

# **Holistic Disaster Recovery**

**Ideas for Building Local Sustainability After a Natural Disaster**

*Developed by*

*Natural Hazards Research and Applications Information Center  
University of Colorado  
Boulder, Colorado*

**Published by the Public Entity Risk Institute**  
*On the Web at: [www.riskinstitute.org](http://www.riskinstitute.org)*

# Public Entity Risk Institute

The Public Entity Risk Institute's mission is to serve public, private, and nonprofit organizations as a dynamic, forward thinking resource for the practical enhancement of risk management. PERI pursues its mission by:

- Facilitating the development and delivery of education and training on all aspects of risk management, particularly for public entities, small nonprofit organizations, and small businesses.
- Serving as a resource center and clearinghouse for risk management, environmental liability management, and disaster management information.
- Operating an innovative, forward-looking grant and research program in risk management, environmental liability management, and disaster management.

For complete information on PERI's programs and information services, visit our Web site at [www.riskinstitute.org](http://www.riskinstitute.org).

Public Entity Risk Institute  
11350 Random Hills Road, Suite 210  
Fairfax, VA 22030  
Phone: (703) 352-1846  
FAX: (703) 352-6339

Gerard J. Hoetmer  
Executive Director  
([ghoetmer@riskinstitute.org](mailto:ghoetmer@riskinstitute.org))

Claire Lee Reiss, J.D., ARM  
Director, Grant and Research Program  
([creiss@riskinstitute.org](mailto:creiss@riskinstitute.org))

Dennis Kouba  
Director, Outreach and Development  
([dkouba@riskinstitute.org](mailto:dkouba@riskinstitute.org))

Audre Hoffman  
Office Manager  
([ahoffman@riskinstitute.org](mailto:ahoffman@riskinstitute.org))

\* \* \* \* \*

The Public Entity Risk Institute (PERI) provides these materials "as is," for educational and informational purposes only, and without representation, guarantee or warranty of any kind, express or implied, including any warranty relating to the accuracy, reliability, completeness, currency or usefulness of the content of this material. Publication and distribution of this material is not an endorsement by PERI, its officers, directors or employees of any opinions, conclusions or recommendations contained herein. PERI will not be liable for any claims for damages of any kind based upon errors, omissions or other inaccuracies in the information or material contained on these pages. PERI is not engaged in rendering professional services of any kind, and the information in these materials should not be construed as professional advice. Users bear complete responsibility for any reliance on this material, and should contact a competent professional familiar with their particular factual situation if expert assistance is required.

# HOLISTIC DISASTER RECOVERY

## IDEAS FOR BUILDING LOCAL SUSTAINABILITY AFTER A NATURAL DISASTER

---

*produced by the*



**Natural Hazards Research and Applications Information Center  
University of Colorado  
482 UCB  
Boulder, Colorado 80309-0482  
(303) 492-6818  
(303) 492-2151 (fax)  
[www.colorado.edu/hazards](http://www.colorado.edu/hazards)**

*with funding from the*



**Public Entity Risk Institute  
11350 Random Hills Rd.  
Fairfax, Virginia 22030  
(703) 352-1846  
(703) 352-6339 (fax)  
[www.riskinstitute.org](http://www.riskinstitute.org)**

2001

## Preface

This is an all-purpose handbook on how to build sustainability into a community during the recovery period after a disaster. It has background information, practical descriptions, and ideas about what sustainability is, why it is a good for a community, and how it can be applied during disaster recovery to help create a better community. The book is intended to be used by local officials, staff, activists, and the disaster recovery experts who help the community during disaster recovery—including state planners, emergency management professionals, mitigation specialists, and others. It is geared mainly toward small to medium-sized communities.

Every locality is different, and every disaster is different. It would be impossible to tell precisely what should be done in every situation. Instead, the handbook illustrates a range of options for a number of hypothetical situations, gives basic information on a few ways to accomplish those options, presents examples of how other localities have handled certain situations, and lists places to get more information and help, locally and outside the community. It will engage managers and decisionmakers in a variety of strategies for using the recovery period to help a community make itself a better place to live, protect its natural environment, improve its resilience in the face of disasters, be safer, be more attractive to business, better manage growth, and preserve its history and culture for its future residents. Whether a community is just getting over the emergency period after being stricken by a hurricane, earthquake, flood, or other disaster, or whether it is looking ahead and wants to know how to get ready to handle the aftermath of such an event, this handbook will provide ideas, guidance, examples, and places to look for more information.

The first chapter introduces the concept of sustainability, defines it in the context of recovery, and explains its usefulness. The second chapter explores the process and procedure of sustainable or holistic recovery. The next six chapters cover the fundamental principles of sustainability as applied to specific disaster recovery situations. Chapter 9 is a summary. At the end of each chapter is a list of information on that topic and places to get more. The chapters on the principles of sustainability (4 through 8) are presented so that a reader with interest in or need for ideas on a particular sustainability principle—say, economic vitality—can turn directly to that chapter and obtain a fairly comprehensive picture of those issues in recovery. In order to make each of those chapters stand alone it was necessary to repeat some information in each of them. At the end of the handbook is a glossary of terms. Throughout the chapters information is enclosed in boxes. The shadowed boxes summarize information contained in the text or give hints about holistic recovery. The boxes with the wide upper and lower borders give examples from the real world. Other graphics and tables are enclosed in boxes with a single-line border.

This handbook is intended to complement other documents already available on recovery, reconstruction, planning, mitigation, and related local concerns. It does not cover all those issues comprehensively, even though they are all touched upon. Instead, it gives a collection of ideas and guidance for looking at disaster recovery in a new way—from a local government perspective and with the broad ideals of sustainability firmly in mind.

This handbook can be accessed and downloaded from the Hazards Center's website at [www.colorado.edu/hazards/](http://www.colorado.edu/hazards/). Also at that site is 12-page synopsis of the concept of holistic recovery as explored in this handbook. The synopsis is entitled "Building Back Better," and is Issue 3 of the Natural Hazards Center's periodical the *Natural Hazards Informer*.

## Acknowledgments

This guide was produced under a 20-month project funded by the Public Entity Risk Institute entitled “A Project to Develop Guidance and Expertise on Sustainable Recovery from Disaster for Communities.” The project developed out of a recognition that small- and medium-sized towns, can have difficulty figuring what to do, or how to do it, when they are confronted with the need to recover from a disaster. The intent of this work was to try to consolidate what is known about sustainable recovery at the local level and to fill in the gaps by suggesting ways to do things in innovative ways. This handbook is one of the results of that work.

To produce this handbook, the Natural Hazards Center contracted with professionals with expertise in the various aspects of sustainability and recovery, asking each of them to draft a chapter on their speciality that would combined with others into a manual or handbook geared toward community leaders and decisionmakers and the people who would advise them during recovery from a disaster. Those experts became the Contributing Authors to this handbook:

Charles Eadie, University of California, Santa Cruz, (Chapter 5. Economic Vitality)  
Rod E. Emmer, R.E. Emmer & Associates (Chapter 7. Environmental Quality)  
Ann-Margaret Esnard, Cornell University (Chapter 4. Quality of Life)  
Sarah Michaels, University of Colorado, Boulder (Chapter 3. Participatory Process)  
Jacquelyn Monday, University of Colorado, Boulder (Chapter 1. Introduction to Sustainability)  
Clancy Philipsborn, The Mitigation Assistance Corporation (Chapter 2. The Disaster Recovery Process)  
Brenda Phillips, Jacksonville State University (Chapter 6. Social and Intergenerational Equity)  
David Salvesen, University of North Carolina, Chapel Hill (Chapter 8. Disaster Resilience)

The Contributing Authors were critical to the process of generating this handbook and are to be highly commended for their willingness to stake out new territory and to participate in this group endeavor. After the Contributing Authors finished their work, however, the Natural Hazards Center compiled the materials into the present arrangement and format, and edited the content. Thus, credit goes to the contributors, but errors and omissions are the Center’s own.

Many other people helped in various ways. Assistance on Chapter 4’s case study searches was provided by Calah Young and Angus Jennings, City and Regional Planning graduate students. Helpful input on Chapter 3 was supplied by Duane Holmes, National Park Service; Bob Cox and Floyd Shoemaker, Federal Emergency Management Agency; and Brenda Phillips, Jacksonville State University. Finally, Jennifer Barnard Miller, graduate student at the University of Colorado, made invaluable editorial and substantive contributions throughout the volume.

The Natural Hazards Center is especially indebted to the many people who lent their time and expertise to repeated reviews of all of parts of the draft handbook. Thanks to Terry Baker, Stephen B. Baruch, Catherine Bauman, Arrietta Chakos, John E. Clouse, Bev Collings, Windell

A. Curole, Mark Darienzo, Marjorie Greene, Bob Hart, George Houston, Ward Huffman, Laurie Johnson, Gene Juve, H. Felix Kloman, Kent Lim, Diana McClure, Deborah Needham, H. Philip Paradise, Eve Passerini, Ann Patton, Scott Porter, Darrin Punchard, Claire Rubin, Jeff Rubin, Patty Rueter, James W. Russell, Dennis Sigrist, Michelle Steinberg, Don Webber, and French Wetmore.

# Contents

Preface .....	ii
Acknowledgments .....	iii
1. INTRODUCTION TO SUSTAINABILITY	
What Does Sustainability Mean for a Community? .....	1-2
How a Community becomes Sustainable .....	1-3
Why Sustainability? .....	1-5
Considering Sustainability after a Disaster .....	1-6
References .....	1-11
Where to Find More Information .....	1-11
2. THE DISASTER RECOVERY PROCESS	
Getting Started: Planning for Disaster Recovery .....	2-2
Recognizing Short-term and Long-term Disaster Recovery .....	2-4
Nine Obstacles to Holistic Disaster Recovery .....	2-5
Seven Enablers for Holistic Disaster Recovery .....	2-8
Planning for Holistic Recovery .....	2-10
Making Sustainability Permanent .....	2-12
References .....	2-14
Where to Find More Information .....	2-14
3. PARTICIPATORY PROCESSES IN DISASTER RECOVERY	
Introduction .....	3-1
Undertaking a Participatory Approach .....	3-1
Localities that have used a Participatory Process .....	3-9
Words to the Wise about Public Involvement .....	3-11
Conclusion .....	3-12
References .....	3-13
Where to Find More Information .....	3-14
4. USING DISASTER RECOVERY TO MAINTAIN AND ENHANCE QUALITY OF LIFE	
Introduction .....	4-1
Recovery Strategies for Enhancing Quality of Life .....	4-4
Pursuing Strategies to Improve Quality of Life .....	4-9
Monitoring Quality of Life .....	4-13
References .....	4-15
Where to Find More Information .....	4-15
5. BUILDING ECONOMIC VITALITY INTO RECOVERY	
Introduction .....	5-1
Recovery Strategies for Building Economic Vitality .....	5-4
Pursuing Strategies for Economic Vitality .....	5-9
Examples of Success .....	5-14

	References .....	5-20
	Where to Find More Information .....	5-20
6.	<b>PROMOTING SOCIAL AND INTERGENERATIONAL EQUITY DURING DISASTER RECOVERY</b>	
	Introduction .....	6-1
	Recovery Strategies for Promoting Social and Intergenerational Equity .....	6-6
	Pursuing Strategies for Social and Intergenerational Equity .....	6-10
	Monitoring Social and Intergenerational Equity .....	6-16
	References .....	6-19
	Where to Find More Information .....	6-19
7.	<b>PROTECTING ENVIRONMENTAL QUALITY DURING DISASTER RECOVERY</b>	
	Introduction .....	7-1
	Recovery Strategies for Protecting Environmental Quality .....	7-2
	Pursuing Strategies for Environmental Quality .....	7-4
	Monitoring Environmental Quality .....	7-9
	Tools for Implementing Environmental Projects or Programs .....	7-9
	Summary .....	7-21
	References .....	7-23
	Where to Find More Information .....	7-23
8.	<b>INCORPORATING DISASTER RESILIENCE INTO DISASTER RECOVERY</b>	
	Introduction .....	8-1
	Recovery Strategies to Build a Disaster-resilient Community .....	8-3
	Pursuing Strategies for Disaster Resilience .....	8-12
	Monitoring Disaster Resilience .....	8-16
	Conclusion .....	8-16
	References .....	8-18
	Where to Find More Information .....	8-19
9.	<b>SUMMARY</b>	
	Sustainability .....	9-1
	Process .....	9-2
	A Final Word .....	9-7
	<b>GLOSSARY</b> .....	10-1



## EVALUATION FORM

Please provide us with some feedback about this handbook and the ideas and information it presents about holistic disaster recovery. Mail or fax this form to the address below.

*Thank you!*

---

How did you use (or will you use) the information in this handbook in your work (or to help others in their work)?

What would make this handbook more useful to you?

Have you been through a disaster recovery?

Comments:

---

Which category best describes your job?

- local government  
(If local government, population of jurisdiction: \_\_\_\_\_)
  - state government
  - federal government
  - private consultant; Specialty \_\_\_\_\_
  - researcher
  - student
  - other; Specify \_\_\_\_\_
- 

Please return to:

Natural Hazards Center  
482 UCB  
University of Colorado  
Boulder, CO 80309-0482  
Fax: (303) 492-2151

Or e-mail your comments to: [jacque.monday@colorado.edu](mailto:jacque.monday@colorado.edu)





## Chapter 1

# INTRODUCTION TO SUSTAINABILITY

---

*There is no myth about the central meanings of sustainability. They are rooted in perennial themes of responsibility to others, providing for the future, and dependence of life on the natural environment.*

—Reid 1995, p. xv

This handbook is for managers or decisionmakers who know that it is important to have higher aspirations for the kinds of communities people live in, and for the types of lives they have access to. These decisionmakers have thought about the troubling aspects of seemingly built-in inequities in many social and economic institutions here in the United States, and may have observed, for example, that sprawling suburbs often mean a loss of community among the people living in a neighborhood. Some decisionmakers reading this handbook may have had experience with a natural disaster and come away thinking that there has got to be a better way to cope with such events than simply rebuilding and hoping it won't happen again.

Doing the right thing—and the best possible thing under the circumstances—is a goal shared by all responsible local officials and staff. It can be a complex undertaking, however, given competing demands, political and economic hurdles, and a bewildering array of ideas and special interests at play. *Sustainability* is an embracing concept that can give localities a framework within which to do many of the forward-looking things that they are already doing (or want to do), whether they be improvements in lifestyle, safety, economic opportunity, or protecting the environment. Sustainability provides an ideal toward which to strive and against which to weigh proposed activities, plans, and decisions. It is a way of looking at a community within its broadest possible context, in both time and space.

A sustainable community thrives from generation to generation because it has

- a social foundation that provides for the health of all community members, respects cultural diversity, is equitable in its actions, and considers the needs of future generations;
- a healthy and diverse ecological system that continually performs life-sustaining functions and provides other resources for humans and all other species; and
- a healthy and diverse economy that adapts to change, provides long-term security to residents, and recognizes social and ecological limits.

The classic definition of sustainability, developed by The World Commission on Environment and Development (the Brundtland Commission) is “[meeting] the needs of the present without compromising the ability of future generations to meet their own needs” (1987, p. 188). Similar concepts are being referred to today with such terms as “sustainable development (or redevelopment),” “development excellence,” “smart growth,” and “sustainable ecosystems.”

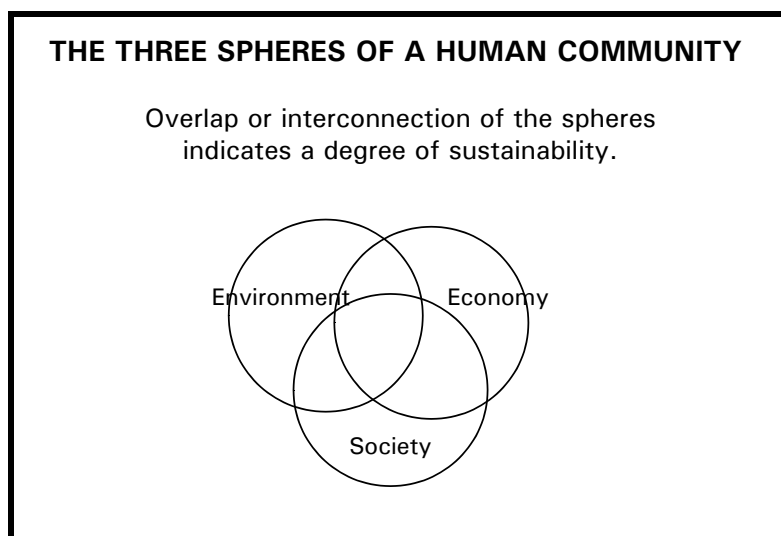
## WHAT DOES SUSTAINABILITY MEAN FOR A COMMUNITY?

A community can be thought of as being made up of three spheres: a social sphere, an environmental sphere, and an economic sphere. Sometimes they are called the three Es—equity, environment, and economics.

- The *social* sphere consists of all the interactions among people—cooperating in their neighborhood activities, practicing their religion, enjoying their families, sharing cultural identities, solving problems together, being friends.
- The *environmental* sphere is the natural and physical setting in which the community exists—the visible landscape as well as the not-so-visible resources like groundwater, air, and fertile soil. People in a community rely on and use these common resources.
- The *economic* sphere within a community consists of all the activities, transactions, and decisions that are based on producing and exchanging goods and services—to each other and to outsiders.

These spheres can appear separate from one another, but in fact they are all intimately related. A town could not exist for long if the early people had totally depleted or contaminated the groundwater, for example. It would not be a nice place to live if some of the people were made to endure poverty-level living conditions so that others could enjoy economic success.

Sustainability, then, means the ability to or the capacity of a community to maintain itself over time. It means that the community is a good place to be, that its foundations are solid and healthy, and that it can cope with the changes that time brings. To have a really sustainable community, the three systems must be integrated in a give-and-take



relationship. In theory, the more they overlap, the more sustainable the community will be (see figure), although there are practical limits.

Although “communities’ can be any size, in this handbook the term is used to mean the local entities by which most people are organized in the United States—a neighborhood, city, town, village, county, or parish. Whether it consists of 500 people or a half-million, it is a community because the people that live there are connected by the interactions they have among themselves and their physical location.

## HOW A COMMUNITY BECOMES SUSTAINABLE

To be sustainable, a community needs to maintain the overlap and integration of its social, environmental, and economic spheres. Each sphere or system has many components, and in every community the quality, quantity, importance, and balance of them will be different. But most people agree that the six principles listed below, if addressed simultaneously, will build sustainability. A community can use these principles as guide to where it wants or needs to improve its sustainability, and how do it.

### 1. Quality of Life

What a community thinks of as quality of life—or “livability”—has many components: income, education, health care, housing, employment, legal rights, and exposure to crime, morality, pollution, disease, disaster, and other risks. Different communities have different things that they prize: one town may be proud of its safe streets, high quality schools, and rural atmosphere, while another thinks that job opportunities and honoring its historical heritage are what make it a good place to live. The point is that every locality can decide for itself how best to maximize the livability within its boundaries—can define and plan for the quality of life it wants and believes it can achieve, for now and for future generations. Quality of life and its applicability to recovery are discussed in Chapter 4 of this handbook.

### The Six Principles of Sustainability

A community that wants to become more sustainable will

1. Maintain and, if possible, enhance, its residents’ **quality of life**.
2. Enhance local **economic vitality**.
3. Ensure **social and intergenerational equity**.
4. Maintain and, if possible, enhance, **environmental quality**.
5. Incorporate **disaster resilience** and mitigation.
6. Use a consensus-building, **participatory process** when making decisions.

(adapted from Mileti 1999, p. 31)

## **2. Economic Vitality**

The people in a community need a reliable source of decent jobs. Businesses need an attractive business climate. The local government needs a stable tax base and revenue to enable it to provide and maintain the infrastructure and services that keep the community operating effectively.

Embracing sustainability in the local economy means paying attention to qualitative factors within the economy as well, not just to the bottom line. All these things are summed up in the term “economic vitality.” A community with this attribute has numerous advantages in its drive not only toward sustainability, but toward all of its other goals, whatever they may be.

A truly sustainable local economy is diversified, and less easily disrupted by internal or external events or disasters. Recovery from disaster, for example, is fundamentally an economic proposition. The success of recovery will be determined not only by how well the community attracts, effectively utilizes, and sustains the flow of investment capital from a multitude of sources through the rebuilding process, but also by the quality of the uses to which it puts that capital. Further, a vital, sustainable economy does not simply shift the costs of its good health onto other regions. Nor is a sustainable local economy reliant on unlimited population growth, high consumption, or non-renewable resources. Economic vitality and its applicability to disaster recovery are discussed in Chapter 5.

## **3. Social and Intergenerational Equity**

In an ideal community everybody gets treated fairly, regardless of ethnicity, age, gender, cultural background, or other characteristics. This means that the resources and opportunities are equally available to all, and that a few people don't profit at the expense of others. It means making sure, to take one example, that people of limited economic means do not end up with no housing choices except for the most dangerous sites in town—that in the floodplain of the river, or over a historic toxic waste site.

One thing that present-day decisionmakers sometimes overlook is the stake that future generations have in what happens today. A sustainable community would not exhaust its resources during this generation, destroy natural systems, or pass along unnecessary hazards to its great-grandchildren. The current nuclear waste crisis is one example of how what seemed like a good idea to one generation's scientists and policymakers may saddle future generations with exposure to hazard. Equity and its applicability to disaster recovery are discussed in Chapter 6.

## **4. Environmental Quality**

Communities are finding that the natural features of their location—a river, beach, mountain setting—can become defining points for community identity. Residents are demanding open spaces, unspoiled areas, parks, wildlife habitat, and the educational opportunities that nature can provide. In the long run, it is essential that human activities not degrade the air, oceans, fresh water, and other natural systems. A community can take a positive step toward a sustainable future by trying to replace local practices that are detrimental with those that will allow ecosystems to continuously renew themselves. In some cases, this will mean simply protecting what is already there by finding ways to redirect human activities and development into less

sensitive areas. In others, a community may have to change deeply ingrained patterns, like reliance on the automobile, in order to combat the sprawl and noise and air pollution it causes. In still other situations, a community may need to reclaim, restore, or rehabilitate an already-damaged ecosystem—like a local wetland. Environmental quality and its applicability to disaster recovery are discussed in Chapter 7 of this handbook.

## 5. Disaster Resilience

A community has a better chance of being around in the future, of retaining its special character over time, and of being a good place for its residents to live (and stay) if it is resilient in the face of natural disasters like tornados, hurricanes, earthquakes, floods, and drought. Although such events cannot be prevented, a community can do a lot to make sure that they cause as little physical damage as possible, that productivity is only minimally interrupted, and that quality of life remains at (or quickly returns to) high levels. Further, a sustainable community would think of hazards and disasters as integral parts of the much larger environment in which it exists. It would not rely solely on outside (such as federal or state) help but instead shoulder responsibility for the risks that cannot be avoided, and for the return to normalcy after a disaster, if one does occur. Disaster resilience and its applicability to recovery are discussed in Chapter 8.

## 6. A Participatory Process

A participatory process means seeking wide participation among all the people who have a stake in the outcome of a decision. The decisionmaker identifies concerns and issues; allows generation of ideas and options for dealing with those concerns; and helps to find a way to reach agreement on what steps will be taken to resolve them.

Engaging in a participatory process improves the quality and dissemination of information, fosters a sense of community, produces ideas that may not have been considered otherwise, and engenders a sense of ownership on the part of the community for the decision that is ultimately made. The participatory process and its applicability to disaster recovery are discussed in Chapter 3.

## WHY SUSTAINABILITY?

Even people who are already convinced of the usefulness of the sustainability ideal can benefit by having some arguments in its favor. Because it is a broad concept, it can mean different things to different people and that is a key selling point. There is something in it for everyone. It's a win-win proposition.

- Sustainability is a forward-looking approach as people become more closely connected, move into an increasingly global economy, realize the global nature of the environment, and have communications networks that instantaneously span the planet.
- It helps give control back to local communities. Sustainability leads communities back to self-determination by asking: What kind of lifestyle do you want and need? How can you live now so that future generations are not penalized? What do you need for an acceptable

quality of life? Should growth be limited? What environmental risks are you willing to take? How can your local government and business work together? The answers to these questions are unique to each community. With sustainability, there is no “national model” that is being imposed on a community from the outside. No one but the residents of a community know what value they place on different aspects of their lifestyle, their community. And no one but a community can really ensure that those values endure.

- The principles of sustainability promote a “Golden Rule” of behavior toward other people, toward the planet itself, and toward the future.
- Many federal agencies have been emphasizing the “livability” of cities in its activities and policies, and is able to offer support through its various programs for localities that adopt that point of view.
- Using the sustainability approach can help a community better recognize the impacts of various decisions on other community goals and concerns. It helps clarify thinking and priorities when making inevitable trade-offs.

### **The Consequences of Business as Usual**

Not incorporating sustainability into the fabric of the community can have negative consequences. After a disaster some of these consequences are easier to see. There are many instances of communities that did not rebuild wisely after a disaster, or that neglected an opportunity to include sustainability.

- If they are not addressed, many marginal local conditions will only worsen. This includes environmental conditions like deteriorating water quality and loss of natural spaces; social conditions like the unfair distribution of risk; and economic situations like loss of employment opportunities as businesses relocate to other towns.
- It’s expensive for everyone when people don’t have a sustainable relationship with their environment. Disaster losses are increasing nationwide; it costs all taxpayers when the federal government provides (sometimes repeatedly) large amounts of financial relief and funds for rebuilding.
- Government policies are getting stricter in terms of helping those communities that help themselves, and requiring those that haven’t at least make an attempt before they get federal assistance. Communities that help themselves now will be in much better position later.

## **CONSIDERING SUSTAINABILITY AFTER A DISASTER**

In an ideal world, communities would routinely take a long-term view of the future, and build into their planning and management processes the various principles of sustainability. But the reality is that most communities have not been doing that. If a community has not yet formally



considered broader issues like environmental quality, social equity, or livability, the period of recovery after a disaster can be a good time to start. Why? Because disasters jiggle the status quo, scrambling a community's normal reality and presenting chances to do things differently.

A disaster brings some temporary changes to a community—changes that can create opportunities to build back in a better way.

- People are thinking about the problems of floods, earthquakes, landslides, tornadoes, etc, when normally they don't think about these things. This is true for residents as well as local staff and officials.
- In some cases, the disaster will have done some of the work already. For example, a tornado, earthquake, or flood may have damaged or destroyed aging, dilapidated, or unsafe buildings or infrastructure.
- A disaster forces a community to make decisions, both hard and easy.
- Technical and expert advice becomes available, from a variety of state, federal, regional, and non-profit sources.
- Financial assistance becomes available from the state and federal government agencies, both for private citizens and for the community itself.
- Programs designed to help a community mitigate disasters can be used to strengthen overall sustainability and resiliency to other social, economic, and environmental problems.

The best way to ensure that a community has a sustainable recovery from a future disaster is to prepare a comprehensive plan for a sustainable, holistic recovery. But even if a community has not prepared such a plan, there are many common-sense things that can be done during recovery that will make a community more sustainable than it was before.

When a community begins recovering from a disaster, its staff, officials, and residents face numerous tasks that have to be done. Roads and bridges may need to be rebuilt; businesses need to reopen; eroded beaches and dunes may need replenishment; housing needs repair, restoration and replacement; problems with utilities must be remedied; social and medical services have to be reinstated; businesses need to be retained and built back. In many cases it is a relatively simple matter to do those tasks in a slightly different way so that long-term, broad benefits are maximized and future damage and disruption avoided, instead of just putting things back the way they were. When looked at in this light, those disaster-caused tasks become *opportunities* for improving the community.



How can a community take advantage of the opportunity that disaster recovery brings? The technique advocated in this handbook follows a framework for sustainable—or “holistic”—recovery in which the principles of sustainability become decisionmaking criteria to be applied to each and every recovery decision. On page 1-9 is a sample Matrix of Opportunities that can be a guide to decisionmaking for holistic recovery. The sustainability principles (and some ways of implementing them) are shown on the vertical axis. Across the top of the matrix are listed some of the problem situations that could confront a community in the aftermath of a disaster: utilities must be restored, infrastructure re-established, housing repaired, social services reinstated, and commercial sectors rehabilitated. At the intersection of the problem and the principle there are opportunities for a recovery decision and action that would be more sustainable than a return to the status quo (marked with an X on the matrix). It should be noted that this matrix is just a sample of a hypothetical disaster in a hypothetical community. A similar matrix developed by a real community to help it in recovery would have a different list of disaster situations across the top, and a different set of boxes marked with X. The principles would be the same as in this sample, as would many of the options for applying them.

For example, the column labeled “power lines” (under “Damaged Utilities”) represents a situation in which a hurricane or other disaster has caused downed and/or damaged electric lines. Reading down that column shows that a community has several options for incorporating sustainability when it repairs or replaces those power lines. Instead of simply putting the power lines back the way they were, the community could devise a recovery strategy that calls for burying replacement power lines underground. This could improve the aesthetics of the neighborhood (thereby improving quality of life now and for future generations), alleviate visual pollution (thereby enhancing environmental quality), and minimize the chance that of future disruption to the electricity supply (thereby improving disaster resilience).

Or, the community might have a strategy that calls for upgrading and/or expanding the coverage of the power lines when they are repaired instead of just replacing them. Depending upon the specifics, this strategy could have the effect of improving the community’s utility services (thereby improving quality of life now and for future generations), supporting development or redevelopment of a new part of the community (thereby enhancing economic vitality), and encouraging development in a less hazardous area (thereby improving disaster resilience).

The options listed under each of the six principles of sustainability are by no means exhaustive; additional ideas may readily be imagined. Recovery strategies that capitalize on disaster opportunities are limited only by the imagination and resourcefulness of the community. That process is the subject of the rest of the chapters of this handbook.

### **Paying for Sustainable Disaster Recovery**

Many federal, state, and private programs provide technical and/or financial assistance to help carry out sustainability strategies. In most instances, this assistance is available in a disaster recovery situation as well as during normal conditions. There also are some government and other programs that assist in working toward sustainability after a disaster. The following chapters contain information about funding and other help community can obtain in building sustainability.

### Matrix of Opportunities

(x = an opportunity to devise a recovery strategy that furthers sustainability)

#### Some Situations a Community Could Face during Disaster Recovery

The Principles of Sustainability & Some Options for Applying Them	DAMAGED TRANSPORT			DAMAGED PUBLIC FACILITIES					DAMAGED UTILITIES			DAMAGED HOUSING			ECONOMIC DISRUPTION				ENVIRONMENTAL DAMAGE				DISRUPTION TO HEALTH & SAFETY			OTHER				
	Roads, bridges, & related infrastructure	Subway, rapid transit	Other	Schools	Downtown, CBD, historic district	Public spaces	Harbor, port, airport	Stormwater system, power plant	Other	Power lines	Phone lines	Water treatment plant	Other	Houses to be repaired	Houses damaged beyond repair	Other	Commercial buildings damaged/destroyed	Businesses disrupted	Unemployment	Loss of work force	Other	Riverine, beach, & dune erosion	Toxic air, water, soil, wellheads	Tree loss, habitat loss	Other	Medical facilities damaged	Social & family services, daycare disrupted	Victims, population traumatized	Other	
<b>1 Maintain &amp; Enhance Quality of Life</b>																														
Make housing available/affordable/better					x		x			x	x			x	x				x										x	
Provide education opportunities		x			x	x											x	x									x	x		
Ensure mobility	x	x		x	x	x	x							x		x	x	x								x				
Provide health & other services					x					x								x				x	x			x	x	x		
Provide employment opportunities			x														x	x	x	x						x	x			
Provide for recreation				x	x	x	x															x		x						
Maintain safe/healthy environs	x	x		x		x		x			x			x	x							x	x	x		x	x	x		
Have opportunities for civic engagement				x	x	x	x												x									x		
Others																														
<b>2 Enhance Economic Vitality</b>																														
Support area redevelopment & revitalization		x		x	x	x	x	x		x	x	x		x	x		x		x							x				
Attract/retain businesses	x	x		x		x								x		x	x	x	x											
Attract/retain work force		x		x		x								x	x		x					x		x		x	x	x		
Enhance economic functionality	x	x		x	x	x	x	x			x						x									x	x			
Develop/redevelop recreational, historic, tourist attractions					x	x	x															x		x						
Others																														
<b>3 Ensure Social &amp; Intergenerational Equity</b>																														
Preserve/conserv natural, cultural, historical resources					x	x	x	x	x			x										x	x	x					x	
Adopt a longer-term focus for all planning	x	x		x	x	x	x	x		x	x	x		x	x		x									x	x			
Avoid/remedy disproportionate impacts on groups	x	x		x	x	x				x				x	x		x	x	x			x	x			x	x	x		
Consider future generations' quality of life	x	x		x		x				x	x	x		x	x		x					x	x	x				x		
Value diversity				x	x	x	x							x	x					x						x	x			
Preserve social connections in and among groups				x	x	x								x	x									x			x	x		
Others																														
<b>4 Enhance Environmental Quality</b>																														
Preserve/conserv/restore natural resources	x	x		x	x	x	x	x			x			x	x							x	x	x						
Protect open space						x	x				x			x		x							x	x	x					
Manage stormwater							x	x			x			x						x			x	x						
Prevent/remediate pollution	x			x	x	x	x	x		x	x	x		x	x								x						x	
Others																														
<b>5 Incorporate Disaster Resilience/Mitigation</b>																														
Make buildings & infrastructure damage-resistant	x	x		x	x	x	x	x		x	x	x		x	x		x					x				x	x			
Avoid development in hazardous areas	x	x		x	x	x	x			x	x	x		x		x						x		x		x				
Manage stormwater							x	x			x			x							x		x	x						
Protect natural areas	x			x	x	x								x		x						x		x						
Promote & obtain hazard & other insurance	x			x	x						x			x	x		x	x								x	x			
Others																														
<b>6 Use a Participatory Process</b>	Use a participatory process in conjunction with all the other principles of sustainability, and in every disaster recovery situation in which it is appropriate.																													

## **Sticking with Sustainability**

Once a community is well along in its recovery from the disaster, it will want to periodically assess its sustainability progress.. For example, suppose that in the course of rebuilding a portion of a community's flood-damaged housing inventory, energy efficiency was incorporated into the new homes. As the years pass, the community will want to monitor the continuing energy efficiency of those structures to ensure that it is still enhancing environmental quality by reduced energy consumption. This might be done by periodically measuring the community's total and per capita energy use; or by measuring the heat loss from those buildings.

There are many ways of measuring the different aspects of sustainability within a community and a community can develop indicators that are unique to its situation. What is important is that the concept of a sustainable community is gradually integrated into the community's normal way of life.. The chapters in this manual discuss ways that different aspects of sustainability could be measured over time within a community.

## REFERENCES

Mileti, Dennis S. 1999. *Disasters by Design*. Washington, D.C.: The Joseph Henry Press. 351 pp. Available at [books.nap.edu/catalog/5782.html](http://books.nap.edu/catalog/5782.html).

Reid, David. 1995. *Sustainable Development: An Introductory Guide*. London: Earthscan Publications. 261 pp.

World Commission on Environment and Development. 1987. *Our Common Future*. New York: Oxford University Press. (The Brundtland report.) Abstract available at [www.oup.co.uk/isbn/0-19-282080-X#desc](http://www.oup.co.uk/isbn/0-19-282080-X#desc).

## WHERE TO FIND MORE INFORMATION

### Training Courses and Workshops

Federal Emergency Management Agency, Emergency Management Institute, Higher Education Project Courses. Emmitsburg, Maryland. [www.fema.gov/emi/edu/aem\\_courses.htm](http://www.fema.gov/emi/edu/aem_courses.htm) [accessed June 15, 2001] (301) 447-1233 or email Barbara Johnson: [barbara.l.johnson@fema.gov](mailto:barbara.l.johnson@fema.gov)

- “Building Disaster Resilient and Sustainable Communities.” Course developed by Raymond Burby. [www.fema.gov/emi/edu/bldcomm.htm](http://www.fema.gov/emi/edu/bldcomm.htm) [accessed June 15, 2001] This course introduces the concepts of sustainable development, resilient communities, and smart growth. Public and private sector planning are discussed. The last quarter of the class focuses on resilience, including financing resilience projects, creating resilience among vulnerable populations, and creating resilience for specific hazards.

### Organizations

#### American Planning Association

The APA is a non-profit organization representing “30,000 practicing planners, officials, and citizens involved with urban and rural planning issues. Sixty-five percent of APA’s members are employed by state and local government agencies.” APA’s mission is to “encourage planning that will contribute to public well-being by developing communities and environments that meet the needs of people and society more effectively.” The website is an excellent source of books about community planning that incorporate the principles of sustainable development.

See [www.planning.org](http://www.planning.org) [accessed June 15, 2001]

#### Center of Excellence for Sustainable Development

The CESD website is a project of the Denver Regional Office of Department of Energy’s Office of Energy Efficiency and Renewable Energy. Since 1995, the CESD website has offered users access to comprehensive resources on community sustainability. It is an excellent source for resources on sustainable development.

See [www.sustainable.doe.gov](http://www.sustainable.doe.gov) [accessed June 29, 2001]

### Minnesota Sustainable Communities Network (MnSCN)

MnSCN, sponsored by the Minnesota Office of Environmental Assistance, seeks to “encourage networking, information exchange, and better access to assistance.” The network contains over 1500 individuals, businesses, local governments, educational institutions, and organizations who are interested in promoting sustainability in Minnesota.

See [www.nextstep.state.mn.us/index.cfm](http://www.nextstep.state.mn.us/index.cfm) [accessed June 22, 2001]

### Redefining Progress

Redefining Progress is an organization that “seeks to ensure a more sustainable and socially equitable world for our children and our children’s children.” Information about the group’s sustainability program is available on its website.

See [www.rprogress.org](http://www.rprogress.org) [accessed June 15, 2001]

### Sustainable Development Communications Network

In addition to over 1,200 documents about sustainable development, this website has a calendar of events, a job bank, the Sustainability Web Ring, a roster of mailing lists (listservs) and news sites dealing with sustainable development.

See [sdgateway.net](http://sdgateway.net) [accessed September 21, 2001]

## Videos, CD-ROMs, and DVDs

*Quality Redevelopment of Eastern North Carolina*. Horizon Video Productions. 2000. Durham, NC. This 20-minute video was produced by the state in the aftermath of Hurricane Floyd to introduce and educate local and state officials about the “better ways” available to recover from the disaster and at the same time address other local concerns such as environmental quality, economic vitality, housing, sense of community, business and job opportunities, and disaster mitigation. It introduced a framework espoused by the state for sustainable community action and features the governor explaining the tenets of “quality redevelopment” and how it can—and did—benefit North Carolina communities and help ensure a better future for the state’s citizens. Available from North Carolina Department of Emergency Management, 1830-B Tillery Place, Raleigh, NC 27699; (919) 751-8000; fax: (919) 715-9763.

*Planning for Natural Hazards: Oregon Technical Resource Guide*. Oregon Natural Hazards Workshop. 2000. University of Oregon: Oregon Natural Hazard Workshop.

The purpose of the project leading to this resource guide was to “develop...technical resource guides for Oregon cities and counties to plan for, and limit the effects of, threats posed by natural hazards.” More information about the guide is available on-line at

[www.uoregon.edu/~onhw/text/projects/tfeatured.html](http://www.uoregon.edu/~onhw/text/projects/tfeatured.html) [accessed June 22, 2001]

*The Link Between Sustainability & Disaster Resistant Communities*. Slide show produced by the U.S. Department of Energy and the Federal Emergency Management Agency.

[www.sustainable.doe.gov/disaster/impact](http://www.sustainable.doe.gov/disaster/impact) [accessed July 23, 2001]

This slide show explains the concept of sustainable redevelopment and gives examples of redevelopment in three communities: Soldiers Grove, Wisconsin; Valmeyer, Illinois; and Arkadelphia, Arkansas.

*Mitigation Revitalizes a Floodplain Community: The Darlington Story*. Wisconsin Department of Natural Resources. 1997. Madison, WI.

This is a splendidly produced videotape about the efforts of a small rural Wisconsin community to reverse the effects of neglect and disinvestment in its historic downtown area caused by repeated flooding and economic change. Using a multi-objective planning and management strategy, officials and citizens, in partnership with government agencies and private entities, identified six goals: 1) preserve the historic character of the downtown; 2) restore community pride; 3) acquire and relocate commercial properties at risk; 4) elevate and flood proof commercial and residential structures; 5) stimulate investment downtown; and 6) pursue tourism as an economic strategy. The video follows the mitigation process from early meetings through floodproofing and relocation. Produced by the Wisconsin Department of Natural Resources. 27 minutes. 1997. Available free from Wisconsin DNR, P.O. Box 7921, Madison, WI 53707-7921; (608) 264-9200.

## Books, Articles, and Papers

Arnold, Matthew B. and Robert M. Day. 1998. *The Next Bottom Line: Making Sustainable Development Tangible*. Washington, D.C.: WRI Publications. 64 pp.

This report tries to bring sustainable development down to earth for a business audience. Its authors seek to break down the abstract ideals of sustainable development into ideas small enough to grasp and powerful enough to lead to new business opportunities. The authors offer a road map for businesses to find financial success in the solutions to our environmental and social challenges.

Becker, William S. and Roberta F. Stauffer. 1994. *Rebuilding the Future—A Guide to Sustainable Redevelopment for Disaster-Affected Communities*. Golden, CO: U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Center of Excellence for Sustainable Development. 18 pp.

This document summarizes why sustainability is important and gives an example of sustainable development in one community, Soldiers Grove, Wisconsin. The reader is walked step-by-step through the sustainable recovery process. The last chapter discusses real-life problems the planner may encounter, and an appendix contains a comprehensive list of resources. This document is available online at [www.sustainable.doe.gov/articles/RFTF1.shtml](http://www.sustainable.doe.gov/articles/RFTF1.shtml) [accessed June 15, 2001]

Berke, Philip R. and Jack Kartez. 1994. *Sustainable Development as a Guide to Community Land Use Policy: A Conceptual Framework*. HRRC Publication 37P. College Station, TX: Texas A&M University, College of Architecture, Hazard Reduction & Recovery Center. 25 pp.

The authors explore how “sustainable development” can be used to describe the common good in land use and development and present a set of principles for land use policy formation. Principles for land use policy that the report identifies are: 1) include public participation in the decisionmaking process; 2) build consensus through conflict resolution mechanisms; 3) build local decisionmaking on a realistic capacity to carry out policies; 4) recognize local rights to devise rules for guiding human settlement patterns; 5) land use policy must work in harmony



with nature and recognize the limits of ecosystems; 6) the built environment should be in harmony with people's needs and aspirations; 7) realistic land use policy must be able to alleviate local poverty and account for the least advantaged; 8) polluters, or culpable parties/corporations, must pay for the adverse affects they have imposed on ecosystems; and 9) responsible regional planning needs to be promoted.

Berke, Philip and Maria Manta. 1999. *Planning for Sustainable Development: Measuring Progress in Plans*. Lincoln Institute of Land Policy Working Paper. Lincoln, NE: Lincoln Institute of Land Policy. 23 pp.

Using six principles that define and operationalize the concept of sustainable development, the authors evaluated 30 comprehensive plans to determine how well the policies of these plans supported sustainable development. Findings indicate no significant differences in how extensively sustainability principles were supported between plans that state an intention to integrate sustainable development and those that did not. In addition, plans did not provide balanced support of all six sustainability principles; they supported one—the livable built environment principle—significantly more than the others.

Burby, Raymond J., ed. 1998. *Cooperating with Nature: Confronting Natural Hazards with Land-Use Planning for Sustainable Communities*. Washington, D.C.: The Joseph Henry Press. 356 pp. Available at [www.nap.edu/catalog/5785.html](http://www.nap.edu/catalog/5785.html). [accessed September 21, 2001]

This book focuses on the breakdown in sustainability that follows disaster. The authors follow the history of land use planning and identify key components of sustainable planning for hazards. The authors explain why sustainability and land use have not been taken into account in the formulation of public policy. They also lay out a vision of sustainability, concrete suggestions for policy reform, and procedures for planning. The volume has an excellent bibliography on local land use planning and management for natural hazard mitigation.

Burby, Raymond J., Timothy Beatley, Philip R. Berke, Robert E. Deyle, Steven P. French, David R. Godschalk, Edward J. Kaiser, Jack D. Kartz, Peter J. May, Robert Olshansky, Robert G. Paterson, and Rutherford H. Platt. 1999. "Unleashing the Power of Planning to Create Disaster-Resistant Communities." *Journal of the American Planning Association* 65 (Summer).

Human suffering and loss of lives and property in natural disasters can be reduced with appropriate planning for hazardous areas. However, the authors of this paper assert that federal policies addressing these problems have yet to recognize the importance of planning as the cornerstone of effective local hazard mitigation. In fact, federal programs make planning more difficult, the authors suggest, because they encourage the intensive use of hazardous land and shield local governments and private decisionmakers from financial losses in the disasters that inevitably follow. To use planning for hazard mitigation, federal policies must be revised so that they help build local understanding of risk, commitment to hazard mitigation, and support for planning.

Casey-Lefkowitz. 1999. *Smart Growth in the Southeast: New Approaches for Guiding Development*. Washington, D.C.: Environmental Law Institute Research Publications.

The southeastern United States has been trying to find ways to continue to reap the benefits of the region's bustling economy without the mounting fiscal, health, and environmental costs of



poorly planned development. This report provides an overview of land use and transportation trends in seven states—Alabama, Georgia, Florida, North Carolina, South Carolina, Tennessee, and Virginia—and shows how these states are beginning to shape the pace and location of development by promoting community revitalization, conservation, and transportation alternatives.

*Civil Engineering* 63(10)(October 1993): 39-76.

This topical journal issue begins with an essay by John Prendergast titled, “Engineering Sustainable Development.” Following this are nine articles that describe projects that incorporate principles and current practices used by the civil engineering profession in its efforts to achieve sustainable development. Topics explored include reusing stormwater runoff, geogrid reinforcement to solve hillside erosion, and solving local wastewater treatment problems.

Darmstadter, Joel. 1994. *Global Development and the Environment: Perspectives on Sustainability*. Washington, D.C.: Resources for the Future.

The first two essays in this volume set the stage for considering requirements to develop sustainably by, first, explaining the problem of global population growth, and second, discussing how to move from sustainability as a concept to a reality. The remainder of the essays in the book discuss individual issues such as fairness; practical difficulties; the future of specific natural resources such as water, agriculture, and energy; climate variability and its effect on agriculture; climate change and carrying capacity; and biodiversity and carrying capacity.

Federal Emergency Management Agency. 1997. *Project Impact Guidebook. Building a Disaster Resistant Community*. Washington, D.C.: U.S. Government Printing Office.

This handbook is designed to help communities protect residents, organizations, businesses, infrastructure, and stability and growth of the economy as much as possible against the impact of natural disasters before they happen.

Federal Emergency Management Agency. 2000. *Planning for a Sustainable Future: The Link Between Hazard Mitigation and Livability*. FEMA Report 364. Washington, D.C.: Federal Emergency Management Agency. 40 pp. Available at [http://www.fema.gov/mit/planning\\_toc.htm](http://www.fema.gov/mit/planning_toc.htm) [accessed September 21, 2001]

This booklet is about hazard mitigation, disaster resilience, sustainable development and livability, and describes the linkages among these concepts. It shows how communities that undertake hazard mitigation planning become more disaster resilient and reap further benefits. Hazard mitigation links disaster resilience to broad community objectives of economic health, social well-being, and environmental protection.

Federal Emergency Management Agency. 2000. *Rebuilding for a More Sustainable Future: An Operational Framework*. FEMA Report 365. Washington, D.C.: Federal Emergency Management Agency. Available at [www.fema.gov/mit/planning\\_toc2.htm](http://www.fema.gov/mit/planning_toc2.htm). [accessed September 21, 2001]

This document provides guidance to the Federal Emergency Management Agency (FEMA) Sustainability Planner in the post-disaster response and recovery process. State emergency management officials, local jurisdictions, and other FEMA staff may also use it as a reference during non-disaster time.

Hart, Maureen. 1999. *Guide to Sustainable Community Indicators*. 2nd edition. North Andover, MA: Hart Environmental Data. 202 pp.

The document identifies indicators of sustainable community: ways to measure how well a community is meeting the needs and expectations of its present and future members. The author explains what indicators are, how indicators relate to sustainability, how to identify good indicators of sustainability, and how indicators can be used to measure progress toward building a sustainable community. A website contains the information in the document, plus links and contact information for sources of assistance and advice, along with a list of communities in the United States that are developing indicators of sustainability: [www.sustainablemeasures.com](http://www.sustainablemeasures.com) [accessed June 15, 2001]

Krizek, Kevin J. and Joe Power. 1996. *Planners Guide to Sustainable Development*. Chicago, IL and Washington, D.C.: APA Planning Advisory Service. 66 pp.

This report urges planners to incorporate sustainable development objectives into their everyday work. It describes the history, concepts, and theories behind sustainable development; evaluates progress at the global, national, and state levels; and proposes strategies to help planners become more actively involved in local sustainable development programs. The book includes case studies of sustainable development initiatives in five communities.

May, Peter J., Raymond J. Burby, Neil J. Erickson, John W. Handmer, Jennifer E. Dixon, Sarah Michaels, and D. Ingle Smith. *Environmental Management and Governance: Intergovernmental Approaches to Hazards and Sustainability*. New York: Routledge. 254 pp.

The book addresses aspects of environmental management that raise fundamental questions about human actions and government roles. The authors examine “cooperative” and “coercive” governments by comparing policies in New Zealand and Australia with the more coercive and prescriptive approaches used in the U.S. They also focus on how the different regimes influence choices by local governments about land use and development in areas subject to natural hazards. Separate chapters are devoted to growth management in Florida, resource management in New Zealand, and flood management in New South Wales. Other chapters describe how policy design is implemented, the role of regional governments, policy compliance and innovation at the local planning level, strategies for sustainable development, and examine the outcomes of cooperative policies.

Mazmanian, Daniel A. and Michael E. Kraft, eds. 1999. *Toward Sustainable Communities: Transition and Transformations in Environmental Policy*. Cambridge, MA: The MIT Press. 322 pp.

This book reviews and assesses environmental policy over the past three decades, primarily in the United States but with implications for other nations. The editors place U.S. environmental policy within the framework of the transition from 1970s-era policies that emphasized federally controlled regulation, through a period of criticism and efficiency-based reform efforts, to an emerging era of sustainability in which decisionmaking takes place increasingly at the local and regional levels. The book looks at what does and does not work and how social, economic, and environmental goals can be integrated through policy strategies ground in the concept of sustainability.

McElfish. 1999. *Sustainability in Practice*. Washington, D.C.: Environmental Law Institute Research Publications.

As sustainable development becomes one of our nation's top priorities, how are U.S. communities envisioning and implementing their sustainability goals? This report identifies trends in community sustainable development efforts based on nearly 600 applications for the U.S. Environmental Protection Agency's Sustainable Development Challenge Grant Program. It features a variety of charts and graphs that identify popular subject areas, partnerships, the urban and rural breakdown, tools, and goals of these projects. It also includes descriptions of funded projects.

Mileti, Dennis S. 1999. *Disasters by Design*. Washington, D.C.: The Joseph Henry Press. 351 pp. Available at [books.nap.edu/catalog/5782.html](http://books.nap.edu/catalog/5782.html). [accessed September 21, 2001]

This book is a summary volume of the Second National Assessment of Research on Natural Hazards with the formal mission of summarizing what is known in the various fields of science and engineering that is applicable to natural and related technological hazards in the United States, and making some research and policy recommendations for the future. It summarizes the hazards research findings from the last two decades, synthesizes what has been learned, and outlines a proposed shift in direction in research and policy for natural and related technological hazards in the United States. *Disasters by Design* is intended for a general audience, including policy makers and practitioners.

National Research Council. 1999. *Our Common Journey: A Transition toward Sustainability*. Washington, D.C.: National Academy Press. 363 pp.

This report of the National Academy of Sciences' three-year Global Commons Project documents large-scale historical currents of social and environmental change and reviews methods for "what if" analysis of possible future development pathways and their implications for sustainability. The book also identifies the greatest threats to sustainability—in areas such as human settlements, agriculture, industry, and energy—and explores what the Board perceives to be the most promising opportunities for circumventing or mitigating these threats. It goes on to discuss what indicators of change, from childrens' birth-weights to atmospheric chemistry, will be most useful in monitoring a transition to sustainability.

North Carolina Emergency Management Division and Federal Emergency Management Agency. 2000. *Hazard Mitigation in North Carolina: Measuring Success*. Raleigh, NC.

To accelerate the institutionalization of hazard mitigation in North Carolina, the North Carolina Emergency Management Division established the Hazard Mitigation Planning Initiative, a long-term program to build local capacity to implement mitigation policies and programs in communities across the state. Through a series of case studies, this study documents losses avoided as a result of the implementation of a wide range of mitigation measures, including elevations and the acquisition and relocation or demolition of floodprone properties.

Schwab, Jim; Kenneth C. Topping, Charles C. Eadie, Robert E. Deyle, and Richard A. Smith. 1998. *Planning for Post-Disaster Recovery and Reconstruction*. PAS Report No. 483/484. Chicago, IL: American Planning Association. 346 pp. Abstract available at [www.planning.org/apapubs/details.asp?Num=1178](http://www.planning.org/apapubs/details.asp?Num=1178). [accessed September 21, 2001]

This document helps community leaders and planners educate their constituents on how informed decisions and choices can affect the rebuilding process and yield a safer, more sustainable community. This report introduces planners to their roles in post-disaster reconstruction and recovery, and provides guidance on how to plan for post-disaster reconstruction side by side with all other players involved. A key theme throughout this report is to rebuild to create a more disaster-resilient community. The report contains many references to technical resources.

U.S. National Science and Technology Council. 1994. *Technology for a Sustainable Future: A Framework for Action*. Washington, D.C.: U.S. National Science and Technology Council. 154 pp.

This report summarizes the Clinton White House's plan for developing a comprehensive environmental technology strategy. It examines the use of environmental technologies to facilitate long-term environmental, energy, and economic goals and asks for suggestions for improving federal policies related to advancing environmental technologies. It includes a section on technology needs for natural disaster reduction. The document also provides examples of avoidance, monitoring and assessment, and remediation and restoration. Appendices contain lists of federal sources for agency offices (names, contact information) and online data resources.

U.S. President's Council on Sustainable Development. 1997. *Sustainable Communities Task Force Report*. Washington, D.C.: U.S. Government Printing Office. 186 pp.

This report and its companion volume, *Sustainable America: A New Consensus for Prosperity, Opportunity, and a Healthy Environment for the Future*, published in 1996, lay out a set of policy recommendations for planning for sustainable communities. One of the recommendations is to "shift the focus of the federal disaster relief system from cure to prevention." The appendix contains case studies of communities that have set forth sustainability principles, profiles of communities in the 50 states, state-led sustainability initiatives and organizations, and a list of resources for sustainable communities.

Wilhite, Donald, Deborah A. Wood, and Kelly Helm Smith. n.d. *Planning for a Sustainable Future: The Case of the North American Great Plains*. IDIC Technical Report Series 95-1. Lincoln, Nebraska: International Drought Information Center.

The participants at this symposium addressed the complex economic, social, and environmental issues facing the Great Plains region in anticipation of climate change in the years to come. In addition to essays on sustainable development and global change policies, the volume contains four case studies that deal with sustainable land use, education and research agendas, the Groundwater Guardian Program, and the use of reverse engineering to enhance the lessons learned over the past eight decades. Also included are focus group reports on agricultural production, land and water resources, human and community resources, biological resources and biodiversity, and integrated resource management.

World Bank. 1994. *Making Development Sustainable*. Environmentally Sustainable Development Occasional Papers Series. Washington, D.C.: The World Bank: The International Bank for Reconstruction and Development. 270 pp.

Eight essays attempt to capture current thought on a number of key conceptual, methodological, and practical issues. The authors cover poverty and the environment; gender and ecosystem

management; the sociologist's, economist's, and ecologist's approaches to sustainable development; the integration of environmental concerns into development policy making; the World Bank's agenda for the environment; and an epilogue regarding the expansion of capital stock.

World Commission on Environment and Development. 1987. *Our Common Future*. Oxford, UK: Oxford University Press.

In 1983, the World Commission on Environment and Development was asked by the United Nations General Assembly to formulate "a global agenda for change." This document, also known as the Brundtland Report, is the report of the Committee chaired by Gro Harlem Brundtland. The Committee undertook to: 1) propose long-term environmental strategies for achieving sustainable development by the year 2000 and beyond; 2) recommend ways concern for the environment may be translated into greater cooperation among developing countries and between countries at different stages of economic and social development and lead to the achievement of common and mutually supportive objectives that take account of the interrelationships between people, resources, environment, and development; 3) consider ways and means by which the international community can deal more effectively with environmental concerns; and 4) help define shared perceptions of long-term environmental issues and the appropriate efforts needed to deal successfully with the problems of protecting and enhancing the environment, a long-term agenda for action during the coming decades, and aspirational goals for the world community.

## Additional Reading

Beatley, Timothy. 1995. *Planning and Sustainability: The Elements of a New (Improved?) Paradigm*. HRRC Publication No. 132A. College Station, TX: Texas A&M University, College of Architecture, Hazard Reduction & Recovery Center. 13 pp.

Berke, Philip R., Jack D. Kartez, and Dennis E. Wenger. 1993. "Recovery after Disaster: Achieving Sustainable Development, Mitigation and Equity." *Disasters* 17(2):93-109.

Clark, William C. 2001. "America's National Interests in Promoting a Transition to Sustainability: Issues for the New U.S. Administration." *Environment* 43(1)(January/February):18-27.

Reid, David. 1995. *Sustainable Development: An Introductory Guide*. London: Earthscan Publications. 261 pp.



## THE DISASTER RECOVERY PROCESS

---

Disaster recovery is viewed by some people as a fight against Mother Nature to restore order in a community. However, the disaster recovery *process* is *not* a set of orderly actions triggered by the impact of a disaster upon a community. Rather, disaster recovery is a set of loosely related activities that occur before, during, and after a disastrous event. These activities can include:

- warning and ongoing public information
- evacuation and sheltering
- search and rescue
- damage assessments
- debris clearance, removal and disposal
- utilities and communications restoration
- re-establishment of major transport linkages
- temporary housing
- financial management
- economic impact analyses
- detailed building inspections
- redevelopment planning
- environmental assessments
- demolition
- reconstruction
- hazard mitigation and
- preparation for the next disaster.

When disaster strikes, response activities and recovery activities are often uncoordinated, occur concurrently and, on occasion, overlap or conflict with one another. Often, management responsibility for these activities will be assigned to people unfamiliar with them. Decisions affecting community welfare—some of which may have long-lasting impacts—will have to be made under intense pressure and scrutiny, and it will be impossible to take into account the views of all the pertinent stakeholders. One consequence is that the community may miss opportunities to improve its infrastructure, economy, environment, or quality of life.

The ideal disaster recovery *process* recognizes the possibilities of the situation, and manages the necessary activities so that they are solutions, not additional problems. A community should strive to fully coordinate available assistance and funding while seeking ways to accomplish other community goals and priorities, using the disaster recovery process as the catalyst.

This *ideal* disaster recovery process is one where the community proactively manages:

- Recovery and redevelopment decisions to balance competing interests so constituents are treated equitably and long-term community benefits are not sacrificed for short-term individual gains;

- Multiple financial resources to achieve broad-based community support for holistic recovery activities;
- Reconstruction and redevelopment opportunities to enhance economic and community vitality;
- Environmental and natural resource opportunities to enhance natural functions and maximize community benefits; and
- Exposure to risk to a level that is less than what it was before the disaster.

This ideal disaster recovery process is consensus-based and compatible with long-term community goals, and takes into account all the principles of sustainability described in Chapter 1. It will have both immediate and lasting impacts that are self-supporting, and will make a community better off than before. It is a *holistic disaster recovery*. Holistic disaster recovery is becoming the next step in a logical progression. If we include sustainability within the multi-objective mitigation we already incorporate during disaster recovery, it can become equally accepted and equally successful. Holistic disaster recovery *does not differ* from “normal” disaster recovery—it is *part* of what should be “normal” disaster recovery. A “good” recovery *is* a holistic recovery—one that considers the community’s best interests overall, by including the principles of sustainability in every decision.

The question is, “How does one make a holistic disaster recovery happen?” How can a decisionmaker reshape a process that operates within an emotional, reactionary, time-sensitive, expensive, and politically charged atmosphere that is based upon incomplete information, disproportionate needs, and the worst working conditions imaginable?

There are two important steps to get a community started. The first is identifying and understanding the obstacles that prevent a holistic disaster recovery from occurring. Second, a community needs to form and adopt new strategies, including the holistic disaster recovery framework and process, that coordinate, lead, and manage post-disaster decisions in a way that starts to overcome these obstacles.

## **GETTING STARTED: PLANNING FOR DISASTER RECOVERY**

Disaster recovery actually begins *before* a disaster occurs. Emergency managers refer to this as *preparedness*—that phase during which people get ready for the onslaught and aftermath of disaster with activities such as warning, evacuation, and sheltering. In disaster-prone regions, it is even common for debris removal, utility restoration, and the management of donations and volunteers to be preplanned. These pre-disaster activities have a dramatic impact upon a community’s ability to respond to, and recover from, a disaster.

*A community’s response to a disaster lays the groundwork* for both short-term and long-term recovery. For example, to re-establish power quickly, downed lines are often immediately re-strung on the poles, rapidly re-established the pre-existing risk with little or no thought as to why the power lines came down (quite often because trees fell across them) or why the poles



themselves failed (were they blown down, broken by wind, or undermined by erosion?). An opportunity has thus been missed to “underground” the power lines to protect from future similar events or improve aesthetics. By studying some of the mitigation options before disaster strikes a community is better prepared for recovery. Decisionmaking could take place in a less-fettered environment, with appropriate funding, public input, and cost-benefit analysis.

*If a community fails to adequately respond to a disaster, its credibility suffers.* This loss of credibility can become a barrier to implementing a holistic disaster recovery. If a local government cannot re-establish power quickly, or clear the roads of debris from an event that they “should have known” would occur sooner or later, then how can that same government expect its constituents to believe in its ability to manage more complex long-term recovery issues?

Communities that are serious about disaster recovery tend to focus first on improving response activities (warning, evacuation, power restoration, debris management) before the more advanced concepts of holistic recovery. In the immediate post-disaster period, people often think that mitigation activities may not work, or that coupling community improvements with repairs may be too expensive, too disruptive, or take too long. Unfortunately, it is within this same time frame that decisions affecting repairs and restoration are made, and thus the opportunity to integrate the principles of sustainability into the recovery process is lost.

Holistic disaster recovery is about change. Because the disaster recovery process begins before the disaster, the best chance to foster post-disaster change is to include sustainability issues in local pre-disaster planning. The six principles of sustainability can be integrated into post-disaster plans, but there is a better chance for implementation—because of timing and a less-pressured decisionmaking environment—if they are addressed beforehand. This concept has been called pre-event planning for post-event recovery (PEPPER) first advanced in the 1980s (Spangle, 1987).

### Planning for Recovery

In 1981, Nags Head, North Carolina, began addressing its severe exposure to coastal storms and subsequent erosion by developing a post-disaster recovery plan that included a Recovery and Reconstruction Task Force *with identified pre- and post-disaster responsibilities*, including building moratoriums and reconstruction priorities and guidelines. The controversial nature of this effort is best demonstrated by its 1989 adoption date, *eight years* after discussions were initiated.

In 1990-91, Hilton Head, South Carolina, developed its Pre-Disaster Recovery & Mitigation Plan as a means of avoiding the similar controversies its neighboring communities faced while recovering from Hurricane Hugo in 1989. Over the next decade, Hilton Head wisely focused its efforts on stormwater and floodplain management, which posed more frequent and disruptive problems than the occasional major hurricane.

In communities that endure repeated disasters, *after* one disaster is the same as *before* the next. Thus, the increased awareness created by the last disaster can provide impetus for pre-disaster planning for the next one, including the opportunity to incorporate sustainability in the next recovery.

## **RECOGNIZING SHORT-TERM AND LONG-TERM DISASTER RECOVERY**

Usually, communities think of preparing for a disaster *before* its onset, and response and recovery as activities for *after* the disaster. However, sometimes communities do respond before disaster happens. For example, in predictable events, like slow-rise riverine flooding or most hurricanes, there is time to notify people of the impending danger, take some protective measures, and evacuate safely. Response actions are taken before anything happens. Doing so lessens the need to respond further, and lessens some of the elements of short-term recovery that might otherwise be necessary.

Traditional, post-event disaster recovery occurs in phases—short-term and long-term.. Search and rescue, damage assessments, public information, temporary housing, utility restoration, and debris clearance are essential elements of short-term recovery. How they occur will affect how some longer-term decisions are made (or not made).

Long-term recovery begins when a community starts to repair or replace roads, bridges, homes, and stores. It is also the period where improvement and changes for the better such as strengthening building codes, changing land use and zoning designations, improving transportation corridors and replacing “affordable housing” stock are considered. Whether they are considered during pre-disaster planning or short-term post-disaster recovery, it is during the long-term recovery period that most changes in pre-existing conditions can and do occur. Changes that include sustained efforts to reduce loss of life and property from the next disaster, such as changes to building codes and land use designations are examples of mitigation (discussed in more detail in Chapter 8). Changes such as improving traffic circulation or supplementing affordable housing units are examples of improvements in a community’s quality of life (see Chapter 4), and there are many other kinds of changes that can take place during long-term recovery.

### **Different Perspectives on Disaster Recovery**

It is important to recognize that not everyone within a community will have the same perspective or understanding of disaster recovery. The issues discussed thus far are presented from a “community recovery” point of view, that is, the activities that need to be managed in order for a local government to recover to an equal or improved state. However, there are also perspectives of the individual and of community economics that need to be taken into account.

The individual perspective is important because as a community starts its recovery, most people are recovering emotionally, and this takes place at a slower pace than the external, community recovery. Communities respond quickly, and with increasing resolve to re-establish utilities, provide access, and create reconstruction policies. Individuals experience a short period of cohesion during which people come together to help and comfort each other, followed by a longer period of disillusionment as personal, family, job, insurance and disaster assistance issues begin to take their toll. The result is that constituents and stakeholders that are subject to the decisions being made on their behalf are in “a different place.” This creates a “disconnect” between

community recovery and individual recovery that leads to frustration, misunderstanding, and disillusionment.

Similarly, there is an economic perspective that differs from both that of the community and the individual. It is this economic perspective that highlights the interrelationship and interdependency between local governments and the business community. Businesses, from small “mom-and-pop” to “big box” national chains, are primarily concerned with minimizing their down time. The businesses often reach out to their employees to help them recover as individuals, because they need them as employees to help manage the business recovery. People forced to stand in line for water and ice, insurance appointments, and disaster assistance find it difficult to return to work to help their “other family” at the same time.

Eight months after a wildfire disaster, the Los Alamos County (New Mexico) government busily adopted changes to the location of utilities, zoning designations, and building codes. The residents affected by the fire, however, were becoming increasingly frustrated as disaster claims remained unresolved, code changes required reconstruction design modifications, utility restoration forced neighborhood roads to be dug up (complicating access and construction), and personal losses continued to become apparent. The County was acutely aware of these circumstances, however, and through concentrated and ongoing communications that made use of newsletters, “survivor” meetings, and the County website, minimized a difficult situation.

There is also an increased reliance of business upon local government. Without access to their facility, or power and water to run equipment and bathrooms, their recovery is hindered. Conversely, the longer it takes for businesses to recover, the greater the problems for local government (unemployment, loss of sales taxes, loss of business services, etc.).

Everyone in the community has a stake in disaster recovery, and the differing perspectives and interdependencies of individuals, government and business can create conflicts over priorities and timing. Local politics can also become a barrier to the holistic recovery. It is important to recognize the differing perspectives and agendas in order to tailor recovery actions that address those needs as much as possible.

## NINE OBSTACLES TO HOLISTIC RECOVERY

There are lots of obstacles to a successful recovery. Although they will not necessarily prevent a holistic recovery, they can slow the process down, and create sidetracks for the unaware. If they are ignored they can become barriers to achieving successful holistic recovery.

**The degree of damage inflicted upon the community.** After Presidential disaster declarations, programmatic funding rules and applicable codes and standards (building codes, infrastructure design standards) will drive the decisions to repair or replace the damaged facilities and affect a community’s ability to make changes. When facilities require full replacement there are often more alternatives to correct poor decisions in the past than there would be if only slight repairs are needed.

## MAXIMS FOR DISASTER RECOVERY

### **Disaster recovery is not easy.**

The operating procedures of critical recovery agencies will be unfamiliar.  
The community will be understaffed.  
The issues will be complex, changing and fueled by competing interests.  
There is never enough time.  
There is never enough money.  
Decisionmakers and their families will likely be victims themselves.

### **Disaster recovery will take years.**

During the first weeks the community will address emergency actions.  
During the first months it will address restoration of community services.  
During the first months and for years thereafter it will address rebuilding, replacing and improving what was lost and addressing financial, political, and environmental issues.

### **Disaster recovery programs and procedures seem like "moving targets."**

Disaster assistance policies are frequently changed, amended, or replaced.  
Political interests often respond with additional, supplemental assistance.  
Different programs from different agencies often don't mesh well.

### **There are many possible outcomes to disaster recovery.**

Re-creating pre-disaster level of services and quality of life is not guaranteed.  
Local, state and federal regulations define boundaries for recovery options.  
Local leadership and "vision" are determinants of the recovery outcome.  
There is a "silver lining." Many communities, in retrospect, feel their disaster was the catalyst for making many improvements through the recovery process that otherwise may never have occurred.

### **There is a lot of help available for disaster recovery.**

Local decisionmakers do not need to re-invent the wheel.  
Help is available from  
State and federal disaster officials  
Decisionmakers from other communities that have been struck by disaster  
Professional organizations (disasters, planning, engineering, service)  
Disaster recovery consultants.

### **Having experienced a disaster does not make a community immune.**

If it happened once, it can happen again.  
After one disaster is before the next. The community should start preparing for the next one.  
Decisionmakers should learn from experiences, by evaluating what worked and what didn't.  
Incorporating mitigation into disaster recovery protects a community from the next disaster.  
Decisionmakers should share "lessons learned" and "successes" with others.

**Rules, regulations, and policies.** On the positive side, funding made available through government disaster relief programs provides the wherewithal to jump-start the recovery process. However, the rules, regulations, and policies that accompany the funding can often alter priorities, limit opportunities, and curtail creative solutions.

**Other “money” issues, such as property rights, development, insurance, land use, and substandard housing.** These broadly connected issues can affect how and when communities make recovery decisions. For example, after a flood, a community may identify an opportunity to enhance economic development, natural resource protection, and the quality of life by limiting redevelopment in certain areas. The idea of establishing a river-front park that combines flood loss reduction with a pedestrian/bicycle corridor and public access for picnicking, fishing, and boating is becoming commonplace. But communities are often surprised to discover that many owners of flooded homes not only want to return to their river-front vistas, but also intend to take the opportunity to replace the structures with larger, more modern units.

In other cases, damaged floodprone property often represents the least desirable housing in the community due to its location, repetitive damage, and decreasing property values. Here, otherwise unaffected property owners may choose to “fight” any redevelopment plan, arguing that government should not help those that knowingly chose that risk to begin with.

**The propensity to strive for “a return to normal.”** Proposed post-disaster changes in land use, building codes, densities, infrastructure, property ownership, and redevelopment plans always take time. This is often seen as an unnecessary delay in what otherwise would be a recovery “back to normal,” and can be an obstacle to utilizing recovery opportunities for community improvement. It is at this point that the concept of pre-disaster planning for post-disaster redevelopment makes the most sense to everyone involved. People say, “If we’d only figured this out *before* the disaster, it would be so easy to rebuild and recover to an improved state—but now, since this all takes so long, maybe we’d be better off if we just put things back the way they were. Then we can look at making plans for recovering from the next disaster if we still want to.”

**A lack of awareness of what the true redevelopment possibilities are.** People are not aware of how other communities have made substantial community improvements by using a disaster to initiate the process. Others are more concerned with their own personal world than with the “bigger picture” of community betterment, and it is difficult to change their primary focus without significant pre-planning, coordination, leadership, political will, and some vision of an improved future.

**The immediate change in the roles and procedures of local government officials.** Post-disaster government roles, procedures, and priorities change, often requiring different mixes of skills than those to which officials are accustomed. Job functions change, workloads increase dramatically, and the work involves new players, new terminology, and even new structures, such as Incident Command or State Emergency Management Systems. Additionally, public scrutiny and political pressure reach new plateaus as local officials try to maintain the day-to-day functions that government normally provides.

**Searching for the extraordinary solution to what appears to be an extraordinary problem.**

Most “extraordinary problems” are actually problems that governments deal with routinely: picking up debris, conducting building inspections, planning, permitting new development, managing grants and loans, and providing public information. The situation becomes extraordinary only because all these functions are happening at the same time, and with greater demands. Communities need to break down the problems into those that they are already accustomed to resolving, and then use the standard procedures to do so. Otherwise, the search for the extraordinary solution will only slow them down.

**The lack of systematic communication between decisionmakers, various departments and agencies, and stakeholders.** Communities can develop a mechanism that ensures that the principles of sustainability are incorporated into each and every decision faced every day by communities. There needs to be a comprehensive, on-going, systematic series of check-points at which every decision is weighed against its impact on hazard vulnerability, economic vitality, environmental preservation, quality of life, and social justice. Unless this occurs, few decisions are analyzed to the extent that their direct and indirect consequences can be foreseen.

**The lack of political will to “do the right thing.”** Addressing the needs of those impacted by disaster and determining methods to prevent a recurrence are often goals unintentionally sacrificed for the lack of appropriate support. When public decisions are swayed by the immediacy of constituent needs, pre-existing conditions are often re-established. Local leaders must define a vision of the future, provide the direction to get there, and establish the priorities to make it happen. They must develop and create a will that is infectious among community politicians and constituents alike. Disaster recovery managers must juxtapose short-term and long-term community needs against the “quick and easy fix” or the perceived rights of select property owners. They must protect the health, safety, and welfare of the community from the desires, power, and influence of those who promote short-sighted solutions. They need to foster personal and community responsibility for recovery decisions that will affect their community for years to come.

## **SEVEN ENABLERS FOR HOLISTIC DISASTER RECOVERY**

The key attributes and tools that have transformed hazard mitigation into a common post-disaster activity are leadership, ownership, vision, political will, mandates, incentives, and resources. These are the same ingredients that will enable communities to achieve holistic disaster recovery.

The concept of disaster recovery as helping communities replace what they had has evolved to mean helping communities prepare and protect themselves from enduring preventable, repeated losses. The Federal Emergency Management Agency (FEMA) helped fashion this change by conditioning disaster assistance upon the requirement to undertake mitigation planning. Substantial financial and technical resources followed up this requirement to help implement the plans, and training on what to do and how to do it followed these resources.

Leadership has changed the way disaster recovery takes place. Community safety and betterment have become standard among post-disaster priorities. The Disaster Mitigation Act of 2000 and

federal initiatives like FEMA's Project Impact helped make these pre-disaster priorities. Incentives have stimulated communities to undertake the additional efforts required. Here are a few "enablers" for holistic disaster recovery, and how they might be utilized.

**Stakeholder perception** Be aware of every person, business, agency, and organization that may be affected by a potential decision and include them in the decisionmaking process. Some may benefit directly from the action being taken, while others may benefit from the multi-objective element of the action. For example, a detention pond that contains a playground within its boundaries may provide protection to some, and recreation opportunities to others. From a holistic recovery perspective, the detention pond may also contribute to improved water quality, wildlife habitat, and protect downstream businesses from being flooded. Build as wide a supporting constituent base as possible and include them in the decisionmaking process. (Participatory processes are discussed in Chapter 3.)

**Political will** is the willingness to analyze the issues, evaluate the alternatives, and protect the long-term public interest over short-term goals. It is the willingness to make the tough decision, to maintain the overall focus, and to get the job done.

**Authority** is the ability to use appropriate tools to support the needs of the community. Making development changes in a community can be difficult and controversial for those with the authority to implement change. Not having the state-empowered local authority to act (e.g., adopting land use measures) is one thing. Failure to act is another.

**Funding.** When funding was scarce, dollars that became available for recovery and redevelopment often drove the decisions about what to do. If it were a case of having funds to take one action, versus having no funds to do anything else, communities commonly took the one "eligible" action, often without a full evaluation of its impacts. Now, funding is more readily available, providing greater flexibility in community choices. This supports taking a preferred action but it also increases the need to undertake a comprehensive evaluation of the proposed action's intended and unintended consequences.

**Priority** allows a community to order its actions to maximize their outcomes. In holistic disaster recovery, establishing priorities allows communities to "double up" on other goals, e.g., affordable housing, access to recreation, or improved transportation corridors. Assigning a weighted decisionmaking factor capitalizes upon additional and non-traditional disaster recovery resources, while maintaining an overall implementation framework. This could range from deciding which actions to take in which order, to establishing other priorities. For example, many communities now recycle over 90% of their disaster debris. This not only eliminates replicating and draining resources, it greatly diminishes waste by keeping it from being landfilled.

**Vision.** It has been said that you can't get somewhere if you don't know where you are going! Creating a vision of where a community wants to "be" in the future provides direction that would be otherwise lacking in recovery from disaster. With a vision of the future, the community can use disaster recovery to reduce its pre-disaster vulnerability while improving overall quality of life and other aspects of sustainability.

**Community endorsement.** Community support or “buy-in” builds public expectations and confidence. Multiple benefits are difficult for people to perceive or accept, particularly if others obscure the one they are most interested in. Promoting multiple objectives and benefits broadens constituent support.

## PLANNING FOR HOLISTIC RECOVERY

Holistic disaster recovery is not going to occur by itself. In the ideal disaster recovery, a community’s goals for economic development environmental protection, disaster resilience, and other issues would have been coordinated through comprehensive planning that was done ahead of time. There are several ways for a community to do this.

### Comparing Planning Approaches

Experience has demonstrated that a key to successful hazard mitigation is multi-objective planning. The multi-objective opportunities commonly identified during hazard mitigation planning resemble the principles of sustainable development and “smart growth,” the name given to state-of-the-art community planning strategies. Planning—whether it be for “smart growth,” sustainable development, or hazard mitigation—adopts similar goals, takes similar approaches, and faces similar barriers. Below are listed the principal elements of each of these three community planning approaches.

### Three Approaches to Community Planning

Sustainability	Hazard Mitigation	Smart Growth
Quality of Life	Planning	Comprehensive planning
Economic vitality	Avoidance	Compact urban areas
Social & intergenerational equity	Strengthening	Mixed land use
Environmental quality	Conserving	Transportation options
Disaster resilience	Limiting	Staged infrastructure
Participatory process	Communication	Human-scale design
		Predictable development review



## Recovery Planning during Recovery

The foregoing discussion assumes that a community either has enough foresight to pre-plan its recovery, or that it has been repetitively impacted to the extent that a real threat is perceived. Most often, though, communities begin their involvement with recovery planning after a disaster.

Most communities complete their recovery and mitigation plans in the post-disaster setting by following FEMA's mitigation planning initiatives, requirements, and incentives. They are advised to follow what has become known as the "10-step mitigation planning process." This is the same planning process that is recommended in the guidance for the National Flood Insurance Program's Community Rating System, and also is recognized for some U.S. Army Corps of Engineers local flood control initiatives. The process is described in easy-to-understand detail, from a flood mitigation perspective, in *Flood Mitigation Planning: The CRS Approach*, by French Wetmore and Gil Jamieson, listed in the References list at the end of this chapter.

Even if the community is not preparing a formal recovery plan, the 10-step process is a useful guide to action.

Holistic disaster recovery can be incorporated into this process as follows.

**In Step 1—Get organized** the community can demonstrate its commitment to the process through the resources it provides for the planning process. This is where the holistic disaster recovery concept can be

introduced, by encouraging appropriate staff and citizen input that reflects the principles of sustainability: environment, economic development, and disaster resilience.

**In Step 2—Involve the public**, the sustainability principle of using a participatory process is readily addressed by including the stakeholders directly. See Chapters 3 and 6 for more discussion of who to include and how to do it.

**In Step 3—Coordinate with other agencies, departments, and groups** a community can expand representation on the central recovery committee or task force to include those who can contribute expertise on each of the principles of sustainability. This could include state or local parks or wildlife departments, economic development directors, the business community, or social services personnel, for example.

**In Step 4 —Identification of problems** the community is facing, and **Step 5—Evaluate the problems** that conditions cause are described. Recovery team members should consider how the potential impacts might affect economic activities, natural resources, the overall quality of life,

### The 10-Step Process for Local Planning and Action

1. Get organized.
2. Involve the public.
3. Coordinate with other agencies, departments, and groups.
4. Identify the problem situation.
5. Evaluate the problem & identify opportunities.
6. Set goals.
7. Explore all alternative strategies.
8. Plan for action.
9. Get agreement on the action plan.
10. Implement, evaluate, and revise.

and people of different ages, races, and economic status. The team should also adopt a long-term viewpoint so that intergenerational equity is considered.

In **Step 6—Goals and objectives** are developed. The recovery team can use the Matrix of Opportunities presented in Chapter 1 to identify and incorporate short- and long-term recovery issues into the evolving plan. Coordination with other community plans and programs at this point can combine disaster recovery issues with existing comprehensive, development, capital improvement, drainage, transportation, housing, and recreation plans. Multiple-objective opportunities give the community the opportunity to establish a coordinated recovery that maximizes available technical and financial recovery resources with pre-planned community goals and objectives.

In **Step 7—Explore all alternatives**, the recovery team reviews the options and tools available to achieve the selected goals and objectives. As part of this review, the six principles of sustainability are included among the criteria that assist the team in deciding which actions to take and in which order. The criteria should clearly identify proposed actions that support sustainability as having high community value. The recovery team needs to be sure that the actions agreed upon do not undermine any of the aspects of sustainability. This step becomes the true litmus test for choosing activities that will help integrate sustainability into the community during its recovery.

Finally, in **Steps 8, 9, and 10, a plan is written, adopted by the elected governing board, and implemented**. Attention to sustainability details in these final steps will set the stage for managing the recovery and ensuring that the community maximizes the opportunities that are created by disaster.

This process does not guarantee that every sustainability principle ends up being addressed in the recovery, but including the principles as decisionmaking criteria ensures that they will at least be considered. The rest of the chapters in this handbook give more details about how to incorporate different aspects of sustainability into the appropriate phases of the 10-step process.

## **MAKING SUSTAINABILITY PERMANENT**

Disaster recovery provides the opportunity to introduce sustainability into a community. There are other ways, to be sure, but the dramatic nature of disasters, and the frequent need to rebuild what has been destroyed, provides an opportunity to substantially improve the character of the community in a manner that rarely presents itself otherwise. However, the principles of sustainability may provide solutions to other problems that exist or that the community may soon be facing. Why should a community wait for a disaster before it pursues sensible objectives?

Sustainability goes far beyond just being an innovative disaster recovery strategy. It can inject the rejuvenating life's blood that so many communities desperately need today. Communities that need this kind of help should consider incorporating sustainability into all development decisions—not just post-disaster re-development.

The most effective way to incorporate sustainability into a community is through adopting a “natural hazards element” within a local comprehensive plan. Following this concept, and the framework for smart growth from which it was derived, would ensure that every development/redevelopment decision made, after a disaster or not, would be subject to the principles of sustainability. Holistic disaster recovery is really “sustainable redevelopment,” which is a subset of a larger issue, sustainable development. As such, communities need to recognize that holistic disaster recovery is not the “end all,” but rather one piece of the pie.

Florida’s 9J-5 rule requires a Disaster Recovery Element in every coastal county’s Comprehensive Plan. While this has yet to be an overwhelming success in terms of its implementation rate, some counties, like Lee County, have taken the requirement seriously and attempted to implement some innovative strategies, such as proposing an Emergency Management Impact Fee to help offset the increased costs of warning, evacuation, and sheltering created by continued development, and proposing the use of the Transfer of Development Rights to create incentives for safer, more sustainable development. Unfortunately, some obstacles have prevented their implementation. On the other hand, this type of pre-disaster planning has set the stage for post-disaster recovery. Lee County, and many others like it nationwide, is only one disaster away from making “the right decisions” the next time.

Disaster recovery provides an opportunity to correct the unsustainable mistakes of the past. Disaster recovery is not, however, the driving force behind implementation of sustainability, nor should it be. Disasters are simply catalysts for change. The post-disaster “window of opportunity” is a time when past mistakes can be assessed, and drawing upon experience, try to demonstrate the way for the future.

## REFERENCES

- American Planning Association, 1994. *Growing Smart Legislative Handbook: Model Statutes for Planning and the Management of Change*. Chicago, IL: APA.
- Association of State Floodplain Managers, Inc. 1996. *Using Multi-Objective Management to Reduce Flood Losses in Your Watershed*. Madison, WI: Association of State Floodplain Managers, Inc. Abstract available at [www.floods.org/PDF%20files/PUBSLIST.pdf](http://www.floods.org/PDF%20files/PUBSLIST.pdf). [accessed September 21, 2001]
- Emmer, R. E. 1994. *Flood Damage Reduction and Wetland Conservation. Three Successful Projects in Louisiana have Common Characteristics*. Topical Paper #6. Madison, WI: Association of State Floodplain Managers, Inc. (September.) 23 pp.
- Spangle, William E., ed. 1987. *Pre-Earthquake Planning for Post-Earthquake Rebuilding (PEPPER)*. Los Angeles, CA: Southern California Earthquake Preparedness Project.
- Wetmore, French and Jamieson, Gil. 1999. "Flood Mitigation Planning: The CRS Approach." *Natural Hazards Informer 1* (July). Boulder, CO: Natural Hazards Research and Applications Information Center. Available at [www.hazards.colorado.edu/hazards/informer/index.htm](http://www.hazards.colorado.edu/hazards/informer/index.htm). [accessed September 21, 2001]

## WHERE TO FIND MORE INFORMATION

### Training Courses and Workshops

DRI International Education Program. (703) 538-1792; email [driinfo@drii](mailto:driinfo@drii) or [www.dr.org/01sched2us.htm](http://www.dr.org/01sched2us.htm) [accessed June 29, 2001]

- "Introduction to Business Continuity Planning." DRP-111.
- "Managing and Developing the Business Continuity Plan." DRP-112.
- "Implementing and Testing the Business Continuity Plan." DRP-113.
- "Crisis Communication, Coordination, Data Communications." DRP-114.

Federal Emergency Management Agency, Emergency Management Institute, National Emergency Training Center. Emmitsburg, MD. (301) 447-1035; [www.fema.gov/emi](http://www.fema.gov/emi) [accessed June 15, 2001]

- "Introduction to Mitigation." Independent Study Course. Federal Emergency Management Course IS393.  
At the end of the course, the student should be able to: explain the rationale for mitigation and its function as a component of emergency management; define the principles, purposes, and priorities of mitigation; describe mitigation measures that are applicable to local hazard risk problems; summarize responsibilities and resources for mitigation; and outline mitigation planning considerations.

- “Integrated Emergency Management Courses for Specific Communities.” Federal Emergency Management Agency Courses E930/S390, E931/S391, E932/S932. These courses place emphasis on community response and short-term recovery issues. They are tailored to fit the community and are based on a selected hazard type. The courses use classroom instruction, planning sessions, and exercises to allow for structured decisionmaking in a learning, yet realistic, environment. A key outcome is to assist with making the transition from response to short-term recovery. The three classes offered are: E930/S390 IEMC/Community Specific/All Hazards: Response and Recovery; E931/S931 IEMC/Community Specific/Hurricane: Response and Recovery; and E932/S932 IEMC/Earthquake: Response and Recovery.
- “IEMC/All Hazards: Recovery and Mitigation.” Federal Emergency Management Agency Course E901/S901. This course emphasizes recovery and mitigation and is conducted for two types of audiences. The course places public officials and other key community leaders in a simulation that begins after a disaster has affected the community.

Federal Emergency Management Agency, Emergency Management Institute, National Emergency Training Center. Emmitsburg, Maryland. [www.fema.gov/emi](http://www.fema.gov/emi) [accessed June 15, 2001] (301) 447-1035.

- “Mitigation and Recovery Exercises.” Federal Emergency Management Agency Courses G398.1, G398.2, and G398.3. These are 1-day exercises for local building officials, zoning officers, commissioners, councils, and chief executive officers. The exercises provide a series of challenges to a local government that could face a threat from earthquake, flood, or hurricane. The local government will have to solve how it intends to deal with temporary housing issues, building permits, and temporary business locations as well as long-term recovery issues. Courses include: G398.1, Earthquake; G398.2, Flood; and G398.3, Hurricane.
- “Recovery From Disaster.” Federal Emergency Management Agency Course E210. The resident version of this course is designed for local disaster recovery teams. These teams, consisting of emergency managers, elected city/county/parish administrators, public works directors, building inspectors, and community planners, are taught how to develop a disaster recovery plan. Participants are given the opportunity to develop their own recovery plan outline during the course.

## Organizations

### American Planning Association

The APA is a non-profit organization representing “30,000 practicing planners, officials, and citizens involved with urban and rural planning issues. Sixty-five percent of APA's members are employed by state and local government agencies.” APA's mission is to “encourage planning that will contribute to public well-being by developing communities and environments that meet the needs of people and society more effectively.” The website is an excellent source of books about community planning that incorporate the principles of sustainable development.

Through its *Growing Smart Legislative Handbook: Model Statutes for Planning and the Management of Change*, the APA promotes the solution to overcoming the barriers of successful hazard mitigation and holistic disaster recovery. APA has developed a model “Natural Hazards Element” for local comprehensive plans. The model incorporates practices taken from numerous state statutes, combining them to create a mechanism whereby hazard mitigation, a stepping-stone for holistic disaster recovery, may be institutionalized.

See [www.planning.org](http://www.planning.org) [accessed June 15, 2001]

Federal Emergency Management Agency

See “Response and Recovery” at <http://www.fema.gov/r-n-r/> [accessed June 29, 2001] and

“After a Flood: The First Steps” at [www.fema.gov/DIZAS/aftrfld.htm](http://www.fema.gov/DIZAS/aftrfld.htm) [accessed June 29, 2001]

Institute for Business and Home Safety. “Showcase Community Program.”

The Institute for Business and Home Safety’s Showcase Community Program has three objectives: 1) help a community help itself by reducing its vulnerability to hurricanes, earthquakes, tornadoes, wildfires, floods or whatever natural disasters threaten it; 2) generate a “me too” attitude among other communities by showcasing the successful efforts of particular jurisdictions; and 3) learn what works and what does not work to reduce the emotional and financial devastation caused by natural disasters.

See [http://www.ibhs.org/ibhs2/html/ibhs\\_projects/projects\\_showcase.htm](http://www.ibhs.org/ibhs2/html/ibhs_projects/projects_showcase.htm) [accessed September 21, 2001]

Rothstein Catalog on Disaster Recovery.

This is a catalog of books, software, videos, and research reports that date to 1989.

See [www.rothstein.com/catalog.html](http://www.rothstein.com/catalog.html) [accessed June 29, 2001]

## **Books, Articles, and Papers**

Arnold, Christopher. 1993. *Reconstruction After Earthquakes: Issues, Urban Design, and Case Studies*. Palo Alto, CA: Building Systems Development, Inc. 170 pp.

After a major earthquake (1976) devastated the Chinese city of Tangshan, planners decided to build a new reinforced concrete city in a western style that was completely different from the masonry construction of the destroyed city. A visit to Tangshan five years after the quake provided an opportunity for the author to raise questions about the reconstruction process. What are the aspirations of those most closely connected to reconstruction planning? Can planners grasp and realize the opportunities for urban renewal presented by a seismic disaster? To what extent does the threat of future earthquakes dictate the urban design and construction of the new city? Why were cities in earthquake-prone areas so often repaired and rebuilt, when rational planning considerations might suggest that they be abandoned and rebuilt elsewhere? This study explores these questions and attempts to examine the reconstruction process from a qualitative rather than an administrative viewpoint. Most of the study is about city planning and urban design, utilizing five case studies to illustrate the author's perspective: Tokyo (1923 & 1945); Tangshan (1976); Spitak, Armenia (1988); and Santa Cruz, California (1989) .

Association of State Floodplain Managers (ASFPM). 1996. *Using Multi-Objective Management to Reduce Flood Losses in Your Watershed*. Madison, WI: Association of State Floodplain Managers. 72 pp.

This publication explores planning and implementation techniques for multi-objective watershed management. It provides a general introduction to multi-objective management and the planning process that helps a community select the flood-loss reduction measures most suitable to its situation. It explains how to define problems and goals, build partnerships, combine needs and solutions creatively, and begin formal implementation procedures. Both riverine and coastal flood watersheds are examined. Much of the document focuses on multi-objective management planning details, involving subjects such as fish and wildlife issues, water supply, housing improvement, transportation, and lifelines. Preparation of a multi-objective management plan involves problem definition, involvement of non-local groups, and public and official acceptance of the plan.

Bay Area Regional Earthquake Preparedness Project. 1990. *Putting the Pieces Together: The Loma Prieta Earthquake One Year Later*. Oakland, CA: Bay Area Regional Earthquake Preparedness Project. 253 pp.

This report grew out of a conference held to determine the lessons learned from the Loma Prieta earthquake and its aftermath. The conference examined preparedness and mitigation efforts before the quake, political and management issues of disaster response, recovery and reconstruction programs, and mitigation activities since the event. Among the numerous topics addressed in the volume, separate chapters are given to seismological and geological considerations, geotechnical aspects, the performance of lifelines, buildings, and transportation systems and the implications for future design of these elements, effective emergency management, emotional and psychological aftereffects, economic impacts, emergency public information and the media, the restoration of lifelines, emergency medical services, business recovery, and housing reconstruction.

Becker, William S. and Roberta F. Stauffer. 1994. *Rebuilding the Future—A Guide to Sustainable Redevelopment for Disaster-Affected Communities*. Golden, CO: U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Center of Excellence for Sustainable Development. 18 pp.

This document summarizes why sustainability is important and gives an example of sustainable development in one community, Soldiers Grove, Wisconsin. The reader is walked step-by-step through the holistic recovery process. The last chapter discusses real-life problems that the planner may encounter. There is an appendix to the report with a comprehensive list of resources. This document is available online at [www.sustainable.doe.gov/articles/RFTF1.shtml](http://www.sustainable.doe.gov/articles/RFTF1.shtml) [accessed June 15, 2001]

Berke, Philip and David Godschalk. 1996. *Hazard Mitigation in California following the Loma Prieta and Northridge Earthquakes*. Natural Hazard Working Paper No. 14. Chapel Hill, NC: University of North Carolina, Center for Urban and Regional Studies. 59 pp.

This report documents a case study conducted almost six years after the Loma Prieta quake and one and one-half years after Northridge. The strengths and weaknesses of the California 409 Plans are identified, state and federal mitigation planning and implementation processes are reviewed, and local mitigation examples are drawn from San Francisco, Berkeley, Watsonville, and Los Angeles and Ventura counties. One finding was the present mitigation systems (policies



and institutions) will not be adequate to mitigate the impacts of a future major earthquake catastrophe. Two recommendations were that California should pursue a coordinated, interdisciplinary effort to further the understanding of earthquake prediction and of earthquake impacts and should reinvigorate efforts to mandate local multi-hazard mitigation planning before and after a disaster.

Comerio, Mary C., John D. Landis, Catherine J. Firpo, and Juan Pablo Monzon. 1996.

“Residential Earthquake Recovery: Improving California’s Post-Disaster Rebuilding Policies and Programs.” *California Policy Seminar* 8(7) 11 pp.

Between 1989 and 1994, California suffered 13 presidentially declared disasters, including the Loma Prieta and Northridge earthquakes, leading to major concerns about the disaster recovery process. This report examines the current state of earthquake recovery practice in California, particularly as it relates to housing. The authors examine the complementary and overlapping roles of different federal, state, private, and nonprofit recovery and rebuilding institutions, as well as the distribution of post-Northridge rebuilding funds. They conclude that relatively little preparation has gone into coordinating and paying for postdisaster rebuilding, and that victims cannot expect private insurers or the federal government to compensate them at a level of assistance comparable to that following the Northridge quake. In particular, the authors conclude that linking earthquake mitigation, particularly residential retrofitting, to assistance holds significant potential for reducing rebuilding costs.

Federal Emergency Management Agency. 1997. *Framework for Federal Action to Help Build a Healthy Recovery and Safer Future in Minnesota, North Dakota, and South Dakota.*

Washington, D.C.: Federal Emergency Management Agency.

This document identifies and explains the wide range of grants, loans, and technical assistance that the federal government can offer to ensure the recovery needs of people and communities. Although the document summarizes these programs for the states of Minnesota, North Dakota, and South Dakota, the descriptions are applicable to other areas recovering from flooding. Programs summarized include: comprehensive flood hazard mitigation; housing repairs, rehabilitation, reconstruction, and replacement financing; the National Flood Insurance Program; economic recovery programs; agriculture programs, infrastructure programs; health and mental health programs; and programs for special needs populations.

Federal Emergency Management Agency. 1999. *Federal Response Plan.* Washington, D.C.:

Federal Emergency Management Agency.

This document is the principal organizational guide for defining the roles and responsibilities of the 26 federal member agencies and the American Red Cross that are engaged to deliver a broad range of emergency aid during a major crisis.

Federal Emergency Management Agency. 2000. *Rebuilding for a More Sustainable Future: An Operational Framework.* FEMA Report 365. Washington, D.C.: Federal Emergency Management Agency. Available at [www.fema.gov/mit/planning\\_toc2.htm](http://www.fema.gov/mit/planning_toc2.htm). [accessed September 21, 2001]

This document provides guidance to the Federal Emergency Management Agency (FEMA) Sustainability Planner in the post-disaster response and recovery process. State emergency management officials, local jurisdictions, and other FEMA staff may also use it as a reference during non-disaster time.



French and Associates, Ltd. and The Mitigation Assistance Corporation. 1994. *Post-Flood Recovery Assistance Plan. A Plan to Help Residents Recover from a Flood and Protect Themselves from Future Floods*. Arvada, CO: City of Arvada, Colorado, Department of Public Works, Engineering Division.

This plan was developed to guide the City of Arvada's actions to help residents after a flood, to assist them in both recovering from the damage and taking steps to protect themselves from future floods. It is based on successful strategies undertaken by other communities that have had similar flooding experiences.

Godschalk, David and Timothy Beatley. 1996. *Hazard Mitigation in Iowa Following the Great Midwest Floods of 1993*. Natural Hazard Working Paper No. 10. Chapel Hill, NC: University of North Carolina-Chapel Hill, Center for Urban and Regional Studies. 31 pp.

The report examines how the Stafford Act influenced recovery in eight localities in Iowa. Questions explored include: What constitutes mitigation? Who is in charge after a disaster occurs? What good is the 409 (Stafford) Plan? Who pays for disasters? Other topics considered include grant administration accountability, equity issues, the promotion of sustainable communities, and problems caused by confusing rules and guidance.

Mileti, Dennis S. 1999. *Disasters by Design*. Washington, D.C.: The Joseph Henry Press. 351 pp. Available at [books.nap.edu/catalog/5782.html](http://books.nap.edu/catalog/5782.html). [accessed September 21, 2001]

This book is a summary volume of the Second National Assessment of Research on Natural Hazards with the formal mission of summarizing what is known in the various fields of science and engineering that is applicable to natural and related technological hazards in the United States, and making some research and policy recommendations for the future. It summarizes the hazards research findings from the last two decades, synthesizes what has been learned, and outlines a proposed shift in direction in research and policy for natural and related technological hazards in the United States. *Disasters by Design* is intended for a general audience, including policy makers and practitioners.

Minnesota Department of Public Safety. *Recovery From Disaster Handbook*. St. Paul, MN: State of Minnesota. Available at [www.dem.state.mn.us/publications/Recovery\\_Handbook/index.html](http://www.dem.state.mn.us/publications/Recovery_Handbook/index.html) [accessed July 23, 2001]

This handbook provides local units of government with guidance in long-term recovery after a disaster. The restoration process places great demands on government and the private sector. This manual will lessen the stress by providing answers and advice to many questions that arise from those who have dealt with recovery from disasters. Tool kits at the end of each chapter provide additional information specific to individual topics, some forms, and information to share with the victims of the disaster as they recover.

Mittler, Elliott. 1997. *An Assessment of Floodplain Management in Georgia's Flint River Basin*. Boulder, CO: University of Colorado, Institute of Behavioral Science, Natural Hazards Research and Applications Information Center. 190 pp.

On July 3, 1994, Tropical Storm Alberto struck the Florida panhandle and proceeded northeast before stalling just south of Atlanta, Georgia, inflicting over \$1 billion in damage. The flood provided an opportunity to identify and document the successes and failures of state and local floodplain management programs and activities. The author assessed the impact of federal, state,

and local floodplain management activities on losses in the Flint River Basin, paying particular attention to the impact of the National Flood Insurance Program (NFIP) and local floodplain management efforts. He examines previous floodplain studies; evaluates the political situation affecting flood recovery in each community; examines federal, state, and local responses to the disaster, concentrating on recovery plans and the use of hazard mitigation programs to reduce future flood losses; analyzes the effectiveness of the NFIP; and offers a series of findings and recommendations based on the relatively successful recovery programs he found.

Reddy, Swaroop. 1992. *A Study of Long Term Recovery of Three Communities in the Aftermath of Hurricane Hugo*. HRRC Monograph 9B. College Station, TX: Texas A&M University, College of Architecture, Hazard Reduction Recovery Center. 171 pp.

The objectives of this report—a doctoral dissertation—included: 1) to determine the factors that explain the successful adoption of hazard mitigation measures during recovery, 2) to develop a conceptual understanding of the problems inherent in the adoption of mitigation during disaster recovery, and 3) to gain an understanding about the influence of pre-storm institutional regulations on mitigation during the recovery period. The major findings were: the stronger and greater the presence of eight implementation factors in a community, the greater the successful adoption of mitigation measures; local institutional involvement is essential in the successful adoption of mitigation; there is a strong linkage between development management and hazard mitigation; a strong linkage also exists between the protection of coastal resources and coastal hazard mitigation; and the existence of strong pre-storm institutional regulations help local jurisdictions promote the adoption of mitigation during recovery.

Rubin, Claire B. Martin D. Saperstein, and Daniel G. Barbee. 1985. *Community Recovery from a Major Natural Disaster*. Monograph No. 41. Boulder, CO: Natural Hazards Research and Applications Information Center. 295 pp.

The publication describes what was learned by a team that spent four years observing how 14 communities coped with the deleterious effects of disasters. The focus of the research was on the ways in which the local government's activities, as well as its interactions with other levels of government, affected the speed and/or efficiency of recovery. The role of community officials in recovery and post-disaster mitigation, the kind of disaster agent involved, the level of emergency planning and preparedness, the community's sense of itself and its future are all analyzed. Part I of the monograph discusses previous research, describes the design of the study, presents a framework for thinking about recovery, and explains how various elements of that framework affected the actual recovery processes of the communities studied. Part II of the monograph presents case studies.

Schwab, Jim, Kenneth C. Topping, Charles C. Eadie, Robert E. Deyle, and Richard A. Smith. 1998. *Planning for Post-Disaster Recovery and Reconstruction*. PAS Report No. 483/484. Chicago, IL: American Planning Association. 346 pp. Abstract available at [www.planning.org/apapubs/details.asp?Num=1178](http://www.planning.org/apapubs/details.asp?Num=1178). [accessed September 21, 2001]

This document helps community leaders and planners educate their constituents on how informed decisions and choices can affect the rebuilding process and yield a safer, more sustainable community. This report introduces planners to their roles in post-disaster reconstruction and recovery, and provides guidance on how to plan for post-disaster reconstruction side by side with all other players involved. A key theme throughout this report is

to rebuild to create a more disaster-resilient community. The report contains many references to technical resources.

Southern California Earthquake Preparedness Project. 1991. *Earthquake Recovery and Reconstruction Planning Guidelines for Local Governments*. Sacramento, CA: Southern California Earthquake Preparedness Project (SCEPP) and California Governor's Office of Emergency Preparedness. 75 pp.

This document recommends that local governments adopt a planning team approach to anticipate problems associated with community recovery from an earthquake. Following an introductory discussion of earthquake recovery concepts, the guidelines present separate sections dealing with the planning process, rehabilitation and rebuilding, local business recovery, housing displaced persons and families, the restoration of public facilities and services, and financing the recovery process. Recommended actions for local governments are provided for preparedness and mitigation, emergency relief, short-term recovery, and long-term reconstruction phases. Appendices list a set of lessons learned from previous earthquake recovery efforts and reprint California's Disaster Recovery Reconstruction Act of 1986.

Wetmore, French and Gil Jamieson.. 1999. "Flood Mitigation Planning: The CRS Approach." *Natural Hazards Informer* 1 (July). Boulder, CO: Natural Hazards Research and Applications Information Center. Available at [www.colorado.edu/hazards/informer/index.htm](http://www.colorado.edu/hazards/informer/index.htm). [accessed September 21, 2001]

Under the National Flood Insurance Program's Community Rating System, flood insurance premiums are reduced based on a community's floodplain management activities. This issue of *Natural Hazards Informer* reviews the CRS planning criteria and offers some suggestions for implementing a plan locally. It is based on the authors' 40 years of combined experience in flood mitigation planning and the lessons learned by others who have helped refine the CRS criteria.

## Additional Reading

Berke, Philip R. Timothy Beatley, and Clarence Feagin. 1993. *Hurricane Gilbert Strikes Jamaica: Linking Disaster Recovery to Development*. HRRC Article 89A. College Station, TX: Texas A&M University, College of Architecture, Hazard Reduction and Recovery Center. 23 pp.

Berke, Philip R. Jack D. Kartez, and Dennis E. Wenger. 1993. "Recovery after Disaster: Achieving Sustainable Development, Mitigation and Equity." *Disasters* 17(2):93-109.

Eadie, Charles. 1991. *Phases of Earthquake Response and Recovery Planning*. Santa Cruz: CA: Santa Cruz Redevelopment Agency.

Emmer, R. E. 1994. *Flood Damage Reduction and Wetland Conservation. Three Successful Projects in Louisiana have Common Characteristics*. Topical Paper #6. Madison, WI: Association of State Floodplain Managers, Inc. (September.) 23 pp.

Executive Office of the President. 1998. *Federal Programs Offering Non-Structural Flood Recovery and Floodplain Management Alternatives*. A Federal Interagency Publication. Washington, D.C. 90 pp.

National Academy of Sciences. 1990. *Practical Lessons from the Loma Prieta Earthquake*. Washington, D.C.: National Academy Press.

Nigg, Joanne M. 1995. *Disaster Recovery as a Social Process*. Article No. 284. Newark, DE: University of Delaware, Disaster Research Center. 13 pp.

Plafker, George and John P. Galloway, eds. 1989. *Lessons Learned from the Loma Prieta, California, Earthquake of October 17, 1989*. Washington, D.C.: U.S. Department of the Interior, Geological Survey.

Spangle, William & Associates, Inc. 1991. *Rebuilding After Earthquakes: Lessons from Planners*. Portola Valley, California: William Spangle & Associates, Inc.

Spangle, William E., ed. 1987. *Pre-Earthquake Planning for Post-Earthquake Rebuilding (PEPPER)*. Los Angeles, California: Southern California Earthquake Preparedness Project.

Wilson, Richard C. 1991. *The Loma Prieta Quake: What One City Learned*. Washington, D.C.: International City Management Association.



## PARTICIPATORY PROCESSES IN DISASTER RECOVERY

---

*At no time is the opportunity for public involvement in decisionmaking greater than when a community is faced with the practical problems of recovering from a disaster.*

### INTRODUCTION

Engaging the public, in one way or another, is crucial to achieving a holistic or sustainable recovery from a disaster. This chapter focuses on how people who do not have professional or political responsibility for holistic recovery might be engaged in the decisionmaking process.

Why and how a local recovery team is trying to accomplish holistic disaster recovery will determine the forms of participatory processes that it considers using. This chapter is not a collection of how-to-build-it kits for the myriad of forms that could be constructed—there are many sources of information and expert assistance on how to do that. Its focus is on understanding the reasons for and against seeking participation in different circumstances, selecting approaches and techniques, and overcoming the obstacles that may present themselves.

### UNDERTAKING A PARTICIPATORY APPROACH

Participation can be thought of as one of three forms of communication in public involvement.

- **Notification** is when the responsible authority tells people something.
- **Education** is when that authority explains the options to people.
- **Participation** is when that authority asks people what they think (City of Denton, 1999).

It is essential to match the goal of the communication with the form.

Taking on a participatory approach requires conviction and commitment on many fronts—financial, public, and political. There must also be a commitment on the part of the recovery team and local decisionmakers to actually incorporate the public input into the decisionmaking process. Processes that fail to satisfy participants have long-term consequences for working relationships within a community and can set the community back from its goal of

achieving sustainability. Public buy-in is essential to avoid making decisions in the immediate aftermath of a disaster that may compromise what the community might achieve in the long term (Schwab et al., 1998).

### **Rationale for a Participatory Process in Holistic Recovery**

The recovery phase of the disaster cycle may well be a time when people are more open to messages about change (Birkland, 1997; Schwab et al., 1998). For example, in the aftermath of Hurricane Fran in 1996, the county of New Hanover, North Carolina, set up a partnership with the business community for education and awareness programs and to promote the development of business continuity and employee preparedness plans (North Carolina Department of Crime Control and Public Safety, 1999). In the aftermath of the 1991 Oakland fire, the fire hazard was reduced by using non-combustible roof materials, placing utilities underground, and limiting flammable vegetation (Platt, 1999). Actively shaping the message about disaster recovery may actually strengthen people's commitment to make the necessary changes.

### **The Recovery Phase and a Participatory Process**

A community-wide participatory process is unlikely to be feasible in the immediate aftermath of a disaster because people are occupied with immediate, basic needs. Also, it takes time for leaders to set up a constructive process. In the case of the Vermillion Basin, South Dakota (discussed in some detail below), the participatory process took place a year after the catalytic 1993 flood.

The immediate aftermath of a disaster does, however, provide an opportunity to build support for both recovery leading to sustainability and for participating in a process to make it happen. Discussion may be promoted through existing media channels, such as radio, television, and newspaper. It may also be encouraged in flyers that people receive from agencies providing disaster assistance.

### **Forms of Participation**

Community leaders can choose different forms of participation. Steelman and Ascher (1997) categorize public participation in policymaking into four broad types:

- **Standardized representative policymaking:** elected and appointed officials make policy on behalf of their constituents, reflecting some combination of their views, preferences, and interests. For example, the City of Oakland approved the Oakland Hills Fire Prevention and Suppression Benefit Assessment District two years after the devastating 1991 Oakland Hills fire. The district included about 20,000 lots in all of Oakland's hill areas. The intent was to work within the existing social, economic, and environmental context to reduce future devastation from wildland fires. Three of the group's explicit objectives were
  - To provide public information materials and training to District residents regarding proper fire prevention practices;
  - To encourage the creation of an active partnership between the City and affected property owners to meet the goals and objectives of the fire suppression programs; and
  - To involve affected residents in the planning and administration of the District via a Citizen Advisory Commission (Topping, 1992).

- **Referenda:** direct binding policymaking by citizens, established through constitutional provisions such as initiative, referendum, and recall. One form of participation through the ballot box is for citizens to approve a general obligation bond. In the summer after the 1991 Oakland Hills fire, the citizens of Oakland passed Measure I. For 30 years bond proceeds are to fund capital improvements and equipment for water supply, seismic reinforcement for fire stations, emergency vehicles access, construction of an Emergency Operations Center, and communication upgrades (Topping, 1992).
- **Non-binding direct involvement:** citizens contribute input to the deliberative process, the outcome of which is mediated by an administrative or legislative body; these include public comment periods, hearings, open meetings, and some citizen advisory commissions (Steelman and Ascher, 1997). Community leaders may choose to share the problem separately with segments of the public or to meet with the public as a single entity (Thomas, 1995). For example, the mayors of Oakland and Berkeley created a Task Force on Emergency Preparedness and Community Restoration one week after the 1991 Oakland Hills fire. The task force included citizens, including those whose homes had burned, local government officials, university faculty, utility employees, and local business people. The task force made proposals to the cities. According to Platt (1999) some proposals were adopted, such as increasing the training and use of local volunteers to identify fire hazards and fight small fires. Others, such as limiting the density of homes in fire-prone areas, were not approved.
- **Binding direct policymaking by non-governmental representatives:** citizen or group representatives formulate policy, but operate within structures overseen by elected or appointed officials (Steelman and Ascher, 1997). Community leaders share the problem with the assembled public, and together they attempt to reach agreement on a solution (Thomas, 1995). The Vermillion River Basin multi-objective flood mitigation planning process discussed in detail later in this chapter reflects this form of participation.

Most participatory processes for sustainable local recovery fall into the latter two categories. Binding direct policymaking by non-governmental representatives gives community participants the greatest latitude in shaping the options with which they will be living.

### **Deciding among Participatory Approaches**

Negotiation is at the heart of all participatory processes. People are invited to participate based on the understanding that they are embarking on a search for the reconciliation of competing interests (Daniels and Walker, 1996). The extent of acceptable disagreement during the search and the outcome of the search are what distinguish one participatory approach from another. Consequently, in deciding which approach to use, it is important to be clear on the following:

**1. How much agreement among participants will likely be reached through the process?**

If there is a strong likelihood that consensus will be reached, a planning exercise will be feasible. If not, an activity that more easily accommodates disagreement, such as collaborative learning, may be more useful.

**2. Is the outcome to be implemented? If so, by whom? Do the implementers have the wherewithal to do so? Do the implementers have the right to review, accept, modify, or reject any or part of the outcome?**

If it is likely that the outcome will be implemented reasonably intact, a planning exercise is warranted. If not, shared learning may be a better way to generate an array of options.

**3. How inclusive is the approach being considered? Can the approach be structured to facilitate the contribution of marginalized groups?**

Historically marginalized and excluded groups may believe they are not able to effect change. They may need opportunities to develop their collective strengths to be able to buy into the recovery process. Making an effort to reach out and include them as active participants enhances the likelihood of a long-term, sustainable outcome.

### **Three Approaches to Direct Involvement in Policymaking**

There are three main approaches to a direct participatory process. Each has a distinct primary objective even though they overlap and complement each other.

#### **1. Participatory Action Research**

This approach focuses on generating knowledge the community can use to address its concerns. It enables local people to find their own solutions based on their priorities, to secure funding, or to engage locals into the agendas of others (Cornwall and Jewkes, 1995). If there are gaps in local knowledge and those gaps are getting in the way of community betterment, participatory action research works well.

Participatory action research adapts conventional research methods to new contexts and new uses, by and with local people (Cornwall and Jewkes, 1995). Non-researchers learn how to get and use information. The intent is to empower grassroots organizations and individuals, but researchers can play supporting roles. They can be scribes, documenting for the participants the results of their transactions (Stoecker, 1999). They can praise and highlight participants' knowledge of their environment and the social context in which they operate (Wacker et al., 1999). Participatory action research includes, but is not limited to, focus groups, participatory mapping, modeling, and matrix ranking (Found, 1997).

#### **2. Collaborative Learning**

The focus of collaborative learning is on the constructive exchange of information within the context of public participation. Insights into how people learn are used as the basis for designing interactions. Collaborative learning is most useful when the situation is contentious and there is no immediate prospect of consensus leading to action. It is helpful where there is no clear desirable outcome and when only incremental change is likely.



Collaborative learning

- Stresses improvement rather than solutions;
- Emphasizes situations rather than problems or conflicts;
- Focuses on concerns and interests rather than positions;
- Targets progress rather than success;
- Seeks desirable and feasible change rather than a definite, desired future condition;
- Encourages systems thinking rather than linear thinking (systems thinking is about understanding the interconnections between parts and seeing the parts as elements of a whole system);
- Recognizes that considerable learning will have to happen before improvements can be made; and
- Emphasizes communication and negotiation as the means to learn and make progress happen (Daniels and Walker, 1996).

According to Daniels and Walker (1996), collaborative learning exercise involves three phases:

- (1) Developing common understanding by exchanging information through such activities as imagining best and worst possible futures and visually representing the situation,
- (2) Focusing on concerns and interests about specific issues and determining how they relate to other issues, then identifying possible improvements, and
- (3) Considering whether these improvements are desirable and feasible.

### **3. Multi-objective Planning and Management**

Multi-objective planning is about finding ways to carry out a number of activities that will achieve specific outcomes. It is the most ambitious form of participatory process described here. Successfully engaging the public, effectively soliciting input and enabling all key players to problem solve is the essence of multi-objective planning (Holmes, n.d.). It should be undertaken when it is likely that action-oriented consensus can be achieved.

According to Holmes, multi-objective planning and management

- Addresses more than one issue and goal at the same time;
- Is based on appropriately delineated planning areas. Depending on the objective, the unit can be a physical unit, such as a watershed or a political unit, such as a county;
- Is locally based. The process must be driven by individuals, groups, and local government based in the planning area;
- Uses existing resources as much as possible; and
- Uses a comprehensive partnership. Trained, neutral facilitators play a key role in interactively involving people in the public and private sector to solve problems.

The table on the next page shows the main characteristics of the three approaches and when they are most useful. Note that participatory action research can be used to generate input into multi-objective planning and management.

### Three Approaches to Direct Involvement in Policymaking

Approach	Emphasis	Most useful
Participatory Action Research	Generating knowledge community can use	When local understanding can fill gaps that constrain community development
Collaborative Learning	Constructively exchanging information	When the situation is contentious and there is no immediate prospect of consensus leading to action
Multi-Objective Planning & Management	Finding ways to carry out activities that will achieve specific outcomes	When action-oriented consensus can be achieved

### Techniques for Participatory Processes

Some of the techniques described below are common practices among community leaders who need to obtain the participation of individuals; others are used less often and are associated more with a particular participatory approach than with others. A combination of techniques is often employed. A community can choose from this list of possibilities.

#### Public Meetings

Used to obtain ideas from residents about goals, problems, and potential solutions. Public meetings should be used to exchange information. They should only be used if citizen information is likely to influence decisions (Thomas, 1995).

#### Issue Presentations

Experts make presentations on scientific, technical and legal dimensions. Each presentation includes a question and answer session (Daniels and Walker, 1986).

#### Panel Discussions

After the issue presentations, a discussion is held with panelists representing critical stakeholder groups. Panelists talk briefly about their viewpoints and concerns and those of the groups they represent. They then engage with one another and participants in a question-answer-comment session (Daniels and Walker, 1986).

#### Workshops

An interactive format in which participants views and ideas are explicitly solicited, often on pre-determined themes. To maximize participation, attendees may be invited to work in subgroups.

#### Field Trips

To view problems first hand and to speak to people who cannot attend gatherings in a given place (Zahn et al., 1994).

### **Live Call-in Radio**

To get immediate feedback on potential solutions. If there is widespread Internet access, real-time chat rooms and conferences may be useful.

### **Meetings with Elected Officials and Others**

To present preliminary plans or to present concerns and options.

### **Best and Worst Views**

To reveal the extent to which people's interests are compatible, participants are asked to write down their best and worst imaginable futures. These futures are then displayed for the rest of the group to discuss (Daniels and Walker, 1986).

### **Charette**

A classic planning technique, it is an intense effort to solve problems in a limited amount of time. A typical charette is characterized by a structured schedule, open process for participation and three activities—generating ideas, decisionmaking and problem solving (Sanoff, 2000).

## **Encouraging Participation**

There are many practical things that a community can do both to obtain public participation and to improve the quality of the input and the use that is made of it in the decisionmaking process.

### **Publicity**

Inviting people to participate is essential.

- Get the message out in as many languages as appropriate.
- Send information to people who have been affected or will be affected.
- Post notices in conspicuous places, such as public buildings, community centers or anywhere many people can see them.
- Make the messages clear, simple, and supported with photographs or illustrations.
- Use existing newsletters or establish a new one for the participatory project.
- Arrange for press coverage from the local media (City of Denton, 1999).

### **Logistics**

Take into account how busy people are, and how they are already juggling competing demands on their time. Making participation easier for them will increase attendance.

- Select a convenient, accessible location.
- Opt for a time (week days, week evenings, weekends) that is most likely to work for most of the people. Be prepared to have duplicate sessions if needed.
- Supply refreshments.
- Provide childcare.
- Provide translation services (City of Denton, 1999).

## **Financing Participatory Processes**

- If there is a Presidential disaster declaration, funds will be available from federal, state, and possibly private sources. Technical assistance will also be forthcoming from

federal and state agencies that may include the “loan” of personnel skilled in planning, facilitation, and leading consensus-building initiatives.

- After a disaster, local businesses, residents, and out-of-town groups often donate to local relief funds. These funds can provide for special projects, such as developing a participatory process, that cannot be funded elsewhere (Watson et al., 1998).
- Food and refreshments for public meetings may be donated by area businesses or corporations wishing to assist in the recovery.
- The local government may be able to tap its own budget for public education or other goal to supply printed materials to be disseminated.
- Meeting space could be obtained free from area businesses or nonprofit organizations.
- Some local radio or television stations will donate on-air time for public service announcements or for live broadcast of meetings.

### **Do’s and Don’t’s for Encouraging Public Involvement**

- Anticipate issues rather than having them be imposed.
- Define issues in terms amenable to resolution.
- Avoid either/or terms.
- Avoid seeing public involvement as good or bad.
- Know what you are trying to get from involving the public.
- Recognize that public involvement requires sharing decisionmaking authority.
- Define ahead of time what can and cannot be negotiated.
- Define ahead of time which “publics” to involve.
- Consider citizen attitudes toward institutional goals.
- Select an appropriate decisionmaking form.
- Use more than one approach.
- Work to build relationships.
- Keep an eye on the public interest.
- Accept and learn from failure.

(Thomas, 1995, pp. 169-175)

### **Monitoring the Participatory Process**

The sophistication and extent of monitoring will vary with the type of participatory process chosen. At a minimum, it is important to ask participants during the process if mid-course corrections need to be made. At the same time, planners and decisionmakers must be willing and able to make modifications.

## **Evaluating the Participatory Process**

Deciding what to evaluate is critical to designing the participatory process. It is a way of ensuring that the exercise is focused and that the goals for the activity are clear. Ideally, participants and those managing and financing the endeavor should undertake evaluation. It is useful to obtain feedback immediately after the activity and again after enough time has lapsed to see what became of the output of the activity. Documenting the experience of participation is essential for both monitoring and evaluation (City of Denton, 1999).

## **LOCALITIES THAT HAVE USED A PARTICIPATORY PROCESS**

The following vignettes sketch out how Pawtucket, Rhode Island, and the Vermillion River Basin, South Dakota, used participatory processes in planning for sustainability. The South Dakota example is described in detail to highlight how to implement multi-objective planning featuring a participatory process.

### **Pawtucket, Rhode Island**

The City of Pawtucket, Rhode Island, is a floodprone community at the southern falls of the Blackstone River and the upper tidewaters of Narragansett Bay. It has a land area of about 9 square miles and a population density of about 7,582 per square mile. The city's industrial base was established over two centuries ago. The city has worked to preserve its distinctive residential architectural inheritance.

City officials are implementing a flood hazard mitigation plan that they developed through non-binding public involvement. City officials developed a risk assessment matrix as a result of a regional public workshop held in the Blackstone Valley in 1997. They then used this information in a mitigation matrix that summarizes the areas at risk, specifies actions to take, who is responsible for the listed actions, and possible options for financing (Watson et al., 1998).

### **Vermillion River Basin, South Dakota**

Draining 2,185 square miles on the southeast corner of South Dakota, the Vermillion River Basin is a semi-arid region with annual average precipitation of 22-25 inches. Draining into the Missouri River near Burbank, South Dakota, the basin has a 20-mile wide drainage corridor of low topographic relief and slow meandering streams that flow into the Missouri River. Ninety-five per cent of the basin's land is agricultural. A population density of 25-35 people per square mile has been maintained since the 1930s.

The catalyst for undertaking a multi-objective flood mitigation plan was the 1993 flooding of the Vermillion River system, when damage to the Basin approached \$250 million. The South Dakota Division of Emergency Management, the TLC (Turner, Lincoln and Clay counties) Water Project District, the National Park Service, and the Federal Emergency Management Agency, through a series of exploratory phone calls, decided to have a public brainstorming session. They decided to employ a binding direct policymaking form of public involvement to undertake multi-objective planning. The intent was to have as many people and agencies from within and outside the basin come together to consider how to improve the quality of life in the Vermillion Basin. The outcome was to be a plan that residents could realistically use, without waiting for massive federal

assistance, to reduce their vulnerability to floods and at the same time improve whatever residents thought was most important (Zahn et al., 1994).

In January 1994, local agencies and interested individuals drew up a preliminary list of 17 issues they thought a planning workshop could address. The issues were grouped into five categories:

- Flood hazard management, drainage, and transportation systems;
- Economic development and sustainability, cultural and historic resources and housing;
- Fish and wildlife;
- Outdoor recreation and open space; and
- Water quality and erosion.

People were recruited from different agencies and groups with the expertise necessary to understand local concerns, make recommendations, and suggest sources and methods of implementation assistance and funding.

### **The Planning Workshop**

About 150 people participated in the planning workshop June 20-24, 1994 in Parker, South Dakota. Two-thirds were residents of the basin, while one-third were from local, state, and national organizations. They used a four-step process (note how this resembles Steps 4, 5, 6, and 7 of the 10-step process for holistic recovery described in Chapter 2) .

1. Defining the basin's flood-related problems and goals.
2. Listing some sensible ideas for solving each problem.
3. Identifying ways to reach other basin goals that coincided with or complemented the potential solutions to the flood problems.
4. Specifying sources of technical assistance and funding for each idea, and how and where to obtain it.

Step 1 was accomplished Monday, the first day, in a large public meeting. The last three steps were done during the rest of the week. On Tuesday participants broke out into five planning teams, one for each category. A draft plan was produced Thursday night for presentation to public officials in the basin on Friday, the last day of the workshop.

The process resulted in a planning document (published with technical and financial assistance from the National Park Service and the Federal Emergency Management Agency) that described the background and physical characteristics of the basin, outlined the concerns as expressed by the participants, listed possible solutions to each of those concerns, and identified ways in which those solutions could be tackled. The document, *Multi-Objective Flood Mitigation Plan—Vermillion River Basin South Dakota* (listed in the References section at the end of this chapter) was not intended to be adopted as a formal plan, but it has served as a foundation for subsequent efforts by the basin residents and business people to address multiple objectives. Recently the basin was successful in getting enabling legislation passed at the state level that will make it possible for a river basin district to be formally established to plan for and implement solutions to basin-wide problems.

## **WORDS TO THE WISE ABOUT PUBLIC INVOLVEMENT**

Participatory processes are not panaceas. There is no guarantee that a participatory process will lead to a successful outcome. Broader public interests may be neglected in favor of the special interests of specific publics who accept the invitation to become involved (Thomas, 1995). In addition, the participating public may express inconsistent preferences that lead to conflict, leaving decisionmakers with mixed signals about what to do (Steelman and Ascher, 1997). Uncertainty is an inevitable byproduct of situations that depend on more than one individual's actions (Kiser and Ostrom, 1982).

Engaging appropriate individuals and representatives of agencies and organizations is critical to the success of any form of participatory process. Organized and unorganized groups of citizens need to be included if they can provide useful information for resolving the issue or if they could affect implementation by accepting or facilitating it. Leaders of organized groups cannot speak for the unorganized (Thomas, 1995).

Participation is not without costs. Not everyone is able or willing to participate. People can be too busy securing the basics of life to participate. It has been suggested that the silence of potential participants stems from three factors, each of which has different roots and requires a different response.

- People already feel adequately represented by an active group, such as a neighborhood association or environmental public interest group. The assumption is that an individual has made an informed decision not to participate. Therefore, the organizers do not need to take any further action. Because an informed decision not to participate can be respected, there is no reason to cajole these nonparticipants.
- People are unaware of having a stake in the decision or view the decision as being of minor importance to them. A comprehensive public information campaign may provide these people with enough information to determine whether the decision does or does not have personal importance.
- People do not believe they can influence the outcome of the process. This may be remedied by a public information campaign that presents technical issues and lays out the proposed process of public involvement in such a way as to encourage wider participation (Creighton, 1983).

People need to be informed to decide whether to participate in the policymaking process. They need to know how to participate if they choose to do so and what are the consequences will be if they do not.

Even when people do participate, involvement may not be continuous or predictable. Commitment and interest wanes as people tire of the task (Thomas, 1995; Cornwall and Jewkes, 1995). People may have preconceived ideas about desirable outcomes, and their enthusiasm can fade when it turns out that other people don't agree (Cornwall and Jewkes, 1995).

People participate because they perceive some interest in the outcome and remain involved as long as that persists. Different people will choose to focus on different aspects of recovery. For example, after the 1991 Oakland fire, the Task Force on Emergency Preparedness and Community Relations organized into five groups—emergency preparedness; communications; forestry and vegetation; infrastructure and development; and planning, zoning, and design (Platt, 1999). Differences in technical expertise, roles in the community, and willingness and ability to commit time and energy inevitably lead to different levels of involvement. People may participate in some stages of the process more than others.

## **CONCLUSION**

Although it is not without pitfalls, a well-chosen and appropriately employed participatory process can contribute to a community's disaster recovery. Only by actively engaging the residents and other stakeholders can recovery from disaster lead to integrating a community's social, economic, and environmental goals and ideals.



## REFERENCES

- Birkland, T.A. 1997. *After Disaster*. Washington, D.C.: Georgetown University Press.
- City of Denton, Planning and Development Department, Comprehensive Planning Section. 1999. *The Denton Plan 1999-2020*. Denton, TX: City of Denton.
- Community Development Society. *What Is Participatory Research?*  
<http://www.comm-dev.org/par-is.htm>
- Cornwall, A. and R. Jewkes. 1995. "What Is Participatory Research?" *Soc. Sci. Med.* 41:1667-1676.
- Creighton, J.L. 1983. "Identifying Publics/staff Identification Techniques." In Creighton, J.L., Delli Priscoli, J. and Dunning, C.M., eds., IWR Research Report 82-R1. Fort Belvoir, VA: Institute for Water Resources, U.S. Army Corps of Engineers:199-206.
- Daniels, S.E. and G.B. Walker. 1996. "Collaborative Learning: Improving Public Deliberations in Ecosystem-based Management." *Environmental Impact Assessment Review* 16:71-102.
- Found, W.C. 1997. "Evaluating Participatory Research." *Knowledge and Policy* 10:109-122.
- Holmes, D. n.d. *A Multi-Objective Workshop Planning Process*. Denver, CO: Stewardship and Partnership Team, Rocky Mountain Support Office, Intermountain Region, National Park Service.
- Kiser, L.L. and E. Ostrom. 1982. "The Three Worlds of Action; a Metatheoretical Synthesis of Institutional Approaches." In Ostrom, E., ed. *Strategies of political inquiry*. Beverly Hills, CA: Sage Publications: 179-222.
- North Carolina Department of Crime Control and Public Safety. 1999. *Hazard Mitigation Successes*. Raleigh, NC: North Carolina Emergency Management Division.
- Platt, R.H. 1999. "Natural Hazards of the San Francisco Bay Mega-city: Trial by Earthquake, Wind, and Fire." In Mitchell, J.K., ed. *Crucibles of Hazard*. Tokyo: United Nations University Press: 335-374.
- Plein, L.C., K. Green, and D.G. William. 1998. "Organic Planning: a New Approach to Public Participation in Local Governance." *The Social Science Journal* 35:509-523.
- Sanoff, H. 2000. *Community Participation Methods in Design and Planning*. New York: John Wiley & Sons.

- Schwab, Jim, Kenneth C. Topping, Charles C. Eadie, Robert E. Deyle, and Richard A. Smith. 1998. *Planning for Post-Disaster Recovery and Reconstruction*. PAS Report No. 483/484. Chicago, IL: American Planning Association. 346 pp. Abstract available at [www.planning.org/apapubs/details.asp?Num=1178](http://www.planning.org/apapubs/details.asp?Num=1178). [accessed September 21, 2001]
- Steelman, T.A. and W. Ascher. 1997. "Public Involvement Methods in Natural Resource Policymaking: Advantages, Disadvantages and Tradeoffs." *Policy Sciences* 30:71-90.
- Stoecker, R. 1999. "Are Academics Irrelevant?" *American Behavioral Scientist* 42:840-854.
- Thomas, J.C. 1995. *Public Participation in Public Decisions*. San Francisco: Jossey-Bass Publishers.
- Topping, K.C. 1992. *Oakland Hills Fire Prevention and Suppression Benefit Assessment District Report*. Unpublished. 46 pp.
- Wacker, C., A. Viaro, and M. Wolf. 1999. "Partnerships for Urban Environmental Management: the Roles of Urban Authorities, Researchers and Civil Society." *Environment & Urbanization* 11:113-125.
- Watson, L., V. Lee, P. Pogue, J. Almeida, H. Araujo, P.F. Mowrey, R. Rendine, R. Lietao, and J. Condon. 1998. *Strategy for Reducing Risks from Natural Hazards in Pawtucket, Rhode Island: a Multi-hazard Mitigation Strategy*. Narragansett, RI: Rhode Island Sea Grant.
- Zahn, S., B. Cox, and D. Holmes. 1994. *Multi-Objective Flood Mitigation Plan Vermillion River Basin South Dakota*. Denver, CO: Federal Emergency Management Agency, State of South Dakota, National Park Service.

## **WHERE TO FIND MORE INFORMATION**

### **Training Courses and Workshops**

Federal Emergency Management Agency, Emergency Management Institute, National Emergency Training Center. Emmitsburg, Maryland. [www.fema.gov/emi](http://www.fema.gov/emi) [accessed June 15, 2001] (301) 447-1035.

- "Project Impact: Building Consensus in Disaster-Resistant Communities." Federal Emergency Management Agency Course E380.  
This course is designed for the person(s) in an organization with responsibility for coordinating and implementing the Project Impact initiative in their jurisdiction. Participants will learn and practice the facilitation skills necessary to work with officials and stakeholders in a community to promote the development of a disaster-resilient community.

## **Organizations**

Many private consulting firms offer expertise in facilitation and consensus-building in a post-disaster or planning situation. A community's federal agency contacts—at the Corps of Engineers, the Bureau of Reclamation, the Environmental Protection Agency, the National Park Service, or the Federal Emergency Management Agency—would be the best source for specific referrals to an area company.

City of Denton.

The public involvement section of the Denton Comprehensive Plan lays out fundamentals of public participation.

See [www.cityofdenton.com/planning/tdp\\_intro.html](http://www.cityofdenton.com/planning/tdp_intro.html) [accessed July 20, 2001]

Creighton and Creighton.

The Creighton and Creighton website provides an annotated list of links about public involvement.

See [www.creightonandcreighton.com/](http://www.creightonandcreighton.com/) [accessed July 20, 2001]

Community Development Society.

See the publication, "What is Participatory Research?" for a discussion of public participation and some guiding principles.

See [www.comm-dev.org/par-is.htm](http://www.comm-dev.org/par-is.htm) [accessed July 20, 2001]

Disaster Resistant Neighborhoods. "Building Disaster Resistant Neighborhoods Handbook."

This handbook outlines a step-by-step action plan, with examples, to assist planners in working with neighborhood associations to help them become better prepared for the next disaster. Posted on the link along with the handbook are a variety of marketing tools to assist in promoting the program.

See [www.tallytown.com/redcross](http://www.tallytown.com/redcross) [accessed September 21, 2001]

Highlander Education and Research Center.

This group specializes in participatory education and action research and involving stakeholders.

See [www.hrec.org](http://www.hrec.org) [accessed July 20, 2001]

National Park Service.

The National Park Service through its Rivers, Trails and Conservation Assistance Program helps local coalitions develop strategic plans, identify potential sources of funding and builds partnerships to achieve goals determined by the community. The National Park Service becomes involved in a project only at the request of citizen groups or governmental agencies. The lead project partner(s) must write a letter of request to the Rivers and Trails Program. Send applications to the Manager of Rivers, Trails and Conservation Assistance Program of your National Park Service Regional Office.

See [www.nps.gov/legacy/regions.html](http://www.nps.gov/legacy/regions.html) [accessed September 21, 2001]

Partnerships Online. "Participation Guide."

This online guide, "The Guide to Effective Participation," was designed for community activists and professionals in the U.K. but has many useful resources for those in the United States interested in fostering community participation as well.

See [www.partnerships.org.uk/guide/index.htm](http://www.partnerships.org.uk/guide/index.htm) [accessed June 15, 2001]

## **Videos, CD-ROMs, and DVDs**

*Taking the Initiative*. Federal Emergency Management Agency, Emergency Management Institute. 2000. Emmitsburg, MD.

This 20-minute video shows how a neighborhood, two small towns, and a business owner took responsibility for and got organized to adopt sustainability principles and techniques in coping with hazards. The three separate instances, all in California, illustrate participatory processes, taking initiative, looking at the economic benefits of hazard mitigation (in one case, elevating a restaurant), incorporating livability components into a flood protection measure, and protecting the local environment and habitat. This video is available from the Emergency Management Institute at 1-800-238-3358. Ask for the "Disaster-Resistant Jobs" video.

*Multi-objective Mitigation Planning*. National Park Service and FEMA. 1995. Denver, CO.

The National Park Service and FEMA produced this 18-minute video of the Vermillion Basin, South Dakota, participatory planning process that discusses the experience from the perspective of both agency and community participants. The video is available from FEMA Region VIII, P.O. Box 25267, Bldg. 710, Denver Federal Center, Denver CO 80225-0267.

## **Books, Articles, and Papers**

Association of State Floodplain Managers (ASFPM). 1996. *Using Multi-Objective Management to Reduce Flood Losses in Your Watershed*. Madison, WI: Association of State Floodplain Managers. 72 pp. Abstract available at [www.floods.org/PDF%20files/PUBSLIST.pdf](http://www.floods.org/PDF%20files/PUBSLIST.pdf).

This publication explores planning and implementation techniques for multi-objective watershed management. It provides a general introduction to multi-objective management and the planning process that helps a community select the flood-loss reduction measures most suitable to its situation. It explains how to define problems and goals, build partnerships, combine needs and solutions creatively, and begin formal implementation procedures. Both riverine and coastal flood watersheds are examined, involving subjects such as fish and wildlife issues, water supply, housing improvement, transportation, and lifelines.

North Carolina Emergency Management Division and Federal Emergency Management Agency. 2000. *Hazard Mitigation in North Carolina: Measuring Success*. Raleigh, NC.

To accelerate the institutionalization of hazard mitigation in North Carolina, the North Carolina Emergency Management Division established the Hazard Mitigation Planning Initiative, a long-term program to build local capacity to implement mitigation policies and programs in

communities across the state. Through a series of case studies, this study documents losses avoided as a result of the implementation of a wide range of mitigation measures, including elevations and the acquisition and relocation or demolition of floodprone properties.

Picou, J. Steven. 2000. "The 'Talking Circle' as Sociological Practice: Cultural Transformation of Chronic Disaster Impacts." *Sociological Practice: A Journal of Clinical and Applied Sociology* 2(2):66-76.

This article presents a description of a culturally sensitive mitigation strategy, the "Talking Circle," and its application to Alaska Natives negatively impacted by the 1989 Exxon Valdez oil spill. Talking Circles are a traditional social activity for Alaska Natives and this activity was organized and implemented by members of the Village of Eyak in Prince William Sound, Alaska. The two-day event resulted in many testimonies about personal experiences with the oil spill. Post-Talking Circle activities by Eyak Village members indicate increased cultural awareness and political mobilization. These findings suggest that this mitigation strategy promoted cultural consciousness among victims experiencing chronic disaster impacts and resulting in a "transforming activity" for the Native Village of Eyak.

Schwab, Jim, Kenneth C. Topping, Charles C. Eadie, Robert E. Deyle, and Richard A. Smith. 1998. *Planning for Post-Disaster Recovery and Reconstruction*. PAS Report No. 483/484. Chicago, IL: American Planning Association. 346 pp.

This document helps community leaders and planners educate their constituents on how informed decisions and choices can affect the rebuilding process and yield a safer, more sustainable community. This report introduces planners to their roles in post-disaster reconstruction and recovery, and provides guidance on how to plan for post-disaster reconstruction side by side with all other players involved. A key theme throughout this report is to rebuild to create a more disaster-resilient community. The report contains many references to technical resources.

Federal Emergency Management Agency. 1994. *Multi-Objective Flood Mitigation Plan Vermillion River Basin South Dakota*. Denver: Federal Emergency Management Agency, State of South Dakota, U.S. National Park Service.

The 1993 Midwest floods renewed interest on the part of government agencies, private groups, and individuals in finding ways to avoid or reduce the impacts of future disasters through permanent, low-cost solutions. This approach requires an examination of the relationships between natural systems (precipitation, drainage, sedimentation, vegetation, etc.) and human systems (water control structures, public policies and funding, agriculture, transportation, etc.) in order to make them more compatible. This document describes a multi-objective planning workshop held in Parker, South Dakota, in June 1994 to address flood mitigation. It describes the Vermillion River Basin and its flood history; the workshop; flood hazard management, drainage, and transportation in the area; economic development and sustainability, cultural and historic resources, and housing; fish and wildlife populations and habitat; outdoor recreation and open space; water quality and erosion; and implementation of the plan.

## **Additional Reading**

- Birkland, T.A. 1997. *After Disaster*. Washington, D.C.: Georgetown University Press.
- Cornwall, A. and R. Jewkes. 1995. "What Is Participatory Research?" *Soc. Sci. Med.* 41:1667-1676.
- Cox, Bob, Sherryl Zahn, and Duane Holmes. 1995. "A Multiobjective Flood Hazard Mitigation Planning Process for the Vermillion River Basin, South Dakota." Pp. 132-135 in *From the Mountains to the Sea--Developing Local Capability*. Proceedings of the 19th annual conference of the Association of State Floodplain Managers. Special Publication 31. Boulder, CO: Natural Hazards Research and Applications Information Center.
- Daniels, S.E. and G.B. Walker. 1996. "Collaborative Learning: Improving Public Deliberations in Ecosystem-based Management." *Environmental Impact Assessment Review* 16:71-102.
- Dore, J. 1998. *Step by Step to Facilitating your Community's Public Participation Process. The Token Creek Watershed Project Case Study*. Madison, WI: The Dane County Natural Heritage Foundation.
- Environmental Protection Agency. 1997. *People, Places, and Partnerships. A Progress Report on Community-Based Environmental Protection*. EPA-100-R-97-003. Washington, D.C.: Office of the Administrator.
- Found, W.C. 1997. "Evaluating Participatory Research." *Knowledge and Policy* 10:109-122.
- Hoff, Marie D. 1998. *Sustainable Community Development. Studies in Economic, Environmental, and Cultural Revitalization*. Boca Raton, FL: Lewis Publishers.
- Holmes, D. 1996. "A Multi-Objective Workshop Planning Process." Pp. 188-199 in *Proceedings of the Conference on Arid West Floodplain Management Issues*. Madison, WI: Association of State Floodplain Managers.
- Kaner, S. et al. 1996. *The Facilitator's Guide to Participatory Decision-Making*. Gabriola Island, B.C.: New Society Publishers.
- Krajeski, Richard L. and Kristina J. Peterson. 1999. "'But She Is a Woman and This Is a Man's Job': Lessons for Participatory Research and Participatory Recovery." *International Journal of Mass Emergencies and Disasters* 17(1): 123-130.
- McShane, John H. 1992. "Integrating Provisions of the National Flood Insurance Program with Multi-objective River Corridor Management." Pp. 200-203 in *Multi-Objective Approaches to Floodplain Management*. Special Publication No. 26. Boulder, CO: Natural Hazards Research and Applications Information Center.

- Oleari, Kenoli. 2000. "Making Your Job Easier: Using Whole System Approaches to Involve the Community in Sustainable Planning and Development." *Public Management* (December):4-10.
- Platt, R.H. 1999. "Natural Hazards of the San Francisco Bay Mega-city: Trial by Earthquake, Wind, and Fire." In Mitchell, J.K., ed. *Crucibles of Hazard*. Tokyo: United Nations University Press: 335-374.
- Plein, L.C., K. Green, and D. G. William. 1998. "Organic planning: A new approach to public participation in local governance." *The Social Science Journal* 35:509-523.
- R. D. Flanagan & Associates. 1994. *Tulsa's Floodplain and Stormwater Management Program*. Tulsa, OK. 85 pp.
- Sanoff, H. 2000. *Community Participation Methods in Design and Planning*. New York: John Wiley & Sons.
- Steelman, T.A. and W. Ascher. 1997. "Public Involvement Methods in Natural Resource Policy Making: Advantages, Disadvantages and Tradeoffs." *Policy Sciences* 30:71-90.
- Thomas, J.C. 1995. *Public Participation in Public Decisions*. San Francisco: Jossey-Bass Publishers.
- Topping, K.C. 1992. *Oakland Hills Fire Prevention and Suppression Benefit Assessment District Report*. Unpublished. 46 pp.
- Wacker, C.; Viaro, A.; and Wolf, M. 1999. "Partnerships for Urban Environmental Management: the Roles of Urban Authorities, Researchers and Civil Society." *Environment & Urbanization* 11:113-125.







## USING DISASTER RECOVERY TO MAINTAIN AND ENHANCE QUALITY OF LIFE

---

*For the purposes of sustainability, the full range of stakeholders in local communities (government, business, and individuals) should begin to consciously define and plan for the quality of life they want and believe they can achieve for themselves and for future generations.*

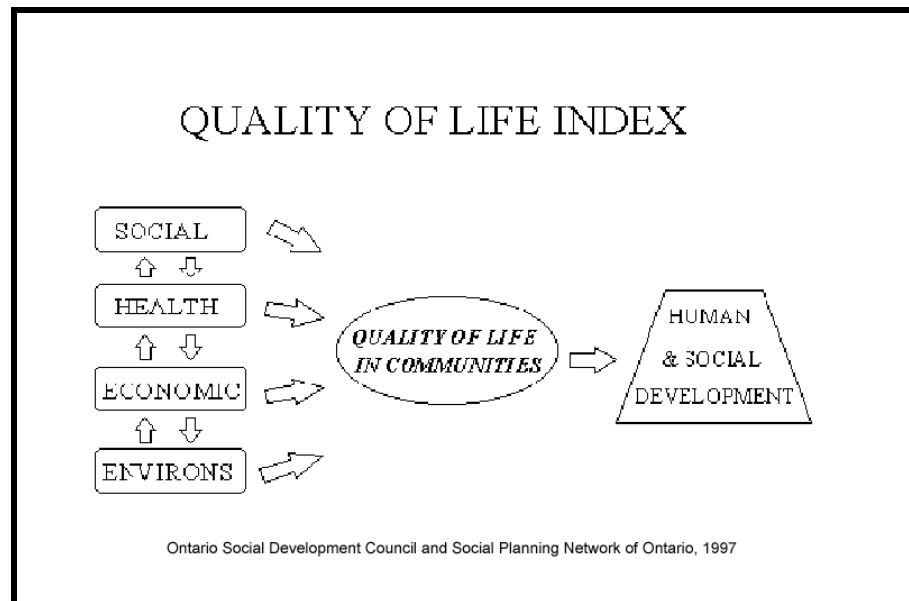
—Mileti, 1999, p. 32

### INTRODUCTION

Quality of life means different things to different individuals, households, and communities. It requires a set of shared goals and visions that make life meaningful, valuable, and purposeful in a particular community setting. The disaster recovery period presents an opportunity to maintain and enhance quality of life elements such as:

- Housing—home ownership, affordable homes and rental properties, appreciating property values
- Education—adequate and safe public education
- Mobility—transportation alternatives and efficient flow of traffic
- Health care—access to good and affordable health care facilities and services
- Employment—individuals having suitable jobs and communities having low unemployment rates
- Recreation—well-designed public spaces, open spaces, parks, greenways, and recreational facilities
- Environment—clean, green, and with minimum pollution; resource- and energy-efficient residential and commercial buildings
- Economics—economic vitality and affordable products and services, local business owners, vibrant downtowns and business districts
- Public safety—least possible exposure to crime, pollution, threat of disease and disasters
- Equity and civic engagement—ability for residents, community groups, and the private sector to participate in planning and development efforts
- Disaster resilience—housing, employment, transportation, and public facilities that are protected from or able to withstand impacts from hazards.

Many residents value most of these elements and understand that the community's built, natural, and social environments greatly affect their quality of life. For example, it is increasingly reported that business location decisions are influenced by the quality of life that workers can expect to experience in a community. Shookner (1997) defines quality of life as the product of the interplay among social, health, economic, and environmental conditions that affect human and social development, as shown in the diagram.



### How Disasters Disrupt Quality of Life

Disasters create sudden changes to social networks, lifelines, the environment, housing, and the economy and also have dramatic effects on the health and well being of community residents. The following scenarios demonstrate some of these changes and impacts played out in many communities year after year.

- Reduced mobility, access to services due to damaged infrastructure.
- Damaged public facilities (schools, central business districts and downtowns, historic districts, airports, harbors, stormwater systems, power plants, telecommunication centers) affect education, employment, recreation, business and the economy, and public safety.
- Damaged utilities (power lines, phone lines, water treatment plants) present a threat of disease and a breach of public safety.
- Partially damaged or uninhabitable housing can lead to loss of personal memoirs and documents, and homelessness.

- Economic disruption, whatever its immediate cause, can spur unemployment, loss of tax base, and a shortage of basic supplies. Unemployment can in turn sever access to health insurance and other benefits.
- Environmental damage can result from riverine erosion, beach/dune erosion, tree loss, and pollution of air and water.
- A traumatized population can be further affected by damaged medical facilities and limited access to social services, family services, and day care.

### **The Domino Effect in Urban and Rural Communities**

Take a closer look at schools and their domino effect on the elements of quality of life. Schools serve multiple functions as centers of learning and recreation, centers of community and child care, and centers of employment. Some schools also serve as shelters and housing during the immediate post-disaster period.

Several communities also house colleges and universities that are a vital employment economic lifeline for many residents, business owners, and rental property owners. Additionally, loss of families due to outward relocation can damage the city and county tax base and in turn weaken the financial strength and educational services provided by schools.

Disasters can also have far-reaching effects beyond their immediate geographic impact zone. Other communities in the county or parish, metropolitan area, and even farther afield can experience partial disruptions in their lifestyles and quality of life.

Many large cities have the ability to absorb the negative effects of disasters. Some businesses and industries are far more disaster resilient than others, leaving them with little long-term effect. After Hurricane Floyd, both AT&T and Bell Atlantic took responsible proactive measures to relocate critical equipment in order to minimize future impacts. AT&T executives made the decision to move all the switching equipment out of the floodplain to other locations in the metropolitan area. These actions had the effect not just of minimizing the business's future risk, but also of protecting the quality of life of every user of that network.

#### **National Impacts Felt When Hurricane Floyd Damages New Jersey Telecommunications Hubs**

The Bell Atlantic telecommunications hub in Rochelle Park, a quarter-mile from New Jersey's Saddle River, was built before the area's designation as a floodplain. Hurricane Floyd left the basement of the Bell Atlantic building under six feet of water and cut telephone service to about a million local customers and to 8,000 automated teller machines throughout the country. The adjacent AT&T building that handled wireless calls for parts of New Jersey, New York, and Connecticut was also flooded.

— *The New York Times*, September 29, 1999, p. B1.

Our nation's rural communities do not always have this luxury. Some are emerging as bedroom communities with a broader economic base that includes manufacturing, recreation, and tourism as economic lifelines, but many are still agriculturally based. The tornadoes that struck Stroud, Oklahoma, a rural community southwest of Tulsa, devastated three of its four top employers. Suddenly the town's tax base dissolved and as a result its only hospital closed for good (Baruch and Baruch, 2000).

## RECOVERY STRATEGIES FOR ENHANCING QUALITY OF LIFE

Enhancing quality of life can start during disaster recovery. A community can start with the *situations* that exist after a disaster, pick and choose among the *options* for improving its quality

### OPTIONS FOR MAINTAINING & ENHANCING QUALITY OF LIFE

- Make housing available/affordable.
- Provide education opportunities.
- Ensure mobility.
- Provide health & other services.
- Provide employment opportunities.
- Provide recreational opportunities.
- Maintain safe/healthy environs.
- Have opportunities for civic engagement.

of life and among the implementation *tools* available to help pursue each of those options, to develop *strategies* that are specially tailored to its own needs. The Matrix of Opportunities in Chapter 1 shows some of the options a recovering community could use to improve quality of life when faced with certain disaster-caused predicaments. The situations and options shown on the matrix, and the tools listed below, are not exhaustive; rather, they are meant to give an idea of the range of possibilities. Likewise, the sample strategies below suggest ways in which some options and disaster-induced situations could be combined to help a community improve its quality of life. Notice how each of the strategies suggested below uses one or more of

the options listed on the Matrix of Opportunities under the first sustainability principle, "Maintain & Enhance Quality of Life."

**Situation:** Damaged transportation facilities

#### Recovery Strategies to enhance Quality of Life:

- Rebuild to increase mobility. Circulation patterns should allow efficient and safe movement between home, work, and recreation, as well as effective evacuation. Rebuilding efforts should not threaten neighborhood integrity, historic and cultural resources, or environmental quality.
- Allow for alternative modes of transit such as walking and cycling. Create connecting paths and greenways for pedestrians and cyclists, with some common nodes for social interaction.

- Beautify the parking lots of public facilities. Upgrade outdoor parking lot facilities to integrate greening concepts and improve aesthetics. Community residents can be asked to compete in design competitions or tree planting and tree maintenance programs.

**Situation:** Damaged public facilities

**Recovery Strategies to enhance Quality of Life:**

- Make public facilities less vulnerable to future hazards. Move public facilities out of known hazard zones (see Chapter 8 on mitigation) but first study the impact of their new locations on future growth and transportation patterns in the community.
- Enhance educational opportunities by rebuilding or upgrading schools. Repairs, modernization, and upgrades should focus not only on structural safety but also on energy efficiency.
- Enhance public facilities and access to them by designing or re-designing schools to be magnets for recreation, sports, and meetings. Ensure that schools have recreational facilities and meeting rooms to host sports tournaments and other activities.

**Situation:** Damaged utilities

**Recovery Strategies to enhance Quality of Life:**

- Relocate critical facilities and equipment out of known hazard zones or retrofit the facilities so that hardship and disruption of services is avoided.

**Situation:** Damaged housing

**Recovery Strategies to enhance Quality of Life:**

- Create disaster-resilient, affordable housing. Re-zone parts of the community for affordable housing.
- Inventory damaged housing that has a history of abandonment and tax delinquency. Consider buyouts of these properties to eliminate eyesores and to reduce potential negative impacts on property values and potential health threats.
- Move toward energy-efficient buildings. Provide education forums and advice for home and business owners on techniques and funding sources to replace aging, damaged heating and cooling equipment with the latest techniques and equipment to lower costs.
- Provide public spaces for social interaction and recreation. Buy out homes in known danger zones and utilize the space as parkland, community gardens or other public open spaces that will promote social interaction and recreation for all residents.
- Upgrade building codes so that new construction will be done to a higher standard.

**Situation:** Damaged commercial/industrial facilities

**Recovery Strategies to enhance Quality of Life:**

- Maintain employment opportunities and minimize economic disruption (see Chapter 5 on Economic Vitality for a full discussion).

**Situation:** Environmental damage

**Recovery Strategies to enhance Quality of Life:**

- Create or enhance natural resources and environmental features at the parcel/site level and at the regional/watershed level (see Chapter 7 on Environmental Quality for a full discussion).

**Situation:** Disruption of health and safety

**Recovery Strategies to enhance Quality of Life:**

- Use the opportunity to identify gaps in family services, social services, and health care facilities and ensure that emergency plans have defined strategies and policies for short-term and long-term sheltering for residents with special needs.
- Create or update the community’s database of housing locations of most vulnerable populations for evacuation and rescue purposes. Create maps that show locations of different population segments and their potential vulnerability to future hazards.
- Consider whether staff in the health and social service sectors are representative of the wider community, especially with regard to spoken languages (see Chapter 6 on Social Equity for a full discussion).

## Tools for Enhancing Quality of Life

Conceptually, communities with a good quality of life have certain traits in common: social ties are strong, the built environment supports a comfortable lifestyle, the economy is healthy, and environmental quality is preserved. In different communities, people will interpret these traits to mean different things and will place varying levels of importance on them. Consequently, which tools used after a disaster to improve a community’s quality of life should depend, at least in part, on what residents desire to change for the better in the community. Below are some tools that could be used during recovery (or any time) to improve a community’s quality of life.

**TOOLS FOR ENHANCING  
QUALITY OF LIFE**

- Public participation
- Zoning and land use planning
- Historic preservation
- Property acquisition
- Special protection of critical infrastructure
- Environmental improvements

### Public Participation

Public participation is essential both to determine what quality of life issues are important to the residents and to obtain local support for improvements. There may be a community member willing to lead a task force or committee with a specific quality of life improvement goal. There may also be standing local committees to deal with such issues as housing, economic development, infrastructure, and hazard mitigation. Members of these committees can serve as liaisons to the public, educating other

community members about the importance of disaster mitigation in improving quality of life. (Guidelines for structuring public participation are discussed in detail in Chapter 3 of this handbook.)

### Zoning and Land Use Planning

Zoning ordinances are the development tools that regulate the location, type, and intensity of new development. Zoning has been used in many communities to restrict growth in high hazard areas, which can also improve quality of life by increasing safety. Examples of zoning techniques that have been traditionally used to keep development away from hazard areas are floodplain regulations, fault-line and coastal setbacks, and hillside development regulations.

National Flood Insurance Program communities should look into the Community Rating System (CRS). The CRS rewards communities that enact floodplain regulations that are stricter than those specifically required by the program by providing flood insurance at reduced rates. Every state has a National Flood Insurance Program coordinator, who can provide more information about the program. Information is also available on the Federal Emergency Management Agency's (FEMA's) website ([www.fema.gov](http://www.fema.gov)).

New kinds of sustainable land use planning can improve both quality of life and disaster resilience: smart growth, urban growth boundaries, infill development, minimum density zoning, and brownfields development are some available tools.

Smart growth refers to a development approach in which growth or economic development is in balance with the environment and quality of life. Smart growth directs new development to limited areas, encourages mixed-use development, and renovation of older areas.

Urban growth boundaries are used to control the extent of a city's sprawl. Rural and urban areas are clearly demarcated, with urban areas allowed to have much denser development than rural ones. Urban areas are designed to have mixed-use development, infill development, and land use patterns that may reduce the need for automobile travel.

Infilling refers to the development of vacant or less-developed parcels of land in already developed areas. Infilling encourages denser development in order to facilitate alternative transportation, urban renewal, and renewed economic vitality. Towns looking for places to house residents after a disaster might consider infilling existing urban areas.

Minimum density zoning requires that development densities stay above a certain level by mandating average or maximum lot sizes. The goal of minimum density zoning is to use land efficiently.

Brownfields are areas of land that were previously developed, where environmental concerns hinder new development. Brownfields can be reclaimed for new development through an Environmental Protection Agency program known as the Brownfields Economic Redevelopment Initiative. Brownfield redevelopment can improve the overall health and safety of the community, because brownfields must be remediated, but planners should bear in mind that environmental remediation can take time.

### **Historic Preservation**

Preserving a community's historic architecture and design adds to its aesthetic appeal, but often historic buildings were built in the path of natural disasters or have deteriorated to the point that they are unsafe. Both FEMA and the National Park Service (NPS) administer programs to help communities preserve historic buildings. FEMA's Repair and Restoration of Disaster-Damaged Properties works in concert with the Stafford Act to evaluate the effects of repairs to, restoration of, or mitigation of hazards to disaster-damaged historic structures. Through its Historic Preservation Grants-in-Aid, the NPS provides matching grants to states to expand the National Register of Historic Places.

### **Property Acquisition**

Alternative transportation and recreation are two quality of life goals that can go hand-in-hand with disaster mitigation. FEMA's Hazard Mitigation Grant Program allows for the acquisition and relocation of damaged properties. Land from buyouts can be converted to public open space.

The Transportation Emergency Relief Program under the auspices of the Federal Highway Administration provides aid for repair of federal-aid roads. These funds can be used to improve the quality and lifespan of these roads.

The NPS's Rails to Trails program allows communities to use an old railroad right-of-way for a bike or walking path. Because many railroads were built on the lowest ground available, they are often in the floodplain. Maintaining the area as a trail corridor, rather than developing it, can save money when the next flood happens and, in the meantime, provide recreation and transportation opportunities for the community. The NPS also operates a Land and Water Conservation Grant program that allows for the acquisition of land for and development of outdoor recreation areas, and a Park and Recreation Recovery Program that allows communities to provide recreational facilities in areas prone to natural hazards.

### **Special Protection of Critical Infrastructure**

At the very least, communities need to ensure that in a natural disaster, water, energy, and shelter will be available. Some communities have learned from experience the importance of taking steps to ensure that these necessities are available.

The city of Des Moines, Iowa, built a drinking water treatment plant near the confluence of the Raccoon and Des Moines rivers. In 1993, during the great Midwest flood, floodwaters from the Raccoon and Des Moines caused flooding that overtopped the drinking water treatment plant's levee. The plant was out of service for more than a week, leaving 300,000 people without drinking water. After the 1993 event, Des Moines became a Project Impact community. One of the town's first mitigation activities was to expand the floodwall at the water plant, from 24 feet to 31 feet (Hauer, 1996).

—[www.fema.gov/impact/cities/im\\_ia03.htm](http://www.fema.gov/impact/cities/im_ia03.htm)

Energy needs can be reduced by retrofitting existing buildings and encouraging the use of new techniques in new construction. Reducing energy needs could be a critical first step to ensuring that a community has energy reserves to deal with the next heat wave or cold snap. A community might consider high R-value insulation in walls or ceilings; underground power lines that are not as susceptible to damage during storms as hanging lines; designing for efficiency in terms of size and scale of buildings; retrofitting heating, ventilation, and

air-conditioning (HVAC) systems, energy-efficient windows and appliances; and conversion to alternative fuels.

### **Environmental Improvements**

Landscaping and natural vegetation enhance the quality of life in a community while also can improve disaster resilience and preserving environmental functions and values. Trees break the force of the wind and stabilize the soil, while providing shade and improving community aesthetics. Wetlands store flood water, improve surface water quality, and provide habitat for birds, which in turn, provide a recreational opportunity for local bird-watchers. Fire-resistant



vegetation can improve safety in wildfire-prone areas. On the coast, native vegetation can decrease erosion and create habitat for native species.

There are several groups and programs that can assist with environmental improvements. For example, the National Arbor Day Foundation has nine programs that encourage communities to plant trees. Many other environmental enhancement programs are discussed in detail in Chapter 7 of this handbook.

## **PURSuing STRATEGIES TO IMPROVE QUALITY OF LIFE**

Once the recovery ideas or strategies are identified, the community will need to explore them through a systematic process in order to decide on the best approach, select feasible tools, locate technical assistance, formulate details, plan for action, find funding, get approval, and move toward implementation.

### **Enhancing Quality of Life During the 10-Step Recovery Process**

Even if the community does not have or create a formal plan for enhancing quality of life, strategies for that principle of sustainability can be carried out in the context of the overall disaster recovery. Within the 10-step process described in Chapter 2, the following activities in particular will help ensure that quality of life is improved during a community's disaster recovery.

#### **Actions to take during Step 2, Involve the Public**

The recovery period presents a vast opportunity to improve the local civic capacity and to bring together diverse segments of a community. Chapter 3 provides important information about different approaches that can be used to maximize participation and Chapter 6 tells how to identify and involve people that may have been overlooked in the past.

##### **What to Do**

- Be creative—organize meetings at proper times and venues, and make sure to provide transportation, child care, and food.
- Do not reinvent the wheel. Review this manual and other resources to come up with examples of communities that have successfully incorporated principles of sustainability during the recovery process. Be prepared to share this information with the public, drawing similarities with the local situation.
- Use different media (flyers, posters, local newspaper, local television stations, and the Internet) to reach the public.

#### **Actions to take during Steps 4 and 5, Assess and identify the problems.**

Use this window of opportunity to discuss the pre-disaster conditions that detracted from the community's quality of life that can now be corrected. Use the Matrix of Opportunities shown in Chapter 1 as a starting point.

### What to Do

- As part of forums, ask community members to voice what they like and dislike about their community. This information may already be available if the community recently completed a master plan that engaged residents in a visioning process for another project. If so, use it as a starting point to ask residents to update the list.

After the meetings planners should be able to verbalize the following:

- What were the pre-disaster problems?
- What are the post-disaster problems? Which problems are common?
- Which problems are different?
- Which problems must be addressed to create, maintain, and enhance the quality of life in the community?

The New York Quality Communities Task Force listed some concrete terms that residents used to describe their community vision:

- lovely old homes
  - good place to send your children to school
  - lots of cultural opportunities
  - good housing available
  - friendly people.
- [www.state.ny.us/litgovdoc/cover.pdf.html](http://www.state.ny.us/litgovdoc/cover.pdf.html)

### Actions to take during Step 6, Set Goals and Objectives

The disaster recovery team is in the special position to work with its community to define what quality of life means to community members and create the relevant conditions during the redevelopment phase. In setting goals, public officials should engage the community in the visioning process to choose the quality of life elements that they wish to safeguard.

### What to Do

- Prepare a map of the community making sure to show main landmarks and roads. As part of meetings and forums ask residents to list their address and place a square (□) on the map to indicate where they live and an (x) where they work.
- Prepare a simple form so that residents can place a check mark next to the elements that are important to maintain and improve their quality of life. Leave blank spaces for them to add in others. Possible examples are:
  - agriculture and related industries
  - historic and rural nature of the town
  - economic vitality and influx of new businesses
  - open space, greenways, and parks
  - energy and/or water efficiency
  - diversity of species or natural resources
  - disaster-resilient, affordable housing
  - low unemployment rates
  - good public education
  - easy access to centers of employment, education, and recreation
  - easy flowing traffic (and planned evacuation routes)
  - public transit
  - community centers.

- Prepare a final map of the community from the exercises done in the prior steps, summarize the main outcomes and distribute a one page flyer to the attendees and the media as part of announcing a follow-up forum or meeting to discuss and review possible strategies and actions. Try to reach more residents, and those from different groups.

**Actions to take during Step 7, Explore all alternative strategies**

Besides considering different ways to build in quality of life concerns, work to consolidate multiple sustainability objectives as well—economic, environmental, social, and mitigation.

Select from the opportunities identified under Step 5, the goals and objectives set in Step 6, and the options and tools described in this chapter. The strategies will need to be expanded and tailor them to meet the needs of the community. It is important at this juncture to be sure that any alternative selected does not detract from any of the principles of sustainability.

**Actions to take during Step 10, Implement, evaluate, and revise.**

Because recovery is a long-term process, goals and policies for improvements in the quality of life that were formulated early in the process must be implemented gradually with ongoing funding, and by institutionalizing appropriate procedures, rules, budgets, and policies.

One of the most problematic areas is obtaining funds to carry out the community’s objectives. Be creative in seeking out grant funding, technical assistance, or in asking for assistance from agencies with quality of life interests. Do not focus only on assistance provided by the federal government. Other resources and tools can be extremely helpful.

Rhineland, Missouri, a community of 157 people, was relocated to a 49-acre plot adjacent to its previous location after being flooded four times in 1993. This effort boasts a 96% participation rate, and a well planned redevelopment phasing process.

Rhineland’s sources of funding included

- Community Development Block Grants (for infrastructure, sewers, and commercial),
- Economic Development Administration,
- Federal Emergency Management Agency,
- Missouri Housing Development Commission, and
- Village of Rhineland.

North Carolina’s Division of Emergency Management has provided communities with guiding principles of sustainability and related strategies and indicators that will result in communities that are more resilient to future natural disasters and have a higher quality of life.

The goals are categorized as:

- Sustainable Housing
- Sustainable Business
- Sustainable Critical Infrastructure
- Sustainable Environment

See the manual “Hazard Mitigation in North Carolina: Measuring Success,” produced by NCDDEM and the Federal Emergency Management Agency, listed at the end of the chapter.

## Examples of Success

The long-term recovery and reconstruction period has been used to (re)build good quality of life. Some communities have replaced aging, damaged buildings with new structures, built with the latest techniques and equipment to lower heating and cooling costs. Others use this opportunity to remedy their community's environmental and economic problems, and social problems such as the lack of disaster-resilient affordable housing. Some communities have had to begin from scratch; it is difficult, given disparities in financial and technical resources, but it is possible.

Affordable housing and home ownership have emerged as a top priorities in many rebuilding efforts. However, this affordable housing should also be disaster resilient. Research institutions, non-profit organizations, and FEMA can provide resources and advice on design and building options that are both safe and affordable. Use available resources; there is no need to start over.

The Housing Authority of Racine County in Racine, Wisconsin, has a project focused on building disaster-resilient rooms in low-income housing. Such rooms are designed to withstand winds of up to 250 mph. FEMA estimates the cost of adding a safe room to a new home or retrofitting an existing home with a safe room at \$2,000–\$4,000. The Johnson Bank in Racine County offered low-interest loans to those interested in retrofitting their homes with safe rooms (Harper, 2000).

Arkadelphia, Arkansas, was struck by a devastating tornado in 1997. Zoning regulation changes and a mix of funding sources have resulted in a greater diversity of housing types. Rural Development Administration funds were used to build attractive low-income, multi-family units and Housing and Urban Development funds were used in an innovative equity buy-down program to finance single-family home construction.

### Soldiers Grove Marches On

The relocation of Soldiers Grove, Wisconsin, took place from 1979 to 1983 and was used as a "community heart transplant" to eliminate flooding and realize other social and economic goals.

Upon the realization that a much-anticipated levee would cost \$3.5 million (to protect \$1 million worth of property), community leaders suggested that the federal government spend that money to help relocate the town instead. The community used the relocation/redevelopment phase to get out of the hazardous floodplain and address problems of a dwindling population (due to out-migration of youth to urban areas), a declining economy, and a blighted downtown.

- The old floodplain was developed as a municipal park
- The critical facilities and buildings (the fire station) were relocated out of the floodplain.
- The downtown and main street were moved closer to U.S. Highway 61 to increase activity.
- Water and sewer were extended to new development sites along the highway to encourage development.

See [www.sustainable.doe.gov/success/soldiers.shtml](http://www.sustainable.doe.gov/success/soldiers.shtml)

## VISIONS – Valmeyer Integrating Sustainability into Our New Setting

Valmeyer, Illinois, is one of the largest communities in U.S. history to completely relocate out of a floodplain. This community of 900 people located 25 miles south of St. Louis rebuilt their new town (hundreds of houses, a downtown, churches, a school, a fire station, and a post office) from scratch, 2 miles east of the older Valmeyer and 400 feet higher on a 500-acre parcel.

The residents lived in transition in what became known as the “FEMAville” trailers while each family used insurance settlements and buyout money from the Federal Emergency Management Agency to rebuild their homes. Long-time residents were determined to stay in the small farm town where they felt safe and secure—what they viewed as the quality of life they wanted to maintain. The community was also the first to benefit from the assistance of the Department of Energy’s Working Group on Sustainable Development and used substantial federal grants to encourage the use of energy-efficient technologies.

VISIONS became a slogan that guided the creation of the new Valmeyer with:

- many energy-efficient new homes (highly insulated, energy-efficient windows, low-flow showerheads, water conserving toilets, efficient heating and cooling systems)
- some passive solar homes and use of ground source heat pumps.

(Watson, 1996)

## MONITORING QUALITY OF LIFE

These five indicators and accompanying questions can be used as public officials work to maintain and enhance quality of life for the community and its residents.

### 1. A long time horizon in the decisionmaking processes.

How do the immediate short term reconstruction efforts affect the overall long-term efforts to maintain and enhance a community’s quality of life?

It is important for the recovery team to keep track of the immediate post-disaster recovery, repair, and reconstruction activities. They should not jeopardize long-term sustainability efforts.

### 2. Consistency with other local planning and development efforts.

Do the quality of life elements envisioned by the community complement other locally-driven planning and development initiatives?

The need to address quality of life should already be a guiding principle that is inherent in many ongoing local, state, and federal initiatives related to smart growth, economic development, housing, and transportation. Join forces with these other programs.

### 3. Management for multiple objectives.

How is this process promoting multi-objective management? Practice multi-objective management whenever possible. All the case studies demonstrate this

### **City of Quincy wins HUD's Local Best Practices Award**

Recovery after disaster declarations for Nor'easters in 1991 and 1992 gave Quincy, Massachusetts, the opportunity to address its quality of life goal of increasing the availability of financing for affordable housing within the city. The city provided a range of options for homeowners whose property was located in floodprone areas. The goal was to reduce vulnerability through retrofit, relocation, and structural improvements. The city also forged some creative partnerships by incorporating public funds not traditionally applied to mitigation. These activities contribute to a more sustainable community.

The success of the city's First Time Home Buyer/Local Lender Memorandum of Understanding was recognized by the U.S. Department of Housing and Urban Development when it granted a 2000 Local Best Practice Award to the City. Signees of the Memorandum included the City of Quincy through its Department of Planning and Community Development, HUD, the Massachusetts Department of Housing and Community Development, and local lenders including the Bank of Canton, Citizens Bank, Colonial Federal, Consolidated Mortgage Services, Inc., Eastern Bank, and Fleet Boston.

The three strategies included in the program demonstrate the city's commitment to incorporating multiple objectives into its mitigation strategies (1) Housing retrofitting; (2) Public works improvement; and (3) Housing acquisition and demolition.

— [www.hud.gov/bestpractices/2000/mass.html](http://www.hud.gov/bestpractices/2000/mass.html)

in one form or another. Where appropriate, set goals that are consistent with a recent comprehensive plan. Make sure the comprehensive plan takes into account the vulnerable areas.

#### **4. A vision shared by community residents.**

How is this process promoting public participation by everyone?

Always remember that quality of life should be a "shared" vision of community residents from diverse backgrounds (rich and poor, employed and unemployed, young and old, homeowners and renters, business owners and consumers). This will be a continuous process as different groups of people move in and out of the area.

#### **5. Consideration of the quality of life for current and future residents**

Is the redevelopment process contributing to an improved quality of life for current and future generations?

Aim to improve the following factors and conditions that can maintain and enhance quality of life—employment opportunities, social interaction, environmental quality, energy efficiency, equity, opportunities for civic engagement and community building, education, recreation and pleasure, affordable housing, health and safety. It makes for a stronger community!

## REFERENCES

- Baruch, S. and M. Baruch. 2000. "The Economic Vulnerability of Rural Businesses to Disasters." *CUSEC Journal* 7 (21):8-9.
- Geis, D.E. 2000. "By Design: The Disaster Resistant and Quality of Life Community." *Natural Hazards Review* 1(3):151-160.
- Harper, C. 2000. "Design and Construction Can Help Rural Homes Avoid Wind Damage." *Rural Voices* 5(4):5-7
- Hauer, Andrea. 1996. "The Power of Water in Des Moines, Iowa." *Forum for Applied Research and Public Policy* 11(3):131-33.
- Mileti, D. 1999. *Disasters by Design: A Reassessment of Natural Hazards in the United States*. Washington, D.C.: Joseph Henry Press. Available at [books.nap.edu/catalog/5782.html](http://books.nap.edu/catalog/5782.html). [accessed September 21, 2001]
- Shookner, Malcolm. 1997. *Quality of Life Summary Report*. Toronto, Ontario, Canada: Social Development Council and Social Planning Network of Ontario. [www.qli-ont.org/report.html](http://www.qli-ont.org/report.html)
- Watson, B. 1996. *A Town Makes History Rising to New Heights*. [www.sustainable.doe.gov/articles/smithsonian/index.shtml](http://www.sustainable.doe.gov/articles/smithsonian/index.shtml) and [www.sustainable.gov/success/Valmeyer.shtml](http://www.sustainable.gov/success/Valmeyer.shtml)

## WHERE TO FIND MORE INFORMATION

### Organizations

Boulder Area Sustainability Information Network (BASIN). BASIN is a pilot project designed to help deliver a variety of environmental information about the Boulder area to its inhabitants. BASIN desires to 1) improve environmental monitoring to provide credible, timely, and usable information about the watershed; 2) create a state-of-the-art information management and public access infrastructure using advanced, web-based computer technologies; 3) build strong partnerships and an ongoing alliance of governmental, educational, non-profit and private entities involved in watershed monitoring, management and education; and 4) develop education and communication programs to effectively utilize watershed information in the public media and schools and facilitate greater public involvement in public policy formation.

See [bcn.boulder.co.us/basin/main/about.html](http://bcn.boulder.co.us/basin/main/about.html) [accessed July 23, 2001]

Disaster Resistant Neighborhoods. "Building Disaster Resistant Neighborhoods Handbook." This handbook outlines a step-by-step action plan, with examples, to assist planners in working with neighborhood associations to help them become better prepared for disaster. Posted on the link along with the handbook are a variety of tools to assist in promoting the program.

See [www.tallytown.com/redcross](http://www.tallytown.com/redcross) [accessed September 21, 2001]

Joint Center for Sustainable Communities.

The advisory committee includes Wellington Webb, Mayor of Denver and President, the U.S. Conference of Mayors and C. Vernon Gray, President, National Association of Counties. See [www.naco.org/programs/comm\\_dev/center](http://www.naco.org/programs/comm_dev/center) or [www.usmayors.org/sustainable](http://www.usmayors.org/sustainable) [accessed August 3, 2001]

Local Government Commission.

The LGC is a non-profit organization “working to build livable communities” in California. LGC organizes a variety of conferences, workshops, and training sessions on land use and transportation-related issues. The organization also publishes a monthly newsletter and has a resources library with a catalog of videos and slides.

See [www.lgc.org/center](http://www.lgc.org/center) [accessed June 15, 2001]

National Arbor Day Foundation

This group sponsors programs that encourage communities to plant trees.

See [www.arborday.org](http://www.arborday.org) [accessed June 15, 2001]

## **Videos, CD-ROMs, and DVDs**

*The Link Between Sustainability & Disaster Resistant Communities.* Slide show produced by the U.S. Department of Energy and the Federal Emergency Management Agency.

[www.sustainable.doe.gov/disaster/impact](http://www.sustainable.doe.gov/disaster/impact)

This slide show explains the concept of sustainable redevelopment and gives examples of redevelopment in three communities: Soldiers Grove, Wisconsin; Valmeyer, Illinois; and Arkadelphia, Arkansas.

*Mitigation Revitalizes a Floodplain Community: The Darlington Story.* Wisconsin Department of Natural Resources. 1997. Madison, WI.

This is a splendidly produced videotape about the efforts of a small rural Wisconsin community to reverse the effects of neglect and disinvestment in its historic downtown area caused by repeated flooding and economic change. Using a multi-objective planning and management strategy, officials and citizens, in partnership with government agencies and private entities, identified six goals: 1) preserve the historic character of the downtown; 2) restore community pride; 3) acquire and relocate commercial properties at risk; 4) elevate and flood proof commercial and residential structures; 5) stimulate investment downtown; and 6) pursue tourism as an economic strategy. The video follows the mitigation process from early meetings through floodproofing and relocation. Produced by the Wisconsin Department of Natural Resources. 27 minutes. 1997. Available free from Wisconsin DNR, P.O. Box 7921, Madison, WI 53707-7921; (608) 264-9200.

*Quality Redevelopment of Eastern North Carolina.* Horizon Video Productions. 2000. Durham, NC.

This 20-minute video was produced by the state in the aftermath of Hurricane Floyd to introduce and educate local and state officials about the “better ways” available to recover from the disaster and at the same time address other local concerns such as environmental quality, economic vitality, housing, sense of community, business and job opportunities, and disaster mitigation. It



introduced a framework espoused by the state for sustainable community action and features the governor explaining the tenets of “quality redevelopment” and how it can—and did—benefit North Carolina communities and help ensure a better future for the state’s citizens. Available from North Carolina Department of Emergency Management, 1830-B Tillery Place, Raleigh, NC 27699; (919) 751-8000; fax: (919) 715-9763.

*Taking the Initiative*. Federal Emergency Management Agency, Emergency Management Institute. 2000. Emmitsburg, MD.

This 20-minute video shows how a neighborhood, two small towns, and a business owner took responsibility for and got organized to adopt sustainability principles and techniques in coping with hazards. The three separate instances, all in California, illustrate participatory processes, taking initiative, looking at the economic benefits of hazard mitigation (in one case, elevating a restaurant), incorporating livability components into a flood protection measure, and protecting the local environment and habitat. This video is available from the Emergency Management Institute at 1-800-238-3358. Ask for the “Disaster-Resistant Jobs” video.

## Books, Articles, and Chapters

Berke, Philip and Maria Manta. 1999. *Planning for Sustainable Development: Measuring Progress in Plans*. Lincoln Institute of Land Policy Working Paper. Lincoln, NE: Lincoln Institute of Land Policy. 23 pp.

Using six principles that define and operationalize the concept of sustainable development, the authors evaluated 30 comprehensive plans to determine how well the policies of these plans supported sustainable development. Findings indicate no significant differences in how extensively sustainability principles were supported between plans that state an intention to integrate sustainable development and those that did not. In addition, plans did not provide balanced support of all six sustainability principles; they supported one—the livable built environment principle—significantly more than the others.

Casey-Lefkowitz. 1999. *Smart Growth in the Southeast: New Approaches for Guiding Development*. Washington, D.C.: Environmental Law Institute Research Publications.

The southeastern United States has been trying to find ways to continue to reap the benefits of the region’s bustling economy without the mounting fiscal, health, and environmental costs of poorly planned development. This report provides an overview of land use and transportation trends in seven states—Alabama, Georgia, Florida, North Carolina, South Carolina, Tennessee, and Virginia—and shows how these states are beginning to shape the pace and location of development by promoting community revitalization, conservation, and transportation alternatives.

Clinton-Gore Administration. 2000. *Building Livable Communities: Sustaining Prosperity, Improving Quality of Life, Building a Sense of Community*.

This report identifies steps that the Clinton-Gore Administration took to help communities grow in ways that ensure a high quality of life and strong, sustainable economic prosperity. It includes a brief description of challenges faced by urban, suburban, and rural communities, the innovative ways that some are meeting them, and the Livable Communities Initiative—a package of 30 policy actions and voluntary partnerships that support local efforts to build livable communities.

*CUSEC Journal* 7(1).

This special issue focused on the economic vulnerability of rural communities and on disaster recovery for small businesses. The journal is produced by the Central U.S. Earthquake Consortium. For more information contact the CUSEC Office at (901) 544-3570 or see [www.cusec.org](http://www.cusec.org) [accessed September 21, 2001]

Department of Energy. 1994. *Rebuilding Your Flooded Home: Guidelines for Incorporating Energy Efficiency*. DOE-EE-0019. Washington, D.C.: U.S. Department of Energy, Office of Building Technologies, 36 pp.

After disasters, the natural tendency is to return to one's home and restore it to the way one left it. Due largely to recent advances in building technologies, it is possible to rebuild a residence with a little extra care—and not much more time and cost—and have a home that is much more energy efficient than it was before the disaster. Because many house components will have to be replaced, i.e., insulation, it makes sense to purchase the most energy-efficient equipment and materials available. Following sections about drying out a flooded house and on personal safety when cleaning up, the document explains how to analyze the property for building shell problems (air leakages, foundations, flooring, etc.), then considers building systems and equipment issues (electric motors, air conditioning, and appliances). Suggestions are presented and tips are provided for financing energy-efficient solutions, such as buying materials in bulk if many properties are affected.

Federal Emergency Management Agency. n.d. *Safeguarding Your Historic Site: Basic Preparedness and Recovery Measures for Natural Disasters*. Boston, MA: U.S. Federal Emergency Management Agency, Region I. 55 pp.

Drawing upon experience gained through disasters in Nantucket, Massachusetts, and Montpelier, Vermont, this document helps stewards of historic sites—including historic buildings, landscapes, districts, and museums—prepare their sites to withstand and recover from a natural disaster. The handbook can also be used by public officials, planners, community development professionals, and emergency management professionals as a general step-by-step guide to emergency planning for such facilities. Before a disaster strikes, the handbook provides information about identifying and assessing the risks to a facility, describes preventive measures for historic sites, and presents emergency planning guidelines. During the disaster itself, the handbook describes what can be done in the time available. After the disaster, guidelines are given for stabilizing the situation and recovering from the impacts. Preventive measures and preservation considerations are provided for four disaster agents: wildfire, hurricanes, riverine floods, and earthquakes.

Federal Emergency Management Agency. 2000. *Planning for a Sustainable Future: The Link Between Hazard Mitigation and Livability*. FEMA Report 364. Washington, D.C.: Federal Emergency Management Agency. 40 pp. Available at [www.fema.gov/mit/planning\\_toc.htm](http://www.fema.gov/mit/planning_toc.htm).

This booklet is about hazard mitigation, disaster resistance, sustainable development and livability, and describes the linkages among these concepts. It shows how communities that undertake hazard mitigation planning become more disaster resilient and reap further benefits. Hazard mitigation links disaster resistance to broad community objectives of economic health, social well-being, and environmental protection.

Federal Emergency Management Agency. 2000. *Rebuilding for a More Sustainable Future: An Operational Framework*. FEMA Report 365. Washington, D.C.: Federal Emergency Management Agency. Available at [www.fema.gov/mit/planning\\_toc2.htm](http://www.fema.gov/mit/planning_toc2.htm).

This document provides guidance to the Federal Emergency Management Agency (FEMA) Sustainability Planner in the post-disaster response and recovery process. State emergency management officials, local jurisdictions, and other FEMA staff may also use it as a reference during non-disaster time.

Flink, Charles A. and Robert M. Searns. 1993. *Greenways: A Guide to Planning, Design, and Development*. Washington, D.C.: Island Press. 351 pp.

Within the developed landscape, greenways serve a dual function: they provide open space for human access and recreational use, and they serve to protect and enhance remaining natural and cultural resources. This manual provides interested organizations and concerned individuals with background information about planning a greenway project, how to enlist local assistance in organizing project support, funding the project, related water recreation, greenway safety and liability, management, and planning for the care of rivers, streams, and wetlands. Information is provided on preserving stream and river functions, the impacts of urbanization on riparian regimes, and the establishment of organizational partnerships to plan, realize, and preserve greenway arrangements.

Geis, D.E. 2000. "By Design: The Disaster Resistant and Quality of Life Community." *Natural Hazards Review* 1(3):151-160.

According to Geis, the present approach to designing and building communities is inadequate and is inflicting great and growing harm—physically, environmentally, socially, economically, and emotionally—that we can no longer tolerate. The disaster resilient community concept, the first step toward creating quality-of-life communities, was created specifically to provide a new way of thinking. A number of basic questions need to be addressed. What are Disaster Resistant Communities? Why are they important? What are the benefits? What is the relationship between a Disaster Resistant Community and a sustainable quality-of-life community? And, most importantly, how do we go about creating them? This article provides the answers to these questions so that the concept can be better understood and used to its fullest potential.

Kline, Elizabeth. 1997. *Sustainable Community: Topics and Indicators*. Available at [ase.tufts.edu/gdae/modules/modinstruct.html](http://ase.tufts.edu/gdae/modules/modinstruct.html) [accessed June 22, 2001]

These narratives about sustainable community indicators were developed under a contract with the U.S. Environmental Protection Agency. The primary audiences are community practitioners and technical resource people.

Mileti, Dennis S. 1999. *Disasters by Design*. Washington, D.C.: The Joseph Henry Press. 351 pp. Available at [books.nap.edu/catalog/5782.html](http://books.nap.edu/catalog/5782.html). [accessed September 21, 2001]

This book is a summary volume of the Second National Assessment of Research on Natural Hazards with the formal mission of summarizing what is known in the various fields of science and engineering that is applicable to natural and related technological hazards in the United States, and making some research and policy recommendations for the future. It summarizes the hazards research findings from the last two decades, synthesizes what has been learned, and outlines a proposed shift in direction in research and policy for natural and related technological hazards in the United States. *Disasters by Design* is intended for a general audience, including policymakers and practitioners.

North Carolina Emergency Management Division and Federal Emergency Management Agency. 2000. *Hazard Mitigation in North Carolina: Measuring Success*. Raleigh, NC.

To accelerate the institutionalization of hazard mitigation in North Carolina, the North Carolina Emergency Management Division established the Hazard Mitigation Planning Initiative, a long-term program to build local capacity to implement mitigation policies and programs in communities across the state. Through a series of case studies, this study documents losses avoided as a result of the implementation of a wide range of mitigation measures, including elevations and the acquisition and relocation or demolition of floodprone properties.

Rueter, Patty. 1998. *Town Centers: Why? What? How?* Portland, OR: Portland State University, School of Urban and Public Affairs, Institute of Metropolitan Studies, Community Fellowship Program.

This report is a study of Portland's growth management challenge including reviews of history, standards, and societal needs as they related to recent community involvement in Portland's town center planning process.

*Rural Voices* 5 (Fall)

This special issue of the magazine, produced in 2000 by the Housing Assistance Council, featured several stories on the "Lessons from Disaster." The Housing Resource Council has also written a guide that explains resources available from federal and state governments for rebuilding housing after a disaster, on a temporary basis or long-term. Contact the national office at (202) 842-8600 or [hac@ruralhome.org](mailto:hac@ruralhome.org)

Schwab, Jim; Kenneth C. Topping, Charles C. Eadie, Robert E. Deyle, and Richard A. Smith. 1998. *Planning for Post-Disaster Recovery and Reconstruction*. PAS Report No. 483/484. Chicago, IL: American Planning Association. 346 pp. Abstract available at [www.planning.org/apapubs/details.asp?Num=1178](http://www.planning.org/apapubs/details.asp?Num=1178). [accessed September 21, 2001]

This document helps community leaders and planners educate their constituents on how informed decisions and choices can affect the rebuilding process and yield a safer, more sustainable community. This report introduces planners to their roles in post-disaster reconstruction and recovery, and provides guidance on how to plan for post-disaster reconstruction side by side with all other players involved. A key theme throughout this report is to rebuild to create a more disaster-resilient community. The report contains many references to technical resources.

U.S. President's Council on Sustainable Development. 1997. *Sustainable Communities Task Force Report*. Washington, D.C.: U.S. Government Printing Office. 186 pp.

This report, and its companion volume, *Sustainable America: A New Consensus for Prosperity, Opportunity, and a Healthy Environment for the Future*, published in 1996, lay out a set of policy recommendations for planning for sustainable communities. One of the recommendations is to "shift the focus of the federal disaster relief system from cure to prevention." The appendix contains case studies of communities that have set forth sustainability principles, profiles of communities in the 50 states, state-led sustainability initiatives and organizations, and a list of resources for sustainable communities.

## Additional Reading

- Baruch, S. and M. Baruch. 2000. "The Economic Vulnerability of Rural Businesses to Disasters." *CUSEC Journal* 7(21):8-9.
- Department of Housing and Urban Development. 1998. *Building Communities and New Markets for the New Century*. Washington, D.C.: U.S. Department of Housing and Urban Development. 78 pp. plus second volume of appendices.
- Hanson, Kate and Ursula Lemanski. 1995. "Converting flood 'buyout' areas to public open space: Case studies from Iowa." Pp. 95-100 in *From the Mountains to the Sea--Developing Local Capability*. Proceedings of the Nineteenth Annual Conference of the Association of State Floodplain Managers. Special Publication 31. Boulder, CO: Natural Hazards Research and Applications Information Center.
- Harper, C. 2000. "Design and Construction Can Help Rural Homes Avoid Wind Damage." *Rural Voices* 5(4):5-7.
- Moran, E.F. 2000. "North Carolina Disaster Recovery: Lessons Learned." *Rural Voices* 5(4):12-15.
- New York Times*. 1999. "Suburbia Learns It Has Paved Over the Natural Defenses to Flooding" Wednesday, September 29: B1&B8.
- Tibbetts, John. 1998. *Open Space Conservation: Investing in Your Community's Economic Health*. Cambridge, MA: Lincoln Institute of Land Policy.





## BUILDING ECONOMIC VITALITY INTO DISASTER RECOVERY

---

### INTRODUCTION

A vital local economy is one of the fundamental principles of sustainability. Embracing sustainability in the local economy means paying attention to environmental, social equity, disaster resilience, and quality of life factors within the economy—not just to the bottom line. It means

- harmonizing economic development to ensure protection of environmental resources,
- accounting for the environmental costs of economic development,
- incorporating hazard mitigation into new development and redevelopment,
- striving for economic development and diversity that support a broad range of community needs,
- promoting economic decisions and investments that support social and intergenerational equity, and
- paying attention to design details that can maintain and enhance local quality of life.

The course to achieving these goals is artful and evolutionary, not prescriptive. It is a matter of bringing the perspectives of sustainability into every discussion of policymaking and investment that affects a community's economy.

This chapter is organized into four parts. The rest of the Introduction discusses opportunities and challenges posed to economic sustainability after a disaster, and the balancing of short and long-term perspectives. It also discusses the components of economic vitality, describes the structure of a local economy, and emphasizes the importance of understanding how the components may be affected by the disaster. The second section, Recovery Strategies for Building Economic Vitality, offers ideas about how disaster can be transformed into opportunity through a range of recovery strategies that support economic vitality. The third section, Pursuing Strategies for Economic Vitality during Recovery, outlines a series of actions a community can take to organize and succeed with sustainable economic recovery. The final section, Examples of Success, cites examples from disasters to illustrate the recent application of sustainable economic recovery.

## **Economic Opportunities and Challenges in Disaster Recovery**

The economic component of sustainability will become especially prominent after a community is struck by a disaster. Recovery from disaster is fundamentally an economic proposition and requires that substantial capital be reinvested into the community. Public capital must repair and rebuild facilities and infrastructure. Private capital must be directed into business recovery and housing. Insurance funds provide another source of capital that can have a major impact on recovery. The pace and success of recovery will be determined by how well the community attracts, effectively utilizes, and sustains the flow of investment capital from a multitude of sources through the rebuilding period.

Through the disaster recovery process a community can have heightened opportunities to direct these capital investments to rebuild the economy and the community in ways that maximize its sustainability. Simultaneously, the community faces a substantial challenge in ensuring that sources of capital from outside the region align with local goals for sustainable development.

Outside sources can both spur sustainability and undermine it. For example, public assistance programs can mandate mitigation but impose requirements that limit a community's options. Private and public investment may be focused on limiting front-end construction costs (first costs) at the expense of long-term sustainability (lower life cycle costs for buildings). The policies and requirements for using insurance funds in disaster recovery are another variable that can have major consequences for sustainability.

These considerations are particularly important because research indicates that the percentage of reconstruction that is financed by sources outside the region is one of the most influential variables determining the success of recovery. Regional indebtedness and long-term losses from a disaster have been shown to decrease inversely relative to the share of outside capital that finances recovery (Chang, 1997).

The post-disaster situation forces a community to reassess its economic situation. In some cases, a disaster might involve only a cursory look at economic policy. For example, the Oakland Hills urban wildfire recovery was primarily residential in scope. In other instances, such as flood recovery in Grand Forks, North Dakota, and East Grand Forks, Minnesota, or earthquake recovery in Santa Cruz and Watsonville, California, and Kobe, Japan, the economic setting was changed in fundamental ways by the disaster. Recovery demanded that the communities create new opportunities and build economic components into their post-disaster recovery plans that reflected underlying changes in the local and regional economies.

## **Achieving A Balance**

The process of rebuilding a more sustainable economy entails a critical balancing act. On the one hand, there is no recovery without economic vitality—no investment, no growth. Yet there may be potentially higher short-term costs associated with sustainable redevelopment, such as for buyouts of floodprone properties or for costs associated with the adoption and implementation of higher development standards or building codes.



At the same time, there is pressure to move fast and furiously after a disaster. This pressure can result in economic development being pursued without careful attention to environmental planning, social equity, and other elements of sustainability. This has the potential to re-create the same unsustainable, vulnerable conditions that turned the natural event into a community disaster in the first place.

The trick during recovery, therefore, is to demonstrate the long-term economic benefit of sustainable development (or redevelopment) while fully supporting short-term economic activity, and to infuse post-disaster plans, policies, and programs with principles of sustainability.

Pre-disaster planning and pre-disaster recovery policies can be especially important in achieving this balance and ensuring a holistic recovery. For example, if there is already a database of at-risk properties and plans for buyouts, that can help recovery move ahead more quickly. Having pertinent knowledge available from pre-event planning can make it easier for the people of a community to understand choices, make decisions, and support long-term implementation. Conversely, delay can be debilitating.

### **Economic Structure and Sustainability**

Each community has a unique economic context and a specific set of drivers in the local economy. The overall health of the local economy will rise and fall with the fortunes of the specific economic sectors that are present in the community.

The economic sectors that make up a local/regional economy (manufacturing, services, retail trade, agriculture, construction, finance, tourism, education, and others), interact among each other in complex ways, exhibiting certain synergies and fluctuation of strength among the individual sectors. Economic vitality can be understood by examining the component parts of the local economy and assessing trends and opportunities within each sector. Factors such as employment, projected growth, relative significance of particular sectors within the total economy, and emerging outside forces such as the business cycle and industry-wide trends collectively establish the relative vitality of the local economy.

The relative sustainability of the local economy is a matter of how the economy is structured, and is an outcome of how well or poorly each sector of the economy functions with respect to environmental responsibility, social equity, disastrous events, and quality of life. For example, an agricultural economy that preserves farmland but chronically overdrafts a groundwater basin is not going to sustain itself. Conversely, conversion of prime farmland to meet human needs is not automatically “unsustainable” if it is done in a judicious way, based on a long-term plan that advances social equity, livability, environmental quality, and economic vitality by balancing and supporting both farming productivity and the provision of human needs through urban growth.

### **Economic Changes in the Aftermath of Disaster**

Building economic vitality into disaster recovery must proceed from a clear understanding of the component parts of the economy and how the new post-disaster conditions affect those components. Here again, pre-event planning and analysis that address economic factors can help to jump-start and improve the quality of post-disaster planning.

In the post disaster setting the investment calculations may change dramatically. For example, a major retailer or manufacturing facility that was perfectly happy with the return on investment in the pre-disaster setting might not be willing to re-invest after the disaster because the cost of repairing or rebuilding may be substantially higher, thereby making re-investment unprofitable. Or, as in Kobe, Japan, and Northridge, California, a loss of local population centers may devastate local or neighborhood-serving small businesses. On the positive side, the disaster can provide new opportunities for economic development that were not possible previously.

Uncertainty compounds and heightens the post-disaster economic recovery challenges. Will competing areas forever take market share away from a local facility? How quickly will other businesses re-open to establish critical mass? How soon will infrastructure be in place? Will enough housing be available to sustain neighborhood-serving small businesses? How different will the new economic context be?

## **RECOVERY STRATEGIES FOR BUILDING ECONOMIC VITALITY**

Building economic vitality can start—or continue—during disaster recovery. A community can start with the *situations* that exist after a disaster, pick and choose among the *options* for improving its economy and among the *tools* available to pursue each of those options, to develop *strategies* that are specially tailored to its own needs. The Matrix of Opportunities in Chapter 1 shows some of the options a recovering community could use to further economic vitality while it tends to other disaster-caused predicaments. The situations and options shown on the matrix, and the tools listed below, are not exhaustive; rather, they are meant to give an idea of the range of possibilities. Likewise, the sample strategies below suggest ways in which some options and disaster-induced situations could be combined to help a community improve its economy. Notice how each of the strategies suggested below uses one or more of the options listed on the Matrix of Opportunities under the second sustainability principle, “Enhance Economic Vitality.”

### **Transforming Disaster into Opportunity**

Economic vitality is the engine that drives recovery. Communities that have successfully recovered and sustained their economic vitality have demonstrated an ability to synchronize their local goals with larger market forces and to act on opportunities to create new partnerships not only with businesses and investors, but also with non-governmental organizations, insurers, educational institutions, and other segments of the community.

#### **OPTIONS FOR BUILDING ECONOMIC VITALITY**

- Support area redevelopment/revitalization.
- Attract/retain businesses.
- Attract/retain work force.
- Enhance economic functionality.
- Develop/redevelop recreational, historic, tourist attractions.

Economically successful communities

- conscientiously seek out what people’s needs and preferences are,

- respond to community values in economic planning,
- creatively utilize traditional economic revitalization tools such as redevelopment authority,
- find ways to transform business districts into more interesting and diverse places,
- pro-actively seek and bring in investment and technical assistance partners from within and outside the community,
- establish positive images to attract investors,
- create new visions for their communities rather than attempting to restore what existed before the disaster, and
- formulate short-term survival strategies to maintain continuity in the economy while long term recovery takes place.

A disaster can provide a community with unprecedented opportunities to bring together economic, social equity, quality of life, and environmental goals. After a disaster, community awareness about the value and need for mitigation is extraordinary. Moreover, because the status quo is no longer an option, there can be greater openness to new ideas and to considering and learning from people with different perspectives. This facilitates the opportunity to move beyond old stereotypes and create new community political alliances.

### **Supporting Economic Vitality through Recovery Strategies**

Nearly every aspect of the urban fabric can play a role in the functionality and success of the local economy. Here are some illustrations of how recovery of specific damaged community components can support economic sustainability through strategic post-disaster recovery planning and action.

**Situation:** Damaged transportation facilities

#### **Recovery Strategies to Build Economic Vitality:**

- Rebuild to enhance capacity. Increase the ability to bring people into a business district, and to move goods in and out of a community.
- Rebuild to improve functionality. Create a different circulation pattern; create and/or expand transit.
- Undo past mistakes and support redevelopment. Demolish an unneeded overhead freeway to re-establish a stronger urban pattern as a key element of economic revitalization of a district.
- Rebuild to promote more sustainable transportation systems. Change land use to promote higher density, mixed uses, and/or concentrated development in support of less auto-dependent transportation systems.

**Situation:** Damaged public facilities

**Recovery Strategies to Build Economic Vitality:**

- Rebuild to transform/expand school facilities in support of economic strategies. Form partnerships between the city and the school district to rebuild the high school auditorium as a community performing arts facility.
- Upgrade public spaces to support economic revitalization. Create new sidewalks and street furniture and plant street trees to create a downtown “civic living room” to enhance the pedestrian experience and increase commercial activity.
- Locate new public uses into a damaged area. Establish a community college branch in a downtown to expand activity and population. Establish a community center for displaced families and others to meet social goals and create higher activity level in support of economic goals.
- Rebuild key economic facilities to improve economic and environmental functionality. Rebuild a port facility with state-of-the-art characteristics resulting in greater capacity, reduced energy consumption, restoration of environmental features, enhanced pollution controls, and disaster-resilient design.

**Situation:** Damaged utilities

**Recovery Strategies to Build Economic Vitality:**

- Create new infrastructure that supports economic growth while incorporating sustainable features. Rebuild a damaged telecommunications system for increased capacity; establish stormwater systems where none existed; increase capacities of water, wastewater or power facilities to meet future economic needs; use disaster-resilient designs.
- Form partnerships with utility companies to upgrade the system. Add fiber-optics or other advanced technologies in infrastructure when it is rebuilt.

**Situation:** Damaged housing

**Recovery Strategies to Build Economic Vitality:**

- Create new housing opportunities to support area redevelopment. Establish new housing stock in a rebuilding area to support neighborhood-serving businesses.
- Create new housing stock to serve specialized needs in the economy. Leverage housing reconstruction assistance to alleviate farm worker housing shortages.
- Create housing to attract or retain businesses. Establish housing near job centers and in keeping with the housing needs and preferences of workers.
- Improve neighborhoods to attract or retain businesses. Establish new schools or parks to improve neighborhood vitality. Upgrade housing that was not damaged but could benefit from higher levels of mitigation or quality.
- Relocate housing out of hazard zones. Create new public attractions such as parks and recreation facilities in floodprone areas to mitigate a hazard and attract people into a business district.

**Situation:** Damaged commercial/industrial facilities

**Recovery Strategies to Build Economic Vitality:**

- Rebuild commercial buildings with enhanced business-supporting features. Rebuild retail buildings to have increased floor-to-ceiling ratios, window/display area, and better floor layouts.
- Create interim commercial facilities. Build temporary retail spaces consolidating multiple businesses in shared facilities.
- Establish and/or improve mitigation features. Rebuild commercial/industrial facilities in floodprone areas with elevated electrical elements and ability to seal water out in floods.

**Situation:** Environmental damage

**Recovery Strategies to Build Economic Vitality:**

- Restore damaged environmental features in ways that support other economic goals. Consider adding improved public pedestrian access along the coastline to encourage tourism while repairing coastal erosion damage.
- Integrate natural features into business district recovery. Upgrade damaged river levees with improved walkway connections and linkages with a downtown commercial area.
- Establish new tourism opportunities based on interest in understanding natural systems. Set up an “earthquake park” focused around dramatic examples of faulting, liquefaction, or landslides.
- Establish memorials or tributes. Memorialize people or events in new greenbelt areas.

**Situation:** Disruption of health and safety

**Recovery Strategies to Build Economic Vitality:**

- Relocate and reuse medical facilities to support economic as well as health objectives. Relocate a damaged hospital while repairing and re-using the previous structure for mixed use housing, commercial, or office uses.

## Tools for Economic Vitality

Although long-term economic recovery is never an easy task, especially for small communities struck by natural disaster, the recovery team and the local planners have many resources at their disposal to help the community recover economically. Because economic recovery is recognized as being one of the most important, and difficult, aspects of disaster recovery, many federal agencies have programs to help communities get back on their feet.

### Redevelopment and housing

Housing is essential for economic recovery because a consumer base is needed to support the businesses in any community. Rather than developing pristine land, a community might consider redevelopment of existing areas by infilling and converting buildings to other uses. Infilling involves “filling in” undeveloped or less developed parcels of land in order to use the land more efficiently, and to encourage multiple-use

### TOOLS FOR BUILDING ECONOMIC VITALITY

- Redevelopment and housing
- Economic incentives
- Loan programs
- Public-private partnerships
- Capital improvements
- Redistricting

development. Natural disasters can also provide chances to redevelop economically depressed areas. One current trend in redevelopment is to convert old warehouses to lofts and apartments.

The redevelopment stage of recovery is also a good time to plan for affordable housing. Hazard-prone land is often inexpensive, and although property acquisition is a good idea for mitigating future natural hazards, doing so may leave poor residents unable to afford new housing. Communities that are economically diverse tend to be healthier economically, so planning for affordable housing makes sense for the economic vitality of the community as a whole.

The Federal Emergency Management Agency's (FEMA's) Disaster Housing Program provides for short-term lodging, home repair assistance, mortgage and rental assistance, and small grants to incorporate hazard mitigation in home repair.

### **Economic Incentives**

State and local governments can use many economic incentives to encourage sustainable redevelopment. One is tax increment financing (TIF) districts. A TIF district establishes a current base level of taxation determined by existing property values and assigns additional increments resulting from increases in property values to a special fund used to pay for infrastructure improvements within the district. TIF districts are one mechanism for financing economic recovery in an area badly devastated by a natural disaster.

Another option is to assess impact fees. The idea is to make development pay the costs of infrastructure expansion. These fees can pay for new schools, libraries, police stations, and other services. Differential taxation is a mechanism that can be used by local government that seeks to retain undeveloped land in a hazard-prone area. The use of this tool is likely to be heavily dependent on state law, so its use in a given locality should be thoroughly investigated.

Finally, density can be reduced in hazard-prone areas using transfer of development rights (TDR). Property owners in hazard-prone places can sell their development rights to developers in nonhazardous areas.

### **Loan Programs**

There are many sources of loans to help individuals and small businesses recover. The U.S. Department of Agriculture's Farm Service Agency provides low-interest loans to family farmers and ranchers for production losses and physical damage. This agency also provides loans for farm operating costs, and loans for improving farms and ranches, including soil and water conservation activities that can contribute to natural hazard mitigation.

The Economic Development Administration (EDA) of the U.S. Department of Commerce awards revolving loan fund grants to state and local governments to provide a source of local financing to support business and economic recovery after a major disaster when other funding is insufficient or unavailable.

The FEMA Community Disaster Loan Program provides loans of up to 25% of a local government's annual operating budget to help communities recover from disaster.

The Small Business Administration (SBA) provides direct loans, called Economic Injury Disaster Loans, to small businesses and agricultural cooperatives to help with disaster recovery. The SBA also provides physical disaster loans, which are direct loans to businesses, nonprofit organizations, and individuals to repair or replace uninsured property losses caused by disaster.

### **Public-private Partnerships**

Probably the best publicized public-private partnership is FEMA's Project Impact initiative, which was based on the principle that preventive actions must be decided at the local level, with private sector participation. Under this agreement, government provides expertise and technical assistance at the national and regional levels, while the community is responsible for planning and engaging the private sector. This is only one possible public-private partnership design. A community should consider benefits the local government can provide to the private sector, in exchange for their participation in mitigation and other sustainability activities.

### **Capital Improvements**

A local government's spending authority should not be overlooked after a natural disaster. Making capital improvements to existing infrastructure can promote economic development and vitality. Moving existing schools, fire stations, and other facilities out of the way of natural hazards is a sensible use of local funds. A community's sustainable redevelopment plan should specifically disallow siting of public facilities in hazard-prone areas.

A few communities have moved their main economic districts away from the path of danger. Soldiers Grove, Wisconsin, moved its downtown business district away from the Kickapoo River in the early 1980s. Pattonsburg, Mississippi moved the entire town to higher ground after the 1993 Midwest floods. If mitigation is necessary, FEMA Public Assistance or Hazard Mitigation Grant Program funds can be used to retrofit or move damaged infrastructure. Moreover, a community may redirect Community Development Block Grants as the non-federal match for Hazard Mitigation Grant matching money in order to make mitigation more affordable.

### **Redistricting**

Local governments can send a market signal to developers and home buyers by establishing the principle that special services, such as those likely to be used during and after a natural hazard, must be supported through special taxes, fees, or assessments in the affected area. California set a precedent for this kind of redistricting by establishing Geological Hazard Abatement Districts. Local governments in the state can establish special assessment districts in the area of known geologic hazards and collect fees from property owners to finance repairs from landslides and implement geologic hazard mitigation measures.

## **PURSUING STRATEGIES FOR ECONOMIC VITALITY**

Once its recovery ideas—or strategies—are identified, the community will need to explore them through a systematic process in order to decide on the best approach, select feasible tools, locate technical assistance, formulate details, plan for action, find funding, get approval, and move toward implementation.

Within the 10-step process described in Chapter 2, the following activities in particular will help ensure that economic vitality is improved during a community's disaster recovery.

**Actions to take during Step 1, Get organized.**

Economic recovery may be accomplished with a series of focused planning endeavors, or there may be a need for a more comprehensive plan. In either case, economic planning must be structured so that key stakeholders and the broader community are both involved in the process of identifying and resolving issues.

**What to Do**

- Consult with businesses, organizations, and community leaders to plan a recovery process for the various components of the local economy.
- Use specialists (local and/or outside expertise).
- Ask for planning grants and technical assistance from federal and/or state sources.
- Make sure key business stakeholders are represented on recovery planning committees.

**Actions to take during Steps 2 and 3, Involve the community.**

Both professionals and the general public need to be included in considering economic sustainability. Much new learning can take place in the recovery planning process as competing factions and perspectives from within the community become united by a common goal. The desire to participate is heightened as is openness, flexibility, and willingness to compromise. But there must be a demonstrated commitment to community involvement and a viable participatory process. See Chapter 3 for ideas on how to use a participatory process during recovery.

**What to Do**

- Design public participation into various components of recovery.
- Include the business community and insurance industry.
- Publicize the sustainability and economic factors that will drive the decisionmaking.
- Be open to new formats for participation (lectures, workshops, and other activities beyond the traditional public hearing and town meeting formats).
- Take advantage of technology for disseminating information and getting ideas and response.

**Actions to take during Steps 4 and 5, Identify and evaluate the economic problems.**

Assess the post-disaster economy. Disasters can have the effect of compressing and accelerating previous trends. For example, if a downtown is in a slow decline, the disaster might fast-forward the negative trend and compound it. Conversely, new opportunities may be emerging. The Matrix of Opportunities in Chapter 1 can be used as a starting point for identifying what changes the disaster may have brought.

**What to Do**

- Get expert analysis of trends, costs of rebuilding, and opportunities for economic growth.



- Do an impact analysis of the effects of the disaster on various aspects of the local economy.
- Consider sponsoring training sessions for small business owners to let them know what they may be facing during disaster recovery that they might not realize—both problems and opportunities—and the assistance that could be available to them. The *Disaster Planning Toolkit*, developed by the Institute for Business and Home Safety, is a good basis for such a workshop (see the list at the end of this chapter).

**Actions to take during Step 7, Explore all alternative strategies.**

While the pressure is on to act quickly, the recovery period offers an opportunity to act on new understanding of environmental hazards and other components of long-term sustainability. Insist that full consideration of sustainable principles be part of the economic recovery planning. Unite economic, social equity, quality of life, and environmental perspectives, and examine the potential impact of each alternative on the status of the other aspects on sustainability within the community.

Select from the opportunities identified under Step 5, the goals and objectives set in Step 6, and the options and tools described in this chapter. Expand and tailor them to meet a community’s needs.

**What to Do**

- Establish sustainability principles as part of economic recovery planning.
- Evaluate and compare the economic outcomes of various planning options.
- Identify economic and other consequences of *not* rebuilding in environmentally and socially sustainable ways.

The following additional suggestions will help a community structure its approach to economic recovery. Although some elements overlap with other components of sustainability, this list focuses on the needs and objectives particular to economic recovery.

- **Keep the economy going in the short term.** While long-term planning is taking place, make sure that the critical components of the local economy are as functional as possible. Devise strategies and funding to create interim facilities such as commercial locations, port facilities, and manufacturing areas.

**HINTS FOR ECONOMIC RECOVERY**

- Keep the economy going in the short-term.
- Build capacity for the long haul.
- Be opportunistic; move quickly.
- Establish new partnerships.
- Pursue multiple strategies and momentum-building projects.
- Develop new local recovery resources.

**What to Do**

- Work with businesses directly on interim operating strategies.
- Establish funding sources and administrative capacity to reconstruct damaged facilities or set up temporary ones.

## SUPPORTING SMALL BUSINESSES

Small businesses typically have a much harder time sustaining themselves after a disaster than do large businesses or corporate entities. Small businesses may suffer a host of burdens such as loss of immediate population (locally focused market), shortage of employees, disrupted traffic circulation, cash-flow problems, lack of capital, and loss of suppliers.

Sometimes business owners who work hard to recover end up worse off than those who pulled out (e.g., they exhaust personal and business sources of capital), even after obtaining forms of assistance, because they do not fully understand the changed economic context and do not adjust their business plans accordingly.

Local governments can support small business recovery by generating and disseminating economic analyses that businesses can use in their own planning. Businesses need to know:

- how the disaster affected their customer base (who is left, what they can afford);
- the relative demand for their goods and services in the post-disaster setting;
- how the disaster affects their key suppliers;
- competitive advantages that other areas possess and the likelihood of market share shifting elsewhere as a result;
- new opportunities in the post-disaster setting that can be maximized by the small business; and
- what the government will do with respect to short- and long-term recovery plans and how these plans might support their particular business.

This kind of information can be a critical component of the local support package that should also include restoration of utilities and infrastructure, financial support such as loan or grant programs, and strategies for temporary relocation of businesses.

Small businesses, meanwhile, would be well-advised to make a new business plan that is fully cognizant of the above factors in formulating their own post-disaster recovery strategy.

- **Build capacity for the long haul.** Recovery of the economy can be a long-term proposition, as is the inclusion of more environmentally sustainable land use and design decisions. Because recovery takes place in a series of small increments, goals and policies formulated early in the process must be consistently implemented over time with ongoing funding, and by institutionalizing appropriate regulations and procedures.

### What to Do

- Make sure that plans, goals, and policies have implementation plans and mechanisms associated with them that ensure consistent attention over time.
- **Establish new partnerships.** Many of the early investments in economic recovery require new efforts by the local government to reach out and establish new partnerships. Government involvement can range from brokering deals and bringing potential partners together to political persuasion (e.g., cajoling re-investment in a damaged area) to

financial involvement with key economic players such as an anchor retailer in a damaged central business district. The non-profit sector can also be a significant source of financial, technical, and administrative capacity.

### What to Do

- Begin discussions immediately with key retail, manufacturing, insurance, educational, or other local and regional economic heavy hitters to discuss and formulate mutually supportive and sustainable economic strategies.
  - Strategize with state and federal elected officials to create and support intergovernmental and public/private partnerships.
  - Work with local, regional, and national non-profit groups such as community foundations, housing or economic development corporations, and environmental or professional organizations, to find ways to focus new resources into recovery.
  - Look for ways in which the goals and objectives of other organizations can be focused to support local economic recovery actions (e.g., expanding a pre-disaster project or investment by leveraging post-disaster assistance).
- **Be opportunistic; move quickly.** In the initial aftermath of the disaster many offers of assistance are forthcoming from many public and private sources. This window of opportunity closes as attention drifts elsewhere. Successful economic recovery maximizes these brief moments of potential by moving quickly and responsively to take advantage of them.

### What to Do

- Set up procedures and have sufficient staff time devoted to receiving, pursuing, and processing offers of economic assistance. Avoid lengthy delays.
- Be creative in seeking out grant funding, technical assistance, or in asking for assistance from agencies with whom the community already has established relationships.
- Do not focus solely on FEMA's reimbursement process or the assistance provided by the federal government

### Urban Land Institute Advisory Panels

The ULI has provided advisory services for communities recovering from disaster, for example, in Watsonville and Santa Cruz, California, after the 1989 Loma Prieta Earthquake. ULI panels consist of 7–12 experts (typically architects, planners, economists, and developers) whose recommendations (including written text and graphics) can be quite specific and can form a focused starting point for economic recovery planning. In disaster recovery situations the Washington, D.C.-based organization provides the service at no charge (except for expenses), with the panel members volunteering their time. Panel members conduct extensive interviews, analyze available economic data, and conduct on-site evaluation of opportunities. Communities can enlist sponsors to help defray the expenses. For example, Pacific Gas and Electric was a partial sponsor of the Watsonville ULI panel.

Other professional organizations such as the American Institute of Architects or the American Planning Association have been similarly helpful to communities recovering from past disasters.

under the Stafford Disaster Relief and Emergency Assistance Act. Other resources and tools can be extremely helpful.

- **Pursue multiple strategies and momentum-building projects.** With so much uncertainty in the recovery process, it is important to move in parallel on multiple fronts, recognizing that some approaches will pan out and others will be discarded. Early “wins” can be especially critical by setting a positive tone to the recovery and encouraging further investment.

**What to Do**

- Identify and prioritize projects that would be especially valuable in jump-starting the recovery, or in demonstrating environmentally responsible economic development.
  - Encourage an entrepreneurial environment to encourage creative recovery strategies. Tolerate false starts so as not to discourage risk-taking.
- **Develop new local recovery resources.** One of the challenges is that public funds for recovery come with conditions and requirements. These sometimes involve cumbersome procedures that can cause delays, or lead to funding gaps in specific projects. Sometimes too these funds cannot be applied in ways that would be most effective for a community’s context. Local resources can provide a flexible solution to these dilemmas.

**What to Do**

- Consider local resources, such as a temporary sales tax surcharge, to provide flexible, locally-controlled sources of supplemental financial assistance.
- Determine how such resources could be supported politically and adopted.

## **EXAMPLES OF SUCCESS**

### **Flood Recovery in Grand Forks, North Dakota, and East Grand Forks, Minnesota**

The downtown areas of Grand Forks (population 52,000) and East Grand Forks (population 9,000) rebounded from the devastating Red River Valley flood of April 1997, providing a successful model for sustainable economic recovery. The communities suffered an estimated \$2 billion in losses but have used the recovery process to transform themselves physically and economically. Both downtowns were completely flooded and 75% of housing units were damaged or destroyed. Recovery was made possible by an aggressive and focused re-investment of public and private capital and planning that re-invented the downtown areas with new amenities and a blend of new and old businesses. Some highlights of the effort are described below.

### **Economic Revitalization**

- A greenway system encompassing 2,200 acres of land between the two cities will improve and restore ecological stability of the Red River corridor, become an economic feature with recreational and tourist amenities, provide a focal resource within both downtowns, improve linkages between the communities, and provide flood protection.
- An “invisible” floodwall in East Grand Forks allows the downtown and river to interrelate aesthetically—an economic plus for the downtown area. The base of the floodwall will protect against a 100-year flood and sections can be added when needed to provide additional protection.
- Substantial investments (\$49 million in Grand Forks) were made in business redevelopment from multiple sources. Nearly \$10.7 million in EDA funds were committed to support key anchor activities such as a new corporate center downtown.
- A variety of programs in Grand Forks directly targeted local business needs, including a \$1.9 million revolving loan fund; a loan interest subsidy program; and central business district relocation, rehabilitation, and acquisition and demolition.
- Other efforts to provide business assistance included programs for job incentives, land acquisition, land development, and capital improvements to parking areas.
- A new town square and other physical improvements were funded and incorporated into the rebuilt central business district in Grand Forks.
- A new industrial park was set up on the west side of town, out of the floodprone area.
- A struggling 1970s enclosed mall damaged in the flood was removed and the street re-established to be consistent with the historic pattern of the downtown area.

### **Economic Partnerships**

- East Grand Forks recruited Cabela’s, a major outdoor (hunting/fishing) retailer, to establish a 62,000-square-foot regional outlet to anchor its downtown.
- East Grand Forks bought and renovated the flooded Holiday Mall, renaming it Riverwalk Center. At first the plan was to temporarily house displaced businesses there, but after Cabela’s decision to locate downtown, the City decided to expand the mall instead. It found another anchor tenant, Crafts Direct, one of the Midwest’s largest craft supplies retailers, to move in and further establish the downtown as a regional destination.
- Grand Forks established a new Corporate Center to replace office space downtown and retain businesses.
- Public sector commitments to re-investment in both downtowns stimulated a range of private sector re-investment, including construction of new, larger buildings such as the building of the *Grand Forks Herald* as well as smaller restaurants and shops.

### **Opportunity Funding**

- Both communities developed strong partnerships with their respective state governments and the federal government. Success in obtaining this level of state and federal support illustrates the importance of political partnerships with legislators.
- Minnesota's state flood recovery package included funding for grants to local governments for locally administered loans for business development, which was instrumental in the recovery of East Grand Forks.
- More than \$283 million was invested in recovery projects in Grand Forks, including \$171.5 million in Community Development Block Grant funding, \$10.67 million in EDA funds, \$18.5 million in commercial financing, \$13.4 million from Fannie Mae/Federal Home Loan Bank programs, and \$66.4 million in reimbursements from FEMA.
- East Grand Forks received nearly \$75 million in assistance from multiple federal agencies (including the U.S. Army Corps of Engineers, FEMA, and the departments of Agriculture, Commerce, Human Services, Housing and Urban Development, and Labor), and state sources (Minnesota Housing Finance Agency, Bureau of Water and Soil Resources, Department of Natural Resources, Department of Trade and Economic Development).
- Private foundations were a significant source of recovery funding. A Flood Relief Fund managed by the North Dakota Community Foundation provided \$1.3 million in assistance to the Grand Forks/East Grand Forks area.
- An "Angel Fund" started with an anonymous contribution of \$15 million provided over \$20 million in assistance to families (up to \$2000 per family).

### **Technical Assistance**

- Both communities made use of technical assistance offered by the universities (North Dakota State University, University of North Dakota, and the University of Minnesota) in discussions related to the redesigning of the river and downtown areas. Grand Forks also received expert assistance from Northwest Technical College, FEMA, and HUD.
- In September 1997, Grand Forks brought in the Urban Land Institute, a national nonprofit professional organization of the real estate and development professions, to conduct a week-long investigation and make recommendations for redevelopment and economic strategies. Their recommendations (making the river a focal point of the downtown, construction of a flood wall, creation of a bi-state river park, building a town square, and utilizing mixed use land use strategies) were largely embraced in the recovery.

### **Community Involvement and Partnerships**

- Underlying the success of the recovery planning was an ongoing commitment to community participation in the process. For example, a downtown development committee was set up in Grand Forks, and the Greenway Alliance, established in 1999, included broad representation from local, state, and federal agencies as well as local organizations, the University of North Dakota, and private businesses.

- Minnesota used a “bottom-up” approach to recovery that emphasized a “one-stop” procedure through which communities applied for assistance based on locally determined priorities. The state role was to expedite the process and provide technical assistance.
- Minnesota attributes recovery success in large part to the variety of local and regional development partnerships involving Regional Development Commissions, Housing Partnerships, Community Action Agencies, Housing and Redevelopment Authorities, Minnesota Initiative Regions, and private consulting firms. With many local governments and officials overwhelmed by the disaster, these partnerships and organizations were able to provide much needed support in the form of technical assistance in identifying, organizing, and implementing local recovery projects.

The success story of the post-flood recovery of Grand Forks/East Grand Forks illustrates how investment in a sustainable economy is interwoven into all facets of the recovery effort. Both communities have implemented focused economic strategies in concert with long-term mitigation efforts that incorporate improved urban design, greater public amenities, and stronger linkages between natural systems and the built environment.

## **A Sampling of Successful Community Economic Strategies**

### **Short-term Survival**

Collaborative efforts to establish short-term locations for businesses have been successfully deployed in numerous post-disaster settings (Grand Forks, Kobe, Santa Cruz). These involve business-to-business cooperation as well as government support. Organized campaigns to maintain retail trade in damaged areas also can be critical.

### **Strategies for the Short Term**

- In Santa Cruz, a new non-profit entity was created (Phoenix Partnership) to secure funding, oversee construction, and manage the leasing of temporary pavilions erected on city parking lots. Although initially intended to be a six-month stop-gap measure, some of the pavilions were needed for several years.
- Los Gatos instituted a “Passport to Shop” program involving newspaper distribution of 50,000 passports with coupons for local businesses. Santa Cruz developed a “Buy Santa Cruz” campaign with events and publicity and pledges by local residents to spend their Christmas dollars in the recovering downtown.
- The Port of Kobe restructured labor agreements and established 24-hour shipping in makeshift facilities to maintain some level of shipping trade while the port was being rebuilt. Without this effort, Kobe’s loss of market share to other Asian ports, which was substantial, would have been even worse.

## **Downtown Revitalization**

Several key elements consistently have been demonstrated as critical to successful and sustainable downtown revitalization. Disaster recovery provides an opportunity to embrace, fund and pursue these features:

- High densities
- Mixed use, including housing in or near downtown
- Historic preservation
- Pedestrian character
- Linkage to natural features (e.g., river corridors)
- Active civic public spaces and community centers
- Multiple functions
- Anchor retail
- Street level activity
- Public space/streetscape design reinforcing historic character
- Urban, not suburban, building forms and land use patterns
- Strict and enforced design and signage policies
- Functional circulation and parking balancing auto and other transportation modes.

### **Downtown Revitalization/Historic Preservation**

- After the 1995 Northridge earthquake, Fillmore, California (population 13,000), used a pre-quake downtown specific plan, aimed at stimulating its struggling historic downtown, as its recovery blueprint. Having a plan in place helped accelerate the recovery and secure post-disaster funding from federal, state, and private sources.
- After the 1989 earthquake, Watsonville, California (population 38,000), used federal and state support to recruit and economically support (through redevelopment funding) a major retail department store to anchor its downtown and support other small businesses. In addition, a non-profit small business incubator was established with grant money to facilitate small business start-ups in the central business district.
- Santa Cruz, California (population 50,000), adopted a Downtown Recovery Plan in 1991 that facilitated mixed uses, and created new streetscape and design guidelines to re-establish the historic visual character of the downtown and implement other public values. It also provided certainty to the approval process, and targeted public investments in parking and other infrastructure in order to encourage private investment. A major community involvement effort (an 18-month process involving a 36-member advisory committee called Vision Santa Cruz) preceded adoption of the plan and resulted in widespread support despite a politically contentious environment.
- Within a week of the 1989 earthquake, Los Gatos, California (population 25,000) decided to encourage repair rather than demolition of its older downtown buildings in order to retain its historic qualities.



## **Sustainable Urban Design and Mitigation**

More effective design and building patterns and techniques can often be incorporated into cities after a disaster brings the opportunity about. Traffic patterns and commercial developments can proceed in way that improve the appeal of the city and also minimize future damage and disruption in the event of a disaster.

### **Vitality and Mitigation in Urban Facilities**

- Kobe, Japan (population 1.1 million) emphasized in its Restoration Plan after the 1995 Great Hanshin Earthquake the creation of a network of water and greenery in the city that would add to the quality of life, create an amenity to attract new population, and provide added safety and mitigation (open areas where people could gather in an emergency). The first urban greenbelt in Japan was established adjacent to the city at Rokko Mountain.
- After years of debate, San Francisco decided to demolish rather than repair an earthquake-damaged elevated freeway along its Embarcadero waterfront area. The re-designed public space has contributed to a major economic revitalization of the immediate area, which also includes the new privately funded waterfront baseball park (Pacific Bell Park), home of the San Francisco Giants.
- Watsonville industries (primarily food processing and manufacturing) re-assessed their disaster preparedness after the 1989 earthquake, even though the damage had been minimal. Many subsequently undertook seismic mitigation/retrofit projects, including external bracing and securing of contents.

## REFERENCES

Chang, Stephanie. 1997. "Reconstruction and Recovery in Urban Earthquake Disasters." Proceedings of the 5th US/Japan Workshop on Urban Earthquake Hazard Reduction. Oakland, CA: Earthquake Engineering Research Institute.

## WHERE TO FIND MORE INFORMATION

### Training Courses and Workshops

Federal Emergency Management Agency, Emergency Management Institute, National Emergency Training Center. Emmitsburg, Maryland. [www.fema.gov/emi](http://www.fema.gov/emi) [accessed June 15, 2001] (301) 447-1035.

- "Disaster Resistant Jobs Training Course: Train-the-Trainer." Course materials include videotape and hard-copy training materials.  
The U.S. has experienced multiple major catastrophic natural disasters in recent years, causing severe physical and economic damage to states and local communities. This experience demonstrates that disasters have long-term impacts on the nation's economy. It is in the best interest of government to help accelerate a community's postdisaster economic recovery and to safeguard its jobs by insulating the local economy from the impact of future disasters. Building partnerships among individuals, businesses, and government is the most effective way to achieve this goal. This course teaches participants to: 1) understand what the term "disaster-resistant community" means; 2) be able to use a disaster "Tool-Kit;" 3) understand the importance of creating disaster-resistant jobs; 4) understand the role of integrating disaster-resilient economic development planning in a community; 5) understand the components of the disaster-resilient economic development planning process; and 6) identify a key audience to target and develop a brief presentation that conveys the importance of organizing efforts to build disaster resistant communities.
- "Disaster-Resistant Jobs Training." Federal Emergency Management Agency Course G246.  
This 2-day course is designed to highlight the need for the local business community to mitigate and prepare for disasters. Communities must protect their economic base in order to survive and thrive in the wake of a disaster. This course will help local leaders recognize the impact of disasters on business and industry and what steps need to be taken to lessen the impact of disaster on local jobs.

University of Vermont, Applied Curriculum for Community Economic Sustainability (ACCESS). Burlington, Vermont. [www.uvm.edu/~jkolodin/access/](http://www.uvm.edu/~jkolodin/access/) [accessed August 3, 2001]

The ACCESS program has three specific objectives: 1) to introduce "real" problems of rural enterprise/local government into three capstone courses; 2) to develop case studies and integrate them into the required introductory course for all majors; and 3) to give students the

experience to utilize knowledge gained in the classroom, using Vermont as their laboratory, through internship opportunities across the state.

## Organizations

Federal Emergency Management Agency. “Assessment of the Economic Impact of Hurricane Floyd on North Carolina Communities.” FEMA Virtual Library and Reading Room.

This contains a “Resource Guide for Business Recovery.”

See [www.fema.gov/library/a\\_dr1292nc.htm](http://www.fema.gov/library/a_dr1292nc.htm) [accessed August 3, 2001]

Minnesota Sustainable Communities Network (MnSCN).

MnSCN is sponsored by the Minnesota Office of Environmental Assistance. The goal of MnSCN is to “encourage networking, information exchange, and better access to assistance.” The network contains over 1500 individuals, businesses, local governments, educational institutions, and organizations who are interested in promoting sustainability in Minnesota.

See [www.nextstep.state.mn.us/index.cfm](http://www.nextstep.state.mn.us/index.cfm) [accessed June 22, 2001]

W.K. Kellogg Collection of Rural Community Development Resources.

This collection, housed in Lincoln, Nebraska, contains community development materials funded by the Kellogg Foundation and other selected sponsors of recognized rural programs.

Guidebooks, manuals, workshop materials, reports, books, and videos are included. The collection is searchable via the internet, although the collection itself is non-circulating.

See [www.unl.edu/kellogg/main.html](http://www.unl.edu/kellogg/main.html) [accessed June 15, 2001]

## Videos, CD-ROMs, and DVDs

*Taking the Initiative*. Federal Emergency Management Agency, Emergency Management Institute. 2000. Emmitsburg, MD.

This 20-minute video shows how a neighborhood, two small towns, and a business owner took responsibility for and got organized to adopt sustainability principles and techniques in coping with hazards. The three separate instances, all in California, illustrate participatory processes, taking initiative, looking at the economic benefits of hazard mitigation (in one case, elevating a restaurant), incorporating livability components into a flood protection measure, and protecting the local environment and habitat. The video is available from the Emergency Management Institute at 1-800-238-3358. Ask for the “Disaster-Resistant Jobs” video.

*Quality Redevelopment of Eastern North Carolina*. Horizon Video Productions. 2000. Durham, NC.

This 20-minute video was produced by the state in the aftermath of Hurricane Floyd to introduce and educate local and state officials about the “better ways” available to recover from the disaster and at the same time address other local concerns such as environmental quality, economic vitality, housing, sense of community, business and job opportunities, and disaster mitigation. It introduced a framework espoused by the state for sustainable community action and features the governor explaining the tenets of “quality redevelopment” and how it can—and did—benefit North Carolina communities and help ensure a better future for the state’s citizens. Available

from North Carolina Department of Emergency Management, 1830-B Tillery Place, Raleigh, NC 27699; (919) 751-8000; fax: (919) 715-9763.

*Mitigation Revitalizes a Floodplain Community: The Darlington Story*. Wisconsin Department of Natural Resources. 1997. Madison, WI.

This is a splendidly produced videotape about the efforts of a small rural Wisconsin community to reverse the effects of neglect and disinvestment in its historic downtown area caused by repeated flooding and economic change. Using a multi-objective planning and management strategy, officials and citizens, in partnership with government agencies and private entities, identified six goals: 1) preserve the historic character of the downtown; 2) restore community pride; 3) acquire and relocate commercial properties at risk; 4) elevate and flood proof commercial and residential structures; 5) stimulate investment downtown; and 6) pursue tourism as an economic strategy. The video follows the mitigation process from early meetings through floodproofing and relocation. Produced by the Wisconsin Department of Natural Resources. 27 minutes. 1997. Available free from Wisconsin DNR, P.O. Box 7921, Madison, WI 53707-7921; (608) 264-9200.

## **Books, Articles, and Papers**

Aguirre International. 1996. *EDA's Post-Disaster Assistance Program After Hurricane Andrew: Final Report*. Washington, D.C.: U.S. Dept. of Commerce, Technical Assistance and Research Division, Economic Development Administration. 128 pp.

After Hurricane Andrew in south Florida in 1992, the Economic Development Administration (EDA) helped communities and organizations by providing over \$50 million in planning grants and revolving loans; infrastructure projects and building renovations and improvements; and training and technical assistance programs. This report evaluates the effectiveness of these programs, asking: Can appropriate economic assistance help communities regain their former condition and even enhance their quality of life? and, Does such assistance have implications beyond the immediate disaster area? Researchers examined the effectiveness of projects in attaining specified goals, the appropriateness of each project to the needs created by the disaster, the economic impacts of the projects, and the social impacts on and benefits to target populations. They discovered that EDA projects have a regional impact, projects do stimulate economic growth, and EDA was generally effective in maintaining an ongoing relationship with local officials and potential grantees.

Arnold, Matthew B. and Robert M. Day. 1998. *The Next Bottom Line: Making Sustainable Development Tangible*. Washington, D.C.: WRI Publications. 64 pp.

This report tries to bring sustainable development down to earth for a business audience. Its authors break down the abstract ideals of sustainable development into ideas small enough to grasp and powerful enough to lead to new business opportunities. The authors offer a road map for businesses to find financial success in the solutions to environmental and social challenges.

Becker, William S. and Roberta F. Stauffer. 1994. *Rebuilding the Future—A Guide to Sustainable Redevelopment for Disaster-Affected Communities*. Golden, CO: U.S. Department of Energy,

Office of Energy Efficiency and Renewable Energy, Center of Excellence for Sustainable Development. 18 pp.

This document summarizes why sustainability is important and gives an example of sustainable development in one community, Soldiers Grove, Wisconsin. The reader is walked step-by-step through the holistic recovery process. The last chapter discusses real-life problems that the planner may encounter. There is an appendix to the report with a comprehensive list of resources. This document is available online at [www.sustainable.doe.gov/articles/RFTE1.shtml](http://www.sustainable.doe.gov/articles/RFTE1.shtml) [accessed June 15, 2001]

Berry, Wendell. 2000. "A Return to the Local: You Stay Home Too." *Worldwatch* (September/October):29-33.

Berry argues that the basis of a sustainable economy is vitality of local economies, which are fundamentally different from the global system.

Casey-Lefkowitz. 1999. *Smart Growth in the Southeast: New Approaches for Guiding Development*. Washington, D.C.: Environmental Law Institute Research Publications.

The southeastern United States has been trying to find ways to continue to reap the benefits of the region's bustling economy without the mounting fiscal, health, and environmental costs of poorly planned development. This report provides an overview of land use and transportation trends in seven states—Alabama, Georgia, Florida, North Carolina, South Carolina, Tennessee, and Virginia—and shows how these states are beginning to shape the pace and location of development by promoting community revitalization, conservation, and transportation alternatives.

Childers, Cheryl and Brenda Phillips. 1998. *Sustainable Development or Transformative Development? Arkadelphia, Arkansas After the Tornado*. Quick Response Research Report #109. Boulder, CO: Natural Hazards Research and Applications Information Center. 12 pp.

The authors visited the small town of Arkadelphia, Arkansas after an F-4 tornado had destroyed much of its downtown and three residential neighborhoods. Leaders of this town characterized the rebuilding effort as "sustainable." The researchers interviewed 31 individuals representing organizations from the national level to the local level and ranging from paid staff to volunteers. They determined, as an initial finding, that residents of impacted communities apply "sustainable development" as it fits their understanding, needs, and interests. Also, the term began to mean different things to different people as recovery ensued.

Federal Emergency Management Agency. 1997. *Report on Costs and Benefits of Natural Hazard Mitigation*. Washington, D.C.: Federal Emergency Management Agency. 52 pp.

Are the costs to reduce or eliminate the impacts of natural hazards substantially less than the benefits they provide? This report reviews the benefits that can accrue to different segments of society from mitigation, the costs that can be incurred by undertaking mitigation, and the analyses needed to evaluate the cost-effectiveness of the measures. It has 16 case studies across the United States and demonstrates their efficiency against several types of natural hazards, as well as the effectiveness of other mitigation tools. The studies include seismic retrofitting of lifelines in Tennessee, reinforcement of highway bridges in California, historic preservation and community development in Wisconsin, mitigation in hospitals in California, reduction of business interruption costs in Iowa, seismic retrofitting in Los Angeles public schools, wind

shutter protection in Florida, acquisition and relocation of floodplain structures in Missouri, regulation of unreinforced masonry buildings in Los Angeles, land use and building regulation along the coasts of Florida, land-use and building requirements in floodplains, and seismic retrofitting to avoid business disruption. The cases include both public- and private-sector initiatives.

Institute for Business and Home Safety (IBHS). 1999. *Open for Business: A Disaster Planning Tool Kit for the Small Business Owner*. Institute for Business and Home Safety.

This tool-kit is designed to help small business owners identify the hazards they may face, plan for and reduce the impact of disasters, keep their business open when disaster hits, and advise on insurance, disaster supplies, and other things the business owner can do to make his/her business more disaster resistant.

Kline, Elizabeth. 1997. *Sustainable Community: Topics and Indicators*. Available online at [ase.tufts.edu/gdae/modules/modinstruct.html](http://ase.tufts.edu/gdae/modules/modinstruct.html) [accessed June 22, 2001]

These narratives about sustainable community indicators were developed under a contract with the U.S. Environmental Protection Agency. The primary audiences are community practitioners and technical resource people.

Louisiana Governor's Office of Rural Development. n.d. *Louisiana Small Towns Program*.

Baton Rouge, LA: Louisiana Governor's Office of Rural Development.

The Louisiana Governor's Office of Rural Development, under a grant from the U.S. Economic Development Administration, conducted the Louisiana Small Towns Program to help communities plan for a successful future. This is a grant report with findings from the program.

Minnesota Department of Public Safety. *Recovery From Disaster Handbook*. St. Paul, MN: State of Minnesota. Available at

[www.dem.state.mn.us/publications/Recovery\\_Handbook/index.html](http://www.dem.state.mn.us/publications/Recovery_Handbook/index.html) [accessed July 23, 2001]

This handbook provides local units of government with guidance in long-term recovery after a disaster. The restoration process places great demands on government and the private sector. This manual will lessen the stress by providing answers and advice to many questions that arise from those who have dealt with recovery from disasters. Tool kits give information specific to each topic, some forms, and information to share with the victims of the disaster as they recover.

Philippi, Nancy S. 1996. *Floodplain Management: Ecologic and Economic Perspectives*. San Diego, CA: Academic Press. 225 pp.

When economic and ecological concerns conflict, effective floodplain management often suffers. The author examines the reasons behind these conflicts and points to solutions. She discusses the challenge of managing floodplains, the need for floodplain management, the public interest and how to define it, governments and their roles, harmful effects of floodplain management, case studies of the Mississippi and American Rivers, and scenarios for effective management. Appendices reprint several important documents useful for the understanding of floodplain management in the United States.

Public Works and Economic Development Association. 1999. *Economic Development Directory*. Prepared for the Economic Development Administration, U.S. Department of Commerce. Washington, D.C.: Public Works and Economic Development Association. 153 pp.

This directory is a convenient and functional information tool to facilitate communication between the various elements of EDA's program components. It is meant to serve economic development practitioners, EDA grantees, associations, and others who are seeking information on EDA's economic development activities in all 50 states and territories.

San Francisco City Planning Department. 1987. *Earthquake Hazards and Housing—Summary Report*. San Francisco, CA: San Francisco City Planning Dept. 26 pp.

With a vacancy rate of less than 1%, San Francisco has virtually no low-rent replacement housing. A large portion of the existing low-rent housing stock is located in areas built of unreinforced brick—a structure type particularly vulnerable to earthquakes. To help maintain a safe low-income housing stock in the vulnerable unreinforced masonry (URM) buildings, this study was commissioned to examine the range of seismic retrofitting measures available for prototypical residential buildings in the city, and the financial profiles of owners and tenants in URM buildings. Using the experiences of other cities that have adopted retroactive URM building codes, the researchers applied the specifications of their seismic strengthening requirements to the masonry building stock in San Francisco.

Tierney, Kathleen J. 1995. *Impacts of Recent U.S. Disasters on Businesses: The 1993 Midwest Floods and the 1994 Northridge Earthquake*. Preliminary Paper No. 230. Newark, DE: University of Delaware, Disaster Research Center. 53 pp.

This report utilizes a methodological approach first applied to the Des Moines area to try to ascertain how the 1994 Northridge earthquake affected businesses in Los Angeles and Santa Monica. Both studies survey both large and small enterprises and a range of business types. Topics discussed in the paper include physical damage to business properties; lifeline service interruption; rates of and reasons for business closure and relocation; use of insurance, Small Business Administration loans, and other sources of recovery assistance; and proprietor's assessments of business recovery and well-being at the time the surveys were conducted.

## Additional Reading

Alesch, Daniel J., James N. Holly, Elliott Mittler, and Robert Nagy. 2001. *Organizations at Risk: What Happens when Small Businesses and Not-for-Profits Encounter Natural Disasters*. First Year Technical Report of the Small Organizations Natural Hazards Project, Center for Organizational Studies, University of Wisconsin—Green Bay. Fairfax, VA: Public Entity Risk Institute. Available at <http://www.riskinstitute.org/ptrdocs/OrganizationsatRisk.pdf>.

Chang, Stephanie. 1997. "Reconstruction and Recovery in Urban Earthquake Disasters." Proceedings of the 5th US/Japan Workshop on Urban Earthquake Hazard Reduction. Oakland, CA: Earthquake Engineering Research Institute.

Department of Commerce. 2000. *Out of Harm's Way*. (Pamphlet.) Washington, D.C.: U.S. Department of Commerce, Economic Development Administration.

Federal Emergency Management Agency. 1998. *Protecting Business Operations: Second Report on Costs and Benefits of Natural Hazard Mitigation*. Washington, D.C.: Federal Emergency Management Agency. 41 pp.

International Red River Basin Task Force, 1999. *An Assessment of Recovery Assistance provided after the 1997 Floods in the Red River Basin: Impacts on Basin-wide Resilience*. Report prepared by the Natural Hazards Center, University of Colorado and the Disaster Research Institute, University of Manitoba for the International Joint Commission's Red River Basin Task Force. Ottawa, Ontario, Canada: International Joint Commission. Available at [www.ijc.org/boards/rrb/Recovery%20Assistance.pdf](http://www.ijc.org/boards/rrb/Recovery%20Assistance.pdf). [accessed September 21, 2001]





## PROMOTING SOCIAL AND INTERGENERATIONAL EQUITY DURING DISASTER RECOVERY

---

*A sustainable community seeks to enhance social capital in a way that makes everyone's life better by not making someone else's worse.*

—Hart Environmental Data Trainers' Workshop

### INTRODUCTION

To achieve sustainability, every community must decide, What is essential for a good life? What should be sustained and for whom? How should people live now so that future generations are not penalized? How many future generations should be taken into account? Who will manage continued sustainability and in whose interest will it be managed? (Mileti, 1999).

These questions can be partly answered, at least philosophically. But the answers are complicated by race, gender, socio-economic class, ethnocentrism, and cultural values. In reality, each question must be addressed within the community, possibly with the help of informed outsiders.

In true social and intergenerational equity, each person has an inherent right to exist, survive threats, have access to resources, and pursue a decent life, despite his or her social or economic status. By the same token, unborn generations must inherit opportunities for a good life that have not been diminished by those who came before them.

A post-disaster recovery that promotes social and intergenerational equity—an equal chance to survive across time—means that every stakeholder gets a chance to participate and benefit from recovery processes. A stricken community pursuing a holistic recovery will use opportunities presented by the disaster to improve existing social inequities and not just return people to their pre-existing situations. This chapter explains how the sustainability principle of promoting social and intergenerational equity can be pursued during disaster recovery.

Social equity and acceptance of responsibility to future generations are essential parts of holistic recovery. This means avoiding disproportionate treatment of or impacts to vulnerable persons, avoiding exporting costs and risks—downstream, alongshore, to taxpayers, to the environment—and to the future. Intergenerational equity; adopting a long-term view; preserving

and restoring natural, historical, cultural, and archaeological resources are also essential components of sustainable redevelopment that can occur after a disaster.

In a holistic disaster recovery, people need also to consider how issues of equity intersect and interconnect with rebuilding transportation, public facilities, utilities, housing, economic disruption, the physical environment, health and safety, and social connections—families, neighborhoods, communities, and cultures or ways of life.

According to Boyce (2000), social vulnerability can be viewed from two perspectives. One is the wealth-based approach, explained as “those individuals who are willing (and, perforce, able) to pay more, deserve to get more.” The rights-based approach, on the other hand, emphasizes “the egalitarian distribution of the right to a clean and safe environment,” implying that each person has an inherent right to live despite money and other resources that permit wealthier households to reduce risk. A rights-based approach tends to be followed in countries that emphasize such democratic rights as voting and public education, with constitutions that spell out that each person is “created equal” and holds “certain unalienable rights.”

In a broad sense equity means freedom from bias or favoritism. It means equal access to resources, equal allocation and treatment of societal risk, and equal consideration of competing interests. “Social equity means understanding how environmental degradation and risk differently affect groups defined by class, age, race, political, or gender distinctions” (Cutter, 1995).

### **How Does Inequity Develop?**

The likelihood that an individual will benefit from society may vary according to what society has historically made available to the larger group to which that individual belongs. Princeville, North Carolina, for example, is a community founded by ex-slaves generations ago with land granted to them—in a floodplain. Nevertheless, Princeville developed into a closely knit community where people felt connected not only to each other but also to the land, as a symbol of freedom.

People also tend to live in different social and economic locations. Upper middle class families, for example, are not very likely to live in same type of housing as a widowed woman living alone on Social Security payments. People who do not live near each other or seek each other out cannot fully comprehend the others’ realities and resources. Living a middle-class life, for example, with the benefit of education and employment experience, may better prepare some people to manage bureaucracy—a task that others may find cumbersome.

A common phenomenon across the country is known as NIMBYism—Not In My BackYard-ism. Traditionally, more powerful, better educated, and more affluent citizens are able to organize to prevent an unwanted element—asphalt plant, public housing, trailer park—from being placed in their “back yards.” This can put less powerful groups at higher risk as noted by a number of researchers and activists. An entire movement known as “environmental justice” has identified numerous areas across the United States (toxic sites and incinerators, for example) placed near African American communities, trailer parks, and public housing units. To avoid this sort of inequity, a community needs to be aware of whether rebuilding is taking place on hazardous or

otherwise undesirable sites. Who are the influential groups in the community and what is their impact on reconstruction? To whom is risk being transferred as a result of the political process?

### **Groups that may be Particularly Susceptible to Inequity**

A fairly new web site from the California Office of Emergency Services lists a variety of vulnerable groups and web links to organizations that assist such populations. Based in part on this web site ([www.preparenow.org](http://www.preparenow.org)) and research by dozens of social scientists, a partial list of groups that may be particularly vulnerable in disaster and/or have more difficulty recovering from one can be constructed. However, no particular group should automatically be assumed to be vulnerable; nor should this list be considered exhaustive.

**Low-income households:** How much money people have influences what type of housing they live in, whether they can engage in mitigation actions, and how long it takes to recover. Income is probably the most difficult challenge to address, because it is not based solely on an individual but is influenced by the larger economy, the availability of jobs, educational opportunity, and much more. Expenses also vary by location: rural places are cheaper to live in but have fewer job opportunities, while urban areas may be exceptionally costly, even for renters.

**Single parents:** “Single parent families, usually with low incomes and typically with constraints upon the time of the sole parent . . . may have lacked opportunities to fully participate in some community recovery activities” (Buckle, 2000).

**Medical needs (physical and psychological):** People who rely on certain types of machinery (ranging from life support to oxygen) are subject to increased risks after an earthquake or during evacuation for a hurricane. Fear and confusion might be experienced by residents of a school for the mentally challenged or those at an institution treating psychiatric illnesses.

**Language and literacy:** In 1988, the small Texas town of Saragosa was hit by a major tornado. Although the local news station tried to broadcast a warning, the translation used ineffective wording, contributing to a number of deaths. A community’s outreach efforts should also include non-print imagery for people who cannot read.

**Elderly:** The elderly may be overlooked in considering holistic recovery because of the stereotypical notion that they are not producers for a community but burdens. They may experience difficulty with bureaucratic regulations after a disaster, perhaps not qualify for loans, or become disabled as a result of the event itself.

**Homeless and street children:** The most rapidly growing group of homeless is families. Little is known about what happens to them after disaster, although some researchers have found that familiar places (doorways, traditional shelters) are often ruined or permanently altered, further displacing the homeless. After housing stock is depleted by disaster, the homeless get pushed further back in the line for a place to live. And, although some homeless persons may find temporary shelter in disaster facilities, they typically go back to the streets when they close.

### A Letter from an Earthquake Survivor

I was not wearing my hearing aids that morning, of course, it was 4:31 in the morning. After the shaking stopped, I was too afraid to get up. When my foot hit the floor, my bare feet felt every piece of glass that had broken. My neighbors interpreted everything via lip-reading for me regarding the radio announcements. My husband was out of town, I was alone and extremely scared; my husband is profoundly deaf, no one even told him there had been an earthquake or that Northridge was the epicenter.

A friend told us about [the Federal Emergency Management Agency] and that it might be able to help us get a new telecommunications device for the deaf (TDD), a vibrating alarm clock, a light alarm. I went to the temporary FEMA office and filled out papers and tried to apply. There was no interpreter. I waited one month to hear any feed back from FEMA. After four months, I went again but got the same old answers. FEMA made no attempts to find an interpreter for me and the interpreter I had brought did not have the skills needed to convey my message. I had lost. I was too tired, too sad, too frustrated and too overwhelmed with just trying to get on with my life. Someone later suggested I call my congress woman. I did and three days later I had a FEMA check. Almost nine months had passed ...”

**The marginally housed:** After the 1989 Loma Prieta earthquake, dozens of families living doubled and tripled up lost their tenuous claim on shelter. Inspection teams condemned marginal units like garages that had previously housed people, exacerbating the situation.

**Immigrants:** Recent arrivals to the United States, documented or not, face a complex array of tasks including language barriers, understanding bureaucratic rules and regulations, fear of military assistance, fear of deportation, and not being included in long-term recovery efforts. Lack of respect for religious customs can also contribute to social inequities. Recent immigrants from the Middle East, for example, may follow religious norms of modesty and separation of the sexes that usually are not accommodated in emergency shelters and may influence who participates in community activities.

**Transients, newcomers, and tourists:** People who pass through, stay temporarily, or have recently arrived in a community may not hear warnings, know where to take

shelter, or have resources immediately available to them. Communities must plan to reduce their vulnerability, particularly in communities with large tourism industries.

**Isolated households, farms, and ranches:** Consider the situation of families living in remote and/or rural areas who face multiple issues. Farmers and ranchers, for example, face continued stock mortality after an event, when cattle and other animals eat glass, insulation and other debris—or are injured by flying debris and have injuries go unnoticed.

**Differently abled:** After Hurricane Andrew, the U.S. military put up tent cities, cooked food, and provided general assistance. However, as one officer noted, “we don’t have disabled people in the Marines;” he then hastened to have a squad construct wheelchair ramps to the portable latrines. Persons who are differently abled are often inadvertently left out of disaster recovery.

**Racial and ethnic minorities:** In an extensive review of research studies on race, ethnicity, and disasters, it was found that minorities experienced longer recoveries due to lower incomes, savings, and insurance; experienced differences in access to insurance; and used aid and relief organizations differently than was expected by the predominantly Anglo emergency management sector (Fothergill et al., 1999). Recovery organizations may not understand some culturally based needs.

**Children:** Society tends to be adult-oriented. If single parents are to participate in recovery activities and sustainability planning, child care must be provided. Involving children and teenagers in community recovery activities and planning facilitates healing and promotes lifelong civic participation.

**Lesbian and gay households:** Little is known about homosexual families after disaster other than to speculate that the hostility they experience every day may be exacerbated. In addition, some groups and organizations may deter aid because of a person's sexual orientation. It may not be safe for a local teacher, for example, to be open about a sexual orientation even if his or her lifetime partner was killed or injured in the event.

**Battered women:** Incidents of relationship violence may increase after disaster. Certainly, shelters report higher numbers of and increased inabilities to deal with post-traumatic stress.

**Future generations:** It goes without saying that the people of the future are not able to voice their needs and desires in today's communities. But the components and characteristics of social and intergenerational equity rest on "not precluding a future generation's opportunity for satisfying lives by exhausting resources in the present generation" (Mileti et al., 1999, p. 33).

### **Multiple Susceptibilities to Inequity**

It is impossible to separate out each of the above categories and treat a person as if they fit only one. Imagine, for example, a differently abled, low-income woman. Is her ability or her income more significant? At times, one identity may take precedence, such as when a person who is deaf cannot communicate with a relief group. The intersection or combination of identities needs to be considered when promoting social equity in a community.

### **Overcoming Social Inequity**

One way to begin to overcome inequity is to attempt to understand it, by putting oneself into the situation of others, listening to their experiences, and involving them in community recovery activities.

Promoting social equity means:

- avoiding generalizing from one's own experiences;
- not assuming that everyone is the same;
- refraining from judging others on the basis of one's learned values and beliefs;

- educating oneself about others;
- exploring ways to include all cultures;
- developing strategies that sustain people's ways of life.

## RECOVERY STRATEGIES FOR PROMOTING SOCIAL AND INTERGENERATIONAL EQUITY

Part of the challenge of meeting the criteria of social and intergenerational equity during disaster recovery inevitably involves “narrowing the gap between the haves and have-nots” according to the Association of Bay Area Governments. Although ideally this is an ongoing process in a

### OPTIONS FOR PROMOTING EQUITY

- Preserve social connections in and among groups.
- Preserve natural, cultural, historical resources.
- Adopt a longer-term focus for all planning.
- Avoid/remedy disproportionate impacts on groups.
- Consider future generations' quality of life.

community, disaster recovery can provide an opening for tackling some inequities. A community can start with the *situations* that exist after a disaster, pick and choose among the *options* for improving social and intergenerational equity and among the implementation *tools* available to help pursue each of those options, to develop *strategies* that are specially tailored to its own needs. The

Matrix of Opportunities in Chapter 1 shows some of the options a recovering community could use to work on equity issues while it tends to disaster-caused predicaments. The situations and options shown on the matrix, and the tools listed below, are not exhaustive; rather, they are meant to give an idea of the range of possibilities. Likewise, the sample strategies below suggest ways in which some options and disaster-induced situations could be combined to address social issues. Notice how each of the strategies suggested below uses one or more of the options listed on the Matrix of Opportunities under the third sustainability principle, “Social and Intergenerational Equity.”

**Situation:** Damaged transportation

#### **Recovery Strategies to Promote Equity:**

- Ask: Where are roadways and bridges being built? Will moving a road displace a neighborhood?

**Situation:** Damaged public facilities

#### **Recovery Strategies to Promote Equity:**

- Ask: What are the impacts of redevelopment decisions on vulnerable populations? Does a setback mean the loss of land?

**Situation:** Damaged housing  
After a disaster, the local challenge of providing affordable and available rental and low-income housing is often worsened. For low-income and older homes, rehabilitation of homes is too expensive.

**Recovery Strategies to Promote Equity:**

A recovery strategy to maintain or even enhance social equity in housing was followed by Watsonville, California, which deliberately passed an ordinance that 25% of all post-disaster housing must be affordable. In doing so, they made it possible for many community members to remain after the disaster and also augmented the city's affordable housing stock.

An economically sound and permanent solution to flood problems from some points of view is a "buyout program," under which federal funds are used to purchase the homes and properties of people who live in hazardous (usually floodplain) areas. However, people in Princeville, North Carolina, rejected the buyout option even though the majority of the city is located in a floodplain. Places are important to people. The residents of Princeville had a set of important ties to the land and to each other.

- Ask: Is overcrowding resulting?
- Create a local grant-writing group to help acquire resources to rehabilitate homes whose owners cannot afford such projects.
- Although buyouts of floodprone property can be beneficial, a community should consider who is being bought out, where they are moving to, and who is being allowed to rebuild.
- Ask: Has the community replaced a devastated section of housing (trailers, for example) with the same, vulnerable housing?

**Situation:** Economic disruption

In rebuilding, communities must face comprehensive and connected questions about equity.

**Recovery Strategies to Promote Equity:**

- Ask: What happened to the business sector?
- Ask: What was the impact on jobs for vulnerable groups?
- Ask: What happened to the work force?
- If there was a loss in the tax base, find out what that means for services and needs of vulnerable groups.

**Situation:** Environmental damage

Preserving and restoring natural, historical, cultural and archaeological resources can help preserve social connections between and within groups, as well as saving important features for future generations. Everyone has seen flood videos of devastated historic cemeteries, museums, and sacred places.

**Recovery Strategies to Promote Equity:**

- Identify and prioritize such resources and places.
- Recognize the value of places and things as sources of people's identity and connection.
- Find funding and resources to restore and mitigate future impacts.
- Value diversity across natural, historical, cultural and archaeological resources.

**Situation:** Disruption to health and safety

The period after the last disaster is also the period before the next one. During recovery there may be a good opportunity to improve preparedness across the diverse groups in a community.

**Recovery Strategies to Promote Equity:**

- The American Red Cross may lead an educational effort for seismic bracing, hurricane awareness, or tornado season using materials designed for a variety of users: non-English speakers, persons who may be illiterate, children, the elderly, etc.
- Inter-organizational support of such efforts, for example having the fire department conduct earthquake drills at schools in conjunction with the distribution of materials, can assist the ARC with information dissemination.
- Each October the United Nations' International Strategy for Disaster Reduction holds Disaster Day, which could also become a community awareness event—the perfect day to hold a community disaster drill. Imagine, for example, having local theater groups act the part of disaster victims or local organizations that support persons who are differently abled participate in evacuation drills and rescues and benefit from interactive briefings on how disaster organizations work.

The Association of Bay Area Governments advocates recovery efforts that “encourage open discussion on the resolution of racial/ethnic problems in all aspects of community life, including housing and employment. This should be a broad-based effort involving schools, lenders, business and civic organizations, religious and community organizations and real-estate community.” For example, “advocate for a federal educational loan program that would facilitate efforts by low-skill/low-wage workers to train for higher skill/higher paid positions” and “encourage businesses to offer their employees financial and other incentives to continually upgrade their work skills.” Equally important to post-disaster housing recovery, ABAG’s indicators also “encourage citizens, business groups and local governments to pressure financial institutions to invest in housing and employment developments in the low-income communities they serve.”

**Tools for Promoting Equity**

Equity means balancing fair process and procedure, distribution of goods and services, and who pays. The residents of a community that supports these goals are likely to have strong ties to one another, making recovery from disaster easier to achieve. For that reason, many community-building activities can also be seen as a disaster recovery activities that promote social equity. To achieve sustainability, it is essential to create a community that supports all of its citizens; past, present, and future. There are a number of tools and techniques that can help accomplish this.



### **Public education and awareness campaigns and events**

Pre-disaster planning presents one opportunity to reach out to groups or individuals that may not be aware of natural hazard risks. Examples of these groups might include the elderly, the differently abled, the mentally ill (and their caregivers), and marginalized groups such as poor and transient

populations. A community should try to plan ahead of a disaster for helping these populations, and use its education campaigns to engage the groups in planning for their protection and/or evacuation during a natural hazard situation.

### **TOOLS FOR PROMOTING SOCIAL & INTERGENERATIONAL EQUITY**

- Public education and awareness campaigns and events
- Public-private partnerships and networks
- Ombudspersons
- Targeted workshops, information, and invitations
- Existing community activities
- Programs to assist populations at risk
- Community Development Block Grants
- Historic preservation efforts

### **Public-private partnerships and networks**

Public-private partnerships and networks work like public education and awareness campaigns because they can be used to reach out to groups or individuals at risk from natural hazards. For example, the Federal Emergency Management Agency's Seismic Hazard Mitigation Program is a public-private partnership program designed to encourage seismic mitigation in hospitals. A community might be able to brainstorm other public-private partnerships to benefit populations at risk.

### **Ombudsperson**

An ombudsperson can investigate the activities of government or other entities that may be infringing on individual rights. A community's ombudsperson ensures that equal protection laws are followed in sustainable disaster recovery and in planning for it.

### **Targeted Workshops, Information, and Invitations**

Invitations to involve members of marginalized or minority groups throughout planning, decisionmaking, implementation, and evaluation activities will help the recovery team understand the culture and needs of marginalized groups. For example, differently abled people need to be involved in mitigation planning so that the plan provides for their special needs. Or, to take another example, minority groups might respond to proposed activities with the assertion that traditional recovery activities will not work for their group. For example, members of some religions may not feel comfortable in a shelter where both men and women are staying.

### **Existing Community Activities**

Any and all community-building activities can be used as a basis for building a stronger, more equitable, disaster-resilient community. A neighborhood group formed to combat crime might use the social capital gained in its interactions to help one another in a disaster situation. When neighbors know and care about each other, they are likely to pull together in a crisis.

### **Programs to Assist Populations at risk**

There are several government programs whose purpose is to help populations at risk mitigate or recover from disaster. Disaster Assistance for Older Americans is provided by the Department of Health and Human Services. The agency provides direct payments to state agencies focused on aging-related services. Mental Health Disaster Assistance is also provided by the Department of Health and Human Services. These are project grants to provide emergency mental health and substance abuse counseling to individuals affected by a major disaster.

Forbearance on Veterans Administration (VA) Home Loans is also available. The program encourages lenders to extend forbearance to VA loan holders who have experienced disaster and are in distress.

### **Community Development Block Grants**

Community Development Block Grants, provided through the Department of Housing and Urban Development, are used to benefit entitlement communities. The preferred use of funding is for long-term needs, but funding may also be used for emergency response activities. The state's program provides formula grants to non-entitlement communities.

### **Historic Preservation**

A community may value historic structures, even if they are in hazard-prone areas, and wish to preserve them for future generations. If a community wants to do this, there are at least two programs to assist them. The Federal Emergency Management Agency's Repair and Restoration of Disaster-Damaged Historic Properties is used to evaluate the effects of repairs to, restoration of, or mitigating hazards to disaster-damaged historic structures in accordance with the requirements of the Stafford Act. In addition, Historic Preservation Fund Grants-In-Aid are available from the National Park Service. These are matching grants provided to states to expand the National Register of Historic Places, the nation's listing of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, engineering, and culture.

## **PURSUING STRATEGIES FOR SOCIAL AND INTERGENERATIONAL EQUITY**

Once the recovery ideas—or strategies—for addressing social equity are identified, the community will need to explore them through a systematic process in order to decide on the best approach, select feasible tools, locate technical assistance, formulate details, plan for action, find funding, get approval, and move toward implementation.

Planning and mitigative action before a disaster strikes are always best. If a community is engaging in sustainability planning before a major disaster, wonderful! As noted throughout this chapter, comprehensive planning, public/private partnerships, and increasing citizen participation across diverse groups all build foundations for starting a community's holistic recovery.

But even without a formal plan, after a disaster the 10-step process can help remedy some disaster-induced situations while also building and promoting social and intergenerational equity.

## **Promoting Social and Intergenerational Equity During the 10-Step Recovery Process**

Strategies for equity can be carried out in the context of the overall disaster recovery. Within the 10-step process described in Chapter 2, the following activities in particular will help ensure that social equity is improved during a community's disaster recovery.

### **Actions to take during Step 1, Get Organized**

Efforts to make sure that a fair distribution of risk exists begins with getting to know all parts of the community (preferably well in advance of disaster) and incorporating everyone into the recovery process.

- Start by looking at census data and learning about recorded diversity: race, ethnicity, income, gender, age, and housing. Remember that census data often miss people, so social services agencies should be contacted for information.
- Consider equity issues as they intersect groups: an elderly Latina woman who speaks Spanish but not English; a recent immigrant to the area; a low-income household.
- Refer back to the list of historically vulnerable groups in the first part of this chapter.
- Identify agencies and organizations that work with, serve, or represent these constituencies.
- Go to and invite a wide variety of persons, groups and organizations to offer input, insights, suggestions on who is at risk and how they relate to the notion of sustainable disaster recovery.

### **Actions to take during Step 2, Involve the Public**

Historically marginalized and excluded groups may believe they are not able to effect change. People who believe they are powerless (economically, politically) to effect change may need opportunities to develop their collective strengths and to become re-empowered. Empowering people enables them to buy in to the recovery process, to speak up, and to lead. See Chapter 3 for ideas on how to use a participatory process during recovery.

- Identify organizations within groups, neighborhoods, and communities.
- Volunteer for community organization activities.
- Attend ethnic festivals.
- Hold neighborhood-based meetings or “charettes” to help citizens visualize their homes and streets after the recovery, including issues of access, public space, safety, pedestrian orientation, etc.

### **Actions to take during Step 3, Coordinate with other agencies, departments, and groups**

Going to people, in their space, and listening to their concerns tells affected citizens not only that officials and emergency managers care, but that they are stakeholders in the long-term viability of their community. Doing so honors the realities and experiences and perspectives of the affected and the vulnerable, breaks the notion of insiders and outsiders. It also undermines the

social, economic and political splits that created inequity in the first place. Finally, reaching out and including diverse stakeholders lessens the potential that a decision imposed on a minority will be rejected (Roseland, 1998).

Involving a wide variety of recovery partners increases diversity of ideas and potential solutions, a labor pool, and creative problem-solving. It also begins to accomplish what makes a recovery truly sustainable: it builds local capacities within and across groups.

- Seek out community organizations who work with known groups and actively solicit information about where victims are gathering and what they see as important recovery issues, especially barriers to recovery.
- Part of this outreach process involves looking for those “intersections” and sometimes hidden equity issues. Consider, for example, how the deaf, people homeless before the earthquake, recent immigrants to the community, and women who were battered will be involved.
- Develop and maintain formal and informal relationships with community leaders across diversity.

#### **Actions to take during Step 4, Assess the Equity Problems**

Local people best know their situation, their needs, and effective recovery approaches. Recovery efforts that are imposed on people may not take into consideration the realities of vulnerable groups. Immigrant families to south Florida faced the reconstruction of housing that resembled that of traditional middle-class Anglo families—house after house, block after block—which resulted in the loss of community and connectedness they preferred through housing with common outdoor areas. Telling people to bolt furniture to the walls as part of seismic-bracing for future earthquakes doesn’t work for low-income households, and may be challenging for persons using wheelchairs or for the elderly.

- What do locals see as their recovery problems?
- How do those problems affect marginalized groups? Consider obvious ways (a flooded home) and less hidden ways (loss of jobs or having to work in earthquake-vulnerable buildings).

#### **Actions to take during Step 5, Evaluate the problems**

Once officials, emergency managers, and recovery personnel have identified vulnerable groups within the community, it becomes imperative to work with them in their own context—and to invite their participation in the recovery process. This will build a broader base of support and knowledge for the recovery and is likely to result in victims buying into the recovery scenario.

What was done poorly or inequitably before the disaster that could be improved upon now? For example, what will be the effect of rebuilding roads and bridges? Will some groups have to be moved out of a floodplain? What happens to housing that may be in the way of the new road or bridge? How did the disaster impact existing housing stock? What was the impact on the pre-disaster homeless? Those living in overcrowded conditions? Those living at poverty levels? What happened to rental units, public housing, congregate care facilities, shelters?

Which groups are at risk and in what ways—such as low-income elderly residents who are unable to mitigate or evacuate? Where are people living doubled and tripled up or in vulnerable housing? Where are people living on the streets? Are there persons with significant medical and

health needs who live in isolated conditions? What languages are used for warnings and are they consistent with local needs? Are materials written for both literate and illiterate populations? Is there a plan for child care so that single parents can participate in recovery charettes? Is there an interpreter for the deaf community?

### **Actions to take during Step 6, Set goals and objectives**

As the participatory Chapter 3 suggests, involving stakeholders in planning goals and objectives for a holistic recovery should lead to reduced physical and social vulnerability and to diversified participation. Involving individuals, groups, agencies and organizations connected to marginalized groups in the decisionmaking process is critical. Perhaps the most important thing during this step is to ask, How do community goals and objectives impact vulnerable groups?

### **Actions to take during Step 7, Explore alternative strategies**

This is the point at which different ways are explored for combining options for promoting social and intergenerational equity with the disaster-caused situations the community is facing. Select from the opportunities identified under Step 5, the goals and objectives set in Step 6, and the options and tools described in this chapter. Expand and tailor them to meet a community's particular concerns. This also is a time to consider what the impacts of different alternatives would be on the marginalized groups in the community, and for the future. Reviewing alternatives means going back to vulnerable groups multiple times to gather information and solicit input.

To determine what the impacts of a given action might be:

- Check census data for existing and emerging populations.
- Identify characteristics of populations (age, income levels, type of residence, family size, race/ethnicity).
- Determine what criteria are being used to choose and prioritize the alternatives. Do they reflect the opinions, realities, and interests of vulnerable groups?

Such discussion should include consideration of the impact of decisions. For example, if a neighborhood is dramatically revised to exclude certain types of housing (like trailers), what is the impact on low-income people who want to return to live next to their pre-disaster neighbors? How can the neighborhood be made more accessible for persons who are differently abled? Assessments should be made: who will be excluded as a result of our decisions? How will a particular decision increase sustainability of future generations? By the same token, will any of the alternatives have a detrimental impact on other aspects of sustainability?

The City of Watsonville, California, hired an ombudsperson in the aftermath of Anglo-Latino conflict, as a way of making sure that communication increased. Having familiar faces from marginalized groups will improve communication, trust, and participation rates.

### **Actions to take during Steps 8, 9, and 10, Plan for action, get agreement, and implement**

When working with historically disadvantaged and/or vulnerable populations, consistency, sincerity, and follow-through are everything. At this point, vulnerable groups will likely wait to see if planners and decisionmakers follow through, or if this is just another example of a broken treaty, failed promise, or adulterated process.

- Keep vulnerable persons, groups, agencies and organizations informed and involved
- Invite stakeholders to participate in the political process necessary to adopt the plan.
- Hold continued workshops in vulnerable areas with vulnerable groups to implement the plan.
- Invite stakeholders to participate in annual reviews and to assist with developing indicators as well as assessments (see next section on indicators).
- Network with local organizations for specific groups.
- Develop appropriate materials in needed languages.
- Train neighborhood groups and give talks.

Many local events that do not directly address disasters or marginalized groups nevertheless can be used as tools for promoting social equity.

- The “Make a Difference” Day has swept across the nation, involving communities in litter pick up and local environmental conservation activities.
- “Trash Bash” days target streamside litter pickup to reduce flooding problems and increase water quality. Such efforts to clean riparian eco-systems and preserve natural resources have a tendency to appeal across the political spectrum and involve diverse groups.
- Involving citizens on boards, committees, and task forces to do planning, code revision, environmental conservation, disaster preparedness, and community development educates and prepares future recovery stakeholders.
- Facilitating localized education about their community also works. Imagine, for example, facilitating neighborhood summits on issues of local importance. Working together to identify and address these issues fosters trust, communication, and cooperation that will serve the community well before and after a disaster.
- Some universities have volunteer trips for students during spring break in place of the traditional beach party. These programs could be tapped to bring in enthusiastic labor to address recovery problems such as the inability of lower-income or elderly people to rehabilitate their damaged housing. The Federal Emergency Management Agency used this idea to further mitigation through its Spring Break Initiative, under which student volunteers traveled to places like Oakland, California, to brace book stands to the walls, secure pictures, and distribute earthquake preparedness information.

### **The Consequences of Failing to Incorporate Sustainability**

The consequences of not incorporating sustainability in disaster recovery will almost surely include an increase in social inequity—higher death and injury rates for vulnerable groups as well as damage to property and loss of possessions. It may mean that injuries result in permanent

disabilities. It certainly means rebuilding—again and again and again. Permitting non-sustainable housing results in sustained economic and household loss; conversely, building unaffordable housing as a way to increase safety standards results in reduced diversity within a community (Habitat for Humanity provides excellent exceptions).

### **Using Recovery to Promote Equity . . .**

#### **toward Children**

- Create child care programs close to recovery meetings so that parents can stay involved in recovery efforts and stay close to their children.
- Organize teen groups to work on construction, clean-up, mitigation and recovery projects, and in discussion groups.
- Put in place counseling programs to work through children’s disaster-related trauma for several years after the disaster.
- When rebuilding places where children are isolated with mothers—low-income housing, neighborhood buildings, playgrounds and parks, child care centers—design with their special needs in mind.

#### **toward the Elderly**

- Link families and their elderly members to recovery services.
- Incorporate the wisdom of the elderly into programs and services for long-term recovery.
- Involve the elderly and their service organizations in preparedness and mitigation activities like putting up shutters before the rainy or hurricane season. Become involved in the Spring Break Initiative (see end of chapter).
- Make sure temporary housing provides support systems.
- Help replace lost possessions, ranging from medicine to a special plant, shrub, or tree (an excellent project for school children).
- Replace damaged or destroyed housing with appropriate, affordable housing.

#### **toward Women**

- Create programs to increase women’s skills and opportunities, including participation in hazard and vulnerability analysis, information dissemination, and recovery planning.
- Train emergency managers in women’s issues—invite caseworkers in low-income issues, violence against women—to address regular staff meetings.
- Place qualified female staff in key positions throughout the recovery effort, especially women who represent marginalized groups.
- Involve women in reestablishment of community health services.
- Allocate resources fairly to children, pregnant women.
- Involve women in housing, economic and physical infrastructure decisionmaking.
- Organize programs for post disaster psychological needs, including children and the elderly.
- Help women’s groups in mobilizing women for emergency management activities and recovery organizations.

## **MONITORING SOCIAL AND INTERGENERATIONAL EQUITY**

Social indicators of sustainability in general—and especially those for disaster recovery and vulnerability to risks—are a challenging topic. Many economic indicators (number of people employed, for example) are recognized as measures of economic progress, yet little consensus exists on social indicators. What is more, each community has a unique set of circumstances that should be taken into consideration when measuring sustainability. Finally, many indicators of social and intergenerational equity are interconnected.

Indicators reflect what and who communities value and direct officials on how to engage in actions, programming, and initiatives that promote intergenerational equity. One useful web site, [www.sustainablemeasures.com](http://www.sustainablemeasures.com), notes that “effective indicators are relevant, easy to understand, reliable, and based on accessible data.” Indicators must be interconnected and tied to long-term community development that is equitable in disaster and non-disaster contexts.

Probably what works best in identifying indicators is to generate discussion around several key principles. Truly sustainable actions would ensure that all groups within a community experience recovery at similar rates and with comparable resources. In reality, though, many groups often feel left out or as if they have fallen through the cracks of recovery efforts.

Generating indicators must begin by having all the stakeholder groups at the table where indicators are discussed, critiqued, and finalized. The table should be filled with representative members of all facets of the community. In short, the first indicator of a holistic recovery that promotes social and intergenerational equity is, “who is participating?”

Some additional suggestions for indicators of social and intergenerational equity are given below. In reality, tracking and verifying some of this information will likely be problematic.

### **Indicators of Social and Intergenerational Equity after a Disaster**

- **Equity in housing**—One indicator of equity in post-disaster housing might track the demographic characteristics of people who lived in the pre-disaster neighborhood and where they moved to afterwards. In Arkadelphia, for example, an unknown number of Hispanic residents apparently left the city for county residences. In Santa Cruz, some downtown-dwelling low-income elderly had no choice but to leave the community to live in cheaper housing or with family members. Most frequently, such data are available from housing offices and religious groups rendering aid.
- **Equity in housing**—Another indicator is the size of post-disaster housing. After the Oklahoma tornadoes, the square footage of houses appeared to drop in some areas. Likewise, some families felt compelled to opt for mobile homes or manufactured housing after losing their traditional homes due to insufficient funds.
- **Equity in overall recovery**—A measure of overall equity could be information on what sorts of people leave the area permanently after a disaster.



The Maine Economic Growth Foundation ([www.mdf.org](http://www.mdf.org)) suggests several important indicators relevant to general community sustainability that can and should be considered to promote equity after disaster. In a post-disaster situation, these benchmarks should, at the very least, not decline.

- Benchmark:** The ratio of the average annual income of the wealthiest 20% of families to the average annual income of the poorest 20% of families will decrease each year until at least 2000.
- Benchmark:** The income per capita of minorities will improve from 69% of per capita income of whites in 1990 to 77% by 2000 and eventually to 100%.
- Benchmark:** Among Maine residents with disabilities, the percentage employed will improve from 86% in 1990 to 90% by 2000, and eventually to the same employment rate as the population as a whole.
- Benchmark:** The percentage of Maine residents who believe that their employers maintain an equal opportunity environment will improve from 84% in 1995 to 90% by 2000 and eventually to 100%.
- Benchmark:** The percentage of jobs that pay a livable wage will improve from 65% in 1995 to 85% by 2005.

- **Equity of risk**—How many low-income homes were moved out of floodplains? How was that housing stock replaced? Where did the families go?
- **Equity in deaths, injuries, damage**—The social impact must include indicators that track reduction of deaths, injuries, and property loss. Are they the same across groups? A positive indicator would show that, post-disaster, there were no significant differences in deaths and injuries between different-income neighborhoods, between races, between men and women, elderly and middle-aged, and so on.
- **Equity in disaster preparedness**—Indicators should also examine preparedness within and across organizations and agencies that work with vulnerable populations. To what extent do area agencies on aging have and use disaster plans? Are nursing homes prepared for everything from tornado to flash flood? Is the local housing project able to board up windows? Does a local church, mosque, or synagogue know how to manage mass feedings, unsolicited donations, and long-term education of its membership?
- **Equity in outreach**—Indicators could track the degree of outreach (increasing it every year) and its effectiveness in reaching different populations (have stakeholders assess outreach materials).
- **Equity in economics**—An indicator of economic equity could be numbers and groups of people who lost their jobs, temporarily or permanently. Which types of businesses were damaged and what was the local impact on jobs? What happened to household income level across race, ethnicity, gender, age?

- **Equity in infrastructure**—Are all areas of the community repaired and replaced at comparable levels and times?
- **Gender equity**—Another indicator of social equity might be the incidence of domestic violence during and after recovery.

## REFERENCES

- Aguirre International. 1996. *EDA's Post-Disaster Assistance Program After Hurricane Andrew: Final Report*. Washington, D.C.: U.S. Dept. of Commerce, Technical Assistance and Research Division, Economic Development Administration. 128 pp.
- Bolin, Robert and Lois Stanford. "Constructing Vulnerability in the First World: the Northridge Earthquake in Southern California, 1994." In Oliver-Smith, Anthony and Hoffman, Susanna M., eds. *The Angry Earth*. New York: Routledge: 89-112.
- Boyce, James K. 2000. "Let Them Eat Risk? Wealth, Rights and Disaster Vulnerability." *Disasters* 24(3):254-261.
- Buckle, Philip, et al. 2000. "New Approaches to Assessing Vulnerability and Resilience." *Australian Journal of Emergency Management* 15(2):8-14.
- Cuny, Fred. 1983. *Disasters and Development*. Oxford: Oxford University Press.
- Cutter, Susan L. 1995. "The Forgotten Casualties: Women, Children and Environmental Change." *Global Environmental Change* 5(1):181-194.
- Enarson, Elaine. 1999. "Violence Against Women in Disasters." *Violence against Women* 5(7): 742-768.
- Henderson, H. 1996. *Building a Win-win World: Life Beyond Global Economic Warfare*. San Francisco: Berrett-Koehler Publishers.
- Mileti, Dennis. 1999. *Disasters by Design: A Reassessment of Natural Hazards in the United States*. Washington, D.C.: Joseph Henry Press. Available at [books.nap.edu/catalog/5782.html](http://books.nap.edu/catalog/5782.html). [accessed September 21, 2001]
- Roseland, Mark. 1998. *Toward Sustainable Communities: Resources for Citizens and Their Governments*. Stony Creek, CT: New Society Publishers.

## WHERE TO FIND MORE INFORMATION

### Training Courses and Workshops

Federal Emergency Management Agency, Emergency Management Institute, Higher Education Project Courses. Emmitsburg, Maryland. [www.fema.gov/emi/edu/aem\\_courses.htm](http://www.fema.gov/emi/edu/aem_courses.htm) Phone: (301) 447-1233 or email Barbara Johnson: [barbara.l.johnson@fema.gov](mailto:barbara.l.johnson@fema.gov) [accessed June 15, 2001]

- "Social Dimensions of Disaster."
- "Sociology of Disaster."

Federal Emergency Management Agency, Emergency Management Institute, National Emergency Training Center. Emmitsburg, Maryland. [www.fema.gov/emi](http://www.fema.gov/emi) [accessed June 15, 2001] (301) 447-1035.

- “FEMA Program Responsibilities: Coordinating Environmental and Historical Compliance. Federal Emergency Management Agency Course G253. This 3-day course is an introduction to environmental and historic compliance. It examines the importance of fully integrating the compliance steps stipulated by the National Environmental Policy Act and the National Historic Preservation Act into the administration of the Public Assistance and Hazard Mitigation Grant Programs. This course is directed to those at environmental/historic entry levels, and others whose primary function is not environmental/historic.

## **Organizations**

Disaster Child Care, Adventist Community Services

The Adventists and the Church of the Brethren have developed model programs for child care and donations management.

See [www.nvoad.org/acs.htm](http://www.nvoad.org/acs.htm) [accessed August 3, 2001]

American Red Cross

Among the topics covered are “Dealing with the Elderly and Disasters” and “Masters of Disasters Curriculum for Children.”

See [www.redcross.org](http://www.redcross.org) [accessed August 3, 2001]

Center for Health, Environment and Justice

See [www.chej.org](http://www.chej.org) [accessed August 3, 2001]

Center for Third World Organizing

See [www.ctwo.org](http://www.ctwo.org) [accessed August 3, 2001]

Environmental Justice Resource Center, Clark Atlanta University

See [www.ejrc.cau.edu](http://www.ejrc.cau.edu) [accessed August 3, 2001]

Federal Emergency Management Agency

“FEMA for Kids” has excellent resources in English and Spanish, with stories for all children, including Native Americans.

See [www.fema.gov/kids/](http://www.fema.gov/kids/) [accessed August 3, 2001]

Gender and Disaster Network

Use this network to find experts on women’s issues around the world.

See [www.anglia.ac.uk/geography/gdn](http://www.anglia.ac.uk/geography/gdn) [accessed August 3, 2001]

Highlander Education and Research Center (HREC)

HREC specializes in participatory education and action research and involving stakeholders.

See [www.hrec.org](http://www.hrec.org) [accessed August 3, 2001]

League of United Latin American Citizens

Mountain Association for Community Economic development, 433 Chestnut Street, Berea, KY 40403; (606) 986-2373; fax 606-986-1299; email [info@maced.org](mailto:info@maced.org)

See [www.lulac.org](http://www.lulac.org) [accessed August 3, 2001]

Mennonite Disaster Services

The Mennonites will appear quietly in a community, assist the low-income, elderly and/or persons with disabilities with post-disaster cleanup and building repair, and then quietly leave.

See [www.nvoad.org/mds.htm](http://www.nvoad.org/mds.htm)

Mid-Florida Area Agency on Aging Emergency Preparedness.

[www.mfaaa.org/emergency/plan/disaster/1.html](http://www.mfaaa.org/emergency/plan/disaster/1.html) [accessed August 3, 2001]

National Association for the Advancement of Colored People

See [www.naacp.org](http://www.naacp.org) [accessed August 3, 2001]

National Voluntary Organizations Active in Disaster.

At [www.nvoad.org/aboutnv.htm](http://www.nvoad.org/aboutnv.htm), you will find a network of voluntary organizations, many of them faith-based.

Pacific Institute. "Environmental Justice Resources on the Internet."

This page has extensive lists of resources at the local, national, and international level, including institutional sites, reports, and relevant legal texts.

See [www.pacinst.org/ej.html](http://www.pacinst.org/ej.html) [accessed August 3, 2001]

Prepare Now

This site is an excellent source for information on vulnerable populations and disasters.

See [www.preparenow.org](http://www.preparenow.org) [accessed August 3, 2001]

Sustainable Measures.

See [www.sustainablemeasures.com](http://www.sustainablemeasures.com) [accessed August 3, 2001]

United Nations Development Programme, Gender in Development

See [www.undp.org/gender/](http://www.undp.org/gender/) [accessed August 3, 2001]

United Farm Workers of America, AFL-CIO

Use this site for connections and networks to local migrant and stationary farm workers and organizations.

See [www.ufw.org](http://www.ufw.org) [accessed August 3, 2001]

## **Videos, CD-ROMs, and DVDs**

*Mitigation Revitalizes a Floodplain Community: The Darlington Story.* Madison, WI: Wisconsin Department of Natural Resources. 1997.

This is a well-produced videotape about the efforts of a small rural Wisconsin community to reverse the effects of neglect and disinvestment in its historic downtown area caused by repeated flooding and economic change. Using a multi-objective planning and management strategy, officials and citizens, in partnership with government agencies and private entities, identified six goals: 1) preserve the historic character of the downtown; 2) restore community pride; 3) acquire and relocate commercial properties at risk; 4) elevate and flood proof commercial and residential structures; 5) stimulate investment downtown; and 6) pursue tourism as an economic strategy. The video follows the mitigation process from early meetings through floodproofing and relocation. Produced by the Wisconsin Department of Natural Resources. 27 minutes. 1997. Available free from Wisconsin DNR, P.O. Box 7921, Madison, WI 53707-7921; (608) 264-9200.

*Quality Redevelopment of Eastern North Carolina.* Horizon Video Productions. 2000. Durham, NC.

This 20-minute video was produced by the state in the aftermath of Hurricane Floyd to introduce and educate local and state officials about the “better ways” available to recover from the disaster and at the same time address other local concerns such as environmental quality, economic vitality, housing, sense of community, business and job opportunities, and disaster mitigation. It introduced a framework espoused by the state for sustainable community action and features the governor explaining the tenets of “quality redevelopment” and how it can—and did—benefit North Carolina communities and help ensure a better future for the state’s citizens. Available from North Carolina Department of Emergency Management, 1830-B Tillery Place, Raleigh, NC 27699; (919) 751-8000; fax: (919) 715-9763.

*The Unexpected Catastrophe: 1989 Newcastle Earthquake Information Resources.* Newcastle, Australia: Newcastle Regional Library. 1999.

The Newcastle Earthquake Database is a multimedia CD-ROM database that contains a record of the events of, the response to, and the renewal since the 1989 Newcastle earthquake. Subjects covered in the database include: disaster management, earthquake engineering, economic impact, geological issues, health issues, heritage issues, insurance, lifeline services, psychological impact, recovery and renewal, seismology, and social and welfare services.

## **Books, Articles, and Papers**

California Environmental Protection Agency. 1994. *Toward the 21st Century: Planning for the Protection of California’s Environment.* Sacramento, CA: California Environmental Protection Agency, California Comparative Risk Project, 642 pp.

California’s unique blend of population density, government, economy, natural resources, beauty, industry, agriculture, and recreational potential, combined with its size, diversity, and social awareness makes the job of protecting public health and the environment particularly challenging. To help identify environmental priorities for the future, the California Comparative

Risk Project was charged with identifying environmental threats of the greatest ecological, human health, and societal concern using the risk-ranking model. This report presents the findings of committees dealing with human health, ecological health, social welfare, environmental justice, education, and economic perspectives. Also in the document are an extensive summary report, an interagency management cooperative case study review, and four appendices which present summary sheets for human health, ecological health, social welfare, and education.

California Governor's Office of Emergency Services. 2000. *Meeting the Needs of Vulnerable People in Times of Disaster: A Guide for Emergency Managers*. Sacramento, CA: California Governor's Office of Emergency Services. 62 pp.

This handbook is a useful guide to the special situations faced by marginalized groups in the wake of hazardous events. Its premise is that a cooperative relationship between government and community-based organizations provides the best assurance that the needs of under-served people and the needs of the community for long-term recovery will be fully addressed. It then proceeds to outline steps for building that relationship, outlining the capabilities, strengths, and weaknesses of both community-based organizations and governments in handling a variety of situations. Extensive appendixes give sample memoranda of understanding, lists of community-based organizations, tips for getting started on a comprehensive approach, and sources of more information.

Federal Emergency Management Agency. n.d. *Safeguarding Your Historic Site: Basic Preparedness and Recovery Measures for Natural Disasters*. Boston, MA: FEMA Region I. 55 pp.

Drawing upon experience gained through disasters in Nantucket, Massachusetts, and Montpelier, Vermont, this document helps stewards of historic sites—including historic buildings, landscapes, districts, and museums—prepare their sites to withstand and recover from a natural disaster. The handbook can also be used by public officials, planners, community development professionals, and emergency management professionals as a general step-by-step guide to emergency planning for such facilities. Before a disaster strikes, the handbook provides information about identifying and assessing the risks to a facility, describes preventive measures for historic sites, and presents emergency planning guidelines. During the disaster itself, the handbook describes what can be done in the time available. After the disaster, guidelines are given for stabilizing the situation and recovering from the impacts. Preventive measures and preservation considerations are provided for four disaster agents: wildfire, hurricanes, riverine floods, and earthquakes.

Jones, Barclay G. 1986. *Protecting Historic Architecture and Museum Collections from Natural Disasters*. Stoneham, MA: Butterworths Publishers. 576 pp.

This handbook is a guide for professionals engaged in the preservation of valuable objects or structures. The book contains 27 papers, scores of illustrations and photographs, and an extensive list of useful references. The papers are grouped into six categories: a general overview of cultural loss caused by earthquakes and other natural disasters; a summary of policy issues for those involved with disaster preparedness; an assessment of hazards and structural vulnerability to them; a description of preventive measures to mitigate losses; listings of emergency and rescue measures for structures and artifacts; and discussions of public and private response measures.

Merritt, John F. 1990. *History at Risk: Loma Prieta—Seismic Safety and Historic Buildings*. Oakland, CA: California Preservation Foundation. 100 pp.

This book was written to serve two functions: to tell others in California what the California Preservation Foundation learned in the aftermath of the Loma Prieta earthquake and to help local officials and state agencies reassess seismic mitigation policies and programs that directly affect the conservation of historic buildings. The book discusses the need to survey buildings at risk, the human and financial resources available to mitigate future losses, and the policies and laws in California that affect preservation before and after a disaster. It then describes how to develop a program to reduce future earthquake risks and lists the financial resources that will be available when an earthquake strikes. The document concludes with recommendations for changes in state policy that will support the preservation and protection of historic buildings from earthquakes. Appendices contain a study that compares different damage assessments of the same building in Santa Cruz, and reprinted ordinances from the town of Los Gatos dealing with the repair, restoration, and reconstruction of buildings damaged during the Loma Prieta quake.

Morris, Marya. 1992. *Innovative Tools for Historic Preservation*. Chicago, IL: American Planning Association Planning Advisory Service. 40 pp.

This report describes the results of a survey of more than 300 planning directors and preservationists to identify innovative techniques that offer the greatest protection to historic resources. It shows how communities have used non-traditional techniques such as conservation districts, down-zoning, and tax and financial incentives to meet historic preservation objectives. The report includes case studies to illustrate each technique.

Nanita-Kennett, Milagros. 1994. *Urban Redevelopment and Earthquake Safety*. Tallahassee, FL: Florida A&M University, School of Architecture. 143 pp.

Urban renewal or redevelopment has been employed by federal, state, and local governments to promote the creation of public infrastructure and regulate the development process. However, earthquake safety programs have never been a part of this process, despite evidence that many cities are broadly vulnerable to the hazard. If these programs could be successfully integrated, seismic safety and protection could be greatly increased with reasonable effort and cost. The author examines this topic by addressing urban decay and earthquake risk; the redevelopment process; the urban environment, including building codes, land use, and infrastructure; federal earthquake programs; local government programs; and the integration of various aspects of redevelopment. She provides case studies of Charleston, South Carolina; Memphis, Tennessee; Salt Lake City, Utah; and Santa Rosa and Santa Cruz, California.

Nelson, Carl L. 1991. *Protecting the Past from Natural Disasters*. Washington, D.C.: The Preservation Press, National Trust for Historic Preservation. 192 pp.

This book issues a clear call to cultural preservation professionals, planners, and emergency management personnel to begin preparations for protecting America's cultural heritage from natural disasters. Following a photo essay on historic buildings damaged by Hurricane Hugo and the Loma Prieta earthquake, the manual lists lessons learned from both of these disasters, describes the types of damage caused by various disaster agents, and offers advice about how to plan protective measures for historic properties. Emergency postdisaster activities also are described, including stabilization of structures, artifact restoration, damage assessment, restoration standards, security, and other recovery and reconstruction actions. Legal precautions,



landscape restoration, and insurance needs are a few of the topics about which information is presented. Numerous checklists, bibliographic references, and an extensive list of resource groups complete the volume.

O'Brien, Matthew Kendall. 1993. *A Survey of Damage to Historic Buildings and an Evaluation of Disaster Response Procedures Following the Cape Mendocino Earthquakes of April 1992*. Disasters and Cultural Property series. Ithaca, NY: Cornell University, Institute for Social and Economic Research, Program in Urban and Regional Studies. 198 pp.

This case study investigates the impact on historic structures of the Cape Mendocino, California, earthquakes of April 1992 and how the disaster recovery process that followed affected historic architecture in the area. The estimated damage rate attributed to the earthquakes (1.5 to 2.5% of the building stock) is not only high compared to other recent earthquakes but also demonstrates the susceptibility of older construction to seismic damage. Separate chapters deal with seismic retrofitting for historic residential buildings; the disaster recovery process in Humboldt County; the role of federal agencies in disaster response and the role of the State of California in disaster response. Topics addressed in the thesis include preservation legislation, California's policy toward historic properties, and the role of the insurance industry in encouraging the preservation of older residential structures.

Phillips, Brenda D. and Mindy Ephraim. 1992. *Living in the Aftermath: Blaming Processes in the Loma Prieta Earthquake*. Working Paper No. 80. Boulder, CO: Natural Hazards Research and Applications Information Center. 15 pp.

This report examines group behavior and attitudes in the aftermath of the 1989 Loma Prieta earthquake. Following the quake, widespread and diverse sheltering needs arose because of the mixed Bay Area population. The groups involved included non-English speakers, physically and mentally disabled individuals, "pre-quake" homeless, and others. Long accustomed to responding to sheltering, the American Red Cross stepped in to help; yet in some locales, complaints were lodged against Red Cross sheltering efforts (or lack thereof) as well as against local government efforts. Shelter problems in Watsonville, California, received heavy media attention when allegations of cultural insensitivity and discrimination against the community's large Latino population arose. This paper examines the evolution of these problems and offers suggestions for avoiding such difficulties in the future.

Picou, J. Steven. 2000. "The 'Talking Circle' as Sociological Practice: Cultural Transformation of Chronic Disaster Impacts." *Sociological Practice: A Journal of Clinical and Applied Sociology* 2(2):66-76.

This article presents a description of a culturally sensitive mitigation strategy, the "Talking Circle," and its application to Alaska Natives negatively impacted by the 1989 Exxon Valdez oil spill. Talking Circles are a traditional social activity for Alaska Natives and this activity was organized and implemented by members of the Village of Eyak in Prince William Sound, Alaska. The two-day event resulted in many testimonies about personal experiences with the oil spill. Post-Talking Circle activities by Eyak Village members indicate increased cultural awareness and political mobilization. These findings suggest that this mitigation strategy promoted cultural consciousness among victims experiencing chronic disaster impacts and resulting in a "transforming activity" for the Native Village of Eyak.

Simile, Catherine M. 1995. *Disaster Settings and Mobilization for Contentious Collective Action: Case Studies of Hurricane Hugo and the Loma Prieta Earthquake*. Newark, DE: University of Delaware, Disaster Research Center. 238 pp.

In 1989 two large-scale natural disasters affected two communities in the U.S. Hurricane Hugo affected the Sea Islands of South Carolina and the Loma Prieta earthquake, Watsonville, California. In both cases, pre-existing social organizations mobilized their resources to address disaster impacts experienced by marginalized populations, specifically, damage to housing. In the Sea Islands of South Carolina, white church groups addressed the housing problems of the rural black poor as ones of misfortune and provided charity to those people. In Watsonville, on the other hand, Latinos mounted contentious collective campaigns against what they claimed to be unjust actions on the part of the local white power structure. The differences in the actions undertaken by the two groups can be explained by the differential access each had to the features necessary for contentious collective action: political opportunity, resources, pre-existing social organization, and frames of injustice. The study concludes that, although disaster settings heighten the potential for contentious collective action, only groups who engaged in such behavior in pre-disaster settings are likely to engage in such action in post-disaster settings.

Thiel, Charles C., Jr., E. Leroy Tolles, Edna E. Kimbro, Fredrick A. Webster, and William S. Ginell. *Guidelines for Seismic Strengthening of Adobe Project—Report of first year activities*. Getty Conservation Institute. 250 pp.

The Getty Conservation Institute's interest in the areas of seismic damage mitigation studies and the stabilization of deteriorating adobe structures led to the establishment in November 1990 of the Guidelines for Seismic Strengthening of Adobe Project (GSAP). The goal of GSAP was to develop technical procedures for improving the seismic performance of existing monumental adobe structures consistent with maintaining architectural, historic, and cultural conservation values. California's seismic vulnerability is particularly hazardous to the state's Spanish Colonial adobe architectural heritage, which includes missions, presidios, and residences. Also included in the report is a glossary of Spanish Colonial architectural terminology, 451 general references plus chapter references, and a census of historic adobe buildings in California. The report is generously supplied with floor-plans, detail drawings, and photographs.

Tolles, E. Leroy, Edna E. Kimbro, Charles C. Thiel, Frederick A. Webster, and William S. Ginell. 1993. *Guidelines for the Seismic Retrofitting of Adobe Project—report of second year activities*. Getty Conservation Institute. 166 pp.

This second report of the Guidelines for Seismic Strengthening of Adobe Project activities offers: 1) a planning guide that provides information and advice about seismic cultural preservation goals, objectives, conservation principles, essential information required, and practical application of the information; and 2) a description of a seismic testing program, which contains information about test procedures, material and wall tests, and the results of the testing program on building models. Other features of the report include sources of information and assistance available from agencies and non-profit organizations, and a reprint of "Working with Architects and Other Consultants," a chapter appearing in the Historic Property Owner's Handbook (1977), which was prepared for the National Trust for Historic Preservation.

U.S. National Task Force on Emergency Response. 1997. *Emergency Response and Salvage Wheel*. Washington, D.C.: National Task Force on Emergency Response. 4 pp.

Much of America's cultural heritage is in the care of museums, libraries, art institutions, and other organizations, and protecting these valuable resources can be difficult under the best of conditions. In a disaster, collections that have been carefully built over many years can be damaged, endangering national treasures. The National Task Force on Emergency Response recently created a useful tool to guide caretakers in protecting and salvaging their collections—the Emergency Response and Salvage Wheel—which outlines steps to take in preparing for, responding to, and recovering from disasters. It discusses creating disaster plans, working with emergency management agencies in the community, and obtaining assistance from national conservation organizations. The wheel also provides information on responding to a disaster warning; taking protective action during a disaster; initiating recovery activities away from the site; stabilizing a building and its environment; handling documentation; retrieving and protecting artifacts; assessing damage; prioritizing salvage activities; revitalizing historic buildings; and restoring photographs, books and papers, electronic records, textiles, furniture, ceramic, stone, metal organic materials, natural history specimens, and framed artwork.

U.S. National Trust for Historic Preservation. 1990. *An Assessment of Damage Caused to Historic Resources by the Loma Prieta Earthquake*. Publication No. NT-RS-10570-90. Washington, D.C.: National Trust for Historic Preservation. 114 pp.

This report assesses the damage and impacts to historic buildings caused by the Loma Prieta quake, analyzes the financial needs and funding available for restoring the buildings, and recommends actions to be taken by both federal and state governments. At the federal level, the report recommends that legislative procedures should be instituted immediately to retrofit historic buildings. The California State Office of Historic Preservation performed very well in dealing with the quake's aftermath. Small scale methods for seismically upgrading buildings are known; what is needed is implementation, not necessarily more research. The report offers numerous suggestions, recommends implementation strategies, lists many California resources, and outlines state legislation aimed at retrofitting historical structures.

U.S. National Trust for Historic Preservation. 1993. *Treatment of Flood-Damaged Older and Historic Buildings*. Washington, D.C.: National Trust for Historic Preservation (NTHP). 12 pp.

Prompted by the massive flooding in the Midwest, the NTHP has prepared an informative booklet to assist building owners in minimizing structural and cosmetic damage caused by riverine flood waters. Construction detail drawings and checklists provide guidelines for dealing with problems caused by hydrostatic pressure (basement slab heaving, foundation collapse, loss of mortar); erosion (foundation erosion, soil erosion, sidewalk and slab heaving); saturated insulation; wood rot; masonry and concrete (soluble salt damage, freezing and thawing damage); exposed and imbedded metals; exterior paint; and interior finishes (drywall, wood floors and trim, paint, wallpaper, and floor coverings). The publication also suggests safety precautions for workers to take during the restoration process. In addition to providing advice on specific restoration details, these offices administer the historic rehabilitation tax credit program for owners of income-producing properties certified as historic rehabilitation projects.

## **Additional Reading**

Bailey, Conner, Kelly D. Alley, Charles E. Faupel, and Cathy Solheim. 1993. *Environmental Justice and the Professional*. HRRC Publication No.125A. College Station, TX: Texas A&M University, College of Architecture, Hazard Reduction & Recovery Center. 10 pp.

Bailey, Conner, Charles E. Faupel, and Kelly D. Alley. 1994. *Environmental Justice: Mobilization of a Grassroots Social Movement*. HRRC Publication 126A. College Station, TX: Texas A&M University, College of Architecture, Hazard Reduction & Recovery Center. 21 pp.

Berke, Philip R., Jack D. Kartz, and Dennis E. Wenger. 1993. "Recovery after Disaster: Achieving Sustainable Development, Mitigation and Equity." *Disasters* 17(2):93-109.

Bolin, Robert and Lois Stanford. "Constructing Vulnerability in the First World: the Northridge Earthquake in Southern California, 1994." In Oliver-Smith, Anthony and Hoffman, Susanna M., eds. *The Angry Earth*. New York: Routledge: 89-112.

Boyce, James K. 2000. "Let Them Eat Risk? Wealth, Rights and Disaster Vulnerability." *Disasters* 24(3):254-261.

Cuny, Fred. 1983. *Disasters and Development*. Oxford: Oxford University Press.

Cutter, Susan L. 1995. "The Forgotten Casualties: Women, Children and Environmental Change." *Global Environmental Change* 5(1):181-194.

Enarson, Elaine. 1999. "Violence Against Women in Disasters." *Violence against Women* 5(7): 742-768.

Fothergill, Alice, Enrique G.M. Maestas, and JoAnne Darlington DeRouen. 1999. "Race, Ethnicity and Disasters in the United States: a Review of the Literature." *Disasters* 23(2):156-173.

Harker, Donald F. and Elizabeth Ungar Natter. 1995. *Where We Live: A Citizen's Guide to Conducting a Community Environmental Inventory*. Covelo, CA: Island Press. 319 pp.

Krajeski, Richard L. and Kristina J. Peterson. 1999. "'But She Is a Woman and This Is a Man's Job': Lessons for Participatory Research and Participatory Recovery." *International Journal of Mass Emergencies and Disasters* 17(1): 123-130.

Martin, Christopher T. 1995. "Historic Resources Compliance and Mitigation in Missouri's Floodplains." Pp. 169-173 in *From the Mountains to the Sea--Developing Local Capability: Proceedings of the Nineteenth Annual Conference of the Association of State Floodplain Managers*. Special Publication 31. Boulder, CO: Natural Hazards Research and Applications Information Center.

- McDonnell, Sharon et al. 1995. "Evaluation of Long-term Community Recovery from Hurricane Andrew: Sources of Assistance Received by Population Sub-groups." *Disasters* 19(4): 338-347.
- Morrow, Betty Hearn and Elaine Enarson. 1996. "Hurricane Andrew Through Women's Eyes: Issues and Recommendations." *International Journal of Mass Emergencies and Disasters* 14(1): 5-22.
- Phillips, Brenda D. 2000 "Environmental Hazards, Sustainability and Social Justice: Making a Difference." In Dunn, Dana and Waller, David V., eds. *Analyzing Social Problems: essays and exercises*, second edition. Upper Saddle River, NJ: Prentice Hall.
- Rogers, George O. 1995. *Environmental Racism or Inequity: Comparative Study of Four Ethnic Groups*. HRRC Publication 131A. College Station, TX: University of Texas, College of Architecture, Hazard Reduction & Recovery Center. 18 pp.
- Roseland, Mark. 1998. *Toward Sustainable Communities: Resources for Citizens and Their Governments*. Stony Creek, CT: New Society Publishers.
- Weaver, James H., Michael T. Rock, and Kenneth Kusterer. 1997. *Achieving Broad-Based Sustainable Development: Governance, Environment, and Growth with Equity*. West Hartford, CT: Kumarian Press.





## Chapter 7

# PROTECTING ENVIRONMENTAL QUALITY DURING DISASTER RECOVERY

---

*PREMISE. Projects or programs that restore, enhance, or protect natural resources and open space (floodplains, wetlands, and wildlife) from degradation also reduce impacts from natural disasters.*

*COROLLARY. A community that integrates these environmental projects or programs into its disaster recovery saves money, improves its quality of life, and contributes to the overall health, safety, and welfare of its citizens, thus building a sustainable community.*

## INTRODUCTION

Floods, hurricanes, earthquakes, landslides, and wildfires are natural disasters that change the character of a community in moments. Transportation systems shut down as roads tumble into creeks, bridges collapse, and rapid transit lines stop. Public facilities such as schools, power plants, and downtown districts close. Ports no longer serve commerce and trade. Interruption of gas, electric, and water utilities paralyzes the community at the very time that rescue teams and people need service the most.

In addition to affecting the built environment, the consequences of natural disasters are also felt in the natural environment. Erosion accelerates along rivers and beaches. When sewer systems, storm drains, and pipelines break and storage tanks rupture, toxic substances spew into the air, onto the water, and across the landscape.

But people can rebuild a better community after a disaster by protecting or enhancing their local environmental quality. Enhancement strategies, described hereafter as environmental projects and programs, may take any of several forms:

- preservation/conservation/restoration of natural resources (habitat, wildlife, flora, fisheries);
- protection of open space (agricultural, waterfront, rivers, shoreline, other);
- management of stormwater runoff; and
- prevention/remediation of pollution (air, water, soil, other).

Immediately after a disaster, response is uppermost in everyone’s mind. But as the community takes action today, it is time to think far into the future. The community should begin environmental projects or programs that make the community less vulnerable and that also address other aspects of sustainability—social equity, economic vitality, and quality of life. In other words, the community can be turned into a sustainable community.

## **RECOVERY STRATEGIES FOR PROTECTING ENVIRONMENTAL QUALITY**

Protecting or enhancing environmental quality can take place during disaster recovery. A community can start with the *situations* that exist after a disaster, pick and choose among the *options* for improving its environment and among the implementation *tools* available to help pursue each of those options, to develop environmental *strategies* (projects or programs) that are specially tailored to its own needs. The Matrix of Opportunities in Chapter 1 shows some of the options a recovering community could use to protect its environment while it tends to disaster-caused predicaments. The situations and options shown on the matrix, and the tools listed below, are not exhaustive; rather, they are meant to give an idea of the range of possibilities. Likewise, the sample strategies below suggest ways in which some options and disaster-induced situations could be combined to help a community address environmental quality. The strategies suggested below use one or more of the options listed on the Matrix of Opportunities under the fourth sustainability principle, “Protect and/or Enhance Environmental Quality.”

### **OPTIONS FOR PROTECTING ENVIRONMENTAL QUALITY**

- Preservation/conservation/restoration of natural resources
- Protection of open space
- Management of stormwater runoff
- Prevention/remediation of pollution

Throughout the nation environmental projects and programs protect natural resources and open space while simultaneously reducing damage from natural disasters. Studies by the U.S. Department of Agriculture concluded that restoring wetlands could reduce 100-year floods by

10%. Purchase of full title or easements of approximately 4,850 acres of wetlands and local zoning of 4,650 acres of floodplain in the Charles River basin eliminated the need for \$30 million of U.S. Army Corps of Engineers structural flood control (see Chapter 8 for more discussion of this project). Riparian buffers of trees and other vegetation in North Carolina intercept runoff into rivers and lakes and remove sediment, nitrogen, phosphorous, trace metals, and hydrocarbons. To maintain its drinking water supply, New York City decided it was cheaper to purchase buffer land in the Hudson River watershed than to build an \$8 billion filtration plant. Buffers stabilize eroding banks in California and Kentucky.



Open space, greenways, and riverside parks serves as habitat for wildlife, birds, and migratory waterfowl, protect streams from pollutants, help maintain water temperatures, and keep people and development from the highest-risk floodplains. Improved water quality raises the recreational and intrinsic values of river basins in Iowa and Illinois. Aesthetic values, recreation, and other functions characterize not only the well-known Rock Creek Park in Washington, D.C., but also the 500-foot greenway along the Chattahoochee River that runs 180 miles from the Appalachian Mountains to Columbus, Georgia. The 19-mile Sims Bayou greenway project in Houston provides habitat for wildlife, enhances the aesthetics of the watercourse, and helps prevent erosion.

Trees can drastically reduce stormwater management costs. American Forests studied Garland, Texas, and calculated that the city's tree canopy reduced stormwater runoff by 19 million cubic feet during a major storm. Annually, the trees save Garland \$2.8 million in infrastructure costs and \$2.5 in air quality costs and residential energy bills.

In some situations, communities can use alluvial fans, critical habitats, wetlands, or slopes prone to landslides for environmental protection. For example, Orange County, California, owns 1,200 acres on the alluvial fan of the Santa Ana River for aquifer recharge. In Louisiana, the state rebuilds undeveloped barrier islands to dampen the impacts of hurricane storm surge on coastal wetlands. States, counties, and towns across the country are building disaster-resilient and sustainable communities that include environmental amenities. At the same time they are saving money and lives.

After a disaster, a community has an opportunity to reconsider and redesign its development patterns. A chance exists to revise and strengthen the mitigation plan by setting priorities that include environmental projects or programs as an important component. Integrating projects or programs that restore, enhance, and protect the natural landscape into a comprehensive or recovery plan(s) can help guide the disaster recovery and reconstruction along paths that will reduce or eliminate damage from future floods, hurricanes, earthquakes, wildfires, and landslides.

This chapter is structured for decisionmakers in medium to small communities where most elected officials are part time and each staff person is responsible for more than one duty. The following sections present a sequence of activities and options for integrating environmental projects and programs into the community's comprehensive plan and disaster recovery plan. The next section lists practical suggestions (maxims) for making important early decisions about environmental quality during the response phase after the disaster and presents a 10-step process for taking action. Next there is a proposed monitoring method to determine if a project or program is succeeding or if changes are needed. The section after that is a menu of tools readily available to a local recovery team. After a short summary, the last section lists agencies agencies and groups with useful information and possible funding sources.

## **PURSUING STRATEGIES FOR ENVIRONMENTAL QUALITY**

Preferably, all communities should practice pre-disaster planning as well as have long-term comprehensive plans to manage their growth, development, and land use. Unfortunately, many communities will only take action after a disaster strikes. During the response phase to a natural disaster, elected officials and professional staff begin to think about their recovery plan. To be most successful, they should build on several fundamental principles that guide the conduct of the community's efforts. These maxims are the foundation upon which an effective environmental component is built into the local comprehensive and/or recovery plans. The more maxims that apply to a community, the better its chances of achieving its environmental goals.

### **Maxims for Protecting the Environment during Holistic Recovery from Disaster**

1. During the response phase of restoring power, clearing debris, opening roads, and providing food and shelter for victims, the community will consider environmental projects and programs as part of its recovery plan. The community must designate a lead person, commit staff time, and provide financial support to integrating environmental projects and programs into the comprehensive plan and recovery plan.
2. Recovery from disasters must be addressed in a regional context. After a flood the community will act throughout the watershed; after a hurricane or drought the community will think regionally; after an earthquake or landslide it will work in consideration of the geologic landscape; and in the aftermath of a wildfire it will deal with issues on an ecosystem basis. The recovery plan will build on horizontal partnerships (among county or parish and municipal officials) and vertical partnerships (federal, state, and local representatives).
3. Responsible agencies will use the legal flexibility built into all programs and interpret their duties and mandates in such a way that a county, parish, or town can effectively build a sustainable community. One approach is to include these environmental initiatives into the existing comprehensive plan.
4. Chances of success increase when environmental projects and programs reinforce solutions to other problems, such as wetlands protection, nonpoint source pollution reduction, erosion control, or a need for open space and recreational areas. At the same time, these projects and programs will curtail development in the most dangerous or hazardous locations in the community, thereby saving money and lives.
5. Information on floods, hurricanes, earthquakes, landslides, or fires, and environmental characteristics is available and will for the most part meet planning needs for the short term. As the need arises, the community will collect more detailed data for long-term

actions. As a result, the community's environmental initiative includes actions that can begin almost immediately and will result in achieving broader, long-term actions.

6. Each environmental project and program will be realistic, technically possible, economically feasible, politically workable, and socially acceptable.

## **Integrating Environmental Elements during the 10-Step Recovery Process**

This section outlines a process by which environmental projects and programs are integrated into a community's recovery plan. It can be adjusted to fit a community's style, capabilities, needs, and setting. However, if the community prefers an alternative planning method, it should keep using it. There is no need to duplicate a community's established planning process. If there is a comprehensive plan, environmental elements can be built into the plan using the process below as a guide. If there is no such plan, strategies for environmental quality can be carried out in the context of the overall disaster recovery. Within the 10-step process described in Chapter 2, the following activities in particular will help ensure that environmental issues are addressed during disaster recovery.

Before a community does anything else, it should review the maxims in the previous section. Is the community ready to commit to integrating environmental projects and programs into the recovery or comprehensive plan?

### **Actions to take during Step 1, Get organized.**

Put one person in charge of environmental issues and provide staff support. Define the planning area for environmental issues:

- For a flood, use a watershed.
- For a hurricane or drought, use a region.
- For an earthquake or landslide, use a geologic region.
- For a wildfire, use an ecosystem.

A multi-jurisdictional approach allows a community to pool technical, financial, and personnel resources, achieving an economy of scale that benefits all:

- Horizontal partners—county, parish, town, district; and
- Vertical partners—federal agencies and state departments.
- Organize the team and identify working groups: technical, financial, legal, public participation and outreach, other.
- Agree on how the planning team will function and its scope of responsibility.
- Set team goals, objectives, and priorities.

### **Actions to take during Step 2, Involve the Public**

- Decide on a public involvement process.
- Invite representatives of the public and non-profit organizations to participate.

- Conduct public meetings and workshops for victims and community representatives.
- After presentations, ask for and record comments.
- Incorporate comments into the planning process and plans.

See Chapter 3 for ideas on how to use a participatory process during recovery.

**Actions to take during Step 3, Coordinate with other agencies.**

- Have agency representatives on the planning or recovery team describe their agency's programs.
- Invite other agencies to make similar presentations.
- Establish a regular process for providing information and receiving ideas.
- Make agencies part of the review process.

**Actions to take during Step 4, Assess the environmental problems.**

- Use reliable sources of existing information.
- Map the environmentally sensitive areas.
- Describe the characteristics of the environment.
- Estimate the probable types and degree of damage.
- Identify development trends in the sensitive areas.

**Actions to take during Step 5, Evaluate the problems.**

These are the “situations” brought about by the disaster that has struck a community, some examples of which are listed on the Matrix of Opportunities in Chapter 1. Use this opportunity to examine how strategies to remedy these conditions can also serve to enhance the community's environment.

- Damaged transportation.
- Damaged public facilities.
- Damaged utilities.
- Damaged housing/businesses.
- Environmental damage.
- Disruption of health and safety.
- Assess risks and magnitude of future events.
- Set priorities so the community can focus on planning, funding, and implementing these projects and programs.

**Actions to take during Step 6, Set goals.**

Using the planning or recovery team and public involvement, set goals and objectives. Make goals positive statements.

**Actions to take during Step 7, Explore all alternative strategies and measures.**

Be sure to have a balanced approach. Give full consideration to all sustainability principles; unite economic, social equity, quality of life, disaster resilience, and environmental perspectives. At

the same time, analyze the potential impacts of each alternative on every one of the aspects of sustainability within the community.

Select from the opportunities identified in Step 5, goals and objectives set in Step 6, and the options and tools described in this chapter. Expand and tailor them to meet community needs

- Identify the lead agency for each action and what they will provide or prepare.
- Describe local actions (zoning, subdivision ordinances, building codes, etc.).
- Schedule team meetings, public participation, data collection, report writing.
- Involve the public as soon and as often as practical.
- Consider funding methods and how the community will apply for them.

### **Actions to take during Step 8, Plan for action.**

During the step the planning or recovery team drafts a plan for action that fits into the recovery phase or becomes part of the community's comprehensive plan.

- Include a budget.
- Develop a schedule.
- Propose a monitoring and review process.
- Obtain public review and comment as needed.
- Revise and finalize the plan.

### **Actions to take during Step 9, Get agreement on or adopt the action plan.**

In many instances, the state, county (parish), and local governments will need to formally adopt the plan of action into the recovery or comprehensive plan.

Agreement likewise should be obtained from federal and state agencies as appropriate. Memoranda of Understanding are signed among partners.

### **Actions to take during Step 10, Implement, evaluate, and revise.**

- Apply for federal and state programs and funds.
- Work with county or parish and town councils and governing boards on zoning, subdivision ordinances, acquisitions, etc.
- Meet with landowners.

Boone, North Carolina, a small town in the mountainous northwestern corner of the state, is vulnerable to flooding and also subject to development pressure because of its scenic location. The town achieved multiple objectives in a broad post-flood program through partnerships that tackled such community needs as additional affordable housing, the creation of more open space and recreational facilities, providing alternative transportation, and removing damaged buildings from the floodplain. One of the keys to Boone's success was been its ability to attract, integrate, and apply multiple sources of funding to carry out mutually compatible objectives. A total of \$4.5 million was raised from several sources: the town, the Federal Emergency Management Agency's Hazard Mitigation Grant Program, the State Acquisition and Relocation Fund, the Clean Water Management Trust Fund, and the Housing and Urban Development's Community Development Block Grant Program.

For more about Boone, see Department of Crime Control and Public Safety, 1999, p. 36.

## **Using a Planning Process for Environmental Projects & Programs—An Example**

The county suffered a major natural disaster. As it works through the response phase, planners and decisionmakers realize that integrating environmental projects and programs into the recovery plan or existing comprehensive plan will improve environmental quality in the community while also accomplishing other sustainability objectives.

- Begin by considering the maxims previously proposed. Be prepared to commit to integrating environmental projects and programs into the recovery plan or existing comprehensive plan.
- Follow the 10-step process outlined or use a process with which the community is comfortable.
- Organize the team and begin work. Involve the public as soon as possible and then keep them involved throughout the process.
- As the planning team coordinates with the other agencies, consider how to most effectively use the identified programs to further environmental objectives.
- Select projects and programs from the Hazard Mitigation Plan. If the community doesn't have a Hazard Mitigation Plan, apply to the responsible state agency that administers the hazard mitigation plan funding. Begin preparing a mitigation plan whether the community receives these funds or not.
- Apply to the Hazard Mitigation Grant Program (Section 404) for support of environmental projects and programs that address the community's problem. See the list at the end of the "tools" section of this chapter for other potentially eligible projects and programs.
- Use Section 406 (Stafford Act) money to move public facilities out of harm's way. State Revolving Fund loans from the Environmental Protection Agency can be used to relocate wastewater treatment plants damaged by flooding .
- Apply for Rural Housing loans to purchase homes that have been damaged.
- Use Community Development Block Grant money as a match for other programs that reduce exposure to natural hazards.
- Engage the National Park Service through their Rivers, Trails, and Conservation Assistance Program to help in developing a plan.
- For a watershed plan, contact the Natural Resources Conservation Service (PL566 projects) or the Corps of Engineers (Section 22 program).
- Use zoning, subdivision, & building codes to implement environmental projects and programs.
- Seek funding for part of the recovery plan from the Corps of Engineers (Section 206 or Section 1135), the Natural Resources Conservation Service (Wildlife Habitat Incentives Program, Environmental Quality Incentives Program, Wetlands Reserve Program) or the Consolidated Farm Services Agency (Conservation Reserve Program), the Department of Housing and Urban Development, the U.S. Fish and Wildlife Service, or the Environmental Protection Agency.
- Generate local funds through tax incentives.
- Encourage participation by offering a transfer of development rights, land purchase, easements, or donations.
- The planning team should begin by selecting from programs listed above. Be sure to check the most recent sources of information by contacting the agencies directly or going to their website. To find the agency website, see [/www.searchgov.com](http://www.searchgov.com).
- Establish and begin the environmental monitoring process.
- Modify the plan and its implementation in response to monitoring results.

- Measure direct, observable results such as wetlands acres protected, restored, or enhanced.
- Survey decisionmakers and the public.
- Report on accomplishments of team members.
- Use the monitoring reports required as part of a federal program.
- Use the monitoring report proposed in this report or one developed in Step 8, above.
- Modify the recovery plan based on results from the monitoring reports.

## **MONITORING ENVIRONMENTAL QUALITY**

A locality should monitor the environmental projects and programs it initiates during recovery to determine how effective they are and whether they need to be changed. All monitoring should be simple and easily conducted while at the same time providing pertinent information to local decisionmakers. As an initial review, local officials should read progress reports required by federal and state agencies when local governments participate in the different programs.

A community is best served when it develops its own environmental monitoring procedures. Three performance measures should provide the needed information:

- **objective results** data—statistics that are observable and can be measured, such as number of acres on a fault removed from potential development.
- **surveys and assessments** of results—opinions from county or parish and town decisionmakers and the general public.
- **activity measures**—information on the implementation of the project or program.

Consider using the model shown in the box on page 7-10. It offers a cost-effective method for assembling a wealth of material and insights, based on a method used by the Louisiana Department of Environmental Quality and Department of Natural Resources to manage its contracts. Someone should always be legally obligated to prepare and attest to the validity of the information contained in the monthly monitoring report.

## **TOOLS FOR IMPLEMENTING ENVIRONMENTAL PROJECTS OR PROGRAMS**

Communities have access to many tools for integrating environmental projects and programs into their recovery plans or existing comprehensive plans. The approach should be tailored to fit a given community's circumstances and not simply reproduce a model or a process from another jurisdiction. When selecting from the following menu, consider the ideas as part of a multi-objective approach that accounts for economic development, social equity, quality of life, and disaster resilience as well as environmental quality. Remember that the community will be working in cooperation with other parties in the watershed, geologic area, or ecosystem.

## SAMPLE MONTHLY MONITORING REPORT

PROJECT or PROGRAM TITLE:

REPORTING PERIOD:

### NARRATIVE ON TECHNICAL ELEMENTS

I. WORK COMPLETED TO DATE: (write here or attach monthly progress report)

A. Activities by Task for this period

B. Fee Schedule (personnel, hours, rates, direct expenses, fee)

II. DESCRIBE PROGRESS ON THE PROJECT *or* PROGRAM

A. Tasks and/or milestones accomplished during this period

B. Tasks and/or milestones not accomplished during this period with an explanation or assessment of:

1. Nature of problems encountered:

2. Remedial action taken or planned:

3. Can minimum criteria for measure still be met:

4. Likely impact upon achievement of task and project or program:

III. DELIVERABLES (state what delivered, give date, and to whom submitted):

IV. OTHER DISCUSSIONS OF SPECIAL NOTE (Please be specific)

### FINANCIAL RECONCILIATION

Invoice No.: \_\_\_\_\_ Reporting Period: \_\_\_\_\_

Invoice Amount: \$ \_\_\_\_\_

Total Contract Amount: \$ \_\_\_\_\_

Total Invoiced to Date: \$ \_\_\_\_\_

Balance: \$ \_\_\_\_\_

COMMENTS:

PROJECT DIRECTOR: \_\_\_\_\_ *signature* \_\_\_\_\_ Date: \_\_\_\_\_



Coordination is essential. Available tools are clustered under the following headings: Regulatory Tools, Incentives, and Programs used as Tools.

### Regulatory Tools

Local governments have several regulatory techniques available to protect natural areas and implement other approaches to environmental protection. Regulations work better if they are in place before a disaster, but there may well be opportunities to improve on existing regulations or get new ones instituted in the recovery period. Some of the more common regulatory measures used by local governments are summarized below.

**Zoning.** Zoning divides land into separate land use districts or zones and establishes the uses (e.g., residential, commercial, or industrial) as well as the density of development allowed in each zone. A wetlands conservation or floodplain area, for example, can be established either by an overlay zone or an incentive zone where zoning already exists, or as a special district when zoning is not yet in place. The overlay zone delineates a conservation district, floodplains, fault lines, and landslide areas on maps and sets the regulations and standards for uses that can take place there. An exclusive wetland or floodplain zone prohibits buildings in wetlands or floodplains, a concept that minimizes conflicts between development and wetlands or floodplain values.

#### TOOLS FOR ENVIRONMENTAL QUALITY

- Zoning
- Subdivision regulations
- Building codes
- Special ordinances
- Tax incentives
- Transfer of development rights
- Easements
- Land purchase
- Voluntary agreements

Incentive zones, also called bonus zones, allow for a compromise between the plans for saving wetlands and floodplains and the desires of the landowners to have intensive development. By allowing the developer to build at a higher density on the more suitable lands, the community protects the wetlands or floodplains as open space. Cluster zoning (grouping or concentrating building units on a smaller land area) achieves the same objectives by modifying densities in approved subdivision plats. For example, assume a parcel of 50 acres is composed of 25 acres of uplands and 25 acres of wetlands or floodplains. The region that contains the tract is presently zoned for one home on each acre. Under cluster zoning, 50 homes would be located on 25 acres, thereby keeping the other 25 acres in wetlands or floodplains.

Buffers protect rivers, creeks, bayous, and lakes from the by-products of the adjacent land uses, for example, by retarding runoff and trapping sediment before it enters the water bodies. Buffer strips can have a fixed width (50–200 feet, depending on their impacts and the importance of the nearby water body) or a specified area with a mechanism for including selected sensitive areas that lie beyond the fixed zone.

**Subdivision regulations.** Subdivision regulations govern the division of land into smaller parcels for development or sale. Traditionally, subdivision regulations focused on the physical aspects of a proposed development: the arrangement of lots, the size and layout of streets, and the provision of stormwater facilities. Now, in addition, they provide for sewers, drainage, and parks and can be used for conserving habitat, wetlands, floodplains, open space, and other environmentally important areas. Developers are encouraged to place buildings on designated sites, avoiding wetlands, floodplains, or areas subject to erosion, faulting, or landslides. In the lower drainageways, wetlands become part of the stormwater system and also a component of the community's open space or park requirements.

**Building codes.** Local governments adopt laws, regulations, ordinances, and other requirements to create building codes. Building codes govern the construction methods used in a structure. Building codes can be used to control development on hydric soils, on unstable soils, in floodprone areas, and near geologic hazards. Disaster-resilient practices should be mandated during recovery (reconstruction, rehabilitation, or alteration), not only to save lives and prevent injuries, but also to reduce the potential for polluting habitat, wetlands, open space, and floodplains. For example, propane tanks can become an environmental hazard if they become part of the debris carried by flood waters; but it is a fairly simple matter to be sure that they are adequately anchored to avoid such a risk. Local building codes can include such provisions.

**Special ordinances.** Obtaining open space, habitat, or wetlands is only one way to conserve their values and functions. Stormwater management ordinances, for example, can be implemented to protect wetlands from nonpoint source impacts by keeping sediment and pollutants out of them. Detention ponds, buffer strips, prohibition of point source discharges into wetlands, and creating artificial wetlands are other methods that communities should consider as they work to improve future environmental quality during recovery.

As an alternative, the community could purchase the rights of first refusal on selected parcels. This basically means that the landowner gives the government the opportunity to purchase the wetlands before he or she sells it to a third party. This may be expensive because the sale price likely will be driven by the market.

### **Incentives as Environmental Tools**

**Tax incentives.** Economic incentives are a way to modify individual and corporate activities when the people involved may not be enthusiastic about regulations. Tax incentives could compensate landowners directly; the state could then have a mechanism to contribute in-lieu payments to the local governments if they lose tax revenues.

The county, parish, or town can assess the targeted areas at a lower rate than the surrounding properties that could be developed into shopping centers or homes. With the application of differential assessments, the community should institute a penalty when the land changes uses. Compensation could equal the higher rate for the new use multiplied by the number of years an assessment was artificially low. These fines could be applied to the community's open space

program. For example, if a landowner places farmland in the lower assessment category he or she pays lower taxes. However, if in 10 years he or she sells the farmland for a shopping center, the higher assessed value would be paid for the 10 years the property was in open space.

**Transfer of development rights.** In those states with enabling legislation, local governments can enact programs that allow all or part of the density potential, as established in the community's zoning ordinance for one parcel of land, to be applied to a noncontiguous parcel or to land owned by someone else. Through this method, these rights can be sold to someone who has land better suited for development—non-wetlands, parcels outside the floodplain, or lots that are not as environmentally sensitive as the original parcel. This technique is similar to easements because the land stays in the private sector, undesirable development is avoided, property taxes are still paid, new development continues, and the landowner is compensated for the development rights he or she relinquished. Again, this technique is useful any time, not just during recovery from a disaster.

**Easements.** Fee simple ownership is full ownership that carries with it the right to do many different things with the land. These rights include keeping people off the land, selling it, leaving it to heirs, building structures on it, and otherwise using it. Naturally, these activities must comply with established regulations and standards to prevent them from being nuisances or adversely affecting the public health, safety, and welfare.

Development rights that can be separated from the property and sold create an easement. An easement is a legal agreement between a property owner and another party to restrict the type and amount of development that may take place on the property. Construction may or may not be prohibited or may be restricted in amount or type. For the development rights, the landowner receives payment that can be used to purchase additional land, make improvements on the existing operations, or fund other projects. Perpetual easements last forever and go with the land while term easements extend for a specified period of years.

**Land purchase.** Purchase is usually considered for only the most exceptional lands. Purchase, also known as fee simple acquisition, has many advantages. This technique gives total ownership and thus affords the best protection for the parcel. It allows for implementing a multi-objective program, including public access to and use of the land for recreation, and habitat restoration, enhancement, and protection. Once a community owns a tract it can develop a management plan to correct past mistakes that may have degraded the value and functions of wetlands or floodplains.

On the other hand, costs are usually high. Initial financing may be difficult to obtain and funding agencies could have different goals now or in the future from those the community identified. Other disadvantages include disruption of the community, especially if condemnation is used; the long-term responsibility and expense for operating and managing the tract; and the potential for the community's policies to change and the land reverts to intensive development.

Variations of the purchase option should be considered and may have significant benefits that stimulate a transaction when it may not have been possible under different circumstances. The community could purchase the property and retain those parts of the parcel that are most desirable for building a sustainable community. Less desirable lands could be sold with deed restrictions. But there still remains the high cost and long-term operations and maintenance obligations.

A second option is to purchase the property and then lease it with restrictions. Lease charges generate income that can be used to offset long-term operations and maintenance costs and property taxes. This option gives greater control over activities on the land.

Finally, a community can purchase the property and agree to life-time grants with restrictions for a defined period, such as the life of the present owners. Although this is still costly, it allows for a smoother transition to a conservation use.

**Voluntary agreements.** Voluntary agreements are yet another method for conserving lands. A major deficiency of this approach is that the agreements may not be binding and could be terminated at will or with the mutual consent of those involved.

**Donations**—A recovery program should allow for donations. There are tax benefits for the donor, the extent of which must be determined by a Certified Public Accountant with a full knowledge of the tax code and the land. Donations may be outright, or the landowners can retain the use of the property for their and another person's lifetime. This approach allows for maximum use of public funds.

**Leases**—A second form of voluntary agreement is a lease between the community and the property owner. Leases are simply rents for the contracted period with the landowner retaining title and the tax obligation. The community is not committed to the property in perpetuity, but there are important problems. If the land is not in public ownership, then long-term site planning is restricted. Without a plan or ownership there may be limitations on public expenditures that can be made on the property. Finally, an annual lease fee must be paid.

**Covenants**—It is possible for the community to arrange a mutual covenant among neighboring landowners when there are no funds for obtaining the property or there is some distrust of the local government. The landowners agree on use controls and the activities that can take place. Signed documents are recorded with the county or municipality and the information is attached to the property until cancelled or modified by a written agreement of all parties.

**Charitable deductions**—A community could offer charitable tax deductions for donations of interest in lands.

### **Federal, State, and Private Programs as Environmental Tools**

The following programs present opportunities for mixing and matching environmental projects into a recovery or comprehensive plan. The summary of each program explains how it can be integrated into a community's strategy for environmental quality. Some of these programs are available any time; some are triggered by a Presidential disaster declaration and thus are particularly appropriate for a recovery strategy. For the most recent information about the option, established requirements, or names and telephone numbers of contacts, review the agency's website or contact the agency directly. This list and program descriptions build upon an unpublished document (Emmer, 1991) prepared for the Environmental Protection Agency.

#### **Conservation Reserve Program (Catalog of Federal Domestic Assistance No. 10.069)**

The Consolidated Farm Service Agency administers the CRP for conserving and improving natural resources such as wetlands, waterfowl habitat, filter strips, or riparian buffers. Participants received direct payments for specified uses. Eligible owners or operators may place highly erodible or environmentally sensitive cropland into a 10–15 year contract.

#### **Small Flood Control Projects, Section 205 of the Flood Control Act (Catalog of Federal Domestic Assistance No. 12.106)**

The U.S. Army Corps of Engineers Section 205 projects reduce flood damage through projects not specifically authorized by Congress. The Corps of Engineers can develop and construct small control projects that are clearly shown to be feasible from an engineering standpoint and economically justified. Each project is limited to a federal cost share of not more than \$5 million. The total local contribution is 35% of the project cost. Nonstructural alternatives are viable options for funding and include such measures as flood warning systems, raising and/or flood proofing of structures, and relocation of floodprone facilities.

#### **Aquatic Ecosystem Restoration (Section 206)**

The U.S. Army Corps of Engineers aquatic ecosystem restoration projects improve the quality of the environment. The projects must be in the public interest and cost-effective. The Corps carries out the study and implementation of the project in conjunction with a non-federal sponsor.

#### **Project Modifications for Improvement of the Environment (Section 1135 Program)**

This program provides for ecosystem restoration either directly modifying the structures and/or operations of water resources projects constructed by the U.S. Army Corps of Engineers, or restoring areas where a Corps project contributed to the degradation of the area. This program can be used to restore wetlands in the flood area, opening oxbows by Corps levees or navigation features, or realignment of a Corps levee to allow areas between the levee and the channel to revert to historic floodplain.

#### **Planning Assistance to States Program (Section 22) (Catalog of Federal Domestic Assistance No. 12.110)**

This U.S. Army Corps of Engineers program assists states, tribes, local governments, and other non-federal entities in the preparation of comprehensive plans for the development, utilization, and conservation of water and related land resources. A 50:50 cost-share is required.

**Post-Disaster Economic Recovery**

Congress may appropriate supplemental funds to the Economic Development Administration after a disaster. Economic Development Administration construction project grants to states, local governments, and certain non-profit organizations may be used for construction of infrastructure. Loans may be used for relocation of non-farm and non-governmental structures, which is one way this program can help with environmental protection projects. The cost share may be as high as 100% for a project located in a Presidentially declared area for which EDA received an application for assistance under a supplemental appropriation within 18 months of the date of the declaration. Otherwise, public works direct grants have a cost share of 80% federal and 20% local. Contact the EDA or visit the EDA website at [www.eda.gov](http://www.eda.gov) for the most recent information.

**Nonpoint Source Pollution Grants** (Catalog of Federal Domestic Assistance No. 66.460)

Counties and towns share the problem of dealing with stormwater runoff. Impervious surfaces and disturbed lands change the quantity and quality of precipitation that flows overland to rivers, bayous, and lakes. As a result, water bodies become polluted. Through the Clean Water Act, the Environmental Protection Agency supports the implementation of best management practices to protect water quality. The community may now be required to prepare a stormwater management plan. Coastal communities should see whether their state is in the process of implementing a coastal nonpoint pollution control program as required by Section 6217 of the Coastal Zone Act Reauthorization Act of 1990.

When a stormwater management or nonpoint source pollution control program exists, the county or town can work to build on the value and function of wetlands, floodplains, and open spaces to store and cleanup runoff. In many cases, a simple redesign of a control structure or modification of an operating schedule can result in significant benefits downstream. In other instances, open space in the impact zones for landslides or along faults could be kept as open space and integrated into the stormwater management plan, thereby serving several objectives. These wetlands and detention/retention ponds may also provide habitat for waterfowl and an outdoor laboratory for middle and high schools.

**Clean Water State Revolving Funds** (Catalog of Federal Domestic Assistance No. 66.458)

The Environmental Protection Agency provides loans at below-market interest rates for up to 20 years. These loans can be used to relocate, repair, or replace wastewater treatment plants damaged by flooding. Contact should be made with the State Revolving Fund Agency.

**Drinking Water State Revolving Funds** (Catalog of Federal Domestic Assistance No. 66.468)

The Environmental Protection Agency loans can be used to repair, replace, or relocate community water systems (public and private) damaged by flooding. Loans are below-market interest rates for up to 20 years, although disadvantaged communities may qualify for 30-year loans. Additional information may be obtained from the State Revolving Fund Agency.

**Watershed Assistance Grants**

River Network and the Environmental Protection Agency team up to offer the Watershed Assistance Grant. The WAG program supports the growth and sustainability of local watershed partnerships in the United States. Requested amounts cannot exceed \$30,000. For more information see the River Network's website at [www.rivernet.org/wag](http://www.rivernet.org/wag).

**Flood Mitigation Assistance** (Catalog of Federal Domestic Assistance No. 83.536)

The Federal Emergency Management Agency will help a state and communities carry out cost-effective measures designed to reduce the risk of flood damage to structures covered under contracts for flood insurance and reduce the number of repetitive-loss structures. Eligible projects include mitigation activities that are technically feasible and cost-effective. Eligible projects include: acquisition, elevation, or relocation of NFIP-insured structures; minor, localized structural projects; and beach nourishment. All funding is on a cost share of 75% federal and 25% non-federal. Only half of the non-federal share can be in-kind work (12.5% of the total). Funds are not contingent upon a Presidential disaster declaration.

**Hazard Mitigation Grant Program, Section 404, The Robert T. Stafford Disaster Assistance and Emergency Relief Act, as amended** (Catalog of Federal Domestic Assistance No. 83.516)

These Federal Emergency Management Agency grants can be used for implementing long-term hazard mitigation measures after a major disaster declaration. These funds are based on the federal funds spent on the Public and Individual

Assistance programs in response to the disaster, minus administrative expenses, and can be used for projects that protect both public and private property. Funding under Section 404 increases from 15% to 20% depending on an acceptable mitigation plan by the state that demonstrates its interest and intent to track the effectiveness of this program. Types of eligible projects include, but are not limited to, elevation, acquisition, or relocation of structures and retrofitting of facilities. The cost-sharing requirement is 75% federal and 25% other, i.e. state, local, or both. Up to 7% of the Section 404 funds are available to states to be used in developing mitigation plans. Funds are available after a Presidential declaration.

The HMGP offers the most immediate source of funding for environmental quality projects. Project types allowed through Section 404 include:

- Construction of detention ponds/basins
- Stabilization of riverbanks and shorelines
- Purchase of land in hazard zones
- Acquisition and demolition or relocation
- Seismic retrofitting
- Improvements to stormwater, wastewater, and water treatment facilities and pumping stations
- Repair or reconstruction of fuel storage tanks

- In Del Rio, Texas, a HMGP grant was used to move more than 164 homes along the San Felipe Creek out of the floodplain. The cleared land was dedicated to open space.
- In Lincoln County, Montana, 30 acres of floodprone land near a residential area were purchased and then turned into community parkland with the help of HMGP funds.
- The Castaic Union School District in northern Los Angeles County used \$7.2 million HMGP grant and the sale of local bonds to relocate school facilities out of a dam inundation area and far removed from high-pressure oil pipelines. The school district agreed to turn the land over to the Newhall County Water District as soon as the relocation effort was underway. The old school property is located above two active wells, which the water district can use to supply their customers in Castaic. In doing so, they changed the property deed to restrict human habitation and development, and to return the site to natural open space.

- Infrastructure improvements to roads and bridges
- Beach nourishment
- Stabilization and/or restoration of sand dunes, roadway banks
- Vegetation management programs
- Erosion controls
- Slope stabilization
- Brush clearing, controlled burns, fuel breaks
- Miscellaneous land improvements.

These projects must demonstrate a positive benefit-cost ratio, be proven to avoid certain losses, and be a part of a state's funding priority.

**Public Assistance Program, Section 406, The Robert T. Stafford Disaster Assistance and Emergency Relief Act, as amended** (Catalog of Federal Domestic Assistance No. 83.516)

The Federal Emergency Management Agency makes funds available to state and local governments for the repair, restoration, and replacement of a public facility or to a person who owns or operates a private nonprofit facility that is damaged or destroyed by a major disaster. The federal share is 75% of the cost. Funds, not exceeding 90%, may be used may be used to repair, restore, or expand other selected public or other selected private nonprofit facilities, to construct new facilities, or to fund hazard mitigation measures that the state or local government determines to be necessary to meet a need for governmental services and functions in the area affected by the major disaster. Funds are available after a Presidential declaration. Repair and restoration work carried out with these funds can help a community with its environmental protection objectives. For example, these funds may allow a community to replace its flood-damaged water treatment plant with a new one at a different site, leaving the original site for community open space or wildlife habitat.

**Increased Cost of Compliance Coverage**

Each flood insurance policy under the National Flood Insurance Program includes a \$75 premium to fund the Increased Cost of Compliance program. When a NFIP insured structure (home or business) within the special flood hazard area is declared substantially damaged or repetitively damaged, the property owner may receive up to \$20,000 for the cost of mitigation measures. Mitigation measures include elevation, floodproofing, demolition, and relocation. ICC coverage provides for the payment of a claim to help pay for the cost to comply with state or community floodplain management laws or ordinances after a flood event. This \$20,000 can be used as part of the 25% non-federal match required under the HMGP. These funds can contribute to a community's environmental goals during recovery if, for example, they are used to help in the relocation of insured structures out of floodprone areas so that the floodplain lands may become part of a nature preserve.

**Partners for Fish and Wildlife**

This U.S. Fish and Wildlife Service program provides financial and technical assistance to private landowners interested in restoring wetlands and riparian habitats on their land. The program uses a non-acquisition approach to voluntary habitat restoration on private lands. The cost sharing agreement is negotiated.



### **Land Acquisition**

This U.S. Fish and Wildlife Service program identifies and acquires high quality lands and waters for inclusion into the national wildlife refuge system. The program focuses on acquiring lands or purchasing easements to protect important fish and wildlife habitats. Funding is 100% federal.

### **North American Wetland Conservation Fund**

This U.S. Fish and Wildlife Service program provides federal cost-share funding to stimulate public-private partnerships to protect, restore, and manage a diversity of wetland habitats for migratory birds and other wildlife. Cost sharing is 50% non-federal.

### **Disaster Recovery Initiative**

Department of Housing and Urban Development grants must be used for buyouts, relocation, long-term recovery, and mitigation. Activities that can be funded include:

- Acquisition of real property, including the buyout of properties in a floodplain and the acquisition of relocation property;
- Relocation payments and assistance for displaced persons, businesses, organizations, and farm operations;
- Repair, rehabilitation or reconstruction of residential and non-residential structures;
- Acquisition, construction, reconstruction, or installation of public facilities and improvements, such as water and sewer facilities, streets, neighborhood centers, and the conversion of school buildings for eligible purposes; and
- Acquisition, construction, or reconstruction of buildings for the general conduct of government damaged or destroyed as a direct result of a Presidentially declared disaster.

These funds are available to states and local governments which experience a Presidentially declared disaster.

### **Community Development Block Grant - Entitlement Communities Program** (Catalog of Federal Domestic Assistance No. 14.218)

Department of Housing and Urban Development CDBG grants can be used for acquisition of real property, clearance, relocation, housing rehabilitation, public services, public facilities and improvements (such as water and sewer facilities, streets, and neighborhood centers), or mitigation activities directly related to an event. The program targets low- and moderate-income people in metropolitan cities and urban parishes. The non-federal match is 25%.

### **Community Development Block Grant - State Administered Program** (Catalog of Federal Domestic Assistance No. 14.228)

Department of Housing and Urban Development CDBG grants can be used for acquisition of real property, clearance, relocation, housing rehabilitation, public services, public facilities and improvements (such as water and sewer facilities, streets, and neighborhood centers), or mitigation activities directly related to an event. The program targets low- and moderate-income people in non-entitlement areas. Non-entitlement areas are cities with populations of less than 50,000, and counties or parishes with populations of less than 200,000. The non-federal match is 25%.

### **Section 108 Loan Guarantee Program**

The Department of Housing and Urban Development provides loan guarantees to public entities for community and economic development. Loans may be used for acquisition of real property; relocation of property, homeowners, and businesses; rehabilitation of publicly owned property such as water and

sewer systems; and housing rehabilitation, including elevation of properties. The target is low- and moderate-income persons.

**Home Investment Partnerships Program** (Catalog of Federal Domestic Assistance No. 14.239)  
Department of Housing and Urban Development grants can be used to assist renters, new home buyers, and existing homeowners with acquisition, new construction, rehabilitation, and tenant-based rental assistance. The target is low-income persons. A 25% match is required, but this may be waived due to fiscal distress or in Presidentially declared disaster areas.

**Single Family Home Mortgage Insurance for Disaster Victims - Section 203(h)** (Catalog of Federal Domestic Assistance No. 14.119)  
Department of Housing and Urban Development mortgage insurance for individuals provides coverage on a new principal, single-family residence after displacement by a disaster. This Federal Housing Administration program supports relocation of residences outside of the floodplain. The borrower may finance 100% of the annual cost of the insurance.

**Rivers, Trails, and Conservation Assistance Program** (Catalog of Federal Domestic Assistance No. 15.921)

Staff from the National Park Service facilitate activities that help local groups gain public support for a project and find funds for implementation. Although the program provides no grants or loans, their personnel bring expertise and extensive experience in open space and community-based conservation programs. Rivers & Trails works with non-profit groups, local and state government appointed

commissions, local government agencies, and others on rivers and trails projects. This program has expanded to include work on developing greenways, scenic byways, and heritage areas. See Chapter 3 for more information on this program.

#### The Rivers & Trails Program helped

- the Buffalo Bayou Partnership to develop the Houston East End Trail, an 8-mile rail-trail that connects a predominately Hispanic neighborhood with downtown Houston, Texas;
- the San Miguel Watershed Coalition, which restored 80 miles of the San Miguel River watershed in Colorado, through a watershed plan adopted by eight communities and seven government agencies; and
- The Providence Plan, a non-profit group that breathed new life into the Woonasquatucket River Greenway in Rhode Island, by organizing interpretive walks and the First Greenway Festival and by bringing other cooperators like the Trust for Public Land, the Lila Wallace Readers Digest Fund, and others.

**Coastal Zone Management Program** (Catalog of Federal Domestic Assistance No. 11.419)  
The Office of Ocean and Coastal Resources of the National Oceanic and Atmospheric Administration provides Section 309 grants that may be used for implementing non-structural coastal flood and hurricane hazard mitigation projects identified in the state Coastal Hazard Mitigation Plan. The state must cost-share 50% of the project.

**Water Bank Program** (Catalog of Federal Domestic Assistance No. 10.062)  
The Natural Resources Conservation Service pays landowners to set aside wetlands for a specified period of time.

**Wetlands Reserve Program** (Catalog of Federal Domestic Assistance No. 10.072)

The objectives of this Natural Resources Conservation Service program are to restore and protect farmed wetlands, prior converted wetlands, wetlands farmed under natural conditions, riparian areas, and eligible buffer areas through permanent or long-term agreements.

**Environmental Quality Incentives**

EQIP is a voluntary conservation program for farmers and ranchers facing threats to soil, water, and related natural resources. The Natural Resources Conservation Service provides technical, financial, and educational assistance on installing or implementing structural, vegetative, and management practices called for in 5- to 10-year contracts for most agricultural land uses. EQIP works primarily in priority areas where significant natural resources problems exist, such as erosion, water quality and quantity, wildlife habitat, wetlands, and forest and grazing lands. Cost sharing may pay up to 75% of the costs of certain conservation practices. For additional information contact the County Agent, the Cooperative Extension Service, or go to the internet site: [www.nhq.nrcs.usda.gov/OPA/FB96OPA](http://www.nhq.nrcs.usda.gov/OPA/FB96OPA).

**Wildlife Habitat Incentives Program**

WHIP is a voluntary program administered by the Natural Resources Conservation Service to improve wildlife habitat. Nationally, acres were distributed among four major habitat types: upland wildlife habitat; wetland wildlife habitat; riparian and instream aquatic wildlife habitat; and threatened and endangered species.

**Small Watershed Protection and Flood Prevention (PL-566 Program)** (Catalog of Federal Domestic Assistance No. 10.904)

This Natural Resources Conservation Service program provides technical assistance for planning and implementing plans for the protection, development and utilization of land and water resources in small watersheds (less than 250,000 acres). Financial assistance is provided for sharing costs of measures for watershed protection, flood prevention, agricultural water management, sedimentation control, public-water-based fish, wildlife, recreation. The program also extends long-term credit to help local interests with their share of the costs.

**Physical Disaster Loans and Economic Injury Disaster Loans** (Catalog of Federal Domestic Assistance No. 59.008)

These disaster loans are available from the Small Business Administration after a declared disaster to non-farm, private sector owners of disaster damaged property for uninsured losses. All loans must be repaid although at a low interest rate of 4% (as of December 2000) and a 30-year term. Loans may be used for relocation of non-farm and nongovernmental structures.

## SUMMARY

Everyone sees the community and its inherent features, for example, clean air. The town cherishes its open space for recreation and being surrounded by agricultural fields. More natural areas such as meadows and woods shelter birds and wildlife; unpolluted rivers, lakes, or estuaries support fishing and boating; and views unobstructed by signs and buildings are aesthetically pleasing. Residents enjoy a greenway through the business district and a designated natural area on the steep hills west of town. Nationally, local decisionmakers are rethinking how they address

the sprawl that now characterizes even the smallest towns. They are working to keep development from hazardous or important locations, such as floodplains, wetlands, agricultural fields, riparian strips, alluvial fans, fault lines, and slopes that experience landslides.

To be most effective, decisionmakers must remain alert to ways they can mix and match federal and state programs to local initiatives. The process outlined above and the menu of tools provide opportunities to improve the quality of the community while recovering from a natural disaster—and thereby move toward local sustainability. With minimal additional effort on the local government's part the community can integrate practical environmental projects and programs into short- and long-term recovery activities and build on opportunities through federal and state programs. By creatively applying these options the local government can contribute to a recovery plan that creates a sustainable community. A community that has a comprehensive plan should build on it to create its recovery plan and strategy and not duplicate efforts or add another layer of planning.

## REFERENCES

Department of Crime Control and Public Safety. 1999. *Hazard Mitigation Successes in the State of North Carolina*. Raleigh, NC: North Carolina Emergency Management Division. 80 pp.

Emmer, R.E. 1991. "Wetlands Conservation through Local Community Programs." Unpublished report prepared for the U.S. Environmental Protection Agency. Washington, D.C.: EPA.

## WHERE TO FIND MORE INFORMATION

### Training Courses and Workshops

Federal Emergency Management Agency, Emergency Management Institute, National Emergency Training Center. Emmitsburg, Maryland. (301) 447-1035; [www.fema.gov/emt](http://www.fema.gov/emt) [accessed June 15, 2001]

- FEMA Program Responsibilities: Coordinating Environmental and Historical Compliance." Federal Emergency Management Agency Course G253.  
This 3-day course is an introduction to environmental and historic compliance. It examines the importance of fully integrating the compliance steps stipulated by the National Environmental Policy Act and the National Historic Preservation Act into the administration of the Public Assistance and Hazard Mitigation Grant Programs. This course is directed to those at environmental/historic entry levels, and others whose primary function is not environmental/historic.

### Organizations

Columbia University, Center for International Earth Science Information Network (CIESIN). The findings at this site were jointly developed by CIESIN, the Yale University Center for Environmental Law and Policy, and the Global Leaders for Tomorrow Environment Task Force of the World Economic Forum. The Environmental Sustainability Index (ESI) identifies 22 major factors such as urban air quality, overall public health, and environmental regulation, and measures these factors using 67 different variables, such as levels of sulfur dioxide in urban air, deaths from diseases associated with poor sanitation, and percentage of land protected from development.

See "Environmental Sustainability Index" at [www.ciesin.columbia.edu](http://www.ciesin.columbia.edu) [accessed August 3, 2001]

Environmental Finance Center, The University System of Maryland.  
According to its mission and purpose statement, the Environmental Finance Center was created to assist local communities in finding creative ways to pay for environmental projects. The

Center promotes alternative and innovative ways to manage the cost of environmental activities, provides training and development opportunities in environmental management, and works to increase the public and private sector's awareness of the benefits associated with sound environmental management policies.

See: [www.mdsg.umd.edu/EFU/index.html](http://www.mdsg.umd.edu/EFU/index.html); [efc@mdsg.umces.edu](mailto:efc@mdsg.umces.edu). or (301) 314-6383.

Environmental Protection Agency.

Water: [www.epa.gov/OWOW](http://www.epa.gov/OWOW) [accessed August 3, 2001]

“Green Communities.” [www.epa.gov/greenkit/sitedex.htm](http://www.epa.gov/greenkit/sitedex.htm) [accessed August 3, 2001]

EPA Wetlands Information Hotline Publication List: e-mail: [wetlands-hotline@epa.gov](mailto:wetlands-hotline@epa.gov)

The Rivers, Trails, and Conservation Assistance Program in the National Park Service.

The RTC has information on funding sources. Its website The site provides a list of organizations that offer financial support for locally lead conservation projects. You must contact each organization directly for more information.

See: [www.ncrc.nps.gov/rzca/funding](http://www.ncrc.nps.gov/rzca/funding).

Federal and state government agencies.

Up-to-date government information is available via the Internet at: [www.searchgov.com](http://www.searchgov.com).

The screen gives links to all the federal departments, independent agencies, and each state. Click on the agency or state and work through their website. Most materials can be ordered from the website with a credit card.

- Agency documents may be obtained by writing the agency or going to the website and ordering a publication. Many federal documents are also available at university libraries that serve as Federal Depositories. Contact a local university for assistance.
- Maps, satellite images, aerial photographs, technical reports, and related hazard information are available from the federal agencies or their representative in each state: U.S. Geological Survey, U.S. Fish and Wildlife Service, the Federal Emergency Management Agency, the U.S. Department of Agriculture, Environmental Protection Agency, and the U.S. Army Corps of Engineers.
- State agencies that may have information relevant to environmental projects include the geological survey, departments of public works, emergency preparedness, environmental quality, natural resources, wildlife and fisheries, and agriculture and forestry.
- For information on Congressional activities, go to the Library of Congress website: [loc.gov](http://loc.gov). The link to THOMAS allows for bill tracking and other activities.

Natural Resources Conservation Service.

See: [www.nhq.nrcs.usda.gov](http://www.nhq.nrcs.usda.gov) [accessed August 3, 2001]

Also check out NRCS's "Wildlife Habitat Incentives Program." at [www.nhq.nrcs.usda.gov/PROGRAMS/wwd/whipindex.htm](http://www.nhq.nrcs.usda.gov/PROGRAMS/wwd/whipindex.htm) [accessed August 3, 2001]

New England Grassroots Environment Fund.

This organization provides grants to communities working on local environmental protection and restoration projects.

See: [www.grassrootsfund.org/index.html](http://www.grassrootsfund.org/index.html) [accessed August 3, 2001]

The Trust for Public Land.

This is a good site for information on financing alternatives—state funding for parks and open space, conservation, the Trust for Public Land Public Finance Program, Public Finance Case Studies, and more. The website also references materials on building green infrastructure and provides examples. The Toolbox includes discussions on local park financing techniques, a matrix of financing options, examples of funding, and community profiles. The matrix for local finance is definitely worth studying.

See: [www.tpl.org](http://www.tpl.org) [accessed August 3, 2001]

United Nations.

This UN document, "Natural Resource Aspects of Sustainable Development in the United States of America" gives an overview of U.S. policy and law associated with environmental sustainability in the United States.

See: [www.un.org/esa/agenda21/natlinfo/countr/usa/natur.htm](http://www.un.org/esa/agenda21/natlinfo/countr/usa/natur.htm) [accessed June 15, 2001]

## Books, Articles, and Papers

Association of State Floodplain Managers. 1996. *Using Multi-Objective Management to Reduce Flood Losses in Your Watershed*. Madison, WI: Association of State Floodplain Managers. 72 pp. Abstract available at [www.floods.org/PDF%20files/PUBSLIST.pdf](http://www.floods.org/PDF%20files/PUBSLIST.pdf).

This publication documents the results of a multi-year project, funded by the Environmental Protection Agency and conducted by ASFPM, to explore planning and implementation techniques for multi-objective watershed management. It provides a general introduction to multi-objective management and the planning process that helps a community select the flood-loss reduction measures most suitable to its situation. It explains how to define problems and goals, build partnerships, combine needs and solutions creatively, and begin formal implementation procedures. Both riverine and coastal flood watersheds are examined. Much of the document focuses on multi-objective management planning details, involving subjects such as fish and wildlife issues, water supply, housing improvement, transportation and lifelines. Preparation of a M-O-M plan involves problem definition, involvement of non-local groups, and public and official acceptance of the plan.

Association of State Floodplain Managers, Inc. 2000. *National Flood Programs in Review—2000*. Madison, WI: Association of State Floodplain Managers, Inc. 47 pp.

This conceptual paper explains how many environmental protection measures support flood mitigation and vice-versa.

Burban, Lisa L. and John W. Andresen. 1994. *Storms Over the Urban Forest: Planning, Responding, and Regreening—A Community Guide to Natural Disaster Relief*. St. Paul, MN: U.S. Department of Agriculture, Forest Service, Northeastern Area. 154 pp.

When severe wind or ice storms strike a community, downed trees, power lines, and damaged property are major hindrances to response and recovery. Severely damaged trees often must be removed in a hurry to allow passage of emergency response vehicles, and sometimes only several weeks or months following a storm does the amount of damage and loss of trees become apparent. This is a guidebook for local governments in coping with such events. It discusses mitigation, preparing for and responding to natural disasters; cleaning up and “regreening” a community; working with disaster relief organizations; and experiences of Midwest communities in recovering from tornado damage, community experiences with Hurricane Andrew, and technical resources and information. Additional resources are listed and numerous references accompany each chapter. The manual also contains reprints of relevant journal articles, educational blurbs from environmental organizations, and checklists.

Bush, David M., Rodney Prado, Kathie Dixon, and Orrin H. Pilkey. 1991. *Principles of Property Damage Mitigation and the Impact of Hurricane Hugo*. Durham, NC: Duke University, Department of Geology, Program for the Study of Developed Shorelines. 167 pp.

Prepared as a field-trip guide for the study of damage caused by Hurricane Hugo along the Carolina coast, this report shows that simply cleaning up and rebuilding should make way for more active steps to enhance and preserve the protective capabilities of the natural setting. It also suggests principles of reducing hurricane-caused property damage given expected sea-level rise, barrier island migration, and increased storm severity, and encourages environmentally sensitive approaches to hurricane mitigation. The document contains an account of pertinent hazard mitigation legislation and hazards research, a matrix of mitigation options, a general description of the shoreline affected by Hugo, and detailed descriptions of various sites included in the field trip.

Clayton, Tonya D., Lewis A. Taylor, Jr., William J. Cleary, Paul E. Hosier, Peter H.F. Graber, William J. Neal, and Orrin H. Pilkey, Sr. *Living with the Georgia Shore*. Durham, NC: Duke University Press. 200 pp.

This latest addition to Duke University’s highly regarded “Living with the Shore” series, is a guide for residents, visitors, developers, planners, and others concerned with the condition and future of the Georgia coast. The authors recount both the human and natural history of the region’s barrier islands, particularly examining coastal erosion and the implications of various human responses to this process. They also discuss the pressures created by rapid recreational and residential development. The book includes an introduction to each of the Georgia barrier isles, an overview of federal and state coastal land- use regulations, pointers on buying and building at the shore, a hurricane preparation checklist, a history of recent hurricanes in Georgia,



an extensive annotated bibliography, and a guide to government agencies and private groups involved in issues concerning coastal development.

Department of Energy. 1994. *Rebuilding Your Flooded Home: Guidelines for Incorporating Energy Efficiency*. DOE-EE-0019. Washington, D.C.: U.S. Department of Energy, Office of Building Technologies, 36 pp.

After disasters, the natural tendency is to return to one's home and restore it to the way one left it. Due largely to recent advances in building technologies, it is possible to rebuild a residence with a little extra care—and not much more time and cost—and have a home that is much more energy efficient than it was prior to the disaster. By doing this, family comfort will be improved, energy consumption and utility bills can be reduced, property value can be enhanced, and money and energy can be saved for years to come. Because many house components will have to be replaced, i.e., insulation, it makes sense to purchase the most energy-efficient equipment and materials available. Following sections about drying out a flooded house and on personal safety when cleaning up, the document explains how to analyze the property for building shell problems (air leakages, foundations, flooring, etc.), then considers building systems and equipment issues (electric motors, air conditioning, and appliances). Suggestions are presented and tips are provided for financing energy-efficient solutions, such as buying materials in bulk if many properties are affected.

Eleff, Bob. 1999. *Minnesota's Flood Recovery Efforts: Good for the Environment?* St. Paul, MN: Minnesota Center for Environmental Advocacy. 41 pp.

In this report, the Minnesota Center for Environmental Advocacy (MCEA) examines the state's recovery efforts after the devastating floods of 1997. Figures that MCEA has collected from various sources indicate that at least \$740 million was spent on emergency operations, rebuilding damaged infrastructure, and on preventive measures aimed at reducing the risks and potential damage from future flood events. This reports seeks to determine the extent to which Minnesota's decisionmaking process following the 1997 floods reflected this policy.

Federal Interagency Floodplain Management Task Force. 1992. *Floodplain Management in the United States: An Assessment Report*. Volume 1: Summary. Boulder, CO: Natural Hazards Research and Applications Information Center. 69 pp.

This assessment of floodplain management in the United States was commissioned in 1987 by the Federal Interagency Floodplain Management Task Force. Its purpose was to provide an evaluation of floodplain management activities in order to report to the public and to the Congress on progress toward implementation of "A Unified National Program for Floodplain Management." Thus, it is a compilation of available information concerning the nation's floodplains, experience with tools and strategies to reduce loss of life, property, and environmental resources, and a perspective of what has been accomplished.

Federal Interagency Floodplain Management Task Force. 1994. *A Unified National Program for Floodplain Management*. Washington, D.C.: Federal Emergency Management Agency. 43 pp. This version of *A Unified National Program for Floodplain Management* responds to the directive in Section 1302(c) of the National Flood Insurance Act of 1968 that the President transmit to Congress any further proposals needed for a unified national program. Prior reports in response to this directive were submitted in 1976, 1979, and 1986. This report: 1) takes account of changes in economic, environmental, and social trends; 2) responds to a number of concerns raised during the nationwide assessment of the status of floodplain management completed in 1992; and 3) addresses the criticism leveled at the Unified National Program by the National Review Committee. The conceptual framework of this report focuses on the need to 1) reduce the loss of life, disruption, and damage caused by floods; and 2) preserve and restore the natural resources and functions of floodplains.

Federal Interagency Floodplain Management Task Force. 1995. *Protecting Floodplain Resources. A Guidebook for Communities*. Washington, D.C.: Federal Emergency Management Agency. 41 pp.

This guidebook provides information for local officials, citizens, landowners, and groups interested in protecting and restoring the natural resources and functions of floodplains. The guidebook focuses on local “grassroots” efforts needed to effectively manage and protect the resources of the floodplain environment including wetlands, riparian habitats, historic sites, and aesthetic amenities. The guidebook introduces a conceptual framework for floodplain management and provides a planning process that can be used in virtually any of the some 20,000 floodprone communities in the United States.

Flink, Charles A. and Robert M. Searns. 1993. *Greenways: A Guide to Planning, Design, and Development*. Washington, D.C.: Island Press. 351 pp.

Within the developed landscape, greenways serve a dual function: they provide open space for human access and recreational use, and they serve to protect and enhance remaining natural and cultural resources. This manual provides interested organizations and concerned individuals with background information about planning a greenway project, how to enlist local assistance in organizing project support, funding the project, related water recreation, greenway safety and liability, management, and planning for the care of rivers, streams, and wetlands. Information is provided on preserving stream and river functions, the impacts of urbanization on riparian regimes, and the establishment of organizational partnerships to plan, realize, and preserve greenway arrangements.

Godschalk, D.R., T. Beatley, P. Berke, D.J. Brower, and E.J. Kaiser. 1999. *Natural Hazards Mitigation. Recasting Disaster Policy and Planning*. Washington, D.C.: Island Press. 575 pp.

This book describes and analyzes the way that hazard mitigation has been carried out in the United States under the Robert T. Stafford Disaster Relief and Emergency Assistance Act. The authors determine how the requirements of this law, establishing a national system for hazard mitigation, have worked in practice and how they might be made to work better.

Kline, Elizabeth. 1997. *Sustainable Community: Topics and Indicators*. Available online at [ase.tufts.edu/gdae/modules/modinstruct.html](http://ase.tufts.edu/gdae/modules/modinstruct.html) [accessed June 22, 2001]

These narratives about sustainable community indicators were developed under a contract with the U.S. Environmental Protection Agency. The primary audiences are community practitioners and technical resource people.

May, Peter J., Raymond J. Burby, Neil J. Ericksen, John W. Handmer, Jennifer E. Dixon, Sarah Michaels, and D. Ingle Smith. *Environmental Management and Governance:*

*Intergovernmental Approaches to Hazards and Sustainability*. New York, Routledge. 254 pp.

The book addresses aspects of environmental management that raise fundamental questions about human actions and government roles. The authors examine “cooperative” and “coercive” governments by comparing policies in New Zealand and Australia with the more coercive and prescriptive approaches used in the U.S. They also focus on how the different regimes influence choices by local governments about land use and development in areas subject to natural hazards. Separate chapters are devoted to growth management in Florida, resource management in New Zealand, and flood management in New South Wales. Other chapters describe how policy design is implemented, the role of regional governments, policy compliance and innovation at the local planning level, strategies for sustainable development, and examine the outcomes of cooperative policies.

Mazmanian, Daniel A. and Michael E. Kraft, eds. 1999. *Toward Sustainable Communities:*

*Transition and Transformations in Environmental Policy*. Cambridge, MA: The MIT Press. 322 pp.

This book reviews and assesses environmental policy over the past three decades, primarily in the United States but with implications for other nations. The editors place U.S. environmental policy within the framework of the transition from 1970s-era policies that emphasized federally controlled regulation, through a period of criticism and efficiency-based reform efforts, to an emerging era of sustainability in which decisionmaking takes place increasingly at the local and regional levels. The book looks at what does and does not work and how social, economic, and environmental goals can be integrated through policy strategies grounded in the concept of sustainability.

Philippi, Nancy S. 1996. *Floodplain Management: Ecologic and Economic Perspectives*. San Diego, CA: Academic Press. 225 pp.

When economic and ecological concerns conflict, effective floodplain management often suffers. The author examines the reasons behind these conflicts and points to solutions. She discusses the challenge of managing floodplains, the need for floodplain management, the public interest and how to define it, governments and their roles, harmful effects of floodplain management, case studies of the Mississippi and American Rivers, and scenarios for effective management. Appendices reprint several important documents useful for the understanding of floodplain management in the United States.

Schwab, Jim, Kenneth C. Topping, Charles C. Eadie, Robert E. Deyle, and Richard A. Smith. 1998. *Planning for Post-Disaster Recovery and Reconstruction*. PAS Report No. 483/484. Chicago, IL: American Planning Association. 346 pp. Abstract available at [www.planning.org/apapubs/details.asp?Num=1178](http://www.planning.org/apapubs/details.asp?Num=1178).

This document helps community leaders and planners educate their constituents on how informed decisions and choices can affect the rebuilding process and yield a safer, more sustainable community. This report introduces planners to their roles in post-disaster reconstruction and recovery, and provides guidance on how to plan for post-disaster reconstruction side by side with all other players involved. A key theme throughout this report is to rebuild to create a more disaster-resistant community. The report contains many references to technical resources.

U.S. National Science and Technology Council. 1994. *Technology for a Sustainable Future: A Framework for Action*. Washington, D.C.: U.S. National Science and Technology Council. 154 pp.

This report summarizes the Clinton White House's plan for developing a comprehensive environmental technology strategy. It examines the use of environmental technologies to facilitate long-term environmental, energy, and economic goals and asks for suggestions for improving federal policies related to advancing environmental technologies. It includes a section on technology needs for natural disaster reduction. The document also provides examples of avoidance, monitoring and assessment, and remediation and restoration. Appendices contain lists of federal sources for agency offices (names, contact information) and online data resources.

U.S. President's Council on Sustainable Development. 1997. *Sustainable Communities Task Force Report*. Washington, D.C.: U.S. Government Printing Office. 186 pp.

This report and its companion volume, *Sustainable America: A New Consensus for Prosperity, Opportunity, and a Healthy Environment for the Future*, published in 1996, lay out a set of policy recommendations for planning for sustainable communities. One of the recommendations is to "shift the focus of the federal disaster relief system from cure to prevention." The appendix contains case studies of communities that have set forth sustainability principles, profiles of communities in the 50 states, state-led sustainability initiatives and organizations, and a list of resources for sustainable communities.

World Commission on Environment and Development. 1987. *Our Common Future*. Oxford, UK: Oxford University Press. Abstract available at [www.oup.co.uk/isbn/0-19-282080-X#desc](http://www.oup.co.uk/isbn/0-19-282080-X#desc). [accessed September 21, 2001]

In 1983, the World Commission on Environment and Development was asked by the United Nations General Assembly to formulate "a global agenda for change." This document, also known as the Brundtland Report, is the report of the Committee chaired by Gro Harlem Brundtland. The Committee undertook to: 1) propose long-term environmental strategies for achieving sustainable development by the year 2000 and beyond; 2) recommend ways concern for the environment may be translated into greater cooperation among developing countries and between countries at different stages of economic and social development and lead to the

achievement of common and mutually supportive objectives that take account of the interrelationships between people, resources, environment, and development; 3) consider ways and means by which the international community can deal more effectively with environmental concerns; and 4) help define shared perceptions of long-term environmental issues and the appropriate efforts needed to deal successfully with the problems of protecting and enhancing the environment, a long-term agenda for action during the coming decades, and aspirational goals for the world community.

## Additional Reading

- Akridge, A., J.D. Eigel, and J.G. Athanasakes. 1999. "Stream Restoration and Soil Engineering." *Public Works* 130(3):48-51.
- American Water Resources Association. 1999. Special Issue: Human Dimensions of Watershed Management. *JAWRA* 35(3)(June).
- American Society of Civil Engineers. 2000. "Texas City Relies on Tree Canopy to Reduce Runoff." *Civil Engineering* 70(10):18.
- Barrette, M. 2000. "Anyone Searching for Examples of Innovative Land Planning Wouldn't Necessarily Look to Water and Stormwater Projects. But That Could Be a Mistake." *Planning* 66(8):14-17.
- Davis, P. and B. Hitchings. 2000. "Protecting Stored Water with Riparian Buffers." *Public Works* 131(3):30-32.
- de Jong, Pieter and Dale Lehman. 1995. "Hazard Mitigation Lessons from the 1993 Midwest Flood: Environmental Compliance Issues." Pp. 179-183 in *From the Mountains to the Sea—Developing Local Capability: Proceedings of the Nineteenth Annual Conference of the Association of State Floodplain Managers*. Special Publication 31. Boulder, CO: Natural Hazards Research and Applications Information Center.
- Devils Lake Basin Interagency Task Force. 1995. *Report of the Devils Lake Basin Interagency Task Force*. Denver: Federal Emergency Management Agency, Region VIII. 93 pp.
- Emmer, R. E. 1994. *Flood Damage Reduction and Wetland Conservation. Three Successful Projects in Louisiana have Common Characteristics*. Topical Paper #6. Madison, WI: Association of State Floodplain Managers, Inc. (September.) 23 pp.
- Emmer, R.E. 1998. "Floodplain Management." Pp. XX-XX in *Peaks to Prairies. A Conference on Watershed Stewardship*. Rapid City, SD: Thorne Ecological Institute. (September.)

- Environmental Protection Agency. 1996. *Protecting Natural Wetlands. A Guide to Stormwater Best Management Practices*. EPA-843-B-96-001. Washington, D.C.: Office of Water.
- Environmental Protection Agency. 1996. *Why Watersheds?* EPA800-F-96-001. Washington, D.C.: Office of Water.
- Environmental Protection Agency. 1997. *Community-Based Environmental Protection: A Resource Book for Protecting Ecosystems and Communities*. EPA230-B-96-003. Washington, D.C.: Office of Policy, Planning, and Evaluation. (September).
- Environmental Protection Agency. 1997. *People, Places, and Partnerships. Progress Report on Community-Based Environmental Protection*. EPA-100-R-97-003. Washington, D.C.: EPA.
- Environmental Protection Agency. 1999. *Catalog of Federal Funding Sources for Watershed Protection*. Second Edition. EPA841-B-99-003. Washington, D.C.: Office of Water.
- Erwin, K.L. 1996. *A Bibliography of Wetland Creation and Restoration Literature*. Berne, NY: The Association of State Floodplain Managers, Inc. 99 pp.
- Office of Management and Budget. 1998. *Federal Programs Offering Non-Structural Flood Recovery and Floodplain Management Alternatives*. A Federal Interagency Publication. Washington, D.C.: Executive Office of the President. 90 pp. Available at [www.fema.gov/MIT/TSD/DL\\_nsfr.htm](http://www.fema.gov/MIT/TSD/DL_nsfr.htm) [accessed September 21, 2001]
- Faber, S. 1996. *On Borrowed Land: Public Policies for Floodplains*. Cambridge, MA: Lincoln Institute of Land Policy. 32 pp.
- Gilmer, M. 1995. *Living on Flood Plains and Wetlands. A Homeowner's High-water Handbook*. Dallas, TX: Taylor Publishing Company. 175 pp.
- Harker, Donald F. and Elizabeth Ungar Natter. 1995. *Where We Live: A Citizen's Guide to Conducting a Community Environmental Inventory*. Covelo, CA: Island Press. 319 pp.
- Hoffman, R. 1999. "The New York City Watershed Agreement." *Water Resources IMPACT* 1(5):2-4.
- Hulsey, B. and G. Tichenor. 2000. "A Call for Flood Security Through Wetland Protection." *National Wetlands Newsletter* 22(3)(May/June):3-4.
- Inyang, Hilary I. 2000. "The Coalescence of Environmental and Natural Disaster Impacts." *Journal of Environmental Engineering* (June):461.

- Izaak Walton League of America. 1999. *Save Our Streams Program Catalog*. Gaithersburg, MD: Izaak Walton League of America.
- Land Trust of the Saratoga Region, Inc. 1998. *Saratoga County Wetlands Guidebook*. Clifton Park, NY: Land Trust of the Saratoga Region, Inc. 59 pp.
- Margoluis, R. and N.N. Salafsky. 1998. *Measures of Success: Designing, Managing, and Monitoring Conservation and Development Projects*. Washington, D.C.: Island Press.
- The National Arbor Day Foundation. 2000. "How to Manage Community Natural Areas." *Land and Water* 44(1):49-52.
- National Association of Counties. 1999. *Leadership in Watershed Management: The County Role*. Washington, D.C.: National Association of Counties.
- National Association of Counties. 1999. *Restoring Community Wetlands & Watersheds. Erie County's (NY) Innovative Partnership to Teach Environmental Stewardship Through the JTPA Summer Youth Employment Program*. Washington, D.C.: National Association of Counties.
- North Carolina Division of Water Quality. 1998. *Basinwide Wetlands and Riparian Restoration Plan for the Watauga River Basin*. North Carolina Wetlands Restoration Program. Raleigh, NC: North Carolina Department of Environment and Natural Resources.
- Northeast Midwest Institute and Marine Studies Consortium. 2000. *The Nonpoint Finance Project*. Final Report. Washington, D.C. and Needham, MA: Northeast Midwest Institute and Marine Studies Consortium, respectively. [www.nemw.org](http://www.nemw.org) [accessed August 3, 2001]
- Platt, K. 2000. "Going Green. Tips on Creating Urban Greenways." *Planning* 66(8):18-21.
- President's Long-Term Recovery Task Force. 1997. *Final Report. Minnesota, North Dakota, South Dakota*. Washington, D.C.: Federal Emergency Management Agency. 13 pp.
- Qui, Z. and T. Prato. 1998. "Economic Evaluation of Riparian Buffers in an Agricultural Watershed." *JAWRA* 34(4):877-890.
- Restore America's Estuaries. 1998. *Funding for Habitat Restoration Projects. A Compendium of Current Federal Programs with Fiscal Year 1996-1998 Funding Levels. A Citizen's Guide*. Washington, D.C.: Restore America's Estuaries. 42 pp.
- Terrene Institute. 1993. *Clean Water in Your Watershed: A Citizen's Guide to Watershed Protection*. Washington, D.C.: Terrene Institute. Prepared in cooperation with Environmental Protection Agency Region VI, Dallas, TX. 89 pp.

vonFeck, S. 2000. "Protecting Wetlands with Clean Water State Revolving Funds." *National Wetlands Newsletter* 22(4):3-4.

Wallace, S.D. 1998. "Putting Wetlands to Work." *Civil Engineering* 68(7):57-59.

White, K.D. and A.L. Meyers. 1997. "Above Par Storm-Water Management." *Civil Engineering* 67(7):50-51.

Wilding, D.A., R.P. Clarke and R. Ballantine. 1999. "Stormwater Management: Shifting the Present Paradigm." *Public Works* 130(8):54-56.





## INCORPORATING DISASTER RESILIENCE INTO DISASTER RECOVERY

---

### INTRODUCTION

Natural disasters disrupt communities. They destroy property, force people out of their homes, close businesses, suspend normal routines, and sometimes take lives. Often, natural disasters rearrange the landscape by tossing buildings, upending roads, toppling trees, reshaping rivers, scattering debris, and rendering a community unrecognizable to its residents. Under these unsettling conditions, communities feel isolated and helpless, and there is tremendous pressure from residents, property owners, and businesses to put things in order, to rebuild the community back the way it was before—assuming that is even possible.

Natural disasters also create opportunities for action. State, and in some cases federal, agencies will converge on the stricken community to assist with the rebuilding effort. Outside money may be available to undertake projects that were previously considered infeasible financially, such as elevating a damage-prone road, relocating a police station, or floodproofing a sewage treatment plant. Damaged or destroyed buildings, roads, and utilities can be rebuilt in safer locations or built to be more damage-resistant. And perhaps most importantly, the community will be focused, at least temporarily, on its own vulnerability and the need to take decisive action.

Timing is critical. In the immediate aftermath of a disaster, a community will be faced with key decisions that will have long-term consequences on its vulnerability to future disasters, with no time for extensive research or prolonged deliberations. This is why it is so important to have a hazard mitigation plan in place to guide the recovery effort. The plan can provide the framework to make informed decisions in an environment of chaos, uncertainty, and expediency. It can help keep decisionmakers focused on the ultimate goal of creating a more sustainable, resilient community. And it can help establish priorities for action.

Some communities have learned to roll with Nature's punches by placing buildings and key infrastructure out of harm's way. That is, they are resilient. For example, after severe flooding in the spring of 1997, the cities of Grand Forks, North Dakota, and East Grand Forks across the river in Minnesota, decided to reduce flood risks by acquiring floodprone properties, building a levee to protect properties that could not be moved, and establishing a minimum setback

distance from the Red River. The combined effort of the two cities resulted in the acquisition of over 1,000 homes and the creation of a 2,200-acre greenway along the river. Plans call for the development of parks, open space, athletic fields, cultural and educational areas, and the restoration of floodplain habitat (see Chapter 5 on Economic Vitality for more information about the communities’ recovery from the Red River flood).

Resilient communities bend but don’t break when disaster strikes. One way for a community to become more resilient is to mitigate the impacts of natural hazards. Hazard mitigation—a technical term for reducing risks to people and property from natural hazards—includes both structural measures, such as flood control levees and landslide barriers, as well as nonstructural measures, such as land use regulations that restrict construction in earthquake fault zones or in floodplains. Mitigation includes not only avoiding additional development in vulnerable areas of a community, but making existing development in hazard-prone areas safer. In general, hazard mitigation involves the following three principles or actions:

- Making new buildings and infrastructure located in hazard-prone areas more damage-resistant and resilient through the use of building codes, design standards, and construction practices and, to safeguard existing development, through protective devices such as dams, levees and seawalls (structural mitigation), if relocation is infeasible.
- Avoiding development in hazard-prone areas by steering new development to less risky areas—that is, to keep buildings out of harm’s way in the first place—and by relocating damaged buildings to safer areas after a disaster.
- Protecting natural areas like wetlands, floodplains, forested areas, sand dunes, and other ecological elements that can absorb and reduce the impacts of hazards.

(Godschalk et al., 1999)

### **Some Benefits of Hazard Mitigation**

<i>Saves lives and property and reduces vulnerability to future hazards</i>	By implementing a mitigation strategy such as moving people and buildings out of harm’s way, a community can save lives and reduce property damage from future disasters—an opportunity that is often lost in the rush to build back to pre-disaster conditions.
<i>Speeds recovery</i>	By reducing damage to buildings and infrastructure, a community can minimize economic and social disruptions and bounce back quicker after a disaster strikes.
<i>Demonstrates commitment to improving community health &amp; safety</i>	A mitigation strategy demonstrates a community’s commitment to safeguarding its citizens and protecting its economic, social, and environmental well-being.
<i>Facilitates post-disaster funding</i>	By identifying and prioritizing projects before the next disaster, communities will be in a better position to obtain post-disaster funding.

Hazard mitigation and disaster resilience go hand-in-hand. A community that follows these three mitigation approaches and also makes use of hazard and other types of insurance that are available will be more resilient the next time disaster strikes. It will bounce back faster.

## RECOVERY STRATEGIES TO BUILD A DISASTER-RESILIENT COMMUNITY

Building a disaster-resilient community can start during disaster recovery. A community can start with the *situations* that exist after a disaster, pick and choose among the *options* for making itself more disaster resilient and among the implementation *tools* available to help pursue each of those options. Combining these, the community can develop *strategies* that are specially tailored to its own needs. The Matrix of Opportunities in Chapter 1 shows some of the options a recovering community could use to enhance its disaster resilience while it tends to disaster-caused predicaments. The situations and options shown on the matrix, and the tools listed below, are not exhaustive; rather, they are meant to give an idea of the range of possibilities. Likewise, the sample strategies below suggest ways in which some options and disaster-induced situations could be combined to help a community become more resistant to natural disasters. Notice how each of the strategies suggested below uses one or more of the options listed on the Matrix of Opportunities under the fifth sustainability principle, “Incorporate Disaster Resilience/Mitigation.”

### **Situation:** Damage to transportation facilities

Roads often lie directly in the path of natural hazards, and as a result, damage is common. For example, roads get washed out by hurricanes, inundated by floods, buried by landslides and torn apart by earthquakes. Repairs are expensive.

### **Recovery Strategies to build Disaster Resilience:**

- Rebuild to improve resistance to damage. Older transportation facilities can be upgraded to more modern standards that make them more resistant to damage from floods, earthquakes, and other risks.
- Relocate, where feasible. In some cases, transportation facilities could be relocated or rerouted around hazard-prone areas.
- Reduce adverse impacts caused by such facilities. For example, certain roads and highways in eastern North Carolina acted as dams during Hurricane Floyd, obstructing the flow of floodwaters and causing extensive flooding of nearby areas.
- Examine the impact of such facilities on encouraging development in hazard-prone locations. Widening roads may only stimulate additional development in risky areas.

### **Situation:** Damage to public facilities

Public facilities such as schools and community centers often serve as emergency shelters after disaster strikes. Unfortunately, these facilities themselves may suffer damage from natural disasters.

### **Recovery Strategies to build Disaster Resilience:**

- Protect against future damage by making such facilities more resistant to damage. For example, elevate buildings above the flood height or build a berm to help keep out floodwaters.

### **OPTIONS FOR IMPROVING DISASTER RESILIENCE**

- Make buildings & infrastructure damage-resistant.
- Avoid development in hazardous areas.
- Manage stormwater.
- Protect natural areas.
- Promote & obtain hazard and other insurance.

- Relocate to a less vulnerable area.
- Avoid building new public facilities in hazard-prone areas.

**Situation:** Damage to utilities  
Utilities are extremely vulnerable to natural disasters. Fallen trees can down power lines, earthquakes can tear apart water or gas lines, and floods can inundate wastewater treatment plants. Protecting utilities from damage can minimize the economic and social disruptions caused by natural disasters.

#### **Recovery Strategies to build Disaster Resilience:**

- Safeguard power lines from damage by fallen trees by putting the lines underground.
- Move water or gas lines out of harm's way. For example, re-route utility lines around earthquake fault zones or floodplains.
- Protect existing facilities from damage, for example, by constructing berms around sewage treatment facilities located in floodplains.
- When planning to install new lines, identify the location of hazard-prone areas and try to avoid them.
- Build redundancy into the system. For example, be able to shift water or wastewater treatment capacity to treatment plants not located in hazard-prone areas.
- Develop plans to contain and treat spills from existing gas or wastewater treatment lines that may be damaged by natural disasters.

#### **Situation:** Damage to homes and businesses

Homes and businesses may suffer direct or indirect damage from natural disasters. For example, wildfires may consume houses, or a hurricane may knock down power lines, putting businesses out of commission temporarily and leaving homes in the dark.

#### **Recovery Strategies to build Disaster Resilience:**

- Buy out or relocate damage-prone properties. Acquiring or relocating homes or businesses located in hazard-prone areas, particularly structures that have been damaged repetitively, can help reduce the public costs of disasters, which include emergency services, evacuation, emergency shelters, debris removal, and the loss of tax revenues.
- Acquire vacant, hazard-prone property. Buying vacant property and prohibiting its development permanently reduces the risk of damage to those properties while providing additional open space, wildlife habitat, and recreation areas.
- Rebuild according to modern building codes; upgrade the local code if necessary. Typically, older buildings not built to modern standards are the ones that suffer the most from natural disasters. When rebuilding, make sure that structures comply with modern building codes that specify how to make buildings more resistant to damage from hurricanes, floods, wildfires, wind, or earthquakes. Educate builders about hazard-resistant provisions in the codes.

### **Protecting Water Service in Des Moines, Iowa**

During the 1993 Midwest floods, the city of Des Moines, Iowa's water works was inundated by floodwaters, which caused extensive damage and knocked the plant out of commission for 11 days. Over 250,000 customers were without water service. In addition, the business community was devastated. Only a few businesses in the city closed due to direct flood damage, yet more than 40% had to close temporarily until water service could be restored. Even those that did not rely on water for production or operation were forced to close for health, sanitation, and fire safety reasons. The result was a loss of staff productivity and sales. Tax revenues to the city were down as well.

In all, although it costs \$14 million to repair the damage caused by flooding, the city suffered an estimated \$300-400 million in business losses.

In response, the Des Moines Water Works is constructing a smaller water treatment facility at another location. This facility will meet growing water demands and serve as a backup for the main plant, when the next flood occurs.

**Situation:** Damage to natural resources

It is hard to put a dollar figure on damage to natural resources. How much is a floodplain worth? Natural systems provide numerous benefits, such as wildlife habitat, open space, recreation, and mitigating the impacts of certain natural hazards. Damage to natural resources has real consequences for wildlife and for human settlements.

**Recovery Strategies to build**

**Disaster Resilience:**

- Relocate and prohibit land use activities that are not safe for hazard-prone areas. Unsafe land use activities include animal waste lagoons, animal production facilities, septic systems, hazardous waste facilities, junkyards, and sewage treatment plants.

### **Minimizing Floods by Protecting Wetlands and Floodplains**

One of the oldest examples of using the natural capacity of floodplains to control floods is the Charles River Project in Massachusetts. The Charles River winds 80 miles from central Massachusetts to Boston Harbor. Rather than spend an estimated \$100 million for additional structural controls (a flood control dam was built in 1977), the U.S. Army Corps of Engineers instead decided to rely on existing wetlands along the river to control flooding. The agency purchased 3,250 acres outright, and acquired easements on 4,680 acres at a total cost of \$10 million, which was only 10% of the estimated cost of constructing another dam. Not only do the wetlands reduce flood hazards, but they continue to provide wildlife habitat, outdoor recreation opportunities, and capture sediment and pollutants to improve water quality.

(Faber, 1996, p. 18)

### **Buyout in St. Charles County, Missouri Proves its Worth**

St. Charles County, Missouri, which sits at the confluence of the Missouri and Mississippi rivers, was hit hard by the 1993 flood. Total federal disaster assistance for the county topped \$26 million. After the flood, the county purchased 1,374 flood-damaged properties in the 100-year floodplain, including 560 single-family homes and three mobile home parks with a combined total of 814 mobile home pads. When floodwaters rose again in 1995, causing serious flooding, about 1,000 families already had been moved to higher ground. This time, federal disaster assistance to the county totaled only \$283,094, a 99% reduction compared to 1993. The difference can be attributed in large part to moving the vast majority of repetitively damaged properties out of floodprone areas.

- Maintain and restore mitigation functions of the natural environment. The natural environment can help mitigate the impacts of natural hazards. For example, wetlands and floodplains slow down and absorb excess water during storms, then slowly release the stored

Throughout eastern North Carolina, Hurricane Floyd's floodwaters engulfed sewage treatment plants, breached hog waste lagoons, and drowned hundreds of thousands of chickens, turkeys, and pigs. Oil and gas seeping from flooded junkyards were added to the mix, as were hazardous chemicals from flooded Superfund sites. Nearby rivers ran brown and oily with the toxic, fetid runoff.

water, thus reducing flooding downstream. Similarly, dunes help protect inland areas from the onslaught of storm-driven waves, and dense forests on steep slopes can reduce the risk of landslides.

- Protecting natural areas keeps people and buildings out of the path of natural hazards and maintains the natural capacity of the environment to attenuate disasters. In addition, protecting natural areas serves other purposes, such as preserving open space and wildlife habitat.

### **Tools for Implementing Disaster Resilience**

Communities vary in their financial, political, and institutional capacity to implement a hazard mitigation plan. Some communities have a variety of planning and investment tools at their disposal while others are more limited. Some of the more common tools and techniques for increasing the resilience of a community are summarized below. The tools are divided into two groups: regulatory and nonregulatory. Most of these techniques have their greatest effectiveness at mitigating losses if they are implemented before a disaster. However, the recovery period may provide opportunities for initiating their use or strengthening them.

## **Regulatory Tools**

Local governments have developed a variety of regulatory techniques such as zoning, impact fees, and subdivision exactions, to protect natural areas, including areas vulnerable to natural hazards. For example, some communities use their subdivision regulations to protect open space. Typically, such regulations require developers to set aside steep slopes, wetlands, floodplains, or other sensitive lands. Sometimes developers will be granted higher densities in return for the set-asides. Some of the more common regulatory measures used by local governments are summarized below.

**Zoning.** Zoning is the most common form of land use control available to local governments. It divides land into separate land use districts or zones and establishes the uses (e.g., residential, commercial, open space, or industrial) as well as the density of development allowed in each zone. The simplest and probably the most common approach to limiting the number of people and buildings in hazard-prone areas is to reduce the allowable density, or downzone an area, either by increasing the minimum lot size or reducing the number of allowable dwelling units permitted per acre.

In areas where stringent restrictions are politically infeasible, zoning preserves some economically viable use of land and therefore generally avoids an unconstitutional taking of land. The weakness of using zoning to reduce a community’s vulnerability to natural disasters is that it only affects new development, rather than existing buildings. Also, zoning’s inherent flexibility is one of its primary weaknesses as a tool for protecting hazard-prone areas. For example, the zoning for a parcel of land can be changed through variances, special use permits or rezonings.

**Subdivision regulations.** Subdivision regulations govern the division of land into smaller parcels for development or sale. Traditionally, subdivision regulations focused on the physical aspects of a proposed development: the arrangement of lots, the size and layout of streets, and the provision of stormwater facilities. Gradually, the regulations evolved to encompass the fiscal impacts of new development as well, ensuring that a community’s facilities and services will not be overburdened by new development (Platt, 1996). Many local governments impose exactions on new subdivisions. For example, as a condition of approval, developers may be required to “dedicate” land for schools or for open space. Developers may pay a fee in lieu of donating land to the municipality. A typical subdivision requirement might call for a 50-foot setback of developed land (a buffer) from a stream or wetlands, or it might prohibit development on steep slopes (Porter, 1997). Thus, subdivision regulations could be used to require minimum setback distances from lands vulnerable to natural hazards, or to set aside such lands as open space.

### **TOOLS FOR DISASTER RESILIENCE**

- ❑ Zoning
- ❑ Subdivision regulations
- ❑ Transfer of development rights
- ❑ Limiting public investment in hazardous areas
- ❑ Relocation out of hazardous areas
- ❑ Increasing public awareness of hazards
- ❑ Land acquisition
- ❑ Preservation of natural floodplain, coastal, wetland, and other functions
- ❑ Retrofitting
- ❑ Warning and preparedness
- ❑ Insurance

Some jurisdictions allow developers to cluster homes in one portion of a subdivision while leaving a large portion of the site undeveloped. That is, by rearranging the density of each development parcel, less than half of the buildable land will be consumed by lots and streets and the rest can be preserved permanently as woodlands, meadows, farms, or wetlands. This would result in the same number of houses as in a conventional subdivision, but the houses would be grouped closer together to protect natural areas, including floodplains, steep slopes, and other hazard-prone areas.

**Transfer of development rights.** While not as common as zoning or subdivision regulations, transferrable development rights or TDRs are used in numerous communities to protect certain lands from development. Transfer of development right programs, which treat the right to develop land as a commodity separate from the land itself, work as follows. A local government identifies an area it wants to protect, say, undeveloped property in a floodplain or landslide-prone area. This area becomes the *sending* area from which TDRs can be purchased from willing landowners. Property owners in the sending area are awarded a set of development rights based on the value or acreage of land. The government then identifies an area, usually

where it would like growth to occur, as a *receiving* area for these development rights. By purchasing TDRs from landowners in sending areas, developers typically can build at higher densities in the receiving areas than would otherwise be allowed by zoning. Landowners who sell TDRs in sending areas typically are prohibited from developing their land.

Transfer of development rights can be used as a relatively low cost means of protecting sensitive lands. But TDRs is a complex system, which makes it difficult for planning staffs to implement and for landowners to understand and accept. Often it is unpopular with residents in the receiving zone, who are subject to development at densities higher than otherwise permitted by existing zoning. Perhaps most importantly, without strong development pressure in the receiving areas, there may be no market for the development rights.

### **Using TDRs to protect Farmland in Maryland**

Montgomery County, Maryland, located just northwest of Washington, D.C., operates one of the most successful transfer of development rights programs in the country. In the early 1980s, the county adopted a TDR program to help stem the loss of agricultural lands. It designated large chunks of agricultural lands as rural density transfer zones that serve as the “sending” areas for the TDR program. The county downzoned this area from 1 dwelling per five acres to 1 dwelling per 25 acres. Landowners in this zone can sell development credits based on the original zoning.

The county then amended its general plan to allow higher density development, through the use of TDRs, in designated “receiving” areas. When a landowner sells the development rights for a parcel, a restrictive easement that permanently limits development is placed on the deed.

Credits sell for about \$10,000–\$12,000. For developers, the added cost for the credits is more than offset by the increase in allowable density in receiving areas. So far, over 4,300 credits have been transferred and over 35,000 acres of farmland have been protected by the TDR program

(Johnston and Madison, 1997, p. 369)



## **Nonregulatory Tools**

Nonregulatory tools can be equally as effective as regulations. Many rely on the market to determine whether and where development will occur. Some, such as limiting public expenditures, can be implemented at virtually no cost to a local government. Others, such as acquisition, can be quite expensive. Some of the more common nonregulatory tools are summarized below.

**Limiting public investments in hazard-prone areas.** Development in hazard-prone areas can be discouraged simply by withholding or restricting government spending for infrastructure in such areas. For example, a local government may choose not to extend roads or water and sewer lines into undeveloped floodplains or into an earthquake fault zone. The expenditure limitation is based on the premise that government spending for infrastructure encourages development in these areas and that removing the subsidies will discourage development, presumably by making it too expensive. This approach not only helps use existing services more efficiently, but can also reduce the pressure to develop in risky areas. The concept is similar to that of urban growth boundaries, beyond which infrastructure will not be extended, at least in the near future.

**Acquisition of hazard-prone lands.** Probably the best way to protect hazard-prone lands is simply to buy them, either outright in fee simple or as an easement. The purchased land can then be set aside permanently as public open space. As mentioned previously, voluntary buyouts, which include purchase of vacant property, purchase and relocation of existing structures, or purchase and demolition of damaged structures, have become a major new focus in the Federal Emergency Management Agency's (FEMA's) overall strategy to reduce flood losses.

Buying properties that lie in the path of natural hazards often is cheaper in the long run than other forms of mitigation, plus it can serve multiple objectives, such as providing open space. Still, acquisition is expensive, especially in areas where property values are high, such as along the coast. Acquisition expenses include not only the cost of purchasing property, but program administration, property maintenance, and liability expenses as well. Small governments may

### **1993 Midwest Flood Boosts Federal Buyouts**

The flood of 1993 devastated communities in the upper Midwest. Missouri was hit hardest, sustaining an estimated \$3 billion in damage. In the wake of that flood, voluntary buyouts, which include purchase of vacant property in floodplains, purchase and relocation of existing structures, or purchase and demolition of flood damaged structures, became a major focus in the federal government's strategy to mitigate flood losses. Since 1993, the Federal Emergency Management Agency has purchased, from willing sellers, approximately 17,000 properties in 36 states and one territory and acquired easements on approximately 400,000 acres of floodprone farmland in 14 states. Property owners were paid pre-flood fair market value for their homes. Many state and local governments have developed successful programs to purchase floodprone properties.

(National Wildlife Federation, 1998)

lack sufficient resources to develop and implement an acquisition program. Federal funds are available for acquisition of damage-prone properties, primarily through the Hazard Mitigation Grant Program (HMGP).

The Federal Disaster Assistance Act (Stafford Act) provides funds authorized by the federal government and made available by FEMA for a cost-share program to states after a Presidentially declared disaster. These funds can be used for acquisition. The HMGP provides 75% of the funds while the states provide 25% for mitigation measures through the post-disaster planning process. The state share may be met with cash or in-kind services.

**Increase public awareness of natural hazards.** People often are unaware that the property they are about to buy is located in a hazard-prone location. Notifying potential purchasers in advance would allow them to make informed decisions about where to live or locate a business as well as take steps to safeguard their property from hazards. Thus, notification relies on the power of the marketplace to take corrective action once full knowledge about hazard conditions is obtained. In California, buyers are notified of an earthquake fault zone presence by real estate agents through a contract addendum at the time of purchase (Godschalk et al., 1998).

Many people are not aware that they live in a hazard-prone area until a disaster strikes. The post-disaster time frame may be a good window in which to pass, for example, a local ordinance requiring disclosure of a hazard at the time of a property sale. As noted in Chapter 2, after one disaster is before the next one, so it is never too late to act.

### **Retrofitting**

Retrofitting means making changes to buildings to make them more resistant to hazards. Relocation and demolition are always mitigation options, but may be unrealistic when the portion of land at risk is large; i.e., in a coastal community or a town along a major fault line. In those cases, making changes to existing buildings may be more practical and cost-effective. Communities that want to retrofit buildings should consider providing economic benefits to residents who are willing to take steps to protect themselves from future hazards.

Four ways to retrofit for the flood hazard are elevation, wet floodproofing, dry floodproofing, and the construction of levees or floodwalls. Elevation means raising the building so that the lowest floor is above the flood level. Under the National Flood Insurance Program, a home is required to be elevated or relocated if it is damaged in a flood to 50% or more of its pre-flood market value. Wet floodproofing makes uninhabited parts of a house resistant to flood damage when water is allowed to enter during a flood. Dry floodproofing is sealing a house to prevent flood waters from entering. Levees and floodwalls are barriers built to prevent flood waters from entering. Other things that homeowners should consider doing are raising electrical and heating, ventilation, and air conditioning (HVAC) systems, anchoring fuel tanks, and installing a sewer backflow valve.

For seismic hazards, the main retrofit activities are bracing cripple walls and bolting sill plates to house foundations. Residents should also be encouraged to anchor tall items in their homes as well as valuable ones like computers. For new construction, there are other engineering methods to prevent seismic damage to buildings, but retrofitting for these design components can be

difficult and expensive. The National Earthquake Hazards Reduction Program is charged with the development and enhancement of provisions to minimize structural damage and loss to life due to earthquakes. More information on seismic retrofitting can be obtained from FEMA, which administers the National Earthquake Hazards Reduction Program..

For areas prone to coastal storm surge and hurricanes, several practices can be applied to existing construction. Hurricane straps, metal fasteners that attach the roof of a building to the walls, can reinforce a building's capacity to withstand severe winds. Shutters are one of the most basic methods for preventing damage and can be easily attached to existing homes and businesses. In coastal areas where flooding is a concern, elevation is highly recommended. Wind-resistant windows, wind- and hail-resistant shingles, and hurricane-resistant doors are also available.

Tornado retrofitting is similar to hurricane retrofitting in many ways. The goal of tornado retrofitting is to reduce the "uplift" effect of strong winds. Straps to attach a roof to the walls are helpful, as are wind-resistant shingles, windows, and doors. Garage and entrance doors should be reinforced. In addition, trees and yard materials that could become wind-borne in a tornado should be removed. Finally, residents may consider constructing "safe rooms," rooms that are reinforced, safe places to wait out a storm. FEMA publishes several how-to books to assist in the construction of safe rooms. Many states, including Arkansas, Mississippi, Hawaii, Iowa, and Oklahoma, have adopted safe room initiatives.

### **Warning and Preparedness**

A warning system is a vital component of mitigation, because it allows both evacuation of people at risk and an additional window of time in which to take last-minute measures to secure property.

In deciding on a warning system, a community should consider such factors as what will happen to the warning system if the power is out, whether the warning system reaches all residents, and how it will promote the use of the system in the community so that people know what to do when a warning is issued.

Existing warning systems include the Emergency Alert System (EAS), which is a national system that can broadcast warnings via television and radio; the Radio Broadcast Data System, used for FM broadcasts; National Oceanic and Atmospheric Administration (NOAA) Weather Wire Service (NWWS); NOAA Weather Radio, which broadcasts to owners of radio transmittal devices designed for the system; Emergency Managers Weather Information Network (EMWIN); the Internet Weather Information Network (IWIN); and the Advanced Weather Information Processing System/Local Data Acquisition and Dissemination (AWIPS/LDAD). Some municipalities also use sirens. The National Science and Technology Council recently summarized many of the issues associated with choosing and implementing warning systems (Working Group on Natural Disaster Information Systems, 2000).

## **Insurance**

Insurance is available for flood, earthquake, and wind hazards. Insurance is a useful means of sharing hazard risk and providing for financial assistance when natural disasters occur.

The National Flood Insurance Program (NFIP) provides flood insurance to residents in floodprone communities that have enacted certain land use restrictions to mitigate the effect of future flooding. In order to make residents in a community eligible for flood insurance, the community must be a member of the program. The NFIP state coordinator can determine whether a community is a member in good standing and, if not, determine what steps to take to make a community eligible.

Earthquake insurance is available through several different insurance companies as an add-on. However, because of the high damage associated with earthquakes, the insurance can be very expensive. In California, the California Earthquake Authority (CEA), a state-sponsored, private-public partnership, provides earthquake insurance to homeowners, renters, and condominium owners. It was implemented after the 1994 Northridge quake. Many insurance companies in California offer CEA's insurance, which has a 15% deductible. Californians can also buy earthquake policies outside the CEA.

Wind insurance, like earthquake insurance, is available through several private insurance companies. However, in some hurricane-prone states, it can be difficult or impossible to get coverage. In Florida, the Florida Windstorm Underwriting Association (FWUA), a group of insurers providing hurricane coverage to Florida homeowners who cannot get wind insurance in the regular market because of their hurricane exposure, is regulated by the state and provides insurance to residents. However, wind insurance remains extremely expensive in spite of this public-private partnership.

## **PURSUING STRATEGIES FOR DISASTER RESILIENCE**

Once the recovery ideas—or strategies—are identified, the community will need to explore them through a systematic process in order to decide on the best approach, select feasible tools, locate technical assistance, formulate details, plan for action, find funding, get approval, and move toward implementation.

How are the disaster resilience strategies suggested above—and others that local planners and decisionmakers brainstorm—carried out? Developing and implementing a hazard mitigation plan is probably the best way a community can reduce its vulnerability to natural disasters.

A good process for developing a hazard mitigation plan is the 10-step process described in Chapter 2. In addition, a hazard mitigation plan should:

- Be linked with land use plans, subdivision regulations, building codes, stormwater management plans, and the capital improvement plan. The capital improvement plan could include a strategy to protect public facilities from disruptions, for example through seismic retrofitting of public buildings such as schools or fire departments.
- Anticipate all hazards faced by the community, such as floods, hurricanes, earthquakes, tornados, high winds, and wildfires.
- Address multiple objectives in order to incorporate other principles of sustainability, such as creating a more livable community, protecting open space or wildlife habitat, enhancing economic vitality, and promoting social equity, and providing for future generations. For example, buyout programs in Arnold, Missouri, and Darlington, Wisconsin, took buildings out of the path of floods and used the resulting open space to connect their river corridors to existing greenways and trail systems (Schwab, 1998). Care should be taken that mitigation actions do not undermine other aspects of sustainability, thus detracting from the community’s “holistic recovery.”
- Focus on the long term. The plan should reduce risks for the future, rather than simply return the community to pre-disaster condition.
- Be internally consistent. That is, reducing risk to one type of natural hazard should not increase risks to others. For example, elevating homes to reduce their vulnerability to floods may make them more susceptible to earthquake damage. These factors need to be weighed so that overall risk is reduced, for the long term.

### **Building Disaster Resilience During the 10-Step Recovery Process**

Even if the community does not have or create a formal hazard mitigation plan, strategies for disaster resilience can be carried out in the context of the overall disaster recovery. Within the 10-step process described in Chapter 2, the following activities in particular will help ensure that disaster resilience is improved during a community’s disaster recovery.

#### **Actions to take during Step 4, Assessing the hazard problems.**

To reduce the risk of natural hazards, a community will need to determine its present and future susceptibility by conducting a vulnerability assessment. Vulnerability is a measure of the risk or likelihood of various types and strengths of hazards occurring in the area, and the amount and quality of development in that area.

Assessing a community’s vulnerability involves identifying areas of greatest risk, conducting an inventory of those areas, putting these areas on a map, identifying existing policies that may reduce vulnerability, and setting priorities for action. These procedures are summarized below.

First, identify the hazards that threaten the community (e.g., floods, earthquakes, wildfires) and prepare a map delineating the vulnerable areas. Is the community subject to frequent flooding or hurricanes? Are earthquakes common? Which areas suffer the most? Some of these areas may already have been mapped. For example, Flood Insurance Rate Maps (FIRMs) delineating floodplains are available for most communities under the NFIP. Identifying and mapping the areas that are most vulnerable can help guide policies and prioritize mitigation actions.

Identifying future areas of risk is more problematic. Boundaries of hazard-prone areas can change over time. For example, an increase in the amount of impervious surfaces (roads, driveways, parking lots) in a watershed could lead to increased stormwater runoff, which in turn could cause flooding in areas formerly considered outside the floodplain. Use current growth or land use patterns to predict how boundaries of hazard-prone areas might change over time.

Second, conduct an inventory of people and properties in vulnerable areas. Estimate the number of people and buildings, and the value of those buildings, located in the hazard-prone areas, and the number of people and buildings that will be there in the future if current growth and land use patterns remain unchanged. The Community Rating System of the NFIP gives points for an assessment of the impact of flooding on a community if it includes an inventory of the number and types of buildings subject to the hazards identified in the hazards assessment.

Third, prepare a map showing areas and facilities at risk. Highlight on the map the areas of highest risk and the critical facilities, major employers, repetitively damaged structures, and infrastructure in those areas. Particularly vulnerable neighborhoods and facilities, such as a low-income neighborhood or a housing facility for senior citizens, should be identified. Areas prone to flooding that are not included on the FIRM should be marked on the map. Areas subject to other hazards should also be identified. Maps can identify boundaries of natural hazard areas such as floodplains and pinpoint the location of vulnerable buildings or facilities.

#### **Actions to take during Step 5, Evaluating the problems.**

Use this window of opportunity to analyze policies, programs, and ordinances that may affect vulnerability. A community's existing policies and programs may, either intentionally or not, increase or decrease its vulnerability to natural hazards. Use the Matrix of Opportunities from Chapter 1 as a starting point to examine whether continuing those policies in the recovery period will worsen vulnerability, or whether changes can be made to minimize future risks. For example, extending water and sewer lines into floodplains will encourage development in those areas, while a plan for a greenway or open space in earthquake fault zones could preclude development there.

Communities should identify current policies that weaken hazard mitigation efforts and those that strengthen them, including land use plans and regulations, subdivision regulations, open space policies, transportation plans, and stormwater management plans. In addition, a community should identify areas where new policies are needed to reduce current and future risks of hazards.

**Actions to take during Step 6, Setting goals and objectives.**

Once it has identified and inventoried vulnerable areas and determined whether existing policies will increase or decrease vulnerability to natural hazards, a community can begin to set goals based on priorities for mitigating the threats posed by such hazards. The priorities should be based on the other principles of sustainability as well as upon traditional criteria such as cost-effectiveness (number of people, houses, or jobs protected per dollar invested), savings in tax revenues, and whether the action will achieve multiple objectives. Again, mitigation measures should not be adopted in isolation. All the risks to which the community is susceptible, and all the principles of sustainability, should be considered before goals and objectives are set. This prevents mitigation actions from undermining other aspects of a holistic recovery, and vice versa.

**Action to take during Step 7, Exploring all alternative strategies.**

Use multi-objective mitigation to link with other aspects of the community recovery. Consider all of the sustainability principles in the formulation of recovery plans for mitigating hazards. Consolidate economic, social equity, quality of life, and environmental perspectives.

**Comprehensive Flood Mitigation in Napa County, California**

In 1965, the Corps of Engineers was authorized to build a flood control project in Napa, California. The project called for constructing concrete walls along 11 miles of the Napa River. Local citizens who opposed the project forced the issue onto a ballot initiative. In 1976 and again in 1977, voters turned down the project, on the grounds that it would be too costly and would destroy the river.

In the mid-1980s, after a severe flood, the Corps proposed a scaled down version of the project, lining only about 6 miles of the river with concrete. But the project languished in the face of stiff opposition.

Finally, after a huge flood struck the city in 1995, the county put together a coalition of state, federal, and local agencies as well as citizen and special interest groups to try to develop a solution to Napa's flooding problems. The result was a \$175 million flood control project that includes both structural and nonstructural measures. The structural component involves widening the river to increase its capacity, moving the levees farther back from the river, and constructing a floodwall to protect the most vulnerable residential properties. The nonstructural component involves acquiring floodprone properties and restoring wetlands along the river.

The county has plans to purchase about 350 parcels, primarily commercial and industrial, in the floodplain. Thus far, it has purchased six properties and is negotiating to purchase another twelve.

To pay for its share of the project—an estimated \$50 million for the buyout alone—county residents approved a ½ cent sales tax increase, which is expected to raise about \$7 million per year, over 20 years. The county also received about \$5 million from the Federal Emergency Management Agency to help fund the buyout.

Choose from the opportunities identified under Step 5, the goals and objectives set in Step 6, and the options and tools described in this chapter. Expand and tailor them to meet a community's concerns. Be sure that the potential impacts of each alternative on other aspects of sustainability within the community are analyzed.

**Actions to take during Step 10, Implement, evaluate, and revise.**

Some ways to monitor and evaluate disaster resilience are discussed in the next section.

## **MONITORING DISASTER RESILIENCE**

It is difficult to measure the success of hazard mitigation efforts. Why? Because for a valid measurement to occur, a community would have to compare damage incurred with and without the hazard mitigation actions. And the events being compared would have to be of the same strength, duration, and location. This seldom occurs.

Other indicators are available, however, to estimate the effectiveness of the hazard mitigation strategy—that is, whether the community has increased or decreased its vulnerability to natural hazards. In addition to measuring a community's progress toward achieving its mitigation goals, the indicators also can be used to set performance goals for a community, e.g., reducing the percentage of homes in the floodplain by 10% per year. Finally, the indicators can help build support for mitigation programs by showing tangible benefits. Several indicators for improving the resilience of homes, businesses, critical facilities, and the natural environment are shown in the box on the next page.

## **CONCLUSION**

Communities vary in their vulnerability to natural hazards and in their capacity to mitigate their impacts. Some face risks from several types of natural hazards, such as earthquakes, landslides, and wildfires, while others suffer primarily from a single type of hazard, such as flooding. Some are subject to seasonal hazards that occur in relatively predictable areas, such as wildfires in the west or Nor'easters along the Atlantic coast, while in other communities, disasters can strike anytime. Also, communities vary in the amount of development that has occurred in hazard-prone locations and in their approach to mitigation, e.g., structural or nonstructural. Thus, each community is unique, and its approach to addressing the threat of natural disaster varies considerably.

Most communities will remain vulnerable to one type of natural hazard or another. Natural disasters provide an opportunity for communities to become more sustainable—to rebuild and redevelop homes, businesses, critical facilities and infrastructure in a manner that they will be less vulnerable to future disasters. To do so requires communities to implement policies and programs that (1) make structures in hazard-prone areas more damage-resistant, (2) avoid development in hazardous areas, and (3) protect natural areas that can reduce the impacts of natural disasters. This is the essence of hazard mitigation.



## Checklist for Measuring Community Resilience to Natural Disasters

### Housing

- Fewer households living in unsafe areas
- Fewer repetitively damaged structures
- Increase in number of households with insurance against natural hazards

### Businesses

- Fewer businesses in unsafe areas
- Fewer repetitively damaged structures
- Increase in number of businesses with insurance against natural hazards

### Infrastructure and critical facilities

- Critical facilities (hospitals, police and fire stations, schools, etc.) relocated to safe areas or protected against damage from natural hazards
- Fewer repetitively damaged facilities
- Infrastructure (roads, bridges, sewage treatment plants, water treatment plants) relocated to safe areas or protected against damage from natural hazards

### Natural Environment

- Unsafe land use activities (junkyards or chemical storage facilities) relocated from areas prone to natural hazards. New unsafe uses prohibited in such areas
- Commercial or industrial facilities in hazard-prone, environmentally-sensitive areas have undertaken mitigation measures to reduce the likelihood of the release of hazardous materials
- Wetlands, floodplains, dunes, and coastal zones protected from development or damage

(North Carolina Division of Emergency Management, 2000)

Mitigation is an ongoing process, and few communities can claim that they are completely free from the risk of natural disasters. Some small communities, such as Pattonsburg, Missouri; Grafton, Illinois; and Soldiers Grove, Wisconsin have come close, because they have relocated themselves to higher ground, out of the path of floodwaters. In most other places, however, particularly in large cities that were settled along rivers or ports or in earthquake-prone areas, relocation of all vulnerable properties is not feasible. It is possible, however, to reduce a community's vulnerability.

When disaster strikes, a mitigation plan can help guide the recovery effort toward increased resilience to future disasters. The plan can help forge a common vision on how to make the community, including its businesses, more resilient and sustainable. And the plan can help ensure that community decisions about the type and location of future growth consider the impacts of natural hazards.

By integrating mitigation concepts into governmental activities today, a community can reduce its vulnerability to natural hazards and avoid much more costly losses from tomorrow's disasters. The time, energy, and resources invested in mitigation could significantly reduce the demand for future dollars by reducing the amount needed for emergency recovery, repair, and reconstruction after a disaster. That is, it could make a community more sustainable, by safeguarding the environment, protecting the local economy, and promoting greater equity.

## REFERENCES

- Faber, Scott. 1996. *On Borrowed Land: Public Policies for Floodplains*. Cambridge: MA: Lincoln Institute of Land Policy.
- Godschalk, David; Norton, Richard; Peterson, Junko; Richardson, Craig; and Salvesen, David. 1998. *Coastal Hazards Mitigation: Public Notification, Expenditure Limitations, and Hazard Areas Acquisition*. Chapel Hill, NC: Center for Urban and Regional Studies.
- Godschalk, D.R.; Beatley, T.; Berke, P.; Brower, D.J.; and Kaiser, E.J. 1999. *Natural Hazards Mitigation. Recasting Disaster Policy and Planning*. Washington, D.C.: Island Press. 575 pp.
- Johnston, Robert and Madison, Mary. 1997. "From Landmarks to Landscaped: A Review of Current Practices in the Transfer of Development Rights." *Journal of the American Planning Association* 63(3):369.
- National Wildlife Federation. 1998. *Higher Ground: A Report on Voluntary Property Buyouts in the Nation's Floodplains*. Washington, D.C.: National Wildlife Federation.
- North Carolina Division of Emergency Management. 2000. *Hazard Mitigation in North Carolina: Measuring Success*. Raleigh, NC: DEM.
- Platt, Rutherford. 1996. *Land Use and Society: Geography, Law, and Public Policy*. Washington, D.C.: Island Press.
- Porter, Douglas. 1997. *Managing Growth in America's Communities*. Washington, D.C.: Island Press.
- Schwab, Jim; Topping, Kenneth C.; Eadie, Charles C.; Deyle, Robert E.; and Smith, Richard A. 1998. *Planning for Post-Disaster Recovery and Reconstruction*. PAS Report No. 483/484. Chicago, IL: American Planning Association. 346 pp. Abstract available at [www.planning.org/apapubs/details.asp?Num=1178](http://www.planning.org/apapubs/details.asp?Num=1178). [accessed September 21, 2001]
- Working Group on Natural Disaster Information Systems, 2000. *Effective Disaster Warnings*. Washington, D.C.: National Science and Technology Council, Committee on Environment and Natural Resources.

## WHERE TO FIND MORE INFORMATION

### Training Courses and Workshops

Federal Emergency Management Agency, Emergency Management Institute, Higher Education Project Courses. Emmitsburg, MD. [www.fema.gov/emi/edu/aem\\_courses.htm](http://www.fema.gov/emi/edu/aem_courses.htm) [accessed June 15, 2001] Contact: (301) 447-1233 or email Barbara Johnson: [barbara.l.johnson@fema.gov](mailto:barbara.l.johnson@fema.gov)

- “Building Disaster Resistant and Sustainable Communities.” Course developed by Raymond Burby. [www.fema.gov/emi/edu/bldcomm.htm](http://www.fema.gov/emi/edu/bldcomm.htm), [accessed June 15, 2001] This course introduces the concepts of sustainable development, resilient communities, and smart growth. Public and private sector planning are discussed. The last quarter of the class focuses on topics of resilience, including financing resilience projects, creating resilience among vulnerable populations, and creating resilience for specific hazards.

Federal Emergency Management Agency, Emergency Management Institute, National Emergency Training Center. Emmitsburg, MD. [www.fema.gov/emi](http://www.fema.gov/emi) [accessed June 15, 2001] (301) 447-1035.

- “Introduction to Mitigation.” Independent Study Course. Federal Emergency Management Course IS393.  
At the end of the course, the student should be able to: explain the rationale for mitigation and its function as a component of emergency management; define the principles, purposes, and priorities of mitigation; describe mitigation measures that are applicable to local hazard risk problems; summarize responsibilities and resources for mitigation; and outline mitigation planning considerations.
- “Integrated Emergency Management Courses for Specific Communities.” Federal Emergency Management Agency Courses E930/S390, E931/S391, E932/S932. These courses place emphasis on community response and short-term recovery issues. They are tailored to fit the community and are based on a selected hazard type. The courses use classroom instruction, planning sessions, and exercises to allow for structured decisionmaking in a learning, yet realistic, environment. A key outcome is to assist with making the transition from response to short-term recovery. The three classes offered are: E930/S390 IEMC/Community Specific/All Hazards: Response and Recovery; E931/S931 IEMC/Community Specific/Hurricane: Response and Recovery; and E932/S932 IEMC/Earthquake: Response and Recovery.
- “IEMC/All Hazards: Recovery and Mitigation.” Federal Emergency Management Agency Course E901/S901.  
This course emphasizes recovery and mitigation and is conducted for two types of audiences. The course places public officials and other key community leaders in a simulation that begins after a disaster has affected the community.

- IEMC/Earthquake: Recovery and Mitigation.” Federal Emergency Management Agency Course E911/S911.  
This course is similar to the above “All Hazards” in its format, but focuses specifically on earthquakes.
- “IEMC/Hurricane: Recovery and Mitigation.” Federal Emergency Management Agency Course E906/S906.  
This course is similar to the above “All Hazards” in its format, but focuses specifically on hurricanes.
- “Multi-Hazard Building Design Summer Institute.” Federal Emergency Management Agency Courses E329, E330, E331, and E333.  
These courses are intended to provide up-to-date technical information on building design for the faculty of engineering or architectural colleges. It is intended that faculty members incorporate this information into their curriculum in order to train the architects and engineers of the future in the proper approaches to mitigating natural hazards. Four courses include: Flood Protective Design (E329), Earthquake Protective Design (E330), Wind Protective Design (E331), and Fire Safety Design (E333).
- “Retrofitting Flood-Prone Residential Buildings.” Federal Emergency Management Agency Course E279/G279.  
This 2-day course is designed to provide engineering and economic guidance on retrofitting existing one- to four-family residential structures situated in floodprone areas. Subjects covered include an introduction to retrofitting, regulatory framework, controlling parameters, building assessment, and design practices. There is also a 1-hour unit on economics and a final exam.
- “Seismic Retrofit Training for Building Contractors and Inspectors.” Federal Emergency Management Agency Course G225.  
This 8-hour course demonstrates methods to retrofit residential structures to reduce seismic damage. Students are shown methods of properly tying a structure to a foundation and using connectors to strengthen its frame. Topics covered include earthquake basics, shear walls, foundations, connections, and miscellaneous elements in construction. In addition, liability issues for contractors are discussed throughout the course. The manual is designed to be an on-site reference tool for contractors.

## **Organizations**

Association of State Floodplain Managers.

The Association of State Floodplain Managers is an organization of professionals involved in floodplain management, flood hazard mitigation, the National Flood Insurance Program, and preparedness, warning and recovery. The ASFPM represents the flood hazard specialists of local,

state, and federal government, the research community, the insurance industry, and the fields of engineering, hydrologic forecasting, emergency response, water resources, and others.

See [www.floods.org](http://www.floods.org) [accessed July 23, 2001]

Center of Excellence for Sustainable Development.

The CESD website is a project of the Denver Regional Office of Department of Energy's Office of Energy Efficiency and Renewable Energy. Since 1995, the CESD website has offered users access to comprehensive resources on community sustainability. It is an excellent source for resources on sustainable development.

See [www.sustainable.doe.gov](http://www.sustainable.doe.gov) [accessed June 29, 2001]

Disaster Resistant Communities Association.

This web site includes recent news stories about communities that have implemented pre-disaster mitigation plans and Project Impact.

See [www.hazmit.net/PIAssoc/PIHome.htm](http://www.hazmit.net/PIAssoc/PIHome.htm) [accessed June 15, 2001]

Federal Emergency Management Agency (FEMA).

FEMA is the federal agency responsible for preparing for and responding to disasters in the United States.

See [www.fema.gov](http://www.fema.gov) [accessed July 23, 2001]

Institute for Sustainability and Technology Policy. *Directory of Policy Journals in Transport, Urban Planning and Sustainability.*

Over 50 journals are described to help academics, professionals, and students research many topics related to this field. Each journal is described including a link to the site where the journal may be found on the internet. Some journals have access to online articles.

See: [www.istp.murdoch.edu.au/research/journal/](http://www.istp.murdoch.edu.au/research/journal/) [accessed July 13, 2001]

Network of State Hazard Mitigation Officers.

This web site is a link to state hazard mitigation officers and an online source of information for hazard mitigation officers.

See: [www.hazmit.net/index.htm](http://www.hazmit.net/index.htm) [accessed June 15, 2001]

## **Videos, CD-ROMs, and DVDs**

*Stand Up to the Flood: Get Your Home in Shape.* Association of Bay Area Governments. 1999. Contact the Association of Bay Area Governments at: P.O. Box 2050, Oakland, CA 94604-2050. Phone: (510) 464-7900; fax: (510) 464-7970; or see [www.abag.ca.gov](http://www.abag.ca.gov) [accessed September 14, 2001]

*Flood Mitigation Planning: The First Steps.* Association of State Floodplain Managers (ASFPM). 2000.

Contact ASFPM at [asfpm@floods.org](mailto:asfpm@floods.org) or see [www.floods.org](http://www.floods.org) [accessed September 14, 2001]

*Mitigation Revitalizes a Floodplain Community: The Darlington Story.* Wisconsin Department of Natural Resources. 1997. Madison, WI.

This is a splendidly produced videotape about the efforts of a small rural Wisconsin community to reverse the effects of neglect and disinvestment in its historic downtown area caused by repeated flooding and economic change. Using a multi-objective planning and management strategy, officials and citizens, in partnership with government agencies and private entities, identified six goals: 1) preserve the historic character of the downtown; 2) restore community pride; 3) acquire and relocate commercial properties at risk; 4) elevate and flood proof commercial and residential structures; 5) stimulate investment downtown; and 6) pursue tourism as an economic strategy. The video follows the mitigation process from early meetings through floodproofing and relocation. Produced by the Wisconsin Department of Natural Resources. 27 minutes. 1997. Available free from Wisconsin DNR, P.O. Box 7921, Madison, WI 53707-7921; (608) 264-9200.

*Rhineland Relocation Project.* Booneslick Regional Planning Commission. n.d. Produced by Video Production Company for the Booneslick Regional Planning Commission and others. For availability, contact the Booneslick Regional Planning Commission at (314) 456-3473 or the Economic Development Administration in Jefferson City, Missouri at (314) 751-4146.

*Quality Redevelopment of Eastern North Carolina.* Horizon Video Productions. 2000. Durham, NC.

This 20-minute video was produced by the state in the aftermath of Hurricane Floyd to introduce and educate local and state officials about the “better ways” available to recover from the disaster and at the same time address other local concerns such as environmental quality, economic vitality, housing, sense of community, business and job opportunities, and disaster mitigation. It introduced a framework espoused by the state for sustainable community action and features the governor explaining the tenets of “quality redevelopment” and how it can—and did—benefit North Carolina communities and help ensure a better future for the state’s citizens. Available from North Carolina Department of Emergency Management, 1830-B Tillery Place, Raleigh, NC 27699; (919) 751-8000; fax: (919) 715-9763.

*Taking the Initiative.* Federal Emergency Management Agency, Emergency Management Institute. 2000. Emmitsburg, MD.

This 20-minute video shows how a neighborhood, two small towns, and a business owner took responsibility for and got organized to adopt sustainability principles and techniques in coping with hazards. The three separate instances, all in California, illustrate participatory processes, taking initiative, looking at the economic benefits of hazard mitigation (in one case, elevating a restaurant), incorporating livability components into a flood protection measure, and protecting the local environment and habitat. This video is available from the Emergency Management Institute at 1-800-238-3358. Ask for the “Disaster-Resistant Jobs” video.

*The Link Between Sustainability & Disaster Resistant Communities.* Slide show produced by the U.S. Department of Energy and the Federal Emergency Management Agency.

[www.sustainable.doe.gov/disaster/impact](http://www.sustainable.doe.gov/disaster/impact) [accessed July 23, 2001]

This slide show explains the concept of sustainable redevelopment and gives examples of redevelopment in three communities: Soldiers Grove, Wisconsin; Valmeyer, Illinois; and Arkadelphia, Arkansas.

*Community Vulnerability Assessment Tool. New Hanover County, North Carolina.* NOAA Coastal Services Center.

Before communities can develop effective hazard mitigation strategies, they must first identify their hazard risks and assess their vulnerability to the impacts of those hazards. This CD-ROM includes a method for conducting a community-wide vulnerability assessment. A tutorial steps the user through a process of analyzing physical, social, economic, and environmental vulnerability at the community level. The foundation for the method was established by the Heinz Center Panel on Risk, Vulnerability, and the True Cost of Hazards.

*Planning for Natural Hazards: Oregon Technical Resource Guide.* Oregon Natural Hazards Workshop. 2000. University of Oregon: Oregon Natural Hazard Workshop.

The purpose of the guide is to help Oregon cities and counties plan for and limit the effects of threats posed by natural hazards.” More information is available on-line at [www.uoregon.edu/~onhw/text/projects/tfeatured.html](http://www.uoregon.edu/~onhw/text/projects/tfeatured.html) [accessed June 22, 2001]

## **Books, Articles, and Papers**

Association of State Floodplain Managers. 1996. *Using Multi-Objective Management to Reduce Flood Losses in Your Watershed.* Madison, WI: Association of State Floodplain Managers. 72 pp. Abstract available at [www.floods.org/PDF%20files/PUBSLIST.pdf](http://www.floods.org/PDF%20files/PUBSLIST.pdf). [accessed September 21, 2001]

This publication documents the results of a multi-year project, funded by the Environmental Protection Agency and conducted by ASFPM, to explore planning and implementation techniques for multi-objective watershed management. It provides a general introduction to multi-objective management and the planning process that helps a community select the flood-loss reduction measures most suitable to its situation. It explains how to define problems and goals, build partnerships, combine needs and solutions creatively, and begin formal implementation procedures. Both riverine and coastal flood watersheds are examined. Much of the document focuses on multi-objective management planning details, involving subjects such as fish and wildlife issues, water supply, housing improvement, transportation and lifelines. Preparation of a M-O-M plan involves problem definition, involvement of non-local groups, and public and official acceptance of the plan.

Bay Area Regional Earthquake Preparedness Project. 1990. *Putting the Pieces Together: The Loma Prieta Earthquake One Year Later.* Oakland, CA: Bay Area Regional Earthquake Preparedness Project. 253 pp.

This report grew out of a conference held to determine the lessons learned from the Loma Prieta earthquake and its aftermath. The conference examined preparedness and mitigation efforts before the quake, political and management issues of disaster response, recovery and reconstruction programs, and mitigation activities since the event. Among the numerous topics addressed in the volume, separate chapters are given to seismological and geological considerations, geotechnical aspects, the performance of lifelines, buildings, and transportation systems and the implications for future design of these elements, effective emergency management, emotional and psychological aftereffects, economic impacts, emergency public information and the media, the restoration of lifelines, emergency medical services, business recovery, and housing reconstruction.



Beatley, Timothy and David Brower. 1997. *Hazard Mitigation in Florida Following Hurricane Andrew*. Natural Hazard Working Paper No. 13. Chapel Hill, NC: University of North Carolina, Center for Urban and Regional Studies. 61 pp.

This case study examines the impacts, activities, and lessons learned from Hurricane Andrew. The report describes the extent and nature of the damage the storm caused, along with Florida's susceptibility to hurricanes. It describes the pre-storm status of the region's planning and mitigation framework, then documents the major recovery and reconstruction activities that have transpired since the storm, including the post-storm mitigation projects and expenditures, changes to building codes, and design charrettes that examined alternative rebuilding strategies. Among the major policy issues that emerged from the study are: the appropriate role of the state mitigation plan, the appropriateness of mitigation choices made following Andrew, the limited mitigation options in South Florida, and the benefits and limitations of Florida's system of comprehensive planning and growth management.

Berke, Philip R. and Timothy Beatley. 1992. *Planning for Earthquakes: Risk, Politics, and Policy*. Baltimore, MD: John Hopkins University Press. 228 pp.

The authors examine the experiences of 260 earthquake-prone communities across the U.S., paying particular attention to three areas of especially high risk: Palo Alto, California; Salt Lake City, Utah; and the lowlands of South Carolina, including Charleston. They address issues that include citizen safety, determining and maintaining the structural integrity of old and new buildings, mapping, and land use, and also discuss alternative seismic hazard reduction measures and local earthquake mitigation programs. They conclude with a set of recommended activities for implementing local programs and building public support while involving federal and state governments. It is recommended that major stakeholders in the development of mitigation strategies should be involved with the planning process from the beginning.

Berke, Philip R. and Jack Kartez. 1994. *Sustainable Development as a Guide to Community Land Use Policy: A Conceptual Framework*. HRRC Publication 37P. College Station, TX: Texas A&M University, College of Architecture, Hazard Reduction & Recovery Center. 25 pp.

This paper provides a conceptual definition of "sustainable development," which many have argued is a vague phrase that threatens to become an unmanageable cliché. The authors explore how "sustainable development" can be used to describe the common good in land use and development and present a set of principles for land use policy formation. Principles for land use policy that the report identifies are: 1) include public participation in the decisionmaking process; 2) build consensus through conflict resolution mechanisms; 3) build local decisionmaking on a realistic capacity to carry out policies; 4) recognize local rights to devise rules for guiding human settlement patterns; 5) land use policy must work in harmony with nature and recognize the limits of ecosystems; 6) the built environment should be in harmony with people's needs and aspirations; 7) realistic land use policy must be able to alleviate local poverty and account for the least advantaged; 8) polluters, or culpable parties/corporations, must pay for the adverse affects they have imposed on ecosystems; and 9) responsible regional planning needs to be promoted.

Berke, Philip and David Godschalk. 1996. *Hazard Mitigation in California following the Loma Prieta and Northridge Earthquakes*. Natural Hazard Working Paper No. 14. Chapel Hill, NC: University of North Carolina, Center for Urban and Regional Studies. 59 pp.

This report documents a case study conducted almost six years after the Loma Prieta quake and one and one-half years after Northridge. The strengths and weaknesses of the California 409 Plans are identified, state and federal mitigation planning and implementation processes are reviewed, and local mitigation examples are drawn from San Francisco, Berkeley, Watsonville, and Los Angeles and Ventura counties. One finding was that present mitigation systems (policies and institutions) will not be adequate to mitigate the impacts of a future major earthquake catastrophe. Two recommendations were that California should pursue a coordinated, interdisciplinary effort to further the understanding of earthquake prediction and of earthquake impacts and should reinvigorate efforts to mandate local multi-hazard mitigation planning before and after a disaster.

Burby, Raymond J., ed. 1998. *Cooperating with Nature: Confronting Natural Hazards with Land-Use Planning for Sustainable Communities*. Washington, D.C.: Joseph Henry Press. 356 pp. Available at [www.nap.edu/catalog/5785.html](http://www.nap.edu/catalog/5785.html).

This volume focuses on the breakdown in sustainability—the capacity of the planet to provide quality of life now and in the future—that is signaled by disaster. The book takes a historical approach to explain why land use and sustainability have been ignored in devising public policies for natural hazards. The authors provide suggestions and a blueprint for the future.

Burby, Raymond J., Timothy Beatley, Philip R. Berke, Robert E. Deyle, Steven French, David R. Godschalk, Edward J. Kaiser, Jack D. Kartez, Peter J. May, Robert Olshansky, Robert G. Paterson, and Rutherford H. Platt. 1999. “Unleashing the Power of Planning to Create Disaster-Resistant Communities.” *Journal of the American Planning Association* 65 (Summer).

Human suffering and losses of lives and property in natural disasters can be reduced with appropriate planning for hazardous areas. However, the authors of this paper assert that federal policies addressing these problems have yet to recognize the importance of planning as the cornerstone of effective local hazard mitigation. In fact, federal programs make planning more difficult, the authors suggest, because they encourage the intensive use of hazardous land and shield local governments and private decisionmakers from financial losses in the disasters that inevitably follow. To unleash the power of planning for hazard mitigation, federal policies must be revised so that they help build local understanding of risk, commitment to hazard mitigation, and support for planning.

Bush, David M., Rodney Priddy, Kathie Dixon, and Orrin H. Pilkey. 1991. *Principles of Property Damage Mitigation and the Impact of Hurricane Hugo*. Durham, NC: Duke University, Department of Geology, Program for the Study of Developed Shorelines. 167 pp.

Prepared as a field-trip guide for the study of damage caused by Hurricane Hugo along the Carolina coast, this report is designed to educate readers about the many effects of hurricanes on seashores and to encourage a new way of thinking about hurricane recovery. It tries to show that simply cleaning up and rebuilding should make way for more active steps to enhance and preserve the protective capabilities of the natural setting. It also suggests principles of reducing

hurricane-caused property damage given expected sea-level rise, barrier island migration, and increased storm severity, and encourages environmentally sensitive approaches to hurricane mitigation. The document contains an account of pertinent hazard mitigation legislation and hazards research, a matrix of mitigation options, a general description of the shoreline affected by Hugo, and detailed descriptions of various sites included in the field trip.

Federal Emergency Management Agency. 1997. *Project Impact Guidebook. Building a Disaster Resistant Community*. Washington, D.C.: U.S. Government Printing Office.

This guidebook is designed to help communities protect residents, organizations, businesses, infrastructure, and stability and growth of the economy as much as possible against the impact of natural disasters before they happen.

Federal Emergency Management Agency. 1997. *Report on Costs and Benefits of Natural Hazard Mitigation*. Washington, D.C.: Federal Emergency Management Agency. 52 pp.

A long-standing question for those who work to reduce the impacts of natural hazards is whether mitigation is worth the time and expense. Specifically, are the costs required to reduce or eliminate the impacts of natural hazards substantially less than the benefits they provide? This report reviews the benefits that can accrue to different segments of society from mitigative measures, the costs that can be incurred by undertaking mitigation activities, and the analyses needed to evaluate the cost-effectiveness of these measures. The document has 16 case studies across the United States and demonstrates their efficiency against several types of natural hazards, as well as the effectiveness of other mitigation tools. The studies include seismic retrofitting of lifelines in Tennessee, reinforcement of highway bridges in California, historic preservation and community development in Wisconsin, mitigation in hospitals in California, reduction of business interruption costs in Iowa, seismic retrofitting in Los Angeles public schools, wind shutter protection in Florida, acquisition and relocation of floodplain structures in Missouri, regulation of unreinforced masonry buildings in Los Angeles, land-use and building regulation along the coasts of Florida, land-use and building requirements in floodplains, and seismic retrofitting to avoid business disruption. The cases include both public- and private-sector initiatives.

Federal Emergency Management Agency. 2000. *Planning for a Sustainable Future: The Link Between Hazard Mitigation and Livability*. FEMA Report 364. Washington, D.C.: Federal Emergency Management Agency. 40 pp. Available at

[www.fema.gov/mit/planning\\_toc2.htm](http://www.fema.gov/mit/planning_toc2.htm). [accessed September 21, 2001]

This booklet is about hazard mitigation, disaster resilience, sustainable development and livability, and describes the linkages among these concepts. It shows how communities that undertake hazard mitigation planning become more disaster resistant and reap further benefits. Hazard mitigation links disaster resilience to broad community objectives of economic health, social well-being, and environmental protection.

French, Steven P., Arthur C. Nelson, S. Muthukumar, and Maureen M. Holland. 1996. *The Northridge Earthquake: Land Use Planning for Hazard Mitigation*. NSF Grant Number CMS-9416458. Atlanta, GA: Georgia Institute of Technology, College of Architecture, City Planning Program. 160 pp.

Land use planning for seismic safety has been mandated in California for more than 20 years. The 1994 Northridge earthquake, which significantly impacted 19 local jurisdictions, provided a

unique opportunity to assess the effectiveness of this planning as a mitigation strategy. The authors found that planning had a small but measurable effect in reducing earthquake damage. In particular, the hazard delineation and public awareness components of the plans were the most strongly related to lower damage levels. Additionally, a disproportionate amount of damage occurred in areas that were previously identified as likely to experience liquefaction, and communities that had undertaken detailed mapping of these areas experienced less damage than those that did not. The report initially discusses the role of land use planning in natural hazard mitigation, then provides a setting for the Northridge quake. The pre-earthquake policy framework is reviewed, and local land use plans in effect are overviewed. The final chapter suggests ways to improve the effectiveness of land use planning for hazard mitigation.

Geis, D.E. 2000. "By Design: The Disaster Resistant and Quality of Life Community." *Natural Hazards Review* 1(3):151-160.

According to Geis, the present approach to designing and building communities is inadequate and is inflicting great and growing harm—physically, environmentally, socially, economically, and emotionally—that we can no longer tolerate. The disaster resistant community concept, the first step toward creating quality-of-life communities, was created specifically to provide a new way of thinking. A number of basic questions need to be addressed. What are disaster-resistant communities? Why are they important? What are the benefits? What is the relationship between a disaster-resistant community and a sustainable quality-of-life community? And, most importantly, how do we go about creating them? This article provides the answers to these questions so that the concept can be better understood and used to its fullest potential.

Godschalk, David and Timothy Beatley. 1996. *Hazard Mitigation in Iowa Following the Great Midwest Floods of 1993*. Natural Hazard Working Paper No. 10. Chapel Hill, NC: University of North Carolina-Chapel Hill, Center for Urban and Regional Studies. 31 pp.

The report examines how the Stafford Act influenced recovery in eight localities in Iowa. Questions explored include: What constitutes mitigation? Who is in charge after a disaster occurs? What good is the 409 (Stafford) Plan? Who pays for disasters? Other topics considered include grant administration accountability, equity issues, the promotion of sustainable communities, and problems caused by confusing rules and guidance.

Godschalk, D.R., T. Beatley, P. Berke, D.J. Brower, and E.J. Kaiser. 1999. *Natural Hazards Mitigation. Recasting Disaster Policy and Planning*. Washington, D.C.: Island Press. 575 pp.

This book describes and analyzes the way that hazard mitigation has been carried out in the United States under the Robert T. Stafford Disaster Relief and Emergency Assistance Act. The authors determine how the requirements of this law, establishing a national system for hazard mitigation, have worked in practice and how they might be made to work better.

Kundzewicz, Zbigniew W. 1999. "Flood Protection—Sustainability Issues." *Hydrological Sciences—Journal—des Sciences Hydrologiques* 44(4): 559–571.

Several types of technical infrastructure used globally for flood protection have been criticized in the context of sustainable development because they close off options for future generations and introduce unacceptable disturbances in ecosystems. Large structural flood defenses like dams, levees, storage reservoirs, and embankments are often listed in this category. This article examines the means of coping with floods in the sustainability context. The premise is that, although some

flood protection is necessary to the present generation to attain a fair degree of freedom from disastrous events, it must be done in such a way that future generations are not adversely affected. Various measures, or tests, of the sustainability of structural and nonstructural flood mitigation approaches are reviewed. Among them are questions about the fairness, reversibility, potential for landscape rehabilitation, and risk of various approaches; the extent to which consensus and/or participatory decisionmaking was incorporated into the planning; the magnitude of the marginal environmental impact; and the efficiency of existing and proposed projects. The author concludes that a change in paradigm is needed because a flood protection system guaranteeing complete safety is an illusion; an attitude of “living with floods” is more sustainable than a hopeless striving to combat floods.

Mileti, Dennis S. 1999. *Disasters by Design*. Washington, D.C.: The Joseph Henry Press. 351 pp. Available at [books.nap.edu/catalog/5782.html](http://books.nap.edu/catalog/5782.html). [accessed September 21, 2001]

This book is a summary volume of the Second National Assessment of Research on Natural Hazards with the formal mission of summarizing what is known in the various fields of science and engineering that is applicable to natural and related technological hazards in the United States, and making some research and policy recommendations for the future. It summarizes the hazards research findings from the last two decades, synthesizes what has been learned, and outlines a proposed shift in direction in research and policy for natural and related technological hazards in the United States. *Disasters by Design* is intended for a general audience, including policymakers and practitioners.

Mittler, Elliott. 1997. *An Assessment of Floodplain Management in Georgia's Flint River Basin*. Boulder, CO: University of Colorado, Institute of Behavioral Science, Natural Hazards Research and Applications Information Center. 190 pp.

On July 3, 1994, Tropical Storm Alberto struck the Florida panhandle and proceeded northeast before stalling just south of Atlanta, Georgia, inflicting over \$1 billion in damage. The flood provided an opportunity to identify and document the successes and failures of state and local floodplain management programs and activities. The author assessed the impact of federal, state, and local floodplain management activities on losses in the Flint River Basin, paying particular attention to the impact of the National Flood Insurance Program (NFIP) and local floodplain management efforts. He examines previous floodplain studies; evaluates the political situation affecting flood recovery in each community; examines federal, state, and local responses to the disaster, concentrating on recovery plans and the use of hazard mitigation programs to reduce future flood losses; analyzes the effectiveness of the NFIP; and offers a series of findings and recommendations based on the relatively successful recovery programs he found.

Nanita-Kennett, Milagros. 1994. *Urban Redevelopment and Earthquake Safety*. Tallahassee, FL: Florida A&M University, School of Architecture. 143 pp.

Urban renewal or redevelopment has been employed by federal, state, and local governments to promote the creation of public infrastructure and regulate the development process. However, earthquake safety programs have never been a part of this process, despite evidence that many cities are broadly vulnerable to the hazard. If these programs could be successfully integrated, seismic safety and protection could be greatly increased with reasonable effort and cost. The author examines this topic by addressing urban decay and earthquake risk; the redevelopment

process; the urban environment, including building codes, land use, and infrastructure; federal earthquake programs; local government programs; and the integration of various aspects of redevelopment. In addition, she provides case studies of Charleston, South Carolina; Memphis, Tennessee; Salt Lake City, Utah; and Santa Rosa and Santa Cruz, California.

National Wildlife Federation. 1998. *Higher Ground: A Report on Voluntary Property Buyouts in the Nation's Floodplains*. Washington, D.C.: National Wildlife Federation.

The National Wildlife Federation is dedicated to restoring landscapes, including natural wetlands, floodplains, and habitat of species that thrive along rivers and streams. *Higher Ground* focuses on efforts to restore floodplains through voluntary property buyouts and relocations of homes and other structures from high-risk flood zones and presents a detailed analysis of National Flood Insurance Program (NFIP) data. It includes sections on the history of buyout programs in the U.S. and the 1993 Midwest floods, an analysis of repetitive losses in the NFIP, and conclusions and recommendations.

North Carolina Emergency Management Division and Federal Emergency Management Agency. 2000. *Hazard Mitigation in North Carolina: Measuring Success*. Raleigh, NC: DEM.

To accelerate the institutionalization of hazard mitigation in North Carolina, the North Carolina Emergency Management Division established the Hazard Mitigation Planning Initiative, a long-term program to build local capacity to implement mitigation policies and programs in communities across the state. Through a series of case studies, this study documents losses avoided as a result of the implementation of a wide range of mitigation measures, including elevations and the acquisition and relocation or demolition of floodprone properties.

Reddy, Swaroop. 1992. *A Study of Long Term Recovery of Three Communities in the Aftermath of Hurricane Hugo*. HRRC Monograph 9B. College Station, TX: Texas A&M University, College of Architecture, Hazard Reduction Recovery Center. 171 pp.

The objectives of this report—a doctoral dissertation—included: 1) to determine the factors that explain the successful adoption of hazard mitigation measures during recovery, 2) to develop a conceptual understanding of the problems inherent in the adoption of mitigation during disaster recovery, and 3) to gain an understanding about the influence of pre-storm institutional regulations on mitigation during the recovery period. The major findings were: the stronger and greater the presence of eight implementation factors in a community, the greater the successful adoption of mitigation measures; local institutional involvement is essential in the successful adoption of mitigation; there is a strong link between development management and hazard mitigation; a strong link also exists between the protection of coastal resources and coastal hazard mitigation; and the existence of strong pre-storm institutional regulations help local jurisdictions promote the adoption of mitigation during recovery.

Schwab, Jim, Kenneth C. Topping, Charles C. Eadie, Robert E. Deyle, and Richard A. Smith. 1998. *Planning for Post-Disaster Recovery and Reconstruction*. PAS Report No. 483/484. Chicago, IL: American Planning Association. 346 pp. Abstract available at [www.planning.org/apapubs/details.asp?Num=1178](http://www.planning.org/apapubs/details.asp?Num=1178). [accessed September 21, 2001]

This document helps community leaders and planners educate their constituents on how informed decisions and choices can affect the rebuilding process and yield a safer, more sustainable community. This report introduces planners to their roles in post-disaster reconstruction and

recovery, and provides guidance on how to plan for post-disaster reconstruction side by side with all other players involved. A key theme throughout this report is to rebuild to create a more disaster-resilient community. The report contains many references to technical resources.

U.S. Department of Agriculture and U.S. Department of the Interior. 1996. *Federal Wildland Fire Management Policy and Program Review Implementation Action Plan Report—May 23, 1996*. Washington, D.C.: U.S. Dept. of Agriculture. 33 pp.

This report describes methods for implementing the recommendations contained in a prior report on federal wildland fire policy. It outlines specific actions to be enacted immediately, such as developing fire management plans for all areas subject to wildland fires, developing research programs, and requiring appropriate treatment of fuel hazards created by resource management and land use activities. The report also discusses items that require a long-term commitment, such as the use of a planning system that recognizes both fire use and fire protection as inherent parts of natural resource management, long-range management objectives, and standard criteria to assess suppression and support requirements.

Western Governors' Association. 1996. *Wildland/Urban Interface Fire Policy Action Report*. Denver, CO: Western Governors' Association, 1996. 9 pp.

Many state governors believe that a comprehensive revision of fire policy regarding the wildland/urban interface is critical to preventing future loss of life, property, and natural resources. Hence, the members of the Western Governors' Association offer a blueprint for improved management of the wildfire hazard that plagues western states. The governors recognize that, as western populations continue to move into wildland areas, the risk increases, and that, although low-intensity fires are often beneficial to the forest environment, intense fires are destructive to plant and soil systems.

Wilhite, Donald, Deborah A. Wood, and Kelly Helm Smith. n.d. *Planning for a Sustainable Future: The Case of the North American Great Plains*. IDIC Technical Report Series 95-1. Lincoln, Nebraska: International Drought Information Center.

The participants at this symposium addressed the complex economic, social, and environmental issues facing the Great Plains region in anticipation of climate change in the years to come. In addition to essays on sustainable development and global change policies, the volume contains four case studies that deal with sustainable land use, education and research agendas, the Groundwater Guardian Program, and the use of reverse engineering to enhance the lessons learned over the past eight decades. Also included are focus group reports on agricultural production, land and water resources, human and community resources, biological resources and biodiversity, and integrated resource management.

Wright, J.M. and J.L. Monday. 1996. *Addressing Your Community's Flood Problems. A Guide for Elected Officials*. Madison, WI: Association of State Floodplain Managers, Inc. and the Federal Emergency Management Agency. 38 pp.

This document was prepared to help elected officials plan and take action to prepare their communities for floods.



## **Additional Reading**

- Beatley, Timothy. 1995. *Promoting Sustainable Land Use: Mitigating Natural Hazards Through Land Use Planning*. HRRC Publication No. 133A. College Station, TX: Texas A&M University, College of Architecture, Hazards Reduction & Recovery Center. 6 pp.
- Beatley, Timothy. 1996. *National Trends and Future Directions in Hazard Mitigation Policy: The Elements of a New Paradigm*. Natural Hazard Working Paper No. 6. Chapel Hill, NC: University of North Carolina, Center for Urban and Regional Studies. 97 pp.
- Faber, Scott. 1996. *On Borrowed Land: Public Policies for Floodplains*. Cambridge, MA: Lincoln Institute of Land Policy.
- Federal Emergency Management Agency. 1987. *Reducing Losses in High Risk Areas: A Guidebook for Local Officials*. FEMA 116. Washington, D.C.: U.S. Government Printing Office.
- Federal Emergency Management Agency. 1995. *Mitigation. Cornerstone for Building Safer Communities*. The Report of the Mitigation Directorate for Fiscal Year 1995. Washington, D.C.: U.S. Government Printing Office. 83 pp.
- Federal Emergency Management Agency. 1997. *Multi Hazard Identification and Risk Assessment. The Cornerstone of the National Mitigation Strategy*. Washington, D.C.: U.S. Government Printing Office.
- Godschalk, David R. and Edward J. Kaiser. 1996. *Lessons from Six Mitigation Case Studies*. Natural Hazard Working Paper No. 15. Chapel Hill, NC: University of North Carolina, Center for Urban and Regional Studies. 10 pp.
- Godschalk, David, Richard Norton, Junko Peterson, Craig Richardson, and David Salvesen. 1998. *Coastal Hazards Mitigation: Public Notification, Expenditure Limitations, and Hazard Areas Acquisition*. Chapel Hill, NC: Center for Urban and Regional Studies.
- Johnston, Robert and Mary Madison. 1997. "From Landmarks to Landscaped: A Review of Current Practices in the Transfer of Development Rights." *Journal of the American Planning Association* 63(3):369.
- Missouri State Emergency Management Agency. 1995. *Out of Harm's Way: the Missouri Buyout Program*. Springfield, Missouri: Missouri State Emergency Management Agency.
- National Park Service, 1996. *Floods, Floodplains and Folks: A Casebook for Managing Rivers for Multiple Uses*. Washington, D.C.: U.S. National Park Service.



Platt, Rutherford. 1996. *Land Use and Society: Geography, Law, and Public Policy*. Washington, D.C.: Island Press.

Porter, Douglas. 1997. *Managing Growth in America's Communities*. Washington, D.C.: Island Press.



## Chapter 9

# SUMMARY

---

A holistic recovery from a disaster is one in which the six principles of sustainability are considered in all recovery decisionmaking and action. Holistic recovery is a reasonable, forward-looking approach to recovering from a disaster. The holistic recovery process as described in this handbook does not guarantee that every sustainability principle will actually be included in the recovery, but including the principles as decisionmaking criteria ensures that they will at least be considered. Applying those principles when making decisions can help communities avoid the pitfalls of adopting a course of action without realizing that it will have detrimental impacts in another place or time—whether that course of action includes disaster recovery activities, environmental quality, mitigation, economic redevelopment, or any other community concern. The holistic recovery framework helps a community work toward fully coordinating available assistance and funding while seeking ways to accomplish other community goals and priorities, using the disaster recovery process as the catalyst. In addition, it broadens those goals to include many aspects of a community’s characteristics that may not have been considered before.

## SUSTAINABILITY

*Sustainability* is an embracing concept that can give localities a framework within which to approach many of the forward-looking activities they are already doing (or want to do), whether they be recovering from a disaster or making improvements in lifestyle, safety, economic opportunity, or environmental quality. Sustainability is a way of looking at a community within its broadest possible context, in both time and space. It provides an ideal toward which to strive and against which to weigh proposed local actions, plans, expenditures, and decisions.

The classic definition of sustainability is “meeting the needs of the present without compromising the ability of future generations to meet their own needs.” People in every community have social, economic, and environmental needs and in every community the quality, quantity, importance, and balance of those needs is unique. To be sustainable, a community needs to integrate its social, economic, and environmental activities so that no single goal, need, group of people, or function takes undue precedence over the others.

There are six principles of sustainability that guide a community in ensuring that integration, and in moving itself toward sustainability. These principles can be a checklist for a community to use as it decides where it wants to improve its sustainability, and how to do it.

A community that wants to become more sustainable will

1. Maintain and, if possible, enhance, its residents' quality of life.
2. Enhance local economic vitality.
3. Ensure social and intergenerational equity.
4. Maintain and, if possible, enhance, environmental quality.
5. Incorporate disaster resilience and mitigation.
6. Use a consensus-building, participatory process when making decisions.

It would be good if all communities already adopted a long-term view and incorporated sustainability ideals into their comprehensive plans and other operating procedures and policies, and budgets. But if a community has not yet formally considered broader issues like environmental quality, social equity, or livability, the period of recovery after a disaster can be a good time to start. A disaster brings temporary changes to a community that can be viewed as opportunities to build back in a better way. People are thinking about the problems that they normally do not think about—the risks they face from hazards, the housing situation, the scenic aspects of the community, livability. Public officials have media attention that enables them to garner support for innovative ideas. A disaster forces a community to make a wide range of decisions—some of them quite difficult ones. Technical and expert advice becomes available from numerous public and private sources. Financial assistance comes into the community, enabling it to tackle more ambitious projects than would normally be the case.

## PROCESS

The best way to ensure that a community has a holistic recovery from a future disaster is to prepare a comprehensive plan for such a recovery. But even if the community does not have such a plan, there are many things that can be done during recovery that will make a community more sustainable than it was before. What is needed is a disaster recovery process that recognizes the possibilities and manages the recovery activities so that they become solutions, not additional problems. A community needs to strive to fully coordinate available assistance and funding while seeking ways to accomplish other community goals and priorities, using the disaster recovery process as the catalyst.

The key to making sustainable disaster recovery happen is that it does not differ from “normal” disaster recovery—it is part of what *should be* normal disaster recovery. A good recovery *is* a sustainable, holistic recovery.

Building sustainability does not demand a new or separate planning or recovery process. Rather, it provides an enlarged focus for examining perennial community concerns in light of disaster-imposed situations. It can be accommodated in different ways and to varying degrees through a standard procedure that a community might use for comprehensive planning, mitigation planning, disaster recovery, or other efforts. A community with a proven, workable procedure for planning and taking action should not dismantle that process, but instead work within it to address sustainability. A community without such an established process should consider using the 10-step process. A community already using the 10-step (or similar) process for other purposes can incorporate sustainability principles at each stage as summarized below.

## A 10-Step Process for Local Sustainable Recovery

**Step 1. Get organized.** At this stage a community makes a commitment to sustainability by designating appropriate responsibility for the holistic recovery, delegating it to an individual or entity—new or existing—and setting up measures for integrating holistic recovery planning and activities with ongoing disaster recovery and other community processes, as necessary. Appointments of appropriate staff and the designation of support resources will help ensure that the subsequent steps are handled effectively. Care must be taken that responsible people understand and support all the principles of sustainability: environment, social equity, consideration of the future, economic development, quality of life, and disaster resilience.

**Step 2. Involve the public.** Using a participatory process is an essential aspect of sustainability and is addressed by including all the stakeholders in the recovery. A community that seeks sustainability must have a demonstrated commitment to full community involvement and a viable participatory process. At this point the community needs to design public participation components into all the anticipated phases of the coming recovery.

There are a range of techniques from which to choose, beyond the traditional public hearing and town meeting formats, including lectures, planning charettes, workshops, call-in radio, and community based events like festivals. Care should be taken to involve all the constituents in the community, giving particular attention to those that may have been historically excluded. Publicize the sustainability factors that will drive the decisionmaking, and use a variety of media (flyers, posters, local newspaper, local television stations, and the Internet) to reach the public.

**Step 3. Coordinate with other agencies, departments, and groups.**

To have a truly holistic recovery, a community expands representation on the recovery team to include those who can contribute expertise on each of the principles of sustainability. They could be in-house staffers, local experts, state or federal agencies, or consultants. Depending on the situation, this could include social services personnel, environmental specialists, engineers, economic development directors, parks or wildlife departments, the business community, or social services personnel. Formal and informal ties need to be developed with every conceivable private entity; non-profit group; neighborhood coalition; church; state, local, federal, and regional agency, and others. This will increase the diversity of ideas and potential solutions, provide a ready-made labor pool (which will be needed when implementation begins), and make problem-solving more imaginative. It also begins to accomplish what makes a recovery truly sustainable by building local capacities within and across groups.

**Step 4. Identify the post-disaster problem situations.** During this step, the recovery team needs to begin a systematic process of considering the ways in which it will be able to build sustainability as it goes about managing the recovery. This can start by simply listing all the disaster-caused situations that will need to be remedied in the course of recovery. (A community that has not had a disaster but instead is looking ahead can use the matrix in Chapter 1 to get some ideas of the sort of situations that may be encountered.)

## PRINCIPLES OF SUSTAINABILITY & SOME OPTIONS FOR APPLYING THEM

### 1. Maintain & enhance quality of life

*Options:* Make housing available/affordable/better  
Provide education opportunities  
Ensure mobility  
Provide health & other services  
Provide employment opportunities  
Provide for recreation  
Maintain safe/healthy environs  
Have opportunities for civic engagement

### 2. Enhance economic vitality

*Options:* Support area redevelopment & revitalization  
Attract/retain businesses  
Attract/retain work force  
Enhance economic functionality  
Develop/redevelop recreational, historic, tourist attractions

### 3. Ensure social & intergenerational equity

*Options:* Preserve/conserve natural, cultural, historical resources  
Adopt a longer-term focus for all planning  
Avoid/remedy disproportionate impacts on groups  
Consider future generations' quality of life  
Value diversity  
Preserve social connections in and among groups

### 4. Enhance environmental quality

*Options:* Preserve/conserve/restore natural resources  
Protect open space  
Manage stormwater  
Prevent/remediate pollution

### 5. Incorporate disaster resilience/mitigation

*Options:* Make buildings & infrastructure damage-resistant  
Avoid development in hazardous areas  
Manage stormwater  
Protect natural areas  
Promote & obtain hazard & other insurance

### 6. Use a participatory process

Incorporate in each of other principles.

For each problem situation, information should be gathered to give a full picture of the problem. This is a broad exercise that likely will include many sub-steps spread over a wide array of issues, for example

- Getting expert analysis of economic trends, costs of rebuilding, and opportunities for economic growth, before and after the disaster.
- Mapping an environmentally sensitive area.
- Assessing the present and future vulnerability to hazards and disasters.
- Pinpointing social inequity and its impacts, before and after the disaster.
- Determining what quality of life concerns are important to residents, before and after the disaster.

(It can be seen that it would be better to have this information in hand before a disaster, rather than trying to gather it afterward, when things are more confused and rushed.)

This step will culminate in a list of problem situations, accompanied by back-up information.

**Step 5. Evaluate the problems and identify opportunities.** It is during this step that the implications of sustainability become clear. The recovery team evaluates each of the problems in the list developed in Step 4 in light of the six principles of sustainability, in turn. The list of options in the box (and on the matrix in Chapter 1) can be used to stimulate thinking about approaches that a locality can use to include that component of sustainability in a solution to each post-disaster problem. One or more approaches should be designated as possibilities for each problem, focusing on those that are applicable to the community's situation, needs, and concerns.

The principles and some options for applying each of them are listed in the box. Note that this is not an exhaustive list and also that some options apply to more than one principle.

This step results in a list of opportunities for holistic recovery activities. This will be a series of general statements of opportunities that could be taken, for example, “Expand stormwater management system to better handle street drainage and reduce streambank erosion in flood-damaged Elm Street neighborhood” or “Address damaged low-income housing by adding seismic-resistant features and insulation during repair.”

**Step 6. Set goals.** This step involves getting people to agree on what should be done. Using the recovery team and public involvement, set goals and objectives by picking and choosing from among the list of opportunities identified in Step 5. The possibilities are narrowed down to those that can be agreed to and are most preferable, based on local needs and situations, public support, cost-effectiveness, availability of technical expertise, other community goals, compliance with regulations, and other factors. Give full consideration to all sustainability principles: unite economic, social equity, quality of life, disaster resilience, and environmental perspectives. Assign priorities to the goals and objectives so that there is a range of possibilities open in case some of them fall through and so the team knows which actions to take, and in which order. The goals should be positive statements of what is intended to be accomplished. By this point it will be clear that the goals set for a holistic recovery are broader and have more far-reaching implications than those for simply returning to the status quo.

This step will result in an agreed-upon set of desirable actions that have reasonable applicability to the community. (It should be noted that in practice, Steps 4, 5, and 6 likely will overlap.)

If, in reviewing the possible alternatives, it is determined that one would detract from one or more of the elements of sustainability as manifested in that community, then that alternative should be eliminated from consideration. Or, if it decides to proceed after analyzing the potential negative impacts, the community should take responsibility for the tradeoff it has made and somehow accommodate it, if necessary.

**Step 7. Develop strategies for implementation.** Working with the list of goals developed in Step 6, the recovery team reviews the tools, funding, and expertise available to achieve each of them. The team chooses those that meet the community’s needs, expanding and tailoring as needed. For each goal, an implementation strategy will be developed that will include

- ! What is to be accomplished;
- ! The lead agency/entity and what they will provide or prepare;
- ! Partnerships that will make the action effective;
- ! Ways to obtain technical expertise and advice;
- ! Official local action needed (zoning, subdivision ordinances, building codes, etc.).
- ! Funding methods.

The team works to consolidate multiple sustainability objectives into each strategy—economic, environmental, social, quality of life, and mitigation.

This will produce a “package” associated with each community goal that outlines what is needed to achieve it.

**Step 8. Plan for action.** During this step the planning or recovery team drafts a complete plan for holistic recovery activities that fits into the recovery plan or becomes part of the community’s comprehensive plan. The plan should have

- ! a budget,
- ! a schedule for team meetings, public participation, data collection, report writing, on-the-ground action,
- ! details for obtaining funding,
- ! a monitoring and review process,
- ! public review and comment.

Consideration should be given to coordination with other community plans and programs, such as existing comprehensive, development, capital improvement, drainage, transportation, housing, and recreation plans.

After public and agency/entity review, the plan should be revised and finalized.

**Step 9. Get agreement on the plan for action.**

In many instances, the state, county (parish), and local governments will need to formally adopt the plan of action into the recovery or comprehensive plan. Agreement likewise should be obtained from federal and state agencies as appropriate. Memoranda of Understanding are signed among partners. Other stakeholders, especially historically excluded groups, should be included in the process necessary to adopt the plan.

**Step 10. Implement, evaluate, and revise.**

These final steps set the stage for managing the recovery and ensuring that the community

<b>Some Tools for Community Sustainability</b>	
R Local redevelopment authority	R Riparian buffers
R Economic incentives	R Soil conservation & management
R Loans for businesses	R Ecosystem restoration
R Housing authority	R Zoning and rezoning
R Capital improvements	R Public education and awareness campaigns and events
R Loan interest subsidy programs	R Special protection of critical facilities, utilities, networks
R Revolving loan funds for	R Valuing public spaces
R Public investment	R Transfer of development rights
R Redistricting	R Limiting public investment in hazardous areas
R Subdivision regulations	R Relocation out of hazardous areas
R Building codes	R Preservation of natural floodplain, coastal, wetland, other functions
R Special ordinances	R Private-public partnerships and networks
R Tax incentives	R Ombudspersons
R Transfer of development rights	R Targeted workshops
R Easements	
R Land purchase	
R Voluntary agreements	
R Planning	
R Retrofitting buildings	
R Habitat protection	
R Filter strips	

maximizes the opportunities that began as disaster. Having the persons and entities responsible for implementation of various aspects of the recovery actually involved in the decisionmaking about what strategies to use helps ensure that the activities specified will be carried out.

As recovery proceeds, it will be clear that some goals and strategies need to be modified. A formal monitoring process helps identify these needed changes and ensures that



certain efforts are not simply abandoned when an unforeseen obstacle is reached. It is good to invite stakeholders to participate in annual reviews and to help develop indicators of progress.

## A FINAL WORD

Throughout the nation, localities and state and federal agencies have become accustomed to thinking in terms of “building in” hazards mitigation during many of the activities that take place during disaster recovery. Compared to only five or ten years ago, there is now more widespread acceptance among policymakers, hazards managers, and the public that reducing disaster losses before they happen is preferable to cleaning them up and paying for them over and over again. This progression has been helped not only by improvements in mitigation techniques and technology but also by the advent of federal disaster programs and policies that provide legal, technical, and financial support for taking these sensible, long-term, cost-saving measures.

Disaster losses continue to rise, however, and disasters seem to be getting bigger and more expensive. It is clear to experienced hazards managers that the nation can no longer afford to consider hazard mitigation in isolation from other aspects of community (and national) well-being. A broader context is needed to ensure that the attempts society makes to protect itself from hazards are not simply creating burdens for someone or someplace else, or simply postponing this year’s medium-sized disaster in favor of a really big one some years down the road.

Incorporating the concept of “sustainability” into disaster recovery—and indeed into all possible aspects of hazards management—is a logical next step in the progression that began with the “building in” of mitigation into disaster recovery. Sustainability can provide an enlarged framework for examining potential mitigation measures—and any other community concerns—in a wider context. This broader context would have the advantage of being able to draw from a wider range of constituencies and types of expertise than hazard mitigation alone is able to, consolidate more problem-solving into a single effort, and most important, have a better likelihood of long-term success because numerous factors would be considered in developing an approach to the local concern, rather than just a narrowly focused one.

Using the sustainability-based, holistic recovery framework described in this handbook may have an unexpected result: a community may well discover that some of the hazard mitigation options that would previously have been regarded as admirable are no longer the best choice. When examined in the broad context of sustainability, not all mitigation is good. But there are still many options for reducing future losses from disasters that will meet the sustainability criteria. Indeed, options that do so will be the most effective mitigation in the long run.

Besides advancing ideals that improve the disaster resilience, livability, and appeal of a locality, this approach can also help local residents to think and rethink their community goals and the kind of place they want their grandchildren to inherit. It encourages each locality to perform its own carefully considered balancing act of risk vs. protection, cost vs. benefit, and today vs. tomorrow.



# GLOSSARY

---

**100-year floodplain**—the area of a floodplain that historically and statistically has a 1% chance of significant inundation in any given year or the area of inundation by the “100-year” flood (also known as the “base flood”).

**affordable housing**—housing that costs no more than 30% of a household’s gross income, including mortgage payments or rent, taxes, insurance, and utilities.

**charrette**—an intensive planning and/or design workshop involving people working together under compressed deadlines. Charrettes provide an interactive forum in which planners, designers, community representatives, and other interested and appropriate parties participate in proposing alternative visions that can help the group understand, evaluate, and determine future plans and options.

**coastal zone**—the area along the shore where the ocean meets the land as the surface of the land rises above the ocean. This land/water interface includes barrier islands, estuaries, beaches, coastal wetlands, and land areas having a direct drainage to the ocean.

**Community Development Block Grants (CDBG)**—administered by the Department of Housing and Urban Development (HUD). The objective of the CDBGs is to develop viable urban communities by providing decent housing and a suitable living environment and by expanding economic opportunities, principally for low-to moderate-income people. Disaster-related assistance can be eligible under this program depending on state priorities; mitigation activities have been funded under this program.

**Community Rating System (CRS)**—a voluntary system under the National Flood Insurance Program in which communities undertake planning and regulatory activities beyond NFIP minimum requirements in order to obtain credits that earn premium reductions on the flood insurance for policies held by their residents and property owners. These activities are delineated in the CRS guidelines but fall under four categories: public information; mapping and regulatory activities; flood damage reduction; and flood preparedness. The premium reductions come in a series of 5% steps based on points earned under the system.

**density**—the average number of persons, household, or dwellings per acre of land.

**disaster housing**—temporary housing supplied by emergency management officials to disaster victims whose homes are no longer inhabitable due to damage sustained in a declared disaster (formerly called temporary housing).

**disaster declaration**—a Presidential determination that a jurisdiction of the United States may receive a federal aid as a result of damage from a major disaster or emergency.

**disaster**—a major detrimental impact of a hazard upon the population and economic, social, and built environment of an affected area. Logically, a natural disaster results from the impact of a

natural (as opposed to human-caused or technological) hazard upon the built environment of an affected area.

**earthquake**—a sudden motion or trembling of the earth caused by the abrupt release of slowly accumulated strain upon tectonic plates; also called a seismic event.

**Economic Development Administration (EDA)**—part of the Department of Commerce, the federal agency that assists communities with grants and technical assistance for economic development.

**emergency period**—the period commencing immediately with the onset of a natural disaster during which a community’s normal operations, such as communications, transportation, and commerce, are disrupted or halted, and ending when danger from the hazard itself has ceased and initial response activities, such as search and rescue and debris clearance and removal, have commenced, at which point the community can begin to restore normal services and functions.

**emergency response plan**—a document that contains information on the actions that may be taken by a governmental jurisdiction to protect people and property before, during, and after a disaster.

**environmentally sensitive areas**—places that contain significant natural resources and/or resource values that may warrant protection.

**exposure**—the measure of people, property, or other interests that would be subject to a given risk, such as a hazard event.

**federal coordinating officer (FCO)**—the responsible official appointed by the President, Federal Emergency Management Agency Director, or Federal Emergency Management Agency Associate Director for Response and Recovery who initiates action immediately to ensure federal disaster assistance is provided in accordance with the declaration, applicable laws, regulations, and the FEMA-State Agreement.

**Federal Response Plan (FRP)**—facilitates the federal response to disasters in the United States, territories, and other jurisdictions; it outlines the planning assumptions, policies, and concepts of operations, organizational structures, and specifies responsibility assignments of federal departments and agencies before and during disasters.

**Federal Emergency Management Agency (FEMA)**— an executive agency whose mission is to reduce the loss of life and property and protect the nation’s critical infrastructure from all types of hazards through a comprehensive program of mitigation, preparedness, response and recovery.

**Federal Insurance and Mitigation Administration (FIMA)**—the FIMA is the branch of FEMA that administers the National Flood Insurance Program (NFIP), providing flood insurance to individuals and communities.

**flash flood**—a flood occurring with little or no warning where water levels rise at an extremely fast rate.

**Flood Insurance Rate Map (FIRM)**—as defined under the National Flood Insurance Program, an official map of the community delineated both the Special Flood Hazard Areas and the risk premium zones applicable to the community.

**floodplain management**—as defined under the National Flood Insurance Program, the operation of an overall program of corrective and preventive measures for reducing flood damage, including, but not limited to, emergency preparedness plans, flood control works, and floodplain management regulations.

**floodplain management regulations**—as defined under the National Flood Insurance Program, zoning ordinances, subdivision regulations, building codes, health regulations, special purpose ordinances (such as floodplain ordinance, grading ordinance, and erosion control ordinance), and other applications of the police power. The term describes such state or local regulations, in any combination thereof, which provides standards for the purpose of flood damage prevention and reduction.

**fuel**—combustible plant material, both living and dead, that is capable of burning in a wildland situation; any other flammable material in the built environment that feeds wildfire.

**geographic information system (GIS)**—computer software that links geographic information (where things are) with descriptive information (what things are like).

**ground failure**—permanent deformation of the soil, including faulting, consolidation, liquefaction, or landslides. Ground failure can cause extensive damage to buildings and lifelines, and development in areas prone to ground failure should be avoided.

**habitat**—the place where a plant or animal species naturally lives and grows; its immediate surroundings.

**hazard mitigation**—a sustained action taken to reduce or eliminate long-term risk to people and property from hazards and their effects.

**hazard mitigation state plan**—a plan required to be developed to describe the state procedures for administering the Hazard Mitigation Grant Program.

**hazard identification**—the process of defining and describing a hazard, including its physical characteristics, magnitude and severity, probability and frequency, causative factors and locations or areas affected

**Hazard Mitigation Grant Program (HMGP)**—authorized under Section 404 of the Stafford Act, it provides funding for cost-effective hazard mitigation projects in conformance with the post-disaster mitigation plan required under Section 409 of the Stafford Act. Section 404 authorizes the President to contribute up to 75% of the cost of mitigation measures that are determined to be cost-effective and substantially reduce the risk of future damage or loss in states affected by a major disaster. The remaining 25% of the cost may be a combination of state, local and other non-federal contributions.

**hazard**—an event or physical condition that has the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, damage to the environment, interruption of business, or other types of harm or loss; also, loosely, the product of risk, vulnerability, exposure, and the capacity of humans to respond

**historic resource**—a structure, object, or place that has historic significance or contributes to the historic significance of a district; includes landmarks, objects, or structures that are included in a historic resources inventory.

**holistic recovery**—a recovery from a disaster that takes into account all the principles of sustainability in decisionmaking and action.

**HOME investment partnerships program**—a program sponsored by the U.S. Department of Housing and Urban Development that provides permanent housing for low-income homeowners or renters in large cities and urban counties. Funds can be used for acquisition, new construction, and rehabilitation.

**housing types**—types of housing units, such as single-family detached, rowhouses, condominiums, and apartments.

**hurricane**—part of a family of weather systems known as “tropical cyclones.” Depending on the strength of the winds extending in a counter-clockwise formation from the eye of the hurricane, it can be classified as a Category 1 to Category 5 hurricane, with 5 being the most severe.

**increased cost of compliance (ICC)**—ICC coverage is a component of the standard flood insurance policy that provides up to \$15,000 coverage for complying with the cost of meeting substantial damage requirements or toward eliminating flood damage to a structure that has had repetitive flood insurance claims paid.

**Individual and Family Grant Program (IFG)**—a FEMA program that provides monetary aid to individuals and families to meet disaster-related expenses for necessary items or for serious needs.

**infrastructure**—the utilities and other basic services of a community essential for the development, operation, and growth of a city and/or that have a direct impact on the quality of life, including transportation systems, regional dams, bridges, communication technology such as phone lines or Internet access, water supplies and sewer treatment facilities, etc.

**Interagency Hazard Mitigation Team**—in the aftermath of a Presidentially declared disaster, the team appointed through the Federal Coordinating Officer to examine the impact of the disaster in a timely fashion and to identify specific opportunities for hazard mitigation uncovered by its investigation.

**Interagency Hazard Mitigation Team (IHMT)**— the mitigation team usually activated after major disasters, pursuant to the Office of Management and Budget directive and subsequent Federal Interagency Agreement. Shortly following a Presidential declared disaster, the IHMT, composed of federal, state, and local officials, develops a report identifying post-disaster mitigation opportunities and common post-disaster recovery policies.

**land use**—the way in which land is used; generally described in terms such as a size of lot, size and location of structure on the lot, and activities taking place within a structure. Also, activities not directly associated with land, such as housing construction, population growth, traffic flow and job development are influenced by the way land is used.

**lifeline systems**—public works and utilities, such as electrical power, gas and liquid fuels, telecommunications, transportation, and water and sewer systems

**liquefaction**—the temporary loss of shear strength in a water-saturated, cohesionless soil deposit, or temporary transformation of unconsolidated materials into a fluid mass.

**livability**—a generally subjective term used variously to describe whether an area feels safe and/or comfortable to those who live, work, and play there; partially based on what the surroundings are and whether goods and services are provided in a satisfactory manner.

**magnitude**—a measure of the strength of an earthquake or the strain of energy released, as determined by seismic observations.

**major disaster**—as defined under Public Law 93-288, any natural catastrophe (including any hurricane, tornado, storm, flood, high water, wind-driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, or drought), or any fire, flood, or explosion in any part of the United States, which in determination of the President, causes damage of sufficient severity and magnitude to warrant major disaster assistance under the Stafford Act.

**mitigation**—sustained actions taken to reduce or eliminate long-term risk to people and property from hazards and their effects.

**mixed-use**—for an individual site, “mixed use” combines residential with commercial or industrial uses; mixed use areas include town centers, main streets, and designated nodes are areas along corridors.

**multi-objective management**—a holistic approach to hazard management that emphasizes the involvement of multiple distinct interests in solving land use problems related to the hazardous area. For instance, parks and recreation interests might advocate for a greenbelt along a river corridor, while tourism interests may see in the same idea a new business opportunity, and fiscal conservatives see savings to be gained in local expenditures for infrastructure in a vulnerable area.

**mutual aid agreements**—agreements among local, state, regional, and/or national agencies to reduce duplication and increase the effectiveness of emergency response and other post-disaster activities. Such agreements are often used to provide supplemental staff assistance after a disaster.

**National Environmental Policy Act (NEPA)**—passed by Congress in 1969, established a national policy for the protection and maintenance of the environment by mandating a planning process that all federal agencies must follow. As it pertains to disasters, NEPA requires that FEMA carry out its responsibilities in a manner that ensures that all practical means and measures are used to protect, restore, and enhance the quality of the environment or to avoid or minimize adverse environmental consequences (44 *CFR* Part 10).

**National Flood Insurance Program (NFIP)**—makes flood insurance available to property owners in exchange for the local adoption and enforcement by their community of floodplain management ordinances that regulate new and substantially damaged or improved development in designated flood hazard areas.

**National Historic Preservation Act (NHPA)**—consideration of cultural resources by federal agencies is mandated under Section 106 of the NHPA, as implemented under 36 *CFR* Part 800. Requirements include identifying significant historic properties that may be impacted by a proposed project.

**National Earthquake Hazards Reduction Program (NEHRP)**—created by Congress in 1977 to mitigate earthquake losses by providing technical and educational assistance to communities threatened by earthquakes. NEHRP is intended to mitigate earthquake losses through development and implementation of seismic design and construction standards and techniques; technical assistance materials, education and risk reduction programs; centers addressing specific aspects of the earthquake problem, and dissemination of earthquake information.

**natural hazards**—hurricanes, tornados, storms, floods, tidal wave, tsunamis, high or wind-driven waters, volcanic eruptions, earthquakes, snowstorms, wildfires, droughts, landslides, and mudslides.

**pedestrian-oriented development**—development designed with an emphasis primarily on the sidewalk and on pedestrian access to the site and building, rather than on auto access and parking.

**planning for post-disaster reconstruction**—the process of planning (preferably before an actual disaster) the steps the community will take to implement long-term reconstruction with one of the primary goals being to reduce or minimize its vulnerability to future disasters. These measures can include a wide variety of landuse planning tools, such as acquisition, design review, zoning, and subdivision review procedures. It can also involve coordination with other types of plans and agencies but is distinct from planning for emergency operations, such as the restoration of utility service and basic infrastructure.

**preparedness**— ensures that people are ready for a disaster and will respond to it effectively; it includes steps taken to decide what to do if essential services break down, developing a plan for contingencies, and practicing that plan.

**probability**—the numeric likelihood of an event. Theoretically, the probability of the occurrence of an event is between zero (indicating that the event never occurs) and one (indicating that the event always occurs).

**Project Impact**—a FEMA initiative to demonstrate the economic, social, and environmental benefits of pre-disaster mitigation to states, local communities, businesses, and individuals. It emphasizes long-term mitigation at the local level through partnerships with businesses, industry, residents, and non-governmental organizations.

**Public Assistance**—the supplementary federal assistance provided by the Federal Emergency Management Agency under Section 406 of the Stafford Act to state and local governments or



certain private, non-profit organizations (other than assistance for the direct benefit of individuals and families). PA deals with repair, restoration, and replacement of damaged public infrastructure and facilities and damage to private non-profit facilities.

**reconstruction**—the long term process of rebuilding a community’s destroyed or damaged housing stock, commercial and industrial buildings, public facilities, and other structures.

**recovery**—the process of getting back to normal after a disaster. It includes restoring public or utility services (electricity, water, communications, and public transportation), perhaps starting during but extending beyond the emergency period. Short-term recovery does not include the reconstruction of the built environment, although reconstruction may commence during this period. Long-term recovery (see reconstruction) is the process of returning all aspects of the community to normal functioning and, to the extent possible, to conditions improved over those that existed before the disaster.

**redevelopment**—usually used to refer to rebuilding the community’s economic activity after a disaster. It is different from economic recovery in that it goes beyond the process of merely restoring disrupted economic activity to the creation of new economic opportunities and enterprises in the aftermath of the recovery period, particularly including those that arise as by-products or direct outcomes of the disaster itself. A famous historic example of this last phenomenon would be the way in which the city of Chicago reshaped much of its economy and urban design in the aftermath of the Great Chicago fire of 1871.

**response**—activities that address the immediate and short-term effects of an emergency or disaster. Response activities include immediate actions to save lives, protect property, meet basic human needs, and restore water, sewer, and other essential services.

**Richter Scale**—the Richter Scale is a numerical scale of earthquake magnitude devised by seismologist C.F. Richter in 1935. Small or microearthquakes can have negative magnitude values. In theory there is no limit to the upper scale an earthquake can reach, but because of rock strength there is an actual upper limit of slightly less than 9.

**risk assessment**—a process or method for evaluating risk associated with a specific hazard. It is defined in terms of probability and frequency of occurrence, magnitude and severity, exposure, and consequences.

**risk**—the probability of an event’s or condition’s occurring.

**Section 404 of the Stafford Act**—authorizes the Hazard Mitigation Grant Program, which provides funding for cost-effective, environmentally sound hazard mitigation measures.

**seismic zone**—a generally large area within which seismic design requirements for structures are uniform.

**seismicity**—the likelihood of an area being subject to earthquakes.

**Small Business Administration (SBA)**—in a Presidential or SBA-declared disaster, SBA can provide additional low-interest loans for mitigation measures up to 20% above that for which an eligible applicant would otherwise qualify.

**Special Flood Hazard Areas (SFHAs)**—areas designated on Flood Insurance Rate Maps (FIRM) in which specific National Flood Insurance Program requirements apply.

**Stafford Act**—the Robert T. Stafford Disaster Relief and Emergency Assistance Act, (Public Law 100-107), was signed into law November 23, 1988 and amended the Disaster Relief Act of 1974 (Public Law 93-288). The Stafford Act itself was amended by the Disaster Mitigation Act of 2000, signed into law October 10, 2000 (P.L. 106-390). It is the statutory authority for most federal disaster response activities, especially as they pertain to the Federal Emergency Management Agency and its programs.

**state coordinating officer**—the individual appointed by the governor to act in cooperation with the Federal Coordinating Officer to facilitate disaster response and recovery efforts.

**state mitigation plan**—a systematic evaluation of the nature and extent of vulnerability to the effects of natural hazards typically present in the state. It includes a description of actions needed to minimize future vulnerability to hazards.

**state hazard mitigation team**—composed of key state agency representatives, local units of government, and other public or private sector bodies or agencies. The purpose of the team is to evaluate hazards, identify strategies, coordinate resources, and implement measures that will reduce the vulnerability of people and property to damage from hazards.

**State Hazard Mitigation Officer (SHMO)**—the representative of state government who is the primary point of contact with state and federal agencies, and local units of government in the planning and implementation of pre- and post-disaster mitigation activities.

**sustainability**—the ability or capacity to keep something going, or the state of being durable, or able to persist over time. Disaster resilience is one of the six principles of sustainability.

**sustainable development**—The World Commission on Environment and Development’s (the Brundtland Commission’s) classic definition is “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

**sustainable recovery**—a recovery from a disaster that takes into account all the principles of sustainability in decisionmaking and action; see “holistic recovery.”

**sustainable redevelopment**—incorporates the concepts and practices of sustainable development into some parts of the disaster recovery process.

**urban wildfire**—a fire moving from a wildland environment, consuming vegetation as fuel, to an environment where the fuel consists primarily of buildings and other structures.

**urban/wildland interface**—a developed area occupying the boundary between an urban or settled area and a wildland characterized by vegetation that can serve as fuel for a forest fire.

**volunteer agency**—any chartered or otherwise duly organized tax-exempt local, state, or national organization or group that provides needed services to the states, local government, or individuals in coping with a disaster.

**vulnerability**—the measure of the capacity to weather, resist, or recover from the impacts of a hazard in the long as well as short term.

**watershed management**—the implementation of a plan or plans for managing the quality and flow of water within a watershed, the naturally defined area within which water flows into a particular lake or river or its tributary. The aims of watershed management are holistic and concern the maintenance of water quality, the minimization of stormwater runoff, the preservation of natural flood controls, such as wetlands and pervious surface, and the preservation of natural drainage patterns.

**wildland**—an area in which development has not occurred (except for some minimal transportation infrastructure, such as highways and railroads) and any structures are widely spaced and serve largely recreational purposes.

---

*This glossary was compiled from several sources, including*

*Schwab, Jim; Kenneth C. Topping, Charles C. Eadie, Robert E. Deyle, and Richard A. Smith. 1998. Planning for Post-Disaster Recovery and Reconstruction. PAS Report No. 483/484. Chicago, IL: American Planning Association. 346 pp.*

*Federal Emergency Management Agency. 2000. Rebuilding for a More Sustainable Future: An Operational Framework. FEMA Report 365. Washington, D.C.: Federal Emergency Management Agency.*

*Rueter, Patty. 1998. Town Centers: Why? What? How? Portland, OR: Portland State University, School of Urban and Public Affairs, Institute of Metropolitan Studies, Community Fellowship Program.*

