

FEMA'S BENEFIT COST-ANALYSIS TOOL FOR WILDFIRE PROJECTS

General Guidance

The purpose of this document is to provide potential subapplicants with general guidance on FEMA's Hazard Mitigation Assistance (HMA) benefit-cost analysis (BCA) tool. The BCA is a required subapplication component. This guidance is not intended to provide complete information, but rather to outline basic requirements and considerations as subapplicants begin the analysis process. Cal OES is available to answer technical questions about BCAs and can be contacted by emailing HMA@caloes.ca.gov.

Wildfire Benefit-Cost Analysis

Wildfire and vegetation management projects mitigate at-risk structures and associated loss of life from the threat of future wildfire through:

- Defensible space: projects creating perimeters around homes, structures, and critical facilities through the removal or reduction of flammable vegetation.
- Ignition-resistant construction: projects that apply ignition resistant techniques and/or non-combustible materials on new and existing homes, structures, and critical facilities.
- Hazardous fuels reduction: projects that remove vegetative fuels near at-risk structures.

BCA Software and Methodology

FEMA requires the use of its BCA software (version 6 for all BCAs). Subapplicants can get the software by visiting [FEMA's Benefit-Cost Analysis Guidance and Tools website](https://www.fema.gov/media-library/assets/documents/179903): <https://www.fema.gov/media-library/assets/documents/179903>.

Data used in the Analysis

In order to complete a wildfire BCA, you must have the following information (this is not intended as a comprehensive list):

1. ZIP code of the project site.
2. Project description.

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3. Project cost and annual maintenance cost.
4. Number of structures being protected (if any). This information typically comes from a GIS-based analysis that shows the number of structures within the project area of effectiveness. FEMA defines the area of effectiveness for fuels reduction projects as two miles from the perimeter of the project. This often results in very large numbers of structures being included. It is not necessary to include every structure, and in many cases it is advisable to limit the number for simplicity. For the defensible space and ignition-resistant construction project types, the area of effectiveness is limited to whatever structure or structures are immediately adjacent to the project.
5. The value of structures within the project area of effectiveness. This is determined by calculating or estimating the total square footage, and then multiplying this value by the per-square-foot building replacement value. There are several standard open sources of the replacement value. Cal OES can provide recommended sources.
6. Number of people occupying structures in the project area of effectiveness. This can be determined by using the U.S. Census quickfacts website, and then multiplying the persons-per-household by the number of residential structures.
7. The value of saleable timber in the project area of effectiveness. This is not mandatory, and is normally used only when the benefits of a proposed project are insufficient without adding this category. Contact Cal OES for more information if this is applicable to your project.
8. The value of infrastructure in the project area of effectiveness. This is typically limited to overhead electric lines and is rarely used. Contact Cal OES for more information if this is applicable to your project.

Benefits

Benefits of wildfire mitigation projects include protecting structures, contents and infrastructure, avoiding injuries and deaths, and (in some cases) protecting saleable timber from being destroyed or damaged by fire. The software also allows the use of *environmental* benefits, which include five “open space” categories, e.g. green open space, riparian, wetlands, forest, marine/estuary. These categories may be used in a BCA only when areas that were previously developed are being returned to one of these uses via the mitigation project. These benefits seldom apply to any wildfire mitigation effort, and should be considered secondary to protecting structures and infrastructure. FEMA also

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allows the use of *stress and anxiety* benefits that apply specific values to avoiding these forms of damage. These are based on the numbers of people in the project area, and apply only when the underlying benefit-cost ratio for the project is 0.75 or greater.

The FEMA BCA software includes data entry fields related to each of these subjects, but it is the responsibility of the subapplicant to develop the information that is entered into the program.

Project Useful Life and Project Effectiveness

Project useful life is simply the period over which a project is effective. FEMA's 2009 BCA guidance (Appendix D) provides specific values for useful life, and can be found by visiting [FEMA's Benefit-Cost Analysis Guidance and Tools website](https://www.fema.gov/media-library/assets/documents/179903): <https://www.fema.gov/media-library/assets/documents/179903>.

Project effectiveness is the extent to which a mitigation activity reduces future damages. The wildfire methodology in the FEMA software provides default project effectiveness selections for the three most common project types.

Documentation

Cal OES and FEMA require subapplicants to provide documentation for all data that is used in a BCA. This must be included with the materials that are submitted as part of the application package. For wildfire projects, this includes an indication of how many structures and infrastructure elements (if applicable) are within the project area of effectiveness, the value of these elements, the number of people who reside within the area of effectiveness, and indications of the areas included in pre-calculated benefits, such as return to riparian uses and other environmental benefits. FEMA includes a limited range of default data in the software (burn probability – based on zip code, and lodging and per diem rates), and if subapplicants choose to use information other than the default, this must be fully documented and explained in a narrative.

Best Practices

Cal OES strongly recommends that each subapplicant BCA be supplemented by a brief technical report that summarizes the approach to the analysis, the data that was used, the sources of the data, and the results of the analysis.

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Cal OES also recommends that for wildfire hazardous fuels reduction projects that subapplicants use GIS approaches to determine the project area of effectiveness and the numbers of structures (or infrastructure elements) that are within this area, AND that local appraisal or GIS/tax records be used as the basis for determining the area of structures included in the BCA.

Pre-Calculated Benefits

FEMA policy allows for certain types of post-fire mitigation projects to be exempted from BCAs, where projects are designed to reduce risk from related hazards such as flood. Soil stabilization, flood diversion, and reforestation projects under the cost of \$5,250 per acre are determined cost effective and no further BCA is required.

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