

SECTION I: INTRODUCTION

Throughout history, the residents of Southern California, including the city of Newport Beach, have experienced and dealt with a variety of natural hazards common to the area. In the 1700s and 1800s, when there were fewer people in the region and almost everyone depended directly on the land and local weather for their food and welfare, the natural events that disrupted their lives were typically recorded in journals, letters, newspaper articles, and more recently, photographs. In the 1900s, as people began to attempt to understand and modify their environment to reduce the impact of natural hazards on the local population and the landscape, these events were also recorded in scientific journals. Many of these sources are referred to in the following sections in an effort to document the area's past exposure to specific natural hazards, and in the process, assess the region's potential future risks. This is especially important because as the population of Southern California increases, natural hazards have the potential to pose an even higher risk to the population and the economic welfare of the region.

California is the eighth (2012, 2013) largest economy in the world (Center for Continuing Study of the California Economy, July 2013), and Newport Beach is a vibrant and significant member of that economy. People originally from all over the United States and the world now call the city of Newport Beach home because of its gentle Mediterranean climate, geographical attributes (the bay and ocean are at their doorstep, and the mountains are within a two-hour drive) and ample job opportunities. However, the Southern California terrain is the product of powerfully active natural forces forming and tearing down mountains at remarkable rates by geological standards, and when humans interact with this changing environment, there is a high possibility for the population to be negatively impacted. Thus, a natural event, such as an earthquake or flood, clearly has the potential to cause significant damage at the personal, local, and regional levels in the forms of loss of life, injuries, destroyed or impaired structures and infrastructure, loss of income, and the high costs associated with disaster response and recovery.

In addition to earthquakes and floods, the City of Newport Beach, like most of Southern California, is also subject to wildfires, landslides and debris flows, soil erosion and expansive soils, windstorms, hurricanes, tornadoes, drought, and other natural hazards. Some of these hazards, like tornadoes, occur fairly infrequently and are difficult to predict, whereas others, such as erodible and expansive soils, can be effectively mitigated with well understood engineering methods. Being a coastal community, Newport Beach is also susceptible to coastal flooding resulting from a variety of phenomena, including storms, rogue waves, tsunamis, and sea-level rise due to global warming. The historical record and our current state of knowledge indicate that those hazards with the potential to cause the most damage in Newport Beach include earthquakes, floods (including coastal flooding), wildfires, landslides (and other forms of slope instability), and strong winds. These are the natural hazards that are covered in most detail in this document, given that it is possible to minimize the losses that result from these hazards through careful planning and community participation in the implementation of hazard reduction measures.

Why Develop a Local Natural Hazards Mitigation Plan?

As the costs of damage from natural disasters continue to increase, communities realize the importance of identifying effective ways to reduce their vulnerability to disasters. Hazard mitigation plans assist communities in reducing their risk from natural hazards by identifying resources, information, and strategies for risk reduction, while helping to guide and coordinate mitigation activities throughout the area. With these aims in mind, the City of Newport Beach completed its first Natural Hazards Mitigation Plan in 2008. Many of the actions contained

therein have been implemented, helping the City be better prepared for future disasters. This update to the City's Hazards Mitigation Plan builds on the original 2008 document, and incorporates those natural disasters that impacted the Southern California area in the last five years, summarizes the mitigation strategies that Newport Beach implemented since 2008 to reduce its vulnerability to natural hazards, and provides a list of new implementation actions that will further prepare the community to resist the impact of potential future natural hazard events.

As with the original 2008 document, this updated Plan provides a set of action items that if implemented can help reduce the risk from natural hazards through education and outreach programs, by fostering the development of partnerships, and by implementing preventive activities (such as land use programs) that limit or guide development in areas at risk from natural hazards. The updated Plan discusses the City's current hazard conditions, and provides actions that are consistent with current City standards and other relevant Federal, State or regional regulations, including FEMA requirements.

The resources and information contained within the Mitigation Plan:

- 1) establish a basis for coordination and collaboration among agencies and the public in the city of Newport Beach,
- 2) identify and prioritize future mitigation projects, and
- 3) assist in meeting the requirements of federal assistance programs.

The Local Natural Hazards Mitigation Plan works in conjunction with other City plans, including the City's Safety Element of the General Plan and the City's Emergency Operations Plan. The updates presented here will be reflected by reference in these other plans and documents.

Section 322 (a-d) of the Federal Disaster Mitigation Act of 2000 (DMA 2000) requires that local governments, as a condition of receiving Federal disaster mitigation funds, have a mitigation plan that:

- 1) describes the hazards, risks and vulnerabilities specific to the community,
- 2) identifies and prioritizes mitigation actions,
- 3) encourages the development of local mitigation, and
- 4) provides technical support for these efforts.

This Local Hazard Mitigation Plan for the City of Newport Beach serves to meet these requirements.

Scope and Impact of the Plan

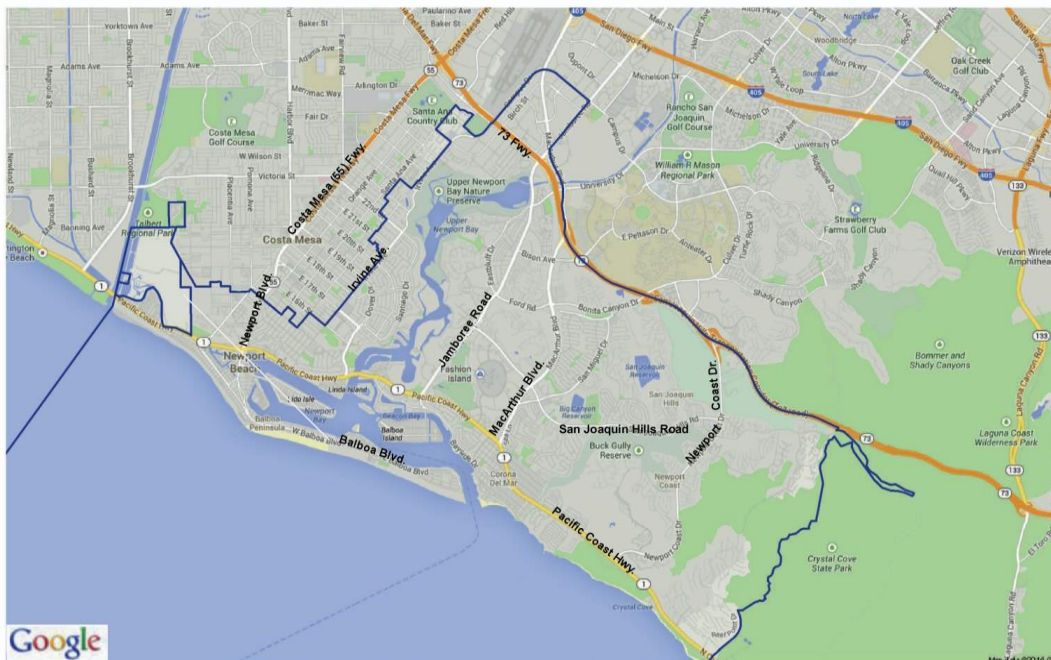
Newport Beach's Local Natural Hazards Mitigation Plan affects the entire City (see Map I-1 below). This Plan provides a framework for planning for the main natural hazards that have the potential to impact the Newport Beach area. The resources and background information in the Plan are applicable City-wide, and the goals and recommendations can lay the groundwork for local mitigation plans and partnerships.

Natural Hazard Land Use Policy in California

Planning for natural hazards should be an integral element of any city's land use planning

program. All California cities and counties are required to have Safety Elements, one of seven mandatory elements of their General Plans, that document the natural hazards specific to the area, and provide the framework by which ordinances to reduce these hazards are implemented. However, Safety Elements are typically updated only once every 15 to 25 years, and are often superseded by other local and statewide planning regulations. With the requirements for Local Hazard Mitigation Plans, the Federal Emergency Management Agency (FEMA) has essentially exported the California municipal Safety Element idea to the rest of the United States, but they also have expanded on it by requiring a more publicly open and economically quantifiable planning process for community disaster reduction, and a process by which the document is reviewed yearly and updated every five years. Safety Elements traditionally emphasize hazard mapping and develop forward-looking land use planning policies to minimize those hazards. FEMA has directed that, following the hazard mapping effort, an emphasis be placed on hazard mitigation policies that are based on quantifiable vulnerability, loss, and risk analysis. FEMA also requires extensive public participation in this process, because they recognize that without public education and citizen buy-in of mitigation needs, it is nearly impossible to mobilize the level of support necessary to fully begin to deal with multi-hazard mitigation over multi-decadal timescales.

Map I-1 – City of Newport Beach; dark blue lines show the City’s boundary.



Source: Google Maps

The continuing challenge faced by local officials and state government is to keep the local hazard mitigation plans effective in responding to the changing conditions and needs of California’s diverse and growing communities without forgetting the effect that low-probability but high-risk natural events (such as major earthquakes, which can skip entire generations and are therefore likely to be dismissed over time) can have on the built environment. This is particularly true in the case of planning for natural hazards where communities must balance development pressures with detailed information on the nature and extent of hazards. Planning for natural hazards therefore calls for local plans to include inventories, policies, and ordinances to guide

the safe development of areas that history shows can be greatly impacted by infrequent but large-magnitude natural hazard events. These inventories should include the compendium of hazards facing the community, the built environment at risk, the personal property that may be damaged by hazard events, and most of all, the people who live in the shadow of these hazards.

Support for Natural Hazard Mitigation

All mitigation is local, and the primary responsibility for the development and implementation of risk reduction strategies and policies lies with local jurisdictions. Local jurisdictions, however, are not alone. Partners and resources exist at the regional, State and Federal levels. Numerous California and Federal agencies have a role in the research and public education about natural hazards and in natural hazard mitigation. Some of these key agencies include:

- ◆ The California Governor's Office of Emergency Services (Cal OES) is responsible for disaster mitigation, preparedness, response, recovery, and the administration of federal funds after a major disaster declaration. Publications by the Cal OES, including tsunami mapping released by Cal OES for the Orange County coastline were used for the Flood section of this study.
- ◆ The Southern California Earthquake Center (SCEC) gathers information about earthquakes, integrates this information on earthquake phenomena, and communicates this to end-users and the general public to increase earthquake awareness, reduce economic losses, and save lives. Many publications, research data and website information provided by SCEC were used in the Earthquake section of this report.
- ◆ The California Division of Forestry and Fire Protection (CalFire) is responsible for all aspects of wildland fire protection on state lands, and administers forest practices regulations on non-federal lands. The Wildfire section of the Plan relies extensively on data provided by and available from the CalFire website.
- ◆ The California Geological Survey (CGS) and the U.S. Geological Survey (USGS) are responsible for geologic hazard characterization, public education, and the development of partnerships aimed at reducing risk. The Earthquake and Landslide Hazards sections of the Plan utilized maps, publications and consensus reports issued by the California Geological Survey and the U.S. Geological Survey.
- ◆ The California Division of Water Resources (DWR) plans, designs, constructs, operates, and maintains the State Water Project; regulates dams; provides flood protection; and assists in emergency management. It also educates the public, and serves local water needs by providing technical assistance. Dam inundation maps and other data prepared and/or administered by the DWR and other departments under the DWR were used in the Floods section of the Plan.
- ◆ The National Oceanic and Atmospheric Administration (NOAA) keeps records of storms and other natural hazard events for all regions of the United States. The NOAA database was used extensively in the Flood, Wildfire and Windstorm sections of this Plan.

Information provided by all of these agencies was used extensively in the preparation of this document. Specific publications and webpages authored by these agencies that were referenced during the preparation of this Plan are identified in the appropriate section and are listed in

Appendix I: References.

Plan Methodology

Guidelines and Requirements for Mitigation Plans

Following are the Federal requirements for approval of a Natural Hazard Mitigation Plan:

- ◆ Open public involvement, with public meetings that introduce the process and project requirements.
- ◆ The public must be afforded opportunities for involvement in identifying and assessing risk, drafting a Plan, and public involvement in approval stages of the Plan.
- ◆ Community cooperation, with opportunity for other local government agencies, the business community, educational institutions, and non-profits to participate in the process.
- ◆ Incorporation of local documents, including the City's General Plan, the Zoning Ordinance, the Building Codes, and other pertinent documents.

The following components must be part of the planning process:

- ◆ Complete documentation of the planning process;
- ◆ A detailed risk assessment on hazard exposures in the community;
- ◆ A comprehensive mitigation strategy, which describes the goals and objectives, including proposed strategies, programs and actions that can be implemented to reduce or minimize long-term vulnerabilities;
- ◆ A plan maintenance process, which describes the method and schedule of monitoring, evaluating and updating the Plan and integration of the Hazard Mitigation Plan into other planning mechanisms;
- ◆ Formal adoption by the City Council; and
- ◆ Plan review by both FEMA and Cal OES.

These requirements are spelled out in greater detail in the following sections of the Plan and supporting documentation.

Information in the Mitigation Plan is based on research from a variety of sources, with emphasis on data previously collected by the consultant for the City's 2008 Disaster Mitigation Plan and a Hazards Assessment Study that was the basis for the City's current Safety Element of the General Plan. The consultant was helped on this effort by staff from the City of Newport Beach, who conducted data research, facilitated steering committee meetings and public workshops, and developed the final Local Hazard Mitigation Plan. The research methods and various contributions to the Plan are discussed further below.

Input From the Advisory Committee

The Hazard Mitigation Advisory Committee guided the development and update of the Mitigation Plan, and played an integral role in developing the mission, goals, and action items. The committee consisted of representatives from the following agencies in the City of Newport Beach:

- ✓ City of Newport Beach Fire Department, Emergency Services Division
- ✓ City of Newport Beach Fire Department
- ✓ City of Newport Beach Municipal Operations Department
- ✓ City of Newport Beach Community Development Department, and
- ✓ City of Newport Beach Public Works Department.

Input on specific sections of the Plan was also provided by representatives from the following agencies and private organizations:

- ✓ City of Newport Beach Police Department
- ✓ City of Newport Beach Information Services – GIS Division
- ✓ City of Newport Beach Harbor Resources Division
- ✓ City of Newport Beach Finance Department
- ✓ City of Newport Beach Library Department, and
- ✓ Hoag Memorial Presbyterian Hospital.

Hazard Specific Research

Newport Beach's consultant and staff collected data and compiled research on the natural hazards that have impacted the Southern California area historically, and identified five hazards that have the potential to cause the most damage in the City. These include earthquakes, wildfires, flooding, landslides, and windstorms. Research materials used include publications by federal agencies such as FEMA, USGS and NOAA; state agencies such as CGS, Cal OES and CalFire; the City of Newport Beach's Safety Element, and other sources. The City's consultant conducted research by referencing historical local sources, interviewing long-time City of Newport Beach employees, who provided invaluable data regarding past local disasters, and locating information specific to the City of Newport Beach in historical documents.

City of Newport Beach's staff proposed and then evaluated the feasibility and potential effectiveness of the mitigation activities, resources and programs, and potential action items based on their experience in implementing the action items in the Safety Element and the 2008 Disaster Mitigation Plan, and from feedback from stakeholder interviews.

Public Participation Process and Stakeholder Interviews

City staff has conducted interviews with individuals and specialists from organizations interested in natural hazards planning since June 2002, when the process of preparing the Safety Element of the General Plan began. The Safety Element was adopted in July 2006 after a comprehensive planning process that included public input in the form of community open-house meetings, and presentations to the public and City and County officials. Input regarding the draft document was also obtained from the Orange County Fire Authority, the California Department of Conservation – California Geological Survey, and the State Board of Forestry and Fire Protection.

The Final Draft of the 2008 Plan was placed on the City's Wide Web site the first week of April 2008, and feedback was sought from each reviewer. The Emergency Services Division printed

and gave hardcopies of the Draft Plan to individuals who did not have access to the internet but expressed interest in reviewing the Plan. A hardcopy of the Draft Plan was also available at the front desk of the Fire Department's main office. Three public workshops to present the Plan and seek input regarding the contents of the Plan, with emphasis on the Goals and Action Items, were held in April 2008. Various residents and volunteers from the City's Community Emergency Response Team were present at these meetings. The workshops included a PowerPoint presentation summarizing the objective of the plan, and preliminary findings regarding the natural hazards identified. Poster-sized images of the maps prepared for the Plan were placed around the room for easy viewing by the participants. Input received from the attendees was taken into consideration when preparing the final document. Once the Plan was adopted by City Council, the final document has been available on the City's website and at City Hall.

City staff also participated extensively in the 2014 Plan Update; several individuals that worked on the 2008 Plan also participated in the 2014 effort. The consultant met with the Advisory Committee on various occasions to discuss the report update, with emphasis on the action items and implementation measures. Those action items covered in the 2008 report that have since been implemented were identified. Other action items that in 2008 were labeled for long-term implementation were reviewed to determine whether or not the City wants to implement them during the next five years, possibly upgrading them to the short-term implementation list, and new action items were identified and discussed. The final list of action items identified for the 2014 Plan update were then prioritized and assigned a responsible agency. After the Draft Plan Update was submitted for comments by City staff, a Public Workshop was held at the City's Main Library to present the Plan data to the public and obtain feedback on the Plan and request suggestions on the action items. Several other people also provided input directly to Ms. Katie Eing, the City's Emergency Services Coordinator.

For the 2014 Update, poster-sized images of the hazard maps were posted at a booth during the City's Disaster Preparedness Fair held at and outside the City's Main Library on September 14-15, 2013, and on September 13-14, 2014. A Public Workshop that included a PowerPoint presentation and posting of the hazard maps was conducted May 7, 2014 at the City's Main Library. Comments from the public were encouraged and received at the meeting, and also via e-mail, in response to the meeting announcements sent out by the City's Emergency Services Coordinator. Additional information regarding these community meetings is provided in Appendix B. The 2014 Plan Update was also posted on the City's website for review by interested residents. Comments were encouraged, with a link allowing for residents to forward their comments directly to the City's Emergency Services Coordinator.

Plan Structure

The resources and information cited in the Hazard Mitigation Plan provide a strong local perspective and help identify strategies and activities to make City of Newport Beach more disaster-resilient.

Each section of the Local Natural Hazards Mitigation Plan provides information and resources to assist City staff and the public in understanding the hazard-related issues facing Newport Beach's citizens, businesses, and the environment. Combined, the sections of the Plan work together to create a document that guides the mission to reduce risk and prevent loss from future natural hazard events.

The structure of the Plan enables the user to refer to specific sections of interest to him or her.

It also allows City government to review and update sections when new data become available. The ability to update individual sections of the Hazard Mitigation Plan places less of a financial burden on the City. Decision-makers can allocate funding and staff resources to selected pieces in need of review, thereby avoiding a full update, which can be costly and time-consuming. New data can be easily incorporated, resulting in a Local Hazards Mitigation Plan that remains current and relevant to the City of Newport Beach.

Newport Beach's Local Hazard Mitigation Plan is organized in three volumes. Volume I contains the Executive Summary followed by Sections 1 through 5: Introduction, Community Profile, Risk Assessment, Goals and Action Items, and Plan Maintenance. Sections 1 through 5 were modified the most during this 2014 update. Volume II contains the five natural hazard sections (Sections 6 through 10) and Volume III includes the appendices. Updates to these volumes include additions summarizing natural hazard events that impacted the southern California area and Newport Beach in the five-year period between 2008 and 2014, and changes or updates to the regulations issued by both the Federal and State governments aimed at reducing the impact of natural hazards. The Wildfire Hazards section in particular was updated significantly. Section 4 is completely new, presenting the action items that the City has prioritized for possible implementation during the five-year period between 2014 and 2019. The Public Participation section in Appendix B was completely re-done to describe the meetings, presentations and workshops conducted as part of this update. Each section of the Plan is described further below.

Volume I: Mitigation Action Plan

Executive Summary: Five-Year Action Plan

The Five-Year Action Plan provides an overview of the Hazard Mitigation Plan's mission, goals, and action items.

Section 1: Introduction

The Introduction describes the background and purpose of developing the Local Natural Hazard Mitigation Plan for the City of Newport Beach.

Section 2: Community Profile

This section presents the history, geography, demographics, and socioeconomics of the City of Newport Beach, with emphasis on the most recently available census data. This section serves as a tool to provide an historical perspective of natural hazards in the City, and a springboard to understand how natural hazards can impact the City in the future.

Section 3: Risk Assessment

This section provides information on hazard identification, vulnerability and risk associated with natural hazards in the City of Newport Beach.

Section 4: Multi-Hazard and Hazard-Specific Goals and Action Items

This section is the "Policy Document" that enumerates the specific action items that Newport Beach will undertake to further reduce its risk to the natural hazards described in Volume II of the document.

Section 5: Plan Maintenance

This section provides information on Plan implementation, monitoring and evaluation, and lists the action items and hazard-reduction activities completed by the City in the

past five years (2008-2013).

Volume II: Hazard Specific Information

Hazard-specific information on five natural hazards is addressed in this Plan. Chronic hazards, such as flooding, occur with some regularity and may be forecast through historic evidence and scientific methods. Catastrophic hazards do not occur with the frequency of chronic hazards, but notwithstanding, they can have devastating impacts on life, property, and the environment. In Southern California, because of its geology and terrain, earthquakes, floods, wildfires, landslides and windstorms have the potential to be catastrophic as well as chronic hazards.

The hazards addressed in the Plan include:

- Section 6: Earthquakes** (including Ground Shaking, Fault Rupture, Liquefaction, and Earthquake-induced Landslides, and Loss Estimations as a result of several plausible earthquake scenarios)
- Section 7: Floods** (including Mudflows, Catastrophic Inundation due to Failure of Reservoirs, Coastal Flooding due to Storms, Tsunamis, Rogue Waves, and Sea Level Rise)
- Section 8: Wildfires** (and Fires After an Earthquake)
- Section 9: Landslides**
- Section 10: Windstorms** (including Santa Ana winds, Tornadoes, Microbursts and Microbursts)

Each of the hazard-specific sections includes information on the history, hazard causes and characteristics, hazard and vulnerability assessment, risk analysis, and local, state, and national resources available to mitigate or reduce the impact of these hazards. Goals and action items aimed at reducing these hazards are provided in Section 4.

Volume III: Resources

The Plan appendices are designed to provide users of Newport Beach's Local Natural Hazards Mitigation Plan with additional information to assist them in understanding the contents of the Mitigation Plan, and potential resources to assist them with implementation.

Appendix A: Plan Resource Directory

This appendix provides a resource directory, which includes City, regional, State, and national resources and programs that may be of technical and/or financial assistance to the City of Newport Beach during Plan implementation.

Appendix B: Public Participation Process

This appendix includes specific information on the various public processes used during development of the 2014 Plan Update.

Appendix C: Benefit Cost Analysis

This appendix describes FEMA's requirements for benefit cost analysis in natural hazards mitigation, as well as various approaches for conducting economic analysis of proposed mitigation activities.

Appendix D: List of Acronyms

This appendix provides a list of acronyms for City, regional, state, and federal agencies and organizations that may be referred to within Newport Beach's Local Natural Hazards Mitigation Plan.

Appendix E: Glossary

This appendix provides a glossary of terms used throughout the Plan.

Appendix F: California Disasters

This appendix lists major California disasters since 1950. This list was updated to include events that occurred since 2008, and as of the writing of this document.

Appendix G: List of Dams

This appendix provides a list of major dams and reservoirs in Orange County, including new reservoirs that have been built since 2008.

Appendix H: Maps

This appendix contains the maps referenced throughout the Plan. All maps in the 2014 Update were revised to include areas incorporated by the City since 2008.

Appendix I: References

This appendix lists the references (plans, studies, technical reports and websites) used in the preparation of the Plan.

Appendix J: Plan Adoption

Documentation regarding the formal adoption of the 2008 Plan and 2014 Plan Update.

Changes from the 2008 Plan

Several sections of the 2014 Plan Update have been modified from the original 2008 Plan. Changes made to specific sections of the Plan are summarized further below.

Section 1: Summarizes the process by which the 2014 Plan was created, with emphasis on the review process and the opportunities provided for City Staff and the public to review and provide feedback on the document.

Section 2: The population and demographics sections were completely revised by the City's Community Development Department, Planning Division, to reflect the 2010 Census data findings, with modifications, as available, from U.S. Census Bureau 2012 estimates. All maps presented in the 2014 Update were modified to include those areas that were incorporated into the City since 2008.

Section 3: This section of the Plan was enhanced to identify in table format those natural hazards that the Advisory Committee agreed pose a potential hazard to the City, with rankings for probability of occurrence and potential level of risk. This section also identifies the critical facilities in the City and their vulnerability to the various natural hazards described in the Plan.

Section 4: The Action Items portion has been completely revised and updated to present the mitigation measures that the City has identified as current priorities in its effort to reduce its risk to natural hazards. The action items are classified into three groups as follows: 1) action items that are already being implemented on an on-going basis, as part of the development or re-development process; 2) action items to be implemented in the short-term, that is, the next 5-year cycle (2015-2019); and 3) long-term action items that the City is considering for implementation in the next approximately 10 years.

Section 5: This section was completely updated to discuss how the Plan will be maintained in the next 5 years, and how progress on natural hazard reduction efforts will be measured. This section also identifies those action items listed in the 2008 Plan that have already been completed.

Section 6: The Earthquake section was updated to describe the more recent earthquake events that impacted the Southern California area between 2008 and 2014, and to summarize the latest scientific findings regarding the faults offshore Newport Beach that could cause an earthquake in the area. The loss estimation section using HazUS was not updated from the 2008 report as the population figures between 2000 and 2010 did not change significantly.

Section 7: The Flood section was updated to describe the storms and tsunamis that resulted in localized flooding in the Orange County region between 2008 and 2014. The section also discusses in more detail the hazard of sea-level rise and its potential impact on the City. Finally, the risk analysis portion was expanded significantly to describe the critical facilities, essential facilities and infrastructure in Newport Beach that are vulnerable to the hazard of flooding, and activities being implemented by the City, County of Orange and other agencies to mitigate these hazards.

Section 8: The Wildfire section was updated significantly from the 2008 version. Significant wildfires that have occurred in the Southern California region between 2008 and 2014 were added. The regulatory context and Federal, State and local programs that have been developed to mitigate the hazard of wildfires are discussed extensively with an emphasis on how these programs apply to and are being implemented in Newport Beach.

Section 9: The text of the Landslides section were not modified significantly from the 2008 report, but the Slope Distribution Map (Map 9-2) and the Slope Instability Map (Map 9-3) were completely redone in response to comments from a resident with geotechnical background that requested these maps reflect the latest development in the City. As a result, the City provided us with a 2007 digital topographic map of Newport Beach that we processed and converted to a Digital Elevation Model (DEM). Slope gradients in the eastern portion of the City have changed substantially as a result of grading operations, which in turn has reduced the potential for slope instability in this area. The new maps reflect this.

Section 10: Significant windstorms, tornadoes and funnel clouds that have been reported in Orange County between 2008 and 2014 were added to the appropriate tables in this section.

All **Appendices** were updated as needed to reflect the most current information, with emphasis on changes made between 2008 and 2014.