



6

conclusion

Adapting to climate change is a process - not the outcome of a single project. With the completion of this adaptation plan, the Town of Corte Madera and the community have taken the next step in their journey to build resilience. Climate adaptation is, and must continue to be, a conscious process where actions are developed, refined, implemented, monitored over time and adjusted as necessary.

Resilience requires a variety of things: 1) robust and redundant systems that can withstand more intense or extreme weather events (or other stressors); 2) holistic and inclusive planning that not only considers, but incorporates, all community members in the development of effective actions; 3) monitoring and flexibility to respond to changing conditions and information over time; 4) persistence and dedication. As a key aspect of this larger climate adaptation process, this plan creates a road map that can guide the Town's investments and choices over time.

There are a number of essential first steps and near-term investments that have the potential to significantly enhance community resilience that the Town can implement now and over the next 10 years. Across the plan's four focus areas (Town-wide, Hillside, Shoreline, Central) and associated actions, there are common themes and initial investments that are clear priorities for the community.

- **Outreach/Education**

Whether it is working with the Neighborhood Resource Groups (NRGs) to enhance homeowner preparedness and home hardening efforts, initiating a program to discuss long-term shoreline resilience, or ensuring that all community members have access to and understand emergency preparedness and evacuation protocols, education is a key facet of action in each focus area. Enhancing and supporting on-going community outreach and education efforts, including incorporating discussion of climate change and deepening engagement for all community members, have a variety of benefits. These actions help ensure that Corte Maderans understand the real and serious threats facing the community, help them be better prepared for those threats, and help them be effectively involved in developing community- and neighborhood-level solutions that meet their needs and enhance resilience.

- **Collaboration**

Climate change exposures and impacts are not limited to the Town's boundaries, creating challenging, multi-faceted issues that require collaboration. Key opportunities for collaboration include: 1) working with neighboring jurisdictions and academic institutions to study the combined impact of projected precipitation, sea level rise, groundwater intrusion, and other flood events for the Town; 2) forming a regional advisory board to investigate the feasibility of managed retreat in Marin County and the region; and 3) working closely with the Marin County Parks and Open Space, the Fire District, and Marin Wildfire Prevention Authority to consider the feasibility and value of improving and opening fire roads for evacuation. From the start, these multi-jurisdictional collaborations will include essential contributors in conversations to develop and implement effective solutions that take into account all stakeholders and their concerns. These collaborations also create a strong foundation for efficient implementation of actions.

- **Infrastructure Investments**

Improving infrastructure to protect community members and property is a necessary investment. Strategic infrastructure investments can enhance community preparedness and safety as well as everyday quality of life. Some investments can be made now, while others require new or additional funding as well as time. Some essential early investments include: 1) elevating Lucky Drive to reduce the risk of flooding during king tides and extreme weather events; 2) upgrading the California Lane connection on Christmas Tree Hill for use during emergency evacuations; improving hill paths, lanes, and stairs on Christmas Tree Hill; and 3) augmenting community centers and school facilities to become Resilience Hubs that can serve as evacuation centers, cooling centers, and charging stations, during extreme heat or weather events. These investments are not inexpensive, but if pursued and strategically implemented using a mix of Town funds and outside grants,

these projects are feasible and can make a real difference in community resilience.

- **Planning and Policies**

Policies and plans are critical components of the Town's holistic approach to building resilience. They can limit or reduce current risks, lay the foundation for future actions, distribute costs, and complement infrastructure investments. An essential first step for the Town to explore is the augmentation of existing policies, (or, as necessary, the creation of new policies) to protect residents and guide future investments. Early consideration should go to policies and plans that: 1) explore a regional approach to meeting housing development goals that locates new housing areas within the County that are less vulnerable to climate hazards; 2) streamline the process for enforcing the Town's WUI building codes and regulations with particular attention to rental properties and absentee homeowners; 3) update the Stormwater Master Plan, including an analysis of current capacity and future needs under changing conditions; and 4) consider implementing a Coastal Resilience overlay zone. Additional near term planning investments include completing a detailed environmental review of the different levee alignment and design options.

Corte Madera is on the forefront of developing actions to enhance resilience, as demonstrated by the development of this proactive adaptation plan and the actions highlighted above. The Town is dedicated to working with other communities, the county, and local, regional, and state organizations to develop efficient, effective, and feasible solutions that reduce risk and enhance resilience. Leading is not always easy, and it requires weighing trade-offs and making difficult decisions about the best use of funding and investments to support the town's goals. In some cases, this will mean trying new, innovative solutions, learning from trial and error, and exploring different alternatives.

In 30-50 years, under the pressures of a changing climate, Corte Madera will look different than it does today. Actions taken now will determine if the Town is able to meet the goals detailed in this plan. The Town is dedicated, however, to preserving its identity and "small-town feel" by protecting and investing in the resilience of the people, infrastructure, and ecosystems that make the community what it is today and ensuring that Corte Madera has a thriving, vibrant, and resilient future.

endnotes

1 (Corte Madera, CA | Data USA, n.d.)
2 (Planning and Investing for a Resilient California: A Guidebook for State Agencies, 2018); EO B-30-15, 2015
3 (Planning and Investing for a Resilient California: A Guidebook for State Agencies, 2018)
4 (California Legislative Information, n.d.)
5 (Town of Corte Madera General Plan, 2009)
6 (Bill Text - SB-379 Land Use: General Plan: Safety Element., n.d.)
7 (Marin County Civil Grand Jury, 2020)
8 (California Adaptation Planning Guide, 2020)
9 (Planning and Investing for a Resilient California: A Guidebook for State Agencies, 2018)
10 (California Adaptation Planning Guide, 2020)
11 (Town of Corte Madera, 2015)
12 (Planning and Investing for a Resilient California: A Guidebook for State Agencies, 2018)
13 (Bill Text - AB-2800 Climate Change: Infrastructure Planning., n.d.)
14 (Bill Text - SB-1 California Environmental, Public Health, and Workers Defense Act of 2019., n.d.)
15 (Bill Text - SB-1000 Land Use: General Plans: Safety and Environmental Justice., n.d.)
16 (The California Environmental Justice Alliance & PlaceWorks Inc., 2017)
17 (About the Project - BayWAVE, 2020)
18 (Lacko, 2019)
19 (Marin County Multi-Jurisdictional Local Hazard Mitigation Plan, 2019)
20 (Adaptation Planning, 2020)
21 (Highway 1 Corridor In Tam Valley Transportation, n.d.)
22 (BayCAN Members' Adaptation Project Matrix, 202 C.E.)
23 See full survey questions and detailed information on responses in Appendix X.
24 (USAID, 2013)
25 (Weiland et al., 2014)
26 (USAID, 2013)
27 (California Adaptation Planning Guide, 2020)
28 San Francisco Bay Regional Report: California's Fourth Climate Change Assessment
29 (Dalton et al., 2018; Petersen, n.d.)
30 (California Adaptation Planning Guide, 2020)
31 (CAL FIRE, 2018)
32 (Rincon, 2019)
33 (Wahl et al., 2019)
34 (CAL FIRE, 2018)
35 (State Key Findings - California Climate Change Assessment, n.d.)
36 (Marin County Civil Grand Jury, 2019)
37 (State Key Findings - California Climate Change Assessment, n.d.)
38 (Marin County Multi-Jurisdictional Local Hazard Mitigation Plan, 2019)
39 (Shirzaei & Bürgmann, 2018); Personal communication with authors and examination of new subsidence rate data.
40 (National Research Council, 2012)
41 (U.S. Army Corps of Engineers, 2018)
42 (USC Sea Grant & USC Dornsife, n.d.)
43 (Rotzoll & Fletcher, 2013)
44 (Plane et al., 2019)
45 (Befus et al., 2020)
46 (Cooper et al., 1964, Freeze and Cherry, 1979, Rotzoll and Fletcher, 2013).
47 (Hoover et al., 2017)
48 (USC Sea Grant & USC Dornsife, n.d.)
49 (Ackerly et al., 2018)
50 (Cal-Adapt, n.d.)
51 (Climate Change | Caltrans, n.d.)
52 (Ackerly et al., 2018)
53 (Marin Municipal Water District, 2016a)
54 Since 2000, the longest duration of drought (D1-D4) in California lasted 376 weeks beginning on December 27, 2011 and ending on March 5th, 2019. California experienced "extreme" and "exceptional" drought beginning in late

2013 and ending in early 2017. See here for more information on current and historical drought conditions in California.

55 (AghaKouchak et al., 2018)
56 Many of California's heaviest precipitation events, called "atmospheric rivers", occur in the winter and are associated with storms generated over the Pacific Ocean.
57 (Ackerly et al., 2018)
58 (Ebi et al., 2018)
59 (OAR US EPA, 2014)
60 (Ho, 2020)
61 (Betancourt, 2020)
62 (Dodgen et al., 2016)
63 Section 502 of the Clean Water Act defines green infrastructure as "...the range of measures that use plant or soil systems, permeable pavement or other permeable surfaces or substrates, stormwater harvest and reuse, or landscaping to store, infiltrate, or evapotranspire stormwater and reduce flows to sewer systems or to surface waters."
64 (Denchak, 2019)
65 (OW US EPA, 2015b)
66 (Green Infrastructure, n.d.)
67 (OW US EPA, 2016)
68 (OW US EPA, 2015a)
69 (Marin County Civil Grand Jury, 2019)
70 (Marin County Civil Grand Jury, 2019)
71 (St. John, Serna, 2018)
72 (Wildfire Preparedness, n.d.)
73 (Marin County Civil Grand Jury, 2020)
74 (Marin County Civil Grand Jury, 2019)
75 (California Public Utilities Commission, 2020)
76 (Urban Sustainability Directors Network, 2019)
77 (Resilience Hubs, n.d.)
78 (Learn about Public Safety Power Shutoffs (PSPS), n.d.)
79 (Marin Climate & Energy Partnership, 2016)
80 (| Code of Ordinances | Corte Madera, CA | Municode Library, n.d.-a); WUI Building Codes Chapter 15.04.080
81 (Marin County Civil Grand Jury, 2020)
82 MC/MV were built on baylands in the 1950s (find citation)
83 (Town of Corte Madera General Plan, 2009); Chapter 7: Flooding and Floodplain Management)
84 (Shirzaei & Bürgmann, 2018)
85 (BCDC & ESA PWA, 2013)
86 (Underwater: Rising Seas, Chronic Floods, and the Implications for US Coastal Real Estate, 2018)
87 (California Coastal Commission, 2018)
88 (Lacko, 2019)
89 (City of Foster City, 2016)
90 (City of Foster City, 2020)
91 (Flood Protection | Corte Madera, CA - Official Website, n.d.)
92 (Grannis et al., 2011)
93 (Center for Ocean Solutions, Stanford Woods Institute for the Environment, 2018)
94 (Grannis et al., 2011)
95 (Lacko, 2019)
96 (Georgetown Climate Center, n.d.)
97 (Local Coastal Program and General Plan Update (City of Imperial Beach), n.d.)
98 (City of Imperial Beach, 2019)
99 (Bridges et al., 2015)
100 (Goals Project, 2015)
101 (SFEI & SPUR, 2019)
102 (Nur et al., 2018)
103 (SFEI & SPUR, 2019)
104 (BCDC & ESA PWA, 2013)
105 (SFEI & SPUR, 2019)
106 (Merkel, 2005)
107 (SFEI and SPUR, 2019)
108 (SFEI & Baye, 2020)
109 (SFEI & SPUR, 2019)

110 (Bridges et al., 2015)
111 (Town of Corte Madera, 2008)
112 (Marin Audubon Society, 2020)
113 (BCDC & ESA PWA, 2013)
114 (BCDC & ESA PWA, 2013)
115 (Carkin et al., 2020; SFEI & Baye, 2020)
116 (Baye, 2020)
117 (Welcome to Communities at Risk, n.d.) (Marin County Civil Grand Jury, 2019)
118 (Marin County Civil Grand Jury, 2019)
119 (Marin County Civil Grand Jury, 2019)
120 (Marin County Civil Grand Jury, 2019)
121 (Town of Paradise California, 2019)
122 (Marin County Civil Grand Jury, 2019)
123 (Marin County Civil Grand Jury, 2019; pg. 1)
124 (Marin County Civil Grand Jury, 2019)
125 (FIRESafe MARIN, Marin County California Fire Safe Council, n.d.)
126 (Office of the County Administrator, 2019)
127 (Frank, 2020)
128 (Bikales, 2020)
129 (Serna, 2020)
130 (Boulder County, 2011)
131 (Marin County Civil Grand Jury, 2019)
132 (Marin County Civil Grand Jury, 2019)
133 (Marin County Civil Grand Jury, 2019)
134 (Headwaters Economics, 2016; pg. 23)
135 (| Code of Ordinances | Corte Madera, CA | Municode Library, n.d.-b); WUI Building Codes Chapter 15.04.080)
136 (County of Marin Community Development Agency, 2017)
137 (California Building Standards Commission, n.d.)
138 (International Code Council, Inc., 2017)
139 (Ordinance No. 904, 2008) (ordinance 904)
140 (Marin County Civil Grand Jury, 2019)
141 (U.S. Dept. of Homeland Security, 2016)
142 (FEMA, 2017; pg. 3)
143 (Newberry, 2019)
144 (Table of Sales Taxes Received by Fiscal Year, n.d.)
145 (Town of Corte Madera, 2019)
146 (Town of Corte Madera, 2008)
147 (Town of Corte Madera, 2008)
148 (Town of Corte Madera, 2008)
149 (OW US EPA, 2015c)
150 As part of an update to the Town's Master Drainage Plan.
151 (Marin County Civil Grand Jury, 2020; pg. 18)
152 (A3GEO, 2019; pg. 3)
153 (A3GEO, 2019; pg. 3)
154 Municipal Stormwater Ordinance is under Title 9 of the Town's Municipal Code, Chapter 9.33, Urban Runoff Pollution Prevention Ordinance
155 (USC Sea Grant & USC Dornsife, n.d.)
156 (Hauer, 2017)
157 (Lustgarten, 2020b)
158 (Qin Fan et al (2018)
159 (Lustgarten, 2020a)
160 (Podesta, 2019)
161 (Syphard et al., 2013)
162 (Barth, 2018)
163 (Barth, 2018)
164 (Town of Corte Madera, 2014); Draft EIR Section 4.8 Hydrology and Water Quality
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166 (Berger, 2018)



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