Texas Wildfire Mitigation Project

Reducing the Risk of Wildfires Caused by Power Lines

Project Advisory Council Meeting
June 11, 2014, 2:00 – 3:30 p.m.
Via Webcast

Hosted by
Texas A&M Engineering Experiment Station

http://WildfireMitigation.tees.tamus.edu

Texas Wildfire Mitigation Project

Reducing the Risk of Wildfires Caused by Power Lines

Welcome

Representative John Otto
Chair, Wildfire Project Advisory Council

Texas Wildfire Mitigation Project

Reducing the Risk of Wildfires Caused by Power Lines

Agenda
Meeting of Project Advisory Council

Wednesday, June 11, 2014, via Webcast

Welcome by Rep. John Otto, Chair, Wildfire Project Advisory Council Chair

Project Refresher

Project Status

Discussion of Advisory Council Function

Open Discussion/Questions

Closing Remarks

Adjourn

Statistics

Power line-caused wildfires 2005-2011

- Number of fires: 6,628 documented
- Acres burned: 2.3 million (3,528 square miles)
- Homes and other property lost: $947 million
- Costs associated with fire response and suppression, other emergency services, and loss of commerce are in addition to the figure shown above.

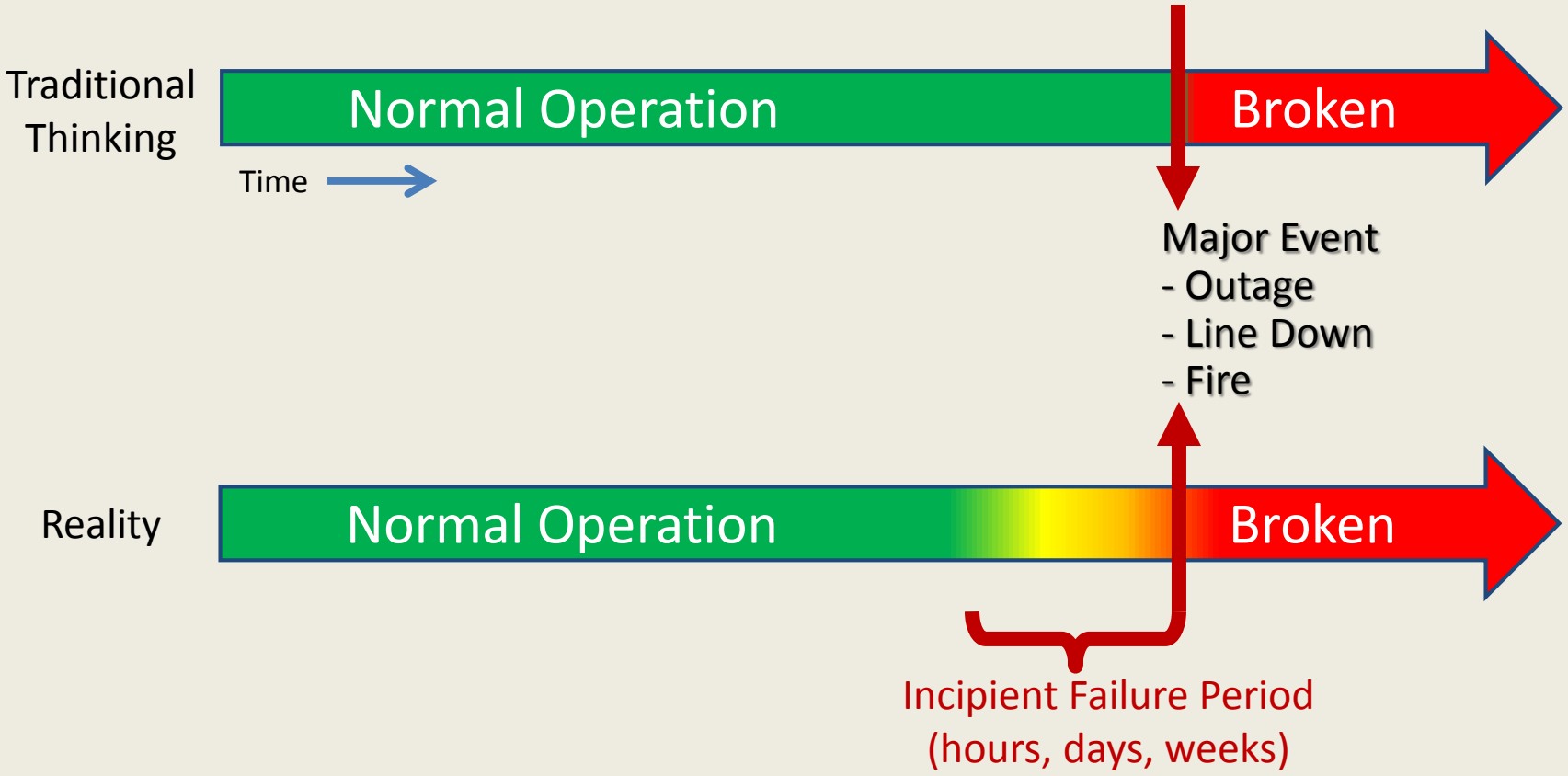
Source: Texas A&M Forest Service statistics

Vision Statement

To reduce wildfire risk and losses in Texas, using state-developed technologies to mitigate power line-caused wildfires.

How Do Power Lines Cause Fires?

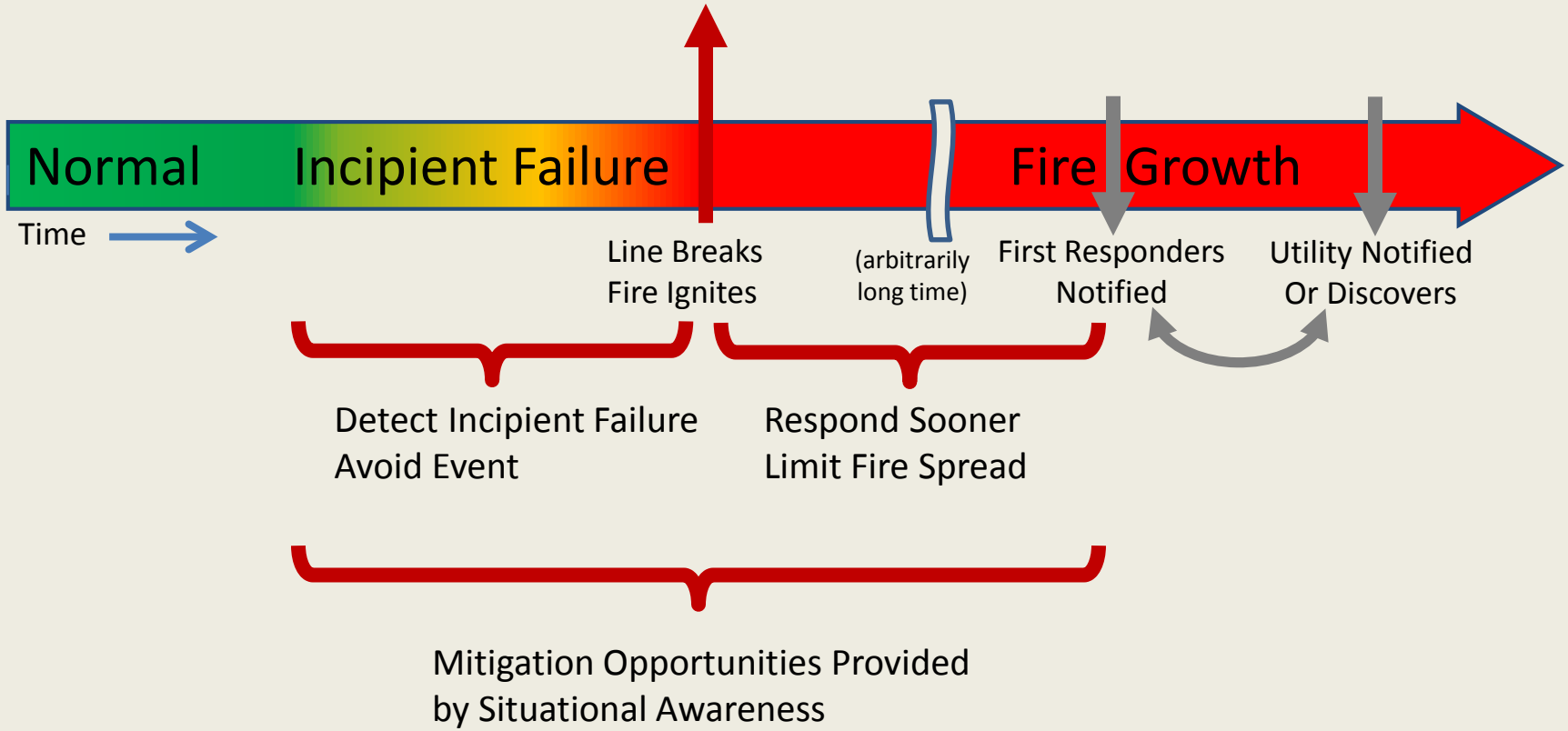
Electrical Feeder Operational Paradigms



TEES technology detects incipient failures and enables repairs before major events occur.

From Failure to Fire – Timeline

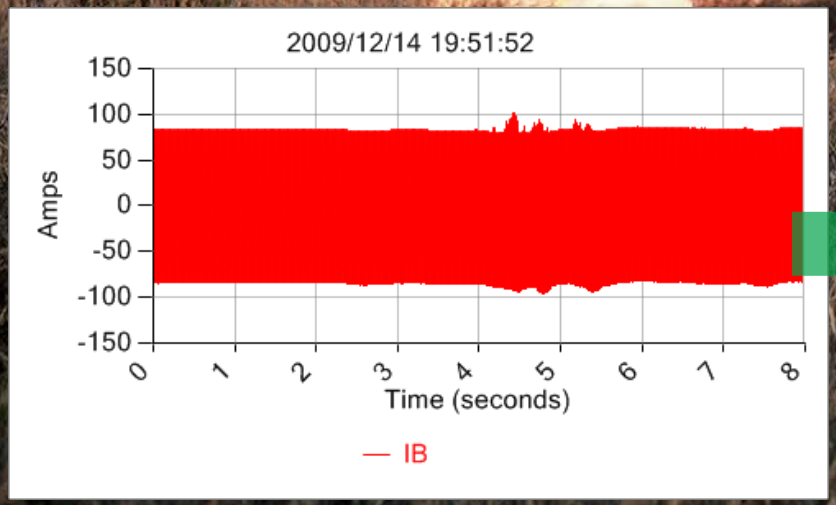
(Example: Failing Clamp Causes Broken Line)



Power Line Incipient Failure Detection

Fundamental Principle

- Graph shows current during “normal” feeder operations.
- Analytics report this specifically as a failing clamp. Failing clamps can degrade service quality, drop hot metal particles, and in extreme cases burn down lines.
- Conventional technologies do not detect incipient failures such as this one.

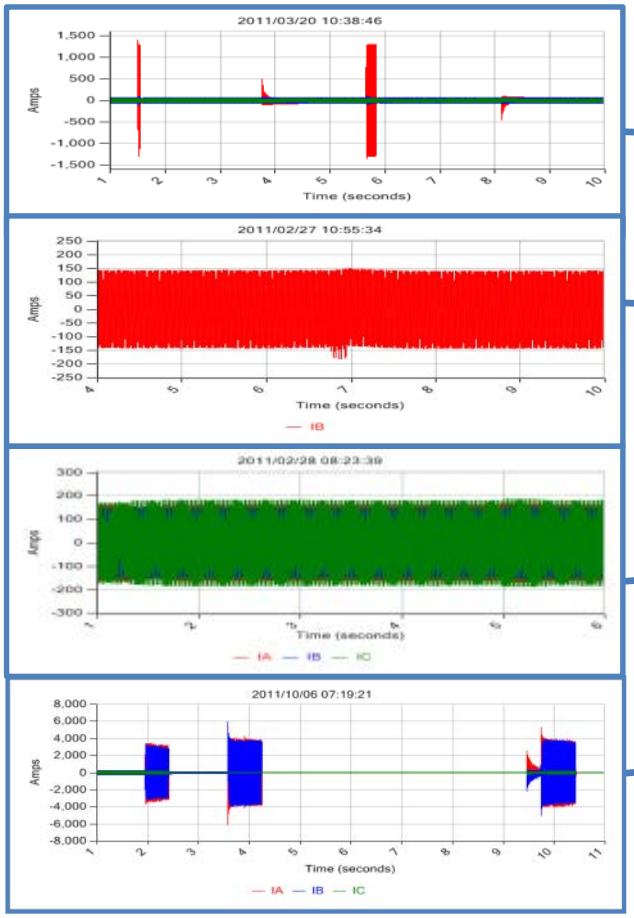


On-Line Waveform Analytics

Power Line Incipient Failure Detection

Signal Acquisition and Report Processing

Inputs: Substation CT and PT Waveforms



Waveform Analytics

On-Line Signal Processing and Pattern Recognition Analytics

(Performed by Device in Substation)

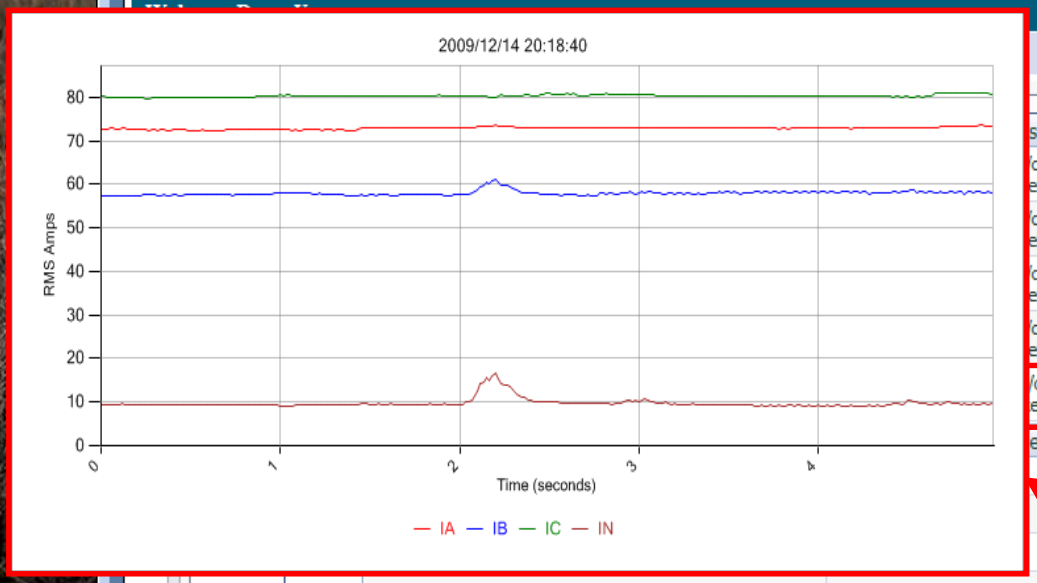
Outputs

- Line recloser* tripped 8% of phase-A load twice, but reclosed and did not cause outage
- Failing hot-line clamp on phase B*
- Failed 1200 kVAR line capacitor* (phase B inoperable)
- Breaker lockout caused by fault-induced conductor slap

*Analytics applied to high-fidelity substation waveforms report on hydraulic line reclosers, switched line capacitors, apparatus failures, etc, without requiring communications to line devices.

Power Line Incipient Failure Detection

Report Access via Web Portal



DFA Alerts and Reports - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://epridfa.tamu.edu/DFAReports/Alerts.aspx?type=alerts&problems=clamp&to=12-3

DFA Alerts and Reports

Alerts | Reports | Diagnostics | Waveforms | Interval Data

Change Password|Sign Out

Displaying Alerts for: All Utilities

	Occurrences	Last Occurred
clamp: 7 kVA elihood clamp	6 (6 days)	12/21/10 15:14:24
clamp: 26 kVA elihood clamp	20 (36 days)	11/07/10 13:51:09
clamp: 45 kVA elihood clamp	8 (25 minutes)	04/08/10 03:02:11
clamp: 12 kVA elihood clamp	9 (2 days)	02/21/10 10:20:32
clamp: 17 kVA elihood clamp	2333 (21 days)	12/14/09 20:19:22

	Occurred
	12/14/09 20:19:22
	12/14/09 20:19:18

Incipient clamp failure causes minimal electrical variations, but waveform analytics diagnose the specific problem and enable targeted response.

Broader Benefits of Situational Awareness
(Partial List)

Power quality and reliability

- Avoid outages (improved SAIDI and SAIFI)
- Avoid momentary interruptions, sags, etc. (improved PQ)
- Improve customer satisfaction
- Better support of economic development

System stresses and liability

- Reduced stress on line equipment
  (e.g., transformers, lines, connectors, switches, reclosers)
- Reduced damage and liability from catastrophic failures
  (e.g., conductor burn-down, fire, transformer explosion)

Operational efficiency and other labor impacts

- Daylight, fair-weather, straight-time failure location and repairs
- Improved worker safety (fair-weather, daylight work)
- More efficient troubleshooting (e.g., fewer no-cause-found tickets)

Participant Status

- Bluebonnet EC (10) (reviewing PO contract)
- Mid-South Synergy (10) (executed)
- Pedernales EC (10) (awaiting execution)
- Sam Houston EC (10) (executed)
- United Cooperative Services EC (4) (awaiting BoD action 6/30)

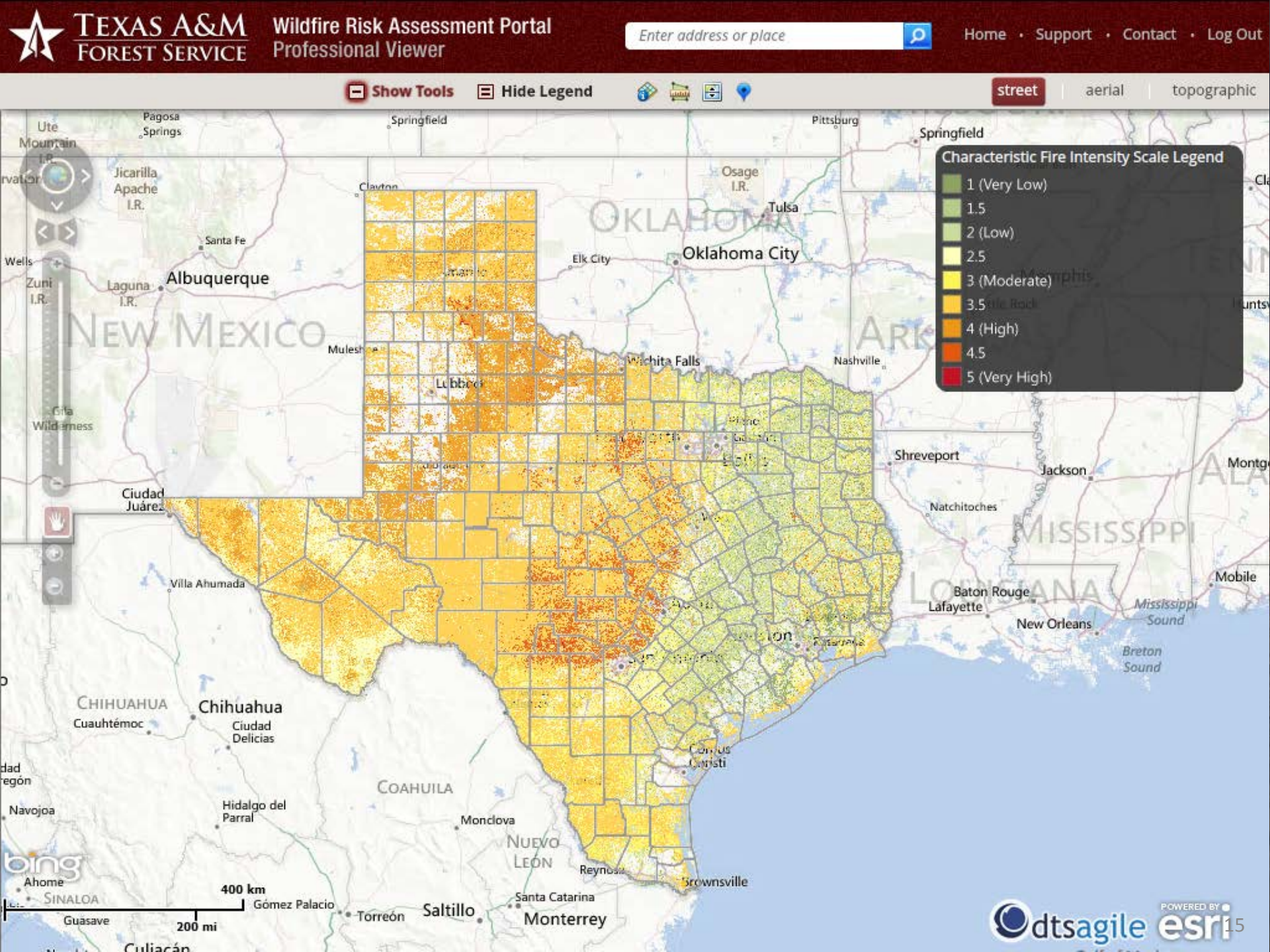
- Austin Energy (6-8) (reviewing PO contract)
- CPS Energy (10) (reviewing PO contract)

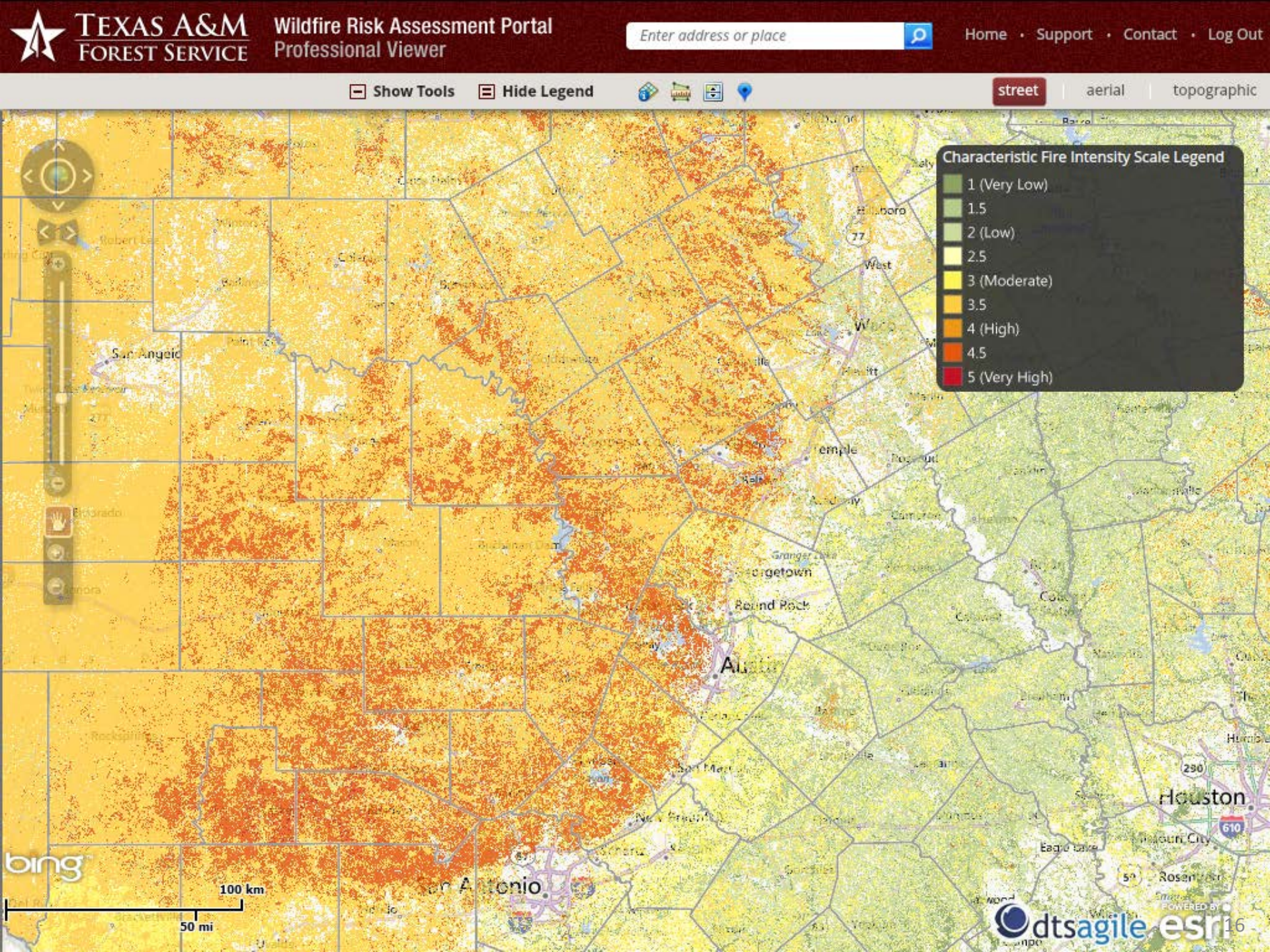
- CenterPoint Energy (24 in 4Q2014, pending budget approval)
- AEP (19 anticipated) (reviewing PO contract)
- Entergy (# of feeders TBD) (reviewing PO contract)
- Xcel Energy (considering participation)

Status and Schedule

- Nine companies have submitted non-binding expressions of interest.
  - Additional utility companies and feeders can be accommodated.
- TEES sent purchase order agreements (for devices) on 5/23/2014.
  - TEES requests execution of purchase orders by 6/20/2014 (next Friday).
- Target Schedule:
  - 6/30/2014: Selection of feeders by utilities
  - 7/16/2014: GIS-based feeder maps/models to TEES
  - 8/29/2014: Substation make-ready work (wiring, communication, …) complete
  - 10/01/2014: Delivery of devices
  - Full installation and commencement of monitoring within four weeks of delivery

Meeting this target schedule is desirable. TEES recognizes that not all participants will be able to do so, and accommodations will be made on a case-by-case basis.


Texas A&M Forest Service
Wildfire Risk Assessment Portal
Professional Viewer
Enter address or place
Home · Support · Contact · Log Out
Show Tools
Hide Legend
street
aerial
topographic
Characteristic Fire Intensity Scale Legend
1 (Very Low)
1.5
2 (Low)
2.5
3 (Moderate)
3.5
4 (High)
4.5
5 (Very High)
Oklahoma City
Tulsa
Albuquerque
New Mexico
Wichita Falls
Lubbock
Shreveport
Jackson
Natchitoches
Mississippi
Louisiana
Baton Rouge
Lafayette
New Orleans
Mobile
Mississippi Sound
Breton Sound
Ciudad Juárez
Villa Ahumada
Chihuahua
Chihuahua
Cuauhtémoc
Ciudad Delicias
Coahuila
Hidalgo del Parral
Monclova
Nuevo León
Reynosa
Brownsville
Corpus Christi
Monterrey
Saltillo
Santa Catarina
Gómez Palacio
Torreón
Sinaloa
Culiacán
Guasave
Navojoa
Ahome
400 km
200 mi
bing
dtsagile
esri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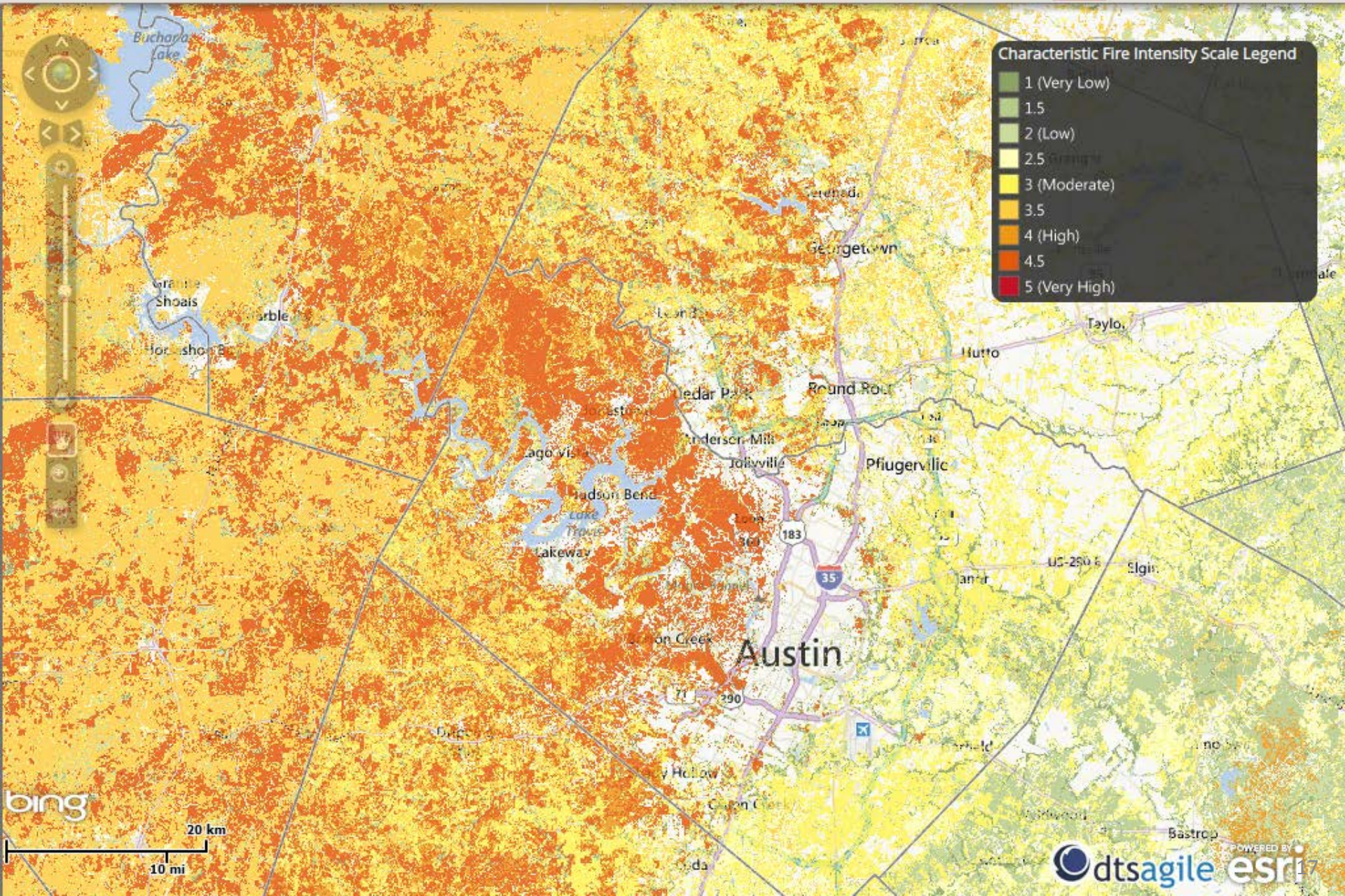
Characteristic Fire Intensity Scale Legend
1 (Very Low)
1.5
2 (Low)
2.5
3 (Moderate)
3.5
4 (High)
4.5
5 (Very High)
San Angelo
Temple
Georgetown
Round Rock
Austin
San Antonio
Houston
bing
100 km
50 mi
dtsagile
esri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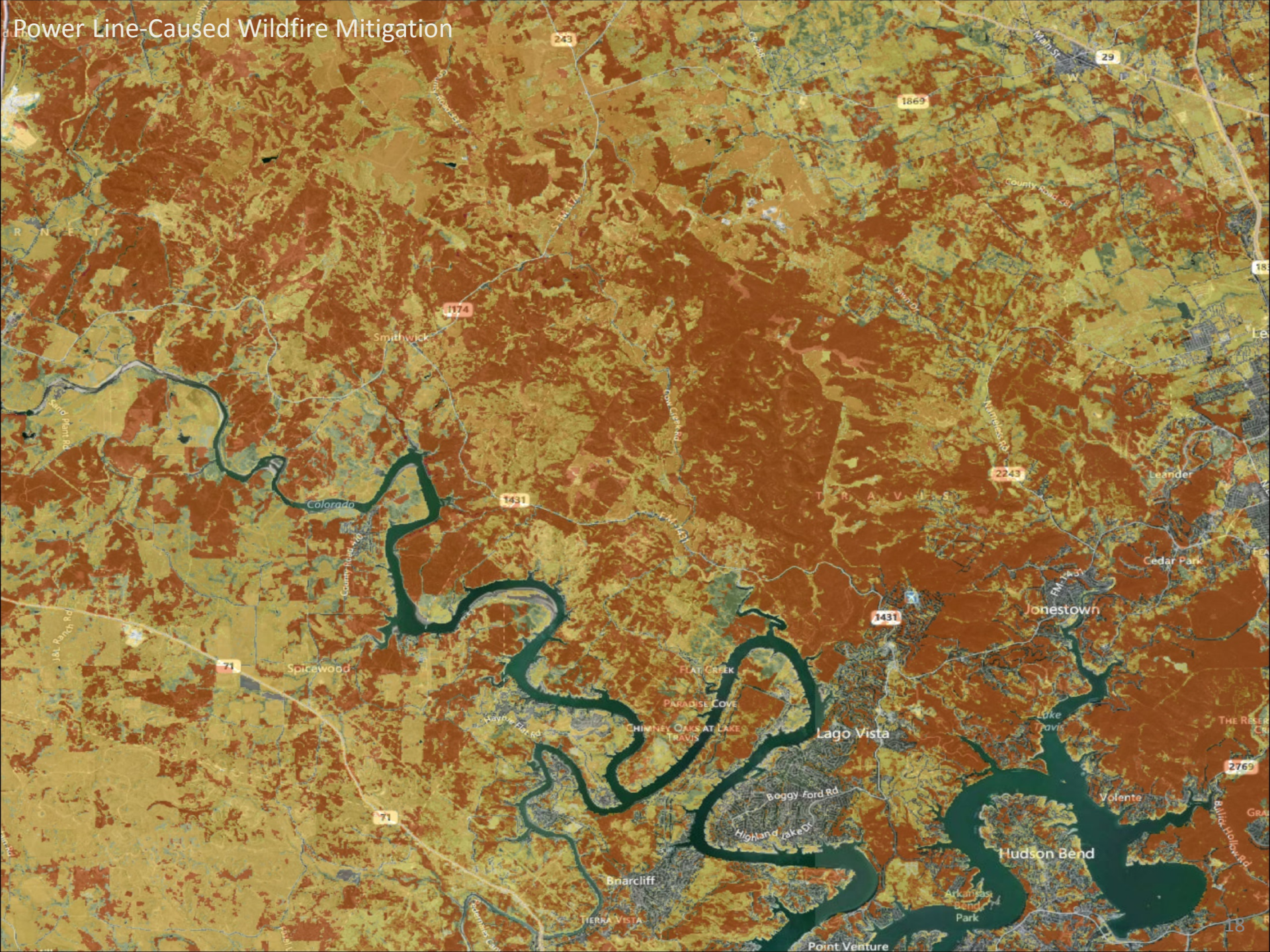
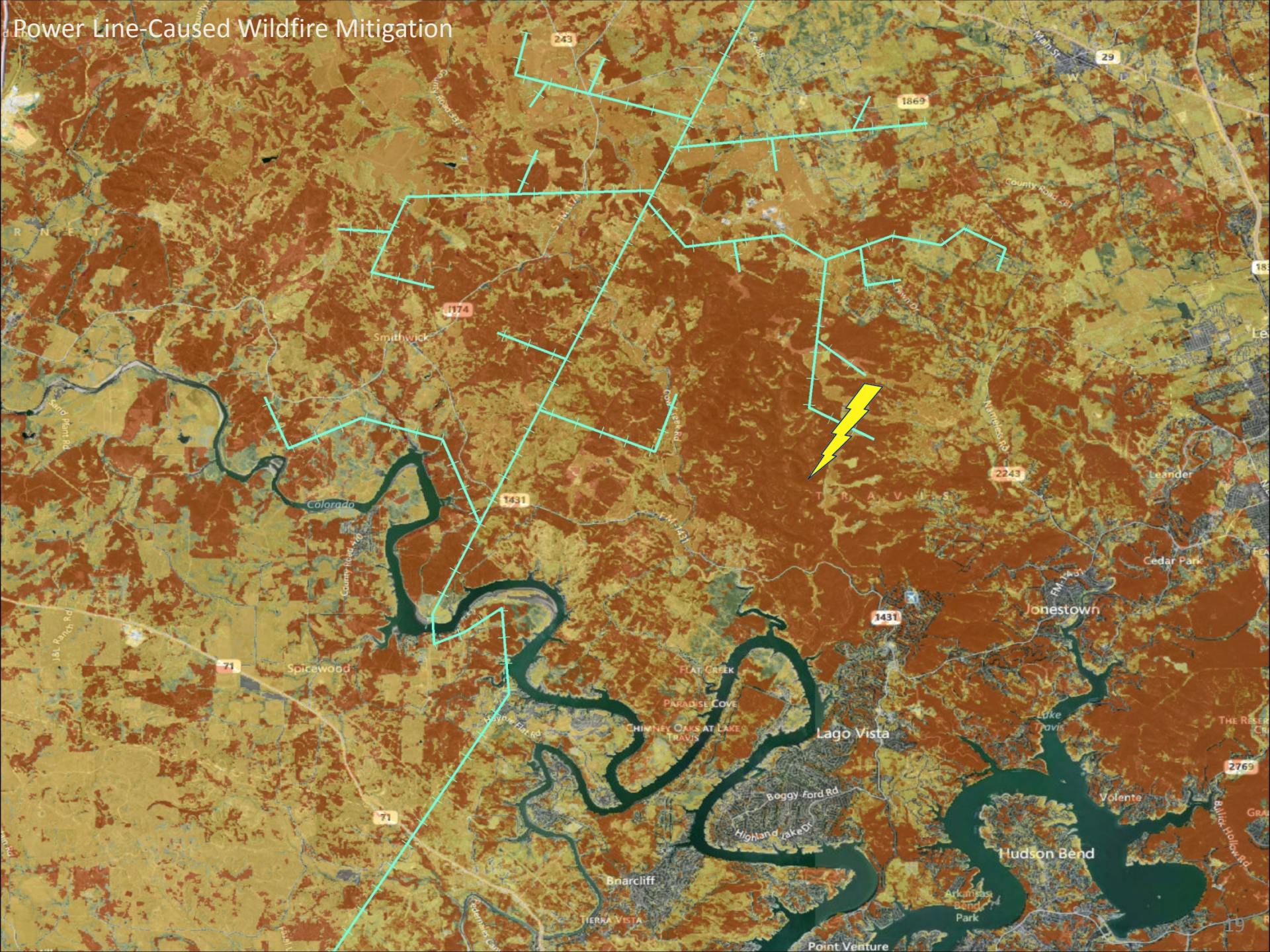
1.5
2 (Low)
2.5
3 (Moderate)
3.5
4 (High)
4.5
5 (Very High)
Austin
Georgetown
Round Rock
Cedar Park
Pflugerville
Taylor
Hutto
Lakeway
Bastrop
Elgin
183
35
71
290
bing
20 km
10 mi
dtsagile
esri

Power Line-Caused Wildfire Mitigation

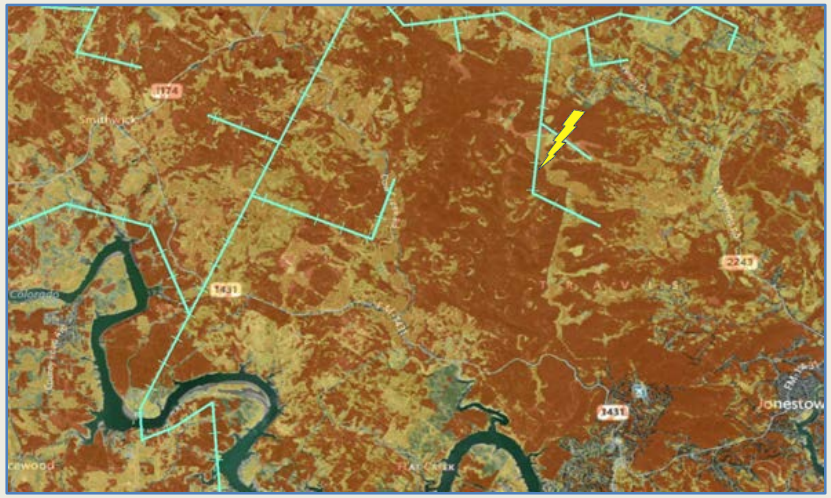



Power Line-Caused Wildfire Mitigation
243
1869
29
1174
Smithwick
1431
Colorado
2243
Leander
Cedar Park
Jonestown
Spicewood
71
Lago Vista
Boggy Ford Rd
Highland Lake Dr
Briarcliff
Hudson Bend
Point Venture
2769

Mitigation Objectives

Identification

- Identify ongoing power line ignition events in regions of high fire risk



Utility Notification/Response

- Find and fix before ignition

Fire Response

- All-hands response, if fire occurs

Important Task for Advisory Council

- Assume we have identified an active ignition event in a high-risk region.
  - What factors will affect the priority, speed, and nature of response?
  - Who responds first?
  - How will communication be established with additional responders?
  - Other considerations?

Questions and Open Discussion

http://WildfireMitigation.tees.tamus.edu

Action Items

- Finish sign up process, including execution of purchase order agreement.
- Finalize selection of specific feeders.
  - Website has guidance on selection.
  - TEES personnel are available for consultation.
- Provide electronic GIS-based map/system model.
- Complete make-ready work. TEES will provide instructions.
- Get buy-in from operational personnel to track and document events with TEES on an ongoing basis.
- Consider issues related to responding to
  - incipient failures
  - active ignition events
- TEES will distribute a document discussing types of power line events and probability of ignition, to start the discussion.