Buying and Selling Ecosystem Services
Presentation To City of Austin Environmental Commission
January 15, 2020
Jim Blackburn
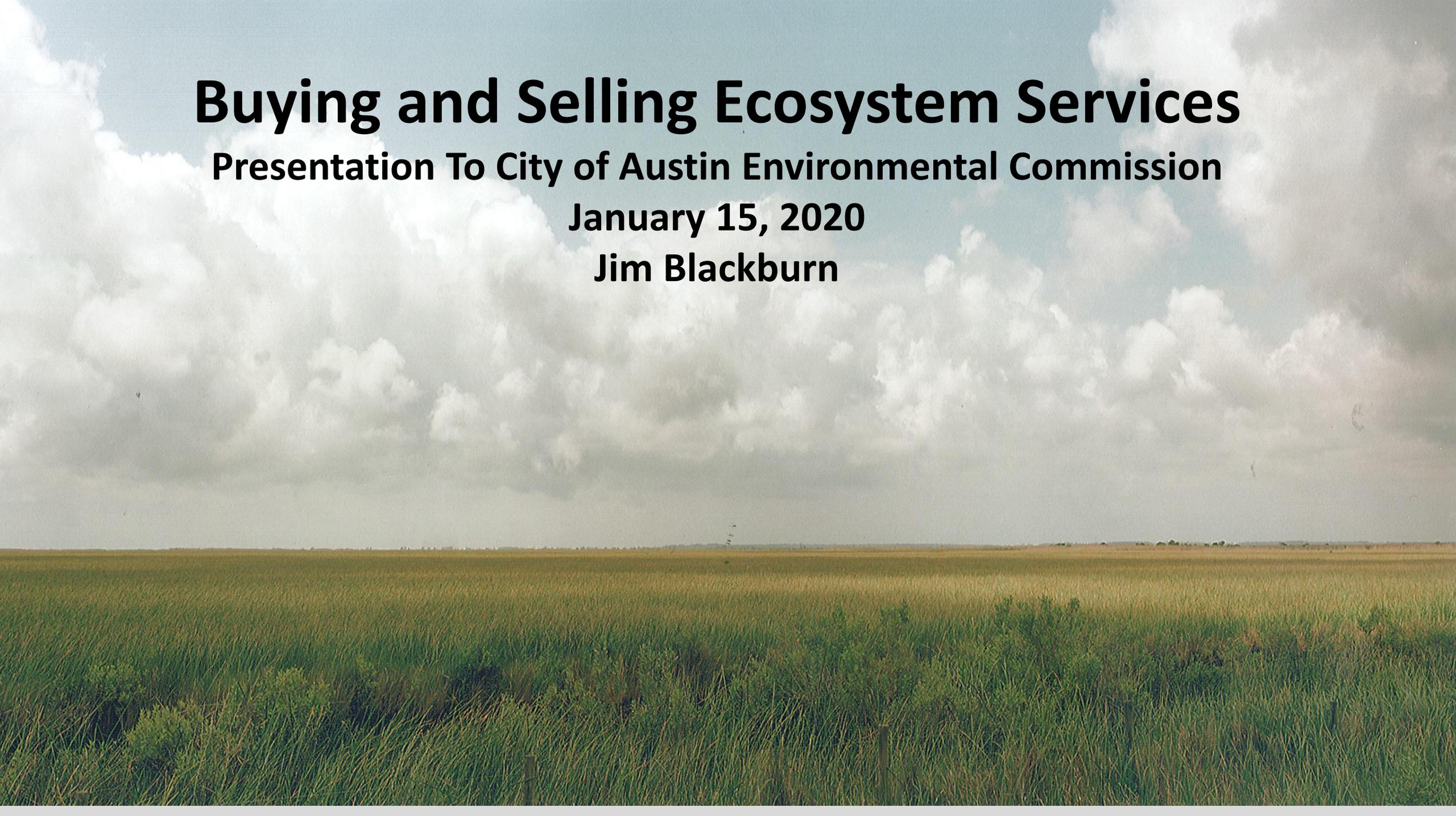
# Post Ike Research at Rice University's SSPEED Center

Hurricane Ike Inundation Depth
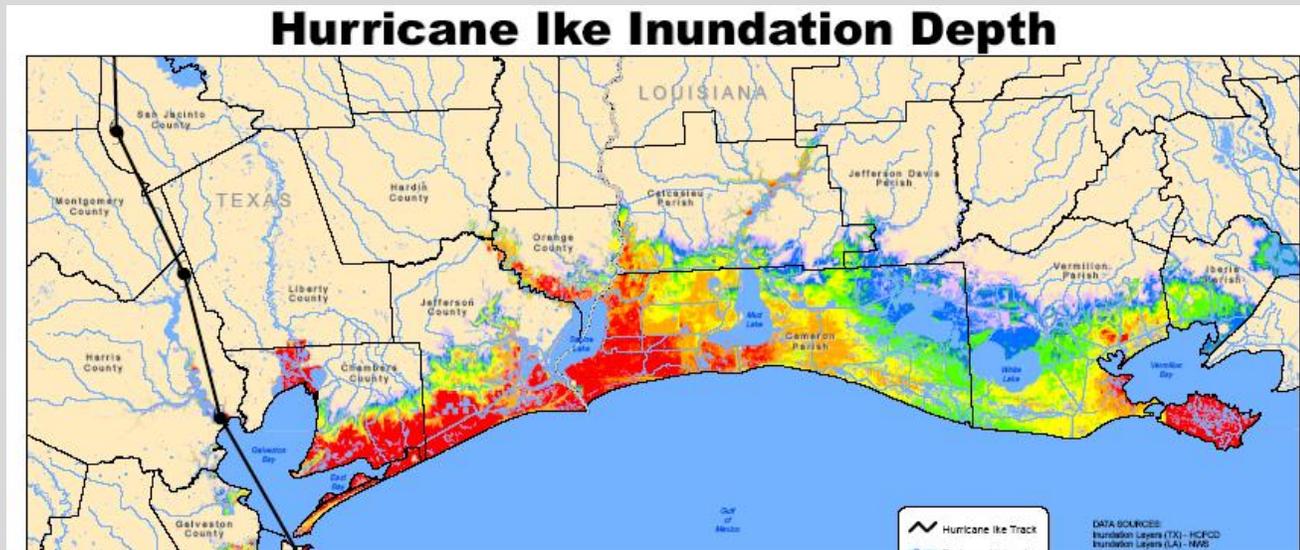
How Do We Protect 2 Million Coastal Acres Lying At Or Below 20 Feet Elevation?

Majority in Private Ownership
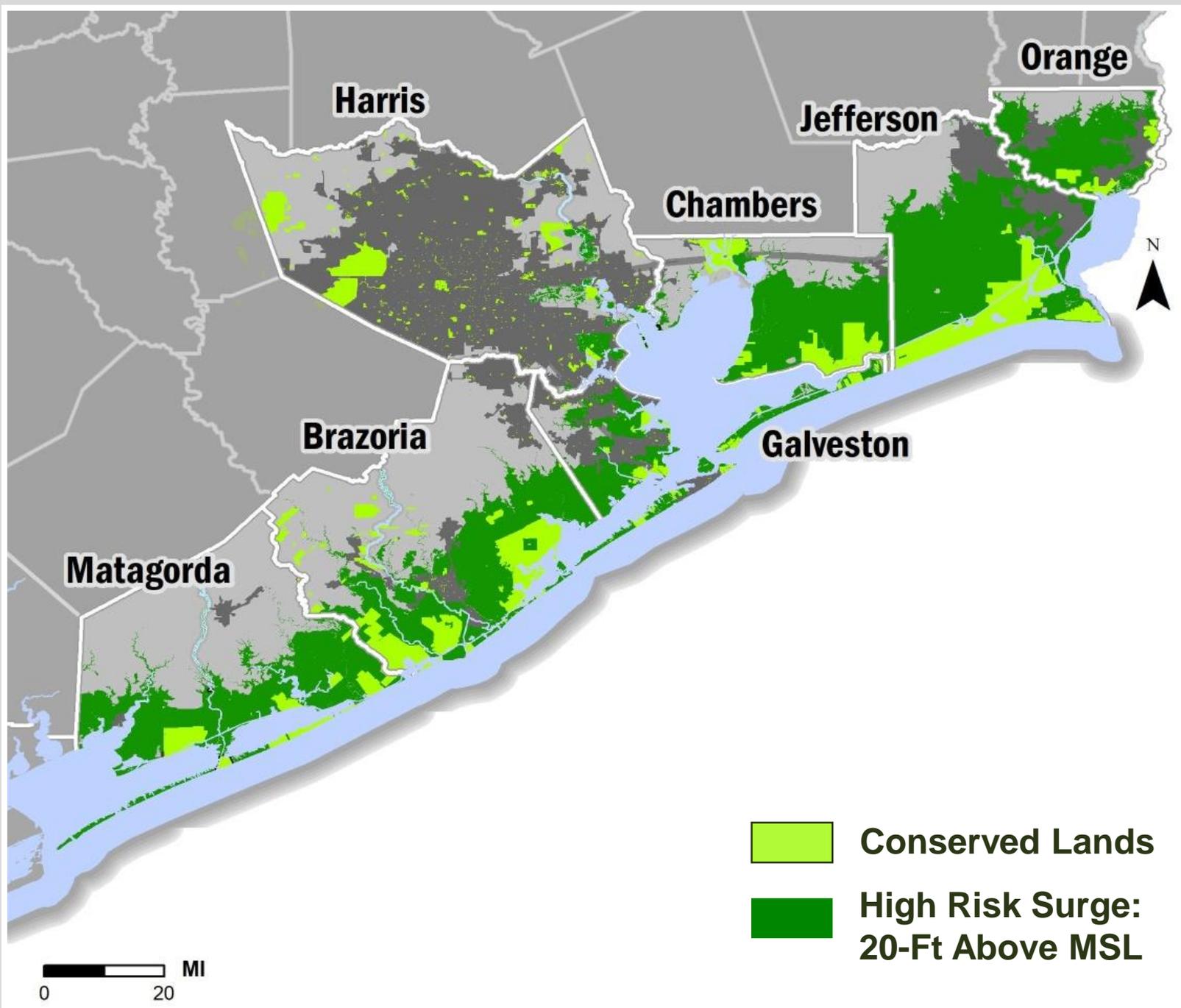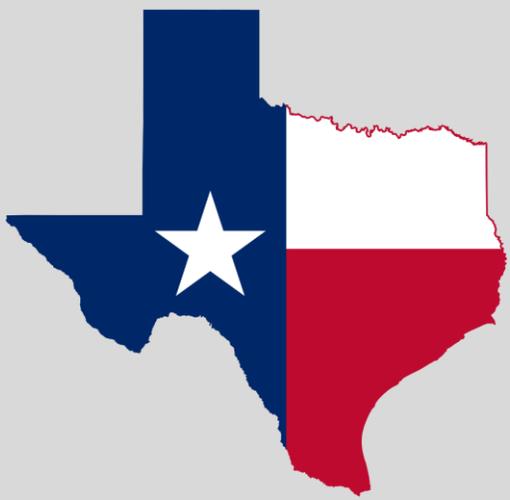
Low-Lying Lands of Galveston Bay

Economy and Ecology As A Land Management Strategy

Could We Develop a Different Economy Here - -

A Resilient Economy Based on Use, Appreciation and Protection of our Natural Values?

Houston-Galveston Study Area · 5' + 25' Inundation Levels with 5' Contour Lines

Let's Have A Conversation About Ecology

|	
County Boundaries	Prairie Systems
Big Thicket	Wetlands (Coastal Marshes)
Piney Woods	Crops (Rice 2011, 2012 & 2013; Cotton, Sorghum 2013)
Bottomlands (Columbia to N.) (Wetlands, Woody)	Live Oak Shrubland
Post Oak Savannah	Developed Areas
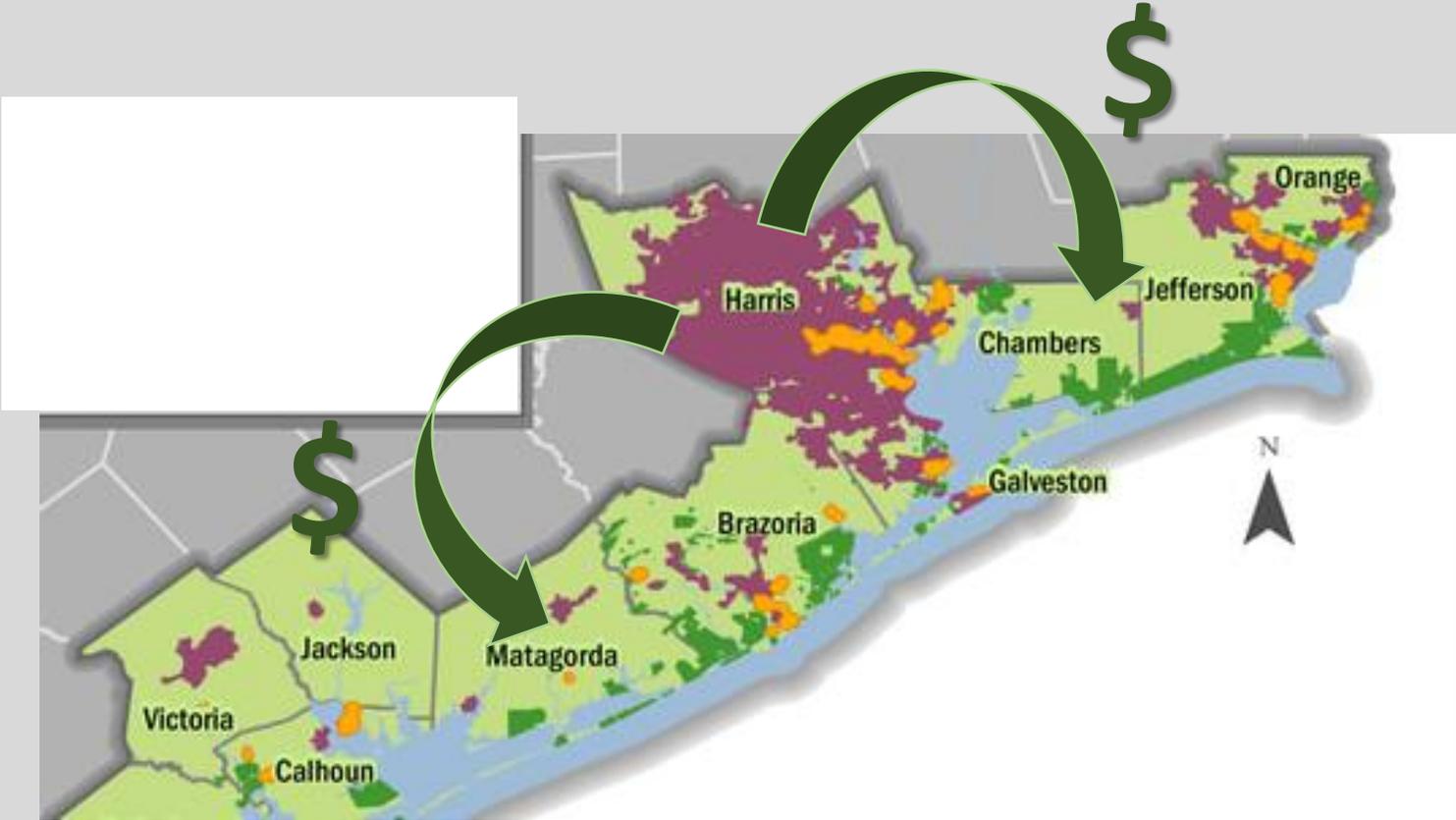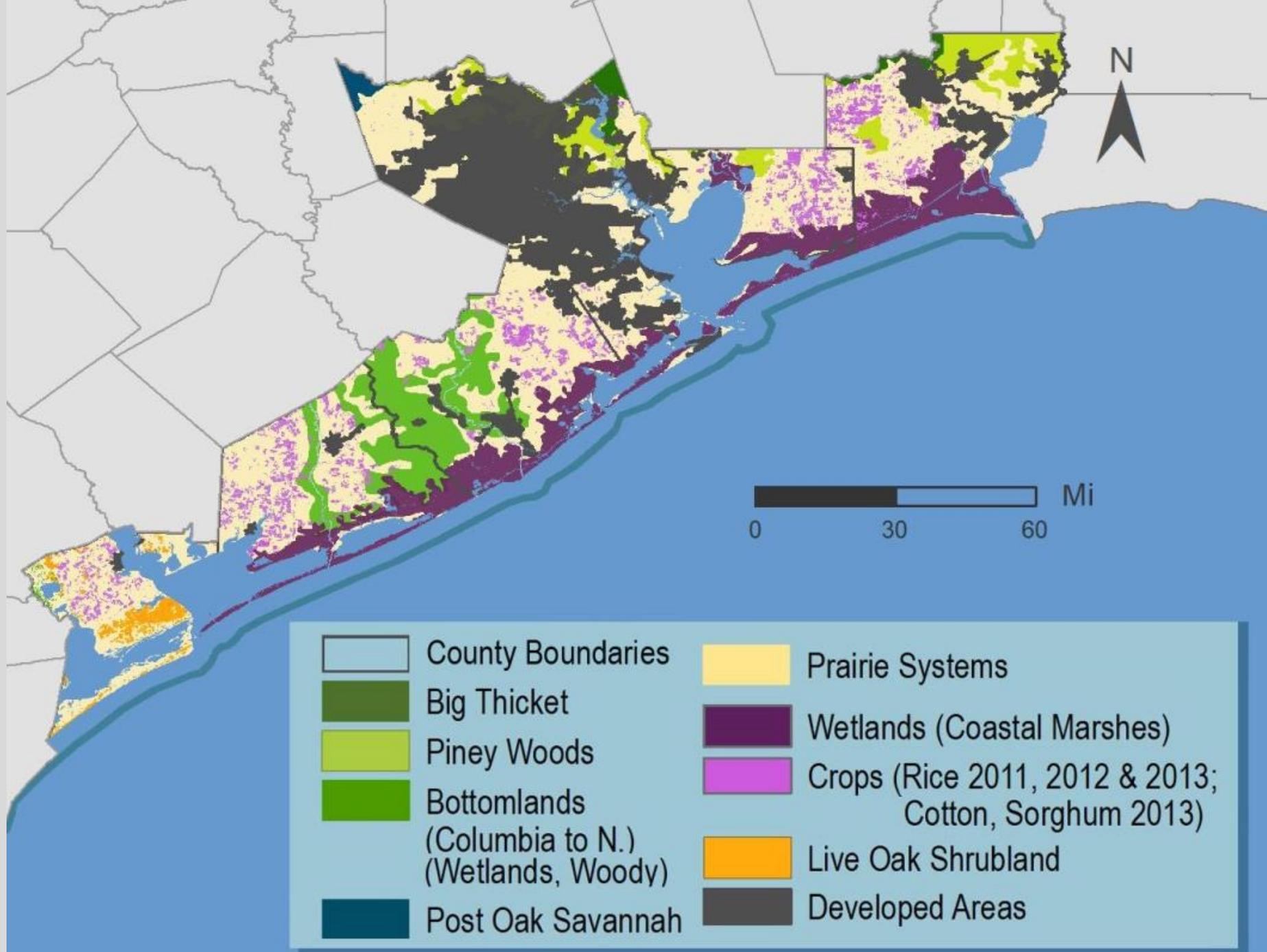
Ecosystem benefits provided by natural coastal lands

- Storm surge protection
- Flood storage
- Carbon sequestration
- Water supply enhancement
- Fishery productivity
- Endangered species habitat
- Neo-tropical migrant bird habitat
- Waterfowl habitat
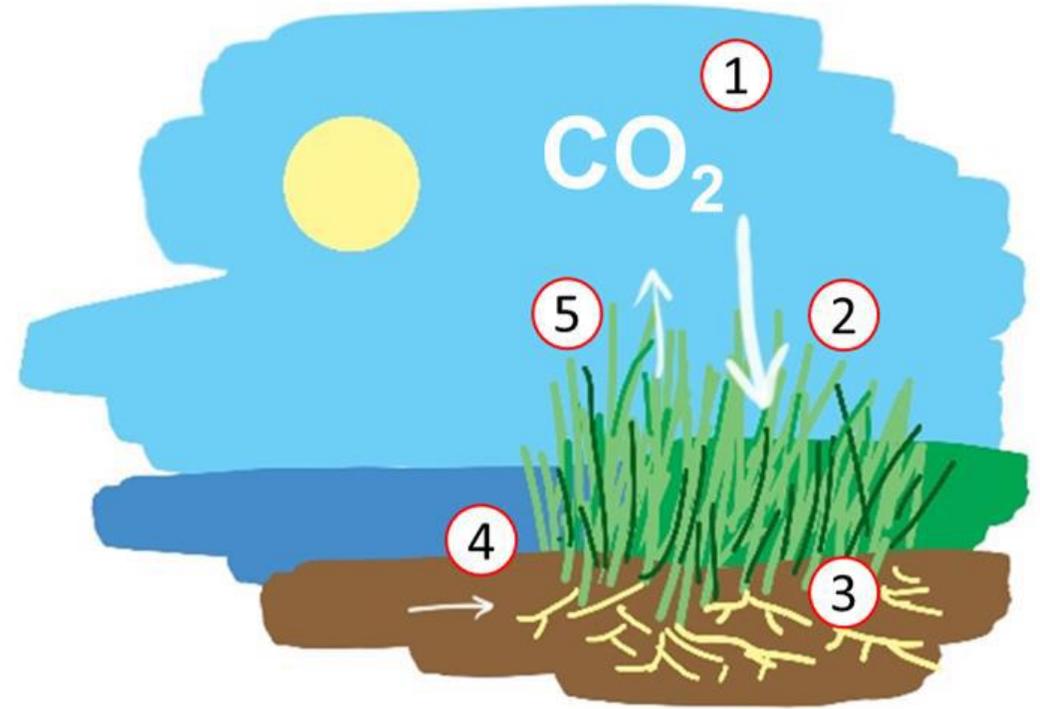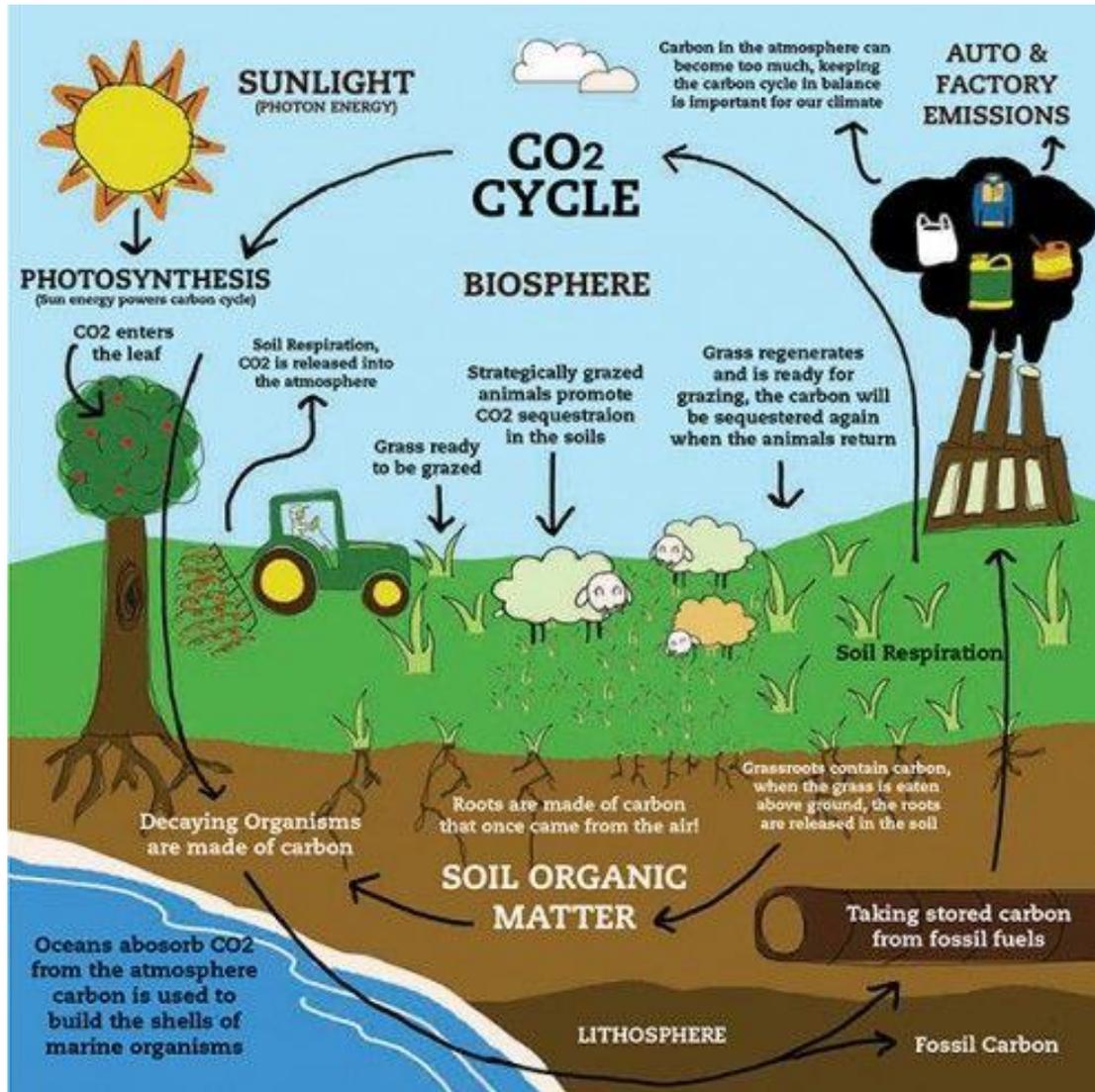
Root Systems of Prairie Plants

Conservation Research Institute

Kentucky Blue Grass *Poa pratensis* · Lead Plant *Amorpha canescens* · Missouri Goldenrod *Solidago missouriensis* · Indian Grass *Sorghastrum nutans* · Compass Plant *Silphium laciniatum* · Porcupine Grass *Stipa spartea* · Heath Aster *Aster ericoides* · Prairie Cord Grass *Spartina pectinata* · Big Blue Stem *Andropogon gerardii* · Pale Purple Coneflower *Echinacea pallida* · Prairie Dropseed *Sporobolus heterolepis* · Side Oats Gramma *Bouteloua curtipendula* · False Boneset *Kuhnia eupatorioides* · Switch Grass *Panicum virgatum* · White Wild Indigo *Baptisia leucantha* · Little Blue Stem *Andropogon scoparius* · Rosin Weed *Silphium integrifolium* · Purple Prairie Clover *Petalostemum purpureum* · June Grass *Koeleria cristata* · Cylindric Blazing Star *Liatris cylindracea* · Buffalo Grass *Buchloe dactyloides*

What Could We Sell? Carbon Dioxide Removal and Storage

California
Ca. $ 15 / tCO$_2$

British Columbia
$ 35 / tCO$_2$

Do we have a CO$_2$ credit desert?

EU CO2 prices are increasing

average is above	**$ 22 / tCO$_2$**
Sweden:	**$ 135 / tCO$_2$**
Switzerland:	**$ 100 / tCO$_2$**
Finland:	**$ 75 / tCO$_2$**
France:	**$ 50 / tCO$_2$**

Basic Concept

SELLERS → Money Exchanged For Protection and Expansion of Ecological Services ← BUYERS
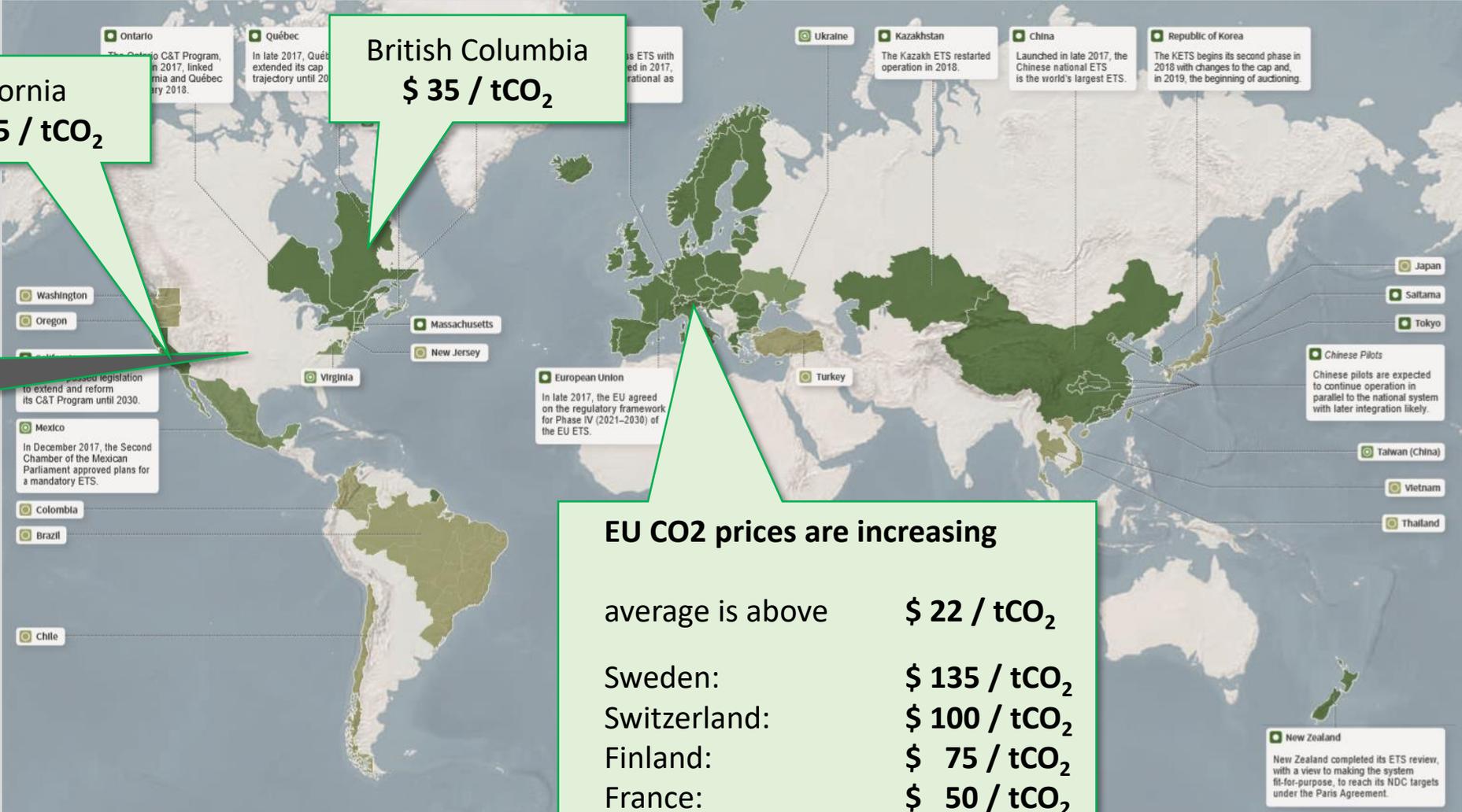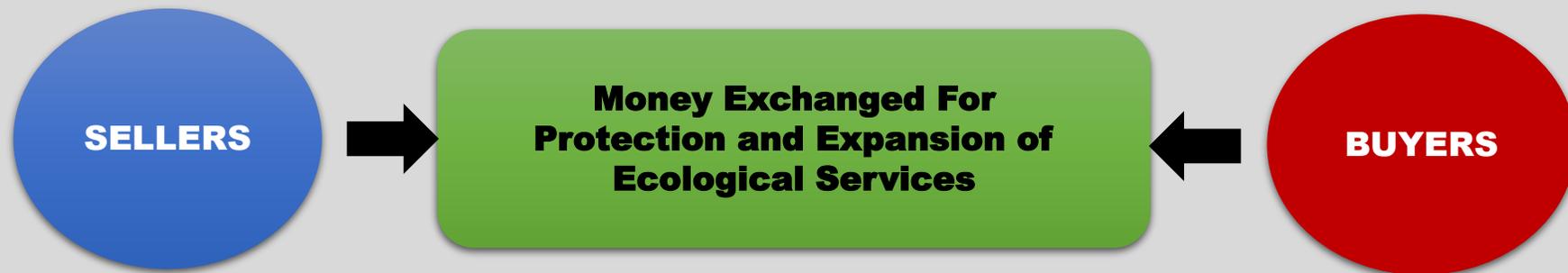
Carbon Neutral/Renewable Commitments

MEMORANDUM

TO: **Mayor and Council**

FROM: Lucia Athens, Chief Sustainability Officer
Zach Baumer, Climate Program Manager

DATE: March 1, 2018

SUBJECT: **Greenhouse Gas Emissions Reduction Progress Report**

Background

The City of Austin is committed to protecting the long-term health and viability of our community through strategies designed to reduce greenhouse gas emissions and mitigate the negative effects of climate change. In 2007, City Council approved Resolution 20070215-0232, the Climate Protection Resolution, which set the goal to make **all City of Austin facilities, fleets and operations totally carbon neutral by 2020**. In 2015, Council approved Resolution 20150604-048, which adopted the Austin Community Climate Plan to achieve **net-zero community-wide greenhouse gas emissions by 2050**. This memo provides a progress report on meeting both municipal and community-wide targets for emissions reduction.

Municipal Operations
BY 2020

net-zero

Community-Wide
BY 2050

Marketing opportunities – CO_2 neutral driving

1 Car's
Emission
527 Gal
Gasoline/yr

4.7 ton CO_2/yr

1.16 acres
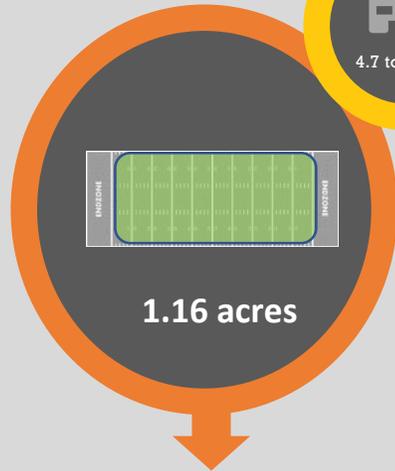
88%
of a Football
Field

$ 15/tCO_2 ~ $ 0.14 / Gal → $ 70 /yr

Market CO_2
neutral
gasoline
Restoring land
& support our
ranchers

Increase market share
or sell premium product

Market CO_2
neutral cars
Restoring land
& support our
ranchers

10 yr CO_2
emissions
stored at
car
purchase

Increase market share
or sell premium product

Value opportunities – CO_2 neutral oil refining
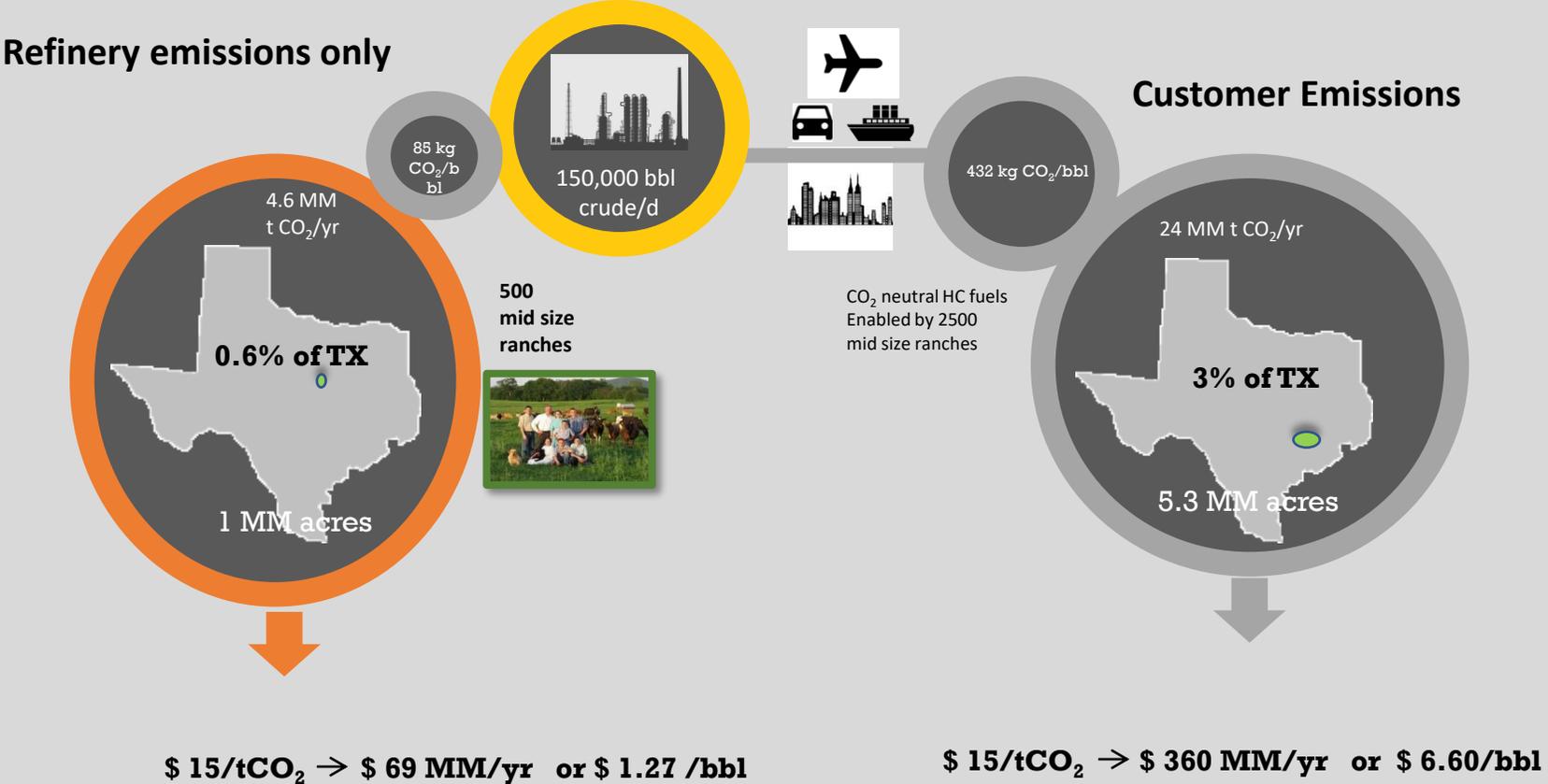
Refinery emissions only

85 kg CO_2/bbl

150,000 bbl crude/d

4.6 MM t CO_2/yr

0.6% of TX

1 MM acres

500 mid size ranches

Customer Emissions

432 kg CO_2/bbl

CO_2 neutral HC fuels Enabled by 2500 mid size ranches

24 MM t CO_2/yr

3% of TX

5.3 MM acres

$ 15/tCO$_2$ $\rightarrow$ $ 69 MM/yr or $ 1.27 /bbl

$ 15/tCO$_2$ $\rightarrow$ $ 360 MM/yr or $ 6.60/bbl
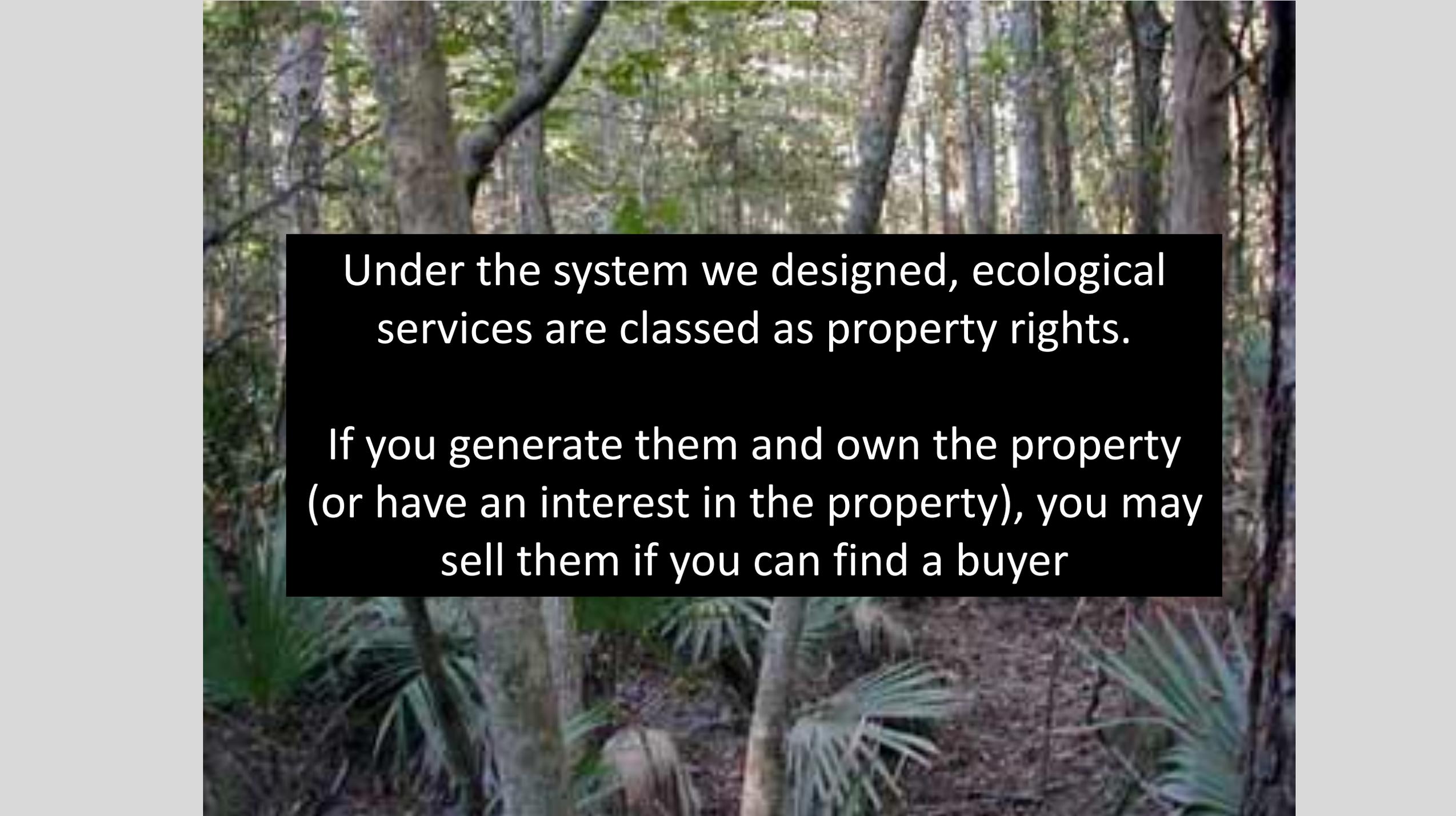
The Future of Carbon Sequestration
Perhaps 1 Billion Tons or More CO2 Storage
Up to 20% of U.S. Carbon Footprint

Under the system we designed, ecological services are classed as property rights.

If you generate them and own the property (or have an interest in the property), you may sell them if you can find a buyer

Stacking To Allow Greatest Landowner Benefits

$
To
Property
Owners

Water/Flood →

Cattle →

Carbon →

Species →

Coastal Protection →

# Honor System For Transactions

Dr. Azure Bevington - Referee

No measurements

No requirement for land management

Sales based upon literature values

Term sheet issued and base price set

You can buy or not

9/25/2014

TEXAS COASTAL EXCHANGE

ECOSYSTEM SERVICES OF THE MID-TEXAS COAST

A review of available literature on the metrics and values of services provided by coastal ecosystems | **Jim Blackburn, Courtney Hale, and Avantika Gori**

Services That Could Be Traded

CARBON STORAGE

STORMWATER RUNOFF STORAGE

RECHARGE AND SPRINGS PROTECTION

WATER SUPPLY ENHANCEMENT

ENDANGERED SPECIES PROTECTION

ENDANGERED SPECIES PROTECTION

Potential Texas Hill Country Exchange Coverage Area

N

MEXICO

Austin

San
Antonio

I-35

I-10

I-35

I-37

I-10

I-35

| Mi |
| 0 30 60 |
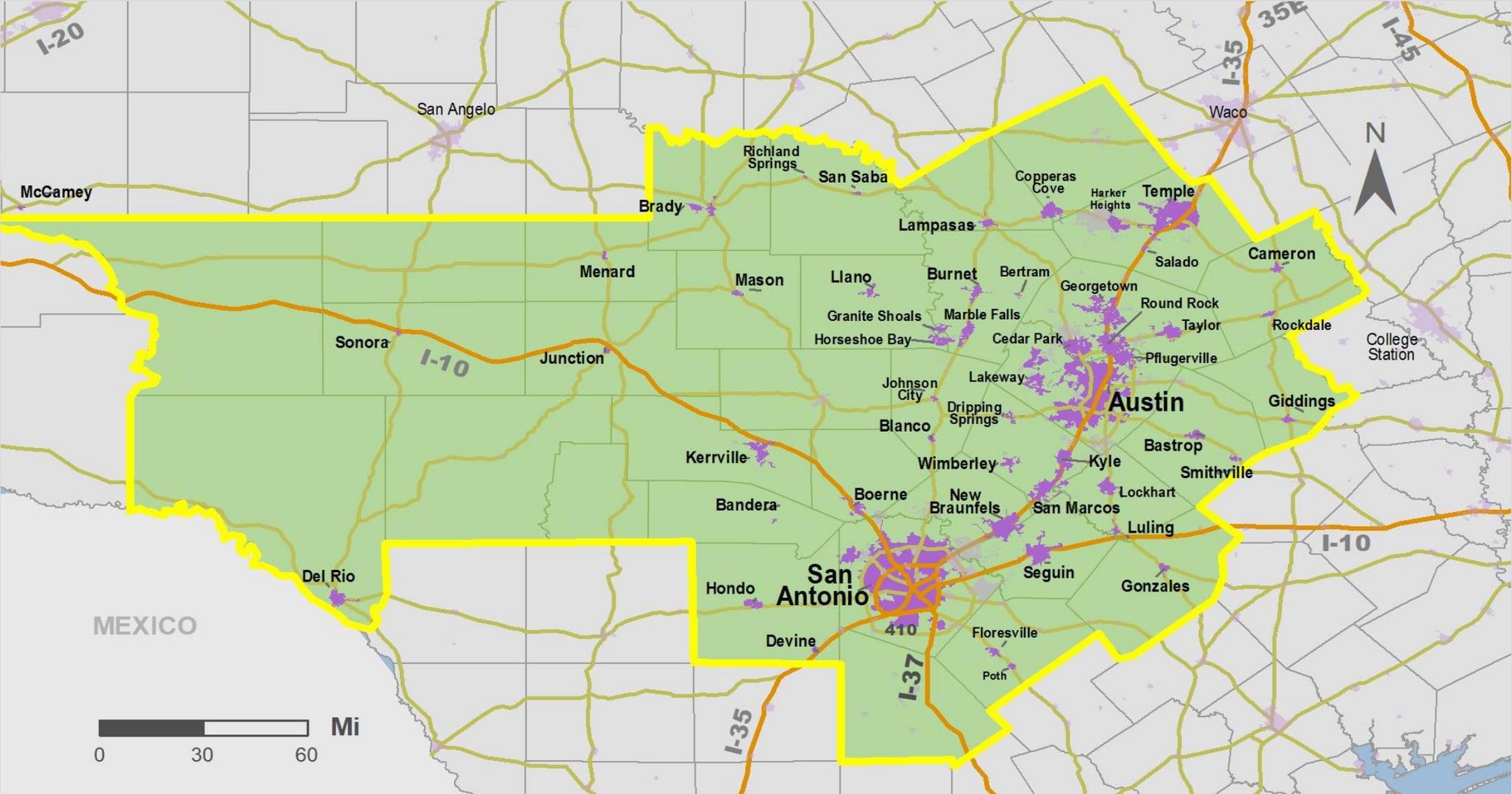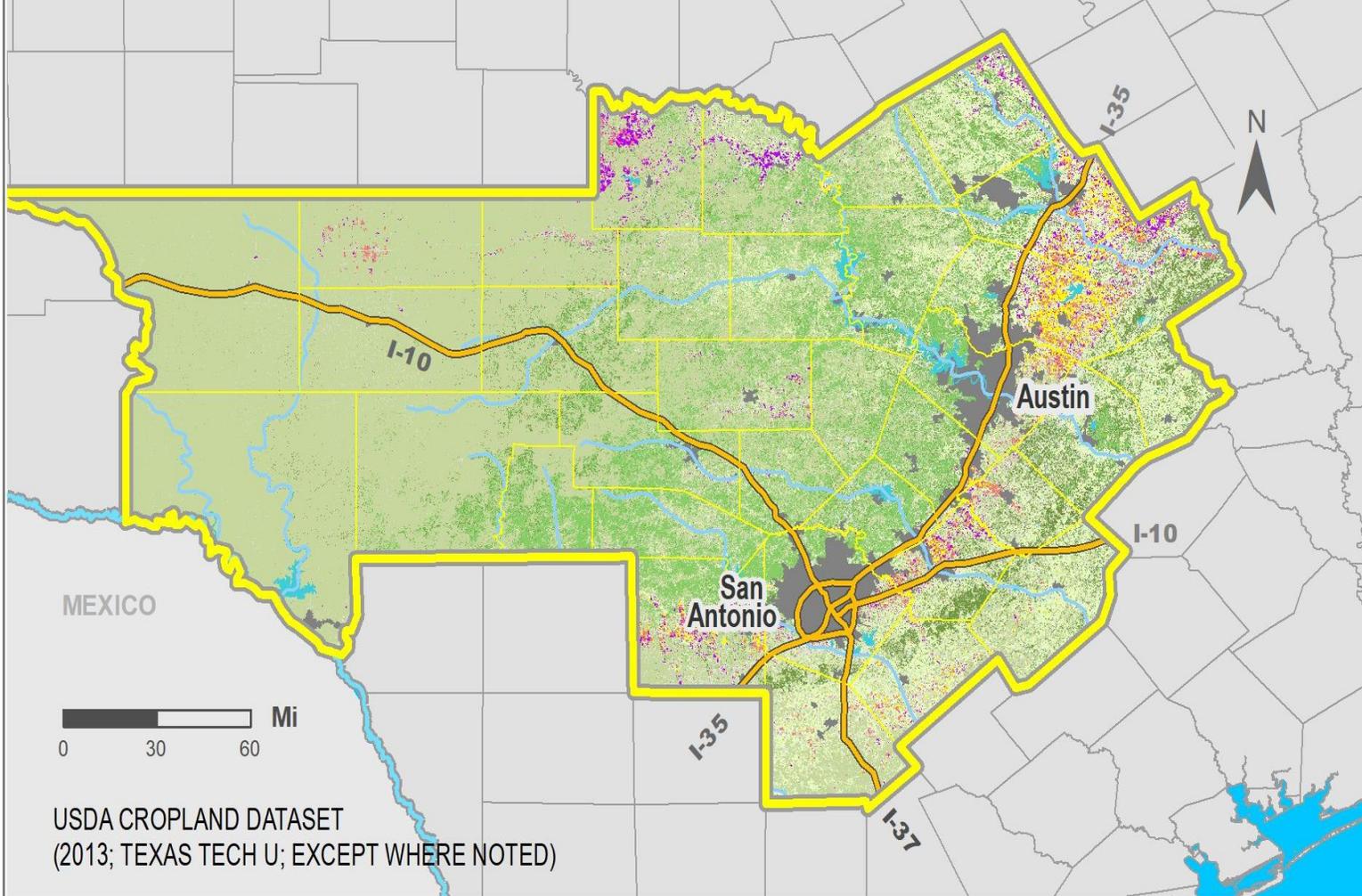
USDA CROPLAND DATASET
(2013; TEXAS TECH U; EXCEPT WHERE NOTED)

⬛ Developed (2016; HGAC)		🟩 Shrubland	
🟨 Crops - Corn (2013; 2012)		🟩 Forest, Evergreen	
🟥 Crops, Cotton, Rice, Sorghum (2013; 2012)		🟩 Grassland	🟦 Open Water
🟪 Wheat (2013; 2012)		🟩 Forest, Deciduous or Mixed	
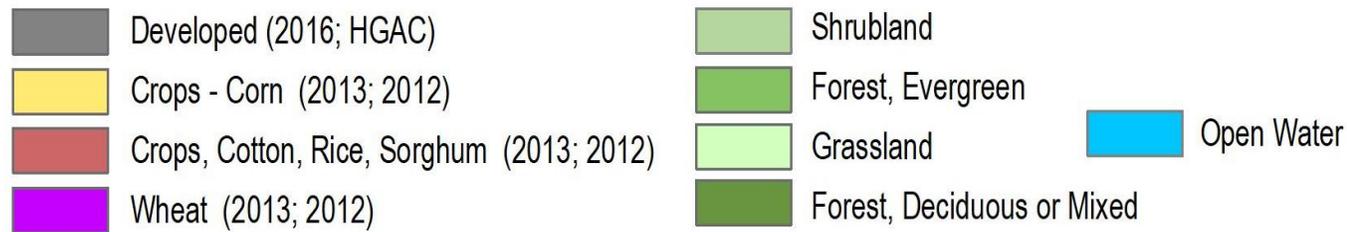
SOURCE: Cropland data: Texas Tech University, Center for Geospatial Technology; based on data from
United States Department of AgricultureNational Agricultural Statistics Service. Developed areas: HGAC, 2016.
Cadastral boundaries: US Census TIGER files. Interstates: Texas Tech University.

Legend:

- balcones canyonlands
- blackland prairie
- brush country
- desert scrub
- grand prairie
- lampasas cut plain
- live oak-mesquite savanna
- llano uplift
- mesquite plains
- oak woodlands
- stockton plateau
- Water features

TEXAS NATURAL REGIONS (HGAC)

We Need To Do Something Different Than We Have Been Doing
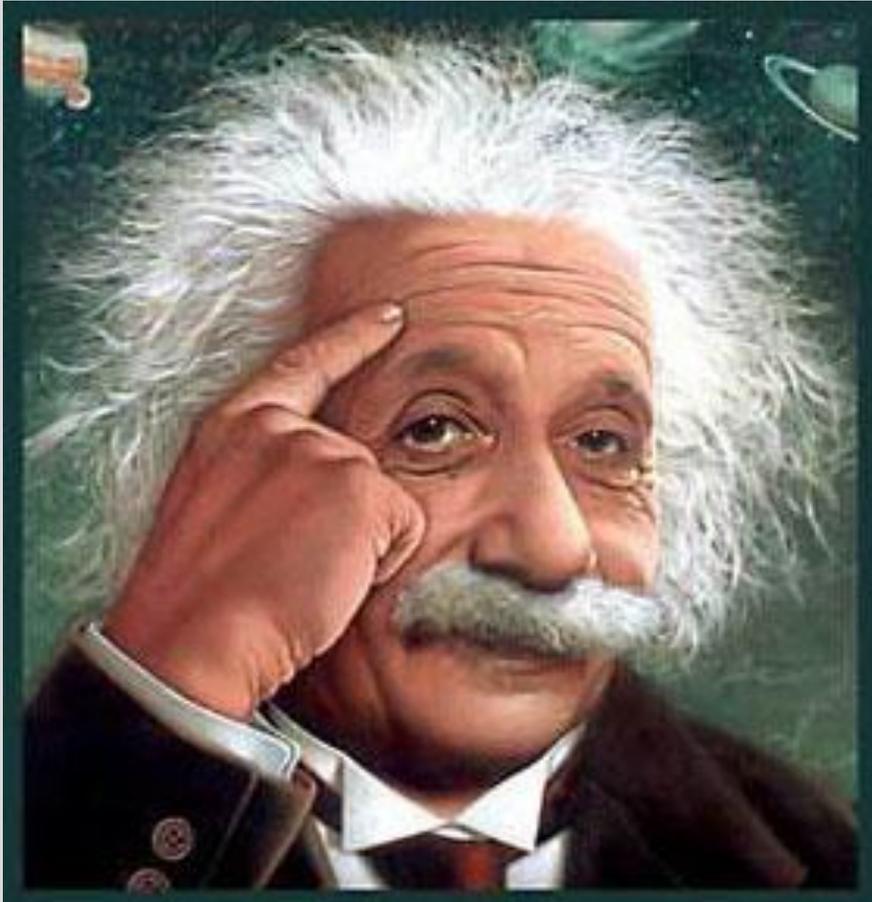
"The world we have created to date as a result of our thinking thus far has problems that cannot be solved by thinking the way we were thinking when we created them."

For Further Information Contact:

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