

Indicator 15. Area and Percent of Forest Affected by Processes or Agents Beyond the Range of Historic Variation (e.g., By Insects, Disease, Competition from Exotic Species, Fire, Storm, Land Clearance, Permanent Flooding, Salinisation, and Domestic Animals)

What Is the Indicator and Why Is It Important?

This indicator analyzes and reports the effects of climate, fire, insects, disease, and invasive plants on ecological processes in forests. When these processes are altered beyond some critical threshold, they may produce significant changes to forest condition.

What Does the Indicator Show?

Depending on available data for each process agent, the effects on the forest between 1996 and 2000 were

determined to be beyond the range of historic or recent variation. The range of historic variation is defined as the effects of the process or agent during the 1800 to 1850 (historic or baseline period). The range of recent variation is defined as the effects of the process or agent during the recent past (approximately 1920 to 2000). The analysis of historic variation was based primarily on anecdotal data while the analysis of recent variation relied on more quantitative data, particularly for the period 1979 to 1995.

Process, Agent, or Event	Beyond Historic Range (year)	Beyond Recent Range (year)
Climate		
El Nino and la Nina events of 1997–2000	--	1997-2000
Ice storm (Northeast)	--	1998
Fire		
Area burned (nationwide)	--	2000
Area burned (West)	--	1996, 1998, 2000
Indigenous insects		
Southern pine beetle (South)	1986, 1995	2000 (parts of AZ, FL, KY)
Mountain pine beetle	1981	--
Spruce beetle (AK)	1996	1996
Spruce budworm (ME)	1978	--
Spruce budworm (AK)	--	1997
Western spruce budworm (West)	1986	--
Douglas-fir tussock moth (ID, OR, WA, MT)	1973	--
Indigenous pathogens		
Dwarf mistletoes, western root diseases (West)	1950-2000	--
Fusiform rust (South), oak wilt (TX)	1950-2000	--
Oak decline (AR)	2000	--
White-tailed deer (North Region)	1950-2000	--
Exotic insects and diseases, diseases of unknown origin, and exotic invasive plants	All years since their introduction	

The behavior of many processes and agents has been altered due to human activities such as fire exclusion, intensive forest management, and introduction of exotic species. Although most indigenous insects were at lower levels during the 1996–2000 analysis period than in previous years, they still caused serious

regional and local damage to forests despite management actions to control them. Further details on the processes, agents, and events affecting U.S. forests can be found in the supporting technical document in the Data Report (see <http://www.fs.fed.us/research/sustain>).