



FEMA

Policy Clarification

Federal Insurance and Mitigation Administration

Benefit-Cost Analysis Tools for Drought, Ecosystem Services, and Post-Wildfire Mitigation for Hazard Mitigation Assistance

May 27, 2016

Purpose: The purpose of this policy clarification is to advise of and explain newly developed benefit-cost analysis tools to calculate benefits for climate resilient mitigation activities, including drought mitigation, ecosystem service, and pre-calculated benefits for cost effectiveness evaluation of soil stabilization, flood diversion, and reforestation projects in wildfire impacted areas to support expedient implementation of post-wildfire mitigation actions. On May 12, 2016, FEMA issued a memorandum titled *Benefit Cost Analysis Tools for Drought, Ecosystem Services, and Post-Wildfire Mitigation for Hazard Mitigation Assistance* releasing the new BCA Toolkit documents.

Background: In June 2013, FEMA released the *Considerations of Environmental Benefits in the Evaluation of Acquisition Projects under the Hazard Mitigation Assistance Programs*. This policy introduced the allowance of ecosystem services in the BCA of acquisition/open space projects. Ecosystem services are benefits provided to people by nature such as aesthetic value, air quality, recreation space, and water filtration.

In September 2015, FEMA released three new activities eligible for the Hazard Mitigation Assistance (HMA) programs: Aquifer Storage and Recovery, Floodplain and Stream Restoration, and Flood Diversion and Storage, known as the Climate Resilient Mitigation Activities (CRMA). These activities can be used for any hazard when appropriate and leverage traditional risk reduction benefits and applicable ecosystem services. Additionally, in 2015, FEMA developed pre-calculated benefits for cost effectiveness evaluation of soil stabilization, flood diversion, and reforestation projects in wildfire impacted areas to support expedient implementation of post-wildfire mitigation actions.

As stipulated by the May 12, 2016 memorandum, FEMA released the following additions to the Benefit-Cost Analysis (BCA) Toolkit and resources to support evaluating the cost-effectiveness of these mitigation activities:

- Aquifer Storage and Recovery BCA Tool
- Ecosystem Service Benefits Calculator
- Supplemental BCA Guidance for Floodwater Diversion and Storage Projects
- Supplemental BCA Guidance for Floodplain and Stream Restoration Projects
- Pre-calculated benefits for post-wildfire mitigation actions

These additional BCA Tools are available for Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM), and the Flood Mitigation Assistance (FMA) for which the application period is open on or after the date of the May 12, 2016 memorandum. Please note that not all mitigation activities are eligible under all three programs (e.g., wildfire mitigation is eligible under HMGP and PDM but not FMA).

Policy Clarifications: FEMA is committed to providing tools and resources to support communities in implementing drought mitigation actions. As part of CRMA, FEMA announced the eligibility of Aquifer Storage and Recovery projects to support community interest in increasing available water supply. FEMA has developed a tool to support cost-effectiveness evaluation for Aquifer Storage and Recovery projects.

The inclusion of ecosystem services in the BCA is no longer limited to only acquisition/open space mitigation activities; and may now be used for all eligible HMA activities that demonstrate the creation or enhancement of the environment including,

“FEMA’s mission is to support our citizens and first responders to ensure that as a nation we work together to build, sustain, and improve our capability to prepare for, protect against, respond to, recover from, and mitigate all hazards.”

but not limited to, CRMA projects or methods such as green infrastructure or nature-based design. The expanded offering of ecosystem services also supports the Office of Management and Budget (OMB) *Incorporating Ecosystem Services into Federal Decision Making* memorandum, dated October 7, 2015, that directed federal agencies to develop policies to promote consideration of ecosystem services in the decision making.

FEMA developed pre-calculated benefits to streamline implementation of mitigation actions in wildfire impacted areas 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.

Benefit-Cost Analysis (BCA): FEMA has developed a tool to support cost-effectiveness evaluation for Aquifer Storage and Recovery projects, and BCA supplemental guidance documents for Floodwater Diversion and Storage and Floodplain and Stream Restoration projects. These BCA tools were developed to provide expedient interim tools to calculate benefits for drought mitigation and/or ecosystem services for mitigation activities. These tools and methods will be incorporated into a future update of the BCA Toolkit software.

FEMA has developed a methodology to calculate the ecosystem service benefits. The methodology is included in a spreadsheet tool (Ecosystem Service Benefits Calculator) and is a stand-alone tool that will be incorporated into a future update of the BCA Toolkit software. The primary purpose of the HMA programs is to protect lives and reduce or eliminate future damage to property. Therefore, the BCA will include ecosystem services only if an activity is calculated to have a benefit-cost ratio (BCR) of 0.75 or greater using traditional risk reduction benefits. This condition applies for all types of activities that are eligible under the HMA programs. Please note that pre-calculated benefits cannot be combined with benefits from a traditional BCR calculated using the BCA software.

To use the post-wildfire pre-calculated benefits, the applicant would multiply the number of acres being mitigated by the total benefits per acre. For example, if the project is to provide ground cover, soil stabilization and replanting for 1,000 acres, $1,000 \times 5,250 = \$5,250,000$ in project benefits. These pre-calculated benefits are based on the risk reduction and ecosystem service benefits that are provided by forest and other vegetation with primary emphasis on the reduced flood risk these systems provide. The BCA Toolkit can be utilized to perform the benefit cost analysis for projects where the pre-calculated benefits are not enough to cover the mitigation activity. Post wildfire mitigation projects that demonstrate they are cost effective using the pre-calculated benefits do not need to submit a separate BCR.

The BCA Toolkit and the interim tools are available for download at <https://www.fema.gov/media-library/assets/documents/110202>. Please note that HMA Job Aids and Supplemental resources are forthcoming. All CRMA materials and HMA program resources can be found at <https://www.fema.gov/climate-resilient-mitigation-activities-hazard-mitigation-assistance>.

Contact Us: If you have any questions on details of the BCA, contact the BCA Technical Assistance Helpline at 1-855-540-6744 or bchelpline@fema.dhs.gov. For policy-related questions, contact the HMA Helpline at 1-866-222-3580 or hmagrantshelpline@fema.dhs.gov.