

# Chapter 3

## Disaster Recovery Planning

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### **3.1 Learning Objectives**

As a result of this chapter, you should be able to:

- Compare and contrast the effectiveness of various strategies to conduct preliminary damage assessment (PDA).
- Discuss why pre-disaster planning is better than post-disaster planning.
- Outline typical steps in a disaster recovery planning process.
- Outline the main elements of a pre- or post-disaster recovery plan.
- Explain the idea that planning is a process.
- Develop a list of stakeholders who should participate in the recovery planning process and design basic protocol for insuring diversity at the planning table.
- Consider principles that should underlie disaster planning such as sustainability and resilience (see previous chapters).

### **3.2 Key Terms**

Collaboration	Internally displaced persons (IDPs)
Comprehensive planning	Land use planning
Disaster resilience	Mitigation planning
Holistic recovery	Ordinance

Participatory process	Preliminary damage assessment (PDA)
Planning	Stakeholders
Post-disaster planning	Visioning process
Pre-disaster planning	

### 3.3 Introduction

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Though not the best time to commence recovery planning, the post-disaster time period is when most recovery planning occurs. Recovery feels overwhelming in the aftermath, with officials facing competing priorities and cumbersome bureaucratic processes. Meanwhile, frustrated homeowners want to return to normal and businesses experience extensive disruptions. Communities face staggering amounts of debris to manage. Volunteers clamor to assist. Yet, without a plan, there is no clear vision of where to start or what the future might hold.

The first steps in launching a recovery begin by knowing where the damages occurred, in a process more challenging than you might expect. Recovery also requires planning, in a time frame when people just want to get things back to normal. Yet, because most communities fail to conduct pre-disaster planning, it is essential that a post-disaster recovery plan be developed. This chapter walks you through many of the steps that must be taken to plan a recovery. In addition, we explore common components of a recovery plan, which lay a foundation for chapters in the remainder of this book.

### 3.4 Damage Assessment

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When the winds and floodwaters subside and people emerge to look around, they take stock of their surroundings. What is left? Who is hurt? Where do I start? Emergency managers, voluntary organizations, and government staff, all take stock as well, in a process called preliminary damage assessment (PDA). Damage assessment is essentially an inventory: damage to housing, schools, businesses, roads, bridges, airports, waterways, railroads, utilities, and more. Information about historical and cultural losses must be amassed. Damage to the environment must be assessed. Knowing what has been damaged enables recovery managers to prioritize essential first steps and to develop a plan of action for the rest (Table 3.1).

The PDA also serves another important function in the United States. Here, emergency managers summarize the damages in a report to the governor of their state, who then requests a presidential disaster declaration through FEMA. Without such a request, federal assistance (technical support and funding) cannot be awarded. FEMA visually confirms the damages prior to making an award (see Photo 3.1). In addition to the

**TABLE 3.1** Challenges of Conducting PDA

Damage Assessment Method	Advantages	Disadvantages
Windshield survey	Quick, efficient early estimate to capture ballpark damage numbers and locations.	Interior damage not seen, structural damage less visible, underground damage not seen.
Damage assessment team	More accurate than windshield survey, relies on people with some degree of training.	Inaccessible areas difficult to assess, training and procedures may be needed, inconsistencies may develop.
Professional inspectors <i>Structural engineers, historic preservation architects, electricians</i>	Made by knowledgeable professionals with expertise in damaged elements.	May take time to bring experts into affected area; some assessments may require additional heavy equipment and time.
Satellite imagery	General overview of damage in relation to nondamaged area, does not require immediate entry, helpful in more remote areas.	Not conducted in real time, lags may result in missed damage, difficult to get clear images, movement of debris may occur over time.



**PHOTO 3.1** Fajardo, Puerto Rico. FEMA participates in damage assessment after Tropical Storm Irene in 2011. (Photo by Michael Medina—Latorre/FEMA, with permission.)

government, voluntary and nongovernmental organizations also use damage assessments to determine how many volunteers to send, what skill sets they will need, and how long they will work in a community. Insurance companies also need damage assessments prior to writing out checks to policyholders and to use the information to gauge the financial impact on their companies.

PDAs can be done several ways. A straightforward and traditional approach is called the *windshield survey*. Using this method, assessment teams drive through an area to count the numbers and types of homes and businesses impacted. A damage list can be created by designating the buildings as (1) destroyed, (2) major damage, or (3) minimal damage. The obvious downside is that a drive by visual inspection can miss some kinds of damage. A home or business that appears fine from the outside may harbor considerable structural damage from an earthquake. Floods leave watermarks on homes but fail to show damage inside the walls to insulation and electrical systems.

Thus, windshield surveys may underreport the damage in a community. Door-to-door inspections by trained professionals, such as damage assessment teams, usually increase accuracy. Damage assessment teams should include people (emergency managers, first responders, and others) with some degree of training in how to look at and identify various kinds of damage (Fleming 2014). They may experience difficulty in reaching less accessible areas. And, without consistency of training (which may occur as a result of the disaster), some variations could develop within and across teams. Professional inspectors (e.g., engineers, construction professionals, electricians) may be used to examine properties for exterior, interior, and structural problems. Infrastructural damage to utilities, often located underground, may be extremely difficult to assess. In addition, even professional inspectors may have trouble reaching affected areas. The area may be difficult to access because of distance or because of the location of damage, such as underground problems with utilities. It is not unusual for damage to be discovered months or even years after an event.

Satellite imagery can also be used to assess damage, particularly in remote locations. Satellite assessment can also provide before and after images of damaged areas. Such rapid assessment can provide valuable information to organizations seeking to expedite response and plan out resources necessary for recovery (Eguchi et al. 2003; Hansen et al. 2007). Experts can identify zones of damage using this technology and even detect the general degree of damage for the physical and built environment. However, the same problem exists with satellite images that cannot see inside a building or underground. Consequently, satellite imagery must then be supported

through “ground truth” verification or aerial photography (Corbane et al. 2011).

The tragedy of Malaysian Airlines Flight 370 in March of 2014 demonstrates the challenges of this problem. Teams searched diligently for a month to find the location of the missing plane. Through extensive efforts, the plane’s last location was tracked to approximately 1000–1500 miles west of Perth, Australia. Satellite imagery from multiple nations then yielded potential areas where debris seemed visible on the surface of the Indian Ocean. Difficulties in reaching the remote site, coupled with severe weather, meant that satellite-identified debris may have moved hundreds of miles before ships and airplanes could retrieve it. Some debris that initially seemed to be from a plane turned out to be fishing gear. The search became even more urgent as batteries in the plane’s “black box” recording device began to run out. Meanwhile, heartbroken families waited for search teams to find the plane and the black box to find out what happened to their loved ones. As of August 2014, the plane had yet to be found.

Certainly, other challenges exist as well. Nonstructural areas requiring damage assessment may prove difficult to calculate, and may need to involve experts. Economic damage, for example, can be calculated in a variety of ways. Building damage is certainly one way to view the impact. However, to estimate losses demands additional information. For example, how long will a business experience “downtime” when they cannot produce goods or provide services? What about displacement costs, due to being relocated temporarily? And what about the impact on staff who may have lost their homes and cannot return quickly to work locations? We will return to this in Chapter 8.

Some industries may prove even more challenging to assess. Hurricanes Katrina and Rita, for example, slammed into the commercial and recreational fishing industries of Louisiana, Alabama, and Mississippi. Documenting the losses required examination of commercial revenue records, licensing data, vessel sales data, storm surge modeling, and field-based observations (Caffey et al. 2007). Louisiana, suffering from a double hurricane impact (Katrina and Rita) along coastal areas, experienced considerable losses in its fisheries. Experts estimate that of the \$98 million in fisheries losses across the three states, Louisiana alone suffered 60% of the total costs (Caffey et al. 2007).

To summarize, recovery starts with damage assessment so that communities, officials, and organizations can know where to begin and how to scale their efforts (see Box 3.1 on Haiti). The damage assessment process provides evidence to qualify potentially for a Presidential Disaster Declaration. With or without such aid, a community must now initiate its pre-disaster recovery plan or launch a post-disaster planning effort.

**BOX 3.1 HAITI DAMAGE ASSESSMENT AND RECOVERY PLAN**

Haiti faced phenomenal losses after the 2010 earthquake. Damage estimates required a solid month of work involving hundreds of experts. They conducted their damage assessment on thematic areas including government, the environment, social impacts, infrastructure, production, development, and the economy. Total damages reached 7.9 billion U.S. dollars or 120% of the nation's gross domestic product. The private sector took the highest hit with 70% of the losses. About 55% of the disaster damaged homes, schools, hospitals, and key infrastructure. The majority of the physical damage hit homes. Economic losses were considerable too with people losing jobs, businesses losing production capabilities, and both dealing with disruption to transportation sectors. Planners estimated they would need 11.5 billion U.S. dollars. Their initial plan was to focus on repairing transportation routes, rebuilding the economy, offering help with temporary and permanent housing, reopening and rebuilding schools, providing for healthy living environments and health care, and ensuring central administration capabilities including justice and security.

For more, see Government of the Republic of Haiti. 2010. *Action Plan for National Recovery and Development of Haiti*. Available at <http://www.lessonsfromhaiti.org/report-center/>, last accessed April 1, 2014.

### **3.5 Getting Started with Planning**

Long-term community recovery planning is “the process of establishing a community-based, post-disaster vision and identifying projects and project funding strategies best suited to achieve that vision, and employing a mechanism to implement those projects” (Federal Emergency Management Agency 2005). In short—what should a community do to recover? What should the rebuilt community look like? How can the expenses to do so be covered? And, very importantly, who should be involved?

Recovery efforts that encourage community participation tend to be more successful (Beierle and Cayford 2002). To engage the public, communities should work hard at communicating with stakeholders, the people most likely to be affected by the outcomes. They should also motivate stakeholders to participate actively and provide a means through which people can exchange views (Beierle and Cayford 2002).

How do you start with a recovery plan? As with most planning, the key is to think through how a plan should be developed. What kind of approach should be used? Who should do the planning? How should input to the plan be developed? What kinds of accountability should there be to those who provide such input? This section looks at these issues.

### 3.5.1 Key Planning Principles

Where do you start with a recovery plan? First, people who live in the affected area should be the ones to drive the recovery process, particularly the vision of what a rebuilt community should look like (FEMA 2005). Locals are the ones who will choose to live and work in the rebuilt area and they should have input. Local residents should also benefit from their participation and not only from the reconstruction efforts.

Reconstruction of any kind should incorporate mitigation efforts to build disaster-resilient communities (see Photo 3.2). But it is also true that communities can rarely complete a recovery without help. Support from governmental and nongovernmental partners is often essential and should be pursued. However, those same partners need to solicit and listen carefully to what locals say.

To guarantee that these principles are followed requires effective leadership, which may come from both expected and unexpected sources (Krajeski and Peterson 2008; Quarantelli 1997). Everyone should have a place at the planning table and recovery leaders must make extensive, sometimes exhausting efforts, to build bridges to all members of the community. No one should be overlooked and efforts should be made to include people with disabilities, children, seniors, people who work different shifts, people who were homeless before as well as after the disaster, people who do not speak the local language, as well as community organizations including



**PHOTO 3.2** Recovery provides a chance to teach about mitigation through children's activity books and materials. (Photo by George Armstrong/FEMA, with permission.)

faith-based, civic, social service, health, and more. The business sector including retail, manufacturing, corporate, and utility companies need to be at the table. In short, recovery planning tasks all the stakeholders to be active in the planning process.

### 3.5.2 Leadership

Effective recovery planning requires involving individuals with varying leadership skills who can plan out, engage, and sustain a community-based recovery planning effort. Several types of leadership skills are necessary.

First, leaders should enjoy broadly based community confidence and support. Involving individuals with abilities to communicate and connect across generational differences, cultural diversity, genders, language, and within the disability community is key. A good leader is well-versed in multiple ways to communicate including face-to-face conversations as well as group settings. Being able to use e-mail, social media, and electronic forms of communication also ranks high. Effective leaders connect and communicate with people in addition to being able to move stakeholders through a process and toward an effective plan.

Second, an effective leader bases recovery planning on collaboration and consensus-building. Committing to a collaborative process requires understanding that such an effort takes time, patience, and expertise. Leaders may need to convene the planning group themselves or, if funds become available, select and hire an experienced facilitator (see Box 3.2). As you will see throughout this chapter, many people may need to become involved to surface information, ideas, and solutions.

Third, leaders must work diligently to coordinate meetings. Doing so requires scheduling capabilities and an understanding of people's time constraints. Holding a meeting every Monday night at 7 p.m., for example, means that parents must leave early to put children to bed and that people doing shift work cannot participate. It may be necessary to hold public meetings in auditoriums, over cable television, in chat rooms or other electronic forums, or through Internet video streaming. Planners may need to go to where the people live. In situations with internally displaced persons (IDPs), it may be necessary to conduct planning in tent cities, along riverbanks, at worksites, or in IDP reception centers. A good leader understands that you have to go to the people, where they live, and meet them within the context of their current lives.

### 3.5.3 Coordination and Communication

Leaders must also coordinate the planning process (Quarantelli 1997). Coordination means more than providing information about what is happening. Coordination means that all stakeholders are informed about and

### BOX 3.2 HIRING A RECOVERY CONSULTANT

Your community's recovery is important. Who do you want to lead this effort? Usually, communities use some combination of local leadership and external consultants or government officials. Using locals matters—you and your community members know your locale best. You know what you want to save, and it is your right as a stakeholder to decide what the rebuilt community would look like. But it can be hard to go through the process and many communities benefit from help. However, hiring that outside consultant should be done carefully. Thus, if a community opts to hire a consultant, they should select individuals who have:

- A degree in emergency management, hazards planning, community development, and/or disaster research.
- Extensive experience in disaster recovery in other communities. Consultants without experience in multiple kinds of disasters should not be considered.
- A strong record of conducting community-based planning and stakeholder involvement.
- Prior clients who can provide a strong recommendation. Communities should also solicit references outside of those provided by the consultant.
- A proven track record of following through from the start to the finish. A consultant should not create a plan and then leave.
- Reasonable fees. Securing bids from multiple consultants is a good idea. Remember that the least expensive may not be the best consultant—and vice versa.
- A focus on process and an understanding of how recovery moves through stages.
- A holistic outlook that incorporates all dimensions of recovery planning.
- An ability to communicate with a variety of stakeholders and experience with outreach to historically marginalized populations.
- A strong, experienced team in place to back up and support the consultant.
- A concern for how recovery planning affects all populations including seniors, people with disabilities, families with schoolchildren, racial and ethnic minorities, and others.
- An ability to design a resilient recovery plan that integrates mitigation efforts.
- A high-level understanding of federal programs, regulations, and funding that influence recovery efforts.
- A sound network among professionals that could be brought in or consulted to enhance the recovery planning process.
- A willingness to do their homework in order to understand local context.
- A commitment to involve the community in a meaningful capacity.
- An understanding of a participatory process.

*Source:* Courtesy of Brenda Phillips.

allowed to participate in the process. Doing so requires considerable effort to identify, involve, and keep representatives connected to the planning process. Communication with IDPs may necessitate multiple, redundant efforts across various media. Coordination also means that all the planning parties know what the others are thinking about and doing. Ultimately, all the parts of a plan must come together—for example, those engaged in planning for historic preservation must have a plan that ties into utility restoration and new building codes. The ultimate outcome is a coherent, integrated plan where differences in approaches and opinions have been ironed out. Doing so makes the recovery plan actions flow more smoothly.

Communication goes beyond the members of a recovery planning team, though. The larger public needs and deserves to know what is being discussed within their community both before and after a disaster. Efforts can be made through media outlets, websites, door hangers, social media, public meetings, and carefully planned meetings. Because the public wants and needs to return home and restart their lives, they will be keen for accurate information. Establishing an information center, a recovery planning kiosk or office, and a website can help to share accurate information (Federal Emergency Management Agency 2005; Natural Hazards Center 2001; Schwab et al. 1998). At first, media attention may be significant but is likely to wane over time. Effective communication means that recovery leaders develop ways to inform those affected and to capture their perspectives. After the 2009 Black Saturday Bushfires in Australia, recovery leaders used websites, email, phones, hotlines, conference sites, television, radio, and other resources (Bennett 2010). The United States used social media including wikis, collaborative workspaces, and cloud solutions to share information after the 2010 Haiti earthquake (Yates and Paquette 2011).

To summarize, the recovery planning process must be local, inclusive, and open to the public. The transparency of the planning process builds confidence among the public that the participating partners become and remain accountable to the broader community of stakeholders (Norman 2004). Connecting the planning process to those whose lives will be affected now and for the long term matters because “recovery cannot succeed if the aims, priorities, and processes do not have community support” (Norman 2004). Effective leaders understand these basic principles.

### 3.5.4 Planning as a Process

Recovery planning is *a process* that should involve the entire community (FEMA 2005; Quarantelli 1997; Schwab et al. 1998). A process implies that a community will move through a series of steps or stages prior to actually rebuilding or taking major action (see Box 3.3). The process starts with a “big picture” view: what type of recovery plan is needed? It may be that the tornado

### BOX 3.3 RECOVERY AS A PROCESS

The idea of a process means that a series of steps or stages should unfold. Experts suggest that recovery should be a process and that mindful planning should proceed through a series of steps.

Those steps should include (FEMA 2005) the following:

1. Assess the need for a recovery plan.
2. Choose a leader and decide where to start.
3. Identify sources of outside assistance.
4. Inform the community through a public information effort.
5. Build consensus around the recovery vision and plan.
6. Work through the issues and recognize opportunities.
7. Develop a vision of a more disaster-resilient community.
8. Specify and prioritize recovery projects.
9. Write the plan, pulling all the elements together into a comprehensive whole.
10. Identify project leaders.
11. Locate funding streams and sources for the projects.
12. Operationalize the plan and put it into action.
13. Review projects regularly and update the plan at periodic intervals.

damaged only the downtown commercial sector, so a focus on economic recovery and area infrastructure could be sufficient. Or, the hurricane may have devastated a wide area requiring integrated efforts for workplaces, homes, parks, hospitals, schools, and more. Recovery experts concur that taking the time to build agreement around what needs to be done leads to greater understanding and community support. The community should identify the types of projects that need to be undertaken and participate in prioritizing them.

Sustaining the community through what can be laborious planning stages requires dedicated teamwork. Because the recovery may go on for years, planning fatigue may set in, coupled with the daily chores of individual household recoveries that face some participants. Local officials leading the recovery, handling their own household return, and moving the community rebuilding may find the burden immense. Burnout among recovery leaders and participants is to be expected, thus putting a team into place with sufficient support and with the ability to integrate new members can help to sustain the process. By integrating the community, a recovery effort has a ready pool of replacement members to sustain the effort.

### 3.5.5 Stakeholders and Participants

Involving stakeholders can generate a plan that reflects “constructive engagement, a carefully considered rationale for its recommendations, and strong leaders within the group that help facilitate its work” (Chrislip 2002). Who

are those key stakeholders and participants? Planners should invite a range of public officials, city staff, planners, emergency managers, business owners, local builders, neighborhood association leaders, health sector participants, school representatives, health care sector leaders, voluntary agency representatives, environmental groups, residents, and more (FEMA 2005). You may also need to include the city or county attorney, public utilities, staff responsible for codes and zoning, school officials, community relations staff, first responders, and accounting personnel (Schwab et al. 1998). The general character of the community also matters, so invitees should include people that represent historic preservation interests, tourism, recreational and professional sports, education, and local populations.

### ***3.5.5.1 Community Involvement and Inclusiveness***

Planning efforts should also mirror the demographic makeup of the community, particularly those affected the most. Too often, we forget to include some persons. Depending on the nature of the community, it may be necessary to think through gender dynamics and find ways to include women. People who are displaced should be able to join in discussion over what happens to them, where, when, and how (Peek and Weber 2012). Similarly, the type of event can influence feelings about who should participate. After September 11, for example, many Muslim Americans felt excluded or afraid to attend public events and to participate in open discourse around recovery efforts. But they also suffered losses, including the right to psychological recovery from an attack perceived to emanate from within their community (Peek 2010). As another perspective, the magnitude of an event coupled with its location can make it very challenging to secure input. Unique and extensive efforts may have to be made to include displaced people in particular (see Box 3.4).

Some basic considerations should be undertaken to include people. Single parents may need childcare or a means through which the parent can join in, such as web-based participation. Meeting locations and planning events should be accessible both physically and with sign language or alternative ways to access information. Websites and social media should be accessible for people with visual limitations. Senior citizens may not want to attend evening meetings, so providing alternative locations and times brings their perspectives into the process. Likewise, new immigrants to the area may need particularly sensitive outreach to welcome them into the community recovery process. Communities with histories of exclusion and segregation will need to work even harder to convince marginalized people that they are welcome. Lower-income families or those lacking more formal education may need encouragement to feel sufficiently empowered to participate in a process that might seem intimidating. Those who still face the digital divide because of cost or digital literacy should be able to join in using alternative means.

### BOX 3.4 VOICES FROM THE VOICELESS

The 2010 earthquake in Haiti displaced hundreds of thousands of people, into tent cities, out into rural areas, and far from formal locations for planning. Inviting them into discussions over recovery plans would be difficult. As part of the effort, several organizations facilitated focus groups across the country (Montas-Dominique 2011). The partners included an educational project, a peasant association, a health care provider, a nongovernmental organization, and the United Nations. A total of 1750 Haitians participated in 156 focus groups. Participants zeroed in on the problems that created the catastrophe, including “preexisting structural problems such as an overpopulated capital, social inequalities, and an atrophied agricultural sector” (p. 265). Key to overcoming these deeply embedded problems was a desire to invest in people through education and training. They also spoke compellingly of the need for agricultural productivity to address issues of food insecurity. Concern remained that authorities would not be responsible and participants demanded that international aid should be distributed fairly. Though outsiders might think that providing housing and food is a good thing, what Haitians clearly asked for was a means to become more self-sufficient and to address their country’s entrenched problems. In essence, they wanted to get to the core of the problems that caused so much suffering.

- For more information, see the “Voice for the Voiceless” report available at <http://www.jebca.org/regular-haitians.pdf>, last accessed April 1, 2014.

Why bring a wide range of stakeholders into the planning process? When we include a broader and more diverse range of people, we insure that the solutions brought forward are more realistic, fit with the local realities of people who live in our communities, and result in more support for the plan. Seniors and people with disabilities may offer insights for accessible transportation systems and housing. Single parents can reveal needs for safe rooms in rental apartments and trailer courts.

Inviting wide participation leads to “civic action in the broader interests of the community” (Chrislip 2002). Collaboration pays dividends as “mutually beneficial relationship between two or more parties to achieve common goals by sharing responsibility, authority and accountability for achieving results” (Chrislip 2002).

#### **3.5.5.2 External Partners**

Various state, provincial, and federal agencies (depending on where you live) can also offer support, resources, insights, and experience (FEMA 2005). As FEMA correctly points out, “you can’t do this alone.” Governmental and nongovernmental agencies can bring in extensive sets

of resources: experts, tools, outreach specialists, planners, volunteers, child care, historic preservationists, environmental specialists, consultants, interpreters, diversity and accessibility knowledge, and funding. For many communities, the disaster that they face may be their once-in-a-lifetime events. But for their external partners, the event may be just the latest disaster. Their experience can help people facing the most difficult days of their lives if such help is offered thoughtfully to locals who ultimately must make their own decisions about recovery. Recovery managers should remember that they are never really alone even when it seems that everyone has left. Resources exist when strong external relationships have been initiated and put into places.

## 3.6 Recovery Planning

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Two kinds of recovery planning typically occur: (1) pre-event recovery planning and (2) post-event recovery planning. Planning can also be linked to non-disaster planning in order to develop a coherent and comprehensive set of integrated visions for a community. Whether pre- or post-recovery planning, the effort often spans short or long-term recovery time periods. Contextual elements should also be integrated into a recovery plan, depending on where the disaster occurred. Context refers to time, place, and circumstances. Thus, while all communities hit by disasters may require reconstruction of housing and workplaces—the kinds of materials may vary depending on the environment. The way in which homes are situated will be influenced by people's culture: side by side or facing each other in a circle, for example. It is through recovery planning that people's preferences can be taken into account. By anticipating those needs in advance, much can be accomplished when disaster actually strikes. Ideally, pre-event recovery planning is the best type of planning as it anticipates disaster impacts and saves time after a disaster. However, most planning occurs after a disaster and that is not optimal.

### 3.6.1 Case Study: Los Angeles, California

Los Angeles first commenced their recovery planning efforts in 1987. A multiagency team with both academic expertise and city staff created working groups to design a pre-event and post-event plan (City of Los Angeles 1994). The city's forward-thinking effort included extensive consideration of mitigation strategies and outlined specific short-term and long-term tasks. Short-term efforts included "damage assessment, debris removal, temporary relocation of residents and businesses, immediate restoration of services, immediate abatement of extreme structural hazards and repair of homes, stores and industrial facilities"

(City of Los Angeles 1994). Long-term considerations addressed damage to buildings, re-establishing city functioning, repair of damaged utilities and infrastructure, and additional attention to mitigation and land use planning.

Proving a plan is a living document that should be revisited, Los Angeles again reviewed and revised their plan after the 1989 Loma Prieta earthquake. The revised plan added new functional areas including interjurisdictional issues, traffic mitigation, and public information plans. Separate subsections of the plan spelled out expectations for each department pre-and post-event. For example, the Cultural Affairs Department was tasked with reviewing design criteria for post-event repairs and historic preservation concerns. The Environmental Affairs Department entered into efforts to map “significant ecological areas” for protection during extreme events and to create plans for disseminating public health and environmental advisories. The Housing Department was charged with designing regulations to protect renters. Housing staff also took on responsibility to create a housing task force by building pre-event partnerships with U.S. Housing and Urban Development, FEMA, and the Small Business Administration (City of Los Angeles 1994).

Plans should be living documents that are revisited and updated on a regular basis. In 2012, Los Angeles coordinated a regional recovery guidance planning effort that spanned Los Angeles and five adjacent counties. They included dozens of government and nongovernmental organizations like the housing authority, conservation officials, departments of water and power, emergency managers, school officials, and others. To take on the daunting task of a massive urban recovery effort, they focused on recovery support functional areas (RSFs) such as community planning and capacity building, economics, health and social dimensions, housing, infrastructure, and natural and cultural resources. Consistent with principles endorsed in this book, planners integrated mitigation measures into each of the functional areas (for a copy of the document, see <http://www.smgov.net/departments/oem/sems/planning/los-angeles-regional-recovery-guidance-for-emergency-planners.pdf>, last accessed April 1, 2014).

### **3.6.2 Linking to Non-disaster Planning**

Linking efforts to other types of community planning promotes efficiencies with funds and staff time (FEMA 2005; Natural Hazards Center 2001; Schwab et al. 1998).

Planning before disasters also allows for more rapid movement to agreed-upon post-disaster steps. Before disaster, communities will have time to research energy-efficient designs, for example. Elected officials will be able

to design emergency ordinances that can be passed quickly to expedite debris management and rebuilding permits (e.g., see Schwab et al. 1998). In short, pre-event planning allows for a fuller, faster, and more meaningful recovery plan. Pre-event planning reduces stress when the disaster unfolds and recovery looms ahead.

Two common forms of planning that occur in many communities include mitigation planning and comprehensive planning. Mitigation planning may be required in a given location, such as the United States. In the United Kingdom and New Zealand, similar efforts promote resiliency. Mitigation planning allows a community the time they need to identify hazards, develop structural and nonstructural mitigation measures, and prioritize which measures should be funded. Mitigation planning can be done not only as a base for recovery planning but also for efforts that address storm-water problems, recreational sites, transportation and infrastructure upgrades, and capital improvement efforts (Burby et al. 2000; FEMA n.d.; Schwab et al. 2007).

Another type of pre-disaster planning is called comprehensive planning. This type of effort usually comes out of a local planning office and is often designed to manage growth. Choices will have to be made within a comprehensive plan, and options should take into account area hazards. For example, a comprehensive plan might safeguard a floodplain from any type of building or runoff from area structures. Comprehensive planning would also wisely advise regulations for new construction projects that promote resistance to potential disasters. Comprehensive planning would pre-identify key principles, involve the public, outline a vision for community development, and protect people and places against potential hazards. When disaster strikes, recovery could then commence more rapidly. Comprehensive planning usually occurs within the planning office, while recovery planning may emanate from the emergency management agency or a broad coalition of locally relevant agencies and organizations. What is important is consistency and consonance across the plans—such as the will to safeguard a watershed or to introduce safe rooms into new construction.

### 3.6.3 Short-Term Recovery Planning

In the first few days after a disaster, “disaster managers must consider response and recovery issues simultaneously... as they attempt to coordinate initial response activities, they must also begin formulating a strategy to handle existing and developing recovery issues” (Neal 2004, p. 51). Several tasks usually occur in the transition from response to recovery, which is our next topic.

### **3.6.3.1 Emergency Measures**

Short-term recovery serves as a transition period from response into recovery. Short-term recovery may include emergency road clearance, temporary sheltering, providing for food security, and supporting displaced persons. Short-term recovery may also include restoration of utilities, temporary relocation of businesses, and efforts to save wildlife or ecologically fragile areas. Once again, the context (time, place, and circumstances) may influence not only response but recovery. In addition, the people, government levels, and organizations that participate may vary considerably too.

As one example, residents of Plaquemines Parish, Louisiana, awaited federal and private sector help during the BP oil spill on April 20, 2010. Meanwhile, local government and environmental organizations, as well as local residents, went into the gulf with makeshift resources to prevent the oil from reaching land. They also rescued and treated wild birds and mammals. The coastline was temporarily closed to fishing on May 2. The spill, which was caused by a failure at the Deepwater Horizon oil well in the gulf, was not reduced until late July. The ruptured well was finally sealed toward the end of September.

As another example, following the earthquake in Haiti, the United Nations and partners provided a wide array of assistance. Heavy equipment had to be brought in to remove debris from streets so that rescue efforts could be made. Buildings had to be shored up temporarily in order to save lives, with some people being rescued up to a week after the earthquake. Massive tent cities had to be erected to house hundreds of thousands of IDPs. Concerned organizations established safety patrols for women and children inside the camps. National response teams from the United States, Canada, Israel, the United Kingdom, and other places flew in mobile and sea-based hospitals with personnel. Foreign governments established emergency adoption procedures for newly orphaned Haitian children. Health professionals spent several years fighting cholera outbreaks that claimed thousands of lives. Four years later, some of those emergency measures remained in place.

### **3.6.3.2 Preplanned Ordinances**

Emergency ordinances serve as one means to launch a transition from response into recovery (Schwab et al. 1998). Emergency ordinances may include:

- Legal procedures for removal of debris on roadways and for access to private property when warranted.
- Legal authority for the creation and powers of a recovery task force (Schwab et al. 1998).
- Procedures to save wildlife and environmentally sensitive areas.
- Means for protecting and safeguarding historic and cultural resources.

- Procedures for a residential permitting process to jump-start the rebuilding process.
- Maps for new zoning, including consideration of any new zoning designations, such as residential, commercial, and industrial areas.
- Changes to how land is or may be used including setbacks to allow for sidewalks or easements to place utilities underground.
- Special “overlay” districts that create conditions for particular uses such as a wildland/urban interface (such as after wildfire) or protect coastal areas (Schwab et al. 1998).

Rebuilding regulations that require a certain percentage of new construction fall within local affordability guidelines.

Preplanning the ordinances before disaster strikes helps to expedite the recovery. Knowing who you will contract to remove debris makes the process occur faster. Knowing how you will require them to move debris also helps. As you will find out in another chapter, debris management requires sensitivity to potential environmental damage that can occur. As with the BP oil spill just discussed, the tar balls that washed up on the beach needed to go somewhere—but where? How should they be treated to prevent future damage? Similarly, knowing the type of overlay district that a community will want can hasten the rebuilding process. A comprehensive plan, for example, may require that certain historic character be retained or put newly into place. Pre-disaster planning helps move a community from response to recovery. Putting in the time, even for a seemingly far-off situation, can make the difference.

### 3.6.4 Long-Term Recovery Planning

Although pre-disaster recovery planning is always the best route, most communities conduct post-disaster planning. Why? Resources remain limited for such efforts, and communities may not want to expend time and money to plan for an event that might not happen. Regardless, the elements of pre- or post-disaster plans remain similar. This section outlines those key planning components that will be expanded upon in upcoming chapters. For now, think about who should be at the planning table for these components. Readers in the United States would be wise to consult Box 3.5 on the U.S. National Disaster Recovery Framework.

#### 3.6.4.1 Housing

New visions of a rebuilt housing sector may arise from design principles that a community comes to embrace through the visioning and consensus-building process. Post-disaster opportunities may also allow for incorporating ideas

### BOX 3.5 U.S. NATIONAL DISASTER RECOVERY FRAMEWORK

In the United States, the National Response Framework includes a number of Emergency Support Functions (ESFs). An ESF is organized around a functional need such as search and rescue or mass care. ESF #14 centers on recovery. The purpose of ESF #14 is to involve appropriate agencies and partners in making assessments of the impacted area. Associated partners also provide advice on recovery to the affected community. ESF#14 functions include linking the affected community to appropriate agencies and helping streamline the aid process. Several “primary” agencies support ESF #14 including FEMA, the Departments of Agriculture, Commerce, Homeland Security, Housing and Urban Development, and Treasury. Services and units within each of the departments also offer help. For example, within the U.S. Department of Agriculture, the Farm Service Agency can offer disaster assistance for natural disasters. The Small Business Administration also plays a role along with several dozen support partners.

Besides response, the United States has a National Disaster Recovery Framework (NDRF). The intent of the NDRF is to plan before disasters, to establish ways to coordinate, and to define roles and responsibilities. Within the NDRF, six recovery support functions (RSFs) serve as the coordinating structure. They are as follows:

- *Community planning and capacity building:* The function of this area is to engage the community in planning. Through this RSF, affected areas can receive assistance to organize the recovery. An emphasis on mitigation is considered essential.
- *Economic:* This RSF focuses on helping the private sector to recover and become more resilient. An emphasis is placed on self-sufficiency and adapting to new market conditions.
- *Health and social services:* After disaster, health care and social services must be restored. Under this RSF, public health, behavioral health, and medical services are supported as a community transitions from response into recovery.
- *Housing:* Challenges with housing often arise from pre-disaster conditions and carry over into the post-disaster time frame. This RSF helps to identify housing solutions that include repairs, rehabilitation, reconstruction, and new construction including affordable options.
- *Infrastructure systems:* Under this functional area, the federal government supports infrastructure owners and operators. Assistance includes helping the community return to not only the restoration of functions but to a more sustainable and resilient set of infrastructural resources.
- *Natural and cultural resources:* The environment and local, cultural resources need support to recover from disasters. A number of

partners including those focused on historic preservation, the environment, national parks, the arts, the humanities, and others support local leaders working on these aspects of disaster recovery.

For more information, visit the ESF #14 Agency Partners page at <http://www.fema.gov/esf-14-agency-partners>, last accessed April 4, 2014. For the National Response Framework, visit <http://www.fema.gov/national-response-framework>.

from non-disaster time comprehensive planning. Imagine a new neighborhood rising from the rubble! Communities could incorporate new amenities like sidewalks, underground utilities, greenways, or dog parks. In short, the housing reconstruction process can be embraced as an opportunity.

Communities may want to consider some of the following (Natural Hazards Center 2001):

- *Mitigation:* Communities should create disaster-resistant housing to withstand area hazards. Homes should incorporate features that provide safety to residents. Safe rooms in tornado areas, hurricane clamps for roofs in areas of high winds, and exterior elements (shingles, siding) that increase fire-resistance serve as some examples. In areas where local hazards will continue to pose a threat, planners could design a congregate tornado shelter or an evacuation route out of the area.
- *Environmental quality:* Homes should increase their energy efficiency and reduce their ecological impact. “Green” rebuilding could include solar panels, native plant landscaping, surfaces that reduce runoff, and recycled or reused building materials. The neighborhood may want to encourage higher density to increase open space. Doing so would alter storm water runoff, increase recreational opportunities, and enhance wildlife habitat.
- *Quality of life:* This dimension is all about the meaning of the place where you live. Perhaps you like the attractions of a downtown area, the quiet of the suburbs, or the spacious, open countryside. Perhaps you feel more comfortable surrounded by nature, while others prefer a walk-able community with public transportation. Incorporating quality-of-life issues connects housing to the ways in which people like to live. When residents connect to places, they are more likely to return after a disaster, to buy homes, and to invest in the community’s future.
- *Social and intergenerational equity:* People who lived in the area before have a right to return home. Planners will need to talk to and consider the needs of people with disabilities, seniors, low-income



**PHOTO 3.3** Rumson, NJ. Residents affected by SuperStorm Sandy discuss ideas and concerns on vision boards for their community. (Photo by Rosanna Arias/FEMA, with permission.)

households, cultural preferences, economic realities, and more. People living in a bayou community will need to return to earn a living from the water. Individuals with disabilities may require additional financial support to make homes accessible. Seniors could benefit from volunteer labor and senior-friendly features. In some areas, households include multiple generations, which will require extra rooms. Planners will need to recognize the diversity within their community and enable everyone to come home.

- *Participatory process:* By bringing in a wide range of participants, planners can increase understanding of concerns and identify solutions. Recovery should always be driven by local perspectives. Ensuring that this happens requires a dedicated effort to involve people in multiple ways. People who participate in planning support the plan (see Photo 3.3).
- *Economic vitality:* People need to live close to where they work. Linking residential recovery to transportation arteries and places of employment reduces air pollution, gasoline costs, and traffic congestion. Rebuilding may also provide an opportunity to rezone areas so that businesses like banks, dry cleaners, cafes, and gas stations can locate closer to residential areas. Home-based employment, often an important source of household income, should be discussed in planning events as well.
- *Historic character:* Homes that have such value should be preserved and a community may need to specify how the rebuilding will occur so as to mitigate future hazards while maintaining the historic

character of the home. Retaining such features helps people maintain a sense of connection to the history and heritage of the area.

- *Thinking holistically:* By connecting housing to other dimensions of the recovery, it is possible to enhance quality of life, offer positive environmental benefits, support local businesses, and revitalize a devastated community. Bringing back the economic sector without a diverse customer base to support it will not work. Similarly, rebuilding housing without economic opportunities will lead to out-migration. We need to rebuild thoughtfully and holistically.

Because the housing stock represents the largest portion of any community, it is a good idea to create a housing task force. Members will need to represent the full population in all its diversity as well as the various partners that may be involved in the rebuilding, such as builders, developers, and voluntary organizations. Everyone should have a voice on the housing task force, or the goals of social and economic diversity in particular may remain elusive.

### **3.6.4.2 Business**

The business sector functions to produce goods and services, jobs, and sales tax revenue (Webb et al. 2000). A full set of businesses must be considered for recovery planning, including home-based and cyber-businesses as well as small businesses, corporate, and industrial sectors. Businesses will face two major challenges: displacement and downtime. Some businesses can manage displacement by moving into temporary locations or possibly by going online. In Santa Cruz, California, local businesses relocated into dome-shaped “Phoenix Pavilions,” so-named after the mythical phoenix that rises from the ashes to be reborn. These pavilions opened between the October 17, 1989, earthquake and Christmas, allowing for both the businesses and tax revenues to rebound. Another local business relocated a few blocks away into the “Santa Cruz Book Tent.” After hurricanes, it is not unusual for a corporation to move temporary mobile homes in so that services like pharmacies can continue to deliver services or retail operations can continue. Another option may be for businesses to partner with others. Newspapers, for example, often use the printing facilities of an adjacent media partner or by relocating their services into cyberspace. Microloans can keep home-based consulting, repair work, insurance, hair care, child care, ironing, and sewing services alive and provide the needed income. Outside nongovernmental organizations can assist with recovery operations too. After the 2004 tsunami, outside foundations provided money to rebuild the devastated commercial sector in Nagapattinam, India. The tsunami waves had surged through a narrow street of vendors, destroying small stores. With a concentrated amount of funding, the commercial sector rebounded with food, beverages, crafts, and more.

Communities can help businesses recover by designating a business recovery task force. Pre-existing organizations, such as the Black or Hispanic Chamber of Commerce or the Business and Professional Women's Association, can facilitate efforts. As we will learn later in the chapter on business recovery, some businesses fare better than others.

A business recovery task force can advocate for economic interests. Recovery leaders will need to understand issues within the business community, such as the loss of parking spaces, the impact of street closures, or the loss of pedestrian traffic (Chang and Falit-Biamonte 2002). Regenerating businesses can help the community by post-disaster income, restoring the tax base, and luring people back home.

Business recovery planning must also include strategies to keep people safe (in a pre-disaster plan) or to enhance safety through post-disaster mitigation. Both customers and employees should be kept in mind. The massive loss of life on September 11 revealed how critical it is to conduct emergency evacuation planning and to exercise those plans. Safe rooms for tornadoes, elevated areas to avoid flooding, warning devices for people who are blind or deaf, and other measures can mean the difference between life and death for employees and customers. Employees may also face the loss of their homes. Thus, businesses will need to plan for temporary or permanent replacement of personnel.

Businesses can also "think green." For example, a large-scale business may want to reduce its water consumption with alternative lighting, low-flow toilets, and xeriscaping. Heating, cooling, and boiler systems can also be upgraded to higher-efficiency units (Smart Energy Design Assistance Center 2006). Businesses can also reduce storm water runoff by incorporating green space. Use of green materials, such as flooring made from natural products with fewer chemicals, may not only be good for the environment but also for employees and customers.

### **3.6.4.3 Environmental Resources**

Environmental recovery planning may start with existing pre-disaster assessments that list and locate threatened or endangered flora and fauna. By developing pre-event partnerships, rapid action to protect wildlife and habitats, and to contain further damage, can be implemented. Thus, planners might want to involve experts knowledgeable in water, ground, air, wildlife, and vegetation issues. Depending on the area, those with expertise in forest ecosystems, hazardous materials, mountain habitat, or coastal concerns should be considered. Academics, scientists, parks employees, and environmental advocates can provide input. And, because of the potential for hazards to affect environmental conditions downstream or upwind, other jurisdictions and levels from local through state and federal representatives may need to be included.

Strategies to protect the environment rely heavily on existing statutes, laws, and ordinances. Consequently, input from those with expertise in environmental law should be consulted. Planners can offer also new ordinances that direct local jurisdictions to protect natural resources. Ordinances can set aside environmentally sensitive lands, disallow encroachment on an endangered species habitat, and limit routing for hazardous cargo. Recovery, for the environment, is truly an opportunity to turn a corner toward positive change. Finally, environmental recovery planning must include mitigation measures designed to safeguard environmental resources. Such efforts could range from educational programs to the generation of cross-organizational partnerships as well as set-asides of sensitive areas (Natural Hazards Center 2001). Such efforts can be time-consuming and expensive. However, the principle of recovery planning that considers future generations is key here: how do we conserve our environmental resources, restore them from damage, and insure sustainability for centuries to come? We will turn to this question in a later chapter.

#### **3.6.4.4 Historic and Cultural Resources**

Places mean something to us, and protecting the historic and cultural character of a community should be an essential part of any recovery plan. Most counties or parishes have local historical associations and many host locations where locally relevant collections can be viewed by the public. Cultural groups and clubs often put together annual events to celebrate ethnic heritage or promote cultural diversity. State historical preservation offices provide expertise on legal, architectural, and historic matters. Both before and immediately after disaster, these prospective partners should be consulted and integrated into planning efforts that salvage the unique character of the community.

Because people tend to focus more on getting back into a normal routine for their families, historic and cultural heritage may be overlooked. However, opportunities to save the unique character can be identified and made part of the recovery effort. In Lancaster, TX, for example, prison labor was used to salvage bricks to restore the damaged, historic downtown. National Parks officials have conducted planning efforts to provide rapid movement of museum exhibits when floodwaters threaten Harper's Ferry in Virginia. Priceless paintings and other artwork were lost in the terrorist attack of September 11, but some were uncovered and saved through careful retrieval. A nation's national, local, and cultural heritage is at risk without pre- and post-disaster recovery planning.

Mitigation measures should be integrated thoughtfully (Schwab et al. 2007). For example, putting on a stronger, better, and more disaster-resistant roof and siding may seem like a good idea, but could undermine the historic

character of the structure. Relocation of properties could remove them from their historic context. Elevations might prove more context appropriate but could harm the structural integrity of a building. The challenges can be significant, but it is possible to hang on to the distinctive areas that mean something to us personally and collectively. In 2004, a 6.6 magnitude earthquake devastated Bam, Iran. The United Nations Educational, Scientific, and Cultural Organization described Bam as

situated in a desert environment on the southern edge of the Iranian high plateau. The origins of Bam can be traced back to the Achaemenid period (6th to 4th centuries BC). Its heyday was from the 7th to 11th centuries, being at the crossroads of important trade routes and known for the production of silk and cotton garments. The existence of life in the oasis was based on the underground irrigation canals, the qanāts, of which Bam has preserved some of the earliest evidence in Iran. Arg-e Bam is the most representative example of a fortified medieval town built in vernacular technique using mud layers (*Chineh*).

In addition to the loss of life in Bam, the loss of its historic character felt like an additional blow. Attempts to preserve the Silk Road history and the buildings have been ongoing with some success, in part due to a joint effort between Iran and Japan (see links in “Resource” section).

### **3.6.4.5 Infrastructure**

Infrastructure includes bridges, ports, waterways, airports, roads, highways, dams, levees, parks, rails, schools, hospitals, and more. Unfortunately, infrastructure repairs are expensive. Damage from disasters worsens existing problems. Across the United States, for example, the nation’s infrastructure has earned very low “grades” from the American Society of Civil Engineers (ASCE 2013). In 2013, the ASCE awarded a grade of D+ across 16 key infrastructure elements, which was a slight increase from a grade of D in 2009.

In many nations, public infrastructure upgrades face long battles with governmental capacity and resources. However, post-disaster recovery planning can help. Planning can identify ways to reroute traffic and insure support for commercial activity. Planning can also emphasize the value of incorporating stronger mitigation measures so that rebuilt infrastructures can resist future disasters or attacks. Mitigation opportunities might include locating utilities underground in areas with high wind hazards, strengthening levees to higher levels for locations that experience flooding, and updating the storm-water drainage system. Airports, rail, and subways can incorporate features that detect or thwart terrorist attacks (Federal Emergency Management Agency 2005; Natural Hazards Center 2001; Schwab et al. 1998).

### **3.6.4.6 Social and Psychological Recovery**

When a household is impacted by disaster, the burden of recovery can be immense. When an entire community is disrupted, critical sources of support from neighbors, friends, and family may be lost. The people who normally help you cope with life's adversities may be feeling the effects as well. Several concerns develop after a disaster. First, some groups tend to fare worse after disaster than others, particularly those at lower income levels. Lower income housing, for example, simply cannot withstand the impacts of disasters as well. Consequently, people living there may experience a higher exposure to traumatic events.

Remember, for example, the earthquakes in Haiti and Chile. The loss of life was significantly higher, with people exposed to traumatic sights and sounds affecting hundreds of thousands of people. People who experienced death, injury, or property loss may be more susceptible to psychological trauma that requires professional support. While in most cases, posttraumatic stress disorder (PTSD) remains relatively low, circumstances may increase rates such as complete loss of the community, long-term displacement from social networks, and proximity to physical trauma.

Planning for psychological impacts should be in any recovery plan. First, involve properly credentialed and professional counselors. Second, generate a list of providers and plans for trauma counseling. Training these providers in post-disaster or mass emergency counseling represents a third step, and may need to involve those who connect to populations at risk. School teachers, child care workers, home health care providers, disability organization representatives, senior citizen center staff, first responders, and others can recognize warning signals of potential problems. Finally, developing a plan to deliver appropriate kinds of services needs to be undertaken. After September 11, for example, the American Red Cross offered multiple kinds of counseling programs in varying languages. The faith-based community can be helpful too, and some religious organizations specialize in disaster spiritual care.

Many communities plan for a 1-year anniversary event, which provides some comfort to survivors. Commemorations range from private meetings held among those directly affected to public occasions that remember those who were lost and recognize the progress that has been made. Planners should organize such events as part of their recovery plan.

### **3.6.4.7 Public Sector Recovery**

Most disasters require some level of governmental support. Yet, disasters strike the public sector too. Training staff locally on what they need to do, how their work may change in a disaster context, and where they might be relocated to support critical services is just the start. The city of Tuscaloosa,

Alabama, lost its emergency operations center (EOC) in the tornado of 2011. The building collapsed, temporarily trapping employees. The EOC then relocated to several sequential locations. After September 11, contingency plans allowed for a rapid relocation of New York City's EOC. When the towers came down, hundreds of police and firefighters were killed. Haitian officials struggled as well after their earthquake. Police and firefighters died in the event, as did government officials and representatives from the United Nations. Losing key officials in decision-making or life-saving capacities impacts post-disaster recovery.

Public servants and public employees who survive may now face challenges at home. Their housing may have been damaged or they find it difficult to get to work. Thus, those working in the public sector may shoulder a significant recovery burden. They have to help their community, and they must help their own families.

Pre-disaster recovery planning for the public sector is essential. All relevant departments must have a clear understanding of recovery functions, how they might be accomplished under the circumstances, and a set of mutual aid agreements with other jurisdictions. For example, conducting damage assessment must be done even if roads are blocked. Aerial reconnaissance and satellite imagery can be used but will require specialized skills and knowledge. Outside aid is likely to be needed. Similarly, historic preservation architects may need to come in to the community. Or, agencies with expertise in saving environmentally fragile systems may need to be consulted.

In an area hard-hit, voluntary organizations represent an important resource. Public officials will need to be ready to work with and manage potentially massive numbers of unsolicited and solicited volunteers. A volunteer center or its counterpart will need to determine where volunteers will stay, what kinds of training they will receive, the liabilities to the jurisdiction, and what kinds of projects they may work on.

Just as with housing and businesses, the public sector may need to consider downtime and displacement. Just how long might it take to relocate into a temporary facility? How long will employees work in a displaced setting? In New Orleans, for example, police and fire staff continued to work in temporary trailers for 3 years after the hurricane.

And, of course, mitigation measures should be undertaken to strengthen the public sector against future losses. By preplanning, areas of potential loss can be identified, such as moving records and key personnel out of below-ground areas susceptible to flooding. Facilities can be “hardened” with stronger, even bullet-resistant windows. Barricades and blast-resistant windows can be placed in buildings at risk of becoming terrorist targets.

## 3.7 Summary

Disaster recovery planning occurs either before or after disasters happen. A common starting point is a PDA that determines damage. Several techniques can be used such as a drive-by survey to capture quickly a general overview of damage. Satellite imagery, while not exact, can also be used to gauge the damage. Direct inspection by professionals, though, serves as the most effective means of assessing damage inside, outside, and underground damaged structures.

Pre-disaster planning, while considered the best action, occurs far less frequently than post-disaster planning. Pre-disaster planning can be done in concert with other forms of planning including mitigation and comprehensive planning. Such coordinated efforts promote efficiency and jump-start a post-disaster recovery.

Post-disaster recovery planning is far more common. A starting point for post-disaster recovery planning is to set out key principles before proceeding. As a minimum, planning efforts should be inclusive and participatory, promote effective communications, and link to key partners both inside and outside of the community. Mitigation efforts should be built into all dimensions of a recovery plan in order to reduce future impacts.

Planning should be considered a process that involves moving through a series of steps or stages. Those stages may include both short-term and long-term recovery planning. For the short term, communities and recovery leaders will try to address critical needs such as debris removal and utility restoration. Part of the work will involve emergency measures to save properties and lives. In addition, communities will likely have to develop ordinances to govern the post-disaster rebuilding. Long-term planning must address areas of recovery needed to restore a community's ability to function. Planning teams must consider ways to rebuild housing, businesses, and infrastructure. As part of the planning, the impacts of the disaster and the rebuilding on the environment, historic and cultural resources, and the social-psychological well-being of those affected need to be discussed. Key actors in the recovery effort, particularly the public sector, will need to provide effective leadership.

## 3.8 End-of-Chapter Questions

### 3.8.1 Summary Questions

1. What are the purposes of PDA?
2. What are the advantages and disadvantages of windshield surveys, satellite imagery, and professional inspections for PDA?
3. A number of key principles should be used to launch disaster recovery planning. List and explain the value of each.

4. Pre-disaster and post-disaster planning occurs in different time frames. What might be the advantages and disadvantages to planning during each time frame?
5. What kinds of planning needs to be done for short-term versus long-term recovery time periods?
6. Identify the common elements of a disaster recovery plan and describe how the key principles might influence how we think through those elements.

### 3.8.2 Discussion Questions

1. Describe the community where you live to others in your class. Based on the demographic makeup of your community, which populations might be excluded from participation? How would you be sure to include them at the planning table?
2. Find some photographs or other images of a recent disaster. Based on the images that you can see, what kinds of damage might you report? Is it minor or major damage? What can you see and not see? What other data sources are available, such as satellite imagery? (Hint: it is fairly easy to find images of recent hurricanes, satellites, earthquakes, landslides, and other disasters with search engines.)
3. Starting with the essential principles for planning, what kinds of efforts (e.g., communication, external partners) would be appropriate if a disaster happened where you live? What about a disaster that occurred very far away in another nation?
4. For your community, what kinds of post-disaster rebuilding would enhance housing and businesses? How might they be rebuilt in an energy-efficient manner?
5. What kinds of environmentally sensitive habitats are there where you live? What about endangered wildlife? How would you write them into the recovery plan?
6. What makes your community “home”? What is it about the history of the place where you grew up? What makes it special and what would you like to retain about your home to keep its unique character intact?

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