VULNERABILITY ASSESSMENT OF AUSTIN'S URBAN FOREST AND NATURAL AREAS

A report from the Urban Forestry Climate Change Response Framework

Leslie A. Brandt, Caitlin Rottler, Wendy Gordon, Stacey L. Clark, Lisa O'Donnell, and April Rose

AUTHORS

Leslie Brandt is a climate change specialist with the Northern Institute of Applied Climate Science and the USDA Forest Service. 1992 Folwell Ave., Saint Paul, MN 55108. Leslie.brandt@usda.gov

Cait Rottler is a USDA Southern Plains Climate Hub Fellow with the USDA ARS Grazinglands Research Laboratory 7207 W. Cheyenne St., El Reno, OK 73036. Caitlin.Rottler@usda.gov

Wendy Gordon is Founder at Climate Action Texas and Vice-Chair (District 10), Environmental Commission for the City of Austin. BC-Wendy.Gordon@austintexas.gov

Stacey Clark is an Ecologist and Invasive Plants/Pesticide Use Program Manager with the USDA Forest Service Pacific Southwest Region.1323 Club Drive Vallejo, CA 94592Stacey.clark@usda.gov

Lisa O'Donnell is a Senior Biologist with the Balcones Canyonlands Preserve, City of Austin 3621 Ranch Road 620 South, Austin 78738 Lisa.odonnell@austintexas.gov

April Rose is Forest Health Coordinator for the City of Austin Community Tree Preservation Division, One Texas Center, 505 Barton Springs Road. April.rose@austintexas.gov

PREFACE

CONTEXT AND SCOPE

This assessment is a fundamental component of the Urban Forestry Climate Change Response Framework project and builds off methods developed for the Chicago Wilderness Urban Forestry Vulnerability Assessment (Brandt et al. 2017). This project builds on lessons learned from the Climate Change Response Framework: a collaborative, cross-boundary approach among scientists, managers, and landowners to incorporate climate change considerations into natural resource management. Each project interweaves four components: science and management partnerships, vulnerability assessments, adaptation resources, and demonstration projects. This assessment focuses on both the developed and natural areas within the Austin region.

We designed this assessment to be a synthesis of the best available scientific information. Its primary goal is to inform those that work, study, recreate, and care about the urban forests and natural areas in the Austin region. As new scientific information arises, we expect that new efforts will need to be undertaken to reflect that acquired knowledge and understanding. Most important, this assessment does not make recommendations about how this information should be used.

The scope of the assessment is the urban forest, broadly defined to include both developed and natural settings within the urban landscape.

AUTHOR CONTRIBUTIONS AND ACKNOWLEDGEMENTS

Leslie Brandt developed the assessment methodology, report structure, and led the writing of chapters 3 and 4. Cait Rottler and Wendy Gordon led the writing of chapter 2 and assembled climate change projections and historical data. April Rose, Lisa O'Donnell, and Stacey Clark led the writing and mapping for chapter 1.

We wish to thank the municipal foresters, park district representatives, natural areas managers, and others that participated in the vulnerability and adaptation workshops that contributed to this report. We also wish to thank Emily King for her help in leading the overall effort, Bill Reiner for his assistance with the species list and community classification, and Annamarie Rutledge for her assistance with document editing.

TABLE OF CONTENTS

(space left for table of contents)

INTRODUCTION

CONTEXT

This assessment is a fundamental component of the Urban Forestry Climate Change Response Framework project (www.forestadaptation.org/urban) and is supported jointly by the USDA Southern Plains and Northern Forests Climate Hubs. This project builds on lessons learned from the Climate Change Response Framework: a collaborative, cross-boundary approach among scientists, managers, and landowners to incorporate climate change considerations into natural resource management. Each project interweaves four components: science and management partnerships, vulnerability assessments, adaptation resources, and demonstration projects (fig. 1). The Austin assessment uses methods developed in the Chicago Wilderness region pilot (Brandt et al. 2017) and also methods developed for assessing vulnerability of natural areas (Brandt et al. 2016).

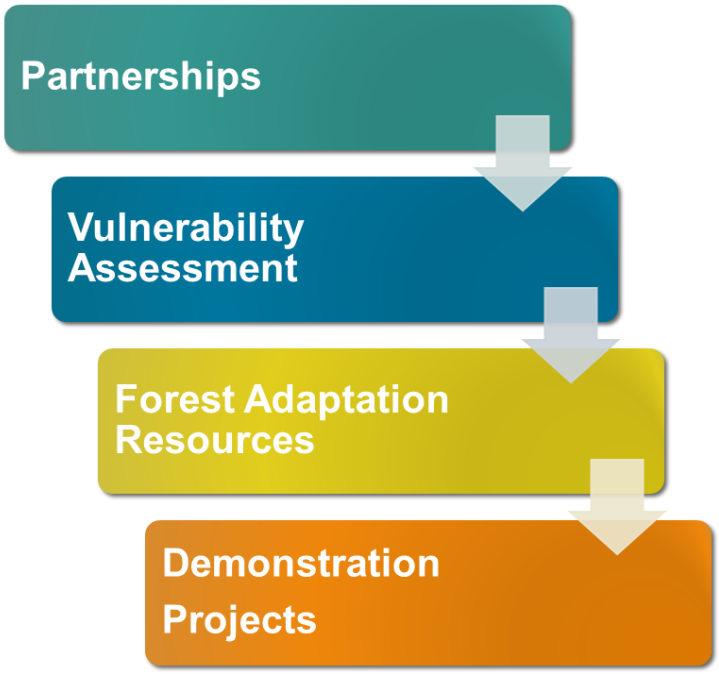

Figure X.1 — Climate Change Response Framework components.

The overarching goal of all Framework projects is to incorporate climate change considerations into forest management. The overall goal of the Urban project is to ensure that urban forests will continue to provide benefits to the people that live in urban communities as the climate changes. We define the urban forest as all publicly and privately owned trees within an urban area— including individual trees along streets and in backyards, as well as stands of remnant forest. The Urban project works across organizations, both public and private, to work toward this goal by accomplishing the following objectives:

- Engage with communities that are interested in adapting their urban forest management to climate change.
- Work with these communities to assess the vulnerability of their urban forests to climate change.
- Identify and develop tools to aid adaptation of urban forests to climate change.

- Develop real-world examples of climate-informed management of urban forests.

The tools and approaches developed in the Urban project were originally designed to be applied to areas in the Midwest and Northeast. This report expands that work to the south-central US through a partnership with the Southern Plains Climate Hub.

Current partners in the effort include:

- Northern Institute of Applied Climate Science
- USDA Southern Plains and Northern Forests Climate Hubs
- USDA Forest Service
- USDA Agricultural Research Service
- USDA Natural Resources Conservation Service
- City of Austin, TX
- Texas A&M Forest Service
- The Nature Conservancy

SCOPE AND GOALS

The primary goal of this assessment is to summarize potential changes to the urban forest of the Austin region under a range of future climates, and determine the vulnerability of trees and developed and natural landscapes to those changes. The assessment also includes a synthesis of information about the current landscape as well as projections of climate and vegetation changes used to assess these vulnerabilities. Uncertainties and gaps in understanding are discussed throughout the document.

This assessment covers the extraterritorial jurisdictional boundary of the City of Austin and encompasses 400,882 acres. Municipalities within this boundary are also included in the assessment.

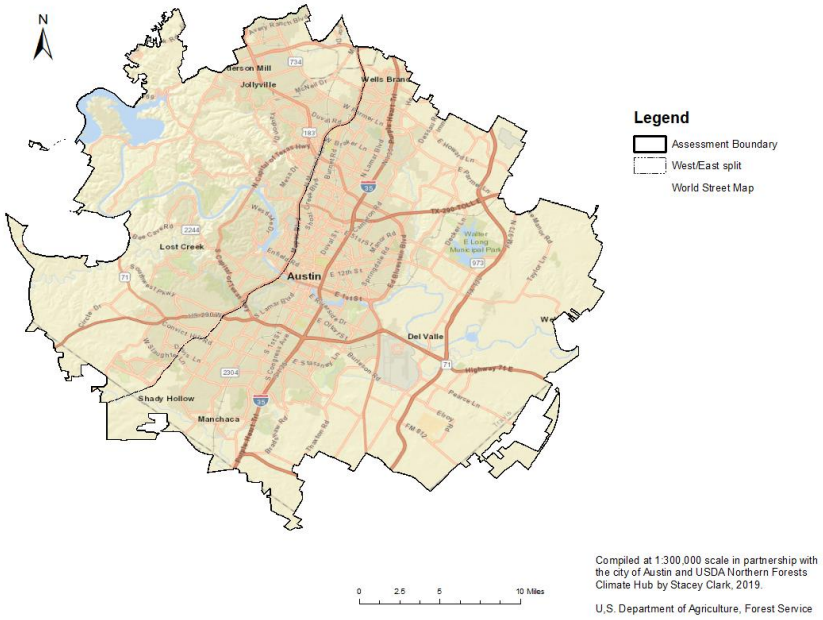

Figure X.2 — Assessment Area. The assessment areas includes the city of Austin's extra-jurisdictional boundary and all municipalities and ownerships within.

ASSESSMENT CHAPTERS

This assessment comprises the following chapters:

Chapter 1: The Contemporary Landscape describes existing conditions, providing background on the physical environment, ecological character, and current management of developed and natural areas in the Austin region.

Chapter 2: Climate Trends, Projections, and Impacts summarizes our current understanding of past and projected future changes in climate in the Chicago Wilderness region.

Chapter 3: Vulnerability of Austin's Trees summarizes the projected changes in habitat suitability and adaptive capacity for trees found in the Austin region.

Chapter 4: Vulnerability of Austin's Urban Forest summarizes the vulnerability of the urban forest in three developed areas and four natural community types in Austin.

Chapter 5: Management Implications (in development)