

Table of Contents

OREGON NATURAL HAZARDS MITIGATION PLAN.....	3
ACKNOWLEDGMENTS	4
STATE OF OREGON PROMULGATION.....	7
FEDERAL EMERGENCY MANAGEMENT AGENCY APPROVAL.....	8
EXECUTIVE SUMMARY	10
Introduction.....	10
Risk Assessment	11
Mitigation Strategy.....	23
Planning Process.....	30
Enhanced Plan	31
TABLE OF CONTENTS.....	32
LIST OF FIGURES	37
LIST OF TABLES	44
Chapter 1 INTRODUCTION TO THE PLAN.....	60
1.1 BACKGROUND	60
1.2 PLAN STRUCTURE	61
1.3 STANDARD PLAN	62
1.3.1 Risk Assessment	62
1.3.2 Mitigation Strategy.....	64
1.3.3 Planning Process.....	64
1.4 ENHANCED PLAN	64
Chapter 2 RISK ASSESSMENT	65
IN THIS CHAPTER	65
2.1 INTRODUCTION	67
2.1.1 Overview.....	70
2.1.2 2020 Risk Assessment Methodology.....	81
2.1.3 Social Vulnerability	111
2.1.4 Introduction to Climate Change	114
2.1.5 State-Owned/Leased Facilities, State Critical Facilities, and Local Critical Facilities Potential Loss Assessment.....	130
2.1.6 Seismic Transportation Lifeline Vulnerabilities	140
2.1.7 Cultural Resources.....	158
2.2 STATE RISK ASSESSMENT.....	163
2.2.1 Coastal Hazards	164
2.2.2 Droughts	194

- 2.2.3 Earthquakes..... 207
- 2.2.4 Extreme Heat..... 237
- 2.2.5 Floods 255
- 2.2.6 Landslides 296
- 2.2.7 Tsunamis..... 314
- 2.2.8 Volcanoes 329
- 2.2.9 Wildfires 355
- 2.2.10 Windstorms 383
- 2.2.11 Winter Storms 394
- 2.3 REGIONAL RISK ASSESSMENTS 413
 - 2.3.1 Region 1: Oregon Coast..... 416
 - 2.3.2 Region 2: Northern Willamette Valley / Portland Metro..... 567
 - 2.3.3 Region 3: Mid/Southern Willamette Valley 695
 - 2.3.4 Region 4: Southwest Oregon..... 827
 - 2.3.5 Region 5: Mid-Columbia 947
 - 2.3.6 Region 6: Central Oregon 1083
 - 2.3.7 Region 7: Northeast Oregon..... 1214
 - 2.3.8 Region 8: Southeast Oregon..... 1330

Chapter 3 MITIGATION STRATEGY 1449

- IN THIS CHAPTER 1449
- 3.1 INTRODUCTION 1450
- 3.2 MISSION, VISION, AND GOALS 1450
 - 3.2.1 Goals: Review and Revision..... 1451
 - 3.2.2 Goals: Linking the Risk Assessment and Mitigation Actions 1454
- 3.3 MITIGATION ACTIONS 1455
 - 3.3.1 Identification, Evaluation, and Prioritization..... 1455
 - 3.3.2 Changes in Mitigation Action Priorities..... 1456
 - 3.3.3 Funding Sources for Mitigation Actions 1457
 - 3.3.4 Mitigation Action Tables 1457
 - 3.3.5 Mitigation Successes 1534
- 3.4 CAPABILITY ASSESSMENT 1568
 - 3.4.1 State Capability Assessment..... 1568
 - 3.4.2 Local Capability Assessment..... 1639
- 3.5 COORDINATING STATE AND LOCAL MITIGATION PLANNING 1670
 - 3.5.1 Funding and Technical Assistance 1670
 - 3.5.2 Prioritizing Local Jurisdictions for Mitigation Funding 1686
 - 3.5.3 Benefit-Cost Analysis of Natural Hazard Mitigation Projects..... 1689

3.6 LOCAL PLAN INTEGRATION.....	1692
3.6.1 State Review of Local Mitigation Plans	1692
3.6.2 Linking State and Local NHMPs	1694
Chapter 4 PLANNING PROCESS	1697
IN THIS CHAPTER	1697
4.1 INTRODUCTION	1698
4.2 DEVELOPING THE 2020 PLAN	1699
4.2.1 Participants and Coordination.....	1699
4.2.2 The Planning Process.....	1702
4.2.3 Revisions to the 2015 Oregon Natural Hazards Mitigation Plan.....	1706
4.3 MAINTAINING THE PLAN	1708
4.3.1 Analysis of the 2015 Plan Maintenance Process.....	1708
4.3.2 Monitoring, Evaluating, and Updating the 2020 Plan	1709
Chapter 5 ENHANCED PLAN	1713
IN THIS CHAPTER	1713
5.1 INTRODUCTION	1714
5.2 COMPLIANCE WITH STANDARD PLAN.....	1714
5.3 INTEGRATION WITH OTHER PLANNING INITIATIVES.....	1714
5.4 PROJECT IMPLEMENTATION CAPABILITY	1714
5.4.1 Established Eligibility Criteria & Ranking System for Multi-Hazard Mitigation Measures	1714
5.4.2 Benefit-Cost Analysis of Natural Hazard Mitigation Projects.....	1715
5.4.3 Program Management Capability	1715
5.4.4 Monitoring Mitigation Measures and Project Closeouts	1715
5.5 MITIGATION ACTION ASSESSMENT.....	1715
5.6 EFFECTIVE USE OF AVAILABLE MITIGATION FUNDING	1716
5.6.1 Current and Potential Funding	1716
5.6.2 Funding Used to Implement Mitigation Actions	1716
5.7 COMMITMENT TO A COMPREHENSIVE MITIGATION PROGRAM	1717
5.7.1 Capacity Building	1717
5.7.2 Executive Actions.....	1717
5.7.3 Non-Federal Match	1717
5.7.4 Building Code.....	1717
5.7.5 Critical/Essential Facilities	1718
5.7.6 Integration with Post-Disaster Recovery Operations.....	1718

Chapter 6 ACRONYMS and ABBREVIATIONS 1719

Chapter 7 GLOSSARY 1731

Chapter 8 REFERENCES 1736

Chapter 9 APPENDICES 1755

9.1 RISK ASSESSMENT..... 1755

9.1.1 Wildfire: Conflagration Fires 2015–2019 1755

9.1.2 Wildfire: West Wide Wildfire Risk Assessment Project Summary Statistics
of Published Results by State: Oregon 1755

9.1.3 Wildfire: West Wide Wildfire Risk Assessment Final Report–Addendum VI,
County Risk Summaries: Oregon 1755

9.1.4 Windstorm: Information on 1931 Dust Storm 1755

9.1.5 Recognizing Tree Risk 1755

9.1.6 Average Observed Snowfall at Various Oregon Weather Stations 1755

9.1.7 Winter Storm: Reducing Ice Storm Damage to Trees 1755

9.1.8 2020 Statewide Loss Estimates: State-Owned/Leased Facilities and Critical
Facilities Table (Excel)..... 1756

9.1.9 2020 Statewide Loss Estimates: Local Critical Facilities Table (Excel)..... 1756

9.1.10 Statewide Loss Estimates: State-owned Critical and Essential Facilities
Loss Estimates Table (PDF) 1756

9.1.11 Statewide Loss Estimates: Local Critical and Essential Facilities Loss
Estimates Table 1756

9.1.12 Statewide Loss Estimates: Historic Resources..... 1756

9.1.13 Statewide Loss Estimates: Archaeological Resources 1756

9.1.14 Oregon Highways Seismic Plus Report, Oregon DOT October 2014 1756

9.1.15 Statewide Loss Estimates: Oregon Highways Seismic Options Report 1756

9.1.16 Statewide Loss Estimates: Seismic Lifelines Evaluation, Vulnerability
Synthesis, and Identification 1756

9.1.17 2019 Threat and Hazard Identification and Risk Assessment (THIRA)
Executive Summary 1756

9.1.18 Oregon Risk Assessment: A New Model, Final Report 1757

9.1.19 OEM Hazard Analysis Methodology 1757

9.1.20 Oregon Climate Assessment Report..... 1757

9.1.21 Fourth Oregon Climate Assessment Report (2019) 1757

9.1.22 2013 Northwest Climate Assessment Report 1757

9.1.23 2020 Climate Change Adaptation Framework, Review Draft, August 12,
2020: Do not cite or quote. 1757

9.1.24 Oregon Climate Change Workshop Summary Report (Fall 2019)..... 1757

9.1.25 2013 CREW Cascadia Subduction Zone Scenario 1757

9.1.26	High-Resolution Natural Hazard Maps Showing State-Owned/Leased Facilities and Critical/Essential Facilities	1758
9.2	MITIGATION STRATEGY	1759
9.2.1	Mitigation Action Prioritization Survey #1 – Results.....	1759
9.2.2	Mitigation Action Prioritization Survey #2 – Results.....	1759
9.2.3	Oregon Resilience Plan.....	1759
9.2.4	Resilience Task Force Report to the Oregon Legislature.....	1759
9.2.5	Resiliency 2025: Improving Our Readiness for the Cascadia Earthquake and Tsunami	1759
9.2.6	Incorporating Green Infrastructure and Low Impact Development into the Ashland Hazard Mitigation Plan	1759
9.3	PLANNING PROCESS	1759
9.3.1	Comments and Responses: Draft Risk Assessment, June 2020	1759
9.3.2	Comments and Responses: Draft Mitigation Strategy, July 2020	1759

List of Figures

Figure 1-1.	The Oregon NHMP as a Component of the Oregon Emergency Management Plan.....	61
Figure 1-2.	Oregon NHMP Natural Hazards Regions.....	63
Figure 2-1.	Understanding Risk.....	67
Figure 2-2.	Oregon NHMP Natural Hazards Regions.....	69
Figure 2-3.	Coastal Hazards Risk by Region	86
Figure 2-4.	Coastal Hazards Risk by County	86
Figure 2-5.	Earthquake Hazard Risk by Region	89
Figure 2-6.	Earthquake Hazard Risk by County	89
Figure 2-7.	Flood Hazard Risk by Region	92
Figure 2-8.	Flood Hazards Risk by County	92
Figure 2-9.	Landslide Hazard Risk by Region.....	95
Figure 2-10.	Landslide Hazards Risk by County.....	95
Figure 2-11.	Tsunami Hazard Risk by Region	97
Figure 2-12.	Tsunami Hazards Risk by County	97
Figure 2-13.	Volcanic Hazard Risk by Region	100
Figure 2-14.	Volcanic Hazard Risk by County	100
Figure 2-15.	Wildfire Hazard Risk by Region	103
Figure 2-16.	Wildfire Hazard Risk by County	103
Figure 2-17.	Seven Hazards Combined Risk by Region	107
Figure 2-18.	Seven Hazards Combined Risk by County.....	107
Figure 2-19.	CDC Social Vulnerability Themes and Components	111
Figure 2-20.	Observed, Simulated, and Projected Changes in Oregon’s Mean Annual (a) Temperature and (b) Precipitation from the Baseline (1970–1999) for RCP 4.5 and RCP 8.5 Scenarios	117
Figure 2-21.	Projected Extreme Precipitation Event Frequency for the 2-day duration and 5-year return interval event for the Northwest under RCP 4.5 and RCP 8.5 Scenarios	120
Figure 2-22.	Average Number of Hot Days Per Year for 1971–2000 (left) and Projected Change by 2040–2069 under RCP 8.5 (right).....	121
Figure 2-23.	Statewide Distribution of State-Owned/Leased Facilities and State Critical Facilities.....	133
Figure 2-24.	Statewide Distribution of Local Critical Facilities	134
Figure 2-25.	ODOT Seismic Plus Programs State Highway Network Program Phases	142
Figure 2-26.	Oregon Seismic Lifeline Routes (OSLR) Geographic Zones	145
Figure 2-27.	Preliminary Oregon Seismic Lifeline Routes (OSLR), by Tier	149
Figure 2-28.	Preliminary Seismic Lifeline Routes and Seismic Acceleration	153
Figure 2-29.	Erosion at The Capes Condominiums, Oceanside, Oregon	164
Figure 2-30.	A) Emergency Riprap Being Placed in Front of a Home at Gleneden Beach, Following a Recent Bluff Failure (February 2013). B) Homes Being Inundated with Excess Sand during a Strong Wind Event in November 2001.....	165
Figure 2-31.	Oregon’s Coastal Geomorphology and Littoral Cells	167
Figure 2-32.	(A) Houses Line the Cliff at Fogarty Creek in Lincoln County. (B) Extensive Erosion along the Dune-Backed Beaches in Neskowin Have Resulted in the Construction of Massive Riprap	168
Figure 2-33.	Patterns of Sediment Transport During “Normal” and El Nino Years	170
Figure 2-34.	Average Monthly Tides for the Yaquina Bay Tide Gage	171
Figure 2-35.	Long- and Short-Term Shoreline Change Rates for the Tillamook County Region.....	173
Figure 2-36.	Alea Bay Spit Erosion.....	174
Figure 2-37.	Bluff Failure Due to Toe Erosion by Ocean Waves.....	175
Figure 2-38.	Landslide Movement Affecting U.S. Highway 101 at Hooskanaden Creek on March 3, 2019. Inset Photo Shows the Overall Scale of the Landslide and Its Proximity to the Coast	176
Figure 2-39.	Coast Variations in Rates of Tectonic Uplift, and Relative Sea Level Trends for the Oregon Coast.....	178
Figure 2-40.	Projected Future Changes in Regional Sea Levels on the Oregon Coast.....	180
Figure 2-41.	Example Map Product Showing Erosion Hazard Zones Developed for Rockaway Beach in Tillamook County	185
Figure 2-42.	Oregon Average Annual Precipitation, 1981–2010	195
Figure 2-43.	Water Year Standard Precipitation-Evapotranspiration Index (SPEI) for Oregon	196
Figure 2-44.	August 25, 2015 U.S. Drought Monitor Report for Oregon	198
Figure 2-45.	Earthquake Monitoring Stations in the Pacific Northwest	208
Figure 2-46.	Annual Rate of Earthquake Occurrence in Oregon, in 5-Year Increments.....	209
Figure 2-47.	Deep Sea Sediment Cores that Record Past Megathrust Earthquakes off the Oregon Coast	210

Figure 2-48.	General Source Areas for Subduction Zone, Crustal Earthquakes, and Intraplate Earthquakes	211
Figure 2-49.	Comparison of the Northern Japan Subduction Zone in and the Cascadia Subduction Zone.....	212
Figure 2-50.	Comparison of Measured Shaking from Tohoku Earthquake and Simulated Shaking from M9 Cascadia Megathrust Earthquake.....	215
Figure 2-51.	Simulated Shaking from M6.0 Crustal Earthquake on the Portland Hills Fault.....	216
Figure 2-52.	Soils Map Showing Where Soils Can Amplify Earthquake Ground Shaking	217
Figure 2-53.	Liquefaction Susceptibility Map.....	218
Figure 2-54.	Liquefaction Probability Map.....	218
Figure 2-55.	Lateral Spreading Map.....	219
Figure 2-56.	Expected Displacement Map	219
Figure 2-57.	Surface Faulting Identified with Lidar Data	222
Figure 2-58.	Probability of experiencing shaking of Modified Mercalli Intensity VI or greater during the next 100 years	223
Figure 2-59.	2020 Oregon Earthquake Probability Ranking Based on Mean County Value of the Probability of Damaging Shaking and Presence of Newly Discovered Faults (Figure 2-57 and Figure 2-58)	224
Figure 2-60.	Draft Hazus Results from the 2011 FEMA Analytical Baseline Study for the Cascadia Earthquake and Tsunami	230
Figure 2-61.	NOAA National Weather Service Heat Index	238
Figure 2-62.	Frequency of Days April–October with Heat Index $\geq 90^{\circ}\text{F}$ in Historic (1971–2000, top) and Future (2040– 2069, bottom) Periods under RCP 8.5	239
Figure 2-63.	Relative Probability of Extreme Heat.....	243
Figure 2-64.	Portland, Oregon’s Urban Heat Islands, the Parts of the City That See Hotter Temperatures in Heat Waves	245
Figure 2-65.	Cooling Zones	249
Figure 2-66.	Channel migration screening overview map of Oregon showing major rivers with low (yellow), moderate (green), and high (red) susceptibility.....	259
Figure 2-67.	State-Regulated High Hazard Dams Not Meeting Safety Standards	293
Figure 2-68.	Statewide Landslide Inventory	296
Figure 2-69.	Common Types of Landslides in Oregon.....	299
Figure 2-70.	Visual Comparison of Five Remote Sensing Data Sets	303
Figure 2-71.	Statewide Landslide Information Database for Oregon, Release 2	305
Figure 2-72.	Example of a Lidar-Based Landslide Inventory (Oregon City, Oregon)	306
Figure 2-73.	Example of an Earthquake-Induced Landslide Susceptibility Map	307
Figure 2-74.	How Data Sets Are Combined to Create Final Landslide Susceptibility Zones.....	308
Figure 2-75.	Generation of a Tsunami by Subduction Zone Earthquakes	314
Figure 2-76.	Cascadia Subduction Zone (CSZ) Active Fault Map	315
Figure 2-77.	Tsunami Damage on the Chetco River, Oregon from the Tsunami Generated by an Earthquake Offshore Japan in 2011	317
Figure 2-78.	Examples of DOGAMI Tsunami Inundation Maps (TIMs) and Tsunami Evacuation Maps for North Bend (Coos Bay Area).....	319
Figure 2-79.	Occurrence and Relative Size of Cascadia Subduction Zone Megathrust Earthquakes	321
Figure 2-80.	Hypothetical Rupture Patches of Cascadia Subduction Zone (CSZ) Earthquakes over Last 10,000 Years	323
Figure 2-81.	Generalized Subduction Zone Setting.....	330
Figure 2-82.	Eruptions in the Cascade Range During the Past 4,000 Years	331
Figure 2-83.	Oblique Air-View of the Parkdale Lava Flow.....	332
Figure 2-84.	Trees Buried in Volcanic Sediment, Sandy River, Oregon.....	334
Figure 2-85.	Mount St. Helens	335
Figure 2-86.	Probable Geographic Extent of Volcanic Ashfall from Select Volcanic Eruptions in the Pacific Northwest.....	337
Figure 2-87.	Mount Hood Risk Study Project Area	352
Figure 2-88.	Interactive Web Map for Mount Hood Risk Study.....	353
Figure 2-89.	Oregon NHMP Natural Hazards Regions.....	356
Figure 2-90.	Lightning Fires 2010-2019.....	362
Figure 2-91.	Equipment Use Fires 2010-2019.....	363
Figure 2-92.	Recreation Fires 2010-2019	364
Figure 2-93.	Debris Burning Fires 2010-2019.....	365
Figure 2-94.	Juvenile Fires 2010-2019	366
Figure 2-95.	Arson Fires 2010-2019	367
Figure 2-96.	Smoking Fires 2010-2019.....	368
Figure 2-97.	Large Fire Costs & Acres Burned	370
Figure 2-98.	Burn Probability	372

Figure 2-99. Oregon Wildland-Urban Interface (WUI): Wildfire Hazard Ratings	374
Figure 2-100. Projected Change in Frequency of Extreme Fire Danger Days in Summer for 2040–2069 Relative to 1971–2000 under RCP 8.5	377
Figure 2-101. Wildland-Urban Interface	379
Figure 2-102. Quantitative Wildfire Risk Assessment Framework.....	381
Figure 2-103. Overall Wildfire Risk	382
Figure 2-104. Satellite Image of the Type of Severe Pacific Storm that Can Bring High Winds to Western Oregon.....	383
Figure 2-105. Peak Gusts for Windstorm on October 12, 1962	384
Figure 2-106. Unstable Trees Near Electric Lines Left after a Logging Operation.....	385
Figure 2-107. Troutdale Area—December 1996.....	394
Figure 2-108. Shielded Snow Gauge Used in the Pacific Northwest to Register Snowfall, 1917	395
Figure 2-109. Ingredients for a Slab Avalanche	396
Figure 2-110. Rescuing Snowbound Vehicles, Old Oregon Trail Highway between Kamela and Meacham, 1923	407
Figure 2-111. Stranded Motorists on I-5 Southbound at Siskiyou Pass, Late December 2003	407
Figure 2-112. Detroit, Oregon, February 2, 2008, Buried from the 12 Feet of Snow	407
Figure 2-113. Trees Collapse from Weight of the Snow on Oregon 62 near Prospect, February 2, 2008	407
Figure 2-114. Trucks Wait Out Winter Storm	409
Figure 2-115. Oregon NHMP Natural Hazards Regions.....	413
Figure 2-116. Region 1 Major Geographic Features	422
Figure 2-117. Region 1 Ecoregions.....	423
Figure 2-118. Educational Attainment in Region 1	431
Figure 2-119. Median Household Income Distribution in Region 1	433
Figure 2-120. Location Quotients, Employment Change, and Total Employment in Region 1, 2018	444
Figure 2-121. Shift-Share-Analysis of Fastest Growing and Declining Industries in Region 1, 2010-2018.....	446
Figure 2-122. Region 1 Transportation and Population Centers.....	449
Figure 2-123. Liquefied Natural Gas Pipelines in Region 1	452
Figure 2-124. Region 1 Population Distribution.....	461
Figure 2-125. Region 1 Land Use	468
Figure 2-126. Region 1 Land Converted to Urban Uses, 1974–2009	469
Figure 2-127. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Coastal Erosion Zone in Region 1.....	478
Figure 2-128. Standard Precipitation-Evapotranspiration Index for Region 1	483
Figure 2-129. 2020 Oregon Earthquake Probability Ranking Based on Mean County Value of the Probability of Damaging Shaking and Presence of Newly Discovered Faults.....	489
Figure 2-130. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Cascadia Subduction Zone Earthquake Hazard Zone in Region 1.....	496
Figure 2-131. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Flood Hazard Zone in Region 1	513
Figure 2-132. High- and Significant-Hazard Dams, Regulators, and Conditions in Region 1	521
Figure 2-133. Region 1 Dam Hazard Classification.....	524
Figure 2-134. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Landslide Hazard Zone in Region 1	529
Figure 2-135. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Tsunami Hazard Zone in Region 1.....	536
Figure 2-136. Number (A) and Percentage (B) of Residents in the Oregon Regulatory Tsunami Inundation Zone (Wood N. , 2007).....	539
Figure 2-137. Number (A) and Percentage (B) of Residents in the Oregon Regulatory Tsunami Inundation Zone (data from Wood and others, 2015).....	540
Figure 2-138. Fires Caused by Humans and Lightning	545
Figure 2-139. Burn Probability	549
Figure 2-140. Chetco Bar Fire	550
Figure 2-141. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Wildfire Hazard Zone in Region 1	554
Figure 2-142. Overall Wildfire Risk	556
Figure 2-143. Region 2 Major Geographic Features	573
Figure 2-144. Region 2 Ecoregions.....	574
Figure 2-145. Educational Attainment in Region 2	583
Figure 2-146. Median Household Income Distribution in Region 2	585
Figure 2-147. Location Quotients, Employment Change, and Total Employment in Region 2, 2018	596
Figure 2-148. Shift-Share-Analysis of Fastest Growing and Declining Industries in Region 2, 2010-2018.....	599
Figure 2-149. Region 2 Transportation and Population Centers.....	601
Figure 2-150. Liquefied Natural Gas Pipelines in Region 2	605
Figure 2-151. Region 2 Population Distribution.....	613

Figure 2-152. Region 2 Land Use	620
Figure 2-153. Region 2 Land Converted to Urban Uses, 1974–2009	621
Figure 2-154. Standard Precipitation-Evapotranspiration Index for Region 2	625
Figure 2-155. 2020 Oregon Earthquake Probability Ranking Based on Mean County Value of the Probability of Damaging Shaking and Presence of Newly Discovered Faults	631
Figure 2-156. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Cascadia Subduction Zone Earthquake Hazard Zone in Region 2	636
Figure 2-157. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Flood Hazard Zone in Region 2	653
Figure 2-158. High- and Significant-Hazard Dams, Regulators, and Conditions in Region 2	661
Figure 2-159. Region 2 Dam Hazard Classification	663
Figure 2-160. Inventory of Landslide Deposits from Lidar Imagery of the Portland Metro region, Oregon and Washington	665
Figure 2-161. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Landslide Hazard Zone in Region 2	668
Figure 2-162. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Volcanic Hazard Zone in Region 2	675
Figure 2-163. Burn Probability	677
Figure 2-164. Human- and Lightning-Caused Wildfires in Region 2, 1992-2017	678
Figure 2-165. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Wildfire Hazard Zone in Region 2	682
Figure 2-166. Overall Wildfire Risk	684
Figure 2-167. Region 3 Major Geographic Features	701
Figure 2-168. Region 3 Ecoregions	702
Figure 2-169. Educational Attainment in Region 3	711
Figure 2-170. Median Household Income Distribution in Region 3	713
Figure 2-171. Location Quotients, Employment Change, and Total Employment in Region 3, 2018	725
Figure 2-172. Shift-Share-Analysis of Fastest Growing and Declining Industries in Region 3, 2010-2018	727
Figure 2-173. Region 3 Transportation and Population Centers	730
Figure 2-174. Liquefied Natural Gas Pipelines in Region 3	734
Figure 2-175. Region 3 Population Distribution	741
Figure 2-176. Region 3 Land Use	748
Figure 2-177. Region 3 Land Converted to Urban Uses, 1974–2009	749
Figure 2-178. Standard Precipitation-Evapotranspiration Index for Region 3	753
Figure 2-179. Amplification Susceptibility for Region 3	758
Figure 2-180. Relative Liquefaction Hazard for Region 3	759
Figure 2-181. Earthquake Induced Landslide Hazards for Region 3	760
Figure 2-182. 2020 Oregon Earthquake Probability Ranking Based on Mean County Value of the Probability of Damaging Shaking and Presence of Newly Discovered Faults	762
Figure 2-183. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Cascadia Subduction Zone Earthquake Hazard Zone in Region 3	766
Figure 2-184. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Flood Hazard Zone in Region 3	783
Figure 2-185. High- and Significant-Hazard Dams, Regulators, and Conditions in Region 3	792
Figure 2-186. Region 3 Dam Hazard Classification	794
Figure 2-187. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Landslide Hazard Zone in Region 3	798
Figure 2-188. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Volcanic Hazard Zone in Region 3	805
Figure 2-189. Burn Probability	808
Figure 2-190. Human- and Lightning-Caused Wildfires in Region 3, 1992-2017	809
Figure 2-191. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Wildfire Hazard Zone in Region 3	813
Figure 2-192. Overall Wildfire Risk	815
Figure 2-193. Region 4 Major Geographic Features	833
Figure 2-194. Region 4 Ecoregions	834
Figure 2-195. Educational Attainment in Region 4	842
Figure 2-196. Median Household Income Distribution in Region 4	844
Figure 2-197. Location Quotients, Employment Change, and Total Employment in Region 4, 2018	854
Figure 2-198. Shift-Share-Analysis of Fastest Growing and Declining Industries in Region 3, 2010-2018	856
Figure 2-199. Region 4 Transportation and Population Centers	859
Figure 2-200. Liquefied Natural Gas Pipelines in Region 4	863
Figure 2-201. Region 4 Population Distribution	869
Figure 2-202. Region 4 Land Use	875
Figure 2-203. Region 4 Land Converted to Urban Uses, 1974-2009	876
Figure 2-204. Standard Precipitation-Evapotranspiration Index for Region 4	880

Figure 2-205. 2020 Oregon Earthquake Probability Ranking Based on Mean County Value of the Probability of Damaging Shaking and Presence of Newly Discovered Faults 886

Figure 2-206. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Cascadia Subduction Zone Earthquake Hazard Zone in Region 4 890

Figure 2-207. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Flood Hazard Zone in Region 4 906

Figure 2-208. High- and Significant-Hazard Dams, Regulators, and Conditions in Region 4 915

Figure 2-209. Region 4 Dam Hazard Classification..... 917

Figure 2-210. Generalized Geologic Map of Bear Creek Valley, Jackson County, Oregon 918

Figure 2-211. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Landslide Hazard Zone in Region 4 921

Figure 2-212. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Volcanic Hazard Zone in Region 4..... 927

Figure 2-213. Burn Probability 931

Figure 2-214. Human- and Lightning-Caused Wildfires in Region 4, 1992-2017..... 932

Figure 2-215. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Wildfire Hazard Zone in Region 4 936

Figure 2-216. Overall Wildfire Risk 938

Figure 2-217. Region 5 Major Geographic Features 952

Figure 2-218. Region 5 Ecoregions..... 953

Figure 2-219. Educational Attainment in Region 5 964

Figure 2-220. Median Household Income Distribution in Region 5 966

Figure 2-221. Location Quotients, Employment Change, and Total Employment in Region 5, 2018 977

Figure 2-222. Shift-Share-Analysis of Fastest Growing and Declining Industries in Region 5, 2010-2018 979

Figure 2-223. Region 5 Transportation and Population Centers..... 981

Figure 2-224. Liquefied Natural Gas Pipelines in Region 5 985

Figure 2-225. Region 5 Population Distribution 992

Figure 2-226. Region 5 Land Use 999

Figure 2-227. Region 5 Land Converted to Urban Uses, 1974–2009 1000

Figure 2-228. Standard Precipitation-Evapotranspiration Index for Region 5 1004

Figure 2-229. Quaternary Faults and Folds in Region 5 1008

Figure 2-230. Relative Ground Shaking Amplification Hazard in Region 5 1009

Figure 2-231. Relative Liquefaction Susceptibility Hazard in Region 5 1010

Figure 2-232. Relative Earthquake-Induced Landslide Susceptibility Hazard in Region 5..... 1011

Figure 2-233. Selected Earthquakes in Region 5, 1841–2002..... 1012

Figure 2-234. 2020 Oregon Earthquake Probability Ranking Based on Mean County Value of the Probability of Damaging Shaking and Presence of Newly Discovered Faults..... 1015

Figure 2-235. Region 5 Generalized Earthquake Hazard Exposure 1016

Figure 2-236. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in an Earthquake Hazard Zone in Region 5 1020

Figure 2-237. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Flood Hazard Zone in Region 5 1036

Figure 2-238. High- and Significant-Hazard Dams, Regulators, and Conditions in Region 5 1044

Figure 2-239. Region 5 Dam Hazard Classification..... 1046

Figure 2-240. Geology of the Hood River Valley 1047

Figure 2-241. Landslides in the The Dalles, Oregon Area 1049

Figure 2-242. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Landslide Hazard Zone in Region 5 .. 1051

Figure 2-243. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Volcanic Hazard Zone in Region 5.... 1058

Figure 2-244. Burn Probability 1062

Figure 2-245. Human- and Lightning-Caused Wildfires in Region 5, 1992-2017..... 1063

Figure 2-246. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Wildfire Hazard Zone in Region 5 1067

Figure 2-247. Overall Wildfire Risk 1070

Figure 2-248. Region 6 Major Geographic Features 1089

Figure 2-249. Region 6 Ecoregions..... 1090

Figure 2-250. Educational Attainment in Region 6 1100

Figure 2-251. Median Household Income Distribution in Region 6 1102

Figure 2-252. Location Quotients, Employment Change, and Total Employment in Region 6, 2018 1114

Figure 2-253. Shift-Share-Analysis of Fastest Growing and Declining Industries in Region 6, 2010-2018..... 1116

Figure 2-254. Region 6 Transportation and Population Centers..... 1119

Figure 2-255. Liquefied Natural Gas Pipelines in Region 6 1123

Figure 2-256. Region 6 Population Distribution..... 1131

Figure 2-257. Region 6 Land Use 1137

Figure 2-258. Region 6 Land Converted to Urban Uses, 1974-2009 1138

Figure 2-259. Standard Precipitation-Evapotranspiration Index for Region 6 1142

Figure 2-260. 2020 Oregon Earthquake Probability Ranking Based on Mean County Value of the Probability of Damaging Shaking and Presence of Newly Discovered Faults 1149

Figure 2-261. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in an Earthquake Hazard Zone in Region 6 1153

Figure 2-262. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Flood Hazard Zone in Region 6 1169

Figure 2-263. High- and Significant-Hazard Dams, Regulators, and Conditions in Region 6 1178

Figure 2-264. Region 6 Dam Hazard Classification 1180

Figure 2-265. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Landslide Hazard Zone in Region 6 .. 1183

Figure 2-266. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Volcanic Hazard Zone in Region 6.... 1191

Figure 2-267. Burn Probability 1195

Figure 2-268. Human- and Lightning-Caused Wildfires in Region 6, 1992-2017 1197

Figure 2-269. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Wildfire Hazard Zone in Region 6 1202

Figure 2-270. Overall Wildfire Risk 1205

Figure 2-271. Region 7 Major Geographic Features 1220

Figure 2-272. Region 7 Ecoregions 1221

Figure 2-273. Educational Attainment in Region 7 1230

Figure 2-274. Median Household Income Distribution in Region 7 1232

Figure 2-275. Location Quotients, Employment Change, and Total Employment in Region 7, 2018 1242

Figure 2-276. Shift-Share-Analysis of Fastest Growing and Declining Industries in Region 7, 2010-2018 1244

Figure 2-277. Region 7 Transportation and Population Centers 1246

Figure 2-278. Oregon Energy Portfolio 1250

Figure 2-279. Liquefied Natural Gas Pipelines in Region 7 1251

Figure 2-280. Region 7 Population Distribution 1258

Figure 2-281. Region 7 Land Use 1264

Figure 2-282. Region 7 Land Converted to Urban Uses, 1974–2009 1265

Figure 2-283. Standard Precipitation-Evapotranspiration Index for Region 7 1269

Figure 2-284. 2020 Oregon Earthquake Probability Ranking Based on Mean County Value of the Probability of Damaging Shaking and Presence of Newly Discovered Faults 1275

Figure 2-285. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in an Earthquake Hazard Zone in Region 7 1278

Figure 2-286. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Flood Hazard Zone in Region 7 1292

Figure 2-287. High- and Significant-Hazard Dams, Regulators, and Conditions in Region 7 1300

Figure 2-288. Region 7 Dam Hazard Classification 1302

Figure 2-289. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Landslide Hazard Zone in Region 7 .. 1305

Figure 2-290. Burn Probability 1314

Figure 2-291. Human- and Lightning-Caused Wildfires in Region 7, 1992-2017 1315

Figure 2-292. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Wildfire Hazard Zone in Region 7 1319

Figure 2-293. Overall Wildfire Risk 1321

Figure 2-294. Region 8 Major Geographic Features 1336

Figure 2-295. Region 8 Ecoregions 1337

Figure 2-296. Educational Attainment in Region 8 1345

Figure 2-297. Median Household Income Distribution in Region 8 1347

Figure 2-298. Location Quotients, Employment Change, and Total Employment in Region 8, 2018 1357

Figure 2-299. Shift-Share-Analysis of Fastest Growing and Declining Industries in Region 8, 2010-2018 1359

Figure 2-300. Region 8 Transportation and Population Centers 1361

Figure 2-301. Liquefied Natural Gas Pipelines in Region 8 1364

Figure 2-302. Region 8 Population Distribution 1371

Figure 2-303. Region 8 Land Use 1377

Figure 2-304. Region 8 Land Converted to Urban Uses, 1974–2009 1378

Figure 2-305. Standard Precipitation-Evapotranspiration Index for Region 8 1382

Figure 2-306. Quaternary Faults and Folds in Region 8 1386

Figure 2-307. Relative Ground Shaking Amplification Hazard in Region 8 1387

Figure 2-308. Relative Liquefaction Susceptibility Hazard in Region 8 1387

Figure 2-309. Relative Earthquake Induced Landslide Susceptibility Hazard in Region 8 1388

Figure 2-310. Selected Earthquakes in Region 8, 1841–2002 1389

Figure 2-311. 2020 Oregon Earthquake Probability Ranking Based on Mean County Value of the Probability of Damaging Shaking and Presence of Newly Discovered Faults 1392

Figure 2-312. Region 8 Generalized Earthquake Exposure 1393

Figure 2-313. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in an Earthquake Hazard Zone in Region 8 1397

Figure 2-314. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Flood Hazard Zone in Region 8 1410

Figure 2-315. High- and Significant-Hazard Dams, Regulators, and Conditions in Region 8..... 1418

Figure 2-316. Region 8 Dam Hazard Classification..... 1420

Figure 2-317. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Landslide Hazard Zone in Region 8 .. 1423

Figure 2-318. Historic Forest Fires in Region 8 1430

Figure 2-319. Burn Probability 1431

Figure 2-320. Human- and Lightning-Caused Wildfires in Region 8, 1992-2017..... 1432

Figure 2-321. Region 8 Communities at Risk of Wildfire 1434

Figure 2-322. State-Owned/Leased Facilities (SOLF) and Local Critical Facilities (CF) in a Wildfire Hazard Zone in Region 8 1436

Figure 2-323. Overall Wildfire Risk 1438

Figure 3-1. Tsunami Hazard Mitigation Program 1600

Figure 3-2. Cannon Beach Tsunami Evacuation Map, 2013 1611

Figure 3-3. Oregon Natural Hazards Mitigation Planning Regions..... 1683

Figure 3-4. State Process for Reviewing Local Mitigation Plans..... 1693

List of Tables

Table 2-1.	Oregon Hazard Overview.....	70
Table 2-2.	Oregon NHMP Hazard Lead Agencies.....	71
Table 2-3.	Presidential Major Disaster Declarations Since 1955	72
Table 2-4.	Local Vulnerability Rankings by County	77
Table 2-5.	Local and State Vulnerability Ranking by County	79
Table 2-6.	Risk Score Classification: Natural Breaks and Risk Scores.....	82
Table 2-7.	Coastal Hazards, 2020 Risk Assessment	85
Table 2-8.	Earthquake Hazard, 2020 Risk Assessment	87
Table 2-9.	Flood Hazard, 2020 Risk Assessment.....	90
Table 2-10.	Landslide Hazard, 2020 Risk Assessment.....	93
Table 2-11.	Tsunami Hazard, 2020 Risk Assessment	96
Table 2-12.	Volcanic Hazard, 2020 Risk Assessment	98
Table 2-13.	Wildfire Hazard, 2020 Risk Assessment.....	101
Table 2-14.	Seven Hazards Combined, 2020 Risk Assessment	105
Table 2-15.	Eleven Hazards Combined, 2020 Risk Assessment	109
Table 2-16.	Comparing Social Vulnerability Variables: CDC Index and Oregon NHMP Regional Community Profiles.....	112
Table 2-17.	Projected Future Changes in Oregon’s Mean Annual and Seasonal Temperatures from Late 20th Century (1970–1999) to Mid-21st Century (2040–2069) under RCP 4.5 and RCP 8.5 Scenarios	118
Table 2-18.	Projected Future Relative Changes in Oregon’s Total Annual and Seasonal Precipitation from Late 20th Century (1970–1999) to Mid-21st Century (2040–2069) under RCP 4.5 and RCP 8.5 Scenarios.....	119
Table 2-19.	Relationship Between Adaptation Framework Risks and Hazards in the Oregon NHMP	122
Table 2-20.	Oregon Seismic Lifeline Routes (OSLR) Evaluation Framework.....	146
Table 2-21.	Oregon Seismic Lifeline Routes (OSLR) Criteria by Group.....	147
Table 2-22.	Projected Sea Level Rise for the Central Oregon Coast	179
Table 2-23.	Historic Coastal Hazard Events in Oregon.....	182
Table 2-24.	Projection of Extreme Wave Heights for Various Recurrence Intervals	183
Table 2-25.	Probability Classification Scheme for Coastal Hazards	188
Table 2-26.	Probability and Exposure Rankings of Coastal Sand Inundation and Coastal Erosion	188
Table 2-27.	Probability and Exposure Rankings of Coastal Flooding and Coastal Landslides	188
Table 2-28.	Final Probability Ranking of Coastal Hazards.....	189
Table 2-29.	Water Years with the Lowest SPEI Values, Averaged Statewide, on Record (1895–2019) for the State of Oregon.....	197
Table 2-30.	Historic Droughts and Dry Periods in Oregon	202
Table 2-31.	Levels of Modified Mercalli Intensity.....	214
Table 2-32.	Historic Earthquakes in Oregon	220
Table 2-33.	Probability of Earthquake by County using the 2020 Risk Assessment Methodology.....	225
Table 2-34.	Turbidite Event History Methods and Implications for Holocene Paleoseismicity of the Cascadia Subduction Zone.....	228
Table 2-35.	Estimated Times for Restoration Services Post CSZ and Tsunami Event	232
Table 2-36.	Projected Loss and Damage Rankings by County from Two Earthquake Loss Models	233
Table 2-37.	2020 Risk Assessment Methodology County Earthquake Risk Scores.....	236
Table 2-38.	Historic Heat and Excessive Heat Events in Oregon	240
Table 2-39.	Sensitivity Rankings	247
Table 2-40.	Percentage of Homes with Cooling Equipment	248
Table 2-41.	Adaptive Capacity Rankings	250
Table 2-42.	Relative Vulnerability Rankings for Oregon Counties and Regions.....	251
Table 2-43.	Risk Rankings for Oregon Counties and Regions	254
Table 2-44.	Recent ENSO Events in Oregon.....	260
Table 2-45.	Historic Damaging Floods in Oregon	262
Table 2-46.	Classifying Flood Probability	270
Table 2-47.	Probability of Flooding by County for the 2020 Risk Assessment Methodology	270
Table 2-48.	Top 10 Oregon Counties Vulnerable to Flooding as Measured by the Total Number of Paid NFIP Claims since 1978.....	272
Table 2-49.	Top 10 Oregon Cities Vulnerable to Flooding as Measured by the Total Number of Paid NFIP Claims since 1978.....	273

Table 2-50.	Top 10 Oregon Counties Vulnerable to Flooding as Measured by Total Dollar (\$) Amount Paid on NFIP Claims since 1978	274
Table 2-51.	Top 10 Oregon Cities Vulnerable to Flooding as Measured by Total Dollar (\$) Amount Paid on NFIP Claims since 1978	274
Table 2-52.	Top 10 Oregon Communities with the Greatest Number of Repetitive Losses	275
Table 2-53.	Historic Significant Dam Failures	281
Table 2-54.	Summary: High Hazard and Significant Hazard Dams in Oregon	282
Table 2-55.	High Hazard and Significant Hazard Dams in Oregon, by County	283
Table 2-56.	Summary: Condition of Oregon’s State- and Federally regulated High Hazard Dams	288
Table 2-57.	Summary: Condition of Oregon’s State-Regulated High Hazard Dams by County.....	289
Table 2-58.	Condition of State-Regulated High Hazard Dams in Oregon	290
Table 2-59.	State-Regulated High Hazard Dams Not Meeting Safety Standards	292
Table 2-60.	Number of Identified Landslides within or Touching Each County in Oregon	297
Table 2-61.	Historic Landslides in Oregon from SLIDO-2	301
Table 2-62.	Classifying Landslide Probability	309
Table 2-63.	Future Probability of Landslides in Each County in Oregon	310
Table 2-64.	Historic Distant Tsunamis in Oregon	320
Table 2-65.	Probability and Exposure Rankings of Tsunami Hazards	324
Table 2-66.	Prominent Volcanoes in the Cascade Range of Oregon and Southwest Washington	340
Table 2-67.	Notable Geologic Events near Mount Hood	343
Table 2-68.	Historic Volcanic Events in Oregon over the Last 20,000 Years	346
Table 2-69.	Proximity to Cascade Range Volcanoes and 30-Year Probability of Tephra Accumulation	348
Table 2-70.	Probability of Volcanic Hazards	349
Table 2-71.	Summary of Community Asset Exposure to Volcano Hazards for Mount Hood	354
Table 2-72.	Historic Wildfires in Oregon.....	369
Table 2-73.	Communities at Risk: Burn Probability, Adjective Classes, and Exposure Ratings	376
Table 2-74.	Historic Windstorms in Oregon	389
Table 2-75.	Probability of Severe Wind Events by State of Oregon Natural Hazard Region (One-Minute Average, 30 Feet above the Ground).....	390
Table 2-76.	Counties Historically Most Vulnerable to Windstorms and Social Vulnerability	393
Table 2-77.	Historic Winter Storms in Oregon.....	397
Table 2-78.	Average Precipitation and Temperature in Region 1 Counties and Climate Divisions.....	424
Table 2-79.	Population Estimate and Forecast for Region 1.....	425
Table 2-80.	Annual Visitor Estimates in Person Nights (x1000) in Region 1	426
Table 2-81.	People with a Disability by Age Group in Region 1	427
Table 2-82.	Homeless Population Estimate for Region 1.....	428
Table 2-83.	Population by Vulnerable Age Group, in Region 1.....	429
Table 2-84.	English Usage in Region 1	430
Table 2-85.	Median Household Income in Region 1	432
Table 2-86.	Poverty Rates in Region 1	434
Table 2-87.	Child Poverty in Region 1.....	434
Table 2-88.	Housing Tenure in Region 1	435
Table 2-89.	Family vs. Non-Family Households in Region 1.....	436
Table 2-90.	Family Households with Children by Head of Household in Region 1	437
Table 2-91.	Civilian Labor Force in Region 1, 2018	438
Table 2-92.	Civilian Unemployment Rates in Region 1, 2014-2018.....	439
Table 2-93.	Covered Employment by Sector in Region 1.....	441
Table 2-94.	Industries with Greatest Share of Employment in Region 1, 2018	443
Table 2-95.	Most Concentrated Industries and Employment Change in Region 1, 2018	443
Table 2-96.	Fastest Growing and Declining Industries in Region 1, 2010-2018.....	445
Table 2-97.	Shift-Share-Analysis of Fastest Growing and Declining Industries in Region 1, 2010-2018.....	446
Table 2-98.	Bridge Inventory for Region 1	450
Table 2-99.	Public and Private Airports in Region 1.....	451
Table 2-100.	Urban and Rural Populations in Region 1, 2010	460
Table 2-101.	Urban and Rural Housing Units in Region 1, 2010	460
Table 2-102.	Housing Profile for Region 1	462
Table 2-103.	Housing Vacancy in Region 1	463
Table 2-104.	Age of Housing Stock in Region 1	464

Table 2-105. Community Flood Map History in Region 1	465
Table 2-106. Value of State-Owned/Leased Critical and Essential Facilities in Region 1	466
Table 2-107. Region 1 Resource Lands Converted to Urban Uses, 2009–2014	470
Table 2-108. Historic Coastal Erosion and Flood Hazard Events in Region 1	472
Table 2-109. Historic Coastal Landslide Hazards in Region 1	473
Table 2-110. Assessment of Combined Coastal Hazards Probability in Region 1	474
Table 2-111. Projection of Extreme Wave Heights for Various Recurrence Intervals: Each Wave Height Is Expected to Occur on Average Once during the Recurrence Interval	474
Table 2-112. Storm-Induced Erosion Defined for Selected Sites in Tillamook County after Having Accounted for the Duration of the Event	475
Table 2-113. Local Assessment of Vulnerability to Coastal Erosion in Region 1	477
Table 2-114. State Assessment of Coastal Hazards Combined Vulnerability in Region 1	477
Table 2-115. Combined Risk of Coastal Hazards in Region 1	481
Table 2-116. Historic Droughts in Region 1	482
Table 2-117. Years with Moderate (<-1), Severe (<1.5), and Extreme (<-2) Drought in Oregon Climate Division 1 according to Standard Precipitation-Evapotranspiration Index.....	484
Table 2-118. Probability of Drought in Region 1.....	484
Table 2-119. Local Assessment of Vulnerability to Drought in Region 1	485
Table 2-120. State Assessment of Vulnerability to Drought in Region 1	485
Table 2-121. Risk of Drought in Region 1	486
Table 2-122. Significant Earthquakes Affecting Region 1	488
Table 2-123. Assessment of Earthquake Probability in Region 1.....	488
Table 2-124. Local Assessment of Vulnerability to Earthquakes in Region 1.....	490
Table 2-125. State Assessment of Vulnerability to Earthquakes in Region 1	490
Table 2-126. Region 1 School and Emergency Response Building Collapse	491
Table 2-127. Projected Dollar Losses in Region 1, Based on an M8.5 Subduction Event and a 500-Year Model	492
Table 2-128. Estimated Losses in Region 1 Associated with a M8.5 Subduction Zone Event.....	493
Table 2-129. Estimated Losses in Region 1 Associated with a 500-Year Model	494
Table 2-130. Risk of Earthquake Hazards in Region 1.....	499
Table 2-131. Historic Extreme Heat Events in Region 1.....	500
Table 2-132. Probability of Extreme Heat in Region 1.....	500
Table 2-133. Annual Number of Days Exceeding Heat Index $\geq 90^{\circ}\text{F}$ for Region 1 Counties	501
Table 2-134. Relative Vulnerability Rankings for Region 1 Counties	502
Table 2-135. Vulnerability to Extreme Heat in Region 1.....	502
Table 2-136. Risk Rankings for Region 1 Counties	503
Table 2-137. Risk of Extreme Heat in Region 1.....	503
Table 2-138. Historic Floods in Region 1	505
Table 2-139. Principal Riverine Flood Sources by County in Region 1	509
Table 2-140. Local Assessment of Flood Probability in Region 1.....	510
Table 2-141. State Assessment of Flood Probability in Region 1.....	510
Table 2-142. Local Assessment of Vulnerability to Flood in Region 1	510
Table 2-143. State Assessment of Vulnerability to Flood in Region 1	511
Table 2-144. Flood Severe/Repetitive Loss Buildings and Community Rating System Communities by County in Region 1	512
Table 2-145. Risk of Flood Hazards in Region 1	515
Table 2-146. Historic Significant Dam Failures in Region 1.....	517
Table 2-147. Summary: High Hazard and Significant Hazard Dams in Region 1	517
Table 2-148. High Hazard and Significant Hazard Dams in Region 1	518
Table 2-149. Summary: Condition of High Hazard State-Regulated Dams in Region 1	519
Table 2-150. Condition of High Hazard State-Regulated Dams in Region 1.....	519
Table 2-151. State-Regulated High Hazard Dams Not Meeting Safety Standards in Region 1	520
Table 2-152. Historic Landslides in Region 1	526
Table 2-153. Assessment of Landslide Probability in Region 1.....	527
Table 2-154. Local Assessment of Vulnerability to Landslides in Region 1.....	527
Table 2-155. State Assessment of Vulnerability to Landslides in Region 1.....	527
Table 2-156. Assessment of Risk to Landslides in Region 1	530
Table 2-157. Historic Tsunamis Affecting the Oregon Coast	533
Table 2-158. Local Probability Assessment of Tsunami in Region 1	534
Table 2-159. Local Assessment of Vulnerability to Tsunamis in Region 1	535

Table 2-160. State Assessment of Vulnerability to Tsunamis in Region 1	535
Table 2-161. Risk from Tsunami Hazard in Region 1	541
Table 2-162. Assessment of Volcanic Hazards Probability in Region 1	542
Table 2-163. Local Assessment of Vulnerability to Volcanic Hazards in Region 1	542
Table 2-164. State Assessment of Vulnerability to Volcanic Hazards in Region 1	543
Table 2-165. Assessment of Risk to Volcanic Hazards in Region 1	543
Table 2-166. Historic Wildfires in Region 1	547
Table 2-167. Assessment of Wildfire Probability in Region 1	548
Table 2-168. Projected Increase in Annual Very High Fire Danger Days in Region 1 Counties by 2050 under RCP 8.5	551
Table 2-169. Local Assessment of Vulnerability to Wildfire in Region 1	551
Table 2-170. Assessment of Vulnerability to Wildfire in Region 1 – Communities at Risk	551
Table 2-171. Assessment of Vulnerability to Wildfire in Region 1 – 2020 Vulnerability Assessment	551
Table 2-172. Wildland-Urban Interface Communities in Region 1	552
Table 2-173. Risk of Wildfire Hazards in Region 1	555
Table 2-174. Historic Windstorms in Region 1	557
Table 2-175. Tornadoes Recorded in Region 1	560
Table 2-176. Local Assessment of Vulnerability to Windstorms in Region 1	560
Table 2-177. State Assessment of Windstorm Probability in Region 1	560
Table 2-178. Assessment of Vulnerability to Windstorms in Region 1	561
Table 2-179. Risk from Windstorms in Region 1	563
Table 2-180. Historic Winter Storms in Region 1	564
Table 2-181. Probability Assessment of Winter Storms in Region 1	565
Table 2-182. Local Assessment of Vulnerability to Winter Storms in Region 1	565
Table 2-183. State Assessment of Vulnerability to Winter Storms in Region 1	565
Table 2-184. Average Precipitation and Temperature in Region 2 Counties and Climate Divisions	576
Table 2-185. Population Estimate and Forecast for Region 2	577
Table 2-186. Annual Visitor Estimates in Person Nights (x1000) in Region 2	578
Table 2-187. People with a Disability by Age Group in Region 2	579
Table 2-188. Homeless Population Estimate for Region 2	580
Table 2-189. Population by Vulnerable Age Group, in Region 2	581
Table 2-190. English Usage in Region 2	581
Table 2-191. Median Household Income in Region 2	584
Table 2-192. Poverty Rates in Region 2	586
Table 2-193. Child Poverty in Region 2	586
Table 2-194. Housing Tenure in Region 2	587
Table 2-195. Family vs. Non-family Households in Region 2	588
Table 2-196. Family Households with Children by Head of Household in Region 2	589
Table 2-197. Civilian Labor Force in Region 2, 2018	591
Table 2-198. Civilian Unemployment Rates in Region 2, 2014-2018	591
Table 2-199. Covered Employment by Sector in Region 2, 2019	593
Table 2-200. Industries with Greatest Share of Employment in Region 2, 2018	595
Table 2-201. Most Concentrated Industries and Employment Change in Region 2, 2018	595
Table 2-202. Fastest Growing and Declining Industries in Region 2, 2010-2018	597
Table 2-203. Shift-Share-Analysis of Fastest Growing and Declining Industries in Region 2, 2010-2018	599
Table 2-204. Bridge Inventory for Region 2	602
Table 2-205. Public and Private Airports in Region 2	603
Table 2-206. Power Plants in Region 2	604
Table 2-207. Urban and Rural Populations in Region 2, 2010	611
Table 2-208. Urban and Rural Housing Units in Region 2, 2010	611
Table 2-209. Housing Profile for Region 2	614
Table 2-210. Housing Vacancy in Region 2	615
Table 2-211. Age of Housing Stock in Region 2	616
Table 2-212. Community Flood Map History in Region 2	617
Table 2-213. Value of State-Owned/Leased Critical and Essential Facilities in Region 2	618
Table 2-214. Region 2 Resource Lands Converted to Urban Uses, 2009-2014	622
Table 2-215. Historic Droughts in Region 2	624
Table 2-216. Years with Moderate (<-1), Severe (<1.5), and Extreme (<-2) Drought in Oregon Climate Division 2 according to Standard Precipitation-Evapotranspiration Index	625

Table 2-217. Probability of Drought in Region 2.....	626
Table 2-218. Local Assessment of Vulnerability to Drought in Region 2	627
Table 2-219. State Assessment of Vulnerability to Drought in Region 2	627
Table 2-220. Risk of Drought in Region 2	628
Table 2-221. Significant Earthquakes Affecting Region 2	630
Table 2-222. Assessment of Earthquake Probability in Region 2.....	630
Table 2-223. Local Assessment of Vulnerability to Earthquakes in Region 2.....	632
Table 2-224. State Assessment of Vulnerability to Earthquakes in Region 2	632
Table 2-225. School and Emergency Response Building Collapse Potential in Region 2	632
Table 2-226. Projected Dollar Losses in Region 2, Based on an M8.5 Subduction Event and a 500-Year Model	634
Table 2-227. Risk of Earthquake Hazards in Region 2.....	639
Table 2-228. Historic Extreme Heat Events in Region 2.....	640
Table 2-229. Probability of Extreme Heat in Region 2	641
Table 2-230. Annual Number of Days Exceeding Heat Index $\geq 90^{\circ}\text{F}$ for Region 2 Counties	642
Table 2-231. Relative Vulnerability Rankings for Region 2 Counties	643
Table 2-232. Vulnerability to Extreme Heat in Region 2.....	643
Table 2-233. Risk Rankings for Region 2 Counties	644
Table 2-234. Risk of Extreme Heat in Region 2.....	644
Table 2-235. Significant Historic Floods in Region 2	646
Table 2-236. Principal Riverine Flood Sources in Region 2	649
Table 2-237. Local Assessment of Flood Probability in Region 2.....	650
Table 2-238. State Assessment of Flood Probability in Region 2.....	650
Table 2-239. Local Assessment of Vulnerability to Flood in Region 2	650
Table 2-240. State Assessment of Vulnerability to Flood in Region 2	651
Table 2-241. Severe/Repetitive Flood Losses and Community Rating System Communities by County in Region 2	651
Table 2-242. Risk of Flood Hazards in Region 2	654
Table 2-243. Summary: High Hazard and Significant Hazard Dams in Region 2	657
Table 2-244. High Hazard and Significant Hazard Dams in Region 2	658
Table 2-245. Summary: Condition of High Hazard State-Regulated Dams in Region 2	660
Table 2-246. Condition of High Hazard State-Regulated Dams in Region 2.....	660
Table 2-247. Historic Landslides in Region 2	666
Table 2-248. Assessment of Landslide Probability in Region 2.....	666
Table 2-249. Local Assessment of Vulnerability to Landslides in Region 2.....	667
Table 2-250. State Assessment of Vulnerability to Landslides in Region 2.....	667
Table 2-251. Assessment of Risk to Landslides in Region 2	670
Table 2-252. Historic Volcanic Events in Region 2	671
Table 2-253. Assessment of Vulnerability to Volcanic Hazards in Region 2	671
Table 2-254. Probability of Volcano-Related Hazards in Region 2.....	672
Table 2-255. Local Assessment of Vulnerability to Volcanic Hazards in Region 2	672
Table 2-256. State Assessment of Volcanic Hazards Vulnerability in Region 2	673
Table 2-257. Assessment of Risk to Volcanic Hazards in Region 2	673
Table 2-258. Historic Wildfires in Region 2.....	676
Table 2-259. Assessment of Wildfire Probability in Region 2.....	676
Table 2-260. Projected Increase in Annual Very High Fire Danger Days in Region 2 Counties by 2050 under RCP 8.5.....	679
Table 2-261. Local Assessment of Vulnerability to Wildfire in Region 2.....	679
Table 2-262. Assessment of Vulnerability to Wildfire in Region 2 – Communities at Risk	679
Table 2-263. Assessment of Vulnerability to Wildfire in Region 2 – 2020 Vulnerability Assessment.....	679
Table 2-264. Wildland-Urban Interface Communities in Region 2	680
Table 2-265. Risk of Wildfire Hazards in Region 2	683
Table 2-266. Historic Windstorms in Region 2	685
Table 2-267. Assessment of Windstorm Probability in Region 2.....	686
Table 2-268. Local Assessment of Vulnerability to Windstorms in Region 2	687
Table 2-269. State Assessment of Vulnerability to Windstorms in Region 2.....	687
Table 2-270. Historic Winter Storms in Region 2.....	690
Table 2-271. Probability Assessment of Winter Storms in Region 2.....	692
Table 2-272. Local Assessment of Vulnerability to Winter Storms in Region 2	693
Table 2-273. State Assessment of Vulnerability to Winter Storms in Region 2	693
Table 2-274. Average Precipitation and Temperature in Region 3 Counties and Climate Divisions.....	704

Table 2-275. Population Estimate and Forecast for Region 3.....	705
Table 2-276. Annual Visitor Estimates in Person Nights (x1000) in Region 3	705
Table 2-277. People with a Disability by Age Group in Region 3	707
Table 2-278. Homeless Population Estimate for Region 3.....	708
Table 2-279. Population by Vulnerable Age Group, in Region 3.....	709
Table 2-280. English Usage in Region 3	710
Table 2-281. Median Household Income in Region 3	712
Table 2-282. Poverty Rates in Region 3	714
Table 2-283. Child Poverty in Region 3.....	715
Table 2-284. Housing Tenure in Region 3	716
Table 2-285. Family vs. Non-family Households in Region 3	717
Table 2-286. Family Households with Children by Head of Household in Region 3	717
Table 2-287. Civilian Labor Force in Region 3, 2018	719
Table 2-288. Civilian Unemployment Rates in Region 3, 2014-2018.....	720
Table 2-289. Covered Employment by Sector in Region 3.....	722
Table 2-290. Industries with Greatest Share of Employment in Region 3, 2018	723
Table 2-291. Most Concentrated Industries and Employment Change in Region 3, 2018	724
Table 2-292. Fastest Growing and Declining Industries in Region 3, 2010-2018.....	726
Table 2-293. Shift-Share-Analysis of Fastest Growing and Declining Industries in Region 2, 2010-2018.....	728
Table 2-294. Bridge Inventory for Region 3.....	731
Table 2-295. Public and Private Airports in Region 3.....	732
Table 2-296. Power Plants in Region 3	733
Table 2-297. Urban and Rural Populations in Region 3, 2010	740
Table 2-298. Urban and Rural Housing Units in Region 3, 2010	740
Table 2-299. Housing Profile for Region 3	742
Table 2-300. Housing Vacancy in Region 3	743
Table 2-301. Age of Housing Stock in Region 3	744
Table 2-302. Community Flood Map History in Region 3	745
Table 2-303. Value of State-Owned/Leased Critical and Essential Facilities in Region 3.....	746
Table 2-304. Region 3 Resource Lands Converted to Urban Uses, 2009-2014.....	750
Table 2-305. Historic Droughts in Region 3	752
Table 2-306. Years with Moderate (<-1), Severe (<1.5), and Extreme (<-2) Drought in Oregon Climate Division 2 according to Standard Precipitation-Evapotranspiration Index.....	753
Table 2-307. Probability of Drought in Region 3.....	754
Table 2-308. Local Assessment of Vulnerability to Drought in Region 3	754
Table 2-309. State Assessment of Vulnerability to Drought in Region 3	754
Table 2-310. Risk of Drought in Region 3	756
Table 2-311. Significant Earthquakes Affecting Region 3	761
Table 2-312. Assessment of Earthquake Probability in Region 3.....	761
Table 2-313. Local Assessment of Vulnerability to Earthquakes in Region 3.....	763
Table 2-314. State Assessment of Vulnerability to Earthquakes in Region 3	763
Table 2-315. Building Collapse Potential in Region 3	764
Table 2-316. Estimated Losses in Region 3 from a M9 CSZ and Local Crustal Event	764
Table 2-317. Estimated Losses in Region 3 Associated with an M8.5-9.0 Subduction Event	764
Table 2-318. Estimated Losses in Region 3 Associated with an Arbitrary M6.5-6.9 Crustal Event	765
Table 2-319. Risk of Earthquake Hazards in Region 3.....	769
Table 2-320. Historic Extreme Heat Events in Region 3.....	770
Table 2-321. Probability of Extreme Heat in Region 3.....	771
Table 2-322. Annual Number of Days Exceeding Heat Index $\geq 90^{\circ}\text{F}$ for Region 3 Counties	771
Table 2-323. Relative Vulnerability Rankings for Region 3 Counties	772
Table 2-324. State Assessment of Vulnerability to Extreme Heat in Region 3	773
Table 2-325. Local Assessment of Vulnerability to Extreme Heat in Region 3	773
Table 2-326. Risk Rankings for Region 3 Counties	775
Table 2-327. Risk of Extreme Heat in Region 3.....	775
Table 2-328. Significant Historic Floods Affecting Region 3	777
Table 2-329. Principal Riverine Flood Sources by County in Region 3	779
Table 2-330. Local Assessment of Flood Probability in Region 3	780
Table 2-331. State Assessment of Flood Probability in Region 3.....	780

Table 2-332. Local Assessment of Vulnerability to Flood in Region 3	781
Table 2-333. State Assessment of Vulnerability to Flood in Region 3	781
Table 2-334. Flood Severe/Repetitive Losses and Community Rating System Communities by County in Region 3	782
Table 2-335. Risk of Flood Hazards in Region 3	785
Table 2-336. Historic Significant Dam Failures in Region 3	787
Table 2-337. Summary: High Hazard and Significant Hazard Dams in Region 3	788
Table 2-338. High Hazard and Significant Hazard Dams in Region 3	788
Table 2-339. Summary: Condition of High Hazard State-Regulated Dams in Region 3	790
Table 2-340. Condition of High Hazard State-Regulated Dams in Region 3	790
Table 2-341. Historic Landslides in Region 3	795
Table 2-342. Assessment of Landslide Probability in Region 3	796
Table 2-343. Local Assessment of Vulnerability to Landslides in Region 3	796
Table 2-344. State Assessment of Vulnerability to Landslides in Region 3	796
Table 2-345. Assessment of Risk to Landslides in Region 3	799
Table 2-346. Historic Volcanic Events Affecting Region 3	801
Table 2-347. Assessment of Volcanic Hazards Probability in Region 3	801
Table 2-348. Probability of Volcano-Related Hazards in Region 3	802
Table 2-349. Local Assessment of Vulnerability to Volcanic Hazards in Region 3	802
Table 2-350. State Assessment of Vulnerability to Volcanic Hazards in Region 3	802
Table 2-351. Assessment of Risk to Volcanic Hazards in Region 3	803
Table 2-352. Historic Wildfires Affecting Region 3	806
Table 2-353. Assessment of Wildfire Probability in Region 3	807
Table 2-354. Projected Increase in Annual Very High Fire Danger Days in Region 3 Counties by 2050 under RCP 8.5	810
Table 2-355. Local Assessment of Vulnerability to Wildfire in Region 3	810
Table 2-356. Assessment of Vulnerability to Wildfire in Region 3 – Communities at Risk	810
Table 2-357. Assessment of Vulnerability to Wildfire in Region 3 – 2020 Vulnerability Assessment	810
Table 2-358. Wildland-Urban Interface Communities in Region 3	811
Table 2-359. Risk of Wildfire Hazards in Region 3	814
Table 2-360. Historic Windstorms Affecting Region 3	817
Table 2-361. Recorded Tornadoes in Region 3	818
Table 2-362. Assessment of Windstorm Probability in Region 3	818
Table 2-363. Local Assessment of Vulnerability to Windstorms in Region 3	819
Table 2-364. State Assessment of Vulnerability to Windstorms in Region 3	819
Table 2-365. Severe Winter Storms in Region 3	822
Table 2-366. Assessment of Winter Storms Probability in Region 3	824
Table 2-367. Local Assessment of Vulnerability to Winter Storms in Region 3	824
Table 2-368. State Assessment of Vulnerability to Winter Storms in Region 3	824
Table 2-369. Average Precipitation and Temperature in Region 4 Counties and Climate Divisions	836
Table 2-370. Population Estimate and Forecast for Region 4	837
Table 2-371. Annual Visitor Estimates in Person Nights (x1000) in Region 4	837
Table 2-372. People with a Disability by Age Group in Region 4	838
Table 2-373. Homeless Population Estimate for Region 4	839
Table 2-374. Population by Vulnerable Age Group, in Region 4	840
Table 2-375. English Usage in Region 4	841
Table 2-376. Median Household Income in Region 4	843
Table 2-377. Poverty Rates in Region 4	845
Table 2-378. Child Poverty in Region 4	845
Table 2-379. Housing Tenure in Region 4	846
Table 2-380. Family vs. Non-family Households in Region 4	847
Table 2-381. Family Households with Children by Head of Household in Region 4	848
Table 2-382. Civilian Labor Force in Region 4, 2018	849
Table 2-383. Civilian Unemployment Rates in Region 4, 2014-2018	849
Table 2-384. Covered Employment by Sector in Region 4, 2019	851
Table 2-385. Industries with Greatest Share of Employment in Region 4, 2018	852
Table 2-386. Most Concentrated Industries and Employment Change in Region 4, 2018	853
Table 2-387. Fastest Growing and Declining Industries in Region 4, 2010-2018	855
Table 2-388. Shift-Share-Analysis of Fastest Growing and Declining Industries in Region 4, 2010-2018	857
Table 2-389. Bridge Inventory for Region 4	860

Table 2-390. Public and Private Airports in Region 4.....	861
Table 2-391. Power Plants in Region 4.....	862
Table 2-392. Urban and Rural Populations in Region 4, 2010.....	868
Table 2-393. Urban and Rural Housing Units in Region 4, 2010.....	868
Table 2-394. Housing Profile for Region 4.....	870
Table 2-395. Housing Vacancy in Region 4.....	871
Table 2-396. Age of Housing Stock in Region 4.....	871
Table 2-397. Community Flood Map History in Region 4.....	872
Table 2-398. Value of State-Owned/Leased Critical and Essential Facilities in Region 4.....	873
Table 2-399. Region 4 Resource Lands Converted to Urban Uses, 2009-2014.....	877
Table 2-400. Historic Droughts in Region 4.....	879
Table 2-401. Years with Moderate (<-1), Severe (<1.5), and Extreme (<-2) Drought in Oregon Climate Division 3 according to Standard Precipitation-Evapotranspiration Index.....	880
Table 2-402. Probability of Drought in Region 4.....	881
Table 2-403. Local Assessment of Vulnerability to Drought in Region 4.....	882
Table 2-404. State Assessment of Vulnerability to Drought in Region 4.....	882
Table 2-405. Risk of Drought in Region 4.....	883
Table 2-406. Significant Earthquakes Affecting Region 4.....	885
Table 2-407. Assessment of Earthquake Probability in Region 4.....	885
Table 2-408. Local Assessment of Vulnerability to Earthquakes in Region 4.....	887
Table 2-409. State Assessment of Vulnerability to Earthquakes in Region 4.....	887
Table 2-410. Building Collapse Potential in Region 4.....	887
Table 2-411. Projected Dollar Losses in Region 4, Based on an M8.5 Subduction Event and a 500-Year Model.....	888
Table 2-412. Estimated Damages and Losses in Region 4 Associated with Two Earthquake Models.....	888
Table 2-413. Risk of Earthquake Hazards in Region 4.....	892
Table 2-414. Historic Extreme Heat Events in Region 4.....	894
Table 2-415. Probability of Extreme Heat in Region 4.....	894
Table 2-416. Annual Number of Days Exceeding Heat Index $\geq 90^{\circ}\text{F}$ for Region 4 Counties.....	895
Table 2-417. Relative Vulnerability Rankings for Region 4 Counties.....	896
Table 2-418. Vulnerability to Extreme Heat in Region 4.....	896
Table 2-419. Risk Rankings for Region 4 Counties.....	897
Table 2-420. Risk of Extreme Heat in Region 4.....	898
Table 2-421. Significant Historic Flood Events Affecting Region 4.....	900
Table 2-422. Principal Flood Sources by County in Region 4.....	902
Table 2-423. Local Assessment of Flood Probability in Region 4.....	903
Table 2-424. State Assessment of Flood Probability in Region 4.....	903
Table 2-425. Local Vulnerability Assessment of Flood in Region 4.....	904
Table 2-426. State Vulnerability Assessment of Flood in Region 4.....	904
Table 2-427. Flood Severe/Repetitive Losses and Community Rating System Communities by County in Region 4.....	905
Table 2-428. Risk of Flood Hazards in Region 4.....	908
Table 2-429. Historic Significant Dam Failures in Region 4.....	910
Table 2-430. Summary: High Hazard and Significant Hazard Dams in Region 4.....	911
Table 2-431. High Hazard and Significant Hazard Dams in Region 4.....	911
Table 2-432. Summary: Condition of High Hazard State-Regulated Dams in Region 4.....	913
Table 2-433. Condition of High Hazard State-Regulated Dams in Region 4.....	913
Table 2-434. State-Regulated High Hazard Dams Not Meeting Safety Standards in Region 4.....	914
Table 2-435. Historic Landslide Events in Region 4.....	919
Table 2-436. Assessment of Landslide Probability in Region 4.....	919
Table 2-437. Local Assessment of Vulnerability to Landslides in Region 4.....	920
Table 2-438. State Assessment of Vulnerability to Landslides in Region 4.....	920
Table 2-439. Assessment of Risk to Landslides in Region 4.....	922
Table 2-440. Historic Volcanic Events in Region 4.....	924
Table 2-441. Assessment of Volcanic Hazards Probability in Region 4.....	924
Table 2-442. Probability of Volcano-Related Hazards in Region 4.....	925
Table 2-443. Local Assessment of Vulnerability to Volcanic Hazards in Region 4.....	925
Table 2-444. State Assessment of Vulnerability to Volcanic Hazards in Region 4.....	925
Table 2-445. Assessment of Risk to Volcanic Hazards in Region 4.....	926
Table 2-446. Historic Wildfires Affecting Region 4.....	929

Table 2-447. Assessment of Wildfire Probability in Region 4	930
Table 2-448. Projected Increase in Annual Very High Fire Danger Days in Region 4 Counties by 2050 under RCP 8.5.....	933
Table 2-449. Local Assessment of Vulnerability to Wildfire in Region 4.....	933
Table 2-450. Assessment of Vulnerability to Wildfire in Region 4 – Communities at Risk	933
Table 2-451. Assessment of Vulnerability to Wildfire in Region 4 – 2020 Vulnerability Assessment.....	933
Table 2-452. Region 4 Wildland-Urban Interface Communities	934
Table 2-453. Risk of Wildfire Hazards in Region 4	937
Table 2-454. Historic Windstorms in Region 4	940
Table 2-455. Assessment of Windstorm Probability in Region 4.....	941
Table 2-456. Local Assessment of Vulnerability to Windstorms in Region 4.....	941
Table 2-457. State Assessment of Vulnerability to Windstorms in Region 4.....	941
Table 2-458. Severe Winter Storms in Region 4	943
Table 2-459. Assessment of Winter Storms Probability in Region 4.....	944
Table 2-460. Local Assessment of Vulnerability to Winter Storms in Region 4	945
Table 2-461. State Assessment of Vulnerability to Winter Storms in Region 4	945
Table 2-462. Average Precipitation and Temperature in Region 5 Counties and Climate Divisions.....	955
Table 2-463. Population Estimate and Forecast for Region 5.....	956
Table 2-464. Annual Visitor Estimates in Person Nights (x1000) in Region 5	957
Table 2-465. People with a Disability by Age Group in Region 5	958
Table 2-466. Homeless Population Estimate for Region 5.....	959
Table 2-467. Population by Vulnerable Age Group, in Region 5.....	961
Table 2-468. English Usage in Region 5	962
Table 2-469. Median Household Income in Region 5	965
Table 2-470. Poverty Rates in Region 5	967
Table 2-471. Child Poverty in Region 5.....	967
Table 2-472. Housing Tenure in Region 5	968
Table 2-473. Family vs. Non-family Households in Region 5	969
Table 2-474. Family Households with Children by Head of Household in Region 5	970
Table 2-475. Civilian Labor Force in Region 5, 2018	972
Table 2-476. Civilian Unemployment Rates in Region 5, 2014-2018.....	972
Table 2-477. Covered Employment by Sector in Region 5, 2019.....	974
Table 2-478. Industries with Greatest Share of Employment in Region 5, 2018	975
Table 2-479. Most Concentrated Industries and Employment Change in Region 4, 2018	976
Table 2-480. Fastest Growing and Declining Industries in Region 5, 2010-2018.....	978
Table 2-481. Shift-Share-Analysis of Fastest Growing and Declining Industries in Region 5, 2010-2018.....	979
Table 2-482. Bridge Inventory for Region 5.....	982
Table 2-483. Public and Private Airports in Region 5.....	983
Table 2-484. Power Plants in Region 5	984
Table 2-485. Urban and Rural Populations in Region 5, 2010	991
Table 2-486. Urban and Rural Housing Units in Region 5, 2010.....	991
Table 2-487. Housing Profile for Region 5	993
Table 2-488. Housing Vacancy in Region 5	994
Table 2-489. Age of Housing Stock in Region 5	995
Table 2-490. Community Flood Map History in Region 5	996
Table 2-491. Value of State-Owned/Leased Critical and Essential Facilities in Region 5.....	997
Table 2-492. Region 5 Resource Lands Converted to Urban Uses, 2009-2014.....	1000
Table 2-493. Historic Droughts in Region 5	1003
Table 2-494. Years with Moderate (<-1), Severe (<1.5), and Extreme (<-2) Drought in Oregon Climate Division 6 according to Standard Precipitation-Evapotranspiration Index.....	1005
Table 2-495. Probability of Drought in Region 5.....	1005
Table 2-496. Local Assessment of Vulnerability to Drought in Region 5	1006
Table 2-497. State Assessment of Vulnerability to Drought in Region 5	1006
Table 2-498. Risk of Drought in Region 5	1007
Table 2-499. Significant Earthquakes Affecting Region 5	1013
Table 2-500. Local Probability Assessment of Earthquakes in Region 5.....	1014
Table 2-501. Local Assessment of Vulnerability to Earthquakes in Region 5.....	1016
Table 2-502. State Assessment of Vulnerability to Earthquakes in Region 5	1016
Table 2-503. School and Emergency Response Buildings Collapse Potential in Region 5.....	1017

Table 2-504. Total Building, Transportation, and Utility Exposure and Potential Losses in Region 5 from a 2,500-Year-Return Interval Ground Motion	1018
Table 2-505. Estimated Losses in Region 5 Associated with an Arbitrary M6.5 Crustal Event	1018
Table 2-506. Estimated Losses in Region 5 Associated with a 2,500-Year Probable M6.5 Driving Scenario	1019
Table 2-507. Assessment of Earthquake Risk in Region 5.....	1022
Table 2-508. Historic Extreme Heat Events in Region 5.....	1024
Table 2-509. Probability of Extreme Heat in Region 5.....	1025
Table 2-510. Annual Number of Days Exceeding Heat Index $\geq 90^{\circ}\text{F}$ for Region 5 Counties	1025
Table 2-511. Relative Vulnerability Rankings for Region 5 Counties	1027
Table 2-512. State Assessment of Vulnerability to Extreme Heat in Region 5	1027
Table 2-513. Risk Rankings for Region 5 Counties	1028
Table 2-514. Risk of Extreme Heat in Region 5.....	1028
Table 2-515. Significant Historic Floods Affecting Region 5	1029
Table 2-516. Principal Flood Sources by County in Region 5	1032
Table 2-517. Local Assessment of Flood Probability in Region 5.....	1032
Table 2-518. State Assessment of Flood Probability in Region 5.....	1033
Table 2-519. Local Assessment of Vulnerability to Flood in Region 5	1033
Table 2-520. State Assessment of Vulnerability to Flood in Region 5	1033
Table 2-521. Risk of Flood Hazards in Region 5	1038
Table 2-522. Historic Significant Dam Failures in Region 5.....	1040
Table 2-523. Summary: High Hazard and Significant Hazard Dams in Region 5	1041
Table 2-524. High Hazard and Significant Hazard Dams in Region 5	1041
Table 2-525. Summary: Condition of High Hazard State-Regulated Dams in Region 5	1042
Table 2-526. Condition of High Hazard State-Regulated Dams in Region 5.....	1042
Table 2-527. Historic Landslides in Region 5	1048
Table 2-528. Assessment of Landslide Probability in Region 5.....	1049
Table 2-529. Local Assessment of Vulnerability to Landslides in Region 5.....	1050
Table 2-530. State Assessment of Vulnerability to Landslides in Region 5.....	1050
Table 2-531. Assessment of Risk to Landslides in Region 5.....	1053
Table 2-532. Historic Volcanic Activity Affecting Region 5	1054
Table 2-533. Assessment of Volcanic Hazards Probability in Region 5.....	1055
Table 2-534. Local Assessment of Vulnerability to Volcanic Hazards in Region 5	1055
Table 2-535. State Assessment of Vulnerability to Volcanic Hazards in Region 5	1055
Table 2-536. Assessment of Risk to Volcanic Hazards in Region 5	1057
Table 2-537. Historic Wildfires in Region 5.....	1060
Table 2-538. Assessment of Wildfire Probability in Region 5	1061
Table 2-539. Projected Increase in Annual Very High Fire Danger Days in Region 5 Counties by 2050 under RCP 8.5.....	1064
Table 2-540. Local Assessment of Vulnerability to Wildfire in Region 5.....	1065
Table 2-541. Assessment of Vulnerability to Wildfire in Region 5 – Communities at Risk	1065
Table 2-542. Assessment of Vulnerability to Wildfire in Region 5 – 2020 Vulnerability Assessment.....	1065
Table 2-543. Wildland-Urban Interface Communities in Region 5	1066
Table 2-544. Risk of Wildfire Hazards in Region 5	1069
Table 2-545. Historic Windstorms Affecting Region 5.....	1071
Table 2-546. Historic Tornadoes in Region 5	1073
Table 2-547. Assessment of Windstorm Probability in Region 5.....	1073
Table 2-548. Local Assessment of Vulnerability to Windstorms in Region 5.....	1073
Table 2-549. State Assessment of Vulnerability to Windstorms in Region 5.....	1074
Table 2-550. Historic Winter Storms Affecting Region 5	1077
Table 2-551. Assessment of Winter Storms Probability in Region 5.....	1080
Table 2-552. Local Assessment of Vulnerability to Winter Storms in Region 5	1080
Table 2-553. State Assessment of Vulnerability to Winter Storms in Region 5	1080
Table 2-554. Average Precipitation and Temperature in Region 6 Counties and Climate Divisions.....	1092
Table 2-555. Population Estimate and Forecast for Region 6.....	1093
Table 2-556. Annual Visitor Estimates in Person Nights (X1000) in Region 6.....	1094
Table 2-557. People with a Disability by Age Group in Region 6	1095
Table 2-558. Homeless Population Estimate for Region 6.....	1096
Table 2-559. Population by Vulnerable Age Group, in Region 6.....	1097
Table 2-560. English Usage in Region 6	1098

Table 2-561. Median Household Income in Region 6	1101
Table 2-562. Poverty Rates in Region 6	1103
Table 2-563. Child Poverty in Region 6	1104
Table 2-564. Housing Tenure in Region 6	1105
Table 2-565. Family vs. Non-family Households in Region 6	1106
Table 2-566. Family Households with Children by Head of Household in Region 6	1107
Table 2-567. Civilian Labor Force in Region 6, 2018	1109
Table 2-568. Civilian Unemployment Rates in Region 6, 2014-2018	1109
Table 2-569. Covered Employment by Sector in Region 6, 2019	1111
Table 2-570. Industries with Greatest Share of Employment in Region 6, 2018	1113
Table 2-571. Most Concentrated Industries and Employment Change in Region 6, 2018	1113
Table 2-572. Fastest Growing and Declining Industries in Region 6, 2010-2018	1115
Table 2-573. Shift-Share-Analysis of Fastest Growing and Declining Industries in Region 6, 2010-2018	1117
Table 2-574. Bridge Inventory for Region 6	1120
Table 2-575. Public and Private Airports in Region 6	1121
Table 2-576. Power Plants in Region 6	1122
Table 2-577. Urban and Rural Populations in Region 6, 2010	1130
Table 2-578. Urban and Rural Housing Units in Region 6, 2010	1130
Table 2-579. Housing Profile for Region 6	1132
Table 2-580. Housing Vacancy in Region 6	1133
Table 2-581. Age of Housing Stock in Region 6	1134
Table 2-582. Community Flood Map History in Region 6	1134
Table 2-583. Value of State-Owned/Leased Critical and Essential Facilities in Region 6	1135
Table 2-584. Region 6 Resource Lands Converted to Urban Uses, 2009-2014	1139
Table 2-585. Historic Droughts in Region 6	1141
Table 2-586. Years with Moderate (<-1), Severe (<1.5), and Extreme (<-2) Drought in Oregon Climate Division 5 according to Standard Precipitation-Evapotranspiration Index	1143
Table 2-587. Years with Moderate (<-1), Severe (<1.5), and Extreme (<-2) Drought in Oregon Climate Division 7 according to Standard Precipitation-Evapotranspiration Index	1143
Table 2-588. Probability of Drought in Region 6	1144
Table 2-589. Local Assessment of Vulnerability to Drought in Region 6	1144
Table 2-590. State Assessment of Vulnerability to Drought in Region 6	1144
Table 2-591. Risk of Drought in Region 6	1146
Table 2-592. Significant Earthquakes Affecting Region 6	1148
Table 2-593. Assessment of Earthquake Probability in Region 6	1148
Table 2-594. Local Assessment of Vulnerability to Earthquakes in Region 6	1150
Table 2-595. State Vulnerability Assessment of Earthquakes in Region 6	1150
Table 2-596. Building Collapse Potential in Region 6	1150
Table 2-597. Projected Dollar Losses in Region 6, Based on an M8.5 Subduction Event and a 500-Year Model	1151
Table 2-598. Estimated Losses in Region 6 Associated with an M8.5 Subduction Event	1151
Table 2-599. Estimated Losses in Region 6 Associated with a 500-Year Model	1152
Table 2-600. Assessment of Earthquake Risk in Region 6	1156
Table 2-601. Historic Extreme Heat Events in Region 6	1157
Table 2-602. Probability of Extreme Heat in Region 6	1157
Table 2-603. Annual Number of Days Exceeding Heat Index $\geq 90^{\circ}\text{F}$ for Region 6 Counties	1158
Table 2-604. Relative Vulnerability Rankings for Region 6 Counties	1159
Table 2-605. Vulnerability to Extreme Heat in Region 6	1159
Table 2-606. Risk Rankings for Region 6 Counties	1160
Table 2-607. Risk of Extreme Heat in Region 6	1161
Table 2-608. Significant Historic Floods Affecting Region 6	1163
Table 2-609. Principal Riverine Flood Sources by County Affecting Region 6	1165
Table 2-610. Local Assessment of Flood Probability in Region 6	1165
Table 2-611. State Assessment of Flood Probability in Region 6	1166
Table 2-612. Local Assessment of Vulnerability to Flood in Region 6	1166
Table 2-613. State Assessment of Vulnerability to Flood in Region 6	1166
Table 2-614. Risk of Flood Hazards in Region 6	1171
Table 2-615. Historic Significant Dam Failures in Region 6	1173
Table 2-616. Summary: High Hazard and Significant Hazard Dams in Region 6	1174

Table 2-617. High Hazard and Significant Hazard Dams in Region 6	1175
Table 2-618. Summary: Condition of High Hazard State-Regulated Dams in Region 6	1176
Table 2-619. Condition of High Hazard State-Regulated Dams in Region 6.....	1177
Table 2-620. State-Regulated High Hazard Dams Not Meeting Safety Standards in Region 6	1177
Table 2-621. Significant Landslides in Region 6	1181
Table 2-622. Assessment of Landslide Probability in Region 6.....	1181
Table 2-623. Local Assessment of Vulnerability to Landslides in Region 6.....	1182
Table 2-624. State Assessment of Vulnerability to Landslides in Region 6.....	1182
Table 2-625. Assessment of Risk to Landslides in Region 6.....	1184
Table 2-626. Historic Volcanic Events in Region 6	1187
Table 2-627. Assessment of Volcanic Hazards Probability in Region 6.....	1187
Table 2-628. Probability of Volcano-Related Hazards in Region 6.....	1188
Table 2-629. Local Assessment of Vulnerability to Volcanic Hazards in Region 6	1188
Table 2-630. State Assessment of Vulnerability to Volcanic Hazards in Region 6	1188
Table 2-631. Assessment of Risk to Volcanic Hazards in Region 6	1189
Table 2-632. Significant Wildfires in Region 6	1193
Table 2-633. Assessment of Wildfire Probability in Region 6.....	1194
Table 2-634. Projected Increase in Annual Very High Fire Danger Days in Region 6 Counties by 2050 under RCP 8.5.....	1198
Table 2-635. Local Assessment of Vulnerability to Wildfire in Region 6.....	1198
Table 2-636. Assessment of Vulnerability to Wildfire in Region 6 – Communities at Risk	1198
Table 2-637. Assessment of Vulnerability to Wildfire in Region 6 – 2020 Vulnerability Assessment.....	1199
Table 2-638. Wildland-Urban Interface Communities by County in Region 6	1200
Table 2-639. Risk of Wildfire Hazards in Region 6	1204
Table 2-640. Historic Windstorms in Region 6	1206
Table 2-641. Tornadoes Recorded in Region 6	1207
Table 2-642. Assessment of Windstorm Probability in Region 6.....	1207
Table 2-643. Local Assessment of Vulnerability to Windstorms in Region 6.....	1208
Table 2-644. State Assessment of Vulnerability to Windstorms in Region 6.....	1208
Table 2-645. Significant Winter Storms in Region 6	1210
Table 2-646. Assessment of Winter Storms Probability in Region 6.....	1211
Table 2-647. Local Assessment of Vulnerability to Winter Storms in Region 6	1212
Table 2-648. State Assessment of Vulnerability to Winter Storms in Region 6	1212
Table 2-649. Average Precipitation and Temperature in Region 7 Counties and Climate Divisions.....	1223
Table 2-650. Population Estimate and Forecast for Region 7.....	1224
Table 2-651. Annual Visitor Estimates in Person Nights (X1000) in Region 7	1225
Table 2-652. People with a Disability by Age Group in Region 7	1226
Table 2-653. Homeless Population Estimate for Region 7.....	1227
Table 2-654. Population by Vulnerable Age Group, in Region 7.....	1228
Table 2-655. English Usage in Region 7	1229
Table 2-656. Median Household Income in Region 7	1231
Table 2-657. Poverty Rates in Region 7	1233
Table 2-658. Child Poverty in Region 7.....	1233
Table 2-659. Housing Tenure in Region 7.....	1234
Table 2-660. Family vs. Non-family Households in Region 7	1235
Table 2-661. Family Households with Children by Head of Household in Region 7	1236
Table 2-662. Civilian Labor Force in Region 7, 2018	1237
Table 2-663. Civilian Unemployment Rates in Region 7, 2014-2018.....	1238
Table 2-664. Covered Employment by Sector in Region 7, 2019.....	1239
Table 2-665. Industries with Greatest Share of Employment in Region 7, 2018	1241
Table 2-666. Most Concentrated Industries and Employment Change in Region 7, 2018	1241
Table 2-667. Fastest Growing and Declining Industries in Region 7, 2010-2018.....	1243
Table 2-668. Shift-Share-Analysis of Fastest Growing and Declining Industries in Region 7, 2010-2018.....	1244
Table 2-669. Bridge Inventory for Region 7	1247
Table 2-670. Public and Private Airports in Region 7.....	1248
Table 2-671. Power Plants in Region 7	1249
Table 2-672. Urban and Rural Populations in Region 7, 2010	1257
Table 2-673. Urban and Rural Housing Units in Region 7, 2010.....	1257
Table 2-674. Housing Profile for Region 7	1259

Table 2-675. Housing Vacancy in Region 7	1260
Table 2-676. Age of Housing Stock in Region 7	1261
Table 2-677. Community Flood Map History in Region 7	1262
Table 2-678. Value of State-Owned/Leased Critical and Essential Facilities in Region 7.....	1263
Table 2-679. Region 7 Resource Lands Converted to Urban Uses, 2009-2014.....	1266
Table 2-680. Historic Droughts in Region 7	1268
Table 2-681. Years with Moderate (<-1), Severe (<1.5), and Extreme (<-2) Drought in Oregon Climate Division 8 according to Standard Precipitation-Evapotranspiration Index.....	1270
Table 2-682. Probability of Drought in Region 7.....	1270
Table 2-683. Local Assessment of Vulnerability to Drought in Region 7	1271
Table 2-684. State Assessment of Vulnerability to Drought in Region 7	1271
Table 2-685. Risk of Drought in Region 7	1272
Table 2-686. Significant Earthquakes Affecting Region 7	1273
Table 2-687. Assessment of Earthquake Probability in Region 7.....	1274
Table 2-688. Local Assessment of Vulnerability to Earthquakes in Region 7.....	1275
Table 2-689. State Assessment of Vulnerability to Earthquakes in Region 7	1275
Table 2-690. Buildings with Their Collapse Potential in Region 7	1276
Table 2-691. Projected Dollar Losses in Region 7, Based on an M8.5 Subduction Event and a 500-Year Model	1276
Table 2-692. Estimated Losses in Region 7 Associated with a 500-Year Model	1277
Table 2-693. Assessment of Earthquake Risk in Region 7.....	1280
Table 2-694. Historic Extreme Heat Events in Region 7.....	1281
Table 2-695. Probability of Extreme Heat in Region 7.....	1281
Table 2-696. Annual Number of Days Exceeding Heat Index $\geq 90^{\circ}\text{F}$ for Region 7 Counties	1282
Table 2-697. Relative Vulnerability Rankings for Region 7 Counties	1283
Table 2-698. Vulnerability to Extreme Heat in Region 7.....	1283
Table 2-699. Risk Rankings for Region 7 Counties	1284
Table 2-700. Risk of Extreme Heat in Region 7.....	1285
Table 2-701. Significant Historic Floods Affecting Region 7	1286
Table 2-702. Principal Flood Sources by County in Region 7	1288
Table 2-703. Local Assessment of Flood Probability in Region 7.....	1289
Table 2-704. State Assessment of Flood Probability in Region 7.....	1289
Table 2-705. Local Assessment of Vulnerability to Flood in Region 7	1290
Table 2-706. State Assessment of Vulnerability to Flood in Region 7	1290
Table 2-707. Risk of Flood Hazards in in Region 7	1293
Table 2-708. Historic Significant Dam Failures in Region 7.....	1296
Table 2-709. Summary: High Hazard and Significant Hazard Dams in Region 7	1297
Table 2-710. High Hazard and Significant Hazard Dams in Region 7	1297
Table 2-711. Summary: Condition of High Hazard State-Regulated Dams in Region 7	1298
Table 2-712. Condition of High Hazard State-Regulated Dams in Region 7.....	1298
Table 2-713. State-Regulated High Hazard Dams Not Meeting Safety Standards in Region 7	1299
Table 2-714. Significant Landslides in Region 7	1303
Table 2-715. Assessment of Landslide Probability in Region 7	1303
Table 2-716. Local Assessment of Vulnerability to Landslides in Region 7	1304
Table 2-717. State Assessment of Vulnerability to Landslides in Region 7.....	1304
Table 2-718. Assessment of Risk to Landslides in Region 7.....	1306
Table 2-719. Historic Volcanic Events in Region 7	1308
Table 2-720. Assessment of Volcanic Hazards Probability in Region 7.....	1308
Table 2-721. Local Assessment of Vulnerability to Volcanic Hazards in Region 7	1309
Table 2-722. State Assessment of Vulnerability to Volcanic Hazards in Region 7	1309
Table 2-723. Assessment of Risk to Volcanic Hazards in Region 7	1310
Table 2-724. Significant Wildfires in Region 7	1312
Table 2-725. Assessment of Wildfire Probability in Region 7	1313
Table 2-726. Projected Increase in Annual Very High Fire Danger Days in Region 7 Counties by 2050 under RCP 8.5.....	1316
Table 2-727. Local Assessment of Vulnerability to Wildfire in Region 7.....	1316
Table 2-728. Assessment of Vulnerability to Wildfire in Region 7 – Communities at Risk	1316
Table 2-729. Assessment of Vulnerability to Wildfire in Region 7 – 2020 Vulnerability Assessment.....	1316
Table 2-730. Wildland-Urban Interface Communities by County in Region 7	1318
Table 2-731. Risk of Wildfire Hazards in Region 7	1320

Table 2-732. Historic Windstorms in Region 7	1323
Table 2-733. Assessment of Windstorm Probability in Region 7	1324
Table 2-734. Local Assessment of Vulnerability to Windstorms in Region 7	1324
Table 2-735. State Assessment of Vulnerability to Windstorms in Region 7	1324
Table 2-736. Severe Winter Storms in Region 7	1326
Table 2-737. Probability Assessment of Winter Storms in Region 7	1327
Table 2-738. Local Assessment of Vulnerability to Winter Storms in Region 7	1328
Table 2-739. State Assessment of Vulnerability to Winter Storms in Region 7	1328
Table 2-740. Average Precipitation and Temperature Ranges in Region 8 Ecoregions	1338
Table 2-741. Population Estimate and Forecast for Region 8	1339
Table 2-742. Annual Visitor Estimates in Person Nights (X1000) in Region 8	1340
Table 2-743. People with a Disability by Age Group in Region 8	1341
Table 2-744. Homeless Population Estimate for Region 8	1342
Table 2-745. Population by Vulnerable Age Group, in Region 8	1343
Table 2-746. English Usage in Region 8	1344
Table 2-747. Median Household Income in Region 8	1346
Table 2-748. Poverty Rates in Region 8	1348
Table 2-749. Child Poverty in Region 8	1348
Table 2-750. Housing Tenure in Region 8	1350
Table 2-751. Family vs. Non-family Households in Region 8	1350
Table 2-752. Family Households with Children by Head of Household in Region 8	1351
Table 2-753. Civilian Labor Force in Region 8, 2018	1353
Table 2-754. Civilian Unemployment Rates in Region 8, 2014-2018	1353
Table 2-755. Covered Employment by Sector in Region 8, 2019	1354
Table 2-756. Industries with Greatest Share of Employment in Region 8, 2018	1356
Table 2-757. Most Concentrated Industries and Employment Change in Region 8, 2018	1356
Table 2-758. Fastest Growing and Declining Industries in Region 8, 2010-2018	1358
Table 2-759. Shift-Share-Analysis of Fastest Growing and Declining Industries in Region 8, 2010-2018	1359
Table 2-760. Bridge Inventory for Region 8	1362
Table 2-761. Public and Private Airports in Region 8	1363
Table 2-762. Power Plants in Region 8	1363
Table 2-763. Urban and Rural Populations in Region 8, 2010	1369
Table 2-764. Urban and Rural Housing Units in Region 8, 2010	1370
Table 2-765. Housing Profile for Region 8	1372
Table 2-766. Housing Vacancy in Region 8	1373
Table 2-767. Age of Housing Stock in Region 8	1373
Table 2-768. Community Flood Map History in Region 8	1374
Table 2-769. Value of State-Owned/Leased Critical and Essential Facilities in Region 8	1375
Table 2-770. Region 8 Resource Lands Converted to Urban Uses, 2009-2014	1379
Table 2-771. Historic Droughts in Region 8	1381
Table 2-772. Years with Moderate (<-1), Severe (<1.5), and Extreme (<-2) Drought in Oregon Climate Division 9 according to Standard Precipitation-Evapotranspiration Index	1383
Table 2-773. Probability of Drought in Region 8	1383
Table 2-774. Local Assessment of Vulnerability to Drought in Region 8	1384
Table 2-775. State Assessment of Vulnerability to Drought in Region 8	1384
Table 2-776. Risk of Drought in Region 8	1385
Table 2-777. Significant Earthquakes Affecting Region 8	1390
Table 2-778. Assessment of Earthquake Probability in Region 8	1390
Table 2-779. Local Assessment of Vulnerability to Earthquakes in Region 8	1392
Table 2-780. Assessment of Vulnerability to Earthquakes in Region 8	1392
Table 2-781. School and Emergency Response Buildings' Collapse Potential in Region 8	1393
Table 2-782. Building, Transportation, and Utility Exposure in Region 8	1394
Table 2-783. Building, Transportation, and Utility Losses in Region 8 Associated with a 2,500-Year Probable M6.5 Driving Earthquake Scenario	1394
Table 2-784. Building, Transportation, and Utility Losses in Region 8 Associated with a (M) 6.9 Arbitrary Crustal Earthquake Event	1395
Table 2-785. Estimated Losses in Region 8 Associated with a M6.9 Arbitrary Crustal Earthquake Event	1395
Table 2-786. Estimated Losses in Region 8 Associated with a 2,500-Year Probable M6.5 Driving Earthquake Scenario	1396

Table 2-787. Assessment of Earthquake Risk in Region 8.....	1399
Table 2-788. Probability of Extreme Heat in Region 8.....	1400
Table 2-789. Annual Number of Days Exceeding Heat Index $\geq 90^{\circ}\text{F}$ for Region 8 Counties	1401
Table 2-790. Relative Vulnerability Rankings for Region 8 Counties	1402
Table 2-791. Vulnerability to Extreme Heat in Region 8.....	1402
Table 2-792. Risk Rankings for Region 8 Counties	1403
Table 2-793. Risk of Extreme Heat in Region 8.....	1403
Table 2-794. Significant Flood Events in Region 8	1405
Table 2-795. Principal Flood Sources in Region 8	1406
Table 2-796. Local Assessment of Flood Probability in Region 8.....	1407
Table 2-797. State Assessment of Flood Probability in Region 8.....	1407
Table 2-798. Local Assessment of Vulnerability to Flood in Region 8	1408
Table 2-799. State Assessment of Vulnerability to Flood in Region 8	1408
Table 2-800. Risk of Flood Hazards in Region 8	1411
Table 2-801. Historic Significant Dam Failures in Region 8.....	1414
Table 2-802. Summary: High Hazard and Significant Hazard Dams in Region 8	1415
Table 2-803. High Hazard and Significant Hazard Dams in Region 8	1415
Table 2-804. Summary: Condition of High Hazard State-Regulated Dams in Region 8	1416
Table 2-805. Condition of High Hazard State-Regulated Dams in Region 8.....	1416
Table 2-806. State-Regulated High Hazard Dams Not Meeting Safety Standards in Region 8	1417
Table 2-807. Assessment of Landslide Probability in Region 8.....	1421
Table 2-808. Local Assessment of Vulnerability to Landslides in Region 8.....	1421
Table 2-809. State Assessment of Vulnerability to Landslides in Region 8.....	1421
Table 2-810. Assessment of Risk to Landslides in Region 8.....	1424
Table 2-811. Historic Volcanic Events in Region 8	1426
Table 2-812. Assessment of Volcanic Hazards Probability in Region 8.....	1426
Table 2-813. Local Assessment of Vulnerability to Volcanic Hazards in Region 8	1427
Table 2-814. State Assessment of Volcanic Hazards Vulnerability in Region 8	1427
Table 2-815. Assessment of Risk to Volcanic Hazards in Region 8	1428
Table 2-816. Significant Wildfires in Region 8	1429
Table 2-817. Assessment of Wildfire Probability in Region 8	1430
Table 2-818. Projected Increase in Annual Very High Fire Danger Days in Region 8 Counties by 2050 under RCP 8.5.....	1433
Table 2-819. Local Assessment of Vulnerability to Wildfire in Region 8.....	1433
Table 2-820. State Assessment of Vulnerability to Wildfire in Region 8 – Communities at Risk	1433
Table 2-821. Assessment of Vulnerability to Wildfire in Region 8 – 2020 Vulnerability Assessment.....	1433
Table 2-822. Wildland-Urban Interface Communities in Region 8	1435
Table 2-823. Risk of Wildfire Hazards in Region 8	1437
Table 2-824. Historic Windstorms in Region 8	1440
Table 2-825. Tornadoes Recorded in Region 8.....	1441
Table 2-826. Assessment of Windstorm Probability in Region 8.....	1441
Table 2-827. Local Assessment of Vulnerability to Windstorms in Region 8.....	1442
Table 2-828. State Assessment of Vulnerability to Windstorms in Region 8.....	1442
Table 2-829. Significant Winter Storms in Region 8	1445
Table 2-830. Probability Assessment of Winter Storms for Region 8.....	1446
Table 2-831. Local Assessment of Vulnerability to Winter Storms in Region 8	1446
Table 2-832. State Assessment of Vulnerability to Winter Storms in Region 8	1446
Table 3-1. From 2015 to 2020 NHMP Goal Statements	1452
Table 3-2. 2020 Mitigation Actions: Priority.....	1459
Table 3-3. 2020 Mitigation Actions: Ongoing	1477
Table 3-4. 2015 Mitigation Actions: Removed	1495
Table 3-5. 2015 Mitigation Actions: Status.....	1500
Table 3-6. 2015 to 2020 Mitigation Action Crosswalk.....	1528
Table 3-7. Policies and Federal Programs Related to Specific Natural Hazards in Oregon	1572
Table 3-8. IHMT Agencies’ Hazard Mitigation Roles, Responsibilities, and Authorities	1585
Table 3-9. SRGP Awarded Projects, 2009-2010	1627
Table 3-10. SRGP Awarded Projects, 2010-2011	1628
Table 3-11. SRGP Awarded Projects, 2011-2012	1628
Table 3-12. Potential Hazard Mitigation Funding Programs.....	1631

Table 3-13.	Local Policies, Programs, Capabilities, and Their Effectiveness	1639
Table 3-14.	Local Jurisdiction NHMP, NFIP, and CRS Participation Status through December 2019.....	1654
Table 3-15.	Model 5-Year Rotational Mitigation Planning Schedule, 2020–2030	1684
Table 4-1.	State IHMT Hazard Lead Agencies	1700
Table 4-2.	Revisions to the 2015 Oregon Natural Hazards Mitigation Plan.....	1706