

Methods for Excluding Cliff Swallows from Nesting on Highway Structures



Introduction

The Cliff swallow (*Petrochelidon pyrrhonota*) is a widespread migratory bird that nests in large numbers on highway bridges. Under the Migratory Bird Treaty Act (MTBA) completed nests cannot be disturbed during the breeding season which in California is from February 15 to September 1. Bridge maintenance cannot be performed when swallows are present causing project delay and greater cost. However, the birds may be prevented from building nests. Exclusion by placing nets around a structure prior to the swallows' arrival in the spring is a commonly used method for preventing nesting. While netting is often successful occasionally birds become entangled and die. This constitutes unintentional take and does not comply with the MTBA, leading Caltrans to seek better means for preventing swallow nesting. Thus, Caltrans sponsored research by the University of California, Davis to identify and evaluate promising control methods and recommend future implementation strategies. The research team included Michael Delwiche, Robert W. Coates, W. Paul Gorenzel, Terrell P. Salmon, and Jaclyn Conklin.

Research Methods

A comprehensive literature search, and a survey of state transportation departments (DOT's) and the U. S. Fish and Wildlife Service, synthesized existing knowledge about the swallow and swallow nesting prevention. The researchers developed a cliff swallow habitat and bridge selection model using logistic regression on data collected from randomly selected bridges, along with habitat data. The research team also evaluated

chemical, visual, auditory, habitat modification and exclusion methods of control, and selected the most promising non-lethal control methods for field trials.

During the 2006 nesting season the researchers compared swallow nesting success at untreated control sites to success at sites with: high density polyethylene (HDPE) sheeting alone, broadcast alarm and distress calls alone, or combined HDPE and calls. In 2007 they compared swallow nesting success at untreated control sites to success at sites with: polytetrafluoroethylene sheeting (PTFE) or silicone based anti-graffiti paint. In 2008 nesting success at control sites was compared to nesting success at sites with: PTFE sheeting or PTFE and broadcast calls. All sheeting materials were temporarily attached to bridges using a commercially available butyl sealant

Research Results

An extensive literature exists on cliff swallow biology and behavior. But, there is little published on controlling cliff swallow nesting and the focus of this literature is on buildings not highway bridges. Cliff swallow nesting on highway structures is mostly a western problem. Despite concern with current methods little work has been undertaken to develop new swallow control techniques.

The main factors correlated to an increased likelihood of cliff swallows nesting on a bridge are: lack of surrounding urban development; no steel I beams on the bridge's undersurface; and presence of water under the bridge.

In the study area cliff swallows most frequently nested at the junctures between vertical supports and the underside of the bridge that were > 1.5 m above the ground or water. Nests were also built on non-juncture surfaces sharing walls with adjacent nests.

In 2006 the maximum number of completed nests averaged 181 for controls, 56 for HDPE treatment, 85 for bioacoustic calls, and 31 for the combined treatment. The combination of treatments was more effective than either treatment alone. But nesting was not eliminated thus not solving the problem faced by DOT's.

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The mean numbers of completed nests for surface modification treatments in 2007 were 347.7 for controls, 0 for PTFE, and 85.0 and for silicone paint. The mean numbers of completed nests for surface modification treatments in 2008 were 195.6 for controls, 0.6 for PTFE and bioacoustic calls, and 51.6 for PTFE alone. No nests were completed on the PTFE surface at any site, though several attempts were made. However, nesting did occur when the butyl sealant failed and the PTFE sheets peeled off leaving the bridge surface exposed. About 192 sheets detached from the bridge surfaces ($\approx 29\%$ of all sheets installed). 176 of these sheets were installed overhead and the weight of the sheets appeared to pull them away from the bridge surface. The butyl sealant appears to be inadequate as used. An improved attachment method for PTFE is needed to assure the success of the method. Sheet attachment failure was not the only reason for completed nests on PTFE treated sites. Nesting also occurred at unusual locations on PTFE treated bridges. Completed nests were found on the vertical surfaces below the edge of PTFE sheets and on the overhead surfaces along seams in the concrete. No nests were completed wholly on PTFE sheets at any site.

Management Suggestions

The research team suggests treating bridges with PTFE sheeting while broadcasting cliff swallow alarm and distress calls to reduce the likelihood of nesting on bridge surfaces. The team recommends treating all junctures of the structure to provide a minimum level of deterrence. Treating all vertical surfaces to within 60 cm of the ground (or water) along with unusual features such as seams cracks, lumps, bolts, and brackets would provide additional deterrence. However, only complete coverage of a bridge surface with PTFE and reliable attachment methods would likely be 100% effective. Improved attachment methods need to be developed to ensure treatment reliability. The main benefit of including bioacoustic calls at PTFE treated sites would likely be in reduced nesting on untreated, unusual nesting locations. Birds

built nests on top of the broadcast call units during the 2006 and 2008 studies. This shows that habituation does occur and precludes complete deterrence of cliff swallows by broadcast calls. Weekly visits to check treatment integrity and remove any partial nests under construction should be made.



Further Reading

- Coates, Robert W., Michael J. Delwiche, W. Paul Gorenzel, and Terrell P. Salmon. August 24, 2009. Methods for excluding cliff swallows from nesting on highway structures. Final Report CA05-0926. California Department of Transportation, Sacramento. CA. Volume 1 Report, 32 p., Volume 2 Appendices, 287 p.
- Conklin, Jaelyn S., Michael J. Delwiche, W. Paul Gorenzel, and Robert W. Coates. 2009. Deterring cliff-swallow nesting on highway structures using bioacoustics and surface modifications. *Human-Wildlife Conflicts* 3(1): 93-102.
http://www.berrymaninstitute.org/journal/spring2009/conklin_delwiche_gorenzel_coates_sp09.pdf

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