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NATIONAL INSECT AND DISEASE

FOREST RISK ASSESSMENT

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Forest Service

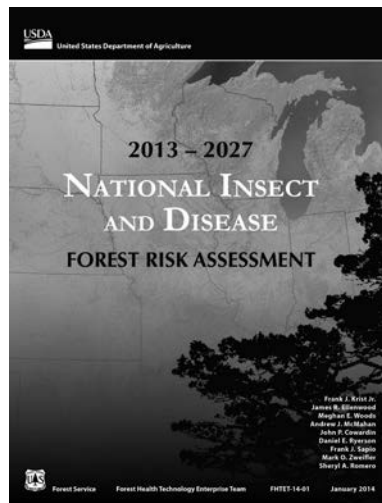
Forest Health Technology Enterprise Team

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The Forest Health Technology Enterprise Team (FHTET) was created in 1995 by the Deputy Chief for State and Private Forestry, USDA, Forest Service, to develop and deliver technologies to protect and improve the health of American forests. This book was published by FHTET as part of the technology transfer series.

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Cover Silhouette of a white bark pine on top of the National 2012 Composite Insect and Disease Risk Map. Cover design by Sheryl A. Romero.

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2013–2027 National Insect and Disease Forest Risk Assessment

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This report on the 2012 National Insect and Disease Risk Map (NIDRM) contains a nationwide strategic assessment of the hazard of tree mortality due to insects and diseases, displayed as a series of maps. Risk, or more appropriately termed *hazard*, is defined as: *the expectation that, without remediation, at least 25% of standing live basal area greater than one inch in diameter will die over a 15-year time frame (2013 to 2027) due to insects and diseases.*

NIDRM is more than just maps: It is a nationwide, science-based, administrative planning tool that is the product of a process whereby, every five years, the forest health community works together to determine the severity and extent of tree-mortality hazard due to insects and diseases.

NIDRM represents 186 individual insect and disease hazard models, integrated within a common GIS-based, multi-criteria framework, that can account for regional variations in forest health. Applied to all 50 states, and based on the best-available science and data, NIDRM's modeling process provides a consistent, repeatable, transparent, peer-reviewed process through which interactive spatial and temporal hazard assessments can be conducted. This process is consistent with the 2006 effort, allows for flexible analysis to produce hazard assessments for specific insects and diseases, and can be used to inform other agency assessments such as the Integrated Resource Restoration, Watershed Condition Framework, Terrestrial Ecosystem Condition Assessment, Existing Vegetation Classification Mapping and Inventory, and Hazardous Fuels Prioritization Allocation System.

NIDRM products are compiled on a national extent with a 240-meter (approximately 14 acres) spatial resolution and can be updated as new data and/or models become available. This "live" or near-real-time approach will greatly facilitate the production of new hazard maps.

PURPOSE NIDRM's primary purpose is as a strategic, broad-scale planning tool that can be used for administrative activities and work planning. In certain landscapes and at appropriate scales, NIDRM maps may be helpful for on-the-ground tactical management.

NIDRM was a highly collaborative process led by the Forest Health Monitoring program (FHM) of the USDA Forest Service (Forest Service), with participation from FHM staffs from all Regions, State forestry agencies, Forest Service Forest Health Protection, and Forest Service Research and Development.

DATA IMPLICATIONS FOR PARTNERSHIPS To develop NIDRM involved an enormous data-production effort. In turn, the data created for NIDRM have enormous value across the Federal Government and its partners, and can be used across a myriad of projects and applications. An organized *all lands* Spatial Data Library, with over 600 data layers, is available through the Forest Health Technology Enterprise Team (FHTET). Tree species maps—including basal area, stand density index, average diameter, and percent host at 30- and 240-meter resolution—are available to partners. The NIDRM data stack supports forest planning and forest-health hazard assessments at national and regional scales.

DATA SOURCES AND PROCESSING Previous NIDRM assessments defined forests as lands containing at least 10% tree canopy cover, including land that formerly had such tree cover and will be naturally or artificially regenerated. By this definition there are approximately 749 million acres of forested land in the coterminous United States and Alaska. For the 2012 hazard assessment, we extended these limits and modeled 1.2 billion acres of *treed* land (i.e. areas of measurable tree presence) across the US—whether or not

these treed lands met some standard definition of forested. This approach improves coverage for rural areas of the Great Plains, as well as urban areas nationally. The 2012 hazard assessment estimates that 81 million of these acres are in a hazardous condition for insects and diseases. Almost 72 million acres are in the coterminous United States, and 9.5 million hazardous acres are in Alaska. In Hawaii, not previously assessed, just under a half-million acres are estimated to be in a hazardous condition. These estimates do not include hazard due to projected climate changes, although this NIDRM report includes an examination of future climate impacts on insect and disease hazards.

With significant improvements in coverage, accuracy, and precision of the data, the 2012 NIDRM was better able to model risk in the Great Plains, urban areas, and national parks. These improvements also allowed us to model pests, such as emerald ash borer and laurel wilt, that infest rare and/or widely distributed host species. The change from a 1-kilometer to a 240-meter spatial resolution moves the 2012 NIDRM closer to a product that can be used to inform local and regional decision making. This table displays some of the differences in acreage between the 2006 and 2012 efforts.

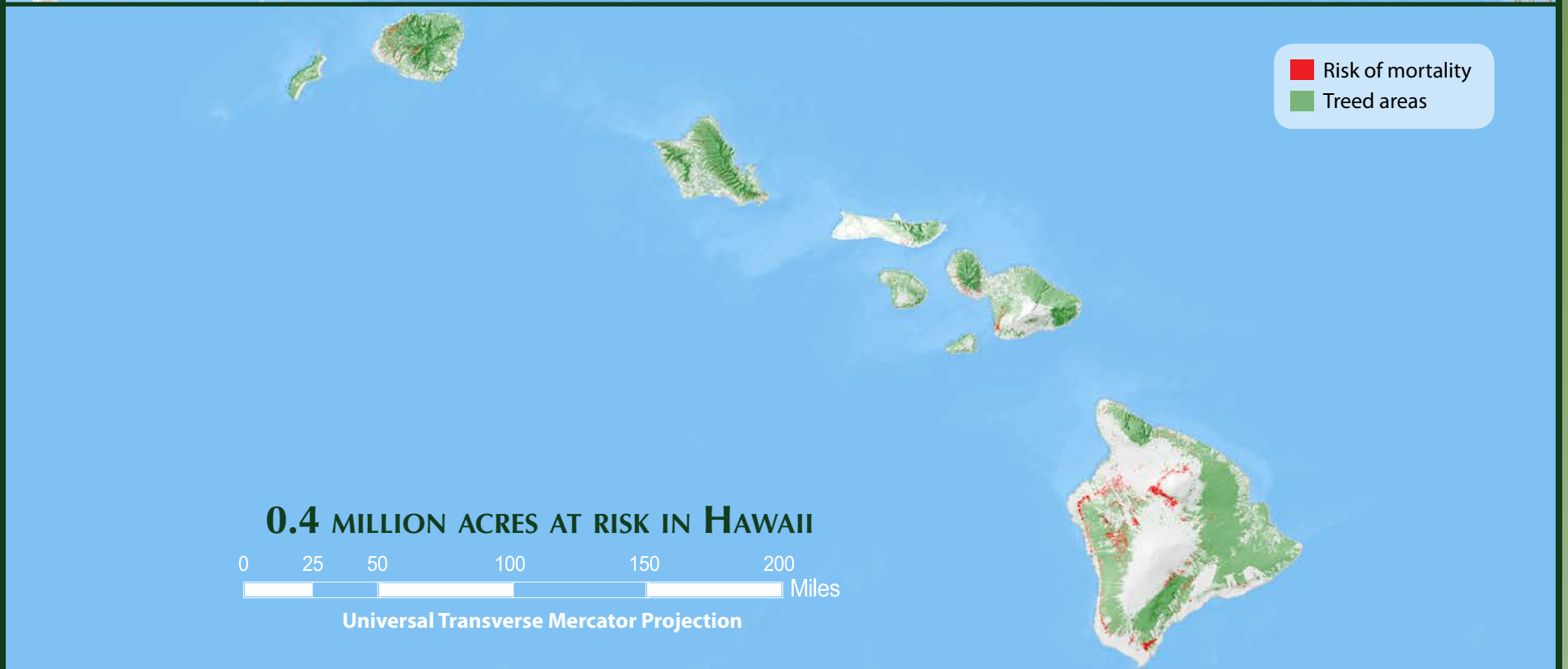
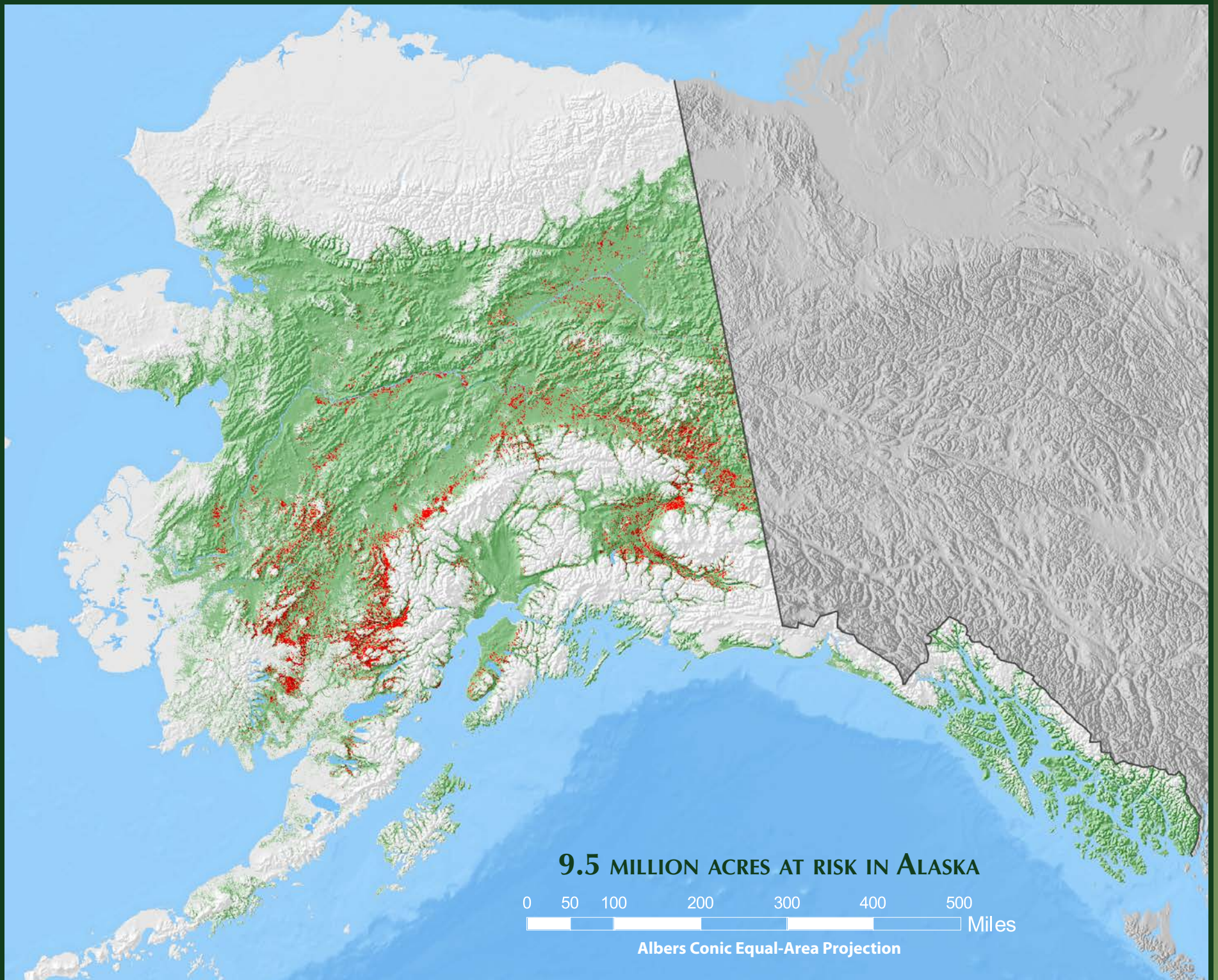
FACTOR	Millions of Acres		
	2006 NIDRM	2012 NIDRM	Difference
Hazardous conditions mapped in the coterminous United States	55.2	71.7	16.5
Sources of differences			
Host data gaps filled, and non-forested but treed areas modeled (2012)		13	
Increased hazards from new models and improvements in process (2012)		3.5	
Hazardous conditions mapped in Alaska	2.8	9.5	6.7
Sources of differences			
Improved host maps and new models (2012)		6.7	
Hazardous condition mapped in Hawaii	0	0.1	0.1
Sources of differences			
Newly modeled (2012)		0.1	
2012 NIDRM TOTAL HAZARD, all states		81.3	23.3

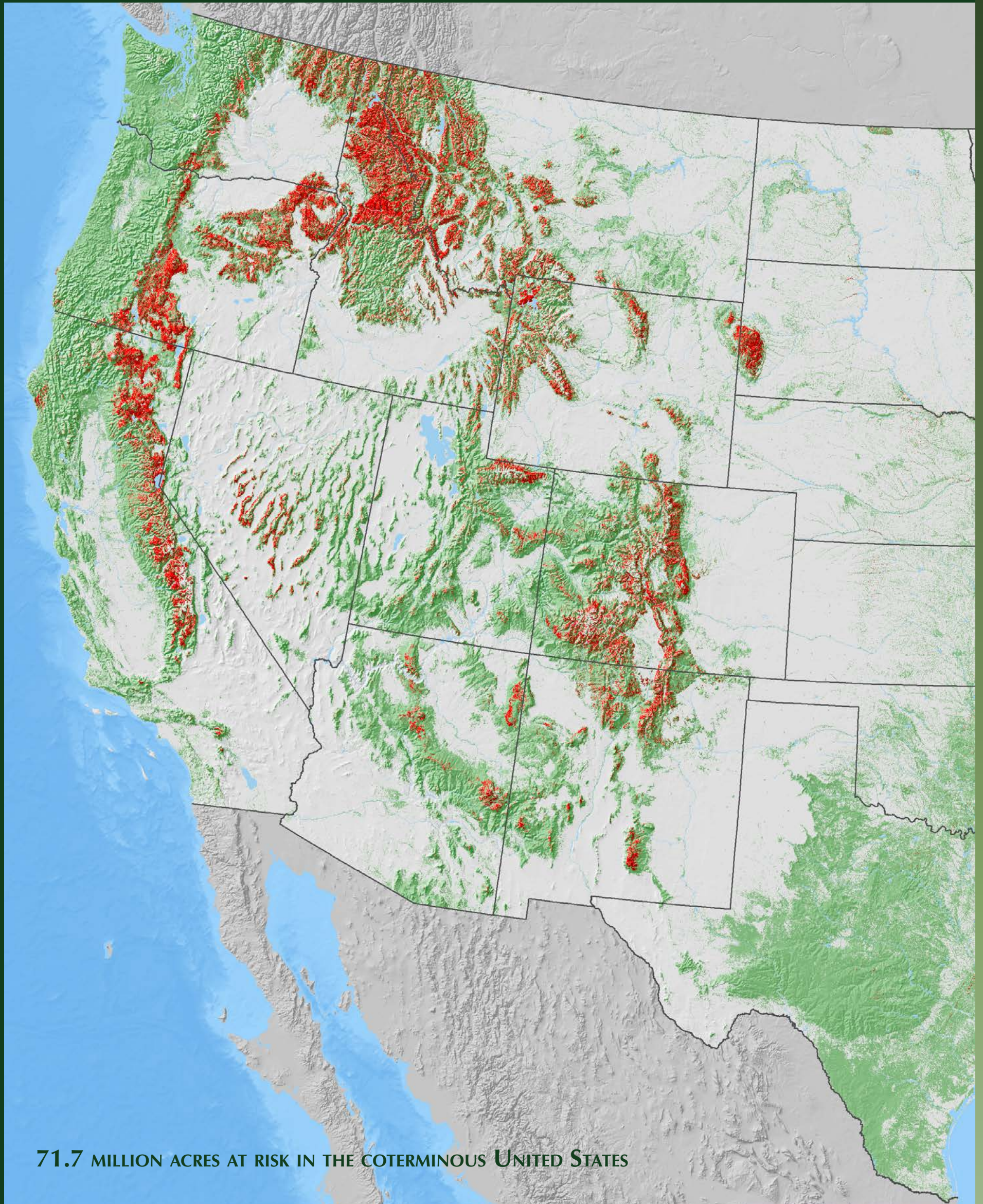
MAJOR HAZARDS Collectively, root diseases, bark beetles, and oak decline were the leading contributor to the risk of mortality in the coterminous United States, while spruce beetle was the most significant contributor in Alaska. The confluence of bark beetles and root diseases has resulted in large contiguous areas at risk across much of the western United States. Emerald ash borer is the most significant exotic forest pest. Tree species with the potential to lose more than 50% of their host volume include redbay and whitebark pine.

While future climate change is not modeled within NIDRM, we expect that the climate changes projected over the next 15 years will significantly increase the number of acres at risk, and will include elevated risk from already highly destructive pests such as mountain pine beetle and engraver beetles (*Ips* spp.). Host trees such as whitebark pine would be at increased risk in future climate-change scenarios. ♦

FOR MORE INFORMATION AND ACCESS TO DATA
visit the 2012 NIDRM website

<http://www.fs.fed.us/foresthealth/technology/nidrm2012.shtml>





71.7 MILLION ACRES AT RISK IN THE COTERMINOUS UNITED STATES

