

LOW DOWN ON THE HIGH UP:

USING DRONES FOR LAND CONSERVATION

TEXAS LAND CONSERVATION CONFERENCE
MARCH 3, 2017

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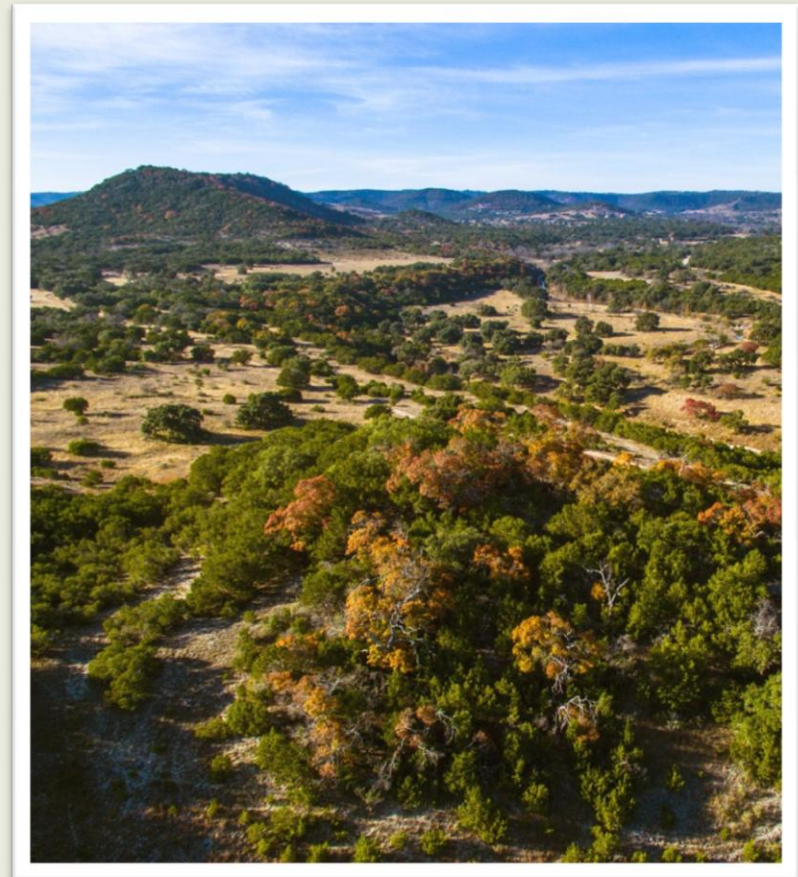
RAY RENNER, RPLS, PMP
MANAGER OF SURVEYING, MAPPING, AND GIS
LOWER COLORADO RIVER AUTHORITY



**TEXAS LAND
CONSERVANCY**

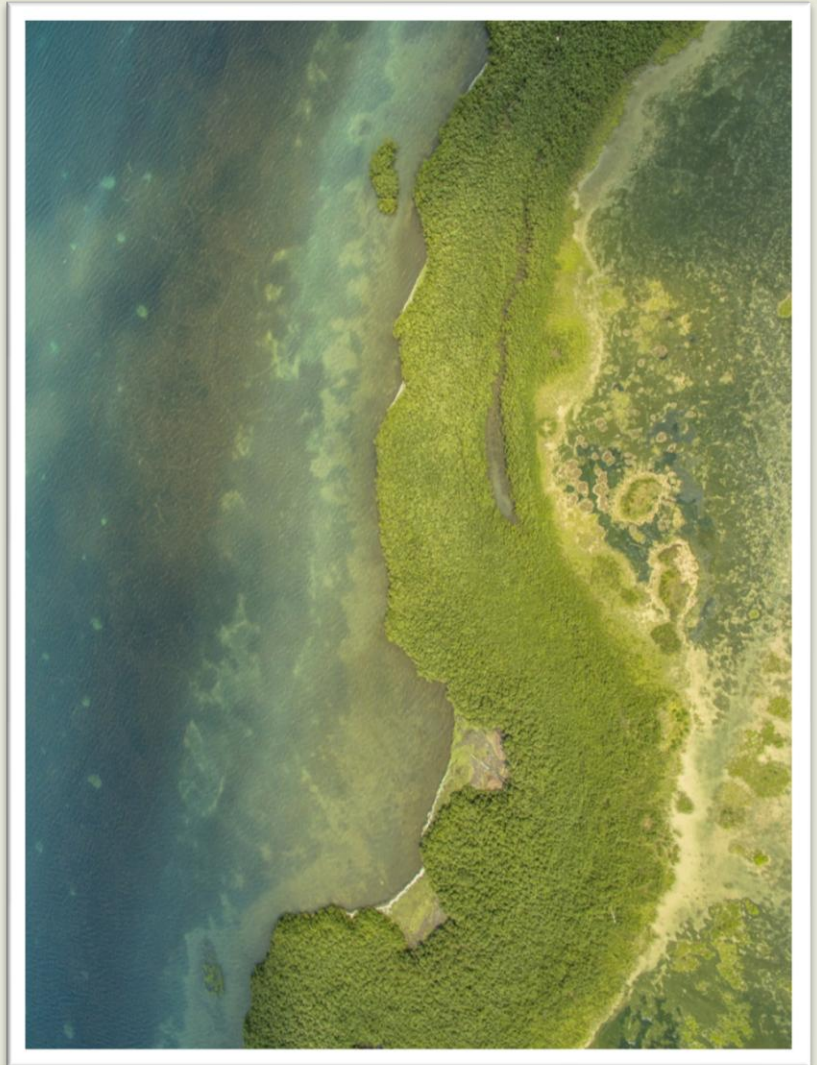
Overview

- Drone applications for land trusts and land conservation
- GIS mapping and surveying
- Regulations
- Implementing drones within your organization



Drone Applications for Land Trusts and Land Conservation

- Captivating imagery
- Surmount physical barriers
- Manual and programmed control
- GIS data production



Monitoring



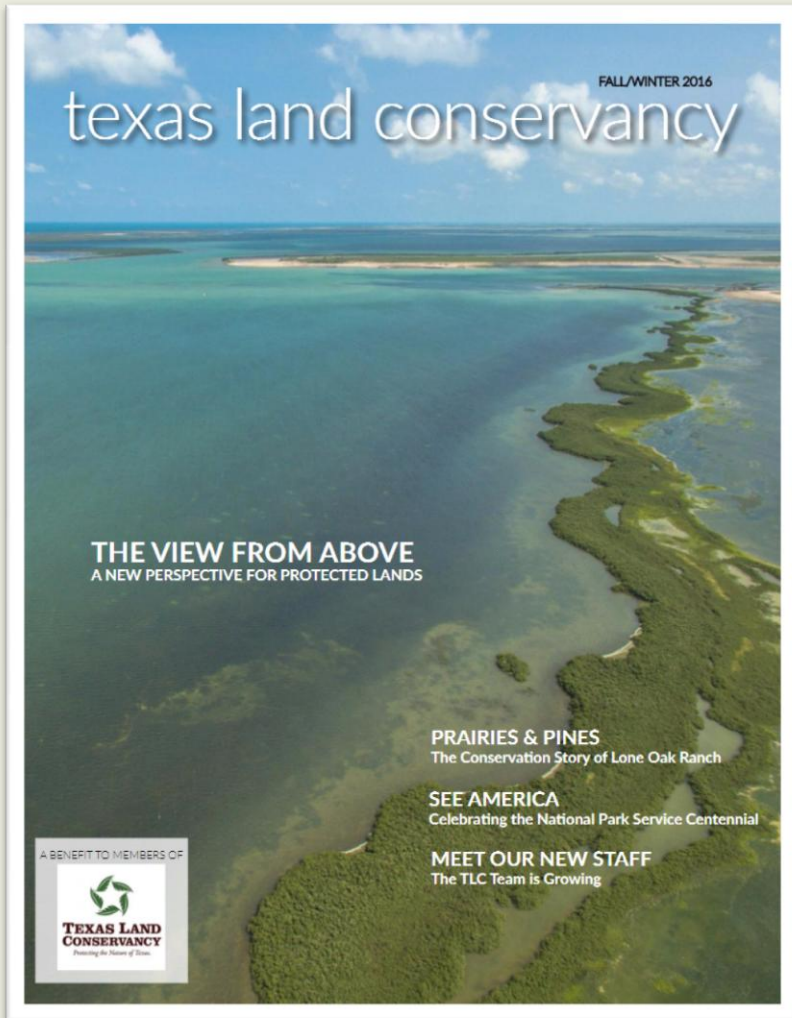
Baseline Documentation



Baseline Documentation



Marketing and Outreach



Property Spotlight



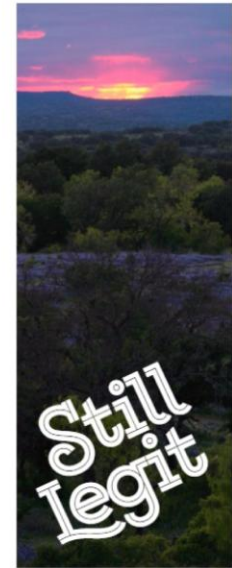
FALL OFF CREEK MITIGATION BANK

Fall Off Creek Mitigation Bank in Coryell County was protected with TLC in 2012. This gorgeous property was once owned by Texas Governor Pat Neff. Today, the 690 acre ranch is protected in perpetuity as a mitigation bank, a reserve of clean water in a healthy, functioning ecosystem.

The property is home to the smooth pimpleback mussel and provides excellent habitat for the endangered black-capped vireo. Sitting at the intersection of the blackland prairie and cross timbers ecosystems, the land is rolling and full of biodiversity.

Located within the Brazos River watershed, Fall Off Creek is part of our Land for Water initiative. The Brazos watershed contains 668 miles of river corridor and 28 counties including the cities of Waco, Temple, and College Station.

As the Brazos meanders through the heart of Texas the river and its connected network of natural tributaries, oxbow lakes and floodplain wetlands provide essential aquatic habitat for rare species of fish, mollusks, and crayfish including species of shiner fish, and the Brazos river watersnake.

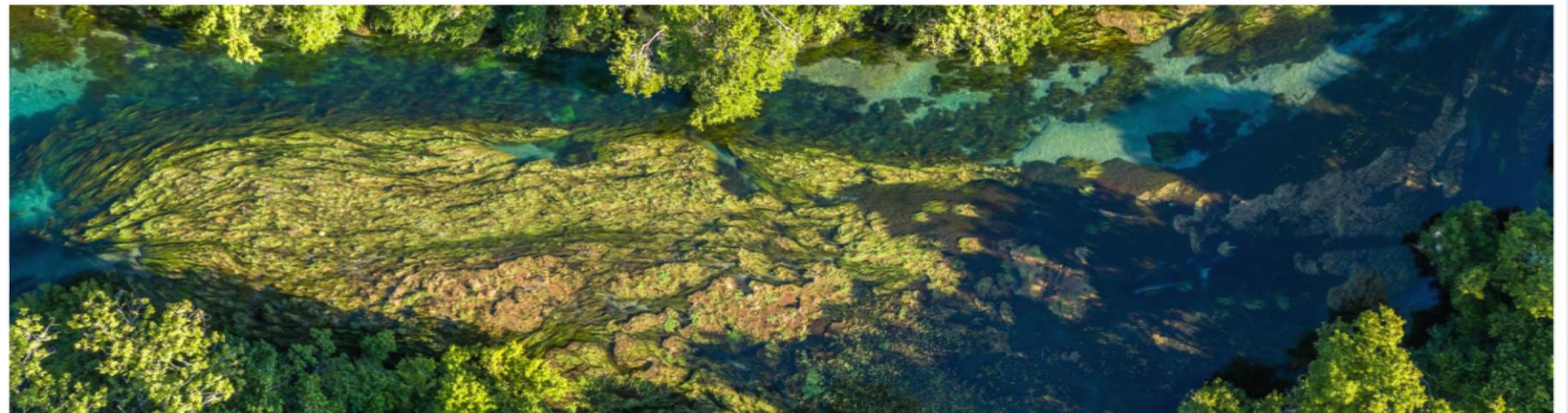


There are a lot of things to be proud of if you're from Texas - longhorns, horny toads, and those big Texas skies. You know what else makes us proud?

Texas Land Conservancy just got re-accredited through the Land Trust Alliance. This means we are one of over 350 land trusts across the country that hold this mark of distinction.



Marketing and Outreach



LCRA UNMANNED AERIAL SYSTEMS

Uses and Operations

Texas Land Conservation Conference

March 3, 2017

History of UAS Program

- August 2014 - Initial LCRA Business Case Analysis
- February 2015 - Initiated contact with FAA
- April - July 2015 - Purchased Aircraft
- FAA Approvals
 - November & December 2015: Authorization to fly four specific areas in Central Texas
 - April 2016: Received “333 Exemption”
 - May 2016: BLANKET COA gave authorization to fly across United States (excluding airports and restricted airspace)
- FAA Part 107 – Into effect August 29, 2016
- Pilot Training and Certification – October 2015 – July 2016

Surveying, Mapping, & GIS

- Surveying – Field Acquisition
 - Mission Planning – What's the Big Picture?
 - Define Scope, Schedule, Budget
 - Flight Planning – Specific operation logistics
 - What aircraft
 - Build a “Flight Plan”
 - NOTAM
 - Notification to Public Safety and SOCC
 - Weather

Surveying, Mapping, & GIS

- Mapping – Reporting conditions observed
 - Data Processing
 - Point Cloud/Data Model
 - Orthomosaic
 - Oblique Photography
 - Video Editing
 - Point of Interest
 - Linear Video
 - Video for Web Presentation or Marketing
 - Topographic Map

Surveying, Mapping, & GIS

- GIS – Adding accessibility and analytics
 - Make the information available
 - What level of detail do you present?
 - Consider future applications
 - Consider a larger audience

Project Scale

- How big of an area can be mapped?

Work Products

- Raw output is either video or photographs
- Processing Software
 - Pix4D
 - Virtual Surveyor
 - Global Mapper
 - FLIR Tools+
 - Future – Multispectral Imagery

Federal Regulations

- Part 107 – The High Points
 - Must maintain Line of Sight with the aircraft
 - Daylight operations only
 - Maximum altitude of 400' (Class G airspace)
 - Class B, C, D, and E Airspace require ATC permission
 - Air deliveries are allowed
- Waivers
- Aircraft Registration

State Laws

- HB 912 – Texas Privacy Act 2013
 - 19 Exceptions are listed *first*
 - Illegal to capture an image of an individual or privately owned real property
- HB 1481 – Critical Infrastructure Bill 2015
 - Operation over; dams, power generating facilities, gas & electric utilities, port or railroad facilities
- HB 3628 – Capital Complex 2015

Remote Pilot in Command

- Currently holds a Pilot Certificate
- Pass a UAS Pilot Exam

Lessons Learned

- Every aspect has intricate details
- Seek out technical expertise
- Everyone is new at this
- Start up costs more than you think
- Continuous reporting to your management
- Do what is right – don't cut any corners

Implementing Drones Within Your Organization

1. Identify potential uses and if drones are beneficial to you
2. Purchase and register drone with FAA
3. Learn to fly and process products
4. Obtain Remote Pilot Certificate from FAA
5. Get to work!

Lessons Learned

- Have plenty of batteries
- Don't dismiss the aeronautical knowledge test
- Most landowners are receptive, share imagery with them
- Start with newest technology and skip a generation
- Glitches and malfunctions can and will occur

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**TEXAS LAND
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Protecting the Nature of Texas.



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