

# **Turks & Caicos Islands**

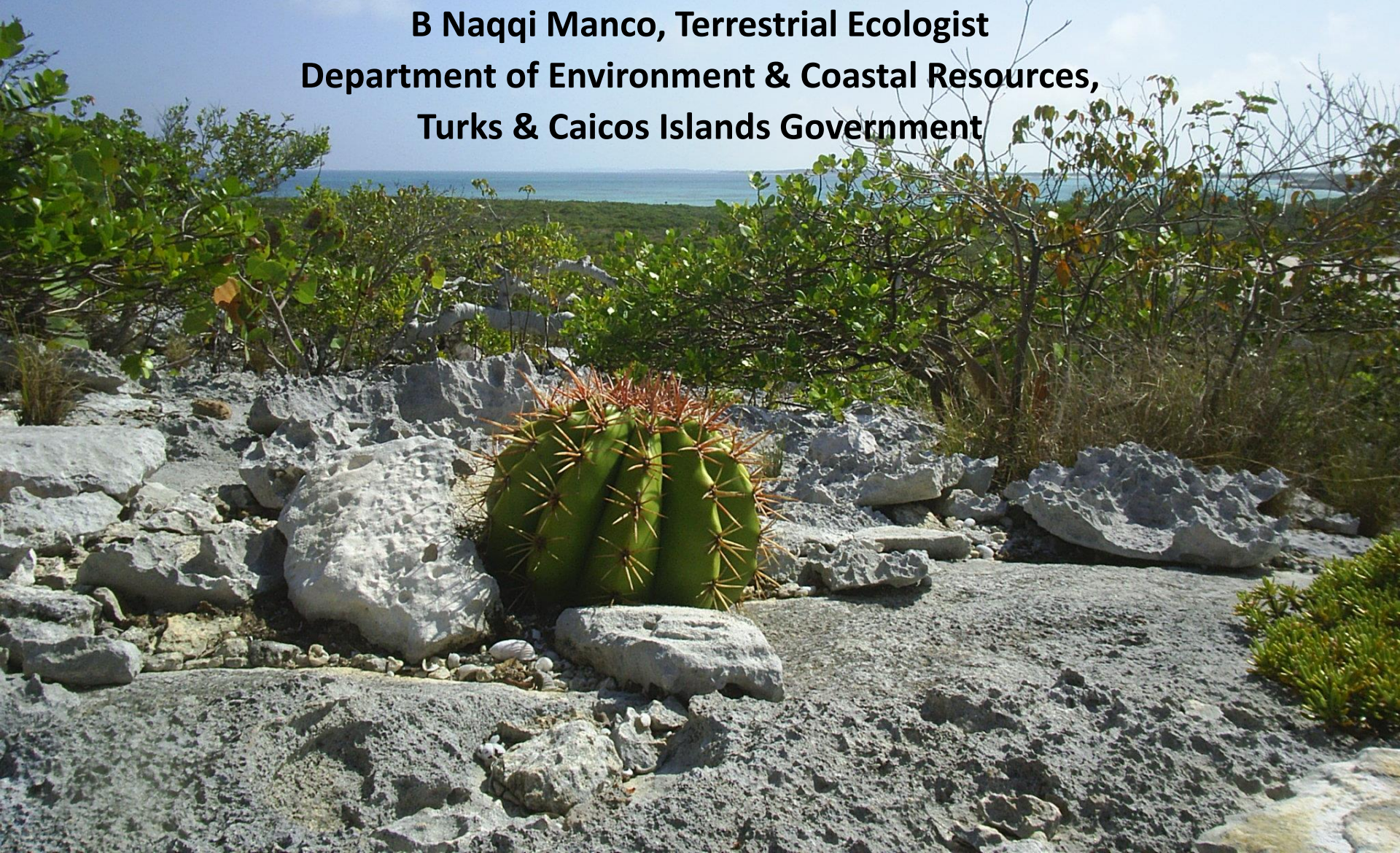
## **Terrestrial Ecosystems and Endemic Wildlife**

**& Caicos Pine Case Study**

**B Naqqi Manco, Terrestrial Ecologist**

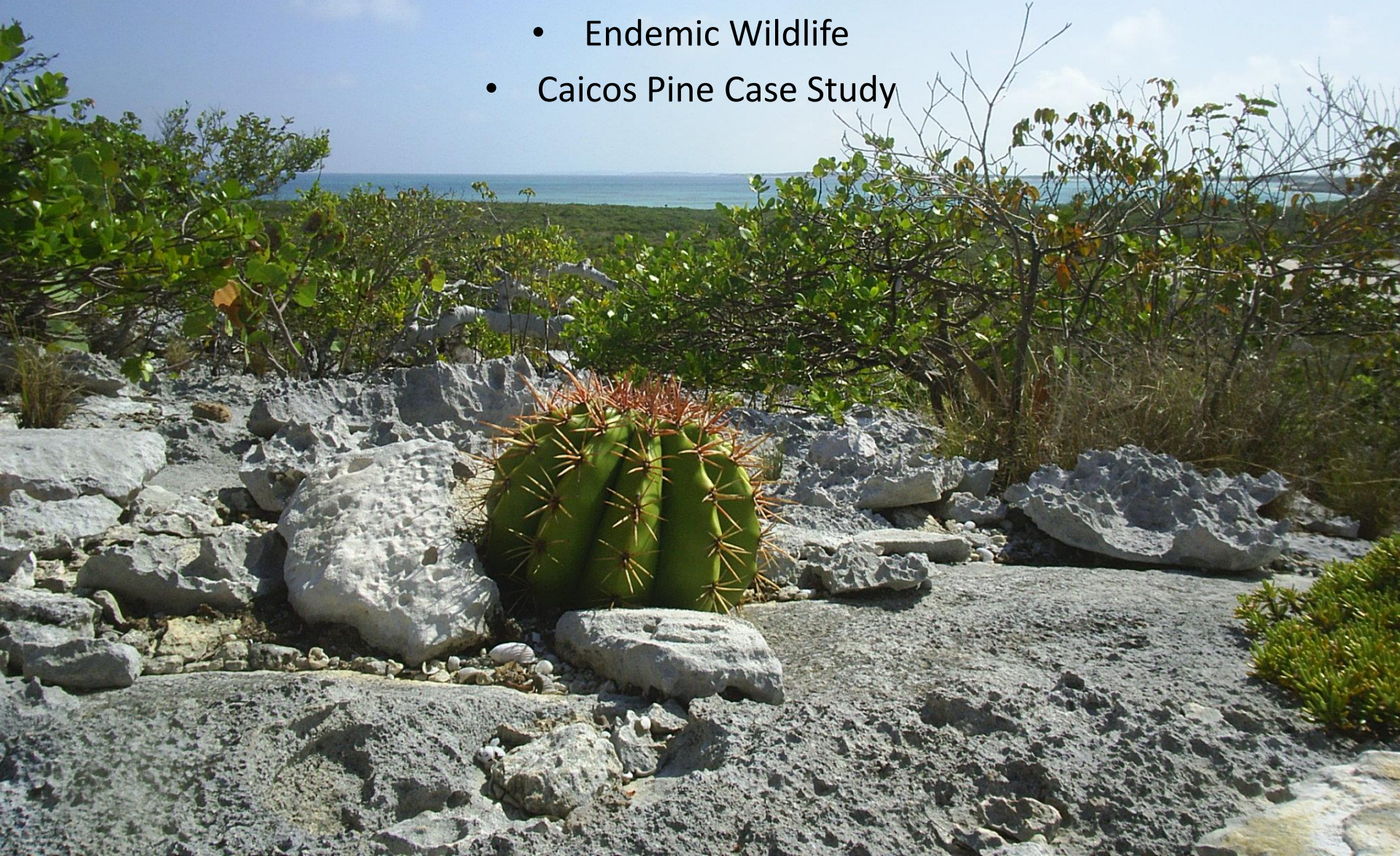
**Department of Environment & Coastal Resources,**

**Turks & Caicos Islands Government**



# Introduction to the Turks & Caicos Islands

- Geography & Political Situation
- Major Terrestrial Ecosystems
  - Endemic Wildlife
  - Caicos Pine Case Study



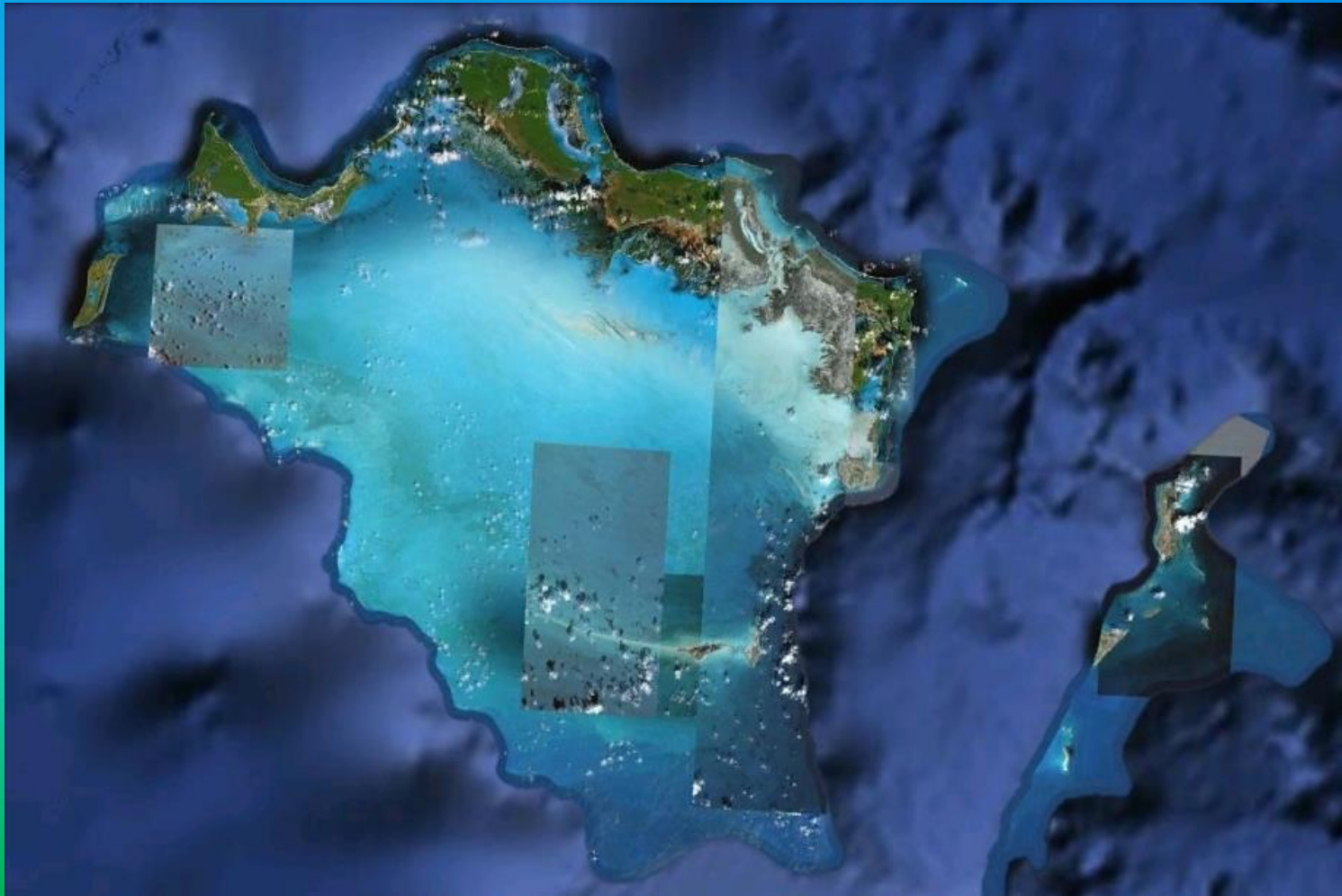
# Geography & Political Situation

- The Turks & Caicos Islands comprise 40 islands, cays, & rocks on two banks at the south-eastern end of the Lucayan Archipelago; TCI and the Bahamas.



# Geography & Political Situation

- The Turks & Caicos Islands are a UKOT with a population of about 37,000 on 9 inhabited islands.





# Turks & Caicos Islands

# Major Ecosystems

## Upland ecosystems :

- Mixed evergreen/drought-deciduous broadleaf forest (tropical dry forest and scrub)
- Pine rockland and sandy pineyard
- Coastal coppice/ coastal scrub

## Wetland ecosystems:

- Intertidal mangrove wetland
- Salinas
- Seasonally flooded marshes and swamps



Dry tropical forest and  
seasonally flooded mars



Pine yard





Coastal coppice/ scrub



Salina





# Endemic Plants

There are nine species of plants currently classified as TCI endemics.

- Britton's buttonbush *Spermacoce brittonii*, Rubiaceae
- Capillary buttonbush *Spermacoce capillaris*, Rubiaceae
- Lucayan pear cactus *Opuntia x lucayana*, Cactaceae
- Slender-stemmed peppergrass *Lepidium filicaule*, Brassicaceae
- Hatpin sedge *Eleocharis bahamensis*, Cyperaceae
- Caroline's rock pink *Stenandrium carolinae*, Acanthaceae
- Caicos Encyclia orchid *Encyclia caicensis*, Orchidaceae
- Bahama broombush *Evolvulus bahamensis*, Convolvulaceae
  
- Turks & Caicos heather *Limonium bahamense*, Plumbaginaceae  
National Flower, was considered endemic until *L. haitense* from Hispaniola was lumped with it

# Britton's buttonbush *Spermacoce brittonii*

- Found in open coastal scrub on Middle, East, and South Caicos and the Ambergris Cays as a suffrutescent.



# Capillary buttonbush *Spermacoce capillaris*

- Lost to science for 40 years, rediscovered on South Caicos in 2009 and East Caicos in 2010.

All: (c) Martin A Hamilton/ RBG Kew



# Lucayan pear cactus *Opuntia x lucayana*

- Unresolved; but thought to be a hybrid between *O. Stricta* and *Consolea nashii* (or *Opuntia macrantha*). Only two individuals currently known on South Caicos.



# Slender-stemmed peppergrass *Lepidium filicaule*

- Lost to science for 37 years, rediscovered in Grand Turk in 2012 – plant appears only after major rain events. Possibly present on Salt Cay; historically collected on Big Ambergris Cay or South Caicos
- Life cycle, seed to seed, completed in 6 weeks.





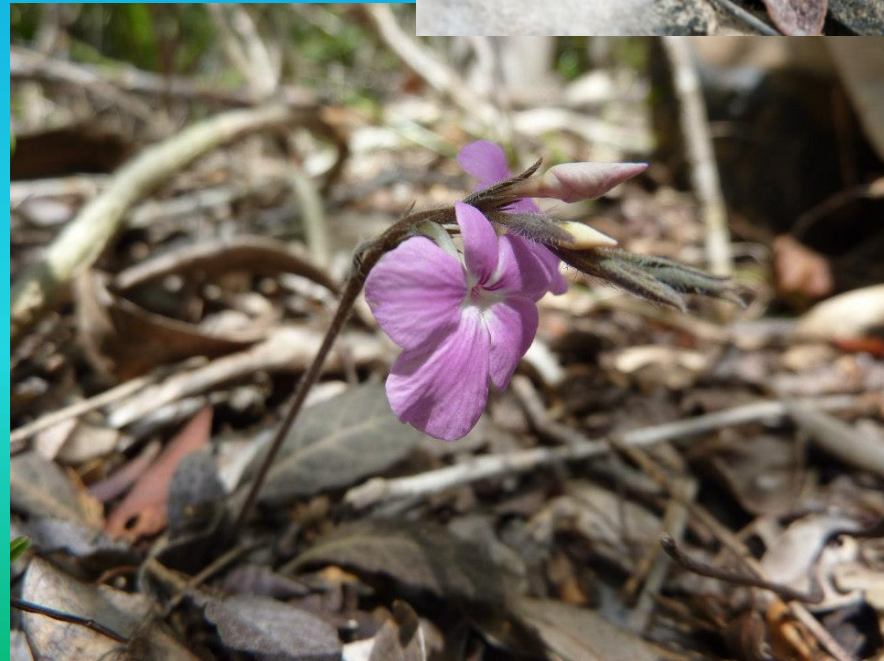
# Hatpin sedge *Eleocharis bahamensis*

- Minuscule freshwater wetland sedge, wild plants typically under 4cm tall but can grow to 25 cm, threatened by feral mammal grazing. Found on all major islands with fresh wetlands.



# Caroline's rock pink *Stenandrium carolinae*

- Small rosette of leaves specialises in looking dead to avoid herbivores, grows in rock crevices and under shrubs. Known only from North, Middle, and East Caicos.



# Caicos Encyclia orchid *Encyclia caicensis*\*

- Extremely variable in flower colour, blooms July-September, to 2.5 m tall in low coastal scrub habitat on North, Middle, East, and South Caicos and Big Ambergris Cay.
- \*There are possibly one or two other species currently identified as this species and considerable research is needed.



# *Encyclia caicensis* variation



# Bahama broombush *Evolvulus bahamensis*

- Now considered a distinct species from the Bahamas populations of *E. arbuscula*, common and widespread in TCI.



# Endemic Fauna

In Turks and Caicos Islands, there are:

- 8 endemic reptiles,
- 1 endemic crab spider,
- 1 endemic tiger beetle,
- 1 endemic sponge,
- and numerous endemic cave crustaceans and worms.

All these species are found nowhere else on earth. There are also numerous endemic subspecies of animals unique to TCI.

# Endemic reptiles

- Turks and Caicos rock iguana *Cyclura carinata*
- Turks and Caicos curly-tail *Leiocephalus psammodromus*
- Turks Islands snake-doctor skink *Spondylurus turksae*
- Caicos Islands snake-doctor skink *Spondylurus caicosae*
- Caicos barking gecko *Aristelliger hechti*
- Caicos dwarf gecko *Sphaerodactylus caicosensis*
- Turks dwarf gecko *Sphaerodactylus underwoodi*
- Caicos pygmy boa *Tropidophis greenwayi*
  
- Caicos rainbow boa *Chilabothrus chrysogaster chrysogaster* is an endemic subspecies of a near-endemic snake; ongoing genetic work may show it as a fully endemic species.

## Turks and Caicos rock iguana *Cyclura carinata*

Formerly widespread throughout all islands, currently restricted to small offshore cays; introduction of cats, dogs, and rats eliminated them on almost all inhabited islands and cays. They favour dune habitats but will live in almost any terrestrial habitat in Turks and Caicos.





Turks and Caicos curly-tail *Leiocephalus psammodromus*

Widespread in numerous habitats throughout Turks and Caicos Islands,; each island has a documented endemic subspecies! Threatened by invasion of introduced northern curly-tail *Leiocephalus carinatus*.



Turks Islands snake-doctor skink *Spondylurus turksae*

Caicos Islands snake-doctor skink *Spondylurus caicosae*

Endemic to Turks Bank and Caicos Bank respectively, found in terrestrial habitats throughout most islands but not common anywhere. Threatened by introduced mammals and corn snake.



Caicos barking gecko *Aristelliger hechti*

Known only from North Caicos gallery forests, Big Ambergris Cay limestone pavement scrub, and French Cay wrack. Extremely local and rare for unknown reasons. Threatened by introduced mammals.



Caicos dwarf gecko *Sphaerodactylus caicosensis*

Moist habitats and leaf litter throughout the Caicos Bank islands.



Turks dwarf gecko *Sphaerodactylus underwoodi*

Moist habitats and leaf litter throughout the Turks Bank islands.



Caicos pygmy boa *Tropidophis greenwayi*

Caicos Islands, all rocky islands, usually found in moist richer areas and feeds primarily on Caicos dwarf geckos. Separate subspecies on Ambergris Cays.



# Endemic Cave fauna

Remipedes, copepods, and scale worm endemic only to Cottage Pond, North Caicos (25+ species)



## And more endemic species...

- We have many more near-endemic species we share with just one or two other islands (Bahamas, Cuba, or Hispaniola)
- We share about 40 species of plants only with the Bahamas, two with Cuba, and one with Hispaniola
- We have a further 6 species of reptiles shared with only one or two nearby islands: two snakes and two lizards.
- We have two endemic subspecies of birds (Greater Antillean bullfinch and thick-billed vireo)
- We have countless yet-unidentified invertebrates and other wildlife waiting to be described!

Thank you!







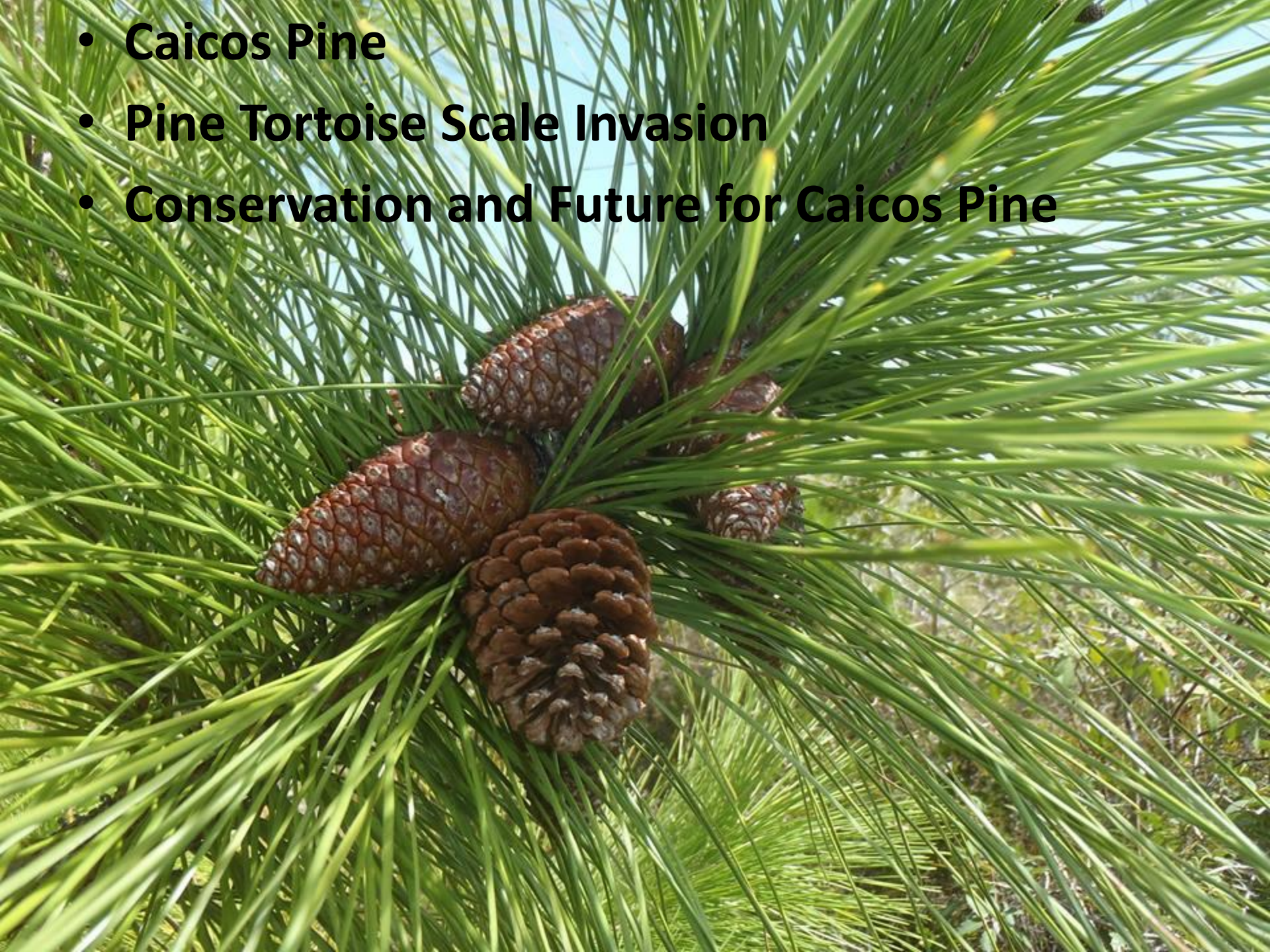
# Caicos Pine and the Pine Tortoise Scale Insect

*A Case Study in Invasive Species in the Turks and Caicos Islands*

B Naqqi Manco, Terrestrial Ecologist  
Department of Environment and Coastal Resources  
Turks & Caicos Islands



- **Caicos Pine**
- **Pine Tortoise Scale Invasion**
- **Conservation and Future for Caicos Pine**



# Caicos Pine

- Caribbean pine *Pinus caribaea* var. *bahamensis* (locally called Caicos Pine) is TCI's National Tree.
- It is the foundation species of two habitats locally called pineyard: The globally imperilled pine rockland and the unique sandy pineyard.
- Pineyard is a fire-dependent ecosystem, requiring low-level fires every 5-15 years to reduce broadleaf competition and renew pine growth.
- It was historically the single most important terrestrial natural resource for the Turks and Caicos Islands (prior to 1960) providing all lumber, pitch, and fuel, and its habitat providing food, medicine, and livestock fodder.





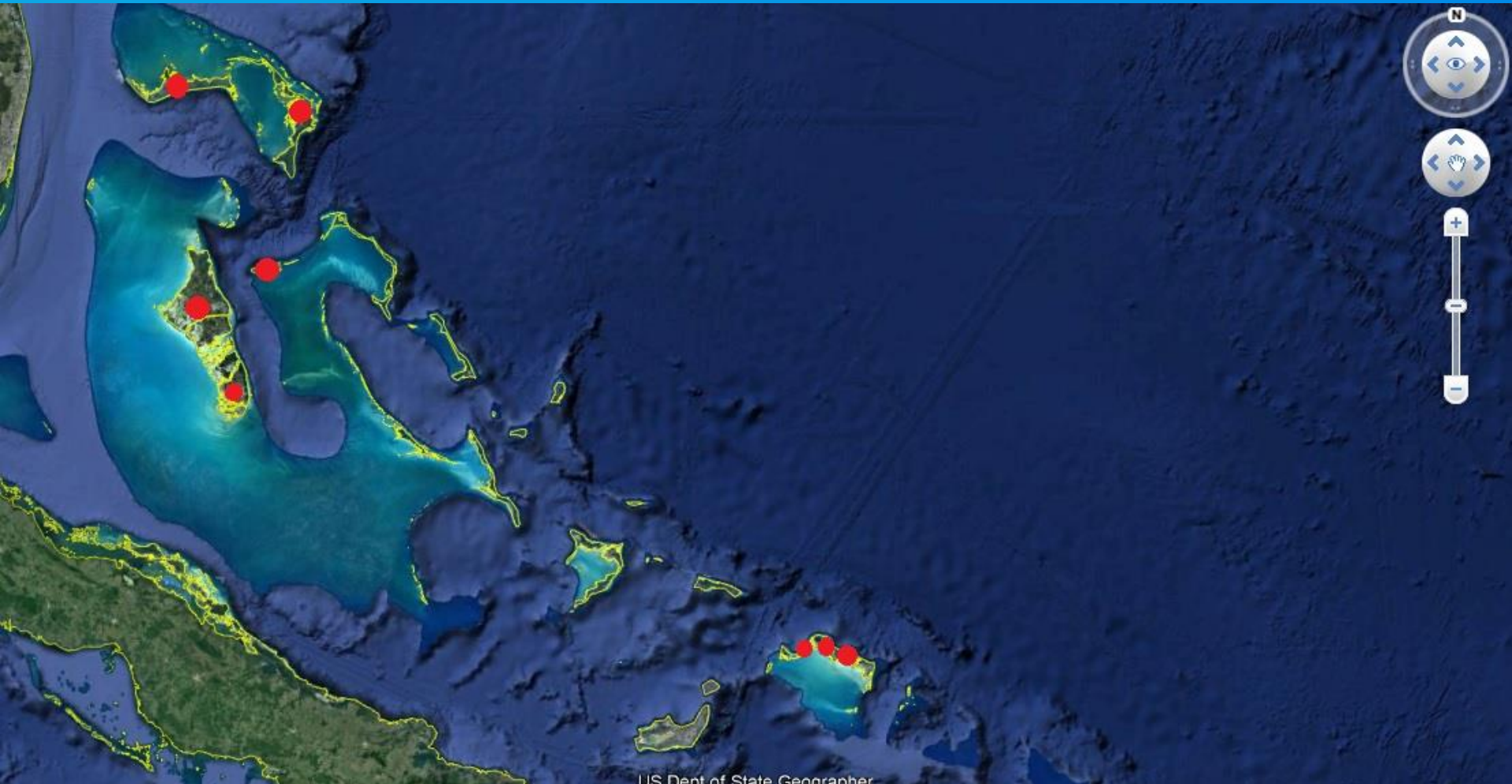
**Pine rockland**

Sandy pineyard



*Pinus caribaea* var. *bahamensis* disjunct distribution: Northern Bahamas (Grand Bahama, Abaco, Andros, and New Providence) and about 400 miles southeast, on Pine Cay, Middle Caicos, and North Caicos.

Turks and Caicos population is genetically significantly different from Bahamas population.



Pine Cay population is also genetically significantly different from North and Middle Caicos populations.





# Pine Tortoise Scale Invasion

- 2005, an introduced scale insect *Toumeyella parvicornis* was observed on Caicos pine causing significant tree mortality.
- Pine tortoise scale is native to North America where it is a low-impact pest on *Pinus* species. It arrived in Turks and Caicos Islands on cut live Christmas trees possibly around the 1990s. It spread quickly from 2005-2010 killing over 97% of pine trees.



Devastating wildfires (due to dead trees), hurricane sea surges, and the introduced Mediterranean black aphid have contributed to pine decline.



Pine tortoise scale is usually in its slow-reproductive bark dwelling phase in its natural range, but in TCI only the constantly reproducing needle dwelling phase exists.

Scale subjects trees to water and food stress, and its honeydew causes sooty mould to grow on needles, slowing photosynthesis.

Scale attacks most severely on branch tips and new growth. Trees die from the top down over the course of a year.



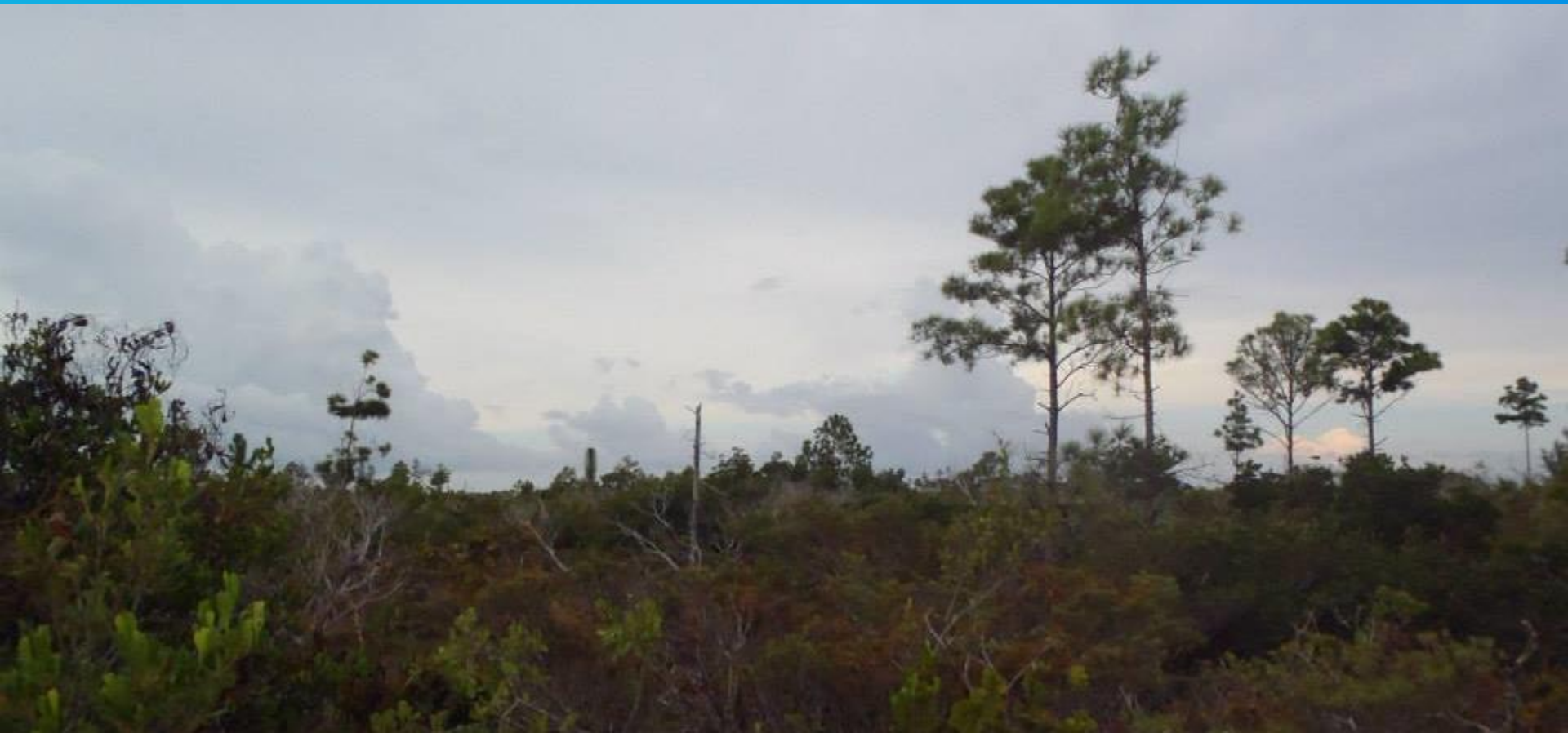
Healthy pine yard



Pine yard killed by scale insects



Between 2005-2012, the population of Caicos pine was reduced by 97.3% causing an alternate stable state (exclusion of fire) in its ecosystem.



# Conservation and Future for Caicos Pine

- The Caicos Pine Recovery Project addresses pine conservation through ex-situ, in-situ, and research practices.
- In 2010, DECR & Royal Botanic Gardens, Kew were awarded a grant from the UK Overseas Territories Environment Programme (OTEP) “Building Capacity & Awareness to Save the National Tree of TCI,” to carry on the Caicos Pine Recovery Project initiated by the Turks & Caicos National Trust in 2008.
- In 2014, DECR & Royal Botanic Gardens, Kew were awarded a grant from the UK Government’s DarwinPlus Overseas Territories Environment & Climate Fund “Caicos Pine Forests: Mitigation for Climate Change and Invasive Species” which resulted in a species recovery and habitat restoration strategy for the Caicos pine.
- Project is still managed by DECR with no regular funding.



John Ellerman  
Foundation





- Ex-situ: Rescue of seedlings from flood zones; collection of seeds for banking and propagation; nursery growth of trees, seed-farming, outreach and education



- In-situ: Setup of permanent monitoring plots for treatment trials; mapping extent of pine and scale infestation; initiation of controlled burn programme; establishment of recovery plots for planting out nursery trees



- Research: Volatile chemicals, fire history, mycorrhizal fungi, propagation techniques, water potential and stress, entomology, habitat restoration, germination, seed longevity, and comparative genetics of TCI populations and Bahamas trees



Eradication of pine tortoise scale is not feasible. Some predatory insects (lacewings, ladybirds, and a parasitoid wasp) are attacking the scale

It is predicted that even with Caicos Pine Recovery Project efforts:

- North Caicos population will reach functional extinction.
- Middle Caicos population and habitat will be greatly reduced and survive in a highly altered state.
- Pine Cay population will fare best, but they are most susceptible to sea level rise.

# Thank you!

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