

City of Austin Ice Storm Damage Assessment

Texas A&M Forest Service

20 February 2023

Between Jan. 30 and Feb. 3, 2023, Central Texas experienced a combination of below-freezing temperatures and rain, resulting in a freezing rainstorm that created hazardous conditions for travel, infrastructure, and public safety. Ice accumulation from Winter Storm Mara resulted in widespread damage to trees, which led to numerous power outages and risks to property and public safety from downed and falling limbs and branches. On Feb. 4, a state disaster declaration was issued for Denton, Hays, Henderson, Milam, Smith, Travis, and Williamson counties.

Damage from this ice event was extensive and extended beyond the analysis area, which was limited to the City of Austin due to the presence of Urban Forest Inventory and Analysis (FIA) data. Similar ice accumulation and tree damage occurred throughout the impacted region in a band that aligned with the areas of heavier precipitation which occurred while temperatures remained below freezing on Feb. 1 (see Figure 1). This band roughly followed Interstate-35, with significant damage stretching northward from Comal County through Hays, Travis and Williamson counties. Portions of eastern Blanco County as well as parts of Bell and Milam counties also experienced significant damage. While the precipitation band extended into Bexar County, temperatures there remained above freezing for much of the storm duration, limiting the amount of ice accumulation and subsequent tree damage.

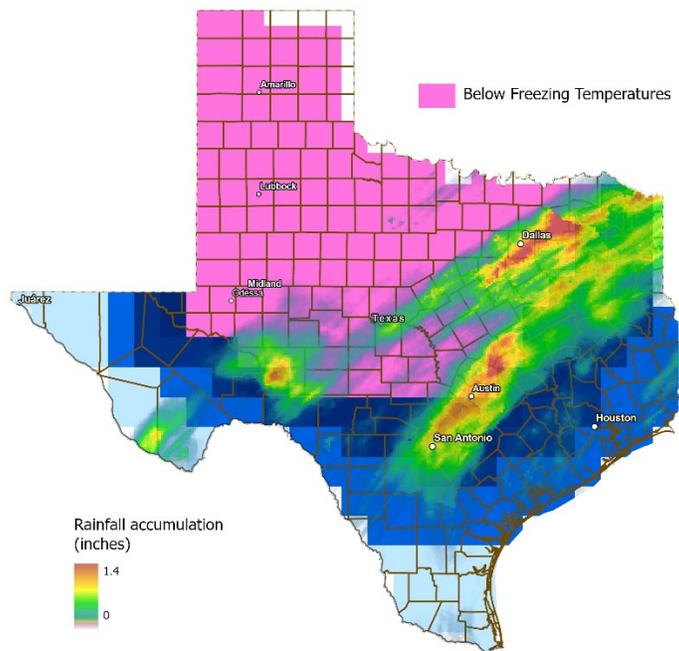


Figure 1. Map of precipitation accumulation and maximum temperature on Feb. 1 during Winter Storm Mara. Data obtained from the National Weather Service.

Urban FIA data for the City of Austin was used along with visual observations to estimate the number of trees damaged across the city. Seven Texas A&M Forest Service crews observed tree damage across Austin. These observations included visual estimates of:

- (1) Percent of trees damaged;
- (2) Percent of canopy lost by damaged trees; and
- (3) Primary species affected.

Using this information, an estimated 31 percent of trees in the city of Austin (10.5 million trees) were impacted, sustaining damage to 13 percent of their crown, on average. Primary species affected were live oak, Ashe juniper, cedar elm, and hackberry.

An analysis of satellite imagery supported and refined estimation of the extent and severity of damage. Sentinel-2 imagery was collected immediately before (Jan. 26) and after (Feb. 5) the ice storm. Comparing the Normalized Differenced Vegetation Index from these two scenes over Austin resulted in an estimation of canopy damage including four categories:

- (1) No damage (NDVI change greater than -0.05);
- (2) Light damage or stress (NDVI change -0.05 to -0.1);
- (3) Moderate damage (NDVI change -0.1 to -0.15);
- (4) Heavy damage (NDVI change less than -0.15).

This data was restricted to only include areas of tree canopy within the City of Austin. Due to the scope of available satellite imagery, the farthest western reaches of City of Austin boundaries were not included in the analysis.

The estimated extent of damage or stress to canopy area was calculated as:

- 30% of total canopy affected
 - 25% of canopy with light damage or stress
 - 5% of canopy with moderate to heavy damage
 - <1% of canopy with heavy damage

These are conservative estimates as the assessment was conducted during the leaf-off season and analysis was restricted to tree canopy. Potential damage to deciduous and understory trees was not assessed in this geospatial analysis.

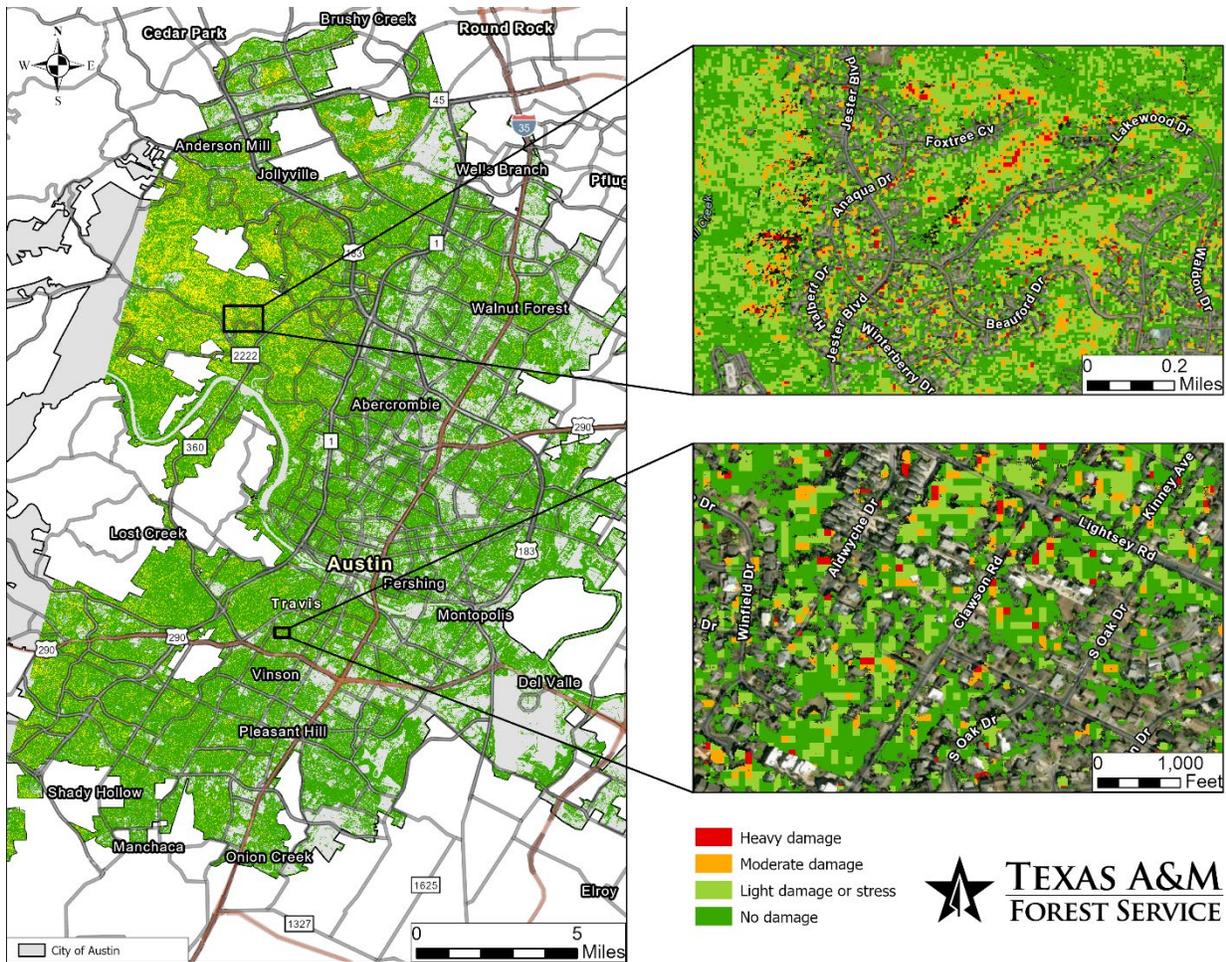


Figure 2. Map of tree canopy in Austin and NDVI damage classes.

What To Do After the Ice Storm

Trees have a remarkable ability to recover from storm damage. If damage is relatively light, prune broken branches and let the tree begin to repair itself. Young trees can recover from quite a bit of damage. When mature trees only have visible branch and crown damage, don't cut the tree down. Carefully prune broken branches and then give the tree some time to recover. Wait until early summer to see which branches re-leaf and which branches are dead. Resist the temptation to prune heavily. Remember that the tree needs all the foliage possible to produce enough nourishment. However, some trees can't be saved or their remaining condition presents too high of a safety risk.

Specific things to evaluate when observing your tree can be found at <https://tfsweb.tamu.edu/afterthestorm/canmytreebesaved>

Hire a Certified Arborist to assess damage and safely accomplish needed pruning or removal. Find one at <http://isatexas.com/for-the-public/find-an-arborist>