

# Weaving Rivercane & Restoration: Ecosystem and Educational Benefits of Restoring Culturally Important Vegetation

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September 9, 2025

# Today's Presentation



**Background**



**History**



**Opportunities**



**Research**



*Source: The Trustees of the British Museum*

# A Little About Rivercane

# Giant Rivercane (*Arundinaria gigantea*)

1 of 4 temperate, woody bamboos native to North America

- *A. tecta* (Switch Cane)
- *A. appalachiana* (Hill Cane)
- *A. alabamensis* (Tallapoosa Cane)

Prefer well-drained soils

- Alluvial floodplains
- First natural terrace
- No prolonged inundation

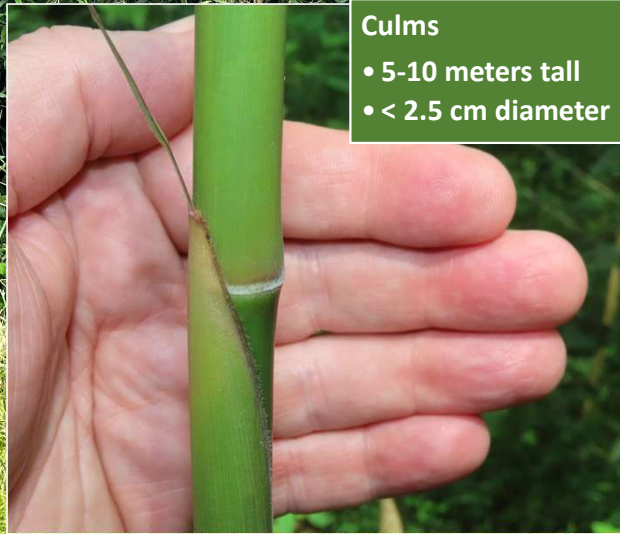
Rhizome

- 15 cm deep



Culms

- 5-10 meters tall
- < 2.5 cm diameter



Evergreen foliage



# Identifying Rivercane VS Non-Native Bamboo



Left: NCSU Cooperative Extension, Right: NCSU/ Forest & Kim Starr CC BY 3.0

**Left Photo:  
Rivercane**

- **Parallel to stem**
- **“Tangled” branches**

**Right Photo:  
Non-native  
Bamboo**

- **Branches 45-  
degrees from stem**

**Other  
Differences**

- **Height**
- **Stems**

# Environmental Significance of Rivercane



## Rivercane Provides Habitat for Wildlife

- Cattle grazing rivercane, Illinois River, Tahlequah, OK



## Rivercane Improves Water Quality

- Rivercane Agricultural Field Vegetative Buffer Study, Illinois (Singh 2019)

## Cultural Significance of Rivercane

### Indigenous peoples fostered rivercane ecosystems

- SE Tribes used rivercane for everyday life
- Regular disturbance allowed canebrakes to flourish

### Canebrakes provided food sources

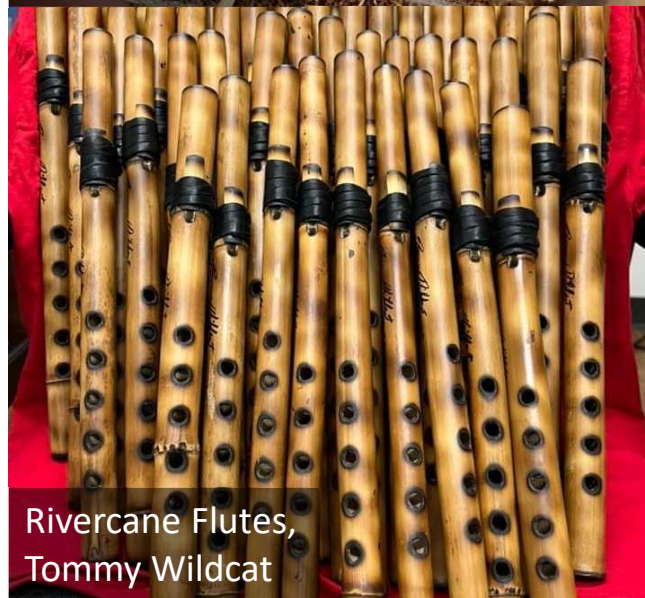
- Plains Tribes followed buffalo to canebrakes in Eastern OK (Pioneer Papers)



Rivercane Mats



Blowgun by Choctaw man, D. L. Bushnell 1909



Rivercane Flutes, Tommy Wildcat



Rivercane Basket, EBCI

# Indigenous Peoples Fostered Rivercane Ecosystems

**SE Tribes used rivercane for everyday life**

- **Regular disturbance allowed canebrakes to flourish**

**Canebrakes provided food source**

- **Plains Tribes followed bison to canebrakes in Eastern OK (Pioneer Papers)**



# Degradation of Canebrakes

## Suspected Causes

- Overgrazing
- Land Use Change
- Lack of Fire

Connected to Decline of  
Wildlife Species



Black Bear



Turkey

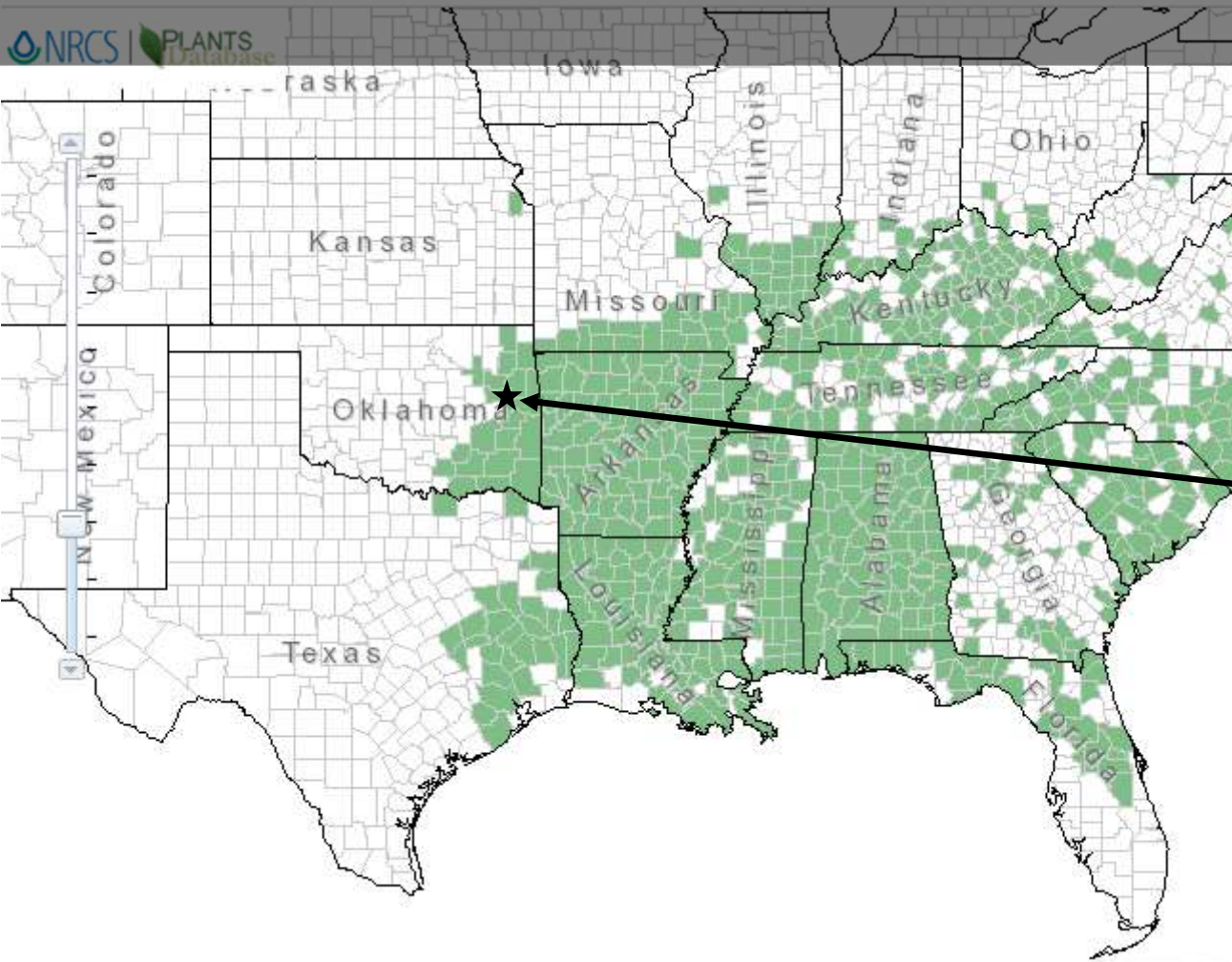


Elk



Bison

# Canebrakes are a Critically Endangered Ecosystem



Less than 2% former abundance

Thomas Nuttall (1821) described canebrakes as

- “15 miles long and perhaps half as wide”
- “about half a league” wide (2.5 km)

# Today's Rivercane Reduced to Field Edges



Or Wetland-Adjacent Settings





# Ecosystem & Educational Opportunities



**Under Forest Canopy**



**Riverbank Top**



**Field Edge**

# Rivercane Provide

Erosion Control

Streambank Stabilization

Removal of Excess Nutrients & Sediments

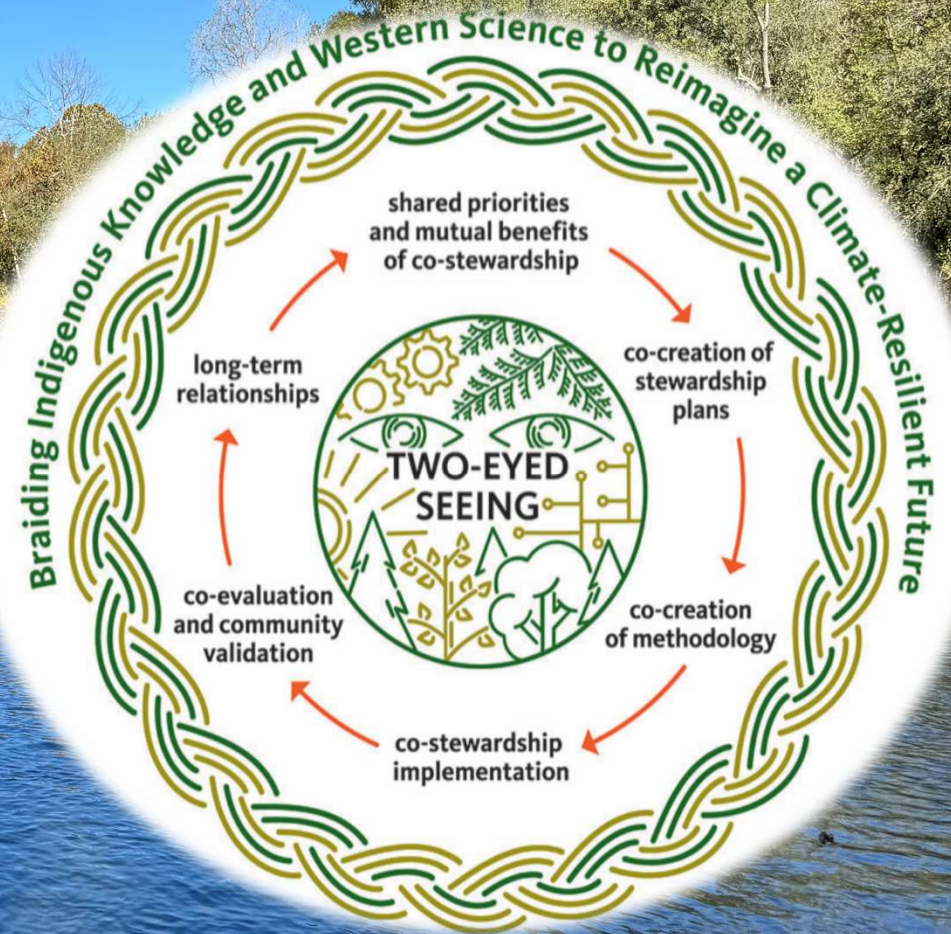
Habitat

Cultural Resource

Natural Resource

# Incorporating Traditional Ecological Knowledge

Combining TEK & Western Science to Restore Cultural Keystone Species



# Rivercane-Riparian Restoration Reconnects the Floodplain and Stream

## Need for Restoration Due to Damages

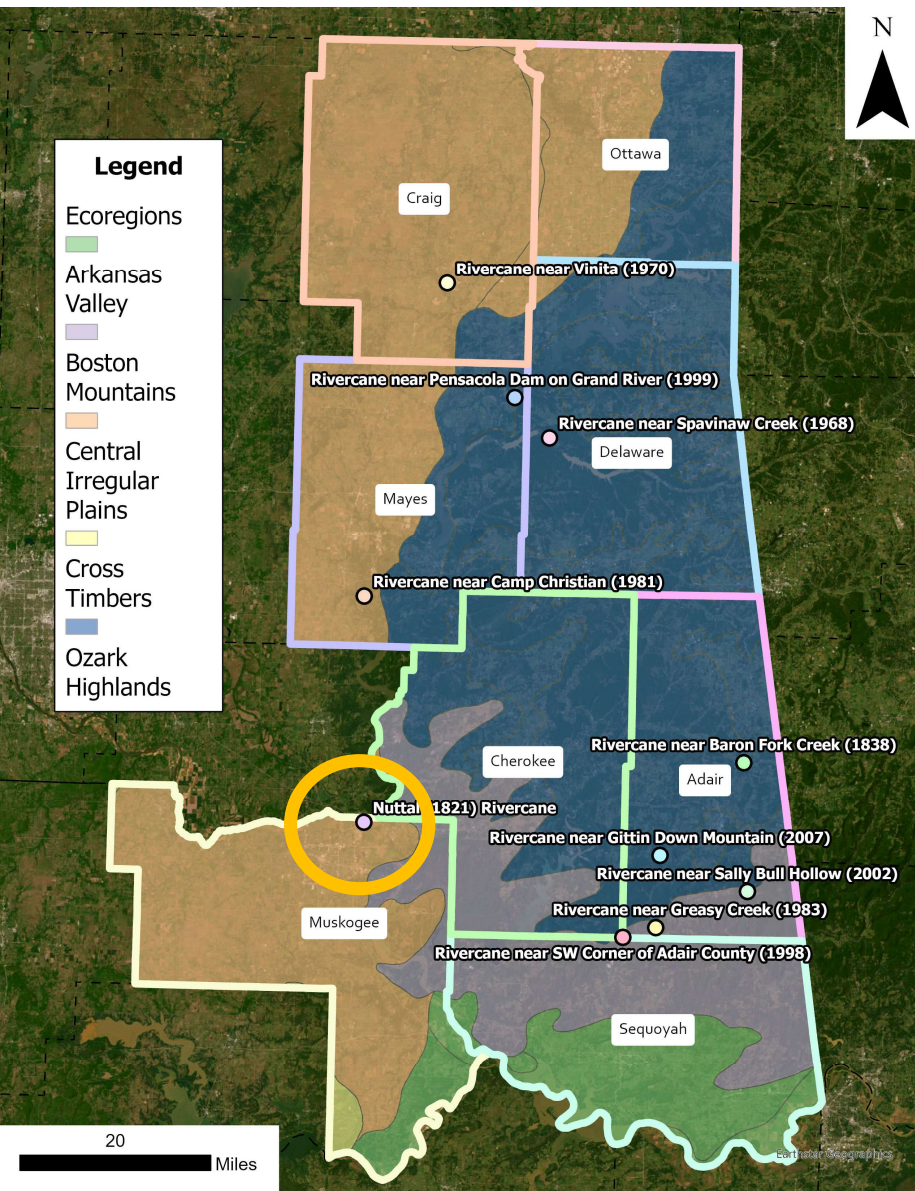
- Anthropogenic Changes
- Intense & Frequent Weather Extremes

## Resulting Restoration Benefits

- Ecosystem Services
- Nutrient Removal
- Hydrologic Connectivity



Rivercane in Oklahoma



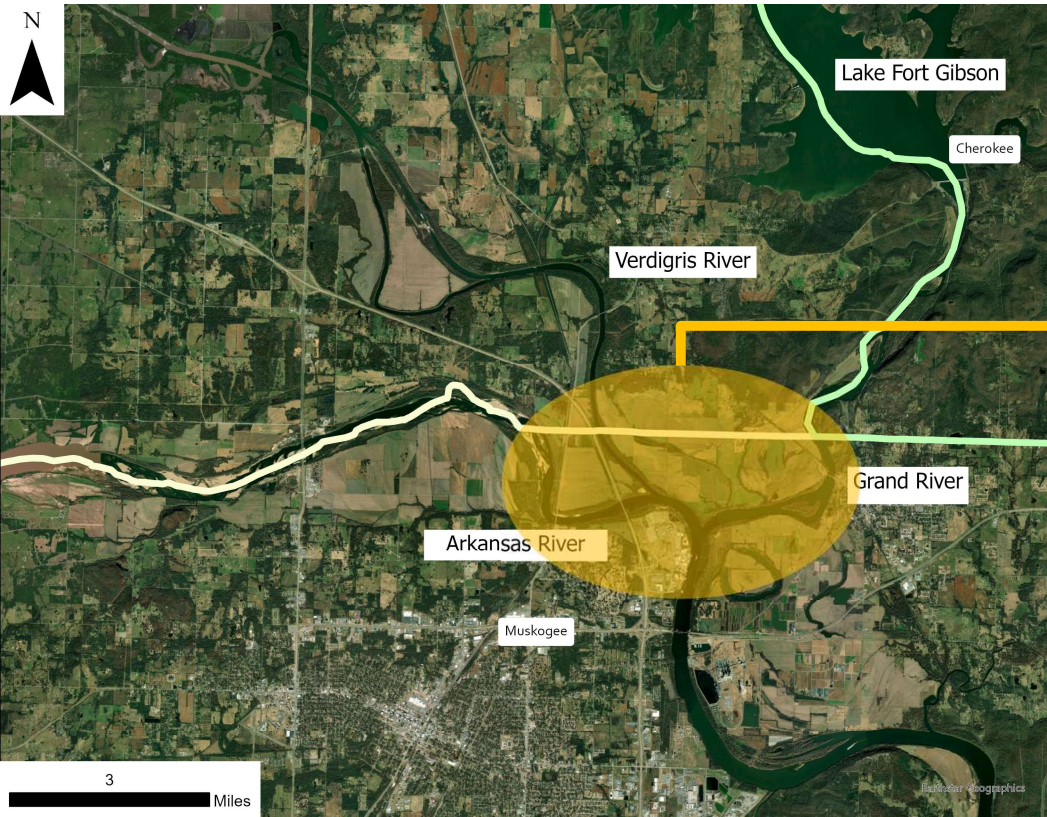
# Historical Rivercane Accounts in NE OK

1820 to 2007

Pioneer Papers

OU Herbarium Records

Thomas Nuttall Journal



**Rivercane Thomas Nuttall and  
Indigenous Tribes Encountered**



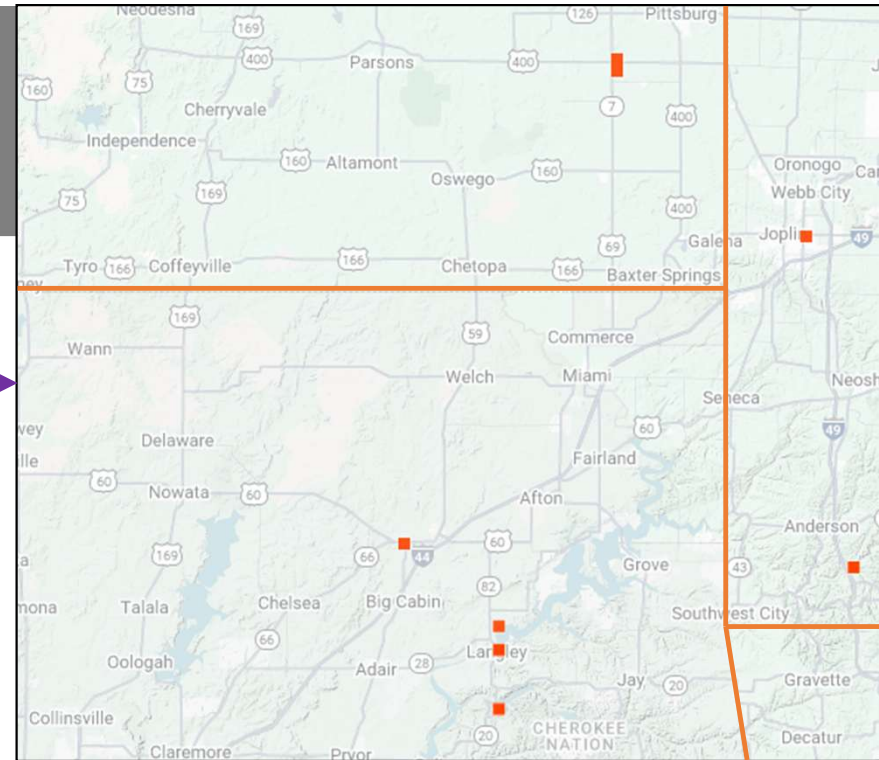
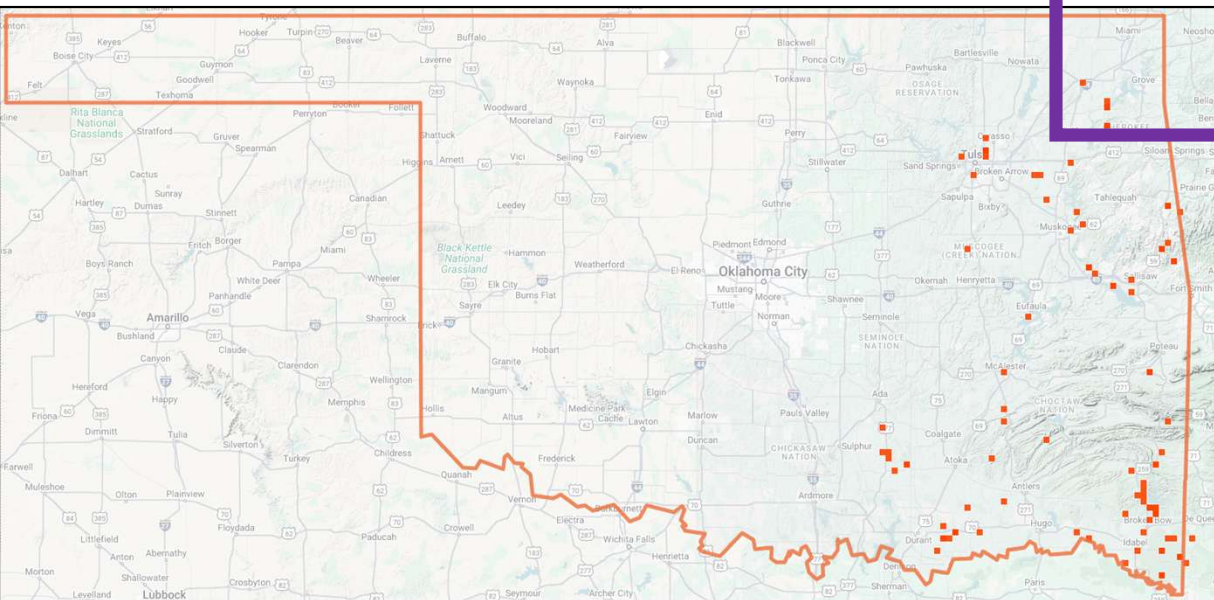
**Three Rivers, Muskogee, OK**

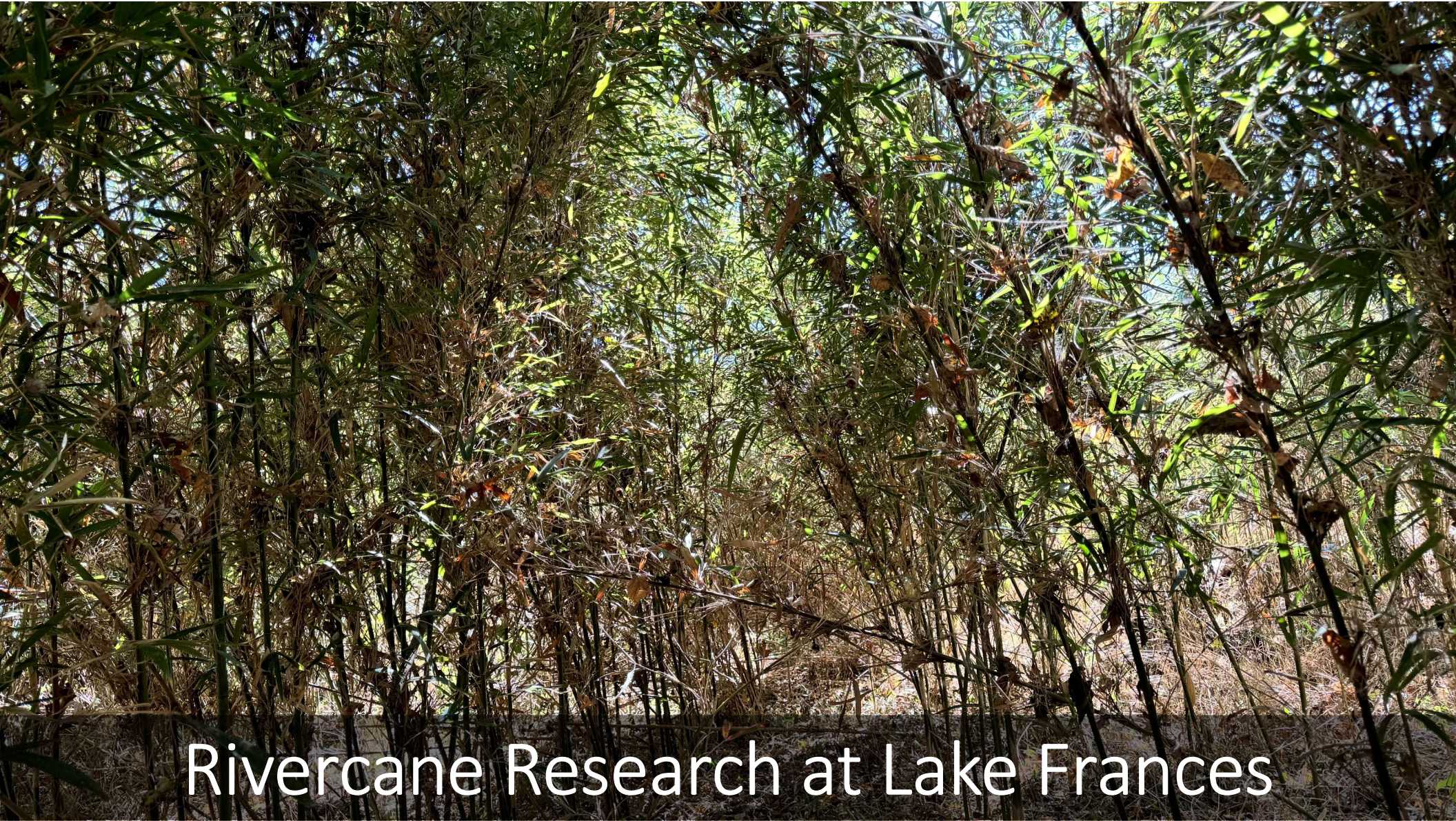
**Former  
Canebrake**

# e-Reporting Rivercane

## iNaturalist

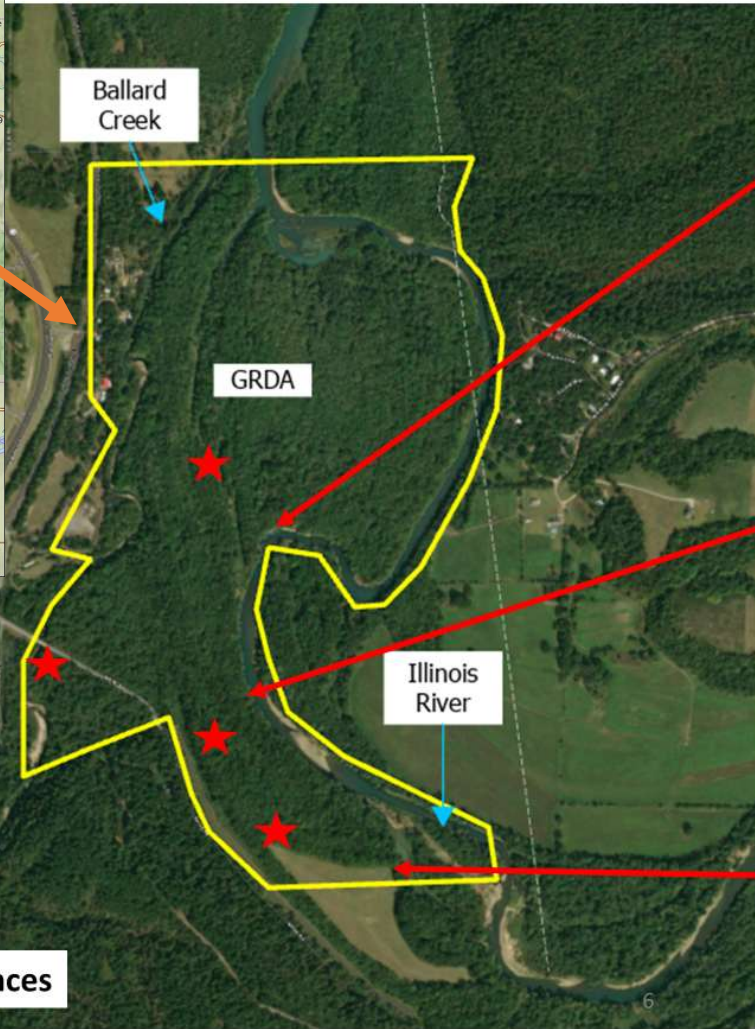
- OK – 136 Observations
- Tri-State Area – 21 Observations
- 2017 to 2025





Rivercane Research at Lake Frances

# Lake Frances Near Watts, Adair County, OK



**Study Area**

**Aerial View of Lake Frances**



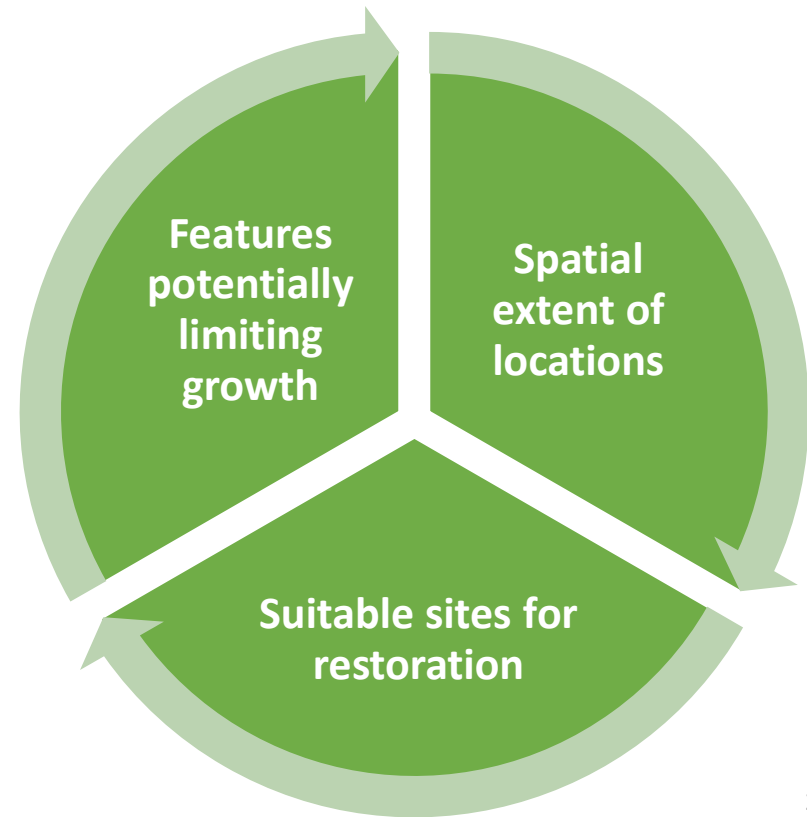
# Geospatial Technology Analysis

Flying small unoccupied aerial systems (sUAS)

Ground-truthing sites

Analyzing data with ArcGIS pro

# Planning Tools for Expanding Canebrakes



# Watershed-Based Modeling

Gridded Surface/Subsurface Hydrologic Analysis (GSSHA)

How does location & extent influence water quality/quantity?

Data Collection

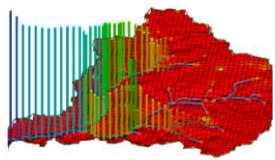
Basin Delineation

Model Development

Model Simulation



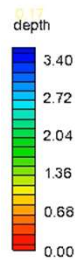
# Visualizing Rivercane Restoration Impacts



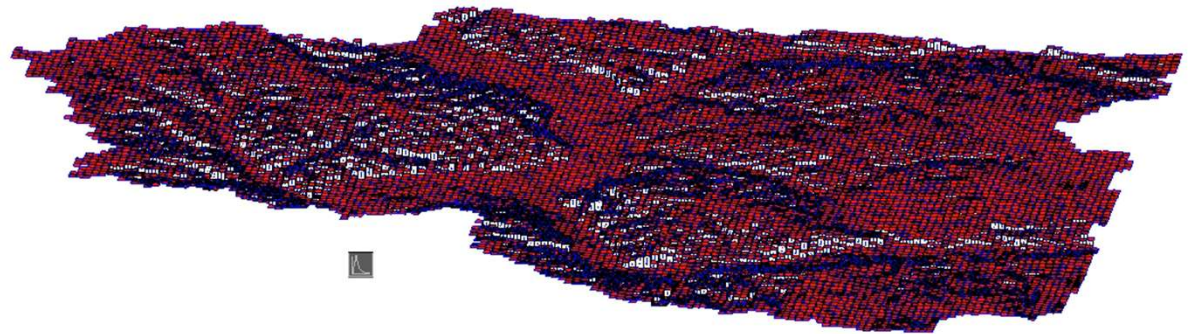
Calibrate



Simulate  
Extent



Apply to Other Sites



# Climate Variability Experimentation



**Estimate rivercane resiliency in anticipated extreme climate events**

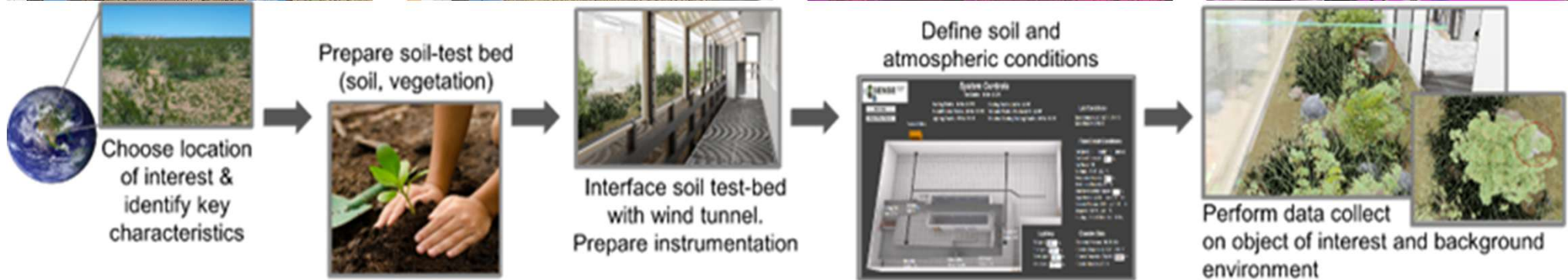
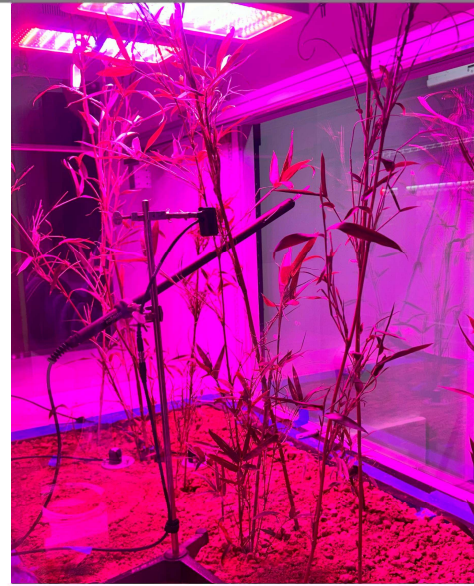
**“Cold Snap”**

**“Flash Drought”**

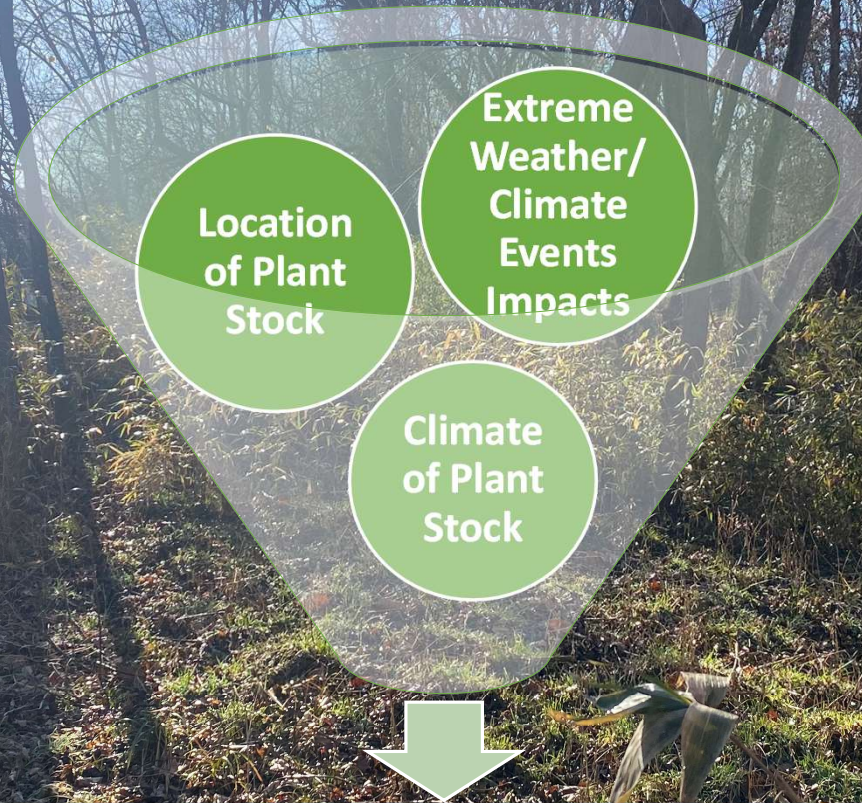


**Develop technical guidance for rivercane restoration and reintroduction**

# Synthetic Environment for Near Surface Sensing and Experimentation (SENSE) at USACE-ERDC



# Resilient Planning for Rivercane Transplanting



**Climate Resilient  
Restoration Planning**



# Conclusions

# Resilient Rivercane Restoration Recipes

## Location

- Use local, climate-acclimated transplant stock
- Consider hydrology and inundation periods

## Management

- Watering schedule
- Disturbance
- Room for growth
- Monitor

# Hop on the 'Cane Train!

**Restoration supports cultural & environmental initiatives**

**Research helps inform restoration strategies**

**Implementation provides opportunities for educational & ecosystem growth**



# Acknowledgements



NETWORK FOR  
ENGINEERING  
WITH NATURE



Thank You!





Any Questions?  
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