

Using Motion Detection Software to Enumerate Lamprey Passage

Abstract

To estimate passage at the Cascade Island Lamprey Passage System (LPS) at Bonneville Dam, electronic paddle counts are typically adjusted using a correction factor determined by reviewing video (~1 day for every 2 weeks). In addition we tested filtering the amount of video to review using motion detection software. Filtering video using motion detection software reduced the amount of time required to review video by 92% and resulted in the most accurate estimate of passage.



Darren G. Gallion
US Army Corps of Engineers
Portland District

Background

As lamprey pass the LPSs at Bonneville Dam they physically make contact with a paddle which triggers an electronic counting system. The counting system is inaccurate. Occasionally lamprey will trigger the paddle several times during each passage event (over-counts) or they will not move the paddle enough to record a passage event (under-counts). In recent years, to get better passage estimates, video was collected and reviewed at regular intervals (~2 weeks) and compared with paddle counts. A correction factor was calculated and applied to each sampling session throughout the passage season to estimate lamprey passage. To increase efficiency and improve accuracy we tested using motion detection to process video.



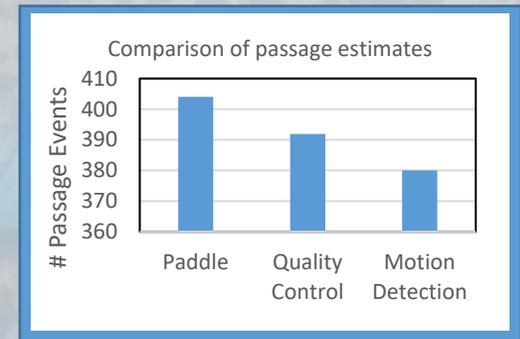
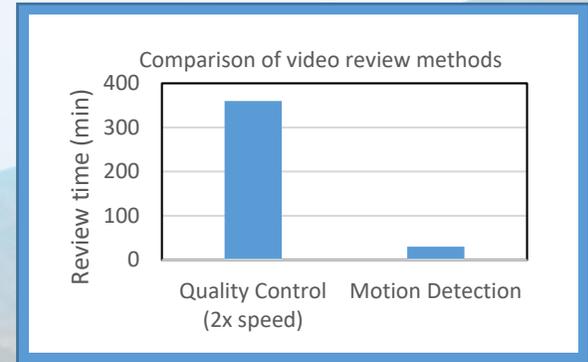
Methods

Original passage video was recorded at the Bonneville Dam Cascade Island Lamprey Passage System. We post processed 1 week of video by playing it on a large monitor to enhance the image for motion detection filtering. A small area in the image was monitored for movement but did not have water moving within it. When the DVR sensed motion it recorded 3 seconds before and after the motion event. Both "area" and "motion sensitivity" were adjusted in the software to capture all motion events and minimize false triggers. The filtered video was then reviewed, passage events were recorded and compared to "paddle counts" and "quality control" counts.



Result

Reviewing 10 hours of motion detection filtered video identified the correct number of passage events (n=70) in 30 minutes, whereas review at 2x standard speed required 360 minutes.



Summary

Using motion detection software reduced review time by 92%

Using Motion detection improved passage estimates by 6% over raw paddle counts and 3% over corrected paddle counts.