



# CEI HEL-CAT Tool



## Hydraulic & Ecological Limited Culvert Assessment Tool

**What:** A unique model for evaluating and rating the performance and vulnerability of culverted stream crossings under various storm events or flow scenarios using limited datasets, especially on a watershed basis. Assists in prioritizing infrastructure improvements and in assessing vulnerability to climate change

**Why:** Less costly method to evaluate which culverts to replace before detailed engineering design.

**Useful for:** Predicting areas where larger storms may wash out infrastructure either in areas that have been experiencing worsening flood damages or as part of climate change adaptations.

The primary advantage of using HEL-CAT is the cost savings that result from application of the tool to watersheds containing dozens of culverted streams so that full design can be focused on the top ranked culverts. CEI's HEL-CAT uses GIS watershed data and USGS regression equations to develop preliminary flows for the 10, 25, 50, and 100 year storm event and compare these flows to culvert capacity under simplified assumptions for a preliminary assessment of culvert vulnerability to high flows. Outputs include projected flow conditions at the culvert relative to the nearby stream for flows less than the over-bank flood event and a rating of the culvert's hydraulic capacity to meet that size storm.

CEI's HEL-CAT can be used as an interim step between the 'rapid assessment' tool developed by the UMASS Amherst Massachusetts Stream Continuity Partnership, and more detailed engineering survey and design. HEL-CAT can reduce overall costs of engineering upgrades by intelligently prioritizing structures for rehabilitation as a pre-design screening and cost analysis step.



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Innovation Overview

