Community Disaster Resilience Zone Designation Methodology

Overview

The Community Disaster Resilience Zones Act of 2022 (P.L. 117-255) (CDRZ Act), signed into law by President Biden on Dec. 20, 2022, amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act, 42 U.S.C. § 5121 et seq.) by adding new section 206 (codified at 42 U.S.C. § 5136) and aims to build disaster resilience across the nation by directing the President to designate community disaster resilience zones in our nation's most at-risk and in-need communities.[1] In addition to providing technical assistance and financial benefits to these communities through FEMA's Building Resilient Infrastructure and Communities (BRIC) and Flood Mitigation Assistance (FMA) programs, the zone designations can help the private sector, nonprofits, philanthropies, and other non-federal partners target investments in community resilience.

Dataset Definitions

FEMA's National Risk Index (Version 1.19.0)

FEMA's National Risk Index (NRI) is an online mapping tool that identifies communities most at risk to 18 natural hazards and provides communities with standardized natural hazard risk data. Common designation criteria used in the National Risk Index include risk scores, which are identified at the census tract level, as well as percentile rankings within each state. The Community Disaster Resilience Zones designation methodology uses a tailored version of Centers for Disease Control and Prevention's (CDC) Social Vulnerability Index (SVI) in the National Risk Index that includes the Socioeconomic Status, Household Characteristics, and House Type & Transportation Themes.

As the Social Vulnerability and Community Resilience components of the NRI are not currently available for tribal census tracts, FEMA developed an additional product, based on the Expected Annual Loss (EAL) component of the NRI, to define hazard risk in tribal census tracts. To calculate EAL for tribal census tracts, FEMA first disaggregated state-county census tract level data to the census block level, and then reaggregated the data to the tribal census tract level. See the Designation Methodology for Tribal Nations section for a detailed description of this approach.

[1] The Act refers to "the President" throughout. These authorities vested in the President are delegated to the Secretary of Homeland Security who has in turn delegated them to the Administrator of FEMA.

Furthermore, NRI scores do not include the Community Resilience component for any of the five territories. NRI scores do not include the Social Vulnerability component for American Samoa, Guam, the Commonwealth of the Northern Mariana Islands, and the U.S. Virgin Islands.

Climate and Economic Resilience Screening Tool (Version 1.0)

The White House Council on Environmental Quality Climate & Economic Justice Screening Tool (CEJST) provides users with an interactive map and datasets comprised of indicators of burdens in eight categories: climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development. The tool uses this information to identify census tracts including disadvantaged communities who experience these burdens at or above identified thresholds and meet an associated socioeconomic burden or are on land within boundaries of federally recognized tribes, including Alaska Native Villages. Communities on land within the boundaries of federally recognized tribes are also considered disadvantaged.

However, as the CEJST technical documentation indicates, many datasets are not currently available for the territories. For Puerto Rico, CEJST includes only 15 of 30 burdens in 7 of 8 categories: low income, projected flood risk, energy cost, lack of indoor plumbing, lead paint, housing cost, proximity to hazardous waste facilities, proximity to Superfund or National Priorities List (NPL) sites, proximity to Risk Management Plan (RMP) facilities, diesel particulate matter exposure, traffic proximity and volume, underground storage tanks and releases, wastewater discharge, low median income, poverty, unemployment, and high school education. For American Samoa, Guam, the Commonwealth of the Northern Mariana Islands, and the U.S. Virgin Islands CEJST includes only 4 of 30 burdens in 1 of 8 categories: unemployment, poverty, low median income, and high school education.

2020 Census tract to 2010 Census tract Relationship File

The Community Disaster Resilience Zones designation team created a Census Relationship File that provides a table describing simple geographic relationships between the 2020 and 2010 Census tracts. This single file provides the clearest path for harmonizing census tract geographical boundaries from different years.

Initial Community Disaster Resilience Zones Designations

On September 6, 2023, FEMA designated an initial set of 483 Community Disaster Resilience Zones (CDRZ) in the 50 states and District of Columbia.

New section 206 of the Stafford Act requires FEMA to designate these zones at the census tract level based on natural hazard risk ratings. To identify what census tracts are most in need of assistance for resilience-related projects, FEMA used components of and datasets from the FEMA National Risk Index in tandem with the White House Council on Environmental Quality Climate & Economic Justice Screening Tool for the initial round of zone designations.

FEMA used fields from these datasets to identify and designate communities within 2020 Census tracts as Community Disaster Resilience Zones if they satisfy both of the following criteria:

- Their composite National Risk Index - Risk Index Scores (i.e. Composite Risk Score) rank in the top 50 nationally or the top 1% within their state.
- They are identified as a disadvantaged community by the Climate & Economic Justice Screening Tool.

Initial Designation Methodology

STEP 1: IDENTIFY CENSUS TRACTS MEETING RISK-BASED DESIGNATION CRITERIA

The National Risk Index Composite Risk Scores were used to identify 2020 Census tracts that satisfy at least one of the following criteria:

1. Its Composite Risk Score ranks among the top 50 census tracts nationally, or
2. Its Composite Risk Score ranks among the top 1% of census tracts within its residing state.[2]

STEP 2: INCORPORATE CLIMATE & ECONOMIC JUSTICE SCREENING TOOL INFORMATION

Climate & Economic Justice Screening Tool datasets are only available for 2010 Census tract entities and the datasets were cross walked to the 2020 Census tract entities using the Census Relationship file. During this data harmonization, a new column was created containing the sum of rows within each 2020 Census tract for which:

1. The 2010 Census tract it overlaps is identified as disadvantaged by the Climate & Economic Justice Screening Tool, and
2. The overlapping area contains land.[3]

This new column indicates the number of disadvantaged 2010 Census tracts with land area that overlaps in each 2020 Census tract. A new field was created identifying each 2020 Census tract as disadvantaged if its land area overlaps one or more 2010 Census tracts that is identified as disadvantaged from Climate & Economic Justice Screening Tool.

These datasets were joined to the National Risk Index Census tract dataset using the 2020 Census tract Federal Information Processing Standard (FIPS) codes. The resulting dataset contains all the necessary fields for the Community Disaster Resilience Zones Designation.

To designate the Community Disaster Resilience Zones, every 2020 Census tract that satisfies criteria from Step 1 was identified as a Community Disaster Resilience Zone only if the 2020 Census tract is also identified as disadvantaged at the conclusion of Step 2.

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[2] Census tracts residing in the District of Columbia with composite Risk Score in the top 1% of the district satisfy these criteria.

[3] Land area overlap values are provided by the field named “AREALAND_PART”. If this field data numbers are positive, then the overlap contains land.

STEP 3: ASSIGN AT MINIMUM ONE DESIGNATION FOR EVERY STATE

At the conclusion of Step 2, 47 of 50 states and the District of Columbia contain one or more identified Community Disaster Resilience Zones. There were only 3 states without a zone designation – Alaska, North Dakota, and Wyoming – due to the disadvantaged screening filter.

To ensure that each state had at least one zone, the 2020 Census tracts with the highest National Risk Index – Composite Risk Score that was also identified as disadvantaged by the Climate & Economic Justice Screening Tool was selected as a Community Disaster Resilience Zone in Alaska, North Dakota, and Wyoming.

STEP 4: PEER REVIEW

In order to develop, improve, review and validate this methodology and to comply with section 206(f) of the Stafford Act, FEMA consulted with subject matter experts participating in a Methodology Data Working Group, as a part of the interagency Mitigation Framework Leadership Group (MitFLG). This working group is comprised of representatives from the 14 agencies outlined in the legislation and will continue to engage as FEMA continually updates the National Risk Index. In addition, the modified version of the Center for Disease Control and Prevention's Social Vulnerability Index used in the designation process is based on methods provided by and reviewed by the CDC Social Vulnerability Index team.

Community Disaster Resilience Zone Designations for Tribal Nations

FEMA's initial designations targeted the census tracts identified as disadvantaged communities that are most at-risk to natural hazards. Although thirty-nine census tracts that overlap with tribal lands were identified in initial designations, these were not chosen specifically because they contained Tribal Nation lands. Due to the depth of need and severity of risk faced by Tribal Nations, and in response to feedback received in an official Tribal Consultation, FEMA is designating additional tracts specifically for these communities, with at least one census tract designated per federally recognized Tribal Nation.

FEMA used a collaborative approach to designate 20 percent of the census tracts that overlap with each Tribal Nation's lands as Community Disaster Resilience Zones. Twenty percent reflects the greater risk and need faced by Tribal Nations in relation to the states (1 percent) and the territories (10 percent). The collaborative approach promotes sovereignty and self-determination by combining national datasets developed by FEMA and Tribal Nations' self-certified data and Indigenous knowledge.

In addition to sovereignty and federal treaty and trust responsibilities, FEMA is taking a collaborative approach because currently available risk data tailored to Tribal Nation lands is insufficient. The National Risk Index (NRI), a key data source for designating zones for the states and the District of Columbia, is calculated at the State-County census tract level but Tribal Nation lands do not align with State-County census tracts. This means that the level of risk faced by non-tribal areas within a census tract can skew the overall risk score for that tract, potentially misrepresenting the level of risk faced by Tribal Nations. Section 206 of the Stafford Act requires FEMA to designate zones at the census tract level, and where available, FEMA used tribal census tracts to ensure maximum benefits to Tribal Nations. To capture the full extent of tribal lands across the county, FEMA used state-county census tracts to

supplement tribal census tracts for tribal land outside of tribal census tracts.[4] FEMA is continuing to work with Tribal Nations to identify land area representation for zone designation purposes.

There are additional data challenges associated with assessing risk in tribal lands. Tribal Nations face less accurate and more limited 2020 Census data than other communities. There is a misalignment between building structure data and some Tribal Nation building types (Hazus 6.0). Additionally, historic loss ratios are underreported in tribal areas.

In short, data challenges and the Administration's commitment have informed this collaborative, CDRZ zone co-designation approach.

Designation Methodology for Tribal Nations

STEP 1: IDENTIFYING TRIBAL NATION LANDS USING A COMBINATION OF TRIBAL AND STATE-COUNTY CENSUS TRACT BOUNDARIES

To identify Tribal Nation lands using U.S. Census data, FEMA started with tribal census tracts and then used the Pairwise Erase tool provided by ArcGIS to obtain all 2023 American Indian, Alaska Native, and Native Hawaiian (AIANNH) areas that *do not* intersect with 2023 tribal census tract boundaries.

With the remaining shapes, FEMA used AIANNHCE (American Indian/Alaska Native/Native Hawaiian Area Code) values as a filter to obtain the set of federally recognized tribal lands without tribal census tract representation. FEMA then merged these shapes with the 2023 tribal census tract boundaries into a single feature class in a new geodatabase. The resulting product was the geographical baseline for identifying Tribal Nation lands and designating census tracts, as section 206 of the Stafford Act requires. This baseline was adjusted as needed in consultation with Tribal Nations to ensure that their lands were properly reflected in FEMA's datasets.

STEP 2: CALCULATE EXPECTED ANNUAL LOSS EXPOSURE VALUES FOR EVERY TRIBAL NATION

FEMA then calculated Expected Annual Loss (EAL) Exposure values for every Tribal Nation within each of their eligible census geometries. FEMA began by spatially joining all fields from all tribal features obtained in Step 1 to the 2020 census blocks they intersect with along with their respective NRI v1.19 census block data fields for Composite EAL and Exposure. For tribal census tracts, we aggregated Composite EAL values across the census blocks within their boundaries.

Similarly, for tribal lands without tribal census tract representation, FEMA grouped census blocks by their associated AIANNH GEOID and 11-digit census tract Federal Information Processing Series (FIPS) code and aggregate

[4] Tribal lands may include but are not limited to reservations, lands held in trust by the United States government for the Tribal Nation (trust land), dependent Indian communities, Tribal service areas, pueblo lands, ceded Tribal lands, treaty lands, lands used for subsistence activities, traditional Tribal territories, individual Tribal community member land (allotted land), service areas, as well as land owned by the Tribal Nation or Tribal community members (fee simple land). Tribal lands that are in fee simple do not need to be in trust or in the process of transitioning to trust in order to be considered Tribal land.

Composite EAL values for each consequence type. This generates EAL values for the intersected areas between 2020 US census tracts and tribal lands that lie outside of the 2023 tribal census tract boundaries.

STEP 3: CALCULATE TOTAL ANNUAL EXPECTED LOSS RATE

Next, FEMA used the Composite EAL and Exposure values obtained in Step 2 to calculate EAL Rate percentile rankings across the eligible census geometries within each Tribal Nation. To do this, FEMA calculated Interim Total EAL rates. Then FEMA used these values to rank the eligible census geometries within each Tribal Nation.

STEP 4: COORDINATE AND CONFIRM IDENTIFIED TRACTS WITH TRIBAL NATIONS

FEMA then identified the top 20 percent (by EAL rate) of the ranked eligible census geometries from Step 3.[5] For Tribal Nations without formal boundaries, FEMA identified the census tract with the Tribal Nation's headquarters. If the Tribal Nation has multiple headquarters, FEMA worked with the Tribal Nation to identify the primary headquarters for this purpose.

FEMA then invited Tribal Nations to revise the initial tract selections as appropriate, considering local knowledge and self-certified data. Tribal Nations were not confined to designate tracts on their federally recognized lands. For example, a Tribal Nation could choose to designate a census tract where many of its members reside, even if that is not on its federally recognized lands.

FEMA designated the final selections, within the 20 percent cap, for each Tribal Nation.

Community Disaster Resilience Zone Designations for U.S. Territories

U.S. territories—American Samoa, the Commonwealth of the Northern Mariana Islands, Guam, Puerto Rico, and the U.S. Virgin Islands—are treated as states under the Stafford Act, and section 206 of the Stafford Act requires that FEMA designate at least 1 percent of the census tracts in each territory as CDRZ. U.S. territories were not included in the first set of designations, announced in September 2023, so that FEMA could prioritize meaningful engagement with territorial stakeholders.

FEMA used a collaborative approach to designate 10 percent of the census tracts in each territory. To reach 10 percent, FEMA first identified the top 20 percent of total census tracts by highest risk, using the best available data for each territory, ensuring that each tract is identified as disadvantaged by the Council on Environmental Quality's Climate and Economic Justice Screening Tool (CEJST). FEMA then worked collaboratively with each region and territory to select amongst the identified tracts, reducing the total to 10 percent. FEMA designated a greater percentage of tracts in the territories than tracts in states and D.C. (1 percent) because data quality for the territories is inconsistent and territories are, in general, at greater risk than the 50 states and D.C. The methodology

[5] FEMA is designating 20% of the census tracts for each Tribal Nation to reflect their greater risk and need compared to the states (1%) and the territories (10%).

for selecting 10 percent is based on the requirement in section 206 of the Stafford Act to "consider making designations in coastal, inland, urban, suburban, and rural areas."

FEMA is taking a collaborative approach because currently available risk data for the territories is insufficient and unreliable. For example, the Community Resilience component of the National Risk Index (NRI) is unavailable for Puerto Rico and both the Community Resilience and Social Vulnerability components of the NRI are unavailable for American Samoa, Commonwealth of the Northern Marianas, Guam, and the U.S. Virgin Islands. Data for various natural hazards are incomplete for many of the territories as well.

Designation Methodology for U.S. Territories

STEP 1: IDENTIFY CENSUS TRACTS MEETING RISK-BASED DESIGNATION CRITERIA

NRI data is incomplete for territories. To address this gap, FEMA used the following approach to identify census tracts that are most at risk to natural hazards:

1. Puerto Rico – FEMA used the Expected Annual Loss component of the NRI and the Center for Disease Control Social Vulnerability Index.[6]
2. American Samoa, Guam, Northern Mariana Islands, and US Virgin Islands – Due to many data limitations, FEMA used NRI - Expected Annual Loss data.

STEP 2: INCORPORATE CLIMATE & ECONOMIC JUSTICE SCREENING TOOL INFORMATION

CEJST datasets are only available for 2010 Census tracts. To identify disadvantaged 2020 Census tracts, FEMA used the Census Relationship file to crosswalk 2010 and 2020 Census tracts. During this data harmonization, FEMA identified a 2020 Census tract as disadvantaged if the overlapping area contains tracts with a minimum of 1% land area overlap. Any census tracts with a total land area overlap less than 1% of its own total land area were excluded.

These datasets were then joined to the NRI census tract dataset using the 2020 Census tract Federal Information Processing Standard (FIPS) codes. The resulting dataset contains all the necessary fields for the CDRZ designation.

STEP 3: PRELIMINARILY IDENTIFY THE TOP 20 PERCENT MOST AT RISK CENSUS TRACTS

To preliminarily identify potential CDRZ, FEMA:

3. Multiplied each territory's total census tracts by 20 percent.[7]
4. Removed from consideration all 2020 census tracts that were not identified as disadvantaged in Step 2.

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[6] The CDRZ designation methodology uses a tailored version of CDC's Social Vulnerability Index (SVI) in the NRI that includes the Socioeconomic Status, Household Characteristics, and Housing Type & Transportation Themes.

[7] Inclusive of land and water census tracts.

5. Ranked the remaining census tracts by the Expected Annual Loss component of the NRI (for Puerto Rico, Social Vulnerability was included).
6. Identified the top ranked census tracts equal to the calculation from 1 above.
7. Passed the identified census tracts to step 4.

STEP 4: COORDINATE WITH EACH TERRITORY TO SELECT 10 PERCENT OF TOTAL CENSUS TRACTS

FEMA then invited each territory to select among the preliminarily identified tracts, reducing the total to 10 percent of each territory's total census tracts (see below), considering local knowledge and data.

- American Samoa – 2 tracts
- Commonwealth of the Northern Mariana Islands – 3 tracts
- Guam – 6 tracts
- Puerto Rico – 99 tracts
- U.S. Virgin Islands – 4 tracts

Next Steps / Future Directions

FEMA will announce the next group of Community Disaster Resilience Zones in 2025. Future Community Disaster Resilience Zone designations will continue to be data-driven and dependent on updates to data included in both the National Risk Index and Climate & Economic Justice Screening Tool. In addition, future designations will consider recommendations and feedback provided by the 2023 Request for Information published in the Federal Register as part of implementing the CDRZ Act.