

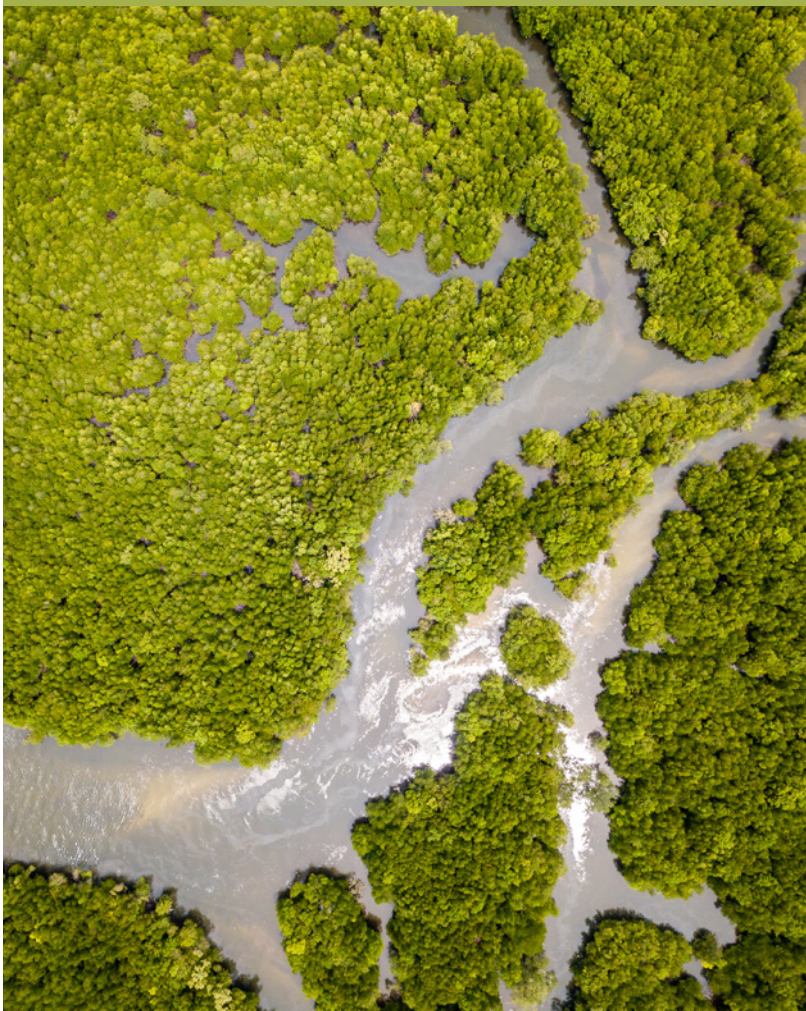
ECOSYSTEM SERVICES VALUES IN FEMA'S HAZARD MITIGATION PROGRAM

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The Federal Emergency Management Agency (FEMA) is the US federal agency tasked with assisting communities as they prepare for, respond to, or recover from, natural disasters. The agency provides billions of dollars each year in disaster mitigation project funding to communities through several Hazard Mitigation Assistance (HMA) programs. The 1998 Stafford Act requires that all mitigation projects must be cost-effective to the federal government, which simply means that benefits outweigh costs. Cost-effectiveness must be demonstrated through Benefit-Cost Analyses (BCAs) that compare the discounted net present value of a project's future benefits and costs. Because the quality and extent of natural ecosystems can influence the likelihood and magnitude of natural disasters, benefits provided by nature can be crucial to supporting disaster mitigation, as well as community resilience and wellbeing.

HMA PROGRAMS INCLUDE

the **Hazard Mitigation Grant Program (HMGP)**, **Building Resilient Infrastructure and Communities (BRIC)**, and **Flood Mitigation Assistance (FMA)**. FEMA also provides hazard mitigation funding through the **Public Assistance (PA)** program, sometimes referred to as **406 Hazard Mitigation**.



FEMA DEFINES ECOSYSTEM SERVICES AS

"direct or indirect contributions that ecosystems make to the environment and human populations," supporting disaster risk reduction through erosion control, air quality, recreation space, water filtration, and more, while also benefiting local ecosystems and nearby communities.

TIMELINE OF ECOSYSTEM SERVICES-RELATED UPDATES TO FEMA'S BCA TOOLKIT

In recent years, FEMA has begun to recognize the value of investing in Nature-Based Solutions (NBS) to mitigate the impacts of floods, wildfires, droughts, and other natural hazards. This new emphasis has been reflected through several important policy advances and updates to its BCA Toolkit, the main tool by which FEMA ensures that applicants follow best practices when reporting project benefits and costs. Earth Economics has worked closely with FEMA since 2013 to support the inclusion of monetary values for ecosystem services in the BCA Toolkit. Our ongoing partnership has led to policy updates that have more than tripled the number of ecosystem service values in the BCA Toolkit and extended their application to all FEMA project types. Earth Economics supported the third update to the BCA Toolkit in 2022, incorporating recent literature on ecosystem services valuation to further ensure that nature is valued in FEMA decision-making. See the [full update here](#).

SUMMARY OF 2022 ECOSYSTEM SERVICES VALUE UPDATES:

- ✓ Increases per-acre, per year estimates four-fold, on average
- ✓ Adds 50 additional research studies to support the included values
- ✓ Includes 22 new individual ecosystem services
- ✓ A total of 59 combinations of landcover and ecosystem services values
- ✓ Added 3 new land-cover types: coral reefs, shellfish reefs, and beaches and dunes
- ✓ Modifies prior urban and rural value estimates for green open space, as well as inland and coastal wetlands



TIMELINE OF ECOSYSTEM SERVICES-RELATED UPDATES TO FEMA'S BCA TOOLKIT

Landcover Types: 9 | Number of Values: 59

Earth Economics supported a third update to the BCA Toolkit values. These updates included the new land covers coral reefs, shellfish reefs, and beaches and dunes; modified existing land covers into urban and rural green open space, and inland and coastal wetlands; added 22 new individual ecosystem service values across all land cover types; and increased many of the landcovers' \$/acre values.

2022



Green Infrastructure Types: 4 Number of Values: 23

Earth Economics worked with FEMA to include nine economic benefits for four green infrastructure types (street trees, pervious pavement, bioretention, and green roofs).

2020



Landcover Types: 5 | Number of Values: 29

FEMA released a significant policy update (FP-108-024-02) which removed the 0.75 benefit-cost ratio threshold requirement for allowing ecosystem service values to be used in a BCA, meaning nature-based hazard mitigation projects could now be considered cost-effective based on the balance of costs and ecosystem services benefits alone.

Landcover Types: 5 | Number of Values: 29

Earth Economics developed values for three new land cover categories ("wetlands," "forest," and "marine and estuary") and updated values for existing land cover categories in the BCA Toolkit under subcontract to CDM Federal Programs Corporation. FEMA adds the following eligible activities: floodplain and stream restoration, green infrastructure, post-wildfire mitigation and aquifer storage and recovery.

2016



Landcover Types: 2 | Number of Values: 17

FEMA issues its first ecosystem services policy (FP-108-024-01), allowing the use of ecosystem service benefits in acquisition projects with a BCR of 0.75 or greater. Earth Economics developed the framework and ecosystem service values for "riparian" and "green open space" land cover categories in the BCA toolkit under subcontract to Ideation, Inc.

2013

