Understanding Behavioral Responses of Wildlife to Traffic to Improve Mitigation Planning Dataset

Datasets available at: https://doi.org/10.25338/B87S5G

(This dataset supports report **Understanding Behavioral Responses of Wildlife to Traffic to Improve Mitigation Planning,** https://doi.org/10.7922/G29S1P9Q**)**

This U.S. Department of Transportation-funded dataset is preserved by the University of California in the digital repository Dryad (https://datadryad.org/), and is available at https://doi.org/10.25338/B87S5G

The related final report **Understanding Behavioral Responses of Wildlife to Traffic to Improve Mitigation Planning**, is available from the National Transportation Library's Digital Repository at https://rosap.ntl.bts.gov/view/dot/54864.

Metadata from the Dryad Repository record for Popular flight costs and emissions data:

Abstract:

Creating and maintaining sustainable transportation systems depends in part on understanding and mitigating ecological impacts. Wildlife crossing structures (WCS) are often used to mitigate impacts on wildlife populations. WCS and existing structures may provide passage for multiple species, depending on their sensitivity to traffic disturbance and perception of the roadway. In a previous project, we found that traffic conditions and traffic noise could reduce WCS effectiveness in facilitating passage of diverse and sensitive species. In the current project, we expanded the geographic scope to 26 sites throughout California, including detailed measurements of vehicle noise and lighting impacts on wildlife use of structures. We investigated individual animal behavior as they approached structures as a possible mechanism for reducing species diversity due to traffic disturbance. In order to inform future WCS planning, placement and construction, we studied traffic noise and light impacts on wildlife in the vicinity of the proposed Liberty Canyon wildlife over-crossing (over US 101), the first and largest of its kind in California. We improved a preliminary statistical model of the effects of traffic on WCS use of existing structures. We recommend strategies for transportation agencies to use in developing and modifying WCS to improve wildlife passage.

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Methods:

- Traffic noise and light measurements: Sound pressure levels were recorded in A-weighted decibels (dbA) and C-weighted decibels (dbC) using digital sound level meter devices (TENMA 72-947 and PCE-322; 30-130 range, set to slow). To correspond to timing of crepuscular and night-time activities, we sampled sound levels for one evening (11pm – 2am) at 1-second intervals within a) the crossing structure entrance and b) the closest camera station in the background area. To characterize overall sound conditions at the structures and following the camera trapping period, we also collected dbA and dbC sound pressure levels at the crossing structure entrance for 1 week at 59-second intervals.

Low-level light intensity as total luminescence was measured along a 50m transect away from each of the 26 crossing structures (0m, 10m, 30m, 50m). We used a novel approach employing a camera with a very wide-angle lens to capture low light levels in collaboration with the Longcore lab at the University of California Los Angeles (Jechow et al., 2017).

- Habitat classification in the surrounding landscape: We characterized habitat surrounding each structure using 16-class land cover data from the 2016 National Land Cover Dataset (NLCD, US Geological Survey), which has a spatial resolution of 30 m2 For each underpass we classified land cover within a 100 m2 radius and 1 km2 radius buffer in ArcGIS. This will determine whether habitat in the approach zone and background area respectively influences species-specific movement on a small and/or large scale and noise attenuation.

- Species detection at WCS in relation to background: We compared species detections at WCS with detections at quiet 'background' camera stations at all 26 sites. We used the same model of camera traps across all sites (Bushnell Aggressor Trophy Camera). We set each of the cameras to capture still images and have a minimum of 3 seconds between trigger events, and one trigger event at a time. To avoid capturing the same individual multiple times, we classed a unique capture event of the same species as one image > 15 minutes apart. Four camera traps were positioned at the WCS 0.5 m to 1.0 m above the ground facing into or at an angle across the opening of structures (Figure 4). In order to measure background species detections and further examine the impact of noise on WCS use, we measured the distance to background noise levels from the nearest study WCS (~800 m) and established 4 bait stations with associated cameras, at >100 m intervals, for each of the sites. We used salt blocks, peanut butter, dried corn, grain, canned cat food, and chicken parts in an attempt to attract a wide range of species. We also included four non-baited cameras in these quieter areas, >200 m apart from the baited cameras. Cameras were positioned adjacent to areas with visible animal tracks. Cameras were set to have a 10-second delay between trigger events due to the high occurrence of false triggers caused by vegetation.

- Wildlife Activity: To assess wildlife activity (hereafter referred to as "behavior"), Browning Dark Ops Pro cameras were set to video mode and deployed at and near to highway crossing structures (n = 2; "Mesa 2" site, SR 74; "PM24" site, I-80) and adjacent to the site of the proposed Liberty Canyon wildlife crossing structure. Based on preliminary data collection for deer and coyote, 20 types of behavior were extracted from videos as point events or state events (table 1). The activities were grouped into two categories of behavior (table 2). Species identification and behavior time budgets was extracted from all videos using the Behavioural Observation Research Interactive Software (BORIS; Friard and Gamba, 2016; figure 6). The number of humans and domestic dogs present were recorded for each video. In addition, for videos deployed at the highway crossing structures, we classified traffic within a video recording into one of three categories: 1) continuous traffic, 2) occasional, distinguishable traffic, representing between 1-5 clearly audible vehicles passing at random intervals, and 3) zero traffic.

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Dataset description:
This dataset contains 1 .zip file collection below.

doi_10.25338_B87S5G_v2.zip:
The .zip file collection contains 1 .docx file and 242 .txt files, described below.

- Image_Video_Data_Summary.docx
  - The .docx file is a Microsoft Word file, which can be opened with Word and other free word processor programs, such as Kingsoft Writer, OpenOffice Writer, and ONLYOFFICE.
- There are various naming schemes that are used for the .txt files.
  - The .txt file type is a common text file, which can be opened with a basic text editor. The most common software used to open .txt files are Microsoft Windows Notepad, Sublime Text, Atom, and TextEdit (for more information on .txt files and software, please visit https://www.file-extensions.org/txt-file-extension).

National Transportation Library (NTL) Curation Note:
As this dataset is preserved in a repository outside U.S. DOT control, as allowed by the U.S. DOT's Public Access Plan (https://doi.org/10.21949/1503647) Section 7.4.2 Data, the NTL staff has performed ***NO*** additional curation actions on this dataset.

NTL staff last accessed this dataset at https://doi.org/10.25338/B87S5G on 2021-03-15.

If, in the future, you have trouble accessing this dataset at the host repository, please email NTLDataCurator@dot.gov describing your problem. NTL staff will do its best to assist you at that time.