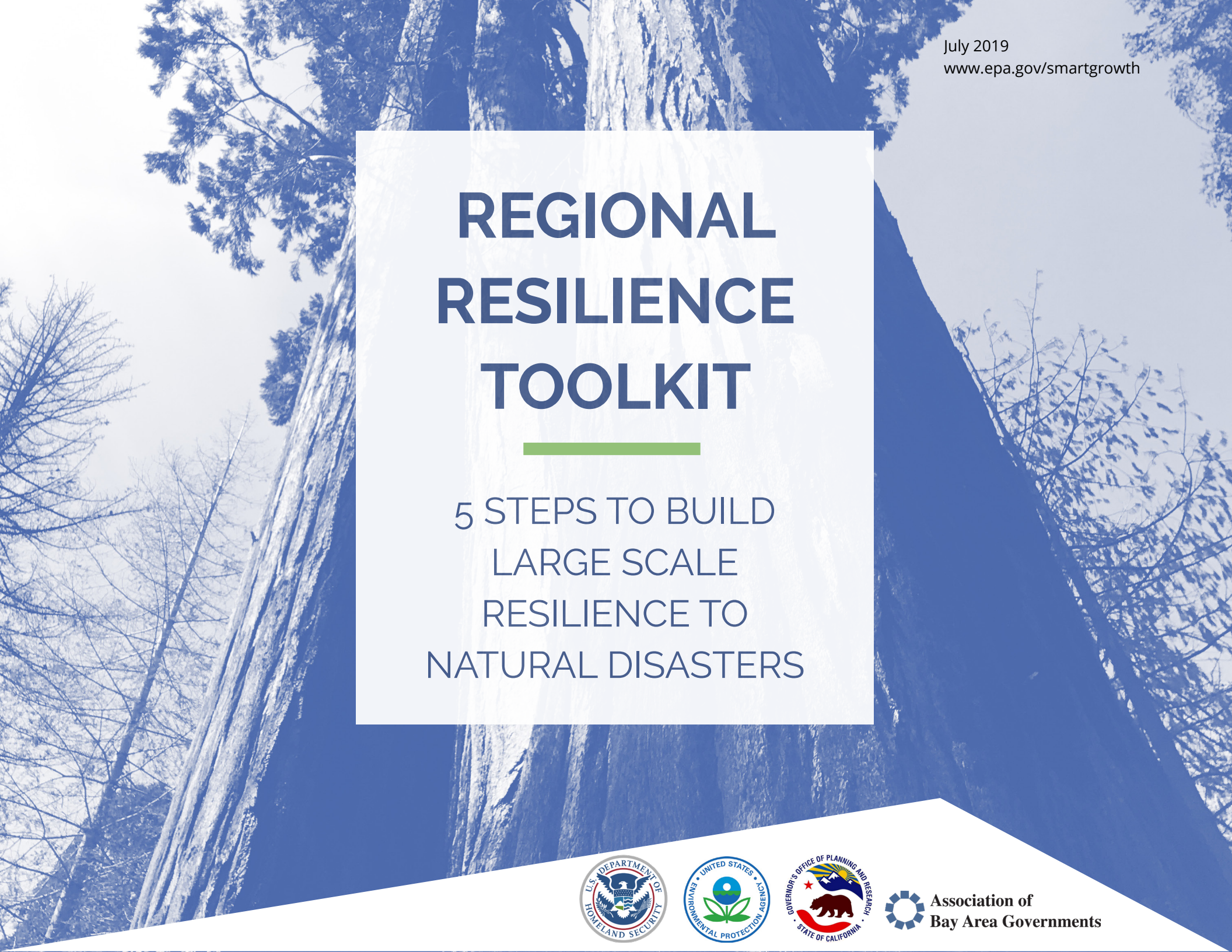

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www.epa.gov/smartgrowth

REGIONAL RESILIENCE TOOLKIT

5 STEPS TO BUILD LARGE SCALE RESILIENCE TO NATURAL DISASTERS

Association of Bay Area Governments

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Photos: All photos courtesy of BluePoint Planning unless otherwise noted.

Cover Photo: Sequoia trees in Sequoia National Park

Sequoias have been adversely impacted by fire management practices.

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Introduction

Figure 2. Eucalyptus grove

Non-native plants and trees such as eucalyptus impact native habitats and increase fire hazard.

Introduction to the Toolkit

Cities, regions, and states across the country are facing natural disasters that can have devastating effects on life, property, the economy, and ecosystems. Climate change is already having observable effects on the environment, and past conditions are no longer a reliable indication of the type or extent of disasters communities will face in the future. As more and more communities face the effects of natural disasters, decision makers and community members need tools and guidance to help them take action that can both protect them from natural disasters while also creating great places to live, work, and play. This Regional Resilience Toolkit provides:

- ✓ A coordinated process for meeting many different state and federal planning requirements.
- ✓ Communication and outreach guidance and resources for engaging a broad coalition of stakeholders across a region.
- ✓ Guidance for project teams who are conducting vulnerability assessments, writing required plans, and implementing projects.
- ✓ Clear information and tools that can be used with an advisory group and to bring in decision makers and community leaders to guide the overall action plan and ensure its successful implementation.
- ✓ Detailed appendices with worksheets to help inform and guide work, as well as additional information and resources for each step.

The Federal Emergency Management Agency (FEMA), U.S. Environmental Protection Agency (EPA), and the Metropolitan Transportation Commission/Association of Bay Area Governments (MTC/ABAG) have partnered to create this Regional Resilience Toolkit. These partners used an approach to regional-scale planning and action for disaster resilience that was originally developed in the Bay Area. These materials were then used to help two other regional partners, the City of Mt. Shasta (and neighboring towns) and the Central Coast Climate Collaborative. EPA and FEMA worked with these two pilot regions

to test how well the materials worked in other geographic, demographic, and political contexts.

The City of Mt. Shasta and the Central Coast Climate Collaborative both requested assistance in building regional resilience. The assistance included a short-term engagement with one on-site workshop, and each partner region received a next steps memo about how to implement disaster resilience actions. With the help of regional partners and participants, the Toolkit has been revised and updated to reflect lessons learned from these pilots.

One key lesson from the two pilots was that state-level policies can really spur along local and regional resilience action because jurisdictions are given new tools, guidance, and even funding support to plan for natural hazards. For example, the California legislature has passed a series of bills that create incentives and requirements for local governments to consider natural hazards and environmental justice and equity as part of routine plan updates. See Figure 26 for more details on these policies. However, any jurisdiction in any state can still use existing plans and processes to improve community safety, livability, and long-term resilience.

The Toolkit is intended for any jurisdiction, no matter the size or capacity or hazards they may face now or in the future. The Toolkit is set up to allow multiple jurisdictions and levels of government to work together for regional scale actions. It is also designed for non-governmental partners and community groups to engage in a more inclusive and holistic process so that resilience actions are guided by core community values.

This Toolkit and its steps are designed to fulfill requirements for Local Hazard Mitigation Plan (LHMP) approval and update, and closely follows FEMA's Local Mitigation Planning Handbook[1]. Rather than solely identifying community assets, this process encourages a more in-depth approach to conducting a vulnerability assessment and selecting hazard mitigation actions. This is intended to help shape each assessment according to a community's preferred goals for a more locally meaningful and actionable LHMP.

Figure 3. Central Coast Climate Collaborative workshop

Daylong workshop testing the Toolkit at Cal Poly, San Luis Obispo.

1 *www.fema.gov/media-library/assets/documents/31598*

Figure 4. Increased damage from extreme weather

Ice storm in Maryland and heavy rain storm in Oakland, California.

Goal of the Toolkit

The goal of this Toolkit is to help cities, regions, and other partners integrate various planning processes – including for hazard mitigation, climate adaptation, sustainability, and equity – into a single process to create a common action plan. There is a need to consolidate varied planning processes, align goals and actions, and make it easier for communities to obtain funding for projects that cut across different planning areas.

This Regional Resilience Toolkit recognizes that the majority of resilience actions, from built projects to implementing policy, will happen at the local level. At the same time, this Toolkit focuses on the regional scale because disasters happen at a regional scale, and a coordinated process across multiple jurisdictions can result in safer communities. There are many benefits of addressing impacts at a larger scale and bringing in partners like nonprofits, community based organizations, and state and federal agencies to support implementation. For example, flood mitigation systems, whether structural (e.g., levees, seawalls) or natural (e.g., river restoration, wetland preservation), must be designed and built across large geographic areas. Fuels reduction efforts to reduce wildfire risk work better across large forestlands that may cross property lines and city or county borders. Even smaller hazard-mitigation efforts have cumulative mitigation benefits when multiple communities take shared actions that carry over from one city to the next.

A region may have many partners working to build resilience, but with slightly different areas of focus and expertise. Resilience partners may include land use planners, emergency managers, fire chiefs, elected officials, utilities, businesses, community activists, nonprofits, faith groups, and more. Each individual department or organization may need to write a specific plan in order to adhere to certain regulations or to seek funding from specific state and federal agencies. But all these partners can support one another's efforts and realize larger success by teaming up and aligning on mutually beneficial projects. They can use the same assumptions about regional risks and then identify common actions. The larger coordination, across a broader geography and with a diverse set of partners, can result in regional scale projects that protect more people, property, infrastructure, and natural resources and do so more efficiently and effectively.

This Toolkit provides tools that will help partners approach resilience as a campaign. Most people care about how they may be affected by disasters. With the right forms of engagement, those same people will support projects that protect them from those

disasters. Public funding is essential for building resilience, and that only comes when a spectrum of groups and residents support both the effort and the elected officials who take action for disaster resilience. An effective campaign will also draw in private funding from businesses that have a stake in protecting assets and investments, as well as from philanthropies invested in the long-term success of a community and its people. Each region or community will need to tap into a variety of organizational support and funding streams to manage the resilience effort.

The most important aspect of this Toolkit is the emphasis on action. Local communities are motivated by a number of different state and federal planning requirements, including for land use, natural hazards, environmental justice, climate change, and more. This Toolkit guides communities on how to align strategies across different plan requirements, define common actions, and then get regulatory credit and funding for those actions. This Toolkit is designed to help partners across a region address multiple hazards simultaneously within the context of federal, state, and local planning requirements and funding streams, so that communities have an easier time meeting requirements while accessing funds for the projects that their residents really care about.

Figure 5. Aerial of the Los Angeles basin in California

Development moves closer to wildlands and increases fire hazards.

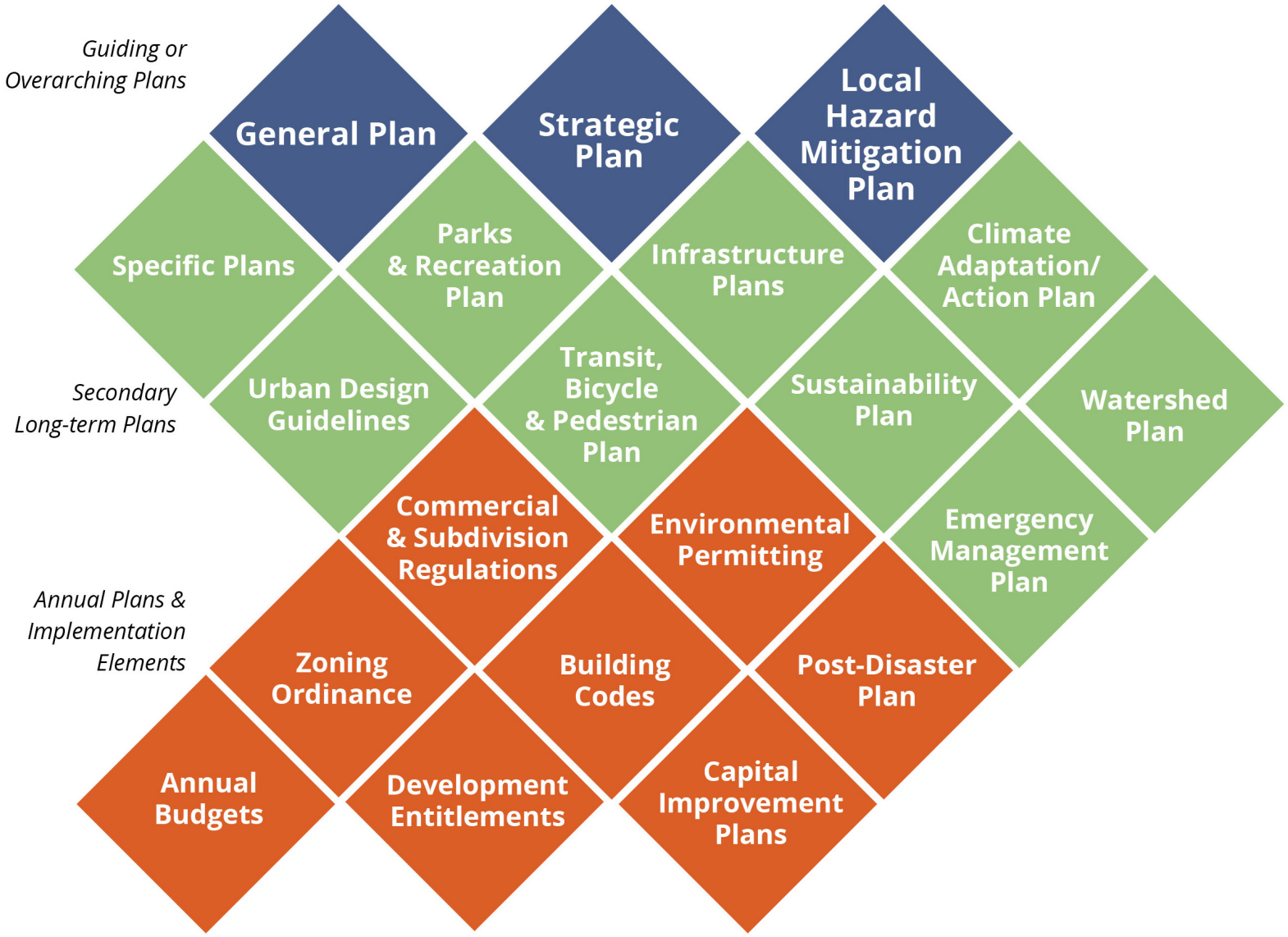

Figure 6. Cascading plans that can be Influenced by resilience planning

What Is Resilience?

Resilience is about building the capacity of the community, at various scales, to prepare for, withstand, recover, and maintain its identity in the face of actual or anticipated hazard occurrences, allowing for continuity of community and quick recovery if a disaster occurs. Two additional factors contribute to a community's resilience: 1) the connections and interdependencies among multiple geographic levels, including the community, the county and region it's within, and the state; and 2) the capacity of a community to change and adapt to challenges posed by changing conditions, either long-term change such as sea level rise, or during the recovery phase of an immediate disaster like an earthquake or fire. Resilience is not specific to any single hazard type and should ideally address multiple hazards at the same time.

Multi-hazard resilience may address risks from wildfires, drought, extreme heat, flooding, earthquakes, landslides, sea level rise, winter storms, and more. Many regions are not prepared for the weather and climate they are experiencing today, much less for worsening impacts in the future or a rare but high impact event. Resilience should include actions that address both immediate, pressing needs as well as decisions that protect long-term investments.

As communities recover from recent disasters and face future risks, resilience must focus not only on surviving disasters but on revitalizing communities and building up and diversifying regional economies to resist and adapt to external shocks.

Conversations about resilience and investment in projects provide an opportunity to empower and benefit every community, from big cities to rural areas, including disadvantaged communities. Planners and decision makers must engage many different voices in the process of defining resilience, which include issues beyond protection from natural disasters. The eventual plans and actions must always connect to a community or region's specific, shared definition of resilience.

Definitions of Resilience

"Resilience is the capacity of a system, be it an individual, a forest, a city or an economy, to deal with change and continue to develop. It is about how humans and nature can use shocks and disturbances like a financial crisis or climate change to spur renewal and innovative thinking."

Source: Stockholm Resilience Centre
www.stockholmresilience.org/research/research-news/2015-02-19-what-is-resilience.html

"Enhanced resilience allows better anticipation of disasters and better planning to reduce disaster losses — rather than waiting for an event to occur and paying for it afterward."

Source: National Academies of Sciences, Engineering, and Medicine
www.nationalacademies.org/topics/resilience/

How to Use this Toolkit

This Regional Resilience Toolkit can be used by regional partnerships and local jurisdictions just starting to plan for resilience, or by those ready to move from planning to action. The Toolkit includes five steps, and users can jump in at any point in the process, depending on where they currently are in resilience planning. The five steps and the expected outcomes are:

Step 1. ENGAGE: Engagement for Resilience

- ✓ An understanding of why trust is so important, and how to build it
- ✓ Tools for effective storytelling
- ✓ A Stakeholder Map that includes your project team, advisory group, leadership and decision makers, interest groups, and the broader community
- ✓ An Engagement and Outreach Plan that identifies goals, target audiences, key messages, tools for outreach, strategies for outreach, and an implementation plan

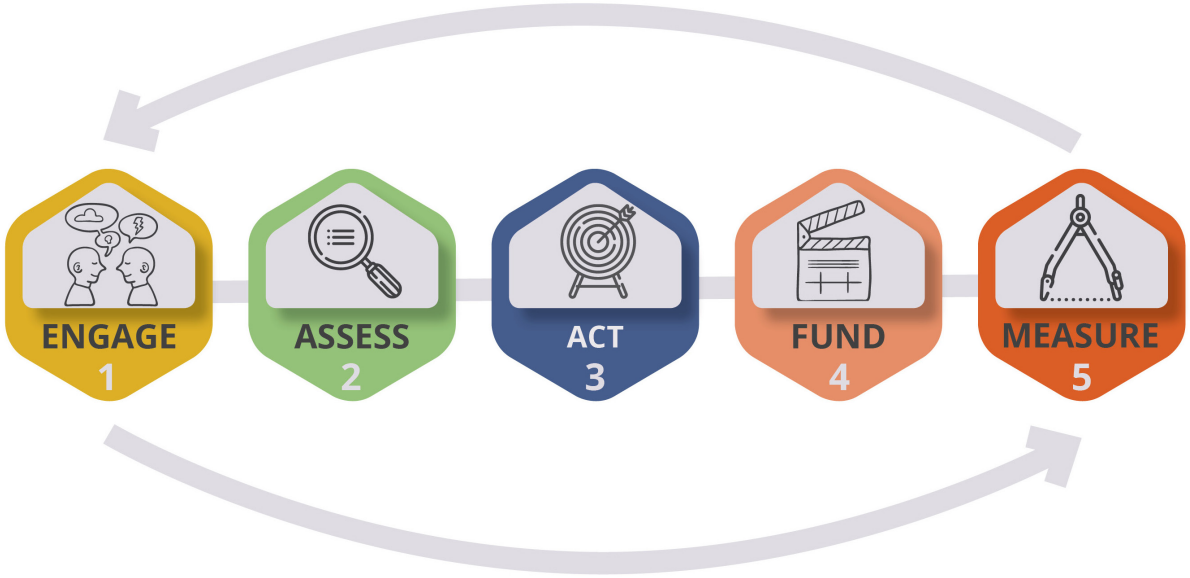

Figure 7. Five steps to building regional resilience

- ✓ A Meeting Roadmap with outreach milestones
- ✓ Practical tools for planning and running a successful meeting or workshop

STEP 2. ASSESS: Conduct Vulnerability Assessment

- ✓ Goals to guide the planning process, risk and vulnerability assessment, and development of mitigation and adaptation actions
- ✓ Prioritized hazards, hazard scenarios, and maps
- ✓ Assessment methodology and approach
- ✓ An inventory of assets to be used in the assessment
- ✓ Exposure analysis – maps and data describing which assets are exposed to which hazards
- ✓ Assessment information about risk, vulnerability, and potential consequences
- ✓ Vulnerability problem statements
- ✓ Fulfillment of Element B1, B2, B3, B4 and C3 in FEMA's Local Mitigation Plan Review Tool Checklist

STEP 3. ACT: Identify and Prioritize Strategies

- ✓ Problem statements that summarize assessment findings
- ✓ Draft list of strategies to address hazard problem statements
- ✓ Basic information on each strategy to assist in evaluating and prioritizing strategies
- ✓ Prioritized list of feasible, impactful strategies with stakeholder buy in
- ✓ Completed Strategy Development and Implementation worksheets for each prioritized strategy
- ✓ A long-term implementation plan over 5-20 years
- ✓ A short-term action plan outlining actions that can start in the near-term
- ✓ Fulfillment of Element B3, C4, C5, and C6 in FEMA's Local Mitigation Plan Review Tool Checklist

Figure 8. Pelicans on coast

Pelicans rest on rocks below favorite tourist spot in La Jolla, California.

STEP 4. FUND: Fund for Action

- ✓ How to engage funders and decision makers
- ✓ How to make the business case for your projects
- ✓ Connect engagement activities to resilience-building actions
- ✓ An initial finance strategy that starts with local funding options
- ✓ Understanding local tools for self-financing
- ✓ A comprehensive resilience finance menu that includes self -funding, public-private partnerships, philanthropic opportunities, regional funds, and grants
- ✓ Understanding federal, state, and philanthropic grants that may match your funding needs

STEP 5. MEASURE: Evaluate Results and Refine Methods

- ✓ An understanding of how and when to use metrics
- ✓ A plan for choosing and implementing metrics
- ✓ A timeline for tracking, evaluating, and reporting metrics
- ✓ Rationale for and benefits of community resilience self-evaluation
- ✓ Designing metrics to support a living document

The five steps ideally work in a continuous loop that will improve planning over time. For instance, partners might start small for the first go round and look at a single category, such as wastewater infrastructure. Partners can then repeat and scale up the process to include other categories and more partners.

The Toolkit was written for project teams of planners, agency staff, and consultants that are responsible for writing plans. The Toolkit is based in FEMA's Local Hazard Mitigation Plan process but is adaptive and expansive enough to meet many different objectives and goals. The Toolkit is also intended for a less technical audience of decision makers, agency and community leaders, and others that will help create and maintain partnerships.

Finally, this Toolkit relies in part on engaging state and federal partners who have funding, policies, and programs intended to support local efforts to create sustainable and resilient communities. Project teams can reach out to FEMA or EPA staff and key state agencies to participate in regional resilience-building process.

The Toolkit includes two appendices organized by the five steps. Appendix A provides more detail on nearly every section of this document, as well as a list of specific outcomes and external resources for each step. Appendix B provides worksheets for use by the project team and an advisory group to help spur conversation and assist in planning. Appendix A and Appendix B will be noted throughout the document with the icons shown on the right.

This icon will indicate when there are additional details and information in Appendix A.

This icon will indicate when there are companion worksheets in Appendix B to help project teams through the process.

Step 1. ENGAGE: Engagement for Resilience

Figure 9. Small group exercise

Testing the vulnerability assessment tools at Central Coast Climate Collaborative workshop.

This step provides specifics about who, what, and how to engage and communicate with stakeholders, decision makers, and the community to build support, ensure successful implementation, and secure ongoing funding for resilience projects and initiatives. This chapter is divided into two primary sections:

- ✓ **Principles for Successful Engagement**
- ✓ **Tactical Tools for Engagement**

Principles for Successful Engagement

Build Trust in Partnerships and Relationships

Successful community planning for disaster resilience relies on people working together and trusting one another. The lead agency should approach engagement for resilience building as an ongoing process that builds upon itself, expanding and improving over time. Further, establishing trust and long-term relationships can be the difference between successful implementation and a plan that sits on a shelf.

Trust building is a multifaceted effort that needs to happen at several levels:

- ✓ Within the agency/organization
- ✓ With decision makers, in and out of the agency
- ✓ With involved stakeholders
- ✓ With the community as a whole

The project team with assistance from the advisory group must identify these different groups of people, understand their role in the process, and prioritize the effort and kind of engagement that should occur to guide a successful process.

Best Practices for Building Partnerships

Embrace a collaborative and cooperative mindset. The lead agency, in particular, must create a collaborative culture among staff and leadership to rebuild or establish trust and a productive planning and implementation process.

Start small. Build on existing relationships and identify high level champions who can help rally other stakeholders to participate in the process. Small, immediate wins can make it easier to address long-term, serious challenges in the planning process.

Take the long view. Establishing relationships and trust for a single project or initiative can seem unwieldy, expensive, and time consuming in relation to the actual project. However, the effort in developing those long-term relationships will not only fuel successful implementation of resilience planning, but it will also seed future efforts by building a long-term coalition for action.

Be authentic. Make sure that the process is designed so that stakeholders and community members can truly guide decisions.

Make cross-cultural communication a critical tenet of community partnerships. Engagement must be open and inclusive of all cultures, lifestyles, and economic statuses. Embrace customized approaches to welcome and encourage involvement by all members of a community.

Budget for it! Building partnerships take time, staff, and budget. Partnering with community based groups to act as a trusted liaison to less accessible community members can be critical – but these groups are often under budgeted and unable to donate much time. Providing them a stipend can significantly assist in developing meaningful and lasting partnerships.

Project Team

A project manager should lead the internal project team and involve staff from relevant city departments. This staff will do the technical work behind the assessment; managing the project, and coordinating other stakeholders and engaging with their managers, executive staff, and elected officials to ensure that the process is moving along smoothly.

Advisory Group

A project advisory group should include key stakeholders such as city staff not part of the project team, representatives from non-governmental and community based organizations, community members, or representatives from private entities and organizations representing the private sector, economic development, and/or business community. The advisory group provides credibility and subject matter expertise that can assist with public and political support and support the project team with volunteer time or funding.

Figure 10. Stakeholder types

Know the Community's Stakeholders

To get the best outcome for the whole community, the resilience-building process should be multidisciplinary, span all local departments, cross levels of authority (e.g., staff, management, executives, and elected officials), and involve many non-governmental stakeholders (e.g., community-based organizations, property owners, regulators, businesses, community members, and local institutions).

Who?

The first step is to **inventory and identify stakeholders** who should be involved, including the broader public and groups who are often underrepresented and hard to reach. Engage a broad range of stakeholders with the necessary expertise, values, and viewpoints at each stage of assessment and implementation.

What?

The lead agency will need to identify what each stakeholder or stakeholder group's role is in the resilience building process, in implementing strategies, and within the community.

When (or how often)?

For the identified stakeholders, determine the level of input and outreach that is appropriate and necessary based on their desired level of engagement and planning role. Align stakeholder expectations with the planning requirements and required level of outreach budget and resources available.

How?

The next step is to determine the best approaches to engaging and reaching the stakeholders. Certain processes, and certain stakeholders may prefer a traditional formal outreach approach while others prefer digital tools, videos, short interactions, or other mechanisms.

Inclusivity and Equity

Identifying underrepresented audiences is challenging. Each community is different, but often non-English speakers, disadvantaged communities, Native Americans/tribal communities, the homeless, and other groups can be left out of or choose not to participate in planning efforts. This can be due to disillusionment with government and related processes, lack of interest, time, and resources to participate, limited information about an issue, and lack of information about the relevance of a plan to their lives. Disasters that create the most significant impacts often disproportionately affect environmental justice communities. EPA defines environmental justice as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Inclusion, equity, and authentic engagement require the active and comprehensive participation of these audiences.

Figure 11. Environmental justice planning can be built into resilience-building processes.
Source: SB 1000 Implementation Toolkit: Planning for Healthy Communities, 2017. Reprinted by permission of the publisher (California Environmental Justice Alliance).

Example: Environmental Justice in Land Use Planning

In 2016 California passed Senate Bill 1000 (SB 1000), the Planning for Healthy Communities Act, which requires cities and counties to address environmental justice within their General Plans. California communities are also required to address climate change adaptation within General Plans (SB 379). Together, these two state laws create an opportunity to connect environmental justice and disaster resilience into long-term plans for how communities will grow and invest in future infrastructure.

Figure 12. Interactive workshops

City College of San Francisco small group visioning exercise.

Figure 13. Mt. Shasta community resilience workshop

Discussion by residents of what they love about their community and what they hope to protect.

Establish a Common Understanding

The process should result in a plan built on community values that also meets the plan's primary objectives. Many planning processes seem abstract to stakeholders and focus on issues that do not resonate with community members. While stakeholders and the community may be interested in climate change, is climate action a priority? Will it drive them to participate, to commit resources, or time to address risk solutions?

Using the climate action plan example, a community may be more interested in the development of jobs than greenhouse gas reduction. The climate action plan can align with this value by integrating and prioritizing initiatives that support the development of jobs, such as training of a green energy workforce to install solar panels and conduct energy efficiency upgrades. Understanding and addressing community values helps the project team develop actions that support the goals of the plan while meeting the needs of the community.

Best Practices to Establish a Common Understanding

Meet communities where they are and honor what they value. Leverage existing partner meetings and processes as a means to introduce the project. For community members, this can mean going to a farmer's market, holiday event, health fair, school, church event, or setting up shop in a local café or brewery. For more technical stakeholders it can mean attending another organization's staff meeting or partnering on a relevant but separate planning effort.

Identify "what we love and what we want to protect." Begin a dialogue in a community workshop, survey, or small group setting by asking what people love and what they want to protect.

Move beyond the workshop. What are the community's specific preferences for engagement and sustained interactions? Traditional meetings and workshops are too often a one-way communication from professional staff to residents and do not lead to the type of interactive, dynamic dialog that is crucial to a plan that will be broadly supported by different stakeholders.

Conduct stakeholder interviews. Connect with the formal and informal leaders, partner organizations, and community members through informational and discovery interviews. Interviews are excellent mechanisms to better discuss and understand underlying issues or concerns in a discrete way and can be an effective means to engage people who may be advocates or adversaries.

Launch immersive listening sessions with diverse stakeholder groups. Conduct small group meetings with invited stakeholders, arranged around a topic or cohort group (e.g., schools, businesses, environmental groups, etc.) to uncover issues and opportunities.

Figure 14. Affordable housing in Miami Beach

Photo source: Miami Beach Development Corporation

Example: Miami Considers How Sea Level Rise Will Impact Low-Income Areas

Miami faces immediate threats from sea level rise, and properties at higher elevations are already becoming more valuable as people and businesses relocate from low-lying areas of the city. In 2018, the Miami city commission adopted a resolution (Resolution R-18-0501) to research how "climate gentrification" may affect low-income areas on high ground. The resolution directs the city manager to research policy options to stabilize property tax rates to "allow as many residents who wish to remain in their neighborhoods to do so."

miamifl.iqm2.com/Citizens/Detail_LegiFile.aspx?ID=4929&highlightTerms=%22climate%20gentrification%22

Figure 15. Story framework

Tell the Story

"If you need someone to back your innovation, invest in your idea, or get excited about following your lead, you need to tell a great story." - IDEO, Storytelling for Influence

While listening is a substantial part of successfully engaging stakeholders, it is equally critical to ensure that project teams and other project representatives are communicating the right information, at the right time, to the right people. One of the most successful approaches is telling a story. Project teams can use stories as a frame for communication, to orient and design project information for the specific audience, and help move the audience to action by connecting on a more personal level. Figure 15 illustrates four vital elements for a range of communication channels (e.g., press conference, funding pitch, workshop, or one-on-one meeting, etc.).

Best Practices to Tell a Story

Grab attention: Get people's attention and help them to recognize the point of the communication. Grabbing people's attention is essential – through a remarkable fact, a surprising comparison, or a visual. Tie it to the point of the story within the first 30 seconds. For example, a good start might be, "My uncle's home burned down in the 2017 Tubbs Fire in Sonoma County, California. Not only were his home and personal life impacted, whole neighborhoods and communities were destroyed. " This offers a significant fact that is attention grabbing and then quickly connects it to action.

Engage and relate to audience: Directly relate the story to the audience and what resonates with them so that the listener becomes engaged and interested. To be effective, use specific information about the community, organization, or person. Continuing the example above, one could say, "Our local fire department helped to fight in that fire and many of you in this room lost properties in these historic fires."

Core story: Develop the meat of the story with core elements, details, and facts. Organize the core story into succinct pieces – three is a manageable number – with clear connections to the story's point and to help hint at what the call to action might be. The example might continue, "The Tubbs Fire wasn't unique. In 2017 alone, California experienced 9,133 fires that burned over 1.3 million acres. And we can expect to see more of the same in the years ahead."

Call to action: Tie the entire story together with a strong call to action. This is perhaps the most important step. Reiterate the key point and connect it to what the "ask" is. An "ask" can be for funding, for a meeting, for support, or for an opportunity to follow up. The call to action not only provides a take away for the audience but also provides an opening to re-engage and to follow up on the "ask." Finally, the example story would wrap up with, "As a community, we need to band together to be better prepared, protect people, and reduce the potential damage to our town."

Example: Public Service Announcements (PSAs) in Tulsa, Okla.

Tulsa, Oklahoma's Disaster Resilience Network does outreach and community education through a series of public service announcements that are read in over 10 languages by people who represent each of those different communities.

www.disasterresiliencenetwork.org/drnresources

Figure 16. Public service announcement image

Photo source: Disaster Resilience Network

Figure 17. Identify key stakeholder groups

See Appendix A pages 1.4 - 1.7 for more details.

Worksheet 1.2 Stakeholder Mapping

Tactical Tools for Engagement

Stakeholder Mapping

Stakeholder mapping is the process of understanding perspectives and interests, visualizing relationships, and establishing which stakeholders are the highest priority for engagement. It may quickly become evident that many people could and should be involved in the planning effort. However, it is essential to differentiate the various audiences based on their level of interest and engagement, what level of technical understanding and input they have, and what level of resources are available to reach and engage the various groups.

The following are examples of criteria to consider in identifying technical and community audiences:

- ✓ The stakeholder owns an important asset.
- ✓ The stakeholder has the authority to regulate, make policy, or make decisions about an asset or asset class.
- ✓ The stakeholder will be affected by the assessment or potential strategies.
- ✓ The stakeholder has the potential to either help or hinder the political process.
- ✓ The stakeholder has specialized expertise that will help with technical questions.
- ✓ The stakeholder may be able to provide funding or otherwise assist in implementing strategies.
- ✓ The stakeholder represents typically underrepresented community members.
- ✓ The stakeholder may be able to make critical connections to other relevant topic areas and/or projects which the project team is unaware.
- ✓ The stakeholder has the time and ability to commit time and effort to the project.

"Map" partners to identify trusted and influential actors.

Key partners may include a city council aide, faith groups, community organizations, skeptics, and social media influencers, among others; the lead agency will need to create a baseline and evolving set(s) of partners to engage in specific ways. Creating a "map" of all of the potential players is a good start to creating a stakeholder engagement strategy. Use a diagram similar to Figure 18 to identify those with the highest level of influence, and those with the greatest interest to ensure that the effort is reaching the right people at the right level. This type of diagram can also be used to identify where there are stakeholders who have a low influence and interest (lower left quadrant), but there is a benefit to better engaging them and moving them to be more involved.

Figure 18. Audiences and stakeholder mapping

Figure 19. Sample project website

California Peralta Community College District Sustainability and Resilience Master Plan collaboration website

Sample Outline for an Engagement and Outreach Plan

1. Overview

2. Outreach & Engagement Goals and Outcomes

3. Target Audiences
- Community-wide
- Targeted stakeholders, including, decision-makers, underrepresented groups, and special interest groups

4. Key Messages and Benefits by Audience

5. Outreach Tools and Materials
- Communications and education
- Workshops and meetings
  Meeting type, frequency, and format

7. Strategies and Tactics
- Print
- Online
- In-person

8. Implementation and Tracking

Develop an Engagement and Outreach Plan

The project team can develop an Engagement and Outreach Plan with the advisory group and/or with a project consultant. To be as efficient and effective as possible, develop an Engagement and Outreach Plan at the beginning of the process. The Engagement and Outreach Plan can be simple, brief, and adapted over time. Ideally, the Engagement and Outreach Plan should:

- ✓ Identify stakeholders and determine multi-cultural outreach needs.
- ✓ Link planning and outreach messages to community values and needs.
- ✓ Develop outreach goals for each stakeholder group and the broader community.
- ✓ Establish how to engage individuals and groups best, and specify objectives and roles.
- ✓ Define the specific methods to most effectively engage each group: in a meeting, via digital communications, one-on-one, or through partners or other groups.
- ✓ Detail how these activities will integrate and leverage other planning.
- ✓ Determine need, objectives, and composition for an advisory group.
- ✓ Determine the focus and purpose of each event, meeting, and input opportunity.
- ✓ Provide a schedule with objectives and roles for each activity.

Sample Outreach Tools and Materials

Outreach materials should be developed with particular audiences in mind and consider the best way to reach each group. The materials should reinforce the key messages and be designed to be simple and clear, resonate with specific audiences, and not be overly technical in nature. The following are examples of tools.

Communications and Education

- ☐ Talking points
- ☐ Webpages
- ☐ Social media
- ☐ Local media
- ☐ Texting campaign
- ☐ Fact sheets
- ☐ Email newsletter
- ☐ Brochures, flyers, and print materials
- ☐ Direct mail
- ☐ Partner announcements
- ☐ Outreach kits for partner organizations

Workshops and Meetings

- ☐ Meeting announcements and flyers
- ☐ Comment cards
- ☐ Project presentations
- ☐ Project and meeting videos
- ☐ Interactive games
- ☐ Maps and display boards

Example: Interactive Game

Marin County's , California's Game of Floods is a public engagement tool for sea level rise adaptation options. The game encourages community members to understand the impacts of sea level rise on different populations and in various areas of a community to help to develop sound strategies to address the issues. An adaptation outreach kit can be downloaded from their website and a game board is available for purchase.

www.marincounty.org/depts/cd/divisions/planning/csmart-sea-level-rise/game-of-floods

Figure 20. Game board image for the Game of Floods
Image source: Marin County Community Development Agency

Figure 21. Meeting announcement sample

Mt. Shasta Building Resilience community workshop flyer.

See Appendix A pages 1.11-1.18 for more details.

Worksheet 1.3 Workshop Checklist

Planning and Running a Successful Meeting

A successful workshop or series of workshops relies on extensive pre-work, planning, and relationship building.

Create a Meeting Plan. A general guide for designing and planning the meeting may include:

- ☐ Meeting purpose, audience, and objectives
- ☐ An agenda with clear objectives
- ☐ Meeting format
- ☐ Education and meeting materials
- ☐ Meeting venue and logistics
- ☐ Outreach effort
- ☐ Initiation and 'Save the Date'

After each meeting or group of meetings, develop a meeting summary that will be provided for dissemination and review by meeting participants.

Meeting Roadmap for Resilience

The Meeting Roadmap on the following page illustrates one approach to engaging stakeholders in alignment with the steps outlined in this Toolkit. The top half of the graphic shows the five steps: Engage, Assess, Act, Fund, and Measure, with a brief description of the work elements for each step. The lower half shows the primary meetings in line with the project planning milestones for the advisory group and community stakeholders. Typically, additional activities will occur concurrently with those outlined below.

Appendix A provides details about a suggested series of meetings for the advisory group, as well as draft agendas and checklists for the meetings.

Resilience Planning Meeting Roadmap

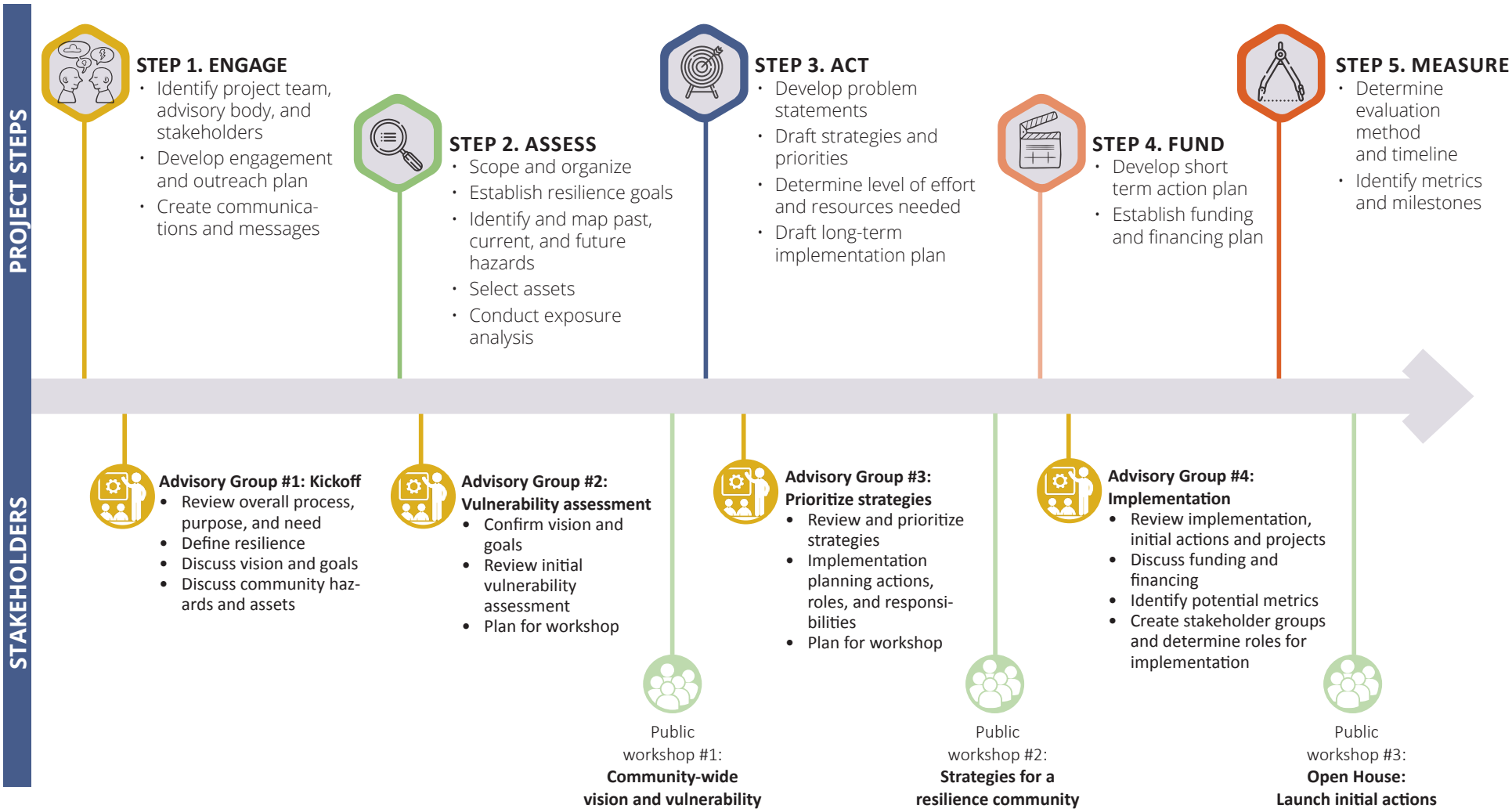

Figure 22. Resilience planning meeting roadmap

Step 2. ASSESS: Conduct a Risk and Vulnerability Assessment

Figure 23. Emigrant National Wilderness, California

Reduced snow and drought conditions increased potential for wildfires and tree vulnerabilities.

Step 2. ASSESS

This chapter provides details about how to conduct a vulnerability assessment that is applicable for a Local Hazard Mitigation Plan, General, Comprehensive, or Master Plan Update. This analysis should lead to the development and implementation of appropriate and achievable resilience strategies and actions. This chapter is divided into five primary sections:

- ✓ **Lay the Groundwork**
- ✓ **Describe Hazards**
- ✓ **Select Assets**
- ✓ **Determine Assessment Method**
- ✓ **Conduct the Assessment**

Lay the Groundwork

The risk and vulnerability assessment is one of the core elements of resilience planning. The objective of the assessment is to determine where hazards and community assets intersect and to determine what the potential impacts are at that intersection - or what is the asset's vulnerability and risk to hazards. In the assessment, make sure to consider:

- ✓ Does asset vulnerability include impacts to people (especially disadvantaged communities), to the economy, and to the environment?
- ✓ Do seemingly unimportant assets provide support to a critical asset?
- ✓ Who controls the asset and how does that affect mitigation efforts?
- ✓ Are there physical or design attributes that make an asset particularly vulnerable, such as age of the building?

Scope and Organize the Project

Establish the scope of the project and a develop a common understanding about the purpose and need for the assessment. This includes determining what the "world view" is that is informing the assessment, and what is the level of effort to conduct a successful project. Scoping the project will include Identifying planning triggers, lenses, and desired outcomes to help deliver a more robust assessment, determining implementable strategies, and assessing internal capacity and external resources to help drive implementation.

The assessment can be done using any number of data sources and tools that already exist. Project teams can coordinate with state agencies or other entities to access appropriate data. For instance, California communities might want to work with the California Department of Forestry and Fire Protection (CAL FIRE) on available wildfire data. Any community in the country can work with federal agencies to obtain data, such as NOAA for sea level rise data or *Drought.gov* for data on drought.

Effective scoping will ensure that the resulting risk and vulnerability assessment will be a useful and lasting tool for resilience planning, including helping to:

- ✓ Guide long range planning and future land use decisions.
- ✓ Leverage other planning efforts and funds create multiple benefits for the community.
- ✓ Spur important partnerships with utilities, the business community, and other stakeholders.
- ✓ Provide additional incentives to assist vulnerable communities, small businesses, or to protect unique community features such as historic structures or critical park and recreational facilities.

Scoping Questions

The following are some questions that can help identify the "whys" for going through this process, scope the effort for the project, and to develop a more resilient community:

- ✓ What has triggered this process to begin? Is it an individual, or a regulation, or general pressure from the community, an agency, or neighboring jurisdictions?
- ✓ Who cares about this process and why? What are the motivations behind who cares and why they care?
- ✓ What is the "lens" through which the team is viewing this process? Is this rooted in climate change, sustainability, equity, etc.? Are there multiple lenses?
- ✓ How should the team measure a successful process?
- ✓ Is this project a stand alone project or will there be multiple small assessments with different stakeholders as part of a larger project?
- ✓ How can this effort tie to the other planning efforts and amplify potential outcomes?

The answers to these questions can help identify and focus the scope of the project, including determining the geographical area, priorities and draft goals that will help shape the extent of the project, and desired outcomes. It is also quite useful to review all previous hazard plans and technical studies (such as for flood areas) to know what information has been assembled previously.

Example: Regional Climate Vulnerability Assessment in the Twin Cities

The Metropolitan Council in Minnesota developed a regional Climate Vulnerability Assessment (CVA) report, a local planning handbook, and a set of online maps and data sets to help local communities address climate change in comprehensive plans. In addition to offering these tools, the Metropolitan Council also encourages communities to partner with academic institutions, which often have the expertise to help communities develop more refined vulnerability assessments and include the results in local plans.

metrocouncil.org/handbook/plan-elements/resilience.aspx

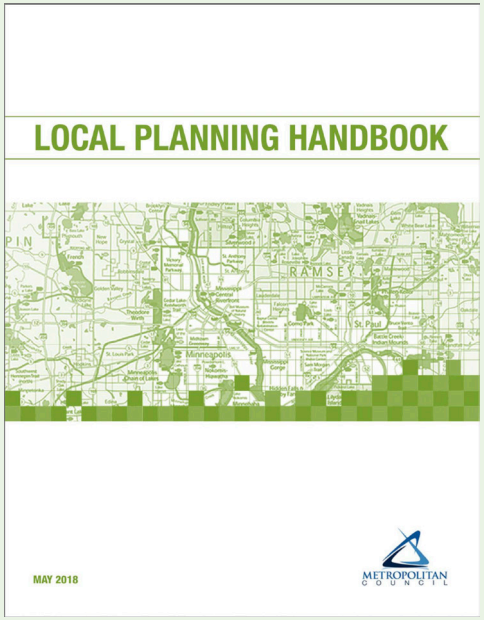

Figure 24. Local planning handbook cover

Image source: Metropolitan Council

Example: Addressing Climate Change in Baltimore's Hazard Mitigation Plan

Baltimore's Disaster Preparedness and Planning Project (DP3) is an integrated hazard mitigation plan, climate adaptation plan, and floodplain mapping effort. The latest plan update meets FEMA's LHMP update requirements.

www.baltimoresustainability.org/plans/disaster-preparedness-plan/

Table 7: Overall Hazard Risk Ranking

Hazards	Probability	Deaths	Injuries	Damages	Local Risk Perspective	Hazard Risk Ranking
Flooding						
Flood	3	4	4	4	4	19
Dam Failure	1	1	1	1	2	5
Coastal Hazards						
Tropical Storms & Hurricanes	1	1	1	4	4	11
Storm Surge/Coastal Inundation	2	1	1	2	3	9
Sea Level Change	4	1	1	4	4	14
Tsunami	1	1	1	1	1	5
Precipitation Variability						
Thunderstorms (Lightning & Hail)	1	4	4	1	3	13
Winter Storms & Nor'easters	4	4	4	4	3	19
Drought	1	1	1	4	2	9
Wind						
Thunderstorm Winds & Derechos	4	4	4	4	3	19
Tornados	1	1	4	3	2	11
Extreme Heat						
Heat & Air Quality	4	4	4	1	4	17
Land						
Earthquakes	1	1	1	4	1	8
Landslump/Subsidence	1	1	1	1	1	5
Sinkholes	3	1	1	4	3	12

Figure 25. Baltimore Disaster Preparedness and Planning table example, page 37.

Identify Triggers and Lenses, and Coordinate with Other Plans

Everyone who picks up this document will have their own "trigger" for moving through this process. A trigger is something that spurs this work to happen; this could be an external trigger like a regulatory requirement or an internal trigger such as a strong champion. The trigger provides the motivation to do resilience building work. The Toolkit was developed primarily to help communities that are triggered by the LHMP process, but users will be able to apply this process to any risk and vulnerability assessment, no matter the trigger. Below are some of the most common triggers for undergoing a risk and vulnerability assessment.

Recent disaster. Sometimes resilience building is triggered by either a local disaster or a high profile disaster elsewhere, that wakes up jurisdictions and causes them to realize that they must take action to reduce the risk.

Regulatory landscape. The entry point to resilience building may be triggered by regulations, which include specific requirements about what the assessment should include. (See Figure 26 for an example of regulatory triggers in California.)

Local or national trends. A high visibility local, state, or national thought leader can help trigger others to conduct resilience planning. This can be especially true when it comes to climate adaptation, as there is a general understanding of the regional nature of sea level rise and other climate hazards.

Business and investment. A visible, public process to assess the community's risks and to be responsive to them is a clear signal to the business and insurance community of the city's commitment to long-term resilience and viability.

See Appendix A pages 2.7-2.10 for more details.

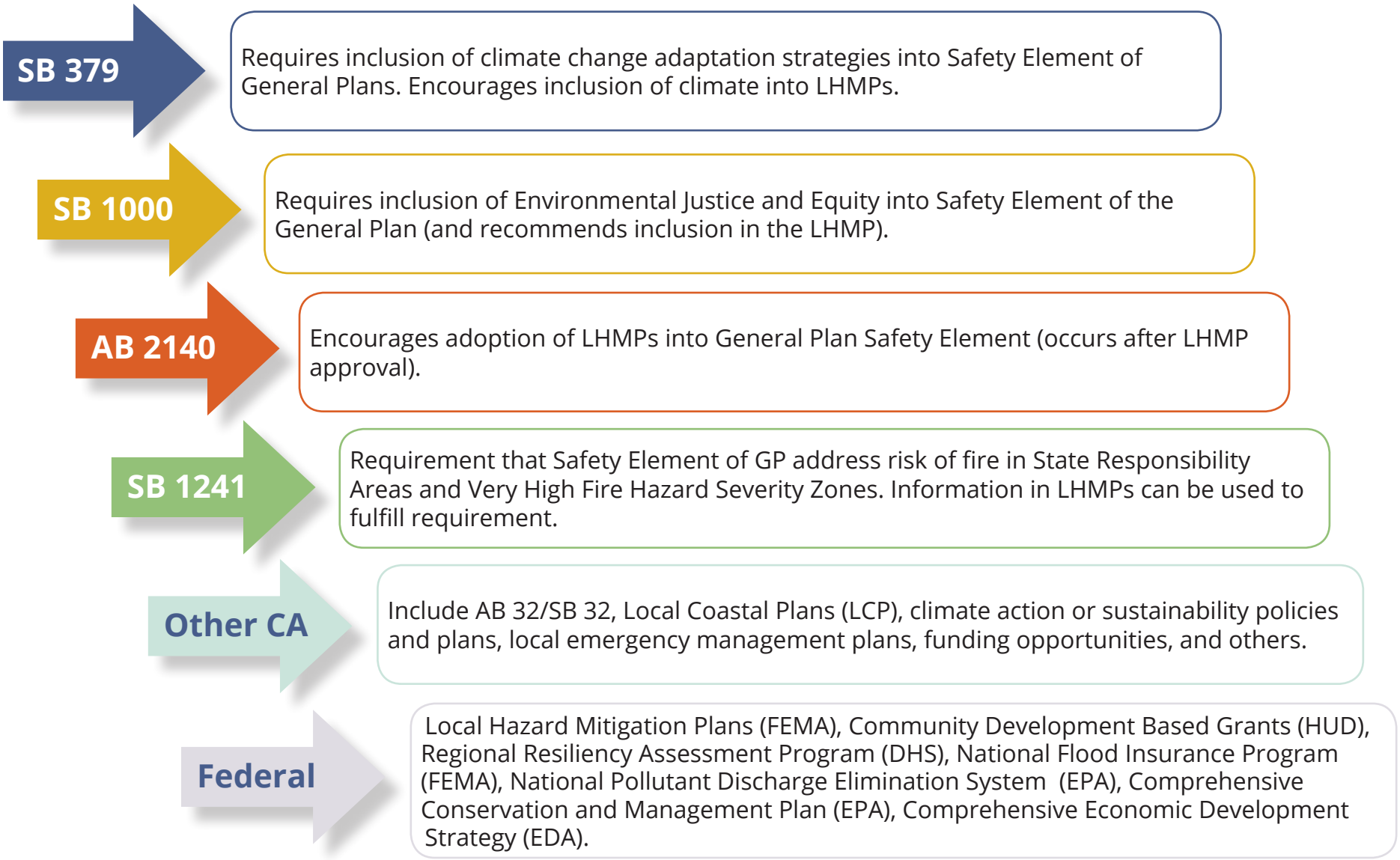

Figure 26. Example of policy and regulatory drivers for resilience planning within California

The Four Frames

The Bay Conservation and Development Commission's Adapting to Rising Tides Program uses four frames that define and prioritize sustainability throughout their assessment and planning process for sea level rise hazards:

Society and Equity: Effects on communities and the services on which they rely, with a focus on disproportionate impacts due to existing inequalities.

Economy: Economic values that may be affected such as costs of infrastructure damages or lost revenues during periods of recovery.

Environment: Environmental values that may be affected, such as species biodiversity, and ecosystem functions and services.

Governance: Factors such as organizational structure, jurisdiction and mechanisms of participation that affect vulnerability to impacts.

Resilience Lenses: Connecting Resilience with Sustainability and Equity

Similar to a trigger, each project team will have its own "lens" that will help scope and frame the work. A lens is the perspective through which the assessment is done; for a LHMP the lens would be hazard risk reduction, but for other jurisdictions and planning processes the lens may be more narrowly focused on climate change adaptation or coastal planning, or may be focused through the lens of a particular asset type, like transportation infrastructure.

Environmental sustainability. The environmental sustainability lens and natural hazards resilience are tightly woven together, particularly with the actions that emerge from the assessment. A more environmentally sustainable community is often more resilient to disasters. The project will maximize resilience to disasters by ensuring that environmental sustainability is a core value. In many instances, the degradation of the environment can, in fact, contribute to disaster vulnerability, such as the loss of wetlands increasing vulnerability to hurricanes or sea level rise. Additionally, disasters that destroy or dramatically alter resources render communities unsustainable, since they impact the long-term ability of the community to access and use resources.

Social equity. Equity is also a critical lens of resilience. The most vulnerable populations are often most affected by natural disasters and are the least likely to be able to effectively prepare for, respond to, and recover from disasters. They often live in the most vulnerable housing, due to age, condition, and location. They are often more dependent on city services to meet their daily needs, which may be significantly compromised by natural hazards. They are less likely to have insurance, to have control over the safety and adaptive capacity of their homes, and, if impacted, typically do not have adequate financial resources to bounce back. After a disaster event, vulnerable populations may have less access to recovery resources, either because of language barriers, fear or mistrust of government leaders or processes, and social exclusion that prevents equal access to resources. Resilience-building processes and actions need to account for the needs of the most vulnerable residents.

Incorporating Hazards into Local Planning and Decision Making

This Toolkit provides options for infusing hazards and climate change considerations in the daily thinking of all city departments, in normal processes and protocols, and in the many documents that guide and regulate city functions. Further, this effort can be seen as a critical component of the success or failure of a city's ability to grow and provide for its residents in a way that contributes to a high quality of life. All decisions that guide city growth, or regulate the current built environment, can include consideration of current and projected hazards and their consequences including projections that take climate change into account.

Establish Resilience Goals

Developing effective resilience goals is an important step to establish a common foundation for stakeholders, the project team, and decision makers. Goals also offer a touchstone throughout the project to assess if strategies and implementation priorities align with the community's needs and desires. Establishing common resilience goals assist in:

- ✓ Building transparency into the process at the outset so that all participants understand the breadth of priorities and topics to cover.
- ✓ Engaging the project team early in deciding what shared outcomes they will work cooperatively to achieve and provide an opportunity for them to ask their stakeholders for input and feedback on the project direction.
- ✓ Providing a foundation upon which future project decisions can be made and help in evaluating how well mitigation actions will help meet established community values and expectations.
- ✓ Connecting to metrics and aid in tracking and monitoring progress of the project through implementation.

Leveraging existing community goals, such as those in a local comprehensive plan, can help ensure alignment, and can rally a broader base of support amongst stakeholders who have already bought into existing goals or priorities. Further, linking existing goals to resilience goals can provide additional impetus and support to advance broad community goals.

Worksheet 2.1 Develop Resilience Goals Exercise

See Appendix A page 2.12 for more details.

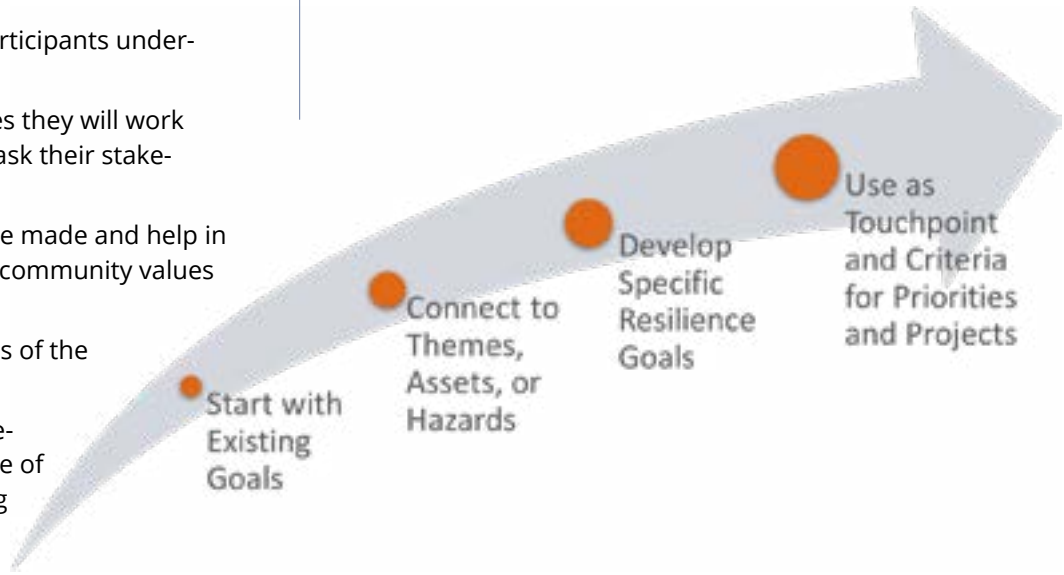

Figure 27. Effective goals start with current plans and connect to future priorities and projects

Example: County of Santa Cruz, California General Plan and LHMP Goals

GENERAL PLAN GUIDING PRINCIPLES

Population and Residential Growth Goals: To provide an organized and functional balance of urban, rural, and agricultural land use that maintains environmental quality, enhances economic vitality, protects the public health, safety, and welfare, and preserves the quality of life in the unincorporated areas of the county.

Rural Residential Siting and Density: To achieve patterns of rural residential development that are compatible with the physical limitations of the land, the natural and cultural resources of the County, the availability of public services, and protection of the natural environment.

Village, Town, Community, and Specific Plans: To continue using village, town, community and specific plans to provide a planning framework to guide future public and private improvements in town centers and other concentrated urban and rural areas, to provide a higher level of planning detail and involvement.

LHMP Goals

1. Avoid or reduce the potential for life loss, injury and economic damage to Santa Cruz residents from hazard events;

2. Increase the ability of the county government to serve the community during and after hazard events;

3. Protect the unique character, scenic beauty and values in the natural and built environment from being compromised by hazard events;

4. Encourage mitigation activities to increase the disaster resilience of institutions, private companies and systems essential to a functioning County of Santa Cruz.

Source: County of Santa Cruz LHMP 2015–2020, pgs 16 and 166.

Goals that guide risk and vulnerability assessments should seek to protect assets, reduce impacts from hazards, and help other stakeholders see how resilience fits in with existing community priorities. Use these goals to help determine what assets, and what degree of detail for each asset, is needed to conduct a meaningful risk and vulnerability assessment.

Setting Resilience Goals

Goals may be driven by a desire to protect:

- ✓ Physical areas (e.g., new development along the shoreline, natural resource areas or assets)
- ✓ Asset classes (e.g., critical services)
- ✓ Social values (e.g., protecting parks because beauty and recreation are highly held values)
- ✓ Economic values (e.g., protecting major economic drivers like large businesses)
- ✓ Character, history, sense of place (e.g., protecting historic structures or neighborhoods)
- ✓ Existing functions/activities (e.g., preserving the function of an airport or seaport)
- ✓ Specific communities (e.g., vulnerable populations)

Use the following questions to help refine broad goals.

- ✓ Does everyone understand the goal? Is it written in clear language? Are there multiple ways to interpret the goal?
- ✓ Who is responsible for implementation? Does the lead agency have influence or ability to achieve the goal? Are the resources, skill, and knowledge available to achieve the goal?
- ✓ How does the team know when a goal has been achieved? Is there a milestone that has been reached? An amount of money spent? An action achieved?
- ✓ Can the jurisdictions involved realistically achieve that goal? If not, what is more likely?
- ✓ Is it clear what the result or outcome is from achieving the goal?
- ✓ When should the goal be achieved? Is there a specific date or timeframe that can be established as a target? Should there be a mid-term timeframe?

Describe the Hazards

Identify and Map Hazards

Before conducting a risk and vulnerability assessment, identify and describe the hazards that are or may be present within the community. An important part of this step is identifying which hazards pose the greatest threat to the community. You can qualitatively estimate which hazards will have the most impact by considering the extent of exposure (this can be measured by the number of people exposed, number of buildings exposed, or the value of assets exposed), the consequences of a hazard, and the likelihood of the hazard occurring.

- ✓ Discuss the types of hazards to be considered - natural hazards (e.g. wildfires, earthquakes), man-made hazards (e.g. cyber attacks, terrorism).
- ✓ Review maps and information of hazards predicting and depicting current and future flooding, wildfire risk areas, landslide risk areas, or earthquake ground shaking or liquefaction risk, etc.
- ✓ Understand past hazard patterns. Where have they struck and how often?
- ✓ Talk to emergency managers as well as operations and maintenance staff who will have knowledge of areas most frequently affected.
- ✓ Identify the hazards most likely to impact the community.
- ✓ Identify changes that may intensify or increase the possibility of hazards.
- ✓ Use climate change data to anticipate how hazards may change in the future, including the intensity and frequency of hazards, as well as how the community will be impacted by new and unfamiliar hazards.

See Appendix A pages 2.12-2.13 for more details.

Potential Hazards

- Avalanche
- Dam Failure
- Drought
- Earthquake
- Erosion
- Expansive Soils
- Extreme Heat
- Flood
- Hail
- Hurricane
- Landslide
- Lighting
- Sea Level Rise
- Severe Wind
- Severe Winter Weather
- Storm Surge
- Subsidence
- Tornado
- Tsunami
- Wildfire

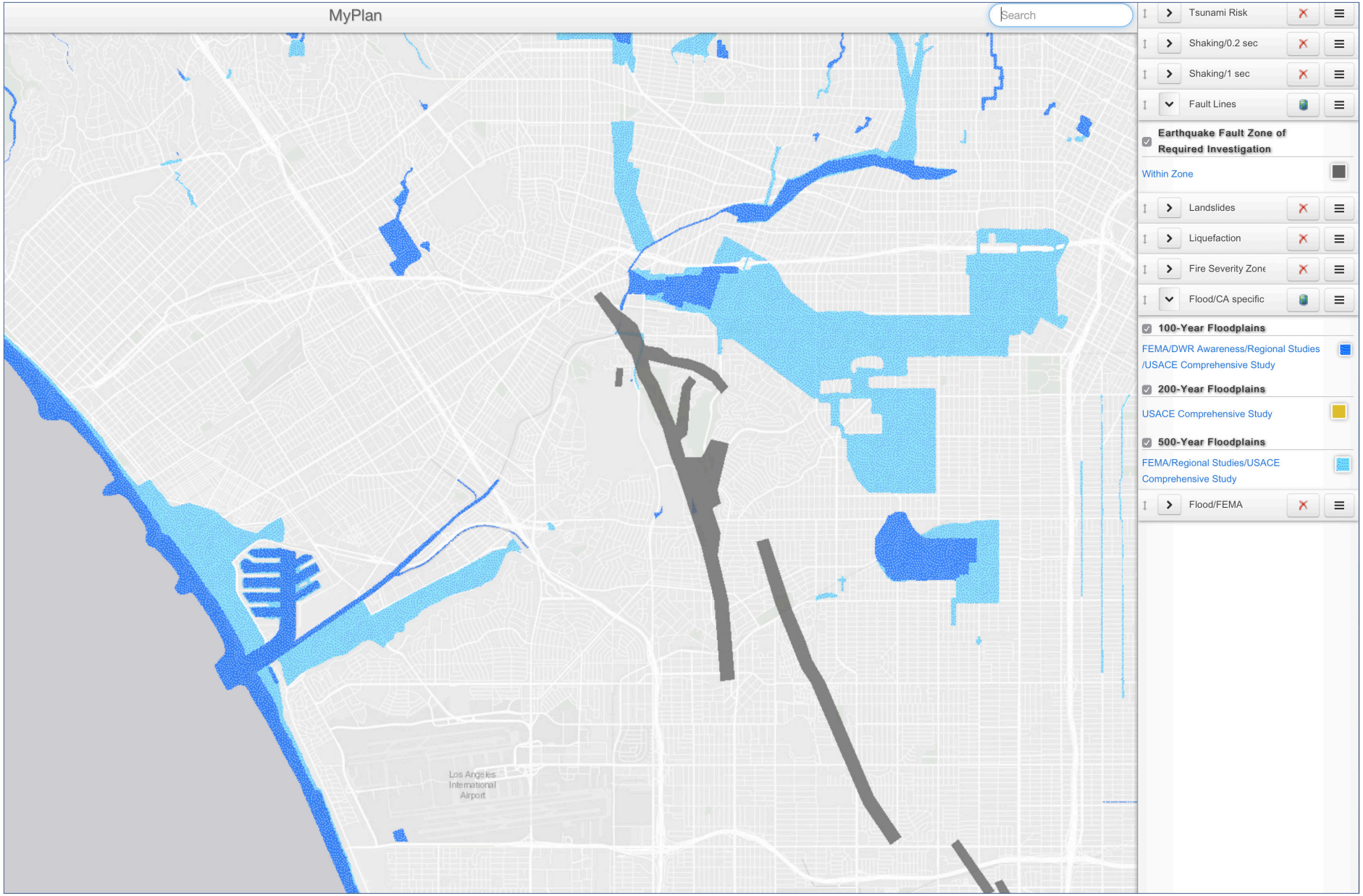

Figure 28. MyPlan website map sample of Los Angeles showing flood plains and fault zones

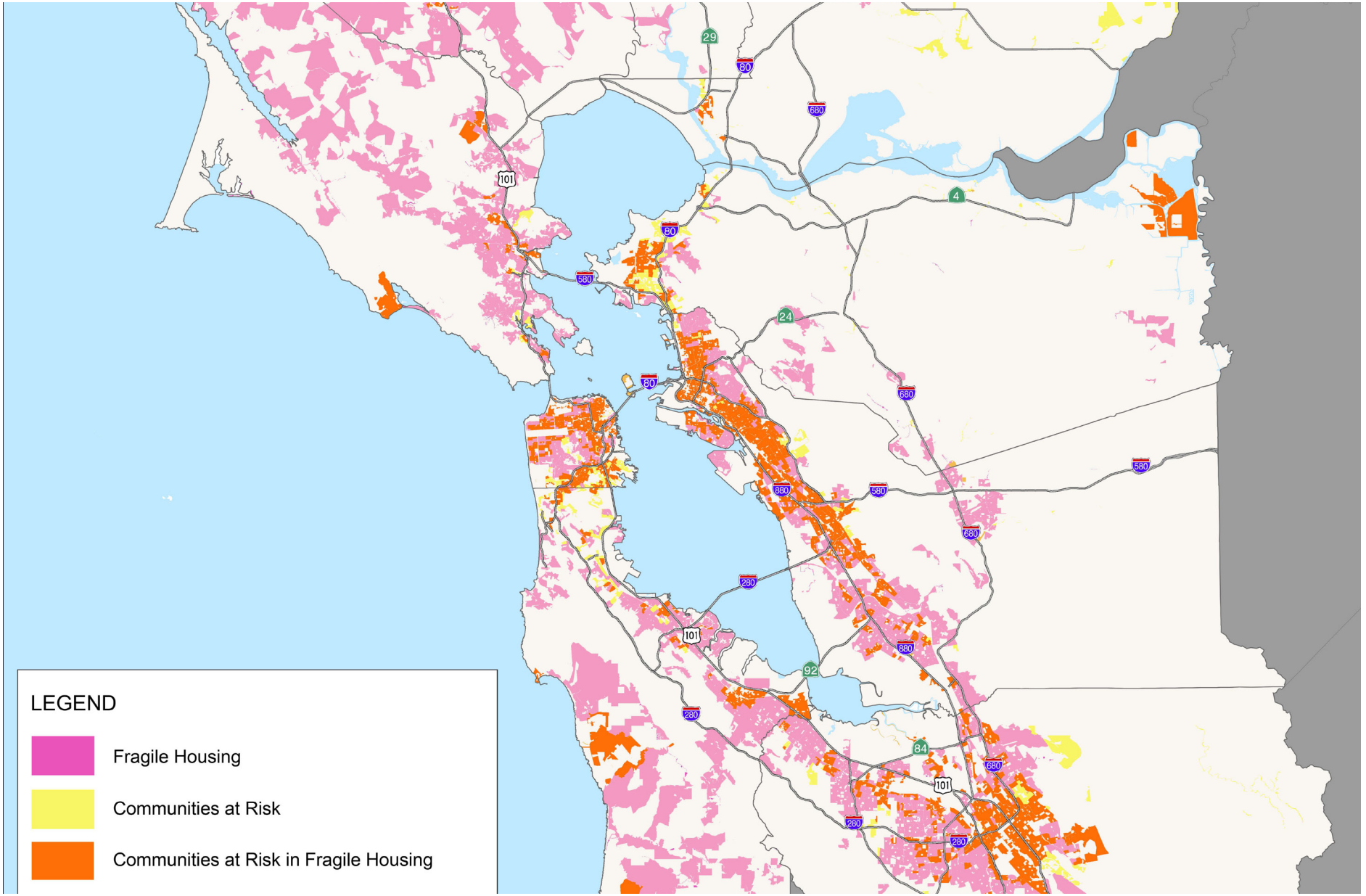

Figure 29. Enlargement of map of housing and community risk from ABAG's Stronger Housing, Safer Communities project. Image source: *resilience.abag.ca.gov/projects/*

Risk Assessment Definitions

Natural hazard – source of harm or difficulty created by a meteorological, environmental, or geological event

Community assets – the people, structures, facilities, and systems that have value to the community

Vulnerability – characteristics of community assets that make them susceptible to damage from a given hazard

Impact – the consequences or effects of a hazard on the community and its assets

Risk – the potential for damage, loss, or other impacts created by the interaction of natural hazards with community assets

Risk assessment – product or process that collects information and assigns values to risks for the purpose of informing priorities, developing or comparing courses of action, and informing decision making.

FEMA Local Mitigation Plan Review Guide, October, 2011, Threat and Hazard Identification and Risk Assessment Guide, and adapted from the Department of Homeland Security Risk Lexicon, 2008.

Develop Hazard Impact Statements

Develop written descriptions that describe the extent, probability, and expected severity of the hazard. This can help succinctly summarize hot spots or areas with multiple hazards that should receive special attention in assessment or strategy development. These descriptions are often called **hazard impact statements.**

As an example, a hazard statement might read: "The western portion of the city has very high liquefaction susceptibility while the remainder of the city has a low likelihood of liquefaction. Liquefaction may occur in earthquakes with very high levels of shaking, including one from the Hayward fault, which runs adjacent to the city and has a high probability of occurring in the next thirty years."

Prioritize Hazards

To complete the risk assessment, prioritize the hazards that could have the most impact on the community. This will help determine which assets will need the most robust assessment (based on exposure to prioritized hazards), can help understand the overlap between high priority hazards and vulnerable populations, or can help engage certain stakeholders.

Once the hazards are prioritized it is a good time for the project team to consider if it is necessary to refine or reprioritize the goals previously outlined. In addition, now that it is understood where hazards may affect the community use that information to guide the remainder of the risk assessment, including which assets should be considered and what information needs to be gathered.

See Appendix A page 2.14 for more details.

Select Assets

Hazards become meaningful when they interact with assets. Community assets include the people, structures, facilities, and infrastructure systems that have value to the community. (e.g., a tsunami only poses a risk when it lands in an area with bridges, homes, and wastewater facilities.) Some questions to consider when determining community assets:

- ✓ What are the places and elements that the community loves?
- ✓ Which assets are critical to maintaining safety, health, and productivity in the community?
- ✓ Are there unique or critical facilities that the community relies upon?
- ✓ Which assets would have significant consequences to the community if they failed?
- ✓ How much information is available on each asset to guide your assessment? Which assets lack enough data to do a meaningful assessment?
- ✓ How do goals relate to specific assets or asset classes?

Scope Matters

The type of assets to be included in an assessment should be broad enough to ensure that the consequences of hazards on people where they live, work, access key services, and conduct other day-to-day activities will be fully considered. Assets can be grouped and assessed in three ways, which will influence the level of detail and effort required for the assessment:

Individual asset: A unique or critically important asset for which assessment findings would differ from other assets. For example, a power plant or major thoroughfare may be individual assets.

Representative asset: Assessment findings would be similar across a group of similar assets and would streamline the assessment process. For example, elementary schools may have very similar vulnerabilities across a jurisdiction. So instead of assessing each site, the assessment can be for the cross-section to reveal potential vulnerabilities inherent in all schools. Individual assets might have issues specific to their location — for

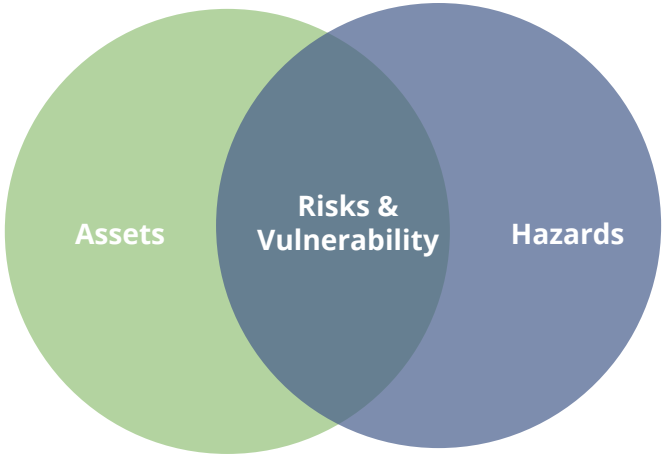

Figure 30. As hazards interact with assets, the vulnerabilities of those assets and risks to the community are revealed.

See Appendix A pages 2.15-2.16 for more details.

Worksheet 2.3 Identify Important Community Assets

Example: Asset Classes

Assets may fall into multiple classes.

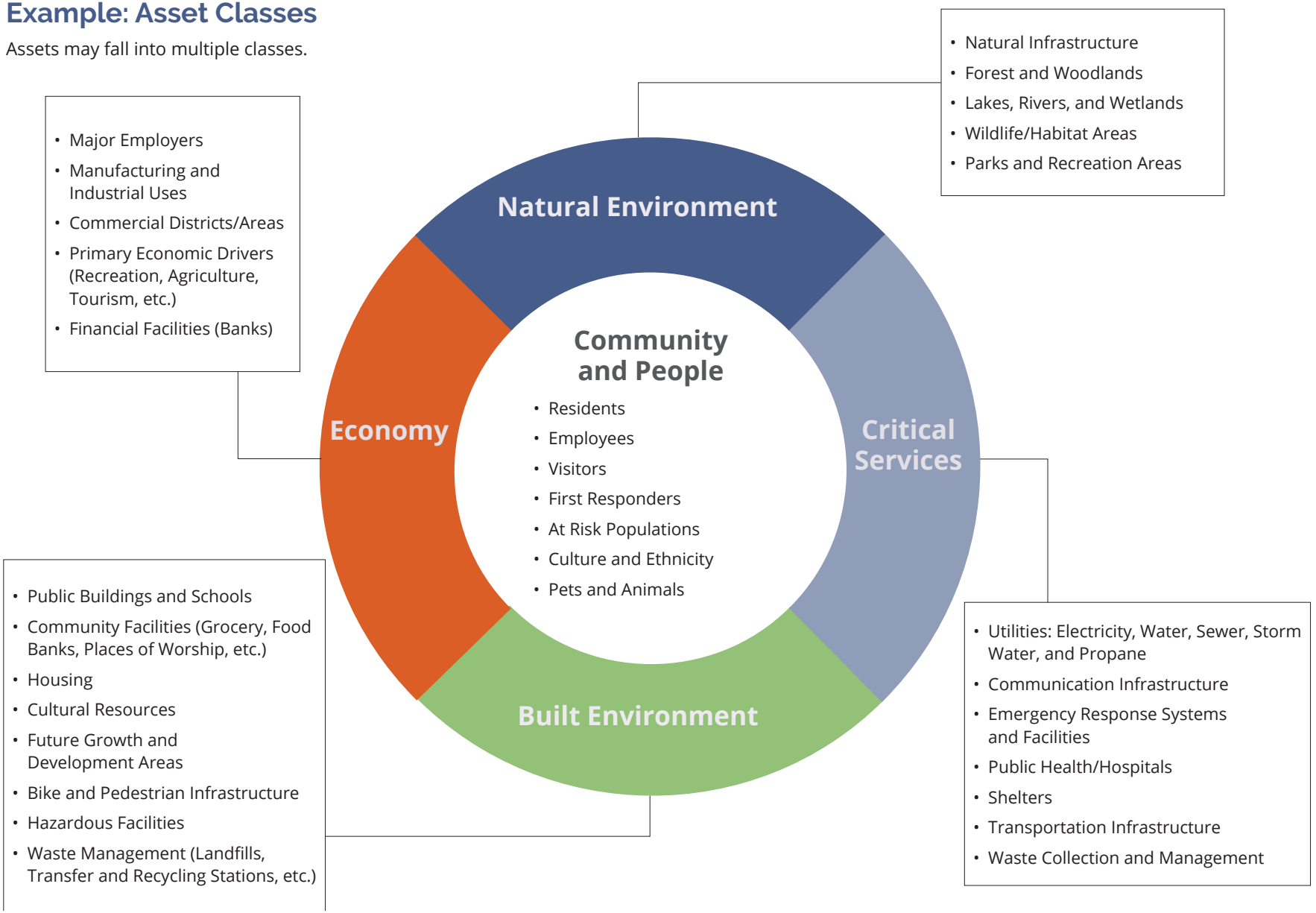

Figure 31. Example community asset classes

example, one elementary school might be near a flood plain while another might have only one road leading to it. Those issues should be considered when necessary.

Asset class: An asset class is a categorization of similar assets in one group. Figure 31 shows five classes: community and people; critical services; built environment; economy; and natural environment. Categorizing a class of assets allows jurisdictions to develop goals and strategies that may address the broad grouping. For instance, for community and people, a goal could be zero loss of life in disaster.

Not Sure Which Approach is Best?

It can be confusing to know what assets should be assessed and at what scale. It may be helpful to do an exploratory assessment of an asset class to gain some basic information about the class to determine if there is a need to explore individual assets, or representative assets, more closely. This can be because of physical vulnerabilities, like greater or more urgent exposure to hazards than anticipated, or because there are some complex governance issues, like ownership or regulations, that require more attention. The project team may also start down an assessment path and find that it is not uncovering any meaningful information. For example if many individual assets are similar and show similar vulnerabilities, it may not make sense to do an assessment of each individual asset but instead use one assessment as a representative for that type of asset.

Be sure to leave some room for adjustments as findings emerge. Sometimes a vulnerability assessment may start to present a compelling storyline, and it makes sense to tell the story of risk through a certain lens, such as within a specific geographic area, or a critical asset class. Some uncertainty about exactly what assets to assess is normal at the scoping phase — eventually, a storyline will emerge, and it is the project team's job to listen to it and guide the assessment to help it be told.

Asset Interdependencies

An ABAG study released in 2015 (Cascading Failures: Earthquake Threats to Transportation and Utilities) explored the concept of interdependencies in utility systems. The study found strong dependencies on the fuel and electric power systems and regional and local roads, meaning that if these systems failed in a disaster, many other systems, like water, wastewater, and telecom, would have difficulty or be unable to function. Failures due to these dependencies would likely lead to significant and widespread consequences. Considering the dependencies and interdependencies of asset classes can help determine priorities in assessing asset vulnerabilities.

Additional resources that can help communities examine these interdependencies:

The U.S. Department of Energy's Energy-Water Nexus Crosscut team has created a set of publications and tools to help a variety of users take a more coordinated approach to water and energy system vulnerabilities.
www.energy.gov/energy-water-nexus-crosscut

The C40 Infrastructure Interdependencies + Climate Risks Report provides a summary from different cities that have grappled with the cascading impacts of climate change on infrastructure systems.
www.resourcecentre.c40.org/resources/assessing-risks-in-cities

What kind of assessment is right?

EPA's Planning Framework for a Climate-Resilient Economy includes helpful guidance for communities with different levels of resources to help them think about the right type of assessment to undertake. See pages 6 and 13.

www.epa.gov/smartgrowth/planning-framework-climate-resilient-economy

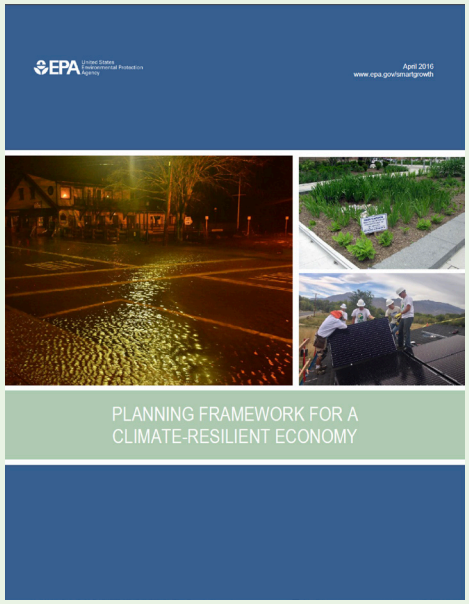

Figure 32. EPA's Planning Framework for a Climate-Resilient Economy report cover. Image source: EPA

See Appendix A pages 2.17-2.18 for more details.

Worksheet 2.4 Community Asset Data Identification

Determine Assessment Method

The depth and scope of a vulnerability assessment can vary significantly and will depend on community goals, the availability of data and information, resources to conduct the assessment, and individual interests of the jurisdiction and its residents. Looking at other vulnerability assessments is a good first step for establishing base informational requirements.

The simplest assessment includes an exposure analysis, which maps hazards on top of locations of key assets to identify a potential hazard. This approach requires at least a list of key assets, their locations, and an overlay map of hazards located in the assessment area. More information about an asset's vulnerability can transform an assessment into a compelling story that sets up targeted, meaningful actions.

However, more detailed information on assets can help uncover the vulnerabilities and consequences for key assets and provides a better platform for identifying hazard mitigation and climate adaptation strategies to address hazards. Because it is important to understand what will happen to assets and the people and services that rely on them if they are exposed to a hazard, the project team may want to go beyond the exposure analysis and collect vulnerability information on the assets. This can be achieved through answering a series of assessment questions about the asset.

- At a minimum, assess emergency response facilities and critical public facilities related to essential services such as police, fire, water, and power.
- A more comprehensive assessment may include residential units, infrastructure systems, and/or recreational spaces.
- The most comprehensive approach would be to evaluate all assets individually, but this will likely require more resources. Project teams may take a simplified approach by choosing a representative asset to assess that may be similar to many others, house important services, or serve a large number of residents. If assessing a representative asset is not possible, asset classes can be assessed with far fewer resources, but can still provide information useful for the community.

Conduct the Assessment

Exposure Analysis

An exposure analysis is a deeper dive within the larger risk and vulnerability assessment to focus in on specific impacts to selected assets. It helps identify which assets will be exposed to a specific hazard and provides a basic understanding of the magnitude of possible damage or loss after a disaster. For example, an exposure analysis can determine how many housing units are likely to be exposed to an earthquake and provide a high level estimate of the economic effects.

An exposure analysis involves combining the location and extent of the hazards with the location of assets. This is generally done through Geographic Information System (GIS) mapping using pre-identified hazard scenario map layers and mapped community asset locations. There are five key steps to the exposure analysis (See Appendix A for more details):

1. Add relevant hazard layers into a new or existing map in ARCGIS (or similar tool).
2. Gather data and map the locations of the community assets included in the assessment scope.
3. Compare assets to the hazard layers.
4. Create maps showing the extent of hazards and the location of assets that intersect with those hazards. (See Figure 33)
5. Ask those with local knowledge and experience to help pinpoint locations that are not accurate and need further analysis.

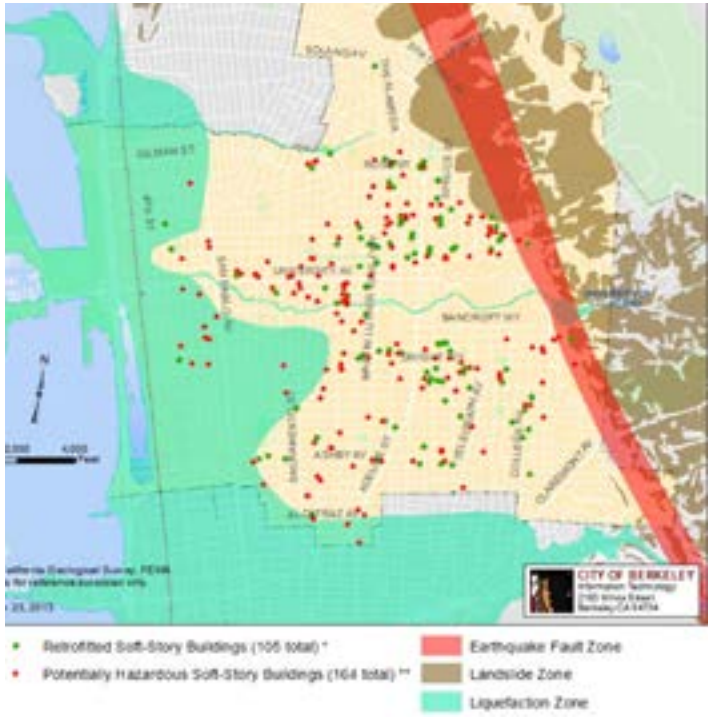

Figure 33. Example exposure map from the City of Berkeley, California natural hazard mitigation plan

See Appendix A pages 2.19-2.20 for more details.

Worksheet 2.5 Vulnerability Assessment Scoping

Figure 34. Example exposure table from City of Berkeley Natural Hazard Mitigation Plan

Infrastructure Element	Total Length	Length in Hazard Areas		
		Earthquake Induced Landslide Planning Zone	**Fault Rupture Planning Zone**	**Liquefaction Planning Zone**
Curbs	354 miles	44 miles (12%)	31 miles (9%)	93 miles (26%)
Streets	257 miles	42 miles (16%)	26 miles (10%)	68 miles (27%)
Solano Tunnel	0.09 miles	0 miles (0%)	0 miles (0%)	0 miles (0%)

Answer Assessment Questions

Assessment questions help describe the existing conditions, different types of vulnerabilities, and consequences that may occur if an individual or representative asset is exposed to a specific hazard. There are separate assessment questions for individual or representative assets and asset classes, so be sure to use the correct assessment questions worksheet for the appropriate scale.

Assessment questions include describing and determining the following information:

- ✓ Ownership and characteristics of an asset
- ✓ Existing conditions
- ✓ Physical vulnerabilities to hazards
- ✓ Functional vulnerabilities including dependencies or relationships to other assets
- ✓ Governance vulnerabilities
- ✓ Consequences if asset is damaged or destroyed

Worksheet 2.6 Rapid Vulnerability Assessment Exercise

Worksheets 2.7/2.8 Vulnerability Assessment Questions

Develop Profile Sheets

Describe the asset or asset class. Describe the key functions of the asset or asset class, the geographic extent of it, who it serves, and any other relevant information.

Describe key issues. Identify pressing issues such as vulnerable populations that may be affected, very high risk areas, or significant financial consequences.

Describe the vulnerabilities. List all of the vulnerabilities uncovered. There are a few basic categories that can help organize vulnerability types:

- ☐ **Information.** Poor data/information can hinder understanding of vulnerability and risk, or can affect the ability to achieve mitigation or adaptation strategies.
- ☐ **Governance.** Identify characteristics such as inadequate authority or regulatory mechanisms, inadequate or unavailable sources of funding, or lack of mechanisms to address issues affecting multiple sectors, jurisdictions, or communities.
- ☐ **Functions.** Identify functions, roles, or relationships that make assets especially vulnerable. For example, a senior facility may be more vulnerable than an office building because of its function and the dependence on outside services. Functional vulnerabilities could include lack of system redundancy, dependence on vulnerable assets, the function of the asset itself, or the asset's position in a networked system.
- ☐ **Physical.** Physical vulnerabilities that make an asset acutely sensitive or limit its ability to withstand hazards. This could include water sensitivity or buildings that are built to older codes that are known to perform poorly in disasters.

Describe the short-, mid- and long-term consequences. Summarize the effects that vulnerabilities could have on people, the economy, and the environment.

- ☐ **People.** Describe the effects on people where they live, work, recreate, obtain key services, and conduct other day-to-day activities. Consider vulnerable populations.
- ☐ **Environment.** Describe the effects on the environment, such as damage to wetlands from sea level rise or potential hazardous materials release.
- ☐ **Economy.** Describe the effects on important elements of the regional economy, such as impacts to goods and movement of people, employment centers, and business sectors.

FEMA's Hazus-MH

One assessment tool that can help inform the economic consequences of natural hazards is FEMA's Hazus-MH software. Hazus requires user input on structure type and value in order to calculate damages. Hazus outputs can be used to identify areas where large investments will likely be lost and is used after a disaster to provide damage estimates to FEMA. Hazus requires detailed and accurate data about individual structure type and value to be useful; therefore it is important to consider when, at what scale, and for which assets Hazus will be informative to the community. The type of data needed to run Hazus includes:

- Building type
- Replacement cost
- Content cost (if available)
- Occupancy class
- Year built
- Location
- Number of stories
- First floor elevation
- Foundation type
- Design level

Download Hazus software at:
www.fema.gov/hazus-software

Step 3. ACT: Identify and Prioritize Strategies

Figure 35. Fort Bragg sand dunes, California

Natural systems such as dunes can be effective in reducing impacts related to sea level rise and extreme storms.

Step 3. ACT

This chapter provides guidance on creating actionable strategies. This chapter is divided into four primary sections:

- ✓ **Summarize Vulnerability**
- ✓ **Develop Strategies**
- ✓ **Evaluate and Prioritize Strategies**
- ✓ **Develop Implementation Plans**

Assessing hazards and assets and summarizing findings into problem statements leads to the most important component of risk reduction and resilience building: **identifying responsive resilience strategies and actions and setting up implementation of these actions.** Resilience strategies should be directly responsive to the hazards and vulnerabilities uncovered in the assessment step and be designed to resolve real world, meaningful local problems. This step results in:

- ✓ A short list of prioritized, implementable strategies that tie back to goals, problem statements, and other planned local actions
- ✓ Concrete plans for implementing strategies through local action
- ✓ Buy in from key stakeholders and community to aid in supporting implementation

Summarize Vulnerability

After completing the risk assessment, summarize the findings to identify the most significant risks in the community. These findings or "problem statements" will help to craft effective strategies and actions. Problem statements will help to:

- ✓ Communicate critical planning issues, for example which critical assets are particularly vulnerable, what areas currently have repetitive losses, or how many high hazard areas are currently zoned for future development.
- ✓ Assist the community and stakeholders to prioritize and focus on the areas that have the greatest need for mitigation or adaptation based on the risk assessment.
- ✓ Create a clear and cogent "story" to help support decision making by elected officials and other stakeholders.
- ✓ Provide a foundation for seeking funds to reduce risks and increase community resilience.

The first step in writing problem statements is to review the exposure analysis maps and answers to the assessment questions. It is often the case that a number of assets will have similar characteristics, conditions and challenges, so it makes sense to read through and reflect on all of the answers before beginning to summarize.

The second step is to use the answers to the assessment questions to write summary statements describing the vulnerabilities and consequences identified. Depending on the process, the statements can summarize the assessment findings for individual assets, a particular asset category or services, the community as a whole, or the agencies and organizations that own, operate, or manage the assets evaluated.

When writing problem statements, consider what vulnerabilities or consequences to include, and if a stand alone problem statement is most effective. Some vulnerabilities will rise to immediate or near-term need, such as those that have:

- ✓ Broad or wide ranging effects on society and equity including to a large geographic area, large numbers of residents, or to environmental justice communities.
- ✓ Reduce ecosystem benefits provided by natural areas, such as flood risk reduction, water quality improvement, and supporting biodiversity.
- ✓ Economic impacts at multiple scales, including local, regional, statewide and national.
- ✓ Urgency and complexity which requires a longer timeframe to address. For example, there may be a stretch of shoreline that may flood with small amounts of sea level rise, but will take a long-time to solve due to complexities in ownership, management, financing, and regulatory oversight.
- ✓ Cascading effects on other assets, services, or communities. This is particularly an issue for networked assets, such as transportation, utilities, and shoreline protection, which are interconnected in a manner such that failure of one part of the system will disrupt the rest of the system. This will also be an issue for assets that rely on other assets to maintain functionality, for example hospitals, nursing homes, and waste-water treatment plants that rely on uninterrupted power supplied by others.

Sample Problem Statements

Problem statements can be developed for each hazard, asset class, or individual assets evaluated in the risk assessment, for example:

"The North Creek Sewage Treatment Plant is located in the 100-year floodplain and has been damaged by past flood events. It serves 10,000 residential and commercial properties and it is the primary treatment plant for this area."

"City Hall is located in an area that is likely to experience very high levels of shaking in either a San Andreas or Hayward earthquake. The building is an unretrofitted unreinforced masonry building built before 1930 and therefore highly vulnerable to damage in an earthquake."

"Five of the eight public elementary schools in this city are in moderate or high ground shaking areas and one is located in both a liquefaction zone and in the 100-year floodplain. One middle school is not currently in any hazard zone but will likely experience future flooding with 36" of sea level rise. There is a data gap around the retrofit status of any of the schools; it is unknown if any have been seismically retrofitted."

See Appendix A pages 3.4-3.10 for more details.

Worksheet 3.1 Develop Initial Problem Statements

Develop Strategies

Once the vulnerability assessment is complete, develop strategies and specific actions and projects to address the vulnerabilities. It is important to ensure that the strategies are actionable, feasible, flexible, and that they are built on the community's long-term vision and values, and link to the plan's goals (see figure below). Consider these best practices in developing strategies:

- ✓ Link strategies directly to problem statements: strategies offer the solutions to the problems identified in the risk assessment.
- ✓ Select fewer, more actionable strategies rather than a long laundry list of potential actions.
- ✓ Address multiple problems or vulnerabilities with a single strategy.
- ✓ Ensure that there is someone who can be the lead on a strategy - someone who has the authority, political will, ability, time, and resources to make it happen.
- ✓ Directly align strategies with resilience goals outlined at the beginning of the process.

Figure 36. Build on long-term vision, values, and goals (blue) to establish more short-term flexible priority actions and projects (orange)

Worksheet 3.2 Strategy Idea Sources

Develop Initial List of Strategies

This step focuses on developing an initial list of potential strategies that are responsive to specific problem statements. Strategies at this point should be robust enough to be able to move forward, but flexible and adaptable enough to adjust as they are advanced. Each kind of problem may have different approaches or types of strategies required. The following are examples of ways to categorize and consider strategies.

- ✓ **Operational** – Strategies to enact operational and governance-related improvements.
- ✓ **Programmatic** - Strategies to expand or create new programs , activities, and initiatives.
- ✓ **Plans, regulations, and policy development** – Strategies to develop or revise policies, plans, regulations, and guidelines.
- ✓ **Capital improvement/infrastructure projects** - Strategies designed to address physical and functional deficiencies and needs in the built and natural environment.
- ✓ **Education/outreach/coordination** – Strategies related to initiating or expanding partnerships and relationships, communicating and sharing information, and building awareness.
- ✓ **Evaluation** – Strategies to improve feedback, input, and data and information or conduct further or new analyses.

The process of developing a basic profile of each potential strategy can help to uncover how easy or feasible the strategy would be to implement. Strategies will vary in terms of timeliness, dependencies, cost, and effort. Some solutions may be preliminary or unlocking, meaning they must be done in a particular order. Some strategies may be easier than others for individual agencies or asset managers to undertake themselves without having to form new partnerships or collaborations. Some strategies are multi benefit, providing community benefits or improving the performance of the asset to multiple hazards. Finally, some strategies should be launched early because they require a long lead time.

Example: Connecting Problem Statements to Strategies

Operational

Problem*:* The City has a lack of staff to enforce building codes and adherence to retrofit policies.

Strategy*:* Within the next year, build staffing capacity to implement and support plan implementation.

Plans, Regulations, and Policy

Problem: Electric power outages occur on a regular basis during winter storms, resulting in business in core commercial areas to lose customers.

Strategy: Within the next five years, require all new commercial solar installations to include energy storage with a minimum of 3 hours of downtime.

Education/Outreach/Coordination

Problem: There are over fifteen agencies and twelve non-profits involved in addressing sustainability and resilience in the city, resulting in substantial gaps, duplication, and increased competition for funding.

Strategy: Develop and convene a regional sustainability council to coordinate and align efforts of the agencies and non-profits.

Example: Connecting Equity to Goals and Strategies

In 2016, the Georgetown Climate Center with the Urban Sustainability Directors Network (USDN) hosted a two-day workshop in Baltimore with 50 thought-leaders in climate adaptation and equity. The workshop resulted in a report titled "Opportunities for Equitable Adaptation in Cities", which summarizes the key findings and lessons learned from the group. This resource can help communities consider social justice goals and strategies alongside resilience goals and strategies.

www.georgetownclimate.org/reports/opportunities-for-equitable-adaptation-in-cities.html

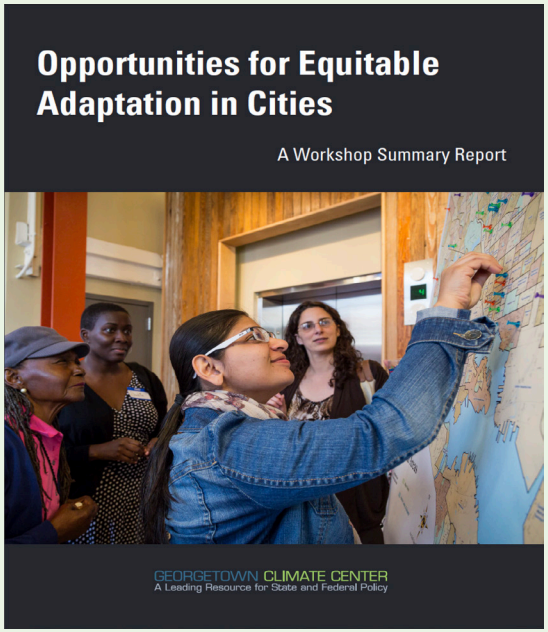

Figure 37. Opportunities for Equitable Adaptation in Cities report cover

Image source: Georgetown Climate Center

Each strategy also has a process or mechanism for implementation that can be identified early on. Some typical identified processes are listed below:

- ✓ **Long range planning** – these are mechanisms like master plans or climate action plans that articulate a long range vision for the community.
- ✓ **Land use planning** – this includes elements that dictate current and future land use planning decisions like General Plans or Specific/Area plans.
- ✓ **Capital planning** – this includes capital improvement plans and is essential if the strategy requires financial support for staff or capital improvements.
- ✓ **Operations** – this includes the annual budgeting process, which can incorporate the financial planning for strategy implementation.
- ✓ **Emergency and hazards planning** – this includes incorporation into the LHMP, emergency response plans, or preparedness planning.
- ✓ **Project planning and design** – this includes public-private development projects like housing developments, which may be necessary to implement specific strategies.
- ✓ **New initiatives –** this includes anything that cannot occur under current processes and needs an entirely new effort like a new department, legislation, or ballot measure.

On the following page, Figure 38 illustrates the information and level of detail that should be gathered at this stage. Figure 39 is an example of a completed strategy profile.

Figure 38. Sample strategy profile

Strategy Development Information			
Problem Statement	This is the problem statement that the strategy is responding to. This should come out of your risk assessment and should include community goals.		
Strategy	Clear, simple strategy statement.		
Strategy Result Summary or Objective	A short description of what the strategy is designed to achieve.		
Hazards Addressed	*Wildfires* *Flooding* *Mudslides* *Other*		
Roles and Responsibilities	Lead Agency: Which agency has the authority, capacity, and knowledge to implement.	Partners: Stakeholders who have some decision-making authority, political influence, policy or regulation authority, or who can assist with implementation.	Staff/Dept Lead: Responsibility party to oversee the project and implement.

Example: Santa Cruz County Local Hazard Mitigation Plan Prioritization Criteria

Very High Priority

- A project that meets multiple plan objectives
- Benefits exceed cost
- Has strong community support
- Addresses those hazards presenting the highest risk
- Funds are identified or potentially available
- Project can be completed in one to five years once project is funded

High Priority

- Project meets at least one plan objective
- Benefits exceed costs
- Funding has not been secured
- Project can be completed in one to five years once project is funded

Important

- Project mitigates the risk of a hazard
- Benefits exceed costs
- Funding has not been identified and/ or timeline for completion is considered long-term (e.g., five to ten years)

Source: 2015-2020 Santa Cruz County Local Hazard Mitigation Plan, Page 168.

Evaluate and Prioritize Strategies

Evaluate and decide which of the initial list of strategies are most relevant, most achievable, or highest priority. Carefully considered evaluation criteria can provide a tool for prioritization. Evaluation criteria can be an essential tool to gauge the priorities and values of different agencies, organizations, communities, or other stakeholders to ensure that strategies are well balanced to reflect the community's goals. Evaluation criteria can also reveal new perspectives in how different strategies impact the four frames — society and equity, economy, environment, and governance — or whatever frames the community has identified. Evaluating strategies through these frames can identify and highlight the benefits and tradeoffs of strategies in each frame, which can be very useful when garnering political, community, and financial support for implementation.

The four frames can reveal some of the following characteristics of each strategy:

- ✓ **Society and equity**: Effects on communities and the services on which they rely, with specific attention to disproportionate impacts due to social, political, or economic inequality.
- ✓ **Economy**: Economic aspects that may be affected such as costs of physical infrastructure damages or lost revenues during recovery periods.
- ✓ **Environment**: Environmental aspects that may be affected, including ecosystem functions and services and species diversity.
- ✓ **Governance**: Factors such as organizational structure, ownership of assets, management responsibilities of assets, jurisdictional mandates, regulations, or funding options that affect how a community can respond to a hazard.

The evaluation criteria can be used not just by the project team, but by any individual or group that will play a significant role in implementation. Vetting and evaluating strategies are a key piece of community outreach to ensure that the plan for building resilience represents what the community wants and needs for a safer future. Additionally, various city departments may have different perspectives on things like ease of implementation, and identifying potential issues during the evaluation phase can help prevent unexpected roadblocks in the future. Strategy evaluation is also another chance to build buy-in and support from decision makers and the community.

Building Consensus on Priorities

If many strategies rate similarly, the following questions may help identify top priorities:

- ✓ Is it aligned with other ongoing or planned efforts? Can the city adapt projects already underway to include mitigation or adaptation efforts, or if the city implements the strategy does it meet multiple goals?
- ✓ Is it an "easy win"? An easy win is a strategy that is easy to achieve and provides a high level of benefit.
- ✓ Is it an unlocking strategy? For example, are additional studies required or new stakeholders needed before the city can implement a priority strategy?
- ✓ Is the timing right? For instance, if the regular building code update is due in the next year, it may make sense to prioritize a strategy to update the building code to take climate change projections into account within that same process and time frame.
- ✓ Is there a champion? Is there someone who strongly believes it is a top priority and is willing and able to devote *time and resources to implement* it in the short term?

Refer to Worksheet **3.3 Evaluation Criteria** that can be adapted to match the project and the community's resilience goals.

Worksheet 3.3 Evaluation Criteria

Things to Consider for Implementation Planning

What is the best timeframe for the implementation plan? Less than five years is reasonable and is relatively predictable. However, some strategies, such as major infrastructure projects, may require a longer timeframe, especially as part of a general plan. The longer the timeframe, the less information, certainty, and feasibility the strategy will have.

Who controls the dependencies that will lead to the success of the strategy? For instance, does a strategy rely on a different organization passing a policy or funding the activity? The more dependencies and the more actors involved in achieving a strategy will likely require more time and resources to complete.

Can the project move forward with some easy win-win strategies early, even if they are not a priority? People and decision-makers like to see action and if there is a way to move forward some activities quickly, make that clear in the implementation plan.

Does a strategy connect to another project? If so, review the timeline for that effort and make sure the implementation plan is responsive to that timeline.

Is the strategy truly feasible? The implementation plan is a final opportunity to **ground truth the feasibility** of a solution and make sure it will actually be accomplished. If a strategy has been moved forward to this point, and it is more aspirational than realistic, adjust implementation to reflect that reality.

Develop Implementation Plans

The entire planning process should be done with an eye to implementation, working to overcome challenges and build consensus throughout to facilitate successful implementation. Once there is a list of prioritized and actionable strategies, the next step is to develop an implementation plan. Implementation can be considered in two parts:

Implementation is a critical part of sustaining resilience over the long-term, ensuring ongoing support and funding for future projects and initiatives. Below are some best practices to use as the project team develops implementation plans.

- ✓ Connect implementation to the goals and process completed to get to this point.
- ✓ Understand the needs and wants of stakeholders and community members.
- ✓ Use survey and polling to gauge broad support for plans and actions.
- ✓ Build support for the value of the plan to increase buy in and increase stakeholders investment in the outcome.
- ✓ Plan on a lot of ongoing public outreach and education to remind people about the effort and how it connects to their lives.
- ✓ Time projects when the atmosphere is right. Modify the timeframe identified in the plan as needed to benefit from external conditions.

A Long-Term Implementation Plan (5-20 years) is typically higher level, and used to share with stakeholders and decision makers, is included in formal plan documents, and illustrates how to achieve the vision and plan goals.

A Short-Term Action Plan (0-5 years) can act as a staff level working plan that details each step or tactic necessary to achieve those longer term goals and vision in a more manageable time frame, up to 2 years. There is a direct link between the action plan and annual budgets, the capital improvements plan, and daily work.

Develop Long-Term Implementation Plan

The long-term implementation plan (5-20 years) should map out the activities, priorities, timing, and costs for each strategy. This builds the overarching framework for implementation, ensuring that the implementation plan hits on all the high level goals. The long-term plan comes first so that the short-term action plans are designed to implement and enable the vision laid out in the long-term plan.

Use the implementation plan as the final chance to ground truth in the feasibility and effectiveness of a solution. If a strategy has been moved forward to this point, and it is more aspirational than realistic, adjust the implementation to reflect that reality.

Develop Short-Term Action Plans

Building upon the Long-Term Implementation Plan, a Short Term Action Plan with a 0-2 or even 5 year time frame should be the next step. This near term planning tool should integrate financing, and assist in routine city decision making while still maintaining the long-term vision of the implementation plan. The Short-Term Action Plan should include specifics and tactical details that go into city work plans, budgets, and grants planning.

Planning for implementation will also use the pieces of information filled in on **Worksheet 3.5 Strategy Development and Implementation** and shown as an example on the following page; the strategy types and process/implementation mechanism portions can be particularly helpful in identifying actions or activities. A Short-Term Action Plan should include the following information:

- ✓ Strategy name
- ✓ Specific actions or tactics to implement strategy
- ✓ Information on the lead, cost, level of effort or estimated hours to complete, funding source, and completion date
- ✓ A status line that can be updated periodically
- ✓ Metric or an evaluation measurement by strategy or tactics depending on the required detail

Worksheets 3.4/3.5 Strategy Development and Implementation

Figure 39. Example Strategy: ABAG/BCDC Stronger Housing, Safer Communities

STRATEGY DEVELOPMENT INFORMATION							
Problem Statement	The City of East Palo Alto experiences coastal flooding during extreme storms. One-quarter of the city and many single family homes are within the coastal watershed that experiences flooding now. These storms are anticipated to increase in the future causing more frequent and extensive flooding.						
Strategy Name	Reduce flood risk through integrated watershed management						
Strategy Summary	Identify projects that sustain or enhance watershed functions while protecting development from shoreline and riverine flooding.						
Hazard(s) Addressed	Current Flooding Future Flooding						
Strategy Type	**Operational**	**Programmatic**	Plans, Regulations, and Policy Development	Capital Improvement/ Infrastructure Project	Education/ Outreach/ Coordination	Evaluation	
Process/ Implementation Mechanism	**Long Range Planning**	**Land Use Planning**	Capital Planning	Operations	Emergency & Hazards Planning	**Project Planning & Design**	New Initiatives
Responsible Agency	Planning and Building Department						
Partners	FEMA, developers						
STRATEGY IMPLEMENTATION INFORMATION							
Priority (Evaluation Score)	13						
Actions/Activities	Conduct additional analysis of appropriate watershed projects, partner with FEMA for guidance and assistance, incorporate projects into long-term city plans, and pursue implementation of identified projects						
Staff Lead	Jane Doe						
Cost Estimate	$50,000 planning, $300,000 - $1 million implementation						
Benefits (losses avoided)	Improves habitats and biodiversity, improves water quality, protects vulnerable residents and recreational uses, protects built environment						
Potential Funding Sources	FEMA						
Timeline	18 months planning, 3-5 additional years for implementation						
Related Policies	Existing policies for management of estuaries along shoreline to enhance bay shoreline flooding protection capacity						

Catalysts for Implementation

Implementation is the most difficult part of any planning effort. Many partners can get behind a concept, but when it comes to dedicating funding, time, or resources, it can be a challenge. The process identified in this Toolkit is designed to help avoid common pitfalls, particularly inadequate engagement of stakeholders, decision-makers and the community. The following are some best practices to adhere to when developing implementation plans:

1. **Political buy in.** Elected officials, like council members, have the power to expedite or stymie action. Building a supportive political climate and addressing the concerns of elected officials or other decision makers can make the difference between action and inaction.
2. **Sustained commitment.** Many actions can take years to implement. Projects may span multiple terms of office for elected officials and multiple funding cycles. It helps to have an advocate at a high level (see above point about political buy-in), but beyond elected officials, who may cycle in and out of office before a project is complete, engagement of department heads, city administrators, city managers, or someone similar helps ensure implementation success.
3. **Focus actions where the money is.** Varying priorities from funders means that sources of funding may not align with all actions identified and prioritized. Rather than focusing on an action without regard to where funding will be coming from, select actions that align with funding priorities. (See Step 4. FUND for more on this)
4. **Piggyback on successful local projects.** What kinds of projects are already successful in communities? Every community has its own capital spending pattern, which reveals the priorities of the community. These priorities should have been identified early on in the project, and strategies and actions should align with existing community priorities. It is important to look at existing projects to see where resilience actions may be able to piggyback.
5. **Use existing processes, groups, or sources of funding.** Similar to capitalizing on existing successful projects, consider how existing working groups, departments, or funding streams can be adapted to include actions that advance resilience. For example, if a community already has a sustainability council that brings together cross-agency staff or department heads, that group could expand its mission to advance resilience as well. Additionally, current investments in infrastructure

Example: Linking Climate Adaptation and Hazard Mitigation in Massachusetts

In 2018, the state of Massachusetts completed an integrated State Hazard Mitigation and Climate Adaptation Plan. The plan outlines 108 specific actions that meet the requirements both for federal disaster mitigation funds and for the governor's executive order requiring the state to prepare for the impacts of climate change.

These 108 actions are scored by priority and have detailed information about the lead agency, partners, funding sources, and completion time frame. Key state agencies will track progress of each action and update and develop new actions over time.

www.mass.gov/service-details/massachusetts-integrated-state-hazard-mitigation-and-climate-adaptation-plan (Chapters 7 and 8)

maintenance may be able to be adapted to incorporate protective actions like water-proofing or seismic retrofit to improve the longevity of infrastructure without the need for new bond measures or other sources of funding.

6. **Consider the city's partners.** Many resilience projects are complex, with multiple owners, regulators, or users of assets that need retrofit, moving, or rebuilding. Create more realistic solutions by identifying and engaging with all involved stakeholders from the beginning, and taking into account all of the moving pieces involved in implementing a solution.
7. **Do not be afraid to build something new.** Sometimes it makes more of a statement and political splash to create an entirely new effort, especially if the effort can garner a lot of excitement and involvement from a wide variety of stakeholders. For example, Bay Conservation and Development Commission's 2009 Rising Tides design competition generated region-wide interest in climate adaptation, leading to the development of the Adapting to Rising Tides Program which has worked with many cities and counties since the competition to develop in-depth vulnerability assessments and sea level rise adaptation strategies for the region.

Every community will need its approach for implementing resilience building actions, building on existing processes to create adaptive decision making and action taking. Ensuring successful implementation stems from active engagement of stakeholders, coordinated decision making, and wide ranging capacity building to minimize barriers to action and garner meaningful support.

Step 4. FUND: Funding Action

Figure 40. Lassen County wildflowers, California

In the shadows of Lassen National Park, a resilient landscape in historic lava flows.

Step 4. FUND

This chapter reviews the pivotal steps for funding the projects outlined during Step 3: ACT. This chapter is divided into two primary sections:

- ✓ **Make the Business Case for Resilience**
- ✓ **Develop a Resilience Capital Strategy**

Figuring out how to fund a project or resilience initiative is a difficult challenge to solve for almost all jurisdictions. No matter the project, financial hurdles are frequently cited as the reason for not acting. Building successful funding and financing for resilience starts with understanding the community's long-term vision for its future and how collectively it will commit to funding and implementing its goals. Successful communities will figure out meaningful ways to mainstream resilience into overall community development and community visioning.

Adaptive approaches to match resilience needs to funding resources may include unconventional solutions: for example, different departments may coordinate on spending for capital projects, or neighboring cities may pool funding for large-scale green infrastructure projects to benefit many jurisdictions. Unexpected co-benefits arise from these imaginative multi-partner efforts — workforce development opportunities, new sources for potential matching funds, enlivened economic conditions resulting from major construction projects, and an improved physical environment that uplifts the quality of life for the community. By highlighting multiple benefits of resilience projects, more funders are likely to emerge to support implementation.

Project teams can work with the advisory group to develop an overall resilience capital strategy, which can include several steps to ensure a robust, diverse, and long-term sustainable plan for funding resilience actions. But project teams will need to first start by mastering the fiscal landscape with training for key staff and leaders in how to make the business case for resilience projects. Thought many project team and advisory group members may be able to talk about the need for resilience actions, they will also need to be able to talk about the cost-benefit analysis, the return on investment, and other such financial considerations for project success. Furthermore, it is important to have a strong network of funders that cut across levels of government and include the private and philanthropic sectors. Lastly, before a capital strategy takes form, the larger community must be willing to invest in actions that improve overall community resilience.

Make the Business Case for Resilience

Master the Fiscal Landscape

Senior staff and elected leaders will need to develop financial literacy to talk with both private financers and public agencies about their projects and funding needs. Local governments can consider setting up a fiscal coaching program for personnel that work on disaster resilience planning and project action. Training and capacity building on fiscal issues can ensure that all decision-making officials are conversant with current finance and funding options that are evolving at a rapid pace. Social investment firms often provide pro bono training support for clients and community stakeholders. Programs such as the Urban Land Institute's Pro Forma Fundamentals course provides transferable models for financial analysis in the real estate sector. There are many ways to support local expertise and to ensure communities are savvy investors and funders in resilience planning. In the same way that cities support leadership or equity training programs for staff and supervisors, cities can consider adding fiscal literacy and innovation curricula into professional development programs to build local proficiency.

Build Your Funding Network

Making the business case for the resilience effort in the community — planning how to frame the project, back it up with data and numbers, and convince people to invest in it — is a critical part of this effort. The project team should devise a clearly articulated business case for the resilience actions. This will support the larger resilience initiative and be the means for the community/region to demonstrate the purpose of the work with information that an audience of financers will need in its deliberations on partnering and investing. Each project, initiative, and strategy must be "sold" to decision makers, partners, and, most importantly, funders.

See Appendix A pages 4.5 - 4.6 for more details.

Worksheet 4.1 Funder Engagement Inventory

The effort to develop a resilience funding plan is a time-intensive activity that warrants attention, sustained networking, and ongoing communications with a broad range of potential fiscal partners. It is realistic to plan for at least two to three years of planning and project development to successfully secure local and external funding.

Best Practices to Develop a Funding Network

- **Build partnerships and relationships** with local groups and those in other sectors and levels of government. This is a good business practice and knits together critical social networks used in supporting funding measures, new budget allocations, and for securing new revenues.
- Connect with funding program officers at state agencies to acquaint them with the community's resilience action planning and fiscal gaps. **Meet with the State Hazard Mitigation Officer** who monitors federal risk reduction programs and manages the state's FEMA funding support for federal mitigation assistance.
- Contact the state office of emergency services and regional FEMA Grants teams and **invite them to visit** the jurisdiction's resilience team, partners, and community leaders in order to present ongoing action planning efforts and demonstrate local needs for additional fiscal support.
- Keeping up on current policy developments is important: **register to receive all public outreach communications on available grant funding, application processes, and proposal deadlines.** Monitor the agency's social media postings and funding alerts to ensure having as much information as possible on funding resources, and place your name on mailing and notice lists for state and federal programs.
- Invite staff from federal agencies such as FEMA, EPA, HUD and other potential funding offices to **quarterly briefings** about ongoing resilience planning and implementation needs.
- Lead state and federal agency leaders, senior state and federal elected officials and staff from philanthropic funders on **community tours to demonstrate the need** for resilience funding and resources.
- **Attend commission and governing body meetings** of funding agencies and organizations on a regular basis to become well versed in their policy priorities; establish a jurisdictional presence and interest in their proceedings; and, to present information during public comment periods on the jurisdiction's resilience efforts.

- **Track relevant state and federal resilience legislation** as well as budget processes to identify potential sources of resilience funding is another useful tack. Submit comments through the jurisdiction's governing body, pertinent committees, and legislative representatives on changes in regulation and funding allocations, especially relevant substantive statewide funding measures.
- Encourage the **inclusion of resilience policies and actions as eligible funding activities** in the development of state regulations developed after voters approve a funding measure.
- Participate in the public dialogue on the **development of regulations that govern bond and tax** disbursements and promote actions that route funds for resilience implementation.

Build Local Support

Building and sustaining stakeholder support for resilience action is an essential component of a finance strategy. As a jurisdiction overhauls its internal spending plan to incorporate climate and disaster resilience improvements, develops new revenue sources, or seeks voter approval for tax measures, having solid community backing is a baseline need. Communities see these efforts as being similar to managing a fundraising drive or a political campaign. After building trust and involvement through consistent outreach and frequent public dialogue, a larger support network naturally evolves as leaders and stakeholders address community risk and develop local solutions that make sense and are doable. Use **Worksheet 4.1 Funder Engagement Inventory.**

Local officials need to understand effective ways to activate community interest and ensure they are addressing the community's highest priority needs. This will assure voters that they have responsive government partners and they are more readily invested in resilience outcomes. As outlined above, building a base for community support calls for astute public outreach.

Best Practices to Build Local Support

- **Cultivate internal allies**. Local boards and commissions, along with the mayor and city council/boards of supervisors, exercise considerable authority on budget decisions, approving grant applications and development of new revenue streams.

Case Study: Accessing Hazard Mitigation Grant Program (HMGP) process

The HMGP program is funded through monies set aside as required by the Stafford Act (the foundational law for FEMA and federal disaster support to communities) to make risk reduction improvements after a federally declared disaster. A set aside for post-disaster dispersal is available and ranges from 10-15% of monies distributed through the federal disaster response programs for Public Assistance.

One complicating issue is that state offices of emergency services direct the grant application process and have a limited alert distribution process when grant funds come available. The jurisdictions filing for a physical project must have an adopted LHMP; funding is also available for development of HMGPs as well.

While typically local fire departments are notified about the potential grants, other municipal departments may not be in notified. One common outcome is that a state's HMGP program often receives applications for funds from local fire departments and OES staff for their departments. Therefore, climate adaptation and large-scale risk reduction projects do not compete or there is inadequate interdepartmental coordination. The program has much wider potential. Building trusting, cooperative relationships through this inter-agency and multi-disciplinary regional resilience planning process can increase the likelihood of successfully applying for, and obtaining, HMPG funding.

Case Study:
Two examples of voter-approved flood bonds from Miami and Houston

The Miami Forever Bond passed in 2017 and is a $400 million general obligation bond in which $192 million was set aside for flood risk reduction and sea level rise mitigation.

www.miamigov.com/Government/Departments-Organizations/Capital-Improvements-OCI/Miami-Forever-Bond

In 2018, Harris County, Texas passed a $2.5 billion flood mitigation bond initiative that will be managed by the county flood control district.

www.hcfcd.org/2018-bond-program/

Enlist members of these appointed bodies as champions for resilience implementation. Start by identifying the senior leaders whose approval is essential for resilience projects' success.

- Develop a **briefing plan** for senior decision makers to establish program and funding priorities, and work with the agency's executive team to craft staff level recommendations for resilience actions to present to the jurisdiction's governing body. Designate senior sponsors who can shepherd projects through planning and budget processes and are trusted figures in the agency and community.
- **Weave financing for resilience into daily activities**. Establish a **resilience action agenda** through existing agency planning processes. Identify practical next steps that align with or improve existing organizational practice; identify innovative ways to blend/unlock funding for multi-benefit projects. Present these ideas as incremental, feasible solutions to address long-term challenges that are woven into the annual budget processes and capital planning budgets.
- **Enlist the support of community stakeholders and active, local groups.** Forging solid community relationships will be the basis for ongoing support for projects and financial support for resilience implementation. Build on community initiatives and link resilience action with other, ongoing local projects and initiatives. This will anchor resilience in daily community life and grow a larger network for implementation.
- **Ensure that resilience is a front burner community topic.** Develop a consistent briefing plan for varied stakeholder groups and integrate presentations with standing meetings to socialize the public consultation process and to ensure that resilience initiatives are always on the community's discussion agendas. Make sure senior officials have a clear understanding of the fiscal challenges the community faces to improve resilience outcomes.
- **Conduct participatory budget processes.** These are public-private discussions about community finances that yield solid results that demonstrate community confidence and partnership. The process is much the same when addressing how to fund resilience improvements; rallying community support at the outset is essential as communities internally negotiate how to pay for climate and disaster safety measures. Whether through electoral campaigns, applying for funds from federal agencies, or by raising local impact fees, local jurisdictions have crucial financial choices to make to reduce the risk they face now and in the years to come.

Develop a Resilience Capital Strategy

A successful resilience capital strategy is one that marries community- and government-supported funding and financing options into a layered and diverse portfolio of options. The concept, similar to a capital stack, is based on the understanding that there is an inherently "correct" sequence of funding and financing to maximize investments. To establish an effective capital strategy, the project team must be intentional about its funding and financing approach from the beginning, and structure its engagement, project development, communications, and resources in a way to leverage and enhance the potential to establish a robust and diverse capital strategy. Most cities struggle to find start-up investments that will bring more partners to the table to scope the project and lay the groundwork, whether through initial design, property acquisition, permitting, and other early-stage project phases. Yet these start-up funds are critical to leverage long-term recovery and pre-disaster funding.

Certain investments, such as those from a community foundation or general fund, can be made early in the process as they require limited return on that investment and are able to seed additional funding sources, particularly private investments, that need a stronger foundation and low-risk profile. For resilience projects, particularly large infrastructure projects, building this funding foundation is essential. Resilience financial planning must consider the need to secure early, pre-development funds from local government reserves or budgets, private-sector partners, or philanthropy sources. This leverages available government funding and keeps initiatives on track.

Communities must consider the overall timing and complicated fiscal process for bringing disaster resilience projects to fruition. Project teams will need to pinpoint financial milestones and appropriate funding sequences to implement the project. This sequencing is tricky to manage, because external government grants are frequently allocated for projects that are fully planned and designed. An effective resilience capital strategy often starts with local, self-reliant investments, and leverages those monies with public-private partnerships, philanthropic dollars, regional funds, grants, and private-sector investments.

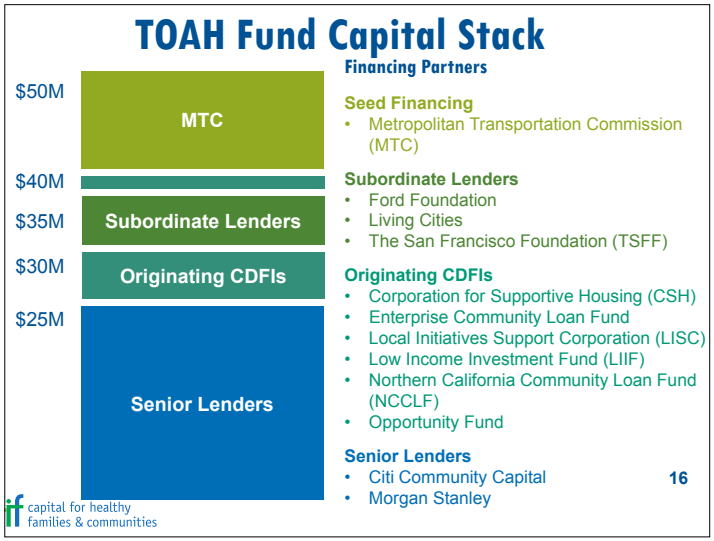

Figure 41. Example of a diverse capital stack, adapted from the report "Bay Area Transit-Oriented Affordable Housing Fund." Bay Area TOAH Fund. 2013. *www.greatcommunities.org/our-work/financing*

Case Study:
New York City Subway Bond

Following Hurricane Sandy, New York's Metropolitan Transportation Authority (MTA) sold a $200 million catastrophe bond to protect the New York City subway system from future storm surges. The bond trigger is set at a specific storm-surge height based on data provided by USGS and NOAA.

www.adaptationclearinghouse.org/resources/nyc-mta-storm-surge-protection-via-catastrophe-bond-market-new-york-city-metropolitan-transportation-authority.html

Self-Reliant Resilience Financing

Starting with the inventory of local resources demonstrates community commitment to a more self-reliant financial future. It also provides local matching funds required for many federal grant programs and shows private investors that local jurisdictions are serious about addressing risks and willing to adopt innovative ways to fund community safety. Use the following common (and not-so-common) tools for local resilience financing.

Develop an initial financial strategy that starts with locally-based funding opportunities. The strategy should consider the following elements:

- Embed resilience budgeting into the community's fiscal planning. As resilience funding is often limited to external, limited scope grants or restricted portions of general fund or capital improvement plan budgets, local resources are undervalued. This includes existing budget planning as part of mainstream operations. Incrementally, resilience projects and initiatives need to be part of the regular budget and decision-making discussions.
- Examine all funding sources at hand as possible resilience monies that can open new possibilities to implement projects more quickly. Comb through internal budget sources and consider how to re-purpose existing funds or create new revenue scenarios to leverage what's already available.
- Influence community-wide conversation and day-to-day decisions about long-term capital improvements to both inform the public and build support for future funding campaigns.

Every community has an investment approach shaped by local values, identified risks, and consensus solutions resulting from local dialogue. Developing a zero-based local budget analysis to closely examine resources at hand can be the gateway to advance a diverse resilience funding strategy. Start by looking at existing internal processes, groups, or sources of funding as topics for public consideration that could offer unexpected answers on how to mainstream resilience projects. Local jurisdictions or regional agencies with cross-functional project groups or inter-departmental work teams may be able to incorporate resilience components into ongoing capital projects or planning initiatives. Projects already poised to be funded and implemented are prime examples of efforts to review as potential vehicles for readily integrating resilience improvements.

Adapting current asset management budgets for infrastructure maintenance might easily combine protective actions such as weather-proofing or structural improvements to expand the full lifecycle investment and infrastructure upgrade with little or no extra funding. This approach is successful when done with a robust participatory process to balance the perspectives of government and local residents. Once local resources are scrutinized and realistically assessed as untapped funds for resilience projects, decision makers can identify additional resilience funding gaps and plan for outside grants or loans. See **Worksheet 4.2 Local Funding Source Inventory Worksheet.**

It is possible, at the local and state levels, to provide fiscal and resource incentives for resilience improvements that property owners use to good purpose. Some disaster-experienced communities have funded post-event grants (some funded through FEMA or the state Office of Emergency Services) for homeowners to use to implement fire and seismic safety improvements. Other cities have provided permit fee waivers, expedited approvals and property transfer tax rebates for residential resilience upgrades. New programs in residential energy and water efficiency offer a promising pathway for property owners to include disaster safety improvements to their renovation projects. It is also possible to leverage these sustainability resources with added state and public utility federal incentives. The following list describes some of the local or regional financing options that can be used to support resilience projects:.

- **Existing budgets.** Assess for potential resilience funding or to leverage financing opportunities, including utility user fees, special service taxes, existing general obligation bond monies, and other operational funds.
- **Existing infrastructure and community development funds.** Review water, public safety, energy efficiency, retrofit funding, green infrastructure funds, housing, climate action, and transportation program budgets. Determine how these monies can be "unlocked" and combined with other funds to amplify resilience action investments and achieve supplemental improvements, e.g., improving a building's energy efficiency while retrofitting for earthquake resilience.
- **Bonds.** Local jurisdictions can issue municipal and general obligation bonds with voter approval for taxes assessed on property parcels. Bond proceeds can fund capital improvements. Other types of bonds include social impact, green, resilience, and environmental impact bonds.

Example: Triple Bottom Line in Colorado

Following the catastrophic 2013 floods in Boulder County, Colorado, nine local jurisdictions formed a planning collaborative and have used the National Institute of Standards and Technology (NIST) Community Resilience Planning Guide (*www.nist.gov/topics/community-resilience/planning-guide*) to develop and enact common, location-appropriate guidelines for rebuilding public-sector facilities and systems. Boulder County applied a triple bottom line analysis, which considers impacts to the economy, the environment, and society, and that links to state-of-the-practice asset management systems.

www.bouldercounty.org/disasters/flood/2013-flood/resiliency/

Geological Hazard Abatement Districts

Geologic Hazard Abatement Districts (GHADs) can be used to raise funds to mitigate landslides, land subsidence, soil erosion, earthquake, or fault movement. Funds can be used to address structural hazards and even for flood protection measures, including green infrastructure approaches. Find out more from the California Association of GHADs: *ghad.org/*

Capital improvements

The University of Maryland Environmental Finance Center produced a report for the Eastern Shore Climate Adaptation Partnership analyzing how Eastern Shore jurisdictions are considering resilience in CIP processes. The report provides a set of best practices and case studies from other places.

www.eslc.org/resilience/escap-materials/

Public-Sector Resilience Bond

A Guide for Public-Sector Resilience Bond Sponsorship, created by re:focus partners, offers cities guidance on setting up resilience bonds as an innovative insurance product to support large-scale infrastructure projects.

www.refocuspartners.com/rebound/

Worksheet 4.2 Local Funding Source Inventory

- **Special tax assessment districts**. Use a voter-approved tax district to levy taxes for a risk-reduction program limited to a particular type of improvement in a defined area. Such districts can use the funds for capital improvements or operating program uses.
- **Capital improvements planning budget.** Cities develop two-, five-, or ten-year capital budgets that outline long-term community improvements to infrastructure and operational programs. These budgets can incrementally add resilience actions as they are refined and adjusted.
- **Resilience impact fees**. A jurisdiction can enact a policy to embed resilience fees in development entitlements or via building permit process fees. These fees are similar to other types of entitlement fees such as for affordable housing, parks and open space, and infrastructure improvements. Fees are charged via the permitting process and used by the jurisdiction as funding for resilience improvements.
- **Department of Housing and Urban Development (HUD) entitlements.** It is possible to repurpose existing federal allocations for higher-impact resilience benefits as allowable under program guidelines; HUD Disaster Recovery funds are also a potential source of funds for resilience improvements.
- **City reserve funds for economic uncertainty.** City reserve funds may be used as collateral for revolving state or federal loan funds, if approved by the jurisdiction's governing body.
- **Parametric triggered catastrophe insurance.** Re-insurance firms offer policies tailored to address probable disaster impacts in a defined area. When the disaster strikes, funds are quickly transmitted to the jurisdiction to accelerate recovery operations.
- **Property Assessed Clean Energy (PACE) programs.** PACE energy, PACE seismic and Pay As You Save (PAYS) on-bill programs are allowable sources of funds to improve environmental sustainability and resilience. Communities use these established programs to fund risk reduction/resilience with improvements as allowable under state law. Property owners borrow capital from private sector lending programs to install safety and energy improvements. The loan is repaid over a designated period, included with payment of annual property taxes.
- **Risk management practices.** The jurisdiction's risk management staff coordinate with other jurisdictions on common safety actions through regional risk pools. Staff can investigate how to work on and accelerate resilience implementation through these typically well-funded programs that provide internal risk-reduction grants for member communities.

Boundary organization investment

Another element in the capital strategy is to create a conduit for donations to the local government for both disaster recovery and pre-disaster mitigation actions. This can be done within the local government or through formation of a non-profit, 501 (c) 3 organization to serve as a fiscal agent. Community Development Financial Institutions (CDFIs), regional land trusts, community foundations, and Community Development Corporations (CDCs) are all potential partners in the initial project phase.

CDFIs, CDCs, land trusts, and community foundations can form a layer of the stack that bridges local need to grants, revolving loan funds, or private sector investments. These boundary organization investments can support the pre-development planning, environmental review, or entitlements that must be in place for projects to be deemed "shovel ready" by grant funders, including federal grants. The Santa Barbara Community Foundation in Southern California supported recovery planning after the 2017/18 disasters struck. Another example is the Rebuild North Bay organization that supports fire recovery work to restore regional housing after the 2017 Wine Country Fires.

Partnering with a boundary organization can help local governments find early funds to jumpstart projects. Boundary organizations are common for bridging science and policy, and these organizations can also function to bring diverse partners together for collaboration in areas that neither side is an expert in. In the case of disaster resilience, this partner can provide start-up, pre-development, and entitlement funds for public sector infrastructure projects and serve as a bridge to implementation from planning to action.

Case Study: Environmental Impact Bond to Reduce Coastal Land Loss in Louisiana

A set of partners in Louisiana structured a $40 million bond to protect Port Fourchon from coastal storms and erosion, including threats to the shipping industry, energy infrastructure, and coastal communities. This environmental impact bond was set up by the Coastal Protection and Restoration Financing Corporation (CPRFC). Impact investors and other investors such as port owners, utilities, and oil and gas companies can buy into the bond. The bond will be used to build wetland restoration projects to protect the Louisiana coastline and all the economic activity located there. Bond repayments depend on the successful performance of the natural infrastructure.

www.conservationfinancenetwork.org/2018/09/25/louisiana-environmental-impact-bond-may-reduce-coastal-land-loss

What Is Impact Investing?

Impact investments are private capital investments intended to offer social and environmental benefits along with financial gains. Impact investors may be large institutions, such as pension funds or banks, as well as individuals, nonprofits, and foundations, who want to invest in projects that will have a larger benefit on society and address big challenges, such as climate adaptation.

www.thegiin.org

Curate a Resilience Finance Menu

A layered capital strategy should address how the project will offer multiple benefits, which will attract the greatest number of potential investors. Funding is all about the framing of a project to meet the needs of a particular funder. A reliable, long-lasting funding strategy will often include a variety of funders, and project teams that want to set up a diverse finance menu may want to:

- Develop a feasible **public-private finance strategy** by connecting with impact investors, corporate partners, and local financial institutions. Local officials can align support of private capital as a crucial part of the resilience funding strategy.
- Pursue **philanthropic and corporate contributors** through the private-sector partnerships and by tapping local community foundations to explore potential funding through this often underused fiscal source.
- Develop **regional funding** programs.
- Secure **external grants.**

Figure 42. Impact investing and levels of expected returns. From SPARCC (Strong, Prosperous, And Resilient Communities Challenge) Capital 101 Training. Adapted with permission

Attracting Private Investments

Private sector support from impact investors, developing private/public partnerships, and exploration of the new federal programs can provide an additional layer of project funding to bolster public sector monies. Programs such as the Department of Treasury's Opportunity Zone program attract funders to public sector infrastructure investments by providing investment tax incentives if private sector partners remain for ten years in the resilience venture. The underused private sector investment is a promising opportunity that communities are exploring as public sector finance programs shift eligibility requirements, reduce grant allocations or simply discontinue operations.

Private sector finance may provide funds from instruments including insurance-linked securities, obtained through insurance policies that cover disaster-related impacts, and catastrophe bonds that pay premiums after a specific, pre-designated disaster hits the policy-holder jurisdiction. Social and environmental impact and green bonds are issued by local governments, for environmental and infrastructure improvements, and provide tax benefits for the municipality. For example, the Port of Los Angeles issued $35.2 million in green bonds in 2015 for port infrastructure improvements; the City of Los Angeles has used green bonds to improve municipal water systems.

The first set of Opportunity Zones were designated in April 2018, and now all 50 states, the District of Columbia, and five U.S. territories have designated Opportunity Zones. The program will allow for long-term investments in housing, infrastructure systems, commercial and economic development in state-designated, frontline communities. These investments offer a potentially powerful new tool to speed resilience implementation with private investor funds. California will allow state disaster recovery and climate adaptation funding to leverage private monies in underresourced communities. Newly introduced federal legislation (SB 3648) will add state wildfire areas to the eligible community list. The details and legal guidance for these zones is still in development, but is likely to provide private sector investors tax incentives to spur financing for public sector infrastructure and community/social investments.

Worksheet 4.3 Foundation and Other Grant Funding Alignment

Example: Measure AA—Protecting the San Francisco Bay

What began as a tentative set of goals to address climate challenges and to save the Bay, Measure AA grew into the Bay Area's first all-region tax measure on the June 2016 ballot. A diverse coalition of environmental, business, foundations, political organizations, with a long history of working together formed and successfully secured the approval of 70% of Bay Area voters for a $500 million program of all nine counties touching the bay. Over the coming decade, the Bay Restoration Authority, the governance body, will ensure effective implementation of the restoration work by coordinating with a community oversight committee.

sfbayrestore.org/

Philanthropic and Corporate Grants

Project teams can establish relationships with community, state, and national grant-makers to further diversify the local capital strategy. Many philanthropies are focusing more and more on issues of disaster resilience, and the list of resilience strategies can be cross-referenced with philanthropy priorities to find overlaps. Philanthropic partners may be well-suited to fund community engagement, training, and non-construction type projects on the list.

The relationship with private grant making groups is another aspect of the social and political networks needed to construct a multi-sector finance strategy and requires steady, intentional, and diplomatic approaches. Finding a good funding match might take more research and communications as compared with more conventional and previously established relationships that local jurisdictions might have with public sector program officers.

The most accessible gateway into information on private sector funding is the Funders Network for Smart Growth and Livable Communities (*www.fundersnetwork.org*). Many members of this group are focusing their philanthropy on resilience, and they now have a Philanthropic Preparedness, Resiliency and Emergency Partnership (PPREP) to build capacity of community foundations in some states (*www.fundersnetwork.org/participate/pprep/*). Other resources include regional community grantmaking alliances and local community and family foundations.

Regional Funding Programs

In most states, regional funding is available for transportation, water, and open space initiatives; these funding programs favor multi-jurisdictional partnerships and regional solutions to disaster risks, including from climate change. These regional monies can be leveraged to support local-level projects. Local project teams may need to coordinate with metropolitan planning organizations (MPOs), councils of governments (COGs), or other regional entities with reliable funding. Many MPOs, COGs, or regional planning agencies may also be the lead agencies for FEMA-approved Local Hazard Mitigation Plans. Also, many regions have multi-jurisdictional Economic Development Districts that write Comprehensive Economic Development Strategies or CEDS, which are required to include regional vulnerabilities and a resilience action plan (*www.eda.gov/funding-opportunities/*). Both Hazard Mitigation Plans and CEDS provide good opportunities to apply for

federal funding tied to these regional planning documents. Northern California's Measure AA is a voter-approved tax passed by nine counties in 2016 to fund efforts that keep the San Francisco Bay environmentally healthy. It's the first regional tax measure for the area and one that garnered approval by all community sectors in the region.

Securing External Grants

After assessing local funding sources, a next step is to identify and tap into outside funding sources. Many state, federal, and philanthropic grant programs have specific guidelines about eligible projects and acceptable matching fund sources. These agencies and organizations likely have program priorities that differ from the local applicant; grant parameters might not completely align with what the local community needs or wants to accomplish. From there, identify components of projects that align grantor's funding priorities and tailor an application to those priorities. Other portions of the project can then be covered by previously identified, re-allocated local funds or through other matching grant or loan programs.

Federal and State Grants

Government partners at the state and federal level can complement local and regional resources. While these options vary among the states, California has a long-established practice of passing statewide bond measures to improve infrastructure, open space, schools, and housing via grants to local government. The California Strategic Growth Council, largely funded by the Greenhouse Gas Reduction Fund, has allocated billions annually for resilience implementation and is an example of a state agency program making inroads on resilience investments. Massachusetts also has dedicated billions of dollars toward climate adaptation, including through the Municipal Vulnerability Preparedness (MVP) grant program and with a diverse set of community investment grants for cities, regions, and other entities.

Information on federal grants is available at *grants.gov*. This portal posts the announcements and all process-related information that jurisdictions, states, and tribal nations need for applying to these programs. No single resource posts all county, regional, and state grant programs, and it is difficult to locate them. Identifying county, regional, state, and federal grant opportunities takes more time to discover, as well as additional staff work to discern if the funding source will meet local needs. The outcomes of funding research, though, are worth the staff time and expense.

Example: County Cost-Share in Southeast Florida

The Southeast Florida Regional Climate Change Compact has been successful at taking in grant funding as a region, including federal funding. By working together across the four-county region, they can demonstrate greater potential outcomes and therefore make a stronger case to funding agencies and organizations than they might be able to as individual counties. For more information on the Compact's activities and funding initiatives, see the Compact website and the Georgetown Climate Center's case study on the Compact.

southeastfloridaclimatecompact.org/

https://www.georgetownclimate.org/reports/lessons-in-regional-resilience.html

Funding for Smart Growth Projects

EPA's website has a list of federal, state, regional, and local funding programs that may be geared toward other issues such as rural land use or historic preservation, but can fund resilience-related projects.

www.epa.gov/smartgrowth/smart-growth-national-funding-opportunities

Federal funding for resilience has been enhanced recently. The Disaster Recovery Reform Act of 2018 will set aside 6% annually of federal disaster expenses to apply to pre-disaster risk reduction. These monies are a significant boost to previous risk-reduction grants and are to be used primarily for national infrastructure improvements. Local governments can actively pursue these funds and be ready to respond to the state-managed application process that is set to begin in fiscal year 2020.

Step 5. MEASURE: Evaluate Results and Refine Methods

Figure 43. Trinity Lake, California

Low water levels in reservoir after multiple years of drought.

Step 5. MEASURE

This chapter will explore the topics of metrics and evaluation, assist with understanding best practices for measuring progress, and illustrate how these tools can inform the resilience building process. This chapter is divided into two primary sections:

- ✓ **What to Measure and Why?**
- ✓ **Self-Evaluation to Measure and Refine**

See Appendix A pages 5.3 for more details.

What to Measure and Why?

Tracking success and evaluating actions are critical elements in ensuring effective implementation of resilience strategies and projects, meeting local needs, securing sound investments, and ensuring people work together effectively. Identifying what to measure (metrics), and how to track and evaluate those metrics over time is central to quantifying results. Good metrics provide:

- ✓ A **baseline** that indicates the starting point;
- ✓ A **target** for where the community is going;
- ✓ An indication if there is something **wrong**; and
- ✓ Highlights when the agency or city achieves its **goal**.

Further, well designed **metrics can help tell a story for why resilience building is necessary**, attract political support and funding, and focus efforts while providing a feedback mechanism about whether decisions, investments, and actions to improve resilience are making a difference and can help guide future decisions. Good metrics should be designed to do the following:

- ✓ Connect to goals, community values, and desired outcomes.
- ✓ Feasibly track information required to measure the metric. If the data is too difficult or expensive to track and gather, it does not help.
- ✓ Mean something and not simply a count. For example, a metric that indicates a number of people who receive training does not necessarily correlate to knowledge.
- ✓ Offer fewer, more meaningful metrics rather than a laundry list that will not be tracked.
- ✓ Provide data for accountability, guiding action, telling a story, and measuring success.
- ✓ Be adaptable and scale with the effort and do not become unwieldy.

Measure Outputs or Outcomes?

Metrics can be designed to measure output (quantitative) and/or an outcome (qualitative). If the data is available, outputs are relatively easy to track. Examples of outputs are number of dollars spent or saved, acres of land preserved, or number of staff hired. However, an output metric does not necessarily demonstrate the quality or success of a strategy, only that something has been done.

An outcome based metric, on the other hand, is more qualitative and tends to measure the value and effectiveness of a strategy. Examples of outcome metrics could be the ecological health of preserved land, or community awareness and preparedness for a disaster.

The figure below demonstrates the differences between outputs and outcomes.

Figure 44. Outputs and outcomes

Outputs "What We Do"		Outcomes "What Difference is There"		
Activities	**Participation**	**Short-Term**	**Medium-Term**	**Long-Term**
What we do • Develop projects • Convene/ Meetings • Deliver Services • Educate • Provide products • Facilitate • Partner	**Who we reach** • Participants • Community members • Agencies • Partners • At-risk populations • Teens/Seniors	**Short-Term results** *Learning* • Awareness • Knowledge • Skills • Opinions • Aspirations • Motivations	**Medium-term results** *Action* • Behavior change • Practice • Decision-making • Policies • Social Activities	**Ultimate Impact** *Conditions* • Social • Economic • Civic • Environmental

The 2012 National Research Council report "Disaster Resilience: A National Imperative"

This report identified four important topics to include in community resilience indicators or measures:

"1. Vulnerable Populations—factors that capture special needs of individuals and groups, related to components such as minority status, health issues, mobility, and socio-economic status

2. Critical and Environmental Infrastructure—the ability of critical and environmental infrastructure to recover from events—components may include water and sewage, transportation, power, communications, and natural infrastructure

3. Social Factors—factors that enhance or limit a community's ability to recover, including components such as social capital, education, language, governance, financial structures, culture, and workforce

4. Built Infrastructure—the ability of built infrastructure to withstand impacts of disasters, including components such as hospitals, local government, emergency response facilities, schools, homes and businesses, bridges, and roads"

Source: National Research Council. 2015. Developing a Framework for Measuring Community Resilience: Summary of a Workshop. Washington, DC: The National Academies Press. doi.org/10.17226/20672

Best Practices for Creating Usable Metrics

Align with Goals and Strategies

Metrics and Resilience Goals, as described in **Step 2: Assess,** should be linked and designed to be measured. Using a S.M.A.R.T. goal approach (i.e., a goal that is Specific, Measurable, Achievable, Relevant, and Time-based) makes the development of an aligned and useful metric much simpler. Broader goals will require more discussion about specific and useful metrics and may require multiple, phased metrics (i.e., a measurement that changes over time) to help measure progress. The hypothetical examples below illustrate how a goal that is too general makes it challenging to select an effective metric:

Example:

Goal A (A broad goal): "Ensure that the City's Water Supply is Maintained as a Safe and Clean Resource."

Metric A: To develop Metric A, the team would need to decide what is meant by "Safe and Clean", need to determine the timeframe, and what 'ensure' means. It is difficult to assign a single simple metric to Goal A. The possible metric could be, "City has invested $X funds to support the water supply," or "City regulators regularly test the water supply and certify it meets acceptable standards." While both of these metrics are valid, they may not provide the level of detail, and information desired.

Goal B (a SMART Goal): "By 2019, ensure that the water system infrastructure has been updated to exceed local standards by 20% and regular maintenance is funded at 100% of need."

Metric B: These two related metrics are easier to define than Metric A.

- **Metric B.1.** 'By 2019, the Water System has been updated and exceeds local standards by 20%.'
- **Metric B.2.** 'Annual Maintenance funding has been allocated at 100% of need.'

Considerations when Choosing Metrics

Deciding whether to use metrics and what metrics to use can be overwhelming. The following factors may help guide decision making around metrics:

- ✓ **Qualitative or quantitative.** Consider adopting a combination of both qualitative outcomes and quantitative outputs.
- ✓ **Simple and clear**. Choose a small set of metrics that are clearly defined, meaningful and generally accepted by stakeholders and decision makers.
- ✓ **Availability of resources and data.** Spending too many resources or too much time on data collection and summaries can create a barrier to taking real resilience building action. Metrics are only helpful as far as they increase the ability of the user to create real, on-the-ground change.
- ✓ **Type of metrics to use.** Communities should be deliberate about selecting metrics systems, and not be afraid to adapt systems to meet their needs.
- ✓ **Useful to decision-makers and stakeholders.** Real time, defensible data pointing to success, or lack of success, can provide information to craft future decisions, investments, and results. Make sure that the metrics provide data that can be easily reported and shared regularly.
- ✓ **Versatile and adaptable.** Measurement systems can be adapted for an individual agency's needs and preferences. Metrics with different evaluation methods can coexist.
- ✓ **Up-to-date and relevant.** Consider identifying several measurement periods rather than a single absolute end to allow for course correction and updates (e.g., quarterly measurements with annual evaluation). Review and evaluate metrics regularly and change them if they become irrelevant or obsolete.

Example: 100 Resilient Cities Resilience Indicators

The Rockefeller's Foundation 100 Resilient Cities measured resilience around the world using their City Resilience Index, designed to measure relative performance of any given city over time, providing a common basis of measurement and assessment.

The index measures 52 indicators supporting 12 goals in four key dimensions: health and well-being, economy and society, infrastructure and environment, and leadership and strategy. The tool also measures performance against 7 qualities of resilience as defined by 100 Resilient Cities: integrated, inclusive, reflective, resourceful, robust, redundant, and flexible. Measuring present-day performance and assessing a city's trajectory towards a more resilient future can be achieved through the assessment and measurement of both qualitative and quantitative information within the 51 indicators. This is done through a series of qualitative and quantitative prompt questions, which places the city on a linear scale between 1 and 5 for each indicator, based on responses to the prompt questions.

The tool is accessed through an online platform that allows cities to self-assess. The result is a city resilience profile, that illustrates performance against the 12 goals and 7 qualities, plus a dashboard that summarizes performance in more detail for the 52 indicators. The tool can be accessed at: *cityresilienceindex.org*.

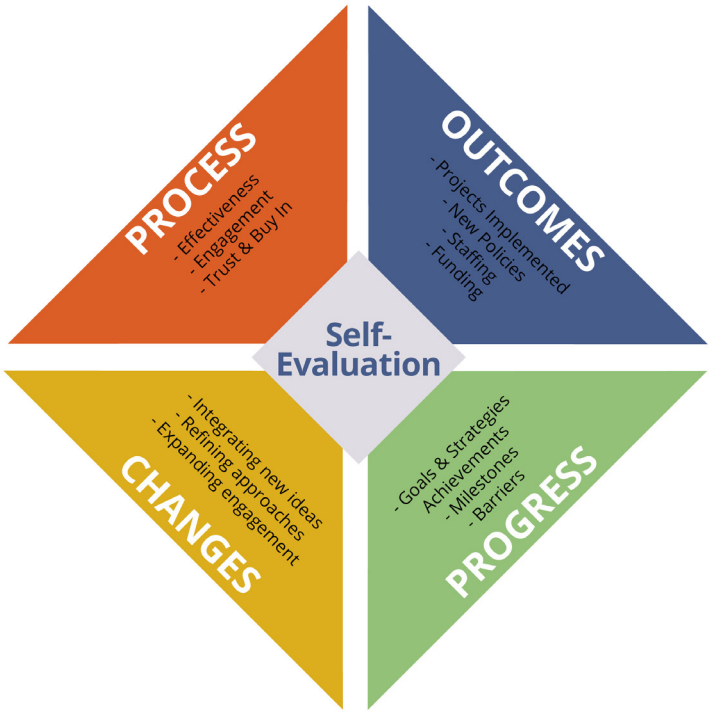

Figure 45. Four elements of self-evaluation

Self-Evaluation to Measure and Refine

Self-evaluation, or process evaluation, at the end of a resilience building planning is different than, but compatible with, establishing metrics. Self-evaluation can require fewer resources than tracking metrics throughout a whole project and can be done on its own or in conjunction with metrics systems. Self-evaluation can be an informal process or a formal outreach and evaluation process.

Use self-evaluation to:

- ✓ Track **overall progress** towards goals and identifying major barriers;
- ✓ Examine the **overall effectiveness** of a process;
- ✓ Evaluate the **stakeholder engagement** process and how it influenced the outcome of the project;
- ✓ Identify and solve **technical or process challenges** such as data acquisition, staffing, or funding; and
- ✓ Determine **next steps** that have emerged from unexpected findings, as a result of new opportunities, or through changes to decision making.

Self-evaluation can help a community adapt its process to be more effective during future projects and build more internal knowledge and capacity. Self-evaluation at the end of a project (or at various stages during the project) is a critical piece that improves the effectiveness of investments, staff time, processes, and outcomes.

Conclusion

Figure 46. Grand Tetons, Wyoming
Bison grazing in National Forest lands.

A Living Document

This Toolkit offers an iterative process that is a living and working routine to maintain and enhance a community or region's resilience over time. The steps, especially Step 1: Engage, need to be pursued consistently to support and ensure successful action. Further, project teams can evaluate results and determine if, when, and where a course correction is needed once metrics and implementation are underway. The lead agency can evaluate work plans, at a minimum on an annual basis and ideally connected to annual budgeting, to streamline implementation and administration.

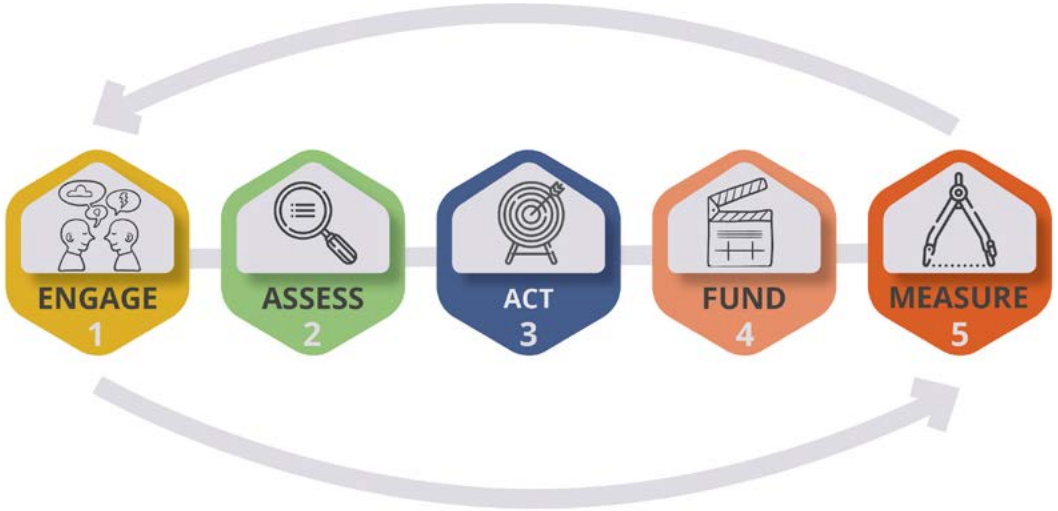

Figure 47. An iterative process that should be considered part of ongoing efforts

Conclusion

There are many reasons to refine the implementation plan or action plan regularly:

- ✓ The strategies were successfully implemented and new priorities are needed.
- ✓ Implementation is not achieving the results expected.
- ✓ The strategy has an unintended consequence.
- ✓ Funding has changed.
- ✓ Political will has changed.
- ✓ New data is available or is clearer.
- ✓ Other significant changes in the environment or circumstances.

When it is time to update the plan, the project team can decide if a full update to the plan is required, if there is a minor modification needed, or if it is adequate to change the implementation plan or the annual work plan. Finally, determine the level of community and stakeholder engagement. The same principles of buy-in and support apply to updates as in the original plan development.

Use the advisory group with stakeholder representatives to ensure successful implementation and lasting impact of the resilience strategies:

- ✓ Evaluate and measure the progress of the plan.
- ✓ Connect related and cross-cutting initiatives and actions.
- ✓ Highlight new ideas and discussions for stakeholders.
- ✓ Advocate for applying a resilience lens in other activities for the region or city.
- ✓ Address local, regional, state, and national policy and legislative influences.
- ✓ Integrate new opportunities into the plan.
- ✓ Disseminate quantifiable results.

This five-step process can be as dynamic as changing demographics, climate conditions, and community needs. As communities and regions grow and change, this five-step process for building resilience can be updated and refined to reflect new people, new vulnerabilities, and new ideas for what resilience means.