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CONFRONTING THE CLIMATE CRISIS

GIS for Climate Action Planning

How does your community move beyond the climate threat and create climate opportunity? Jurisdictions at all scales are facing the need to mitigate impacts of the climate crisis that threatens our safety, economies, and quality of life. The impacts of the crisis are diverse, including declining air quality, flooding, sea level rise, biodiversity loss, and extreme heat. The complexity of the crisis can make it difficult to prioritize effective actions with budget restrictions and resources. With geographic information system (GIS) technology, you can take immediate action where it matters most.

By utilizing GIS, you can turn the climate crisis into climate opportunity. GIS provides you with a comprehensive view to develop short-, medium-, and long-term strategies. Whether you need to site suitable locations to shelter unhoused populations during extreme weather events, or understand the relationship between forecasted water supply, crop production, and economic impacts, GIS modeling allows you to assess current conditions against future scenarios. With GIS, you can leverage locally authoritative data including community assets, transportation networks, and land development with community variables and climate models to inform and develop your community's climate action plan. Ensure that your community thrives, and get ahead of the storm with GIS today.

GIS enables communities to take their climate action planning to the next level, breaking it into actionable steps.
A geographic approach enables you to

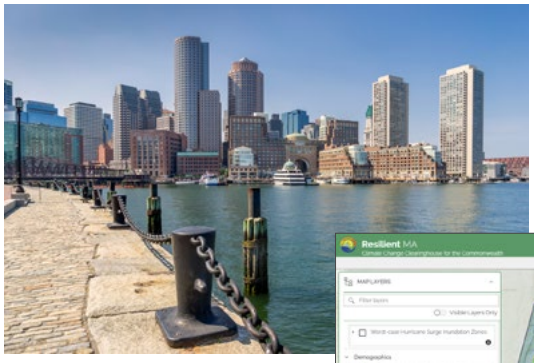
- Establish your baseline understanding of what climate hazards impact you most at the local level, to measure your risk and reveal opportunities.
- Design a mitigation and adaption strategy by prioritizing immediate actions through geospatial artificial intelligence (GeoAI) techniques.
- Communicate and share priorities and initiatives with stakeholders to gain support and buy-in.
- Measure and report on the success of these critical initiatives through ArcGIS® StoryMaps℠ and ArcGIS Dashboards to ensure transparency and accountability.

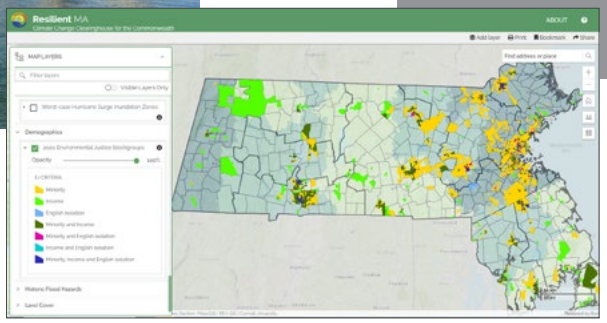
Establish a Baseline to Identify Risk and Reveal Opportunity

GIS empowers you to understand what hazards will have the most impact and where.

Establishing a baseline to understand what climate hazards will impact your community most is the key to developing plans to address them. GIS allows communities to visualize and model these complex interactions at once and in real time. Organizing data from sensor networks, field data collection, and remotely sensed data from drones and satellites using GIS provides a real-time awareness of current conditions. Users can synthesize this information into a single operating picture for both current and future conditions, assessing not only hazards' greatest risk but also where they occur, and whom and what will be impacted. These insights allow communities to change climate hazards into opportunity by confidently investing in sustainable infrastructure and implementing sustainable policies.

- Use authoritative national datasets, maps, and apps through the White House Climate Mapping for Resilience and Adaptation portal to establish an immediate baseline.
- Analyze your areas of greatest risk and opportunity using ArcGIS Pro.
- Manage your community's data securely with ArcGIS Enterprise.
- Ingest data from sensors and third-party APIs to monitor your community's climate in real time with ArcGIS Velocity℠.
- Extract new insights from imagery streams to classify your land use and extract community assets using ArcGIS Image.
- Streamline your workforce's monitoring and inspection activities with ArcGIS Field Maps.





Cities in Massachusetts are using the resources and tools available on the site to plan and prioritize resilience projects.

Massachusetts Bolsters Resilience with Accessible Climate Data and Tools

Communities across Massachusetts can use the ResilientMass Maps and Data Center site to inform and guide resilience project planning and implementation. Leveraging the White House's GIS-based Climate Mapping for Resilience and Adaptation portal, the Executive Office of Energy and Environmental Affairs (EEA) launched its own climate data clearinghouse to promote community awareness and engagement around climate risk. Users can create and share maps showing climate change risks, forecasts, and adaptation strategies for their localities.

Interactive Maps Tell the Story of Modern Risk Mitigation

After getting feedback that its huge five-year effort to create a state hazard mitigation plan was not useful, the Florida Division of Emergency Management took a new approach, using GIS technology to build a more engaging experience. What was once a 500-page PDF document is now a website with data-rich maps and insightful narrative. Built using ArcGIS Hub to organize information and ArcGIS StoryMaps for narratives, the new GIS-based approach is more user-friendly, enabling better loss-avoidance reporting, stronger collaboration, and clear risk visibility.

Design Your Mitigation Strategy

GIS empowers you to determine your future with your choices today.

GIS helps communities identify opportunities, such as areas suitable for renewable energy projects or sustainable land-use planning. GeoAI-based techniques, such as using machine learning and predictive modeling, can help organizations analyze vast amounts of geospatial data to reveal the signature in the noise, identifying trends, and compare potential future scenarios. By harnessing the power of GIS, communities can make informed decisions, allocate resources effectively, and implement proactive measures to build resilience and adapt to the challenges posed by climate hazards.

- Incorporate environmental and social information into community planning scenarios with ArcGIS Urban.
- Visualize and compare mitigation scenarios and site selection with ArcGIS Pro.
- Ensure that mitigation strategies protect your most vulnerable populations with ArcGIS Community Analyst℠.
- Integrate complex data science seamlessly into workflows using the R-ArcGIS Bridge and Jupyter Notebooks.
- Take advantage of pretrained deep learning models in ArcGIS Living Atlas of the World and ArcGIS Pro to quickly gain insights through artificial intelligence and machine learning.

The Florida Enhanced State Hazard Mitigation Plan (SHMP) identifies hazards based on the history of disasters within the state and lists goals, objectives, strategies, and actions for reducing future losses.

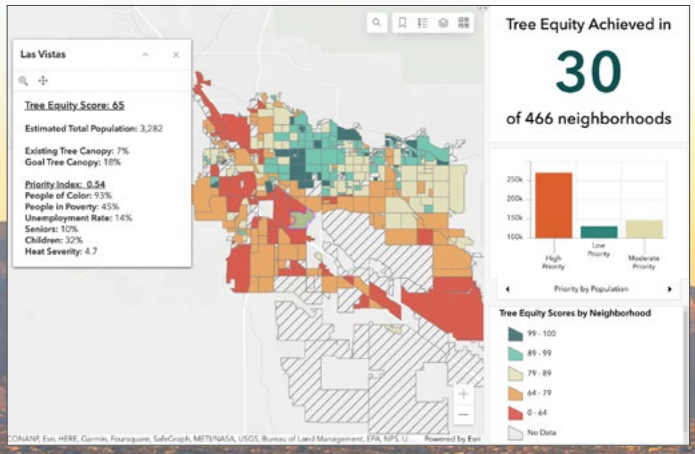
Communicate Risk, Priorities, and Initiatives

GIS empowers you to share priorities and initiatives with stakeholders to gain support.

Climate hazards impact your environmental assets, threaten lives, and harm your economy. GIS allows communities to communicate how policy decisions will help mitigate these hazards to gain buy-in from multiple perspectives. With GIS, communities can summarize complex information, allowing stakeholders and the public to interact with different scenarios, understand how scenarios might impact them, and provide relevant and data-driven feedback during public hearings and other engagements. GIS allows communities to engage organizations and nongovernmental organizations (NGOs) to empower everyone to contribute to the community's broader climate action goals.

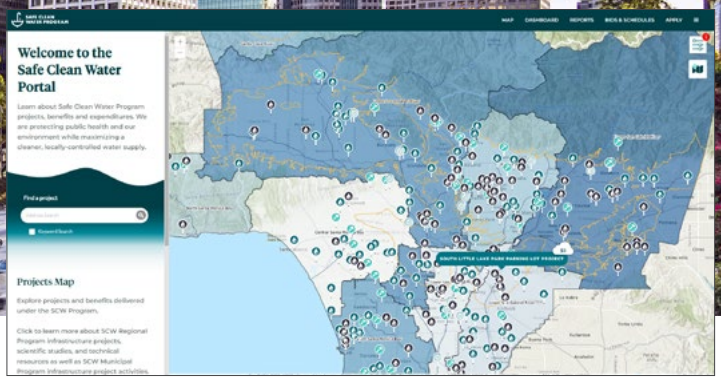
- Communicate clearly and effectively without compromising the facts, using ArcGIS StoryMaps.
- Provide your community with the tools they need to take action using ArcGIS Experience Builder.
- Summarize complex climate science into intuitive and interactive maps, charts, and graphs with ArcGIS Dashboards.
- Empower all stakeholders to contribute using ArcGIS Hub.

An interactive GIS dashboard allows people to monitor the city's progress toward tree equity at the neighborhood level.



Building Extreme Heat Resilience: Tucson Million Trees

With Tucson being one of the fastest-warming cities in the United States, the city developed a program to build heat resilience through increasing the tree canopy coverage, with a particular focus on ensuring equitable coverage. The Tucson Million Trees initiative features an interactive GIS dashboard that utilizes American Forests' Tree Equity Score methodology to calculate a tree equity score for each of Tucson's 466 neighborhoods. The score combines a series of metrics pertaining to each neighborhood's tree canopy cover as well as climate, demographic, and socioeconomic information to create a single measure of the need for investment. The city considers indicators such as the percentage of people of color, percentage of people living in poverty, the unemployment rate, and the population of seniors and children in order to effectively target the communities that will benefit the most from increased tree coverage. The dashboard is publicly available for people to track the city's progress toward tree equity, and residents are able to use an online reporting tool to submit information about the trees they plant.



Anyone can visit the Safe, Clean Water Program site to see the map of projects, benefits, and expenditures.

Measure and Report

GIS empowers you to track the success of critical initiatives to ensure transparency.

When communities utilize GIS holistically throughout their climate planning process, they position themselves to be able to measure and report on progress in real time, with better insights. Communities can use GIS to create visually compelling maps and infographics that effectively communicate progress to stakeholders, policymakers, and the public. Presenting data in a spatial context overcomes language barriers, enhances understanding, and supports evidence-based decision-making. Overall, the use of GIS in measuring and reporting on success provides organizations with reliable and transparent evidence of their efforts in addressing climate risk, enabling them to demonstrate accountability, rapidly inform future actions, and foster collaboration with stakeholders.

- Provide everyone in your entire organization with the tools they need to contribute updates to your climate action initiative.
- Shine a light on your success with engaging and effective maps and rich content with ArcGIS StoryMaps.
- Track projects and outcomes through space and time with ArcGIS Dashboards.
- Provide residents and stakeholders—with tools that match their skill level—with ArcGIS Experience Builder.
- Ensure that everyone remains up-to-date and informed of initiatives with ArcGIS Hub.

LA County Maps Big Plans for Its Water Supply

Roughly one-third of the water supply in Los Angeles comes from locally pumped groundwater that is continually replenished by percolation when it rains. However, outdated infrastructure is causing more than 100 billion gallons a year to flow into the Pacific Ocean, rather than be captured for reuse. Los Angeles County's Safe, Clean Water Program (SCWP) uses geospatial technology to manage, report, and track nearly 200 stormwater projects and studies to show taxpayers how improvements are being made to the local water supply.

GIS Tools and Solutions to Get Started

Esri offers software, services, and training to assist you with every step of your climate action planning.

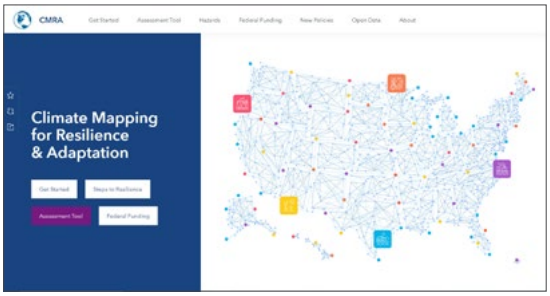
Here are the steps to help get you started:

1. Assess Your Climate Risk

The Climate Mapping for Resilience and Adaptation (CMRA) portal offers a framework to help communities systematically consider and address their climate hazards. Communities can use this portal to document their past, present, and future exposure to climate-related hazards.

CMRA Assessment Tool

Check how conditions related to common climate hazards are projected to change over the next several decades. Results can help you understand if people, property, and infrastructure could be exposed to climate-related hazards. Simply enter your location to get started.



2. Address Your Climate Risk

Next, explore over 100 Esri solutions to help you begin to address and mitigate your climate risks. These solutions run on Esri's core platform.


Flood Impact Analysis


Tree Management Solution


Social Equity Analysis


Stormwater Data Management Solution

3. Contact Us

Connect with an Esri expert to take your climate action planning to the next level. Explore how GIS can support your organization's mission and goals.

Visit go.esri.com/confrontingclimate.

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Esri, the global market leader in geographic information system (GIS) software, location intelligence, and mapping, helps customers unlock the full potential of data to improve operational and business results.

Founded in 1969 in Redlands, California, USA, Esri software is deployed in hundreds of thousands of organizations globally, including Fortune 500 companies, government agencies, nonprofit institutions, and universities.

Esri has regional offices, international distributors, and partners providing local support in over 100 countries on six continents. With its pioneering commitment to geospatial technology and analytics, Esri engineers the most innovative solutions that leverage a geographic approach to solving some of the world's most complex problems by placing them in the crucial context of location.

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