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Two Adjustable Waterfalls for Evaluating Fish Jumping Performance

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Abstract

Instream obstacles such as low-head dams and waterfalls are important in fisheries management because they can restrict the movement of fishes. This can have detrimental or beneficial effects on a fish population, depending on whether a particular structure operates as a barrier to migration or as a barrier to invasion. We developed flashboard-type and flume-type adjustable waterfalls in the laboratory to study the effects of waterfall height and plunge pool depth on fish jumping performance. Flashboard-type waterfalls were used for tests where the waterfall height was less than the maximum pool-and-flume height, and flume-type waterfalls were used for tests where the waterfall height exceeded the maximum pool-and-flume height. In both cases, the waterfalls worked well in the laboratory. In the field, the flashboard-type waterfall worked well in a situation where the waterfall height was less than the maximum pool-and-flume height, and the flume-type waterfall worked well in a situation where the waterfall height exceeded the maximum pool-and-flume height. The results of the laboratory and field tests were similar, suggesting that the waterfalls were effective in restricting the movement of fishes in both the laboratory and the field.

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depth of the raceway. Of the two waterfalls developed, we recommend using the flume-type for future studies because of its greater flexibility, even though it has a higher construction cost and is slightly more difficult to operate.

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