

Model or Project Name	Source/ Vintage	Type	Geographic Extent/ Resolution	Metrics	Number of Species	Time- frame(s)	Predictor Variables	Future Climate
Climate Change Tree Atlas ^a	USFS Northern Research Station 2007– on-going	Empirical	30+ states in Eastern U.S. 20 km ²	Potential suitable habitat; species Importance Value ^b	134	2100	38 predictors, including: 7 climate variables, 5 elevation classes, 9 soil classes, 13 soil properties and 4 landuse variables	High and low scenarios from three GCMs (Hadley CM3, GFDL, & PCM)
ForeCASTS	USFS Eastern Forest Environmental Threat Assessment Center & NC State 2009	Empirical	Continental U.S.; Global 4 km ²	Future suitable habitat; straight- line minimum required migration distance from current suitable habitat to nearest favorable future habitat	213	2050; 2100	17 variables, including climatic, soil-related, and topographic	High and low scenarios from two GCMs (Hadley CM3 & PCM)
Canada's Plant Hardiness Site ^c	Natural Resources Canada 2007	Empirical	(Non-spatial)	Average change in area and latitude of climate habitat per species	130	2011-2040; 2041-2070; 2071-2100	Climate variables only (climate envelope developed for each species)	High and low scenarios from three GCMs (CGCM, CSIRO, & HADCM3)
Canada's Plant Hardiness Site: Species-specific Models and Maps ^d	Natural Resources Canada	Empirical	North America 300 arc sec (~10km ²)	Climate suitability zone (range and core range for each species)	3,000	2011-2040; 2041-2070; 2071-2100	Climate variables only	High, moderate, and low scenarios from five GCMs (CanESM2, HadGEM2-ES, CESM1 (CAM5), MIROC-ESM-CHEM, & composite-AR5)
USFS Moscow Lab: Plant Species and Climate Profile Predictions	USFS Rocky Mountain Research Station, Moscow Lab 2014	Empirical	11+ states in Western U.S. 30 arc sec (~0.65 km ²)	Species viability scores in the range of 0 to 1 (where low numbers indicate that the climate is not consistent with where the species grows and high numbers indicate consistency)	76	2030; 2060; 2090	Climate variables only	High, moderate, and low scenarios from three GCMs (CGCM3, HADCM3, & GFDLCM21)

USFS Vulnerability Assessments (see appendices in the following documents): <ul style="list-style-type: none"> • Central Appalachians • Central Hardwoods • Northern Wisconsin & Western Upper Michigan • Northern Lower & Eastern Upper Michigan • Minnesota • Northern Wisconsin • New England & Northern New York (<i>in press: 2016</i>) • Mid-Atlantic (<i>on-going</i>) 	USFS, Northern Institute of Applied Climate Science	Empirical & Process-based models (DISTRIB, LINKAGE S, LANDIS PRO)	(non-spatial)	Metrics vary depending on model, from species importance values (DISTRIB) to biomass per species (LINKAGES) and basal area or trees/acre (LANDIS PRO).	Variable	2010-2039; 2040-2060; 2070-2099 or 2040; 2070; 2090; 2100 (depending on model)	Variables include climate, soils, landuse, and elevation, depending on the model.	High and low scenarios from two GCMs (PCM & GFDL)
---	---	---	---------------	--	----------	--	---	---

Note: Most models use US Forest Service Forest Inventory and Analysis (FIA) data for species occurrence.

GCM = Global Climate Model

^a Includes estimates of model reliability for each species.

^b A measure of relative abundance, which is calculated from FIA based on basal area and number of stems.

^c Also see original paper from [McKenney et al \(2007\)](#).

^d As of 4/25/16 their servers are down, with no access to the species maps, but they are expected to be up again within a few weeks. CSV files of the climate envelopes are available for download and users can also query what species models intersect/overlap any selected location.