APPENDICES

APPENDIX 1: NATURAL COMMUNITY CROSSWALK WITH TEXAS PARKS AND WILDLIFE VEGETATION TYPES

Table A1.1—Natural Community Types and the Texas Parks and Wildlife Vegetation Types (Elliott et al. 2014) Found Within Each Type.

Natural Community Type	Vegetation Types
Upland Forest	Edwards Plateau: Ashe Juniper Motte and Woodland
	Edwards Plateau: Ashe Juniper Slope Forest
	Edwards Plateau: Oak - Ashe Juniper Slope Forest
	Edwards Plateau: Oak - Hardwood Slope Forest
	Native Invasive: Juniper Woodland
	Edwards Plateau: Deciduous Oak - Evergreen Motte and Woodland
Upland Woodland	Edwards Plateau: Live Oak Motte and Woodland
	Edwards Plateau: Oak - Hardwood Motte and Woodland
	Edwards Plateau: Post Oak Motte and Woodland
	Post Oak Savanna: Live Oak Motte and Woodland
	Post Oak Savanna: Post Oak - Yaupon Motte and Woodland
	Post Oak Savanna: Post Oak Motte and Woodland
	Native Invasive: Deciduous Woodland
	Edwards Plateau: Wooded Cliff/Bluff
Upland Mixed Shrubland	Edwards Plateau: Ashe Juniper-Live Oak Shrubland
	Edwards Plateau: Ashe Juniper-Live Oak Slope Shrubland
	Edwards Plateau: Shin Oak Shrubland
	Edwards Plateau: Shin Oak Slope Shrubland
	Native Invasive: Juniper Shrubland
	Native Invasive: Mesquite Shrubland
Floodplains and Terraces	Central Texas: Floodplain Deciduous Shrubland
	Central Texas: Floodplain Evergreen Forest
	Central Texas: Floodplain Evergreen Shrubland
	Central Texas: Floodplain Hardwood - Evergreen Forest
	Central Texas: Floodplain Hardwood Forest
	Central Texas: Floodplain Live Oak Forest
	Central Texas: Riparian Deciduous Shrubland
	Central Texas: Riparian Evergreen Shrubland
	Central Texas: Riparian Hardwood - Evergreen Forest
	Central Texas: Riparian Hardwood Forest
	Central Texas: Riparian Live Oak Forest
	Central Texas: Riparian Evergreen Forest
	Central Texas: Riparian Live Oak Forest
	Central Texas: Riparian Evergreen Forest
	Edwards Plateau: Floodplain Ashe Juniper Forest
	Edwards Plateau: Floodplain Ashe Juniper Shrubland
	Edwards Plateau: Floodplain Deciduous Shrubland
	Edwards Plateau: Floodplain Hardwood - Ashe Juniper Forest
	Edwards Plateau: Floodplain Hardwood Forest
	Edwards Plateau: Floodplain Live Oak Forest

Natural Community Type	Vegetation Types
	Edwards Plateau: Riparian Ashe Juniper Forest
	Edwards Plateau: Riparian Ashe Juniper Shrubland
	Edwards Plateau: Riparian Deciduous Shrubland
	Edwards Plateau: Riparian Hardwood - Ashe Juniper Forest
	Edwards Plateau: Riparian Hardwood Forest
	Edwards Plateau: Riparian Live Oak Forest

APPENDIX 2: SEASONAL CLIMATE TRENDS

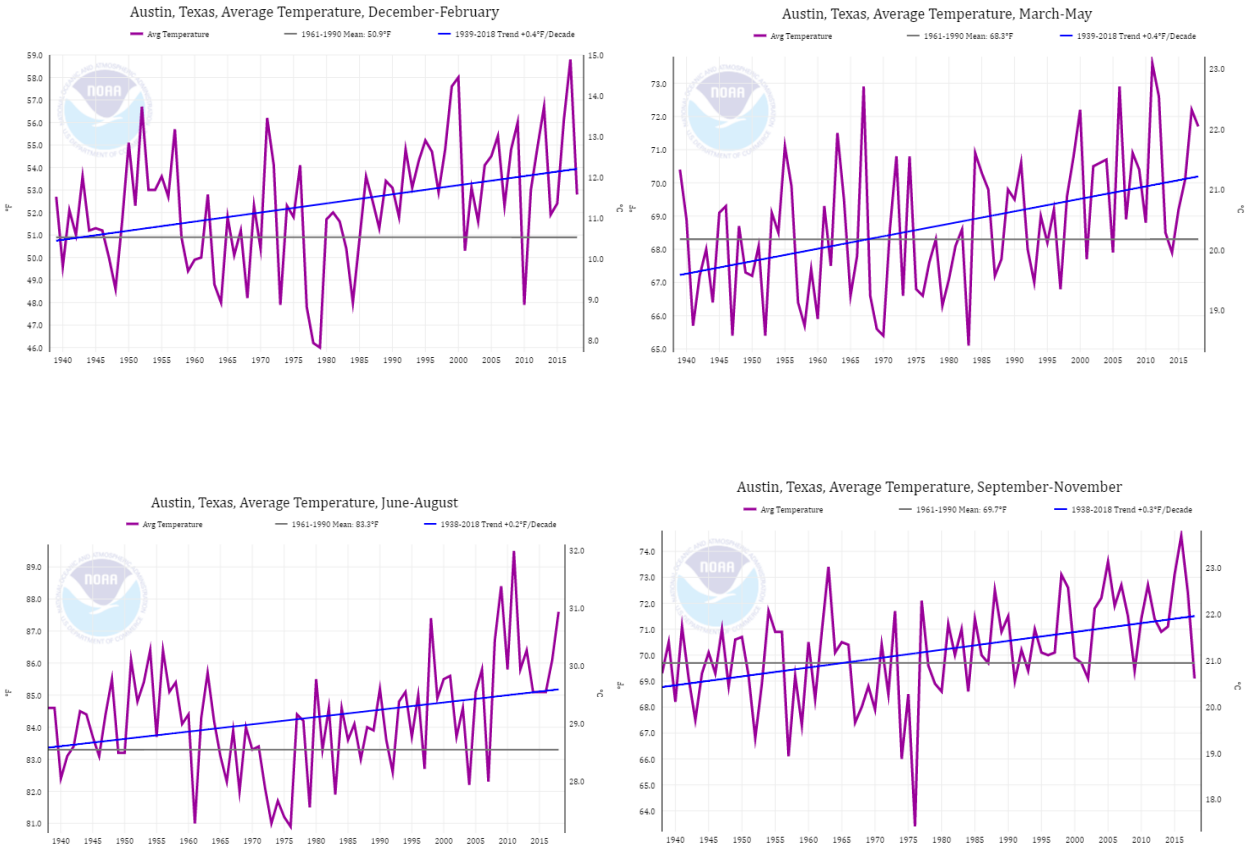

Figure A2.1 – Seasonal trends in mean temperature for Austin. Souce: NOAA Climate-at-a-glance tool.

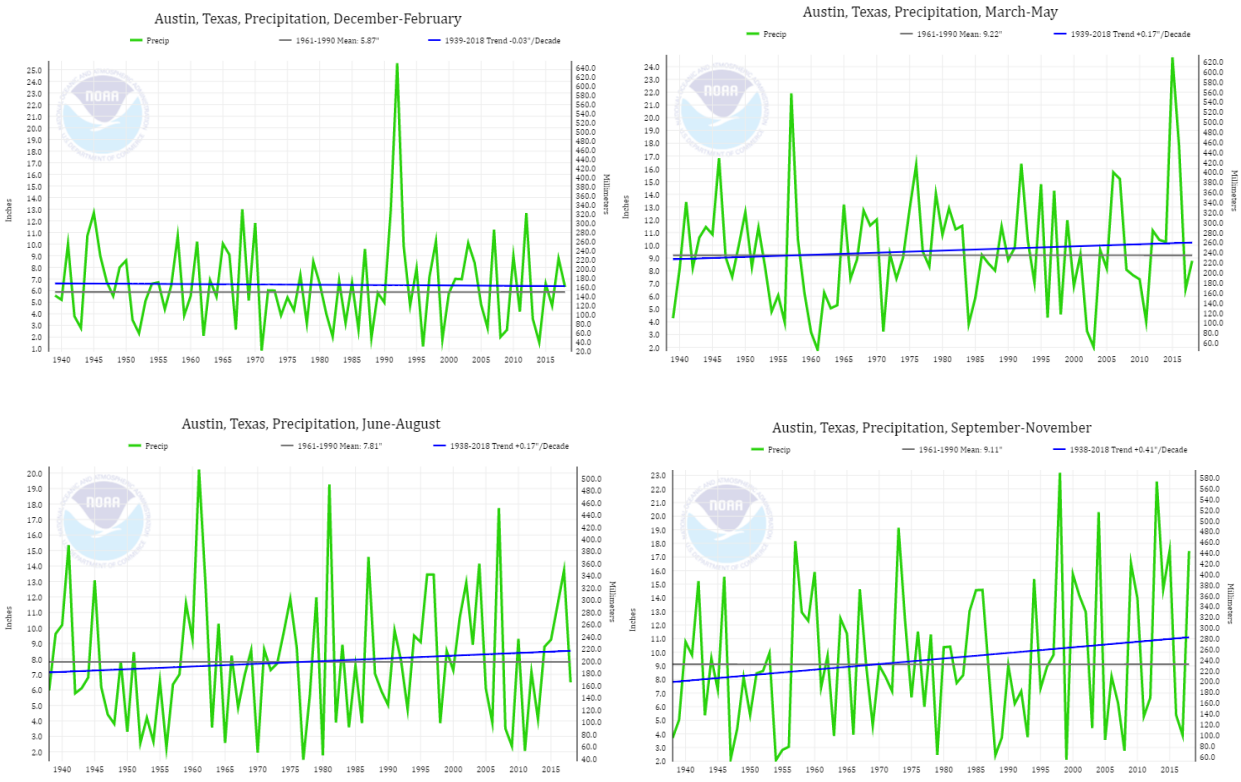

Figure A2.2 – Seasonal trends in mean temperature for Austin. Souce: NOAA Climate-at-a-glance tool.

APPENDIX 3. MODELED PROJECTIONS OF HABITAT SUITABILITY

The table below provides the current and modeled importance values for the species modeled using the Distrib-II species distribution model for trees in the 1 by 1 degree latitude/longitude grid cell bounded by 30 degree south and 97 degrees west. Definitions for headings and supporting documentation are below.

Common Name	Scientific Name	Model reliability	FIAsum	FIAiv	G45i	G85i	G45r	G85r	ChngCl45	ChngCl85
Ashe juniper	*Juniperus ashei*	High	1368.3	38.07	1247.31	1241.76	0.86	0.85	No change	No change
live oak	*Quercus virginiana*	High	742.94	23.37	846.3	828.55	1.07	1.05	No change	No change
post oak	*Quercus stellata*	High	430.91	23.41	243.79	236.93	0.53	0.52	Sm. dec.	Sm. dec.
cedar elm	*Ulmus crassifolia*	Medium	334.38	15.5	433.93	406.72	1.22	1.14	Sm. inc.	No change
eastern redcedar	*Juniperus virginiana*	Medium	235.27	13.87	161.26	169.59	0.64	0.68	Sm. dec.	Sm. dec.
loblolly pine	*Pinus taeda*	High	123.56	26.76	57.63	57.75	0.44	0.44	Sm. dec.	Sm. dec.
hackberry	*Celtis occidentalis*	Medium	43.24	8.25	52.54	53.57	1.14	1.16	No change	No change
blackjack oak	*Quercus marilandica*	Medium	39.64	5.83	50.52	50.95	1.2	1.21	Sm. inc.	Sm. inc.
pecan	*Carya illinoinensis*	Low	35.2	13.46	66.75	75.65	1.78	2.02	Sm. inc.	Lg. inc.
green ash	*Fraxinus pennsylvanica*	Low	28.59	5.65	25.55	30.38	0.84	1	No change	No change
sugarberry	*Celtis laevigata*	Medium	27.53	4.74	74.17	84.24	2.53	2.88	Lg. inc.	Lg. inc.
cittamwood/ gum bumelia	*Sideroxylon lanuginosum ssp. lanuginosum*	Low	20.31	3.9	17.1	18.78	0.79	0.87	Sm. dec.	No change
black walnut	*Juglans nigra*	Low	20.02	21.3	9.74	9.72	0.46	0.46	Sm. dec.	Sm. dec.
sycamore	*Platanus occidentalis*	Low	13.88	14.77	5.71	5.78	0.39	0.39	Sm. dec.	Sm. dec.
American elm	*Ulmus americana*	Medium	12.94	2.95	12.48	15.39	0.91	1.12	No change	No change
Osage-orange	*Maclura pomifera*	Medium	5.95	5.17	10.94	15.71	1.73	2.48	No change	No change
black oak	*Quercus velutina*	High	5.68	3.16	2.33	2.33	0.39	0.39	Sm. dec.	Sm. dec.
Shumard oak	*Quercus shumardii*	Low	5.49	3.73	2.88	2.86	0.49	0.49	Sm. dec.	Sm. dec.
winged elm	*Ulmus alata*	Medium	5.29	2.85	5.27	12.04	0.94	2.14	No change	No change
red mulberry	*Morus rubra*	Low	3.15	3.35	1.9	1.74	0.57	0.52	Sm. dec.	Sm. dec.
water oak	*Quercus nigra*	High	3.07	1.03	17.73	23.51	5.42	7.19	Sm. inc.	Sm. inc.
boxelder	*Acer negundo*	Low	2.17	9.23	1.61	1.61	0.7	0.7	No change	No change
black cherry	*Prunus serotina*	Medium	1.74	0.79	0.74	0.77	0.4	0.42	Sm. dec.	Sm. dec.
white ash	*Fraxinus americana*	Medium	1.34	0.57	0.49	0.48	0.34	0.34	Sm. dec.	Sm. dec.
black hickory	*Carya texana*	High	1.18	0.36	3.19	3.46	2.53	2.75	No change	No change
slippery elm	*Ulmus rubra*	Low	0.86	0.31	0.5	0.5	0.55	0.55	Sm. dec.	Sm. dec.
bur oak	*Quercus macrocarpa*	Medium	0.35	1.47	0.14	0.04	0.39	0.12	Sm. dec.	Lg. dec.
flowering dogwood	*Cornus florida*	Medium	0.18	0.11	0.03	0.02	0.18	0.12	Lg. dec.	Lg. dec.
bitternut hickory	*Carya cordiformis*	Low	0.08	0.08	0	0	0	0	Lg. dec.	Lg. dec.
honeylocust	*Gleditsia triacanthos*	Low	0.08	0.14	0.21	0.94	2.28	10.16	No change	Lg. inc.

Definitions

Heading	Heading Definition
Common Name	Species common name used by FIA.
Scientific Name	Species scientific name used by FIA.
Model Reliability	The model reliability of the species' model predicting current and future suitable habitat (High, Medium, Low) (see Peters et al. 2019).
FIAsum	The area-weighted sum of the importance values (IV) per 100 sq km, so it is based on both abundance and area occupied within the zone, calibrated to 10,000 sq km, the approximate area of 1x1 degree zone at 35 degrees latitude. This is the primary variable to sort on for ranked abundance of species within the region. These values have been corrected for partial 1x1 degree zones (to 10,000 sq km), and for varying sizes north to south (curvature of earth makes zones narrower towards the poles), or partial coastal grids, according their proportion of a full 1x1 degree zone at mid latitudes (35 degrees).
FIAiv	The average importance value (IV) according to FIA records for the species. This provides indication of abundance of the species where it is found, not including where it is absent.
G45i or G85i	The area-weighted sum of importance values (IV) per 100 sq km according to a Random Forest model for the species within cells, under the Representative Concentration Pathway (RCP) 4.5 (relatively low emission future) or 8.5 (high emission pathway) average of 3 general circulation modelsc (GCMs) by 2100. The 0-100 score is based on number of stems and basal area.
G45r or G85r	The ratio of future (2070-2099) suitable habitat (G45i or G85i) to actual (2001-2016) habitat (=act_sumIV), so that a ratio of 1 indicates no change in suitable habitat, <1 indicates a potential loss in habitat, and >1 indicates a potential gain in habitat by 2100 according to the lower (or higher) emissions scenario, average of 3 GCMs.
ChngCl45	Class of potential change in habitat suitability by 2100 according to the ratios of future (2070-2099) suitable habitat for an average of 3 GCMs to current (1981-2010) modeled habitat at RCP4.5.
ChngCl85	Class of potential change in habitat suitability by 2100 according to the ratios of future (2070-2099) suitable habitat for an average of 3 GCMs to current (1981-2010) modeled habitat at RCP8.5.

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Prasad, A. M., L. R. Iverson, S. N. Matthews and M. P. Peters (2016). A multistage decision support framework to guide tree species management under climate change via habitat suitability and colonization models, and a knowledge-based scoring system. Landscape Ecology 31(9): 2187-2204. DOI: 10.1007/s10980-016-0369-7

APPENDIX 4: MODIFYING FACTORS FOR ASSESSING THE ADAPTIVE CAPACITY OF TREE SPECIES IN URBAN AREAS

Modifying Factor scores, based on Matthews et al. (2011), were developed for 105 species that are either already present or have the potential to gain habitat in the Austin region (defined as Travis county and all adjacent counties). The purpose of these scores is to provide managers and policy-makers regional information about individual species which will allow potential suitable habitat distribution models to be considered in a local context based on specific variables within their jurisdiction. This approach will assist interpretation of modeled outputs as published on the Climate Change Atlas (Landscape Change Research Group 2014) and other species distribution models.

Several assumptions associated with climate change over the next 50 years in the Austin region were made to develop the scores. We assume, based on the literature reviews in this assessment:

- More drought conditions throughout the region because growing season average temperatures are projected to be higher in the future with only minimal increases in precipitation during this time in most scenarios.
- Higher exposure to fire events in natural areas due to higher average temperatures.
- Higher incidence of flooding due to more extreme precipitation patterns.
- Higher wind damage due to more intense pressure differences.
- Increase in several air and soil pollutants over the next 50 years as the area population increases and industry and transportation increases, which will be especially harsh in urban areas.
- Disease, insects, herbivory from deer (especially in natural areas), and invasive plants will increase or remain steady.
- Harvesting will be primarily for restoration efforts and for new land development.

There are several limitations to these scores. Landscapes, natural, urban, and rural, contain many diverse interactions between processes and patterns that influence the species that inhabit them. Although this analysis uses common factors that influence habitat at the local level to modify large scale projections, some factors that are not included might and should be considered by local managers where applicable.

It is also important to understand that severe events can influence many factors used to modify habitat projections. A long drought can influence dispersal, fire, insect development, and seedling establishment. Therefore these modifications are somewhat dynamic, and should be updated as needed by managers.

Scoring System

Each species was given individual scores for each Modifying Factor that was then weighted and converted into an overall Disturbance, Biological, and Adaptability score.

Below are the definitions for the scoring system:

FactorType- One of two influential Factor Types (Biological and Disturbance) which describe the variables used to modify the outputs of individual species distribution models.

ModFactor - A Modifying Factor that is considered to affect the establishment, growth, mortality rate, and regeneration of a species which could reduce or increase the habitat suitability or future abundance for that species. See below for specific details relating to each Modfactor for planted and naturally-occurring trees.

Score- A score, given as an integer ranging from -3 (negative effect on reproduction, growth, or survival) to +3 (positive effect on reproduction, growth, or survival) which relate to the potential influence a ModFactor has on the species throughout its range at the present.

Uncert - A default score (multiplier on Score) of how uncertain the ModFactor is in influencing the distribution of the species. Scores are 0.5 = highly uncertain; 0.75=somewhat uncertain; 1.0=low uncertainty that the ModFactor

will provide the influence. These values are also assigned preliminarily by the modeling team based on literature research. For example, if there is contradictory information in the literature, the score would be 0.5.

FutureRelevance- A value (also a multiplier to Score) referring to the likely potential Future Relevance that a particular ModFactor could have on the distribution of a species, over the next 50 years in a changing climate. Values range from 1=not highly relevant over next 50 years to 5=likely to be an extremely important ModFactor.

Weighted - A weighted score based on multiplication of the three default values (ScoreX UncerX FutureRelevance) for the species throughout its range.

Average Disturbance Score - The average of all the Weighted Disturbance Factor Scores – and relates to the relative overall impact of these factors.

Average Biological Score - The average of all the Weighted Biological Factor Scores– and relates to the relative overall impact of these factors.

Converted Dist Score - The average of all Disturbance Factor Scores (unweighted) +3 to remove negative values. Values can range from 0 to 6.

Converted Bio Score - The average Biological Factor Scores (unweighted) +3 to remove negative values. Values can range from 0 to 6.

Adapt Score - The hypotenuse of a right triangle created from the Converted Dist and Bio Score. Values can range from 0 to 8.5.

Adapt Class - Categories assigned based on Adapt Score. Low: less than 3.5. Moderate: 3.5-4.5. High: More than 4.5

Factors for Trees in natural and Other undeveloped areas

These scores were developed for native, naturalized, and invasive species in the Austin region for use in natural areas and others where trees naturally regenerate. Scores for native species were primarily based on those developed by Matthews et al. (2011), with most information derived from Burns and Honkala (1990). For invasive species, information was gleaned from various sources, including the USDA Plants Database (USDA 2015) and invasive species fact sheets developed by Federal and state agencies. Additional information for wind and ice storm susceptibility were taken from Hauer et al. (2006) and Duryea et al. (2007).

Defaults were kept consistent with Matthews et al. (2011), with a few exceptions. Insect and disease scores were modified to account for local pest and disease influences such as oak wilt and hypoxylon.

Factors that received a weighted score of less than -4.5 or greater than 4.5 were listed as contributing negatively or positively to the species' overall adaptability score in tables. Weighted scores between these two values were not listed.

DISTURBANCE FACTORS:

Disease - Accounts for the number and severity of known pathogens that attack a species. If a species is resistant to many pathogens, it is assumed that it will continue to be so in the future. If the mortality rate is low it is assumed that the species is not greatly affected by diseases. Thus, those species would receive positive scores. Defaults for all species: -1 Score, 0.75 Uncert, and 2 FutureRelevance.

Insect pests - Accounts for the number and severity of insects that may attack the species. If a species is resistant to attacks from known insect pests now or is adapted to cope with them, then it is assumed to be at least partially resistant in the future. This factor, although highly uncertain in overall effects, is likely to be very important over the next 50 years. Defaults for all species: -1 Score, 0.5 Uncert, and 4 FutureRelevance.

Browse - The extent to which browsing (by deer or other herbivores) has an effect on the species, either positive by promoting growth or by effective strategies for herbivory avoidance, or negative by over browsing. Defaults for all species: -2 Score (+1 if promoted by browsing), 0.75 Uncert, and 1 FutureRelevance.

Invasive plants - The effects of invasive plants on the species, either through competition for nutrients or as a pathogen. This factor is not yet well researched as to effects on individual tree species, but could be very important in the future as invasives are usually more readily adapted to changing environments, and can form monotypic stands that restrict regeneration. Defaults for all species: -3 Score, 0.5 Uncert, and 4 FutureRelevance.

Drought - Extended periods without sufficient access to water. Certain species are better adapted to drier conditions, allowing them to survive more frequent or prolonged droughts. Defaults for all species: -1 Score, 0.75 Uncert, and 5 FutureRelevance.

Flood - Frequent or prolonged periods of standing water. Species adapted to sustained flooding will be positively affected while species vulnerable to flooding will be negatively affected by the assumed greater flooding exposures under climate change. Defaults for all species: -1 Score, 0.75 Uncert, and 4 FutureRelevance.

Ice - The damaging effects of ice storms and potential for ice heaving on a species. Defaults for all species: -1 Score, 0.5 Uncert, and 2 FutureRelevance.

Wind – The damaging effects of wind storms and uprooting potential (and top breakage) of a species. -1 Score, 0.75 Uncert, and 2 FutureRelevance. If a species is susceptible to windthrow the standard default is -2 (Score); if resistant to windthrow, Score is +1.

Fire topkill - The effects of fire or fire suppression on the larger stems of a species (poles and sawtimber). Species adapted to fire will be positively affected by the assumed greater fire exposure under climate change, while species vulnerable to fire will be negatively affected. As a first approximation, bark thickness relates directly to this ModFactor. Defaults for all species: -1 Score, 0.75 Uncert, and 2 FutureRelevance.

Harvest – If the species is harvested using best management practices, is the species generally enhanced or diminished through time? If the best management practice includes replanting, that is included in the ranking. If the species is not a target species currently being managed within a harvest context, consider how the species responds when it is an incidental species in harvested stands. Since harvesting is generally low in urban areas, this defaults to 0 and is not factored in unless there is an active attempt at managing this species (e.g. removal of woody invasives). Defaults for all species: 0 Score, 0.5 Uncert, and 2 FutureRelevance

Temperature gradients - The effects of variations in the temperature gradient associated with a species. Species that currently occupy regions with a diverse range of temperatures are assumed to be better adapted to warmer and highly variable climates than species occupying regions with a small range of temperatures. Defaults for all species: 1 Score, 0.75 Uncert, and 2 FutureRelevance

Air Pollution - Airborne pollutants that affect, mostly negatively, a species' growth, health, and distribution. Includes acid rain, ozone. Defaults for all species: -2 Score, 0.75 Uncert, and 3 FutureRelevance.

Soil/Water Pollution-Pollutants in the soil and water that that affect, mostly negatively, a species' growth, health, and distribution. Defaults for all species: -1 Score, 0.5 Uncert, and 1 FutureRelevance.

BIOLOGICAL FACTORS:

Competition-light - The tolerance of a species towards light. Does the species grow better in shade, partial shade, or full sun? Default values depend on species tolerance level, and all with FutureRelevance of 3. Species intolerant to

shade receive -3 (Score) 0.75 (Uncert), Intermediate either -1, 0, 1 (Score) 0.5 (Uncert). Intermediate default is 0, with flexibility to go +1 or -1. Tolerant species have scores of +3 (Score) 0.75 (Uncert).

Edaphic Specificity - The specific soil requirements (e.g., pH, texture, organic content, horizon thickness, permeability) for a species to survive in a suitable habitat. Includes long-term soil moisture capacities of the soil. Species with general requirements have positive scores, and species with specific requirements have negative defaults. Unsuitable soils north of the current range of a species can be a barrier to migration. Defaults for all species: 0 Score, 0.75 Uncert, and 2 FutureRelevance.

Environmental habitat specificity - Considers the range of non-edaphic environmental characteristics (e.g., slope, aspect, topographic position, climatic modulation, specific associates) that the species requires. Also considers whether the species may be able to survive a changed climate in relatively small refugia (e.g., coves, N-facing slopes). Defaults for all species: 0 Score, 0.75 Uncert, and 3 FutureRelevance.

Dispersal - The species ability to effectively produce and distribute seeds; considers viability, production, production intervals, seed banking, dispersing agents (even humans), and other factors related to moving seeds across the landscape. Defaults for all species: 1 Score, 0.5 Uncert, and 3 FutureRelevance.

Seedling establishment - The ability of the species to regenerate with seeds to maintain future populations; considers the conditions required for establishment of seedlings and survival rates for seedlings, but not necessarily to the sapling stage. Defaults for all species: 1 Score, 0.75 Uncert, and 4 FutureRelevance.

Vegetative reproduction – The ability of the species to regenerate by means of stump sprouts or cloning (not necessarily growing into sapling sizes). Species that can reproduce vegetatively have positive defaults and those that cannot have negative defaults. Defaults assume some vegetative reproduction, so for all species: 1 Score, 0.75 Uncert, and 2 FutureRelevance.

Fire regeneration – The capability of the species to be enhanced in regeneration through fire, usually surface fires. This score will never be < 0 as it is only used if there is an extra benefit in fire to regenerate the species, above seedling establishment and vegetation reproduction. Defaults are 0 Score, 0.75 Uncert, and 2 FutureRelevance.

Below is an example natural score for boxelder (table A4.1).

Table A4.1 — Example of Natural Modifying Factor scores generated for the species boxelder.

FactorType	ModFactor	Score	Uncert	FutureRelevance	Weighted
Disturbance	Disease	-1	0.75	4	-3.00
Disturbance	Insect pests	-1	0.5	4	-2.00
Disturbance	Browse	-1	0.75	1	-0.75
Disturbance	Invasive plants	-1	0.5	4	-2.00
Disturbance	Drought	3	0.75	4	9.00
Disturbance	Flood	2	0.75	3	4.50
Disturbance	Ice	-2	0.5	1	-1.00
Disturbance	Wind	-2	0.75	2	-3.00
Disturbance	Fire topkill	-2	0.75	2	-3.00
Disturbance	Harvest	0	0.5	2	0.00
Disturbance	Temperature gradients	3	0.75	2	4.50
Disturbance	Air Pollution	-2	0.75	3	-4.50
Disturbance	Soil & water pollution	-1	0.5	1	-0.50
Biological	Competition-light	2	0.75	3	4.50
Biological	Edaphic specificity	2	0.75	2	3.00

Biological	Environmental habitat specificity	1	0.75	3	2.25
Biological	Dispersal	3	1	3	9.00
Biological	Seedling establishment	3	0.75	4	9.00
Biological	Vegetative reproduction	2	0.75	2	3.00
Biological	Fire regeneration	1	0.75	2	1.50
	Average dist score				-0.09
	Average bio score				-0.13
	Converted dist score				2.62
	Converted bio score				5.00
	Adapt score				5.64
	Adapt class				high

Factors for Planted Trees in developed areas

We created separate scores for trees planted in developed areas. Factors, scores, and weighting were modified from naturally-occurring trees to account for the different environments experienced by trees in more developed areas. Many biological factors were also altered to account for the fact that dispersal and natural reproduction are not typically factors for planted trees. Most information for native species was derived from Burns and Honkala (1990) with supplementary material relevant to cultivated environments from Gilman and Watson (1993). Most information for cultivars and nonnatives was taken from Gilman and Watson (1993). Additional information for wind and ice storm susceptibility were taken from Hauer et al. (2006) and Duryea et al. (2007).

Factors that received a weighted score of less than -4.5 or greater than 4.5 were listed as contributing negatively or positively to the species' overall adaptability score in tables. Weighted scores between these two values were not listed.

DISTURBANCE FACTORS:
Disease - Same as natural scores.

Insect pests - Same as natural scores.

Browse - Same as natural scores, but defaults to -1 because it is assumed herbivory would be lower in planted environments (primarily because larger trees are planted).

Invasive plants - Same as natural scores, but defaults to 0 because it is assumed that for the most part planted trees will be shielded from competition from invasive species.

Drought - Same as for natural scores, but future relevance is reduced from 5 to 3 because it is assumed that many planted trees will be watered during drought periods.

Flood - Same as natural scores.

Ice - Same as natural scores.

Wind – Same as natural scores.

Temperature gradients - Same as natural scores, except future relevance was increased from 2 to 3 because of the urban heat island effect.

Air Pollution - Same as natural scores, but default is reduced to -3 to account for the increased air pollution in developed areas.

Soil & Water Pollution - Same as natural scores, but default is reduced to -2 to account for greater pollution in developed areas.

BIOLOGICAL FACTORS:
Competition-light - Same as natural scores.

Edaphic Specificity - Same as natural scores.

Land-use/Planting Site Specificity - The ability for the species to be planted in a variety site types (street, residential, park, campus). Also considers the range of non-edaphic environmental characteristics (e.g., slope, aspect, topographic position, climatic modulation, specific associates) that the species requires. Defaults for all species: 0 Score, 0.75 Uncert, and 3 FutureRelevance.

Restricted Rooting Conditions and Coil Compaction - The ability of a species to grow and survive in narrow boulevards and other constrained spaces. Defaults for all species: -1 Score, 0.75 Uncert, and 3 FutureRelevance.

Nursery Production Potential -The ease and/or cost of producing the species in a nursery. Also relates to how widely available it is. Future Relevance is high for this factor because it will largely determine the extent to which the species is widely propagated and planted. For all species: 0.75 Uncert, and 4 FutureRelevance. If stock is widely available, Score is +2. If not currently available, Score is -2.

Planting Establishment - The ease at which the species establishes itself after planting. Also relates to the amount of care required to establish. Defaults for all species: 1 Score, 0.75 Uncert, and 2 FutureRelevance. -1 Score if not easily established.

Maintenance Required - The degree to which pruning or other maintenance is needed after establishment. Negative score indicates that maintenance is required. Defaults for all species: -1 Score, 0.75 Uncert, and 2 FutureRelevance. 1 Score if minimal maintenance required.

Invasive Potential - Likelihood the species could become invasive if planted. Applies to both native and nonnative species. Negative score indicates that a species is known to be or has the potential to be invasive. Defaults for all species: 0 Score, 0.75 Uncert, and 3 FutureRelevance. -3 Score if species is known to be invasive.

Below is an example planted score for boxelder (table A6.2)

Table A4.2 — Example of Planted Modifying Factor scores generated for the species boxelder.

FactorType	ModFactor	Score	Uncert	FutureRelevance	Weighted
Disturbance	Disease	-1	0.75	2	-1.50
Disturbance	Insect pests	-3	0.5	5	-7.50
Disturbance	Browse	-1	0.75	1	-0.75
Disturbance	Invasive plants	0	0.5	2	0.00
Disturbance	Drought	3	0.75	3	6.75
Disturbance	Flood	2	0.75	3	4.50
Disturbance	Ice	-1	0.5	2	-1.00
Disturbance	Wind	-1	0.75	2	-1.50
Disturbance	Temperature gradients	3	0.75	3	6.75
Disturbance	Air Pollution	-2	0.75	3	-4.50
Disturbance	Soil & Water Pollution	-2	0.5	1	-1.00

Biological	Competition-light	2	0.5	1	1.00
Biological	Edaphic specificity	2	0.75	2	3.00
Biological	Land use & planting site specificity	1	0.75	3	2.25
Biological	Restricted rooting conditions	1	0.75	3	2.25
Biological	Nursery propagation	-1	0.75	4	-3.00
Biological	Planting establishment	2	0.75	2	3.00
Biological	Maintenance required	-1	0.75	2	-1.50
Biological	Invasive potential	-3	0.75	3	-6.75
	Average dist score				0.02
	Average bio score				0.03
	Converted dist score				2.83
	Converted bio score				3.38
	Adapt score				4.41
	Adapt class				medium