Climate Change Atlas Tree Species Current and Potential Future Habitat, Capability, and Migration

USDA Forest Service Northern Research Station Landscape Change Research Group Iverson, Peters, Prasad, Matthews

sq. km sq. mi FIA Plots Area of Region 24,377 9,412.2 641

Species Information

The columns below provide breif summaries of the species associated with the region and described in the table on the next pages. Definitions are provided in the Excel file for this region.

Genus	Species								in Habitat Suitability	Capability	to Cope o	Migration Potential			
Ash	4			Ŋ	Model			Scenario	Scenario		Scenario	Scenario		SHIFT	SHIFT
Hickory	6	Abu	ndance	F	Reliability	Adaptability		RCP45	RCP85		RCP45	RCP85		RCP45	RCP85
Maple	4	Abundant	4	High	19	24	Increase	23	31	Very Good	9	12	Likely	0	0
Oak	20	Common	23	Medium	40	60	No Change	16	11	Good	12	17	Infill	16	19
Pine	7	Rare	58	Low	38	14	Decrease	40	37	Fair	14	11	Migrate	0	3
Other	44	Absent	16	FIA	6		New	9	9	Poor	18	16	•	16	22
•	85	_	101		103	98	Unknown	15	15	Very Poor	24	21			
							-	103	103	FIA Only	3	3			
										Unknown	9	9			
Potentia	d Chang	es in Climate Var	iahles							•	90	90			

Potentiai Changes in Climate variables

Temperatu	ıre (°F)				
	Scenario	2009	2039	2069	2099
Annual	CCSM45	61.3	62.9	64.7	64.8
Average	CCSM85	61.3	63.2	65.4	68.0
	GFDL45	61.3	64.3	66.1	67.0
	GFDL85	61.3	64.0	67.2	70.7
	HAD45	61.3	63.0	65.7	66.9
	HAD85	61.3	63.4	66.4	70.0
Growing	CCSM45	75.0	76.4	77.9	78.3
Season	CCSM85	75.0	76.5	78.8	81.9
May—Sep	GFDL45	75.0	78.2	80.1	81.4
	GFDL85	75.0	78.0	81.5	85.3
	HAD45	75.0	77.0	79.3	80.7
	HAD85	75.0	77.0	80.6	84.2
Coldest	CCSM45	40.9	43.1	44.0	44.2
Month	CCSM85	40.9	43.3	44.2	45.5
Average	GFDL45	40.9	44.0	44.5	45.2
	GFDL85	40.9	42.9	43.9	45.0
	HAD45	40.9	41.3	43.1	43.5
	HAD85	40.9	41.7	42.9	44.5
Warmest	CCSM45	80.0	81.4	82.3	82.3
Month	CCSM85	80.0	81.6	83.1	84.4
Average	GFDL45	80.0	82.4	83.5	84.5
	GFDL85	80.0	83.1	84.8	87.0
	HAD45	80.0	82.2	83.6	84.1
	HAD85	80.0	82.5	84.6	86.6

Precipitati	on (in)				
	Scenario	2009	2039	2069	2099
Annual	CCSM45	50.2	55.4	57.1	56.8
Total	CCSM85	50.2	55.6	57.2	63.5
	GFDL45	50.2	53.9	57.1	59.7
	GFDL85	50.2	53.0	57.7	58.1
	HAD45	50.2	53.7	53.3	51.8
	HAD85	50.2	56.1	51.4	49.2
Growing	CCSM45	25.2	30.7	31.4	31.4
Season	CCSM85	25.2	29.0	30.6	34.1
May—Sep	GFDL45	25.2	27.1	29.3	31.1
	GFDL85	25.2	26.3	30.2	30.9
	HAD45	25.2	27.3	26.2	24.2
	HAD85	25.2	28.4	24.7	21.5

NOTE: For the six climate variables, four 30-year periods are used to indicate six potential future trajectories. The period ending in 2009 is based on modeled observations from the PRISM Climate Group and the three future periods were obtained from the NASA NEX-DCP30 dataset. Future climate projections from three models under two emission scenarios show estimates of each climate variable within the region. The three models are CCSM4, GFDL CM3, and HadGEM2-ES and the emission scenarios are the 4.5 and 8.5 RCP. The average value for the region is reported, even though locations within the region may vary substantially based on latitude, elevation, land-use, or other factors.

Cite as: Iverson, L.R.; Prasad, A.M.; Peters, M.P.; Matthews, S.N. 2019. Facilitating Adaptive Forest Management under Climate Change: A Spatially Specific Synthesis of 125 Species for Habitat Changes and Assisted Migration over the Eastern United States. Forests. 10(11): 989. https://doi.org/10.3390/f10110989.



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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO N	N
loblolly pine	Pinus taeda	WDH	High	83.8	3968.3	27.5	5 No change	No change	Medium	Abundant	Good	Good			1	1
red maple	Acer rubrum	WDH	High	84.7	1399.5	10.4	4 Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	2
sweetgum	Liquidambar styraciflua	WDH	High	79.1	1244.3	8.8	No change	No change	Medium	Abundant	Good	Good			1	3
pond pine	Pinus serotina	NSH	Medium	26.9	647.0	18.3	1 No change	No change	Low	Abundant	Fair	Fair			0	4
swamp tupelo	Nyssa biflora	NDH	Medium	52.7	482.2	5.9	9 Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	5
yellow-poplar	Liriodendron tulipifera	WDH	High	41	430.5	5.2	2 Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	6
water oak	Quercus nigra	WDH	High	44	250.4	3.3	3 Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	7
redbay	Persea borbonia	NSL	Low	46.6	221.4	3.0	No change	No change	High	Common	Good	Good			1	8
American holly	llex opaca	NSL	Medium	39.6	178.1	1.8	8 Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	9
green ash	Fraxinus pennsylvanica	WSH	Low	26.5	159.2	5.0	O Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	10
water tupelo	Nyssa aquatica	NSH	Medium	7.6	155.0	10.3	1 No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	0	11
sweetbay	Magnolia virginiana	NSL	Medium	47.3	152.8	2.5	5 Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	12
bald cypress	Taxodium distichum	NSH	Medium	20.4	149.9		5 Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	13
loblolly-bay	Gordonia lasianthus	NSH	Medium	14.4	149.2		No change	Sm. dec.	Medium	Common	Fair	Poor	Infill +	Infill +	1	14
white oak	Quercus alba	WDH	Medium	20.6	123.7		1 Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	15
southern red oak	Quercus falcata	WDL	Medium	16.2	94.5	2.0	D Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	16
black cherry	Prunus serotina	WDL	Medium	19.4	75.0		7 Sm. inc.	Lg. inc.	Low	Common	Fair	Good				17
American beech	Fagus grandifolia	WDH	High	12.3	74.7		2 Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +		18
blackgum	Nyssa sylvatica	WDL	Medium	27.4	74.3		3 Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good				19
pond cypress	Taxodium ascendens	NSH	Medium	6.6	72.1		4 No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +		20
American hornbeam; muscl		WSL	Low	21	70.3		9 Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good				21
longleaf pine	Pinus palustris	NSH	Medium	4.9	70.1		2 Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++		
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	11.1	66.2		1 Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor				23
laurel oak	Quercus laurifolia	NDH	Medium	18.9	65.9		5 Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good				
willow oak	Quercus phellos	NSL	Low	17.5	65.3		9 Lg. inc.	Lg. inc.		Common	Very Good	Very Good				25
American elm	Ulmus americana	WDH	Medium	22	62.2		Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good	Infill ++	Infill ++		26
swamp chestnut oak	Quercus michauxii	NSL	Low	15.4	58.6		No change	Sm. inc.	Medium	Common	Fair	Good				27
sourwood	Oxydendrum arboreum	NDL	High	16.5	48.4		5 Lg. dec.	Lg. dec.	High	Rare	Poor	Poor				28
cherrybark oak; swamp red	'	NSL	Medium	8.8	43.0		No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +		29
Virginia pine	Pinus virginiana	NDH	High	3.4	39.8		3 Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor				30
black willow	Salix nigra	NSH	Low	7	36.7		No change	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +		31
mockernut hickory	Carya alba	WDL	Medium	9.4	35.7		No change	No change	High	Rare	Fair	Fair	Infill +	Infill +		32
sassafras	Sassafras albidum	WSL	Low	3.6	35.5		7 Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor	111111111111111111111111111111111111111	11111111111		33
black oak	Quercus velutina	WDH	High	7.3	31.2		O Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				34
slash pine	Pinus elliottii	NDH	High	1	27.5		9 Lg. inc.	Lg. inc.	Medium	Rare	Good	Good				35
flowering dogwood	Cornus florida	WDL	Medium	11.6	27.5		No change	Sm. inc.	Medium	Rare	Poor	Fair				36
eastern redcedar	Juniperus virginiana	WDH	Medium	4.7	26.5		3 Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				37
slippery elm	Ulmus rubra	WSL	Low	6.3	25.0		9 Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				38
sycamore	Platanus occidentalis	NSL	Low	3.2	24.4		No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +		39
chestnut oak	Quercus prinus	NDH	High	1.1	21.4		5 Lg. dec.	Lg. dec.	High	Rare	Poor	Poor	111111111111111111111111111111111111111	11111111111	0	40
	·	WDL	Medium	5	21.4		O Sm. dec.	•	Medium							41
pignut hickory	Carya glabra	NSH	FIA	4.2	19.9			Sm. dec.		Rare	Very Poor	Very Poor				41
pumpkin ash	Fraxinus profunda						4 Unknown	Unknown	NA	Rare	FIA Only	FIA Only	Infill +	Infill ++		
post oak black locust	Quercus stellata	WDH NDH	High	6.9 1.1	18.0 14.9		4 No change	Lg. inc.	High Medium	Rare	Fair	Good	1111111 +	1111111 ++		43
	Robinia pseudoacacia		Low				8 Very Lg. dec.	Very Lg. dec.		Rare	Lost	Lost		Indill .		
common persimmon	Diospyros virginiana	NSL	Low	4.3	14.5		7 Lg. dec.	Sm. dec.	High	Rare	Poor	Poor	I f :II	Infill +		45
northern red oak	Quercus rubra	WDH	Medium	3.6	14.5		1 Lg. dec.	Lg. dec.	High	Rare	Poor	Poor	Infill +	Infill +		46
river birch	Betula nigra	NSL	Low	2.5	13.3	2.6	6 No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1	47



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Secrite Description Cell Secription Cell S	Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv ChngCl	45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO N	N
Developer Deve	hackberry	Celtis occidentalis	WDH	Medium	1.1	12.9	3.5 Sm. ded	c. :	Sm. dec.	High	Rare	Poor	Poor			0	48
Examine ash Faximus carollininal NSL Flack 1	scarlet oak	Quercus coccinea	WDL	Medium	3.8	12.2	0.6 Sm. ded	c.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	49
Section Suglarism Suglar	boxelder	Acer negundo	WSH	Low	2.9	10.3	1.6 Lg. dec.	•	Lg. dec.	High	Rare	Poor	Poor		Infill +	2	50
Description contrownood Deputing definities NSH Description De	Carolina ash	Fraxinus caroliniana	NSL	FIA	3.1	9.5	4.7 Unknov	wn	Unknown	NA	Rare	FIA Only	FIA Only			0	51
Segretable Control Control Segretable Segretabl	black walnut	Juglans nigra	WDH	Low	1	9.2	1.9 Sm. ded	c. :	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	52
Signatery Celtis faewgata NDH Medium NDH Signate	eastern cottonwood	Populus deltoides	NSH	Low	2.5	8.1	1.1 Sm. ded	c. :	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	53
Income No. High Wish	turkey oak	Quercus laevis	NSH	Medium	0.1	6.6	0.5 No char	nge	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	54
Pastern bophornbeam; Iromw Ostrya virginiana WSL Low MSL Low WILL Low Rare Lig dec. Lig de	sugarberry	Celtis laevigata	NDH	Medium	0.3	6.4	2.9 Lg. inc.		Lg. inc.	Medium	Rare	Good	Good			2	55
white sh	live oak	Quercus virginiana	NDH	High	0.7	6.3	2.1 Lg. inc.		Lg. inc.	Medium	Rare	Good	Good			2	56
Develop able Control	eastern hophornbeam; iron	w Ostrya virginiana	WSL	Low	3.4	5.5	1.2 Sm. ded	c.	No change	High	Rare	Poor	Fair		Infill +	2	57
Shagbark hickory Carya ovata W.S. Medium 0.9 4.2 1.8 Eg. dec. Lg. dec. Lg. dec. Low Rare Very Poor Very Poor 0.0 2.0 2.0 2.0	white ash	Fraxinus americana	WDL	Medium	2.6	4.7	0.6 Lg. dec.		Lg. dec.	Low	Rare	Very Poor	Very Poor			0	58
Pro	overcup oak	Quercus lyrata	NSL	Medium	3.8	4.6	0.8 Lg. inc.		Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	59
Paulownia Paulownia mentosa NSL FIA 0.7 3.7 0.5 Unknown Unknown NA Rare Rare Fair Good 2 2 62	shagbark hickory	Carya ovata	WSL	Medium	0.9	4.2	1.8 Lg. dec.		Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	60
winged elm Ulmus alata WDL Medium 1.1 3.7 0.4 Sm. inc. Lg, inc. Medium Rare Fair Good 2 6.8 Shumard dak Quercus shumardii NSL Low 1.8 3.2 0.9 Sm. dec. Sm. dec. Lg, inc. Low Per Yep Poor 9 0 6.5 2.5 2.1 Lg, dec. Lg, dec. Hedium Rare Yeey Poor Fair Infill + 2 6.5 1.1 Lg, dec. Lg, dec. Hedium Rare Yeey Poor Yeey Poor 0 6.6 6.6 1.1 8.8 5.0 0 6.6 1.1 8.8 5.0 0 6.6 1.2 </td <td>pin oak</td> <td>Quercus palustris</td> <td>NSH</td> <td>Low</td> <td>0.1</td> <td>4.1</td> <td>0.6 Lg. dec.</td> <td></td> <td>Lg. dec.</td> <td>Low</td> <td>Rare</td> <td>Very Poor</td> <td>Very Poor</td> <td></td> <td></td> <td>0</td> <td>61</td>	pin oak	Quercus palustris	NSH	Low	0.1	4.1	0.6 Lg. dec.		Lg. dec.	Low	Rare	Very Poor	Very Poor			0	61
Sumard oak Quercus shumardii NSL Low 1.8 3.2 0.9 Sm. dec. Sm. dec. High Rare Poor Poor Poor 6 6 6 6 6 6 6 6 6	paulownia	Paulownia tomentosa	NSL	FIA	0.7	3.7	0.6 Unknov	wn	Unknown	NA	Rare	NNIS	NNIS			0	62
Pecan Carya illinoinensis NSH Low 0.4 2.8 6.8 Sm. dec. Lg. dec. Lg. dec. Medium Rare Very Poor Fair Infill + 2 6.5	winged elm	Ulmus alata	WDL	Medium	1.1	3.7	0.4 Sm. inc.		Lg. inc.	Medium	Rare	Fair	Good			2	63
red mulberry	Shumard oak	Quercus shumardii	NSL	Low	1.8	3.2	0.9 Sm. ded	с.	Sm. dec.	High	Rare	Poor	Poor			0	64
Borida maple	pecan	Carya illinoinensis	NSH	Low	0.4	2.8	6.8 Sm. ded	c.	Lg. inc.	Low	Rare	Very Poor	Fair		Infill +	2	65
bitternut hickory Carya cordiformis WSL Low 0.5 2.1 1.8 Sm. dec. Sm. dec. High Rare Poor Poor 0 68	red mulberry	Morus rubra	NSL	Low	0.6	2.5	0.3 Lg. dec.		Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	66
Allanthus Allanthus altissima NSL FIA 0.8 2.1 0.7 Unknown Unknown NA Rare NRIS NNIS 0.6 9 19 1.1 5m. dec. Sm. dec. Medium Rare Very Poor Very Poor 0.7 70 70 80 80 9 90 90 90 90 90	florida maple	Acer barbatum	NSL	Low	0.5	2.3	2.1 Lg. dec.		Lg. dec.	High	Rare	Poor	Poor			0	67
cucumbertree Magnolia acuminata NSL Low 0.9 1.9 1.1 Sm. dec. Sm. dec. Medium Rare Finus echinata WDH High 0.5 1.8 2.0 lg. inc. Lg. inc. Medium Rare Good Good 2 7 71 sm. dec. Sm. dec. Medium Rare Good Good 1 7 71 sm. dec. Sm. dec. Medium Rare Good Good 1 7 71 sm. dec. Sm. dec. Medium Rare Good Good 1 7 71 sm. dec. Sm. dec. Medium Rare Fair Good Infill 2 7 2 73 sm. dec. Medium Rare Fair Good Infill 2 7 2 73 sm. dec. Medium Rare Fair Good Infill 2 7 2 73 sm. dec. Medium Rare Fair Good Infill 2 7 2 73 sm. dec. Medium Rare Fair Good Infill 2 7 2 73 sm. dec. Medium Rare Fair Good Infill 2 7 2 73 sm. dec. Medium Rare Fair Good Infill 2 7 2 73 sm. dec. Medium Rare Fair Good Infill 2 7 2 75 serviceberry Amelanchier spp. NSL low 1.8 0.6 0.2 Sm. dec. Sm. dec. Medium Rare Fair Good Infill 2 7 2 75 serviceberry Prunus virginiana NSLX FIA 0 2 0.1 Unknown Unknown Medium Rare Fair Good Infill 2 7 75 serviceberry Prunus virginiana NSLX FIA 0 2 0.1 Lg. dec. Lg. dec. Medium Rare FiA Only FIA Only 0 7 76 chokecherry Prunus virginiana NSLX Medium 0 0 0 2 0.1 Lg. dec. Lg. dec. Lw. Rare Very Poor Very Poor Very Poor 0 7 76 chikapin oak Quercus muehienbergii NSL Medium 0 0 0 2 0.1 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 0 7 80 bigleaf magnolia Magnolia macrophylla NSL Low 0.3 0.2 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 0 80 bigleaf magnolia Magnolia macrophylla NSL Low 0.3 0.2 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 0 80 80 bigleaf magnolia Magnolia macrophylla NSL Low 0.3 0.4 0.5 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 0 80 80 80 80 80 80 80 80 80 80 80 80	bitternut hickory	Carya cordiformis	WSL	Low	0.5	2.1	1.8 Sm. dec	c. :	Sm. dec.	High	Rare	Poor	Poor			0	68
Shortleaf pine Pinus echinata WDH High 0.5 1.8 2.0 Lg. inc. Lg. inc. Medium Rare Good Good 2 71	ailanthus	Ailanthus altissima	NSL	FIA	0.8	2.1	0.7 Unknov	wn	Unknown	NA	Rare	NNIS	NNIS			0	69
southern magnolia Magnolia grandiflora NSL Low 0.8 1.7 0.6 Sm. inc. Lg. inc. Medium Rare Fair Good Infill + 2 72 blackjack oak Quercus marilandica NSL Medium 1.2 1.5 0.5 Very Lg. dec. Sm. inc. High Rare Lost Good 2 73 water hickory Carya aquatica NSL Medium 0.6 1.1 0.3 Sm. inc. Lg. inc. Medium Rare Very Poor Lost 0 74 water hickory Carya aquatica NSL Medium 0.6 1.1 0.3 Sm. inc. Lg. inc. Medium Rare Very Poor Lost 0 75 serviceberry Amelanchier spp. NSL Low 1.8 0.6 0.2 Sm. dec. Wery Lg. dec. Medium Rare Very Poor Very Poor Lost 0 75 serviceberry Prunus virginiana NSLX FlA 0 0.2 0.1 Lg. dec. Sm. dec. Medium Rare Fair Good Infill + 2 75 serviceberry Prunus virginiana NSLX FlA 0 0.2 0.1 Lg. dec. Medium Rare Very Poor Very Poor 0 0 78 bigtooth aspen Populus grandidentata NSL Medium 0 0.2 0.1 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 0 78 bigtooth aspen Populus grandidentata NSL Medium 0 0.2 0.1 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 0 79 bigtooth aspen Populus grandidentata NSL Low 0.3 0.2 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 0 79 bigtooth aspen Populus grandidentata NSL Low 0.3 0.2 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 0 80 bigtooth aspen Populus grandidentata NSL Low 0.3 0.2 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 0 80 bigtooth aspen Populus grandidentata NSL Low 0.3 0.2 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 0 80 80 bigtooth aspen NSL Low 0.3 0.2 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 0 80 80 80 80 80 80 80 80 80 80 80 80	cucumbertree	Magnolia acuminata	NSL	Low	0.9	1.9	1.1 Sm. dec	c. :	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	70
blackjack oak Quercus marilandica NSL Medium 1.2 1.5 0.5 Very Lg. dec. Sm. inc. High Rare Very Poor Lost 0 74 yayayaw Asimina triloba NSL Low 0.8 1.2 0.6 Lg. dec. Very Lg. dec. Medium Rare Very Poor Lost 0 74 water hickory Carya aquatica NSL Medium 0.6 1.1 0.3 Sm. inc. Lg. inc. Medium Rare Very Poor Very Poor O 75 serviceberry Amelanchier spp. NSL Low 1.8 0.6 0.2 Sm. dec. Sm. dec. Medium Rare Very Poor Very Poor O 76 chokecherry Prunus virginiana NSLX FIA 0 0.2 0.1 Unknown Unknown Medium Rare Fiar Good Infill Piar O 77 eastern white pine Pinus strobus WDH High 0.1 0.2 0.1 Lg. dec. Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 77 chinkapin oak Quercus muehlenbergii NSL Medium 0 0.2 0.1 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 79 chinkapin oak Quercus muehlenbergii NSL Low 0.3 0.2 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 79 chinkapin oak Quercus muehlenbergii NSL Low 0.3 0.2 0.2 Sm. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 80 bigleaf magnolia Magnolia macrophylla NSL Low 0.3 0.2 0.2 Sm. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 81 sugar maple Acer saccharum WDH High 0.4 0.1 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 81 sugar maple Acer saccharum WDH High 0.4 0.1 0.3 Lg. dec. Lg. dec. Medium Rare Poor Poor 0 0 82 white mulberry Morus alba NSL FIA 0.5 0.1 0.5 Unknown Unknown NA Rare NNIS NNIS NNIS 0 83 swamp white oak Quercus bicloir NSL Low 0.4 0.1 0.3 Lg. dec. Lg. dec. High Rare Poor Poor Very Poor 0 2 82 Sand pine Pinus clausa NDH High 0 0 0 New Habitat New Hab	shortleaf pine	Pinus echinata	WDH	High	0.5	1.8	2.0 Lg. inc.		Lg. inc.	Medium	Rare	Good	Good			2	71
blackjack oak Quercus marilandica NSL Medium NSL Low 0.8 1.2 0.5 Very Lg. dec. Sm. inc. High Rare Very Poor Lost 0 74 water hickory Carya aquatica NSL Medium 0.6 1.1 0.3 m. inc. Lg. inc. Medium Rare Fair Good Infill 2 75 serviceberry Amelanchier spp. NSL Low 1.8 0.6 0.2 Sm. dec. Sm. dec. Medium Rare Fair Good Infill 2 75 serviceberry Amelanchier spp. NSL Low 1.8 0.6 0.2 Sm. dec. Sm. dec. Medium Rare Fair Good Infill 2 76 chokecherry Prunus virginiana NSLX FIA 0 0.2 0.1 Unknown Unknown Medium Rare FiA Only FIA Only 0 77 eastern white pine Pinus strobus WDH High 0.1 0.2 0.1 Lg. dec. Lg. dec. Low Rare Very Poor Very Poor 0 78 chikkapin oak Quercus muehlenbergii NSL Medium 0.3 0.2 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 79 chinkapin oak Quercus muehlenbergii NSL Medium 0.3 0.2 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 80 bigleaf magnolia Magnolia macrophylla NSL Low 0.3 0.2 0.2 Sm. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 80 bigleaf magnolia Acer saccharum WDH High 0.4 0.1 0.3 Lg. dec. Lg. dec. High Rare Poor Poor 0 81 swapar maple Acer saccharum WDH High 0.4 0.1 0.3 Lg. dec. Lg. dec. High Rare Poor Poor 0 82 white mulberry Morus alba NSL FIA 0.5 0.1 0.5 Unknown Unknown NA Rare NNIS NNIS NNIS 0 83 swamp white oak Quercus bicolor NSL Low 0.4 0.1 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 82 Scape-orange Maclura pomifera NDH Medium 0.1 0.1 0.5 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 82 Scape-orange Maclura pomifera NDH Medium 0.1 0.1 0.5 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 83 Scape-orange Pinus glabra NSL Low 0 0 0 0 New Habitat New Habitat Low Absent New Habitat	southern magnolia	Magnolia grandiflora	NSL	Low	0.8	1.7	0.6 Sm. inc.		Lg. inc.	Medium	Rare	Fair	Good	Infill +		2	72
water hickory Carya aquatica NSL Medium 0.6 1.1 0.3 Sm. inc. Lg. inc. Medium Rare Fair Good Infill + 2 75 serviceberry Amelanchier spp. NSL Low 1.8 0.6 0.2 Sm. dec. Sm. dec. Medium Rare Very Poor Very Poor 0 76 chokecherry Prunus virginiana NSLX FIA 0 0.2 0.1 Unknown Unknown Medium Rare FIA Only FIA Only 0 77 eastern white pine Pinus strobus WDH High 0.1 0.2 0.1 Lg. dec. Lg. dec. Low Rare Very Poor Very Poor 0 78 bigtooth aspen Populus grandidentata NSL Medium 0 0.2 0.1 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 79 chinkapin oak Quercus muchlenbergii NSL Medium 0.3 0.2 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 80 bigleaf magnolia macrophylla NSL Low 0.3 0.2 0.2 Sm. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 81 sugar maple Acer saccharum WDH High 0.4 0.1 0.3 Lg. dec. Lg. dec. High Rare Poor Poor 0 81 swamp white oak Quercus bicolor NSL Low 0.4 0.1 0.3 Lg. dec. Lg. dec. High Rare Poor Poor 0 82 white mulberry Morus alba NSL FIA 0.5 0.1 0.5 Unknown Unknown NA Rare NNIS NNIS 0 83 Samd pine Pinus clausa NDH High 0.1 0.1 0.0 Lg. dec. Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 84 Samp white oak Quercus bicolor NSL Low 0.4 0.1 0.3 Lg. dec. Lg. dec. Lg. dec. Medium Rare Poor Poor 0 84 Samp white oak Quercus bicolor NSL Low 0.4 0.1 0.3 Lg. dec. Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 84 Samp white oak Quercus bicolor NSL Low 0.4 0.1 0.3 Lg. dec. Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 84 Samp white oak Quercus bicolor NSL Low 0.4 0.1 0.3 Lg. dec. Lg. dec. Lg. inc. High Rare Poor Good 2 2 85 Sand pine Pinus clausa NDH High 0.0 0.0 New Habitat New Hab	blackjack oak		NSL	Medium	1.2	1.5	0.5 Very Lg	. dec.	Sm. inc.	High	Rare	Lost	Good			2	73
serviceberry Amelanchier spp. NSL Low 1.8 0.6 0.2 Sm. dec. Sm. dec. Medium Rare Very Poor Very Poor 0 76 chokecherry Prunus virginiana NSLX FIA 0 0.2 0.1 Unknown Unknown Medium Rare FIA Only FIA Only 0 77 eastern white pine Pinus strobus WDH High 0.1 0.2 0.1 Lg. dec. Lg. dec. Low Rare Very Poor Very Poor 0 78 bigtooth aspen Populus grandidentata NSL Medium 0 0.2 0.1 Lg. dec. Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 79 chinkapin oak Quercus muehlenbergii NSL Medium 0.3 0.2 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 79 chinkapin oak Quercus muehlenbergii NSL Low 0.3 0.2 0.2 Sm. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 80 bigleaf magnolia Magnolia macrophylla NSL Low 0.3 0.2 0.2 Sm. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 81 sugar maple Acer saccharum WDH High 0.4 0.1 0.3 Lg. dec. Lg. dec. High Rare Poor Poor 0 82 white mulberry Morus alba NSL FIA 0.5 0.5 Unknown Unknown NA Rare NNIS NNIS 0 83 swamp white oak Quercus bicolor NSL Low 0.4 0.1 0.3 Lg. dec. Lg. dec. High Rare Poor Poor 0 84 Qosage-orange Maclura pomifera NDH Medium 0.1 0.1 0.0 Lg. dec. Lg. inc. High Rare Poor Good 2 85 sand pine Pinus clausa NDH High 0 0 0 New Habitat New Habit	pawpaw	Asimina triloba	NSL	Low	0.8	1.2	0.6 Lg. dec.		Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	74
chokecherry Prunus virginiana NSLX FIA 0 0.2 0.1 Unknown Unknown Medium Rare FIA Only FIA Only 0.77 eastern white pine Pinus strobus WDH High 0.1 0.2 0.1 Lg. dec. Lg. dec. Low Rare Very Poor Very Poor 0.78 bigtooth aspen Populus grandidentata NSL Medium 0 0.2 0.1 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0.79 chinkapin oak Quercus muehlenbergii NSL Medium 0.3 0.2 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0.80 bigleaf magnolia Magnolia macrophylla NSL Low 0.3 0.2 0.2 S.m. dec. Lg. dec. Medium Rare Very Poor Very Poor 0.81 sugar maple Acer saccharum WDH High 0.4 0.1 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0.81 sugar maple Acer saccharum WDH High 0.4 0.1 0.3 Lg. dec. Lg. dec. High Rare Poor Poor 0.82 white mulberry Morus alba NSL FIA 0.5 0.1 0.5 Unknown Unknown NA Rare NNIS NNIS 0.83 swamp white oak Quercus bicolor NSL Low 0.4 0.1 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0.84 Osage-orange Maclura pomifera NDH Medium 0.1 0.1 0.0 Lg. dec. Lg. inc. High Rare Poor Good 2.85 sand pine Pinus clausa NDH High 0.0 0.0 New Habitat New Habitat Low Absent New Habitat New Ha	water hickory	Carya aquatica	NSL	Medium	0.6	1.1	0.3 Sm. inc.		Lg. inc.	Medium	Rare	Fair	Good	Infill +		2	75
eastern white pine Pinus strobus WDH High 0.1 0.2 0.1 Lg. dec. Lg. dec. Low Rare Very Poor Very Poor 0 79 bigtooth aspen Populus grandidentata NSL Medium 0 0.2 0.1 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 79 chinkapin oak Quercus muehlenbergii NSL Medium 0.3 0.2 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 80 bigleaf magnolia macrophylla NSL Low 0.3 0.2 0.2 S.m. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 81 sugar maple Acer saccharum WDH High 0.4 0.1 0.3 Lg. dec. Lg. dec. High Rare Poor Poor 0 82 white mulberry Morus alba NSL FIA 0.5 0.1 0.5 Unknown Unknown NA Rare NNIS NNIS 0 83 swamp white oak Quercus bicolor NSL Low 0.4 0.1 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 84 Osage-orange Maclura pomifera NDH Medium 0.1 0.1 0.0 Lg. dec. Lg. inc. High Rare Poor Good 2 85 spruce pine Pinus glabra NSL Low 0 0 0 New Habitat New Habitat Low Absent New Habitat New	serviceberry	Amelanchier spp.	NSL	Low	1.8	0.6	0.2 Sm. ded	c. :	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	76
bigtooth aspen Populus grandidentata NSL Medium 0 0.2 0.1 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 80 bigleaf magnolia Magnolia macrophylla NSL Low 0.3 0.2 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 81 sugar maple Acer saccharum WDH High 0.4 0.1 0.3 Lg. dec. Lg. dec. High Rare Poor Poor 0 82 white mulberry Morus alba NSL FIA 0.5 0.4 0.1 0.3 Lg. dec. Lg. dec. High Rare Poor Poor 0 83 swamp white oak Quercus bicolor NSL Low 0.4 0.1 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 84 Osage-orange Maclura pomifera NDH Medium 0.1 0.1 0.0 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 84 Osage-orange Maclura pomifera NDH Medium 0.1 0.1 0.0 Lg. dec. Lg. inc. High Rare Poor Good 2 85 sand pine Pinus clausa NDH High 0 0 0 New Habitat New Habitat Low Absent New Habitat New Habitat New Habitat Striped maple Acer pensylvanicum NSL Low 0 0 0 New Habitat New H	chokecherry	Prunus virginiana	NSLX	FIA	0	0.2	0.1 Unknov	wn	Unknown	Medium	Rare	FIA Only	FIA Only			0	77
chinkapin oak Quercus muehlenbergii NSL Medium 0.3 0.2 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 80 bigleaf magnolia Magnolia macrophylla NSL Low 0.3 0.2 0.2 Sm. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 81 sugar maple Acer saccharum WDH High 0.4 0.1 0.3 Lg. dec. Lg. dec. High Rare Poor Poor 0 82 white mulberry Morus alba NSL FIA 0.5 0.1 0.5 Unknown Unknown NA Rare NNIS NNIS 0 83 swamp white oak Quercus bicolor NSL Low 0.4 0.1 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 84 Osage-orange Maclura pomifera NDH Medium 0.1 0.1 0.0 Lg. dec. Lg. dec. High Rare Poor Good 2 85 sand pine Pinus clausa NDH High 0 0 0 New Habitat New Habitat Low Absent New Habitat	eastern white pine	Pinus strobus	WDH	High	0.1	0.2	0.1 Lg. dec.		Lg. dec.	Low	Rare	Very Poor	Very Poor			0	78
bigleaf magnolia Magnolia macrophylla NSL Low 0.3 0.2 Sm. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 81 sugar maple Acer saccharum WDH High 0.4 0.1 0.3 Lg. dec. Lg. dec. High Rare Poor Poor 0 82 white mulberry Morus alba NSL FIA 0.5 0.1 0.5 Unknown Unknown NA Rare NNIS NNIS 0 83 swamp white oak Quercus bicolor NSL Low 0.4 0.1 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 84 Osage-orange Maclura pomifera NDH Medium 0.1 0.1 0.0 Lg. dec. Lg. inc. High Rare Poor Good 2 85 sand pine Pinus clausa NDH High 0 0 0 New Habitat New Habitat Low Absent New Habitat New Habit	bigtooth aspen	Populus grandidentata	NSL	Medium	0	0.2	0.1 Lg. dec.		Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	79
sugar maple Acer saccharum WDH High 0.4 0.1 0.3 Lg. dec. Lg. dec. High Rare Poor Poor 0 82 white mulberry Morus alba NSL FIA 0.5 0.1 0.5 Unknown Unknown NA Rare NNIS NNIS 0 83 swamp white oak Quercus bicolor NSL Low 0.4 0.1 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 84 Osage-orange Maclura pomifera NDH Medium 0.1 0.1 0.0 Lg. dec. Lg. inc. High Rare Poor Good 2 85 sand pine Pinus clausa NDH High 0 0 0 New Habitat New Habitat Low Absent New Habitat New Habita	chinkapin oak	Quercus muehlenbergii	NSL	Medium	0.3	0.2	0.3 Lg. dec.		Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	80
white mulberry Morus alba NSL FIA 0.5 0.1 0.5 Unknown Unknown NA Rare NNIS NNIS 0 83 swamp white oak Quercus bicolor NSL Low 0.4 0.1 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 84 Osage-orange Maclura pomifera NDH Medium 0.1 0.1 0.0 Lg. dec. Lg. inc. High Rare Poor Good 2 85 sand pine Pinus clausa NDH High 0 0 0 New Habitat New Habitat Low Absent New Habitat New H	bigleaf magnolia	Magnolia macrophylla	NSL	Low	0.3	0.2	0.2 Sm. ded	c.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	81
Swamp white oak Quercus bicolor NSL Low 0.4 0.1 0.3 Lg. dec. Lg. dec. Medium Rare Very Poor Very Poor 0 84 Osage-orange Maclura pomifera NDH Medium 0.1 0.1 0.0 Lg. dec. Lg. inc. High Rare Poor Good 2 85 sand pine Pinus clausa NDH High 0 0 New Habitat New Habitat Low Absent New Habitat New Ha	sugar maple	Acer saccharum	WDH	High	0.4	0.1	0.3 Lg. dec.		Lg. dec.	High	Rare	Poor	Poor			0	82
Osage-orange Maclura pomifera NDH Medium 0.1 0.0 Lg. dec. Lg. inc. High Rare Poor Good 2 85 sand pine Pinus clausa NDH High 0 0 New Habitat New Habitat Low Absent New Habitat	white mulberry	Morus alba	NSL	FIA	0.5	0.1	0.5 Unknov	wn	Unknown	NA	Rare	NNIS	NNIS			0	83
sand pine Pinus clausa NDH High 0 0 0 New Habitat New Habitat Low Absent New Habitat New H	swamp white oak	Quercus bicolor	NSL	Low	0.4	0.1	0.3 Lg. dec.		Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	84
spruce pine Pinus glabra NSL Low 0 0 0 New Habitat New Habitat Medium Absent New Habitat N	Osage-orange	Maclura pomifera	NDH	Medium	0.1	0.1	0.0 Lg. dec.		Lg. inc.	High	Rare	Poor	Good			2	85
striped maple Acer pensylvanicum NSL Medium 0 0 0 Unknown Unknown Medium Absent Unknown Unknown Unknown 0 88 cittamwood/gum bumelia Sideroxylon lanuginosum ssp. NSL Low 0 0 New Habitat New Habitat High Absent New Habitat N	sand pine	Pinus clausa	NDH	High	0	0	0 New Ha	abitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	86
cittamwood/gum bumelia Sideroxylon lanuginosum ssp. NSL Low 0 0 0 New Habitat New Habitat High Absent New Habitat New Habitat New Habitat 0 89 shellbark hickory Carya laciniosa NSL Low 0 0 0 Unknown Unknown Medium Absent Unknown Unknown Unknown Unknown New Habitat New H	spruce pine	Pinus glabra	NSL	Low	0	0	0 New Ha	abitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	87
shellbark hickory Carya laciniosa NSL Low 0 0 0 Unknown Unknown Medium Absent Unknown New Habitat New Habi	striped maple	Acer pensylvanicum	NSL	Medium	0	0	0 Unknov	wn	Unknown	Medium	Absent	Unknown	Unknown			0	88
black hickory Carya texana NDL High 0 0 0 New Habitat 0 91 eastern redbud Cercis canadensis NSL Low 0 0 0 Unknown Unknown Medium Absent Unknown Unknown Unknown 0 92 black ash Fraxinus nigra WSH Medium 0 0 0 Unknown Unknown Low Absent Unknown Unknown 0 93	cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	. NSL	Low	0	0	0 New Ha	abitat	New Habitat	High	Absent	New Habitat	New Habitat			0	89
eastern redbud Cercis canadensis NSL Low 0 0 0 Unknown Unknown Medium Absent Unknown Unknown Unknown 0 92 black ash Fraxinus nigra WSH Medium 0 0 0 Unknown Unknown Low Absent Unknown Unknown 0 93	shellbark hickory	Carya laciniosa	NSL	Low	0	0	0 Unknov	wn	Unknown	Medium	Absent	Unknown	Unknown			0	90
black ash Fraxinus nigra WSH Medium 0 0 0 Unknown Unknown Low Absent Unknown Unknown 0 93	black hickory	Carya texana	NDL	High	0	0	0 New Ha	abitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	91
	eastern redbud	Cercis canadensis	NSL	Low	0	0	0 Unknov	wn	Unknown	Medium	Absent	Unknown	Unknown			0	92
honeylocust Gleditsia triacanthos NSH Low 0 0 0 Unknown New Habitat High Absent Unknown New Habitat Migrate + 3 94	black ash	Fraxinus nigra	WSH	Medium	0	0	0 Unknov	wn	Unknown	Low	Absent	Unknown	Unknown			0	93
	honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0 Unknov	wn	New Habitat	High	Absent	Unknown	New Habitat		Migrate +	3	94



Climate Change Atlas Tree Species

USDA Forest Service Northern Research Station Landscape Change Research Group Iverson, Peters, Prasad, Matthews

Current and Potential Future Habitat, Capability, and Migration

Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
silverbell	Halesia spp.	NSL	Low	0	C) (Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	95
water elm	Planera aquatica	NSL	Low	0	C) (New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	96
quaking aspen	Populus tremuloides	WDH	High	0	C) (Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	97
pin cherry	Prunus pensylvanica	NSL	Low	0	() (Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	98
shingle oak	Quercus imbricaria	NDH	Medium	0	C) (Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	99
bluejack oak	Quercus incana	NSL	Low	0	C) (New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	100
cabbage palmetto	Sabal palmetto	NDH	Medium	0	C) (New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	101
American basswood	Tilia americana	WSL	Medium	0	C) (New Habitat	Unknown	Medium	Absent	New Habitat	Unknown			3	102
cedar elm	Ulmus crassifolia	NDH	Medium	0	() (New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	103

