions. The PAWS study—designed as a research prototype—was intended to show the feasibility of these systems.

This project's results did show a reduction in average driving speeds when animal warning signs were illuminated, which was greatest during evening, overnight, and early morning hours, times when deer and other wildlife tend to be most active. Additional data suggests that the deceleration rates that were required when drivers spotted an animal were also reduced, mitigating the need for panic stops. No evidence was seen suggesting driver adaptation to the PAWS signs over the duration of the study.

Break-a-beam microwave devices at the Northern California test site. Three are installed on each side of the road.



However, driver survey data indicated that most respondents were unhappy with the system, detailing driver concerns over system costs, the brightness of the signs after dark, and site location.

Based on a high number of perceived false positives, surveyed drivers expressed low confidence in the system's reliability. In actuality, a majority of the false animal detections were related to vehicles turning on and off the road, a limitation researchers know must be overcome to regain the public's confidence. In the end, the system was not accepted by the public or the district in which it was tested. Caltrans is in the process of having it dismantled and removed.

Study analysts note that the State Route 3 system might have been more reliable had specific modifications been put in place. Animal detection systems are still considered experimental, and reliability issues will need to be addressed. Only then will it be clear whether implementation of these systems can be considered an alternative to the more expensive wildlife fencing in combination with wildlife underpasses and overpasses.

WHAT IS THE BENEFIT?

Long-term experience and data are needed regarding reliable animal warning effectiveness. The PAWS study provides information to state agencies that are considering selecting reliable off-the-shelf systems to reduce crashes and improve transportation safety. PAWS data could also lead to the development of improved warning systems that alert drivers of impending road hazards. Studies have shown that dynamic situational information is more reliable in catching a driver's attention than any other current system.

The ultimate goal is to increase road safety for the public, reduce costs caused by wildlife-vehicle collisions and reduce wildlife road kill, while allowing animals to continue to move across the landscape. Animal detection systems remain a compelling and potentially effective countermeasure to large animal-vehicle crashes, providing both a sensing and dynamic situational warning. This study adds valuable data to the animal warning system portfolio.

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To view the report:
www.dot.ca.gov/research/researchreports/reports/2012/2012-06_task_2090-tsm.pdf