Best Practices for Using FloodVision

CLIMATE CENTRAL

Purpose of FloodVision

FloodVision® is designed to communicate potential flood risk from storm events and sea level rise to individuals, organizations, and authorities responsible for resilience and adaptation planning and to help emergency managers communicate potential flood risk and plan for storm events.

Intended Audience and Users of FloodVision (Non-Commercial) Visuals

- Public officials, including but not limited to planners, emergency managers, engineers, consultants, other climate service providers,
- Community leaders and concerned citizens interested in integrating climate impacts data and visualizations into planning, public education, and other documents.
- Journalists and meteorologists reporting on climate impacts and communicating flood risk.
- Academics, teachers, and students integrating visualizations into educational materials, research, presentations, or studies.
- State, local, tribal and territorial government officials leading or contributing to Hazard Mitigation Plans that serve as an eligibility requirement for U.S. Federal Emergency Management Agency (FEMA) disaster mitigation grants.

Best Practices for Using FloodVision

<u>Present a flood event scenario that portrays risk responsibly</u>

FloodVision allows users to select from a number of scenarios. Users can work with Climate Central staffers to select the scenarios and visualizations that best work for their needs. Here are some examples:

- **Forecasted storm event.** When an extreme storm event is predicted with a map of projected flooding heights, users can select that height of water in a visualization for risk communications to warn people to prepare or evacuate.
- **Current potential storm surge risk.** You can select a height of water over the mean high higher water (MHHW) that occurred during a historic storm at or near that location. For example, during Hurricane Sandy, the 9 foot storm surge coincided with a high astronomical tide creating a record tidal maximum of 13.88 feet at The Battery in New York City Harbor.
- **Near-term sea level rise + yearly storm.** Sea level along the U.S. coastline is projected to rise, on average, 10 - 12 inches (0.25 - 0.30 meters) in the next 30 years (2020 - 2050), which will be as much as the rise measured over the last 100 years (1920 - 2020). To show the risk associated with this level, you can

select the year 2050, the intermediate scenario, and select an annual flood risk.

- **Long-term sea level rise + no storm.** About 2 feet (0.6 meters) of sea level rise along the U.S. coastline is increasingly likely between 2020 and 2100 because of emissions to date. Failing to curb future emissions could cause an additional 1.5 - 5 feet of rise for a total of 3.5 - 7 feet by the end of this century. To show this risk, select 2100, the intermediate-high 50th percentile scenario, and no flood.

Provide information and context

- Every visualization used for non-commercial purposes must show language provided in the right hand bottom corner that this is a “modeled visualization” with the scenario information used for that visualization (for example: NOAA22 - Modeled visualization of potential inundation for 2050 under NOAA’s 2022 intermediate high sea level rise scenario, 50th percentile)
- Must credit: Climate Central FloodVision®

What is allowed to be shown:

- Private properties (including storefronts) that are part of a streetscape that do not focus on any particular private property, or contain personally identifiable information, such as individual names, individual telephone numbers, or faces, particularly of children.
- Purely public properties such as parks, beaches, intersections, highways, and evacuation routes, transportation facilities, the outside of federal buildings, etc.
- Commonly known landmarks

What is *not* allowed to be shown:

- A private property (that is not a commonly known landmark) that is the main focus of the visualization.
- Individual homes, especially those with identifiable information (ie: name, address or other personally identifiable information)
- Properties filmed from private property (ex: homeowners’ association private roads) even if the properties shown are public. Properties should not be filmed from private property unless the property owner specifically consents in writing

Use best practices in showing private property images

- Make sure personally identifiable information is not included in images
- Smudge individual faces, license plate numbers, street addresses, etc.

Caveats of FloodVision

Climate change science is constantly evolving. Our visualizations are based on the latest sea-level projections, including those from the recently released Sixth Assessment Report (AR6) from the Intergovernmental Panel on Climate Change (IPCC) and the 2022 Sea Level Rise Technical Report from an interagency U.S. government task force (including NOAA, FEMA, USGS, and others).

- Coastal defenses. FloodVision visualizations and data focus on the scanned area and do not account for coastal defenses, such as levees, flood control structures, or natural terrain features like ridges, that exist outside the scanned region and could provide protection to the areas analyzed and visualized.
- Bathtub Model. FloodVision visualizations utilize a "bathtub model" for the area scanned and analyzed, assuming uniform water levels across the landscape, and do not incorporate dynamic factors such as physical storm surge modeling, which may affect the accuracy for rapidly changing flood events or specific protective features outside the scanned scope.
- Our visualizations are not based on physical storm and flood simulations and do not take into account factors such as erosion, future changes in the frequency or intensity of storms, inland flooding, or contributions from rainfall or rivers.

Glossary

100 Year Flood - The term "100-year flood" refers to a flood event that has a 1 percent chance of occurring in any given year. This term does not mean that such floods occur only once every 100 years; rather, it indicates the statistical probability of occurrence. It is possible for a 100-year flood to happen multiple times in a smaller number of years.

Base Flood Elevation (BFE) - The elevation of the “100-year flood,” or the elevation of surface water resulting from a flood that has a 1% chance of equaling or exceeding that level in any given year. It is used as the national standard by federal agencies for requiring flood insurance and regulating new development.

Bathtub mapping/modeling of sea-level rise - Coastal flood mapping that assesses vulnerability based on comparing a water height (such as sea level rise plus the local

1-year return level storm surge height) with land elevation. This method does not model dynamics such as those driven by waves, wind, bathymetry, water level attenuation, rainfall, or river flooding.

Digital elevation model (DEM) – A representation of the Earth's topographic surface above a certain datum (such as sea level) in digital form often used in geographic information systems (GIS).

Intergovernmental Panel on Climate Change (IPCC) - The United Nations body for assessing the science related to climate change. Through its assessments, the IPCC determines the state of knowledge on climate change. The IPCC identifies where there is agreement in the scientific community on topics related to climate change, and where further research is needed. The reports are drafted and reviewed in several stages, thus guaranteeing objectivity and transparency. The IPCC does not conduct its own research. IPCC reports are neutral, policy-relevant but not policy-prescriptive. The assessment reports are a key input into the international negotiations to tackle climate change. Created by the United Nations Environment Programme (UN Environment) and the World Meteorological Organization (WMO).

Light Detection and Ranging (LiDAR) – A remote sensing method capable of measuring distance and direction to an object by emitting timed pulses of light and measuring the time between when a pulse was emitted and when its echo was received. When combined with a Global Positioning System (GPS), lidar technology can be used to map coastal topography faster and more thoroughly than traditional surveying methods.

Local sea-level - The height of the water as measured along the coast relative to a certain datum.

Mean Higher High Water (MHHW) - Coastal areas experience a mixed semidiurnal tidal
pattern, with two unequal low and high tides per day. Mean higher high water is the average of the highest water level observed in each day over a period of interest. An official MHHW tidal datum is established by NOAA for each tide station by averaging over a designated 19.6-year "tidal epoch" period.

Mean Lower Low Water (MLLW) is the average level of the lowest tide for each day computed over a 19-year period. (See Mean Higher High Water)

Representative Concentration Pathways (RCPs) - Greenhouse gas scenarios that include 21st century changes in the concentrations of the full suite of greenhouse gasses, and particulates, and chemically active gasses; as well as changes in land use and land cover. The word "representative" signifies that each RCP provides only one of

many possible scenarios that would lead to the specific radiative forcing characteristics. The term pathway emphasizes that not only the long-term concentration levels are of interest, but also the trajectory taken over time to reach that outcome.

Resilience - The capacity of a system, community, or society potentially exposed to hazards to adapt, by resisting or changing, in order to reach and maintain an acceptable level of functioning and structure. This is determined by the degree to which the social system is capable of organizing itself to increase its capacity for learning from past disasters for better future protection and to improve risk reduction measures.

Risk - The potential for harmful consequences or expected losses (death and injury, losses of property and livelihood, economic disruption, or environmental damage) resulting from interactions between natural or human-induced hazards and vulnerable conditions. This can be assessed as the product of the probability of such events occuring with the severity of their consequences.

Storm surge - Water that is pushed toward the shore by the force of the storm winds.

Tide gauge - An instrument fitted with sensors that record the height of the surrounding water-level to help with tide monitoring.

Datum - A base elevation used as a reference from which to reckon heights or depths. These include ellipsoidal datums such as WGS84, which model Earth as a smooth ellipsoid, orthometric datums such as NAVD88 that incorporate Earth's gravitational field, and tidal datums such as mean higher-high water (MHHW) which are based on average tide phase heights directly measured at local tide stations.

Sources used for Glossary:

Sea-level Rise and Coastal Flood Risk Assessment: Island County, Washington, Miller, et. al. (2016)
IPCC 5 (2013)
FEMA NOAA Coastal Inundation
NOAA Tides and Currents
EPA Climate Adaptation Resource Center
NASA Sea-level Change Glossary

Data collected by FloodVision for each visualization:

U.S. state, city, street name and number, zip code
Date of drive

Latitude and longitude coordinates
Altitude relative to datums such as Mean Higher High Water and Mean Lower Low Water
GPS estimated precision
EFE - entry floor elevation
Road elevation