Texas Water Observatory (TWO)

Water Network, Monitoring, Data Portal, Process Understanding, Modeling, Analyses and Assessment

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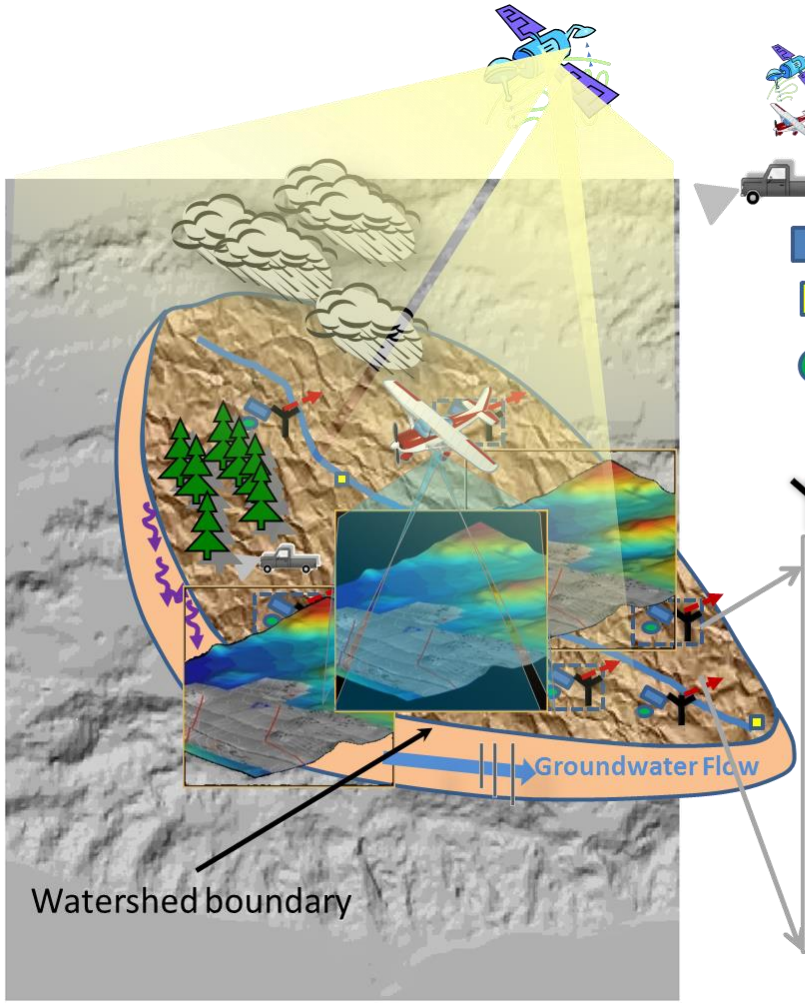
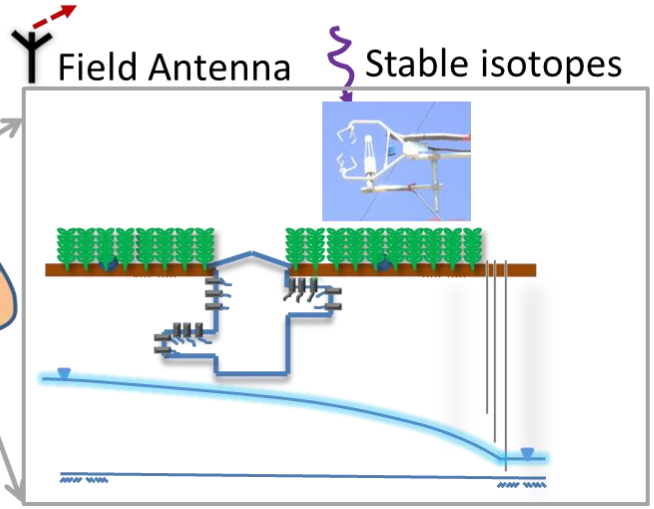
TX Water Observatory (TWO) Network
A Master Test Bed Proposal



Satellite-based remote sensor
Aircraft-based remote sensor
Under-canopy, ground-based mobile sensor
Critical zone / groundwater research sites
Surface water monitoring stations
Meteorology / ET stations



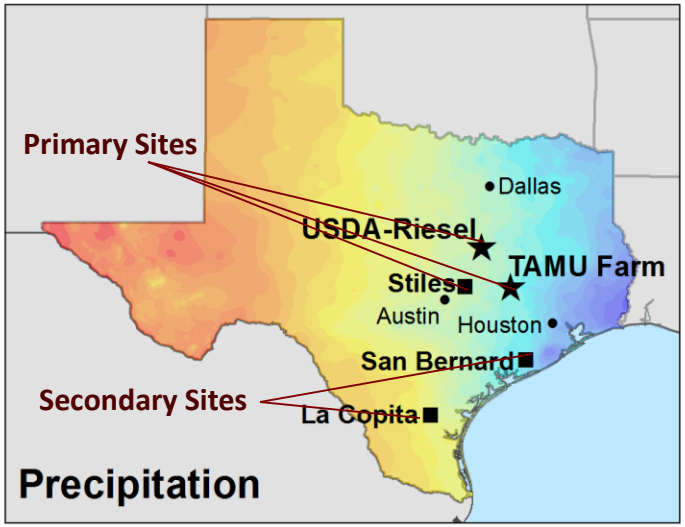
Data to/from field antennae

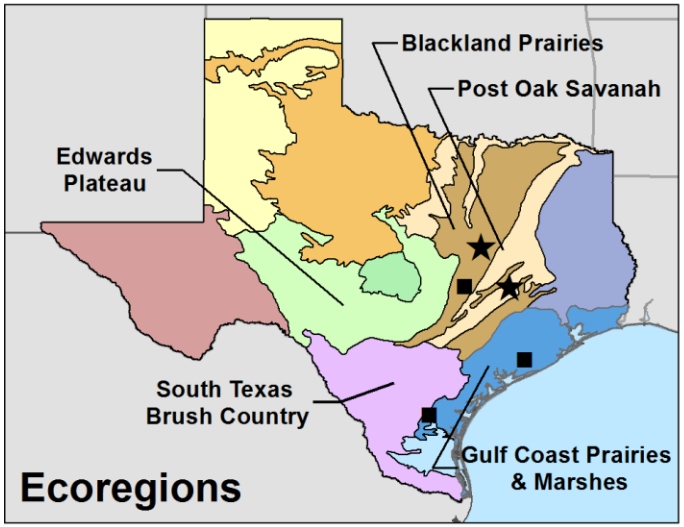
Cyber Infrastructure (CI)

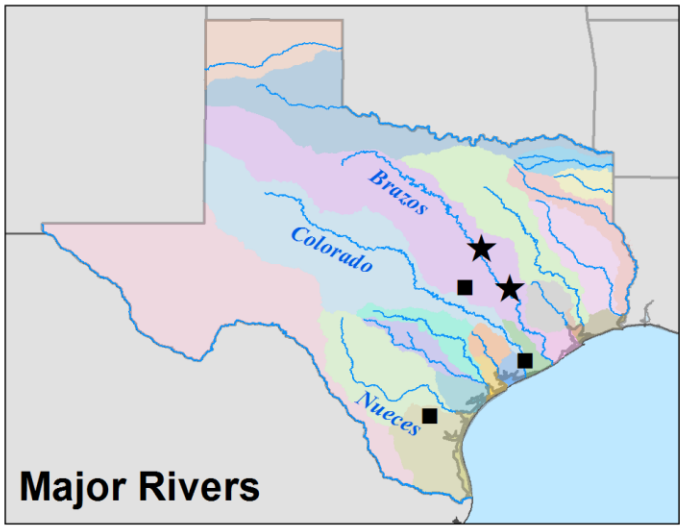
Texas Water Observatory: A Four Prong Initiative

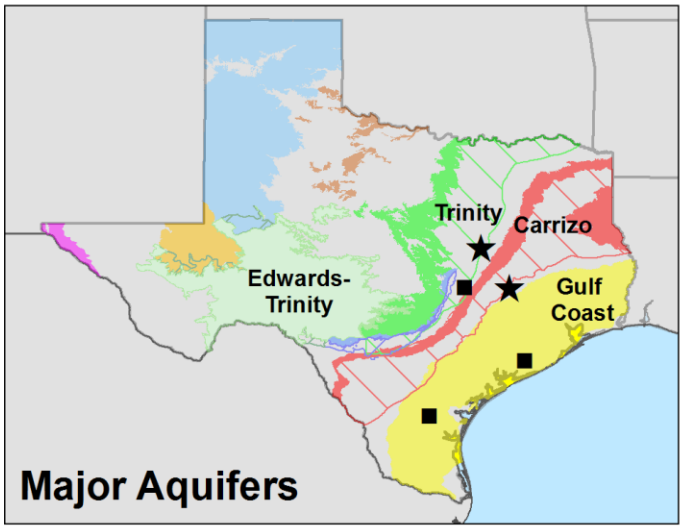
- Observatory Network
  - Establishing a series of real-time and near-real time sensor networks in critical zone across Texas monitoring various surface/subsurface water parameters and fluxes (physical, chemical, biological) in various land use land cover, climatic gradient, erosional/depositional environment. It will be supplemented by air-/ space-based remote sensing platforms
- Data Portal
  - web-based access portal, real-time web query, data retrieval, normalization, analysis and interpretation. Water related data would include, but not be limited to temperature, precipitation, humidity, evaporation, groundwater and surface discharge, soil moisture, water demand, water supply, water use, and water quality, among others.
- Modeling
  - The Water Observatory would integrate surface and groundwater hydrology and decision-making modeling; apply, test and refine existing models; develop modeling software and provide technical assistance on problems related to models
- Analyses and Assessment
  - Application of these Water Observatory models for decision makers would provide critical data on climate, surface and groundwater resources, water quality, and threats to water supplies.

Site selection for the TWO monitoring network

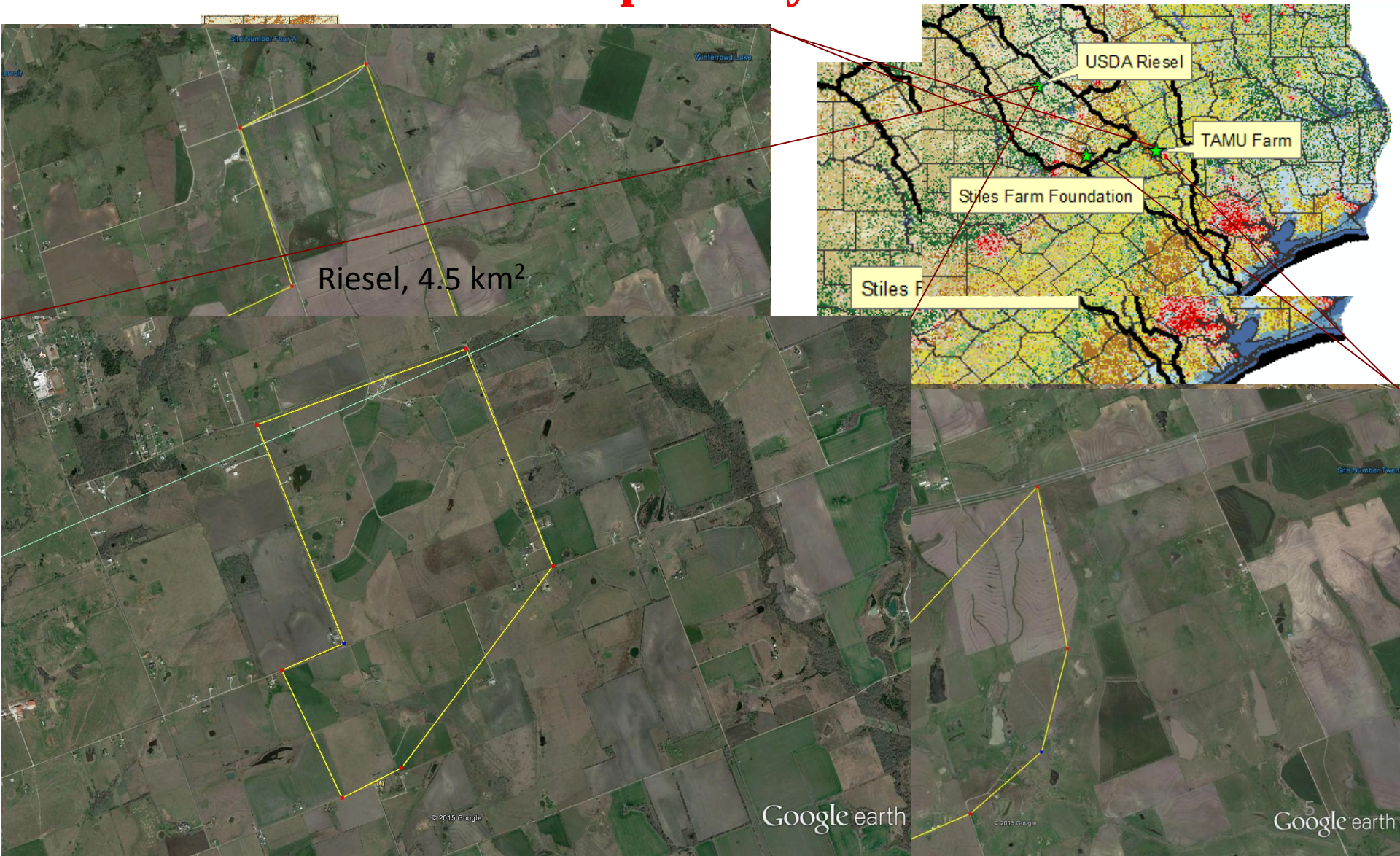




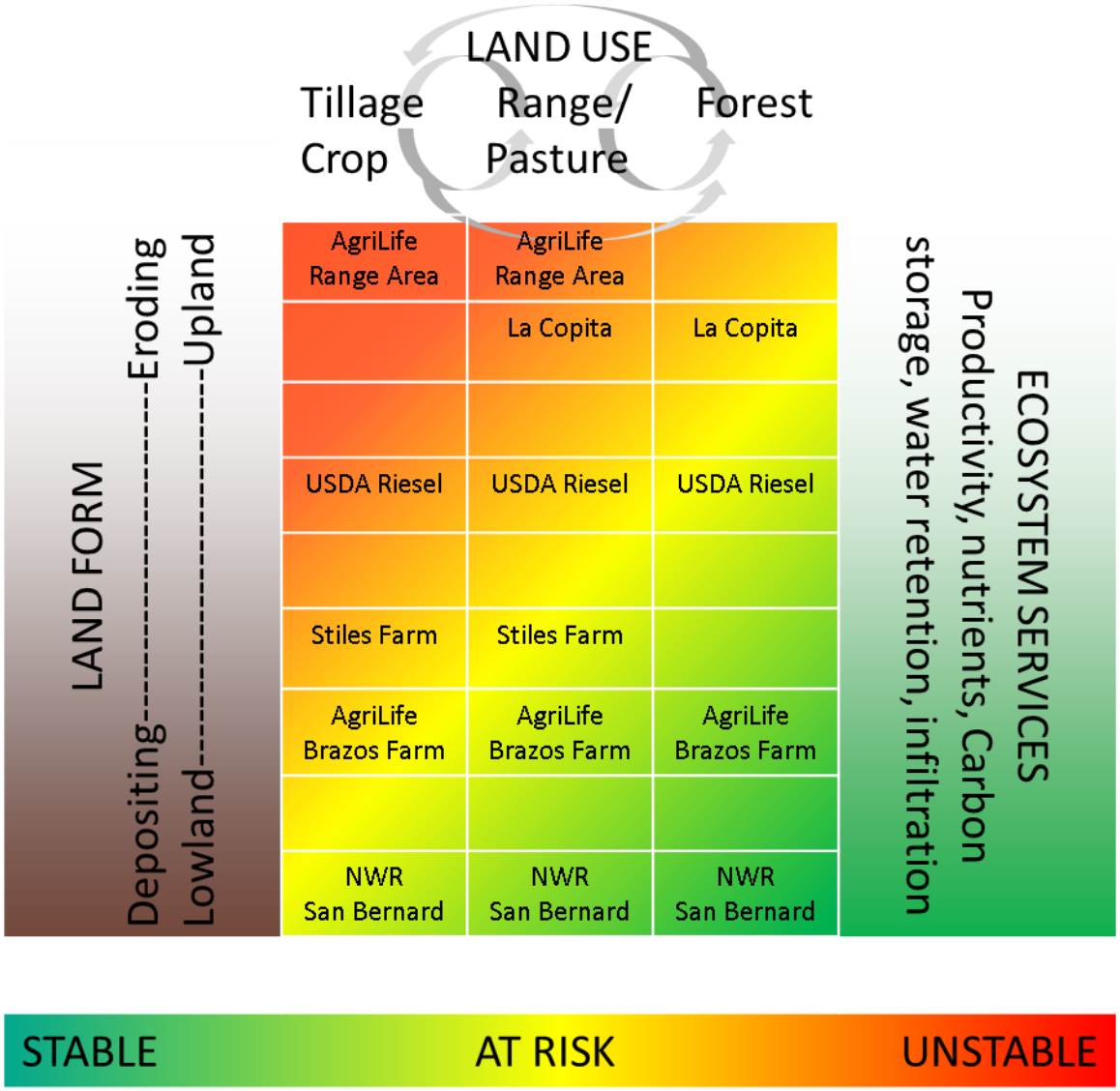




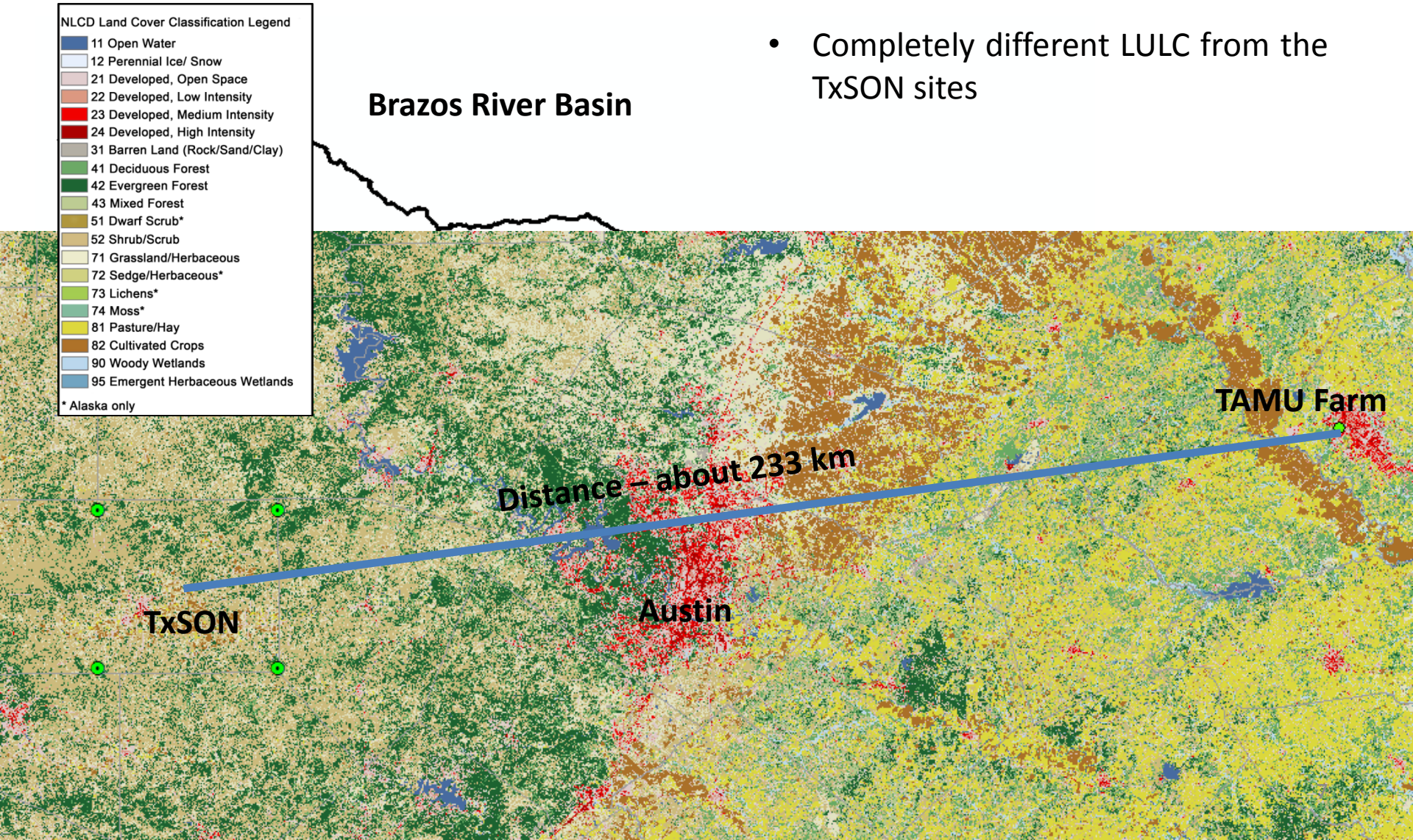
TWO primary sites



Texas Landscape



Complement to TxSON sites



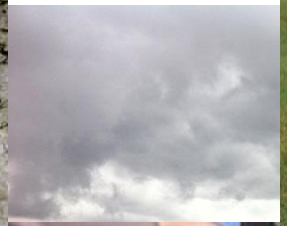
- Completely different LULC from the TxSON sites

TWO Instrumentation

Eddy covariance tower

Scintillometer

GPR studies



Instrumented soil pit

Deep-shallow coring

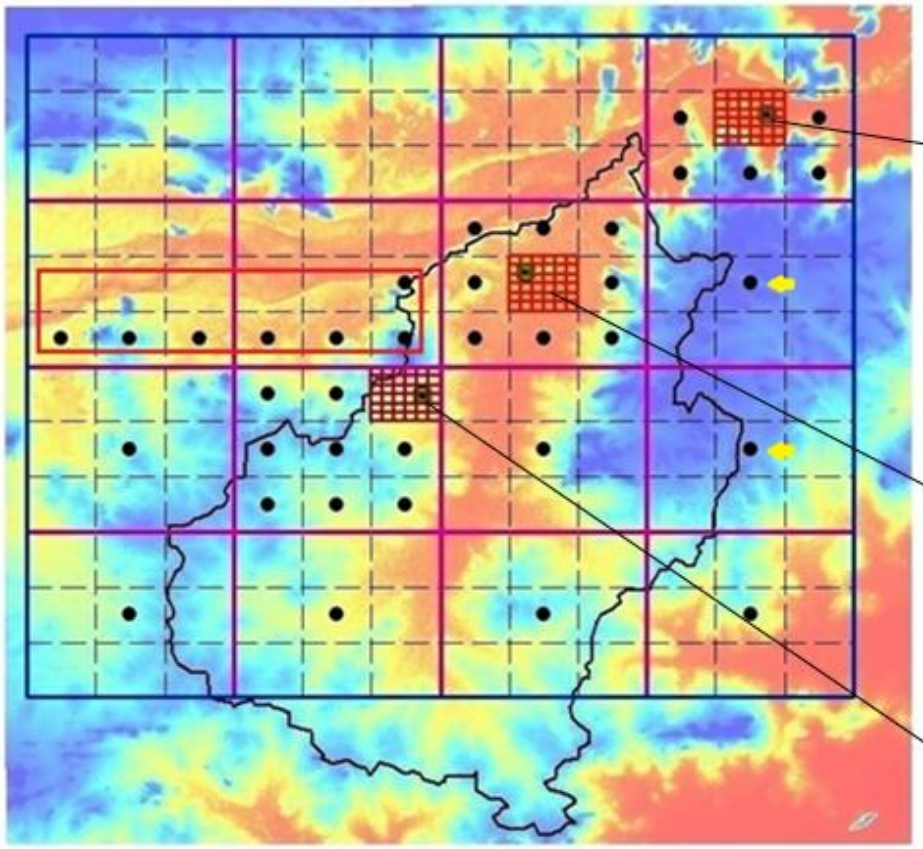
Groundwater monitoring (quality and quantity)

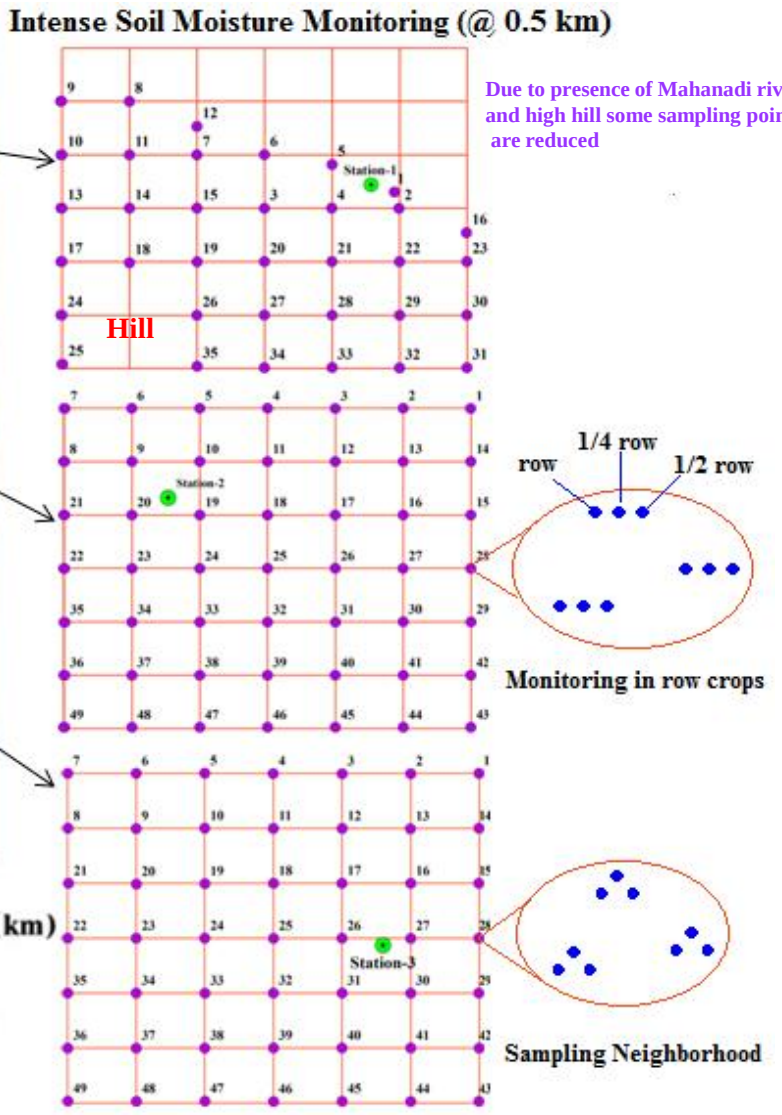
- TWO will be operational in Summer, 2016
  - Coordinating data sharing efforts with regional and state mesonets
  - Providing both real-time and historical data
  - Performing on-the-fly QA/QC checks on integrated datasets
  - Scaling up network infrastructure
  - Currently set-up to provide data through Fall 2017

- SMAP validation related activities
  - Develop site specific relationships between point scale soil moisture measurements across depths with COSMOS/SMAP measurements for different wetness conditions

Sub Task 3.3 *Contd...*

Protocol of Grid-wise soil moisture monitoring





Elevation (m)

High : 470

Low :0

SMAP Radiometer Pixel (36*36 km)

SMAP Combined Radiometer/Radar Pixel (9*9 km)

SMAP Radar Pixel (3*3 km)

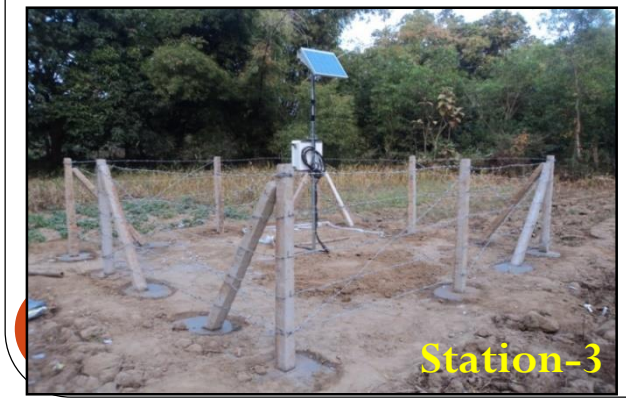
Profile-based Soil Moisture Monitoring Station

Watershed

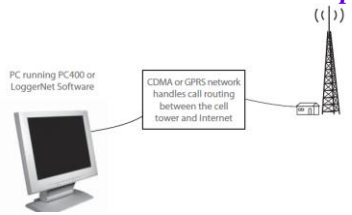
Soil moisture sampling points

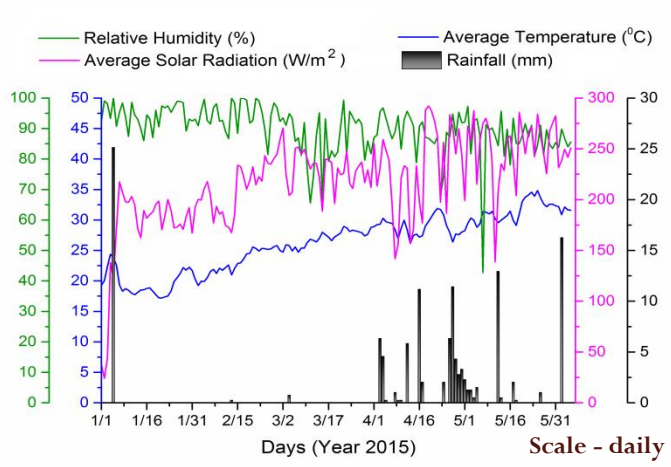
Sub Task 3.4 *Contd...*

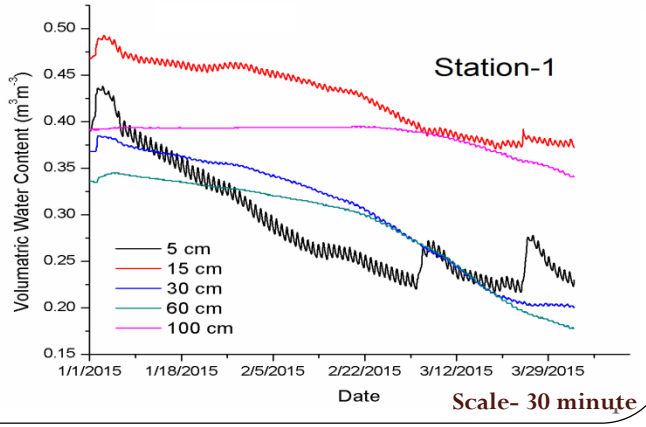
In-situ Test-beds for continuous monitoring using sensors



GPRS communication modems (RAVEN-XT) have been procured for remote communication from the data loggers ***to perform automatic data collection on computer0***







Crop Experiments in the Farmers' Fields

Station-1

Variety: Miss Okra (F1 Hybrid)
Spacing : 0.6 x 0.3 m
Plot size: 4 m x 4 m
Experimental design: Split plot
No. of treatments: 2 (30 % and 40 % MAD) **Replications:** 4
Irrigation methods: Surface & Furrow

Field preparation

A view of okra crop sown in the experimental plots at Station-1

Station-2

Variety: Miss Okra (F1 Hybrid)
Spacing : 0.6 x 0.3 m
Plot size: 3 m x 4 m
Experimental design: Split plot
No. of treatments: 2 (30 % and 40 % MAD) **Replications:** 3
Irrigation methods: Surface & Furrow

Okra crop sown in the experimental plots at Station-2

Field preparation- in progress

A view of okra seeds being sown in the experimental plot