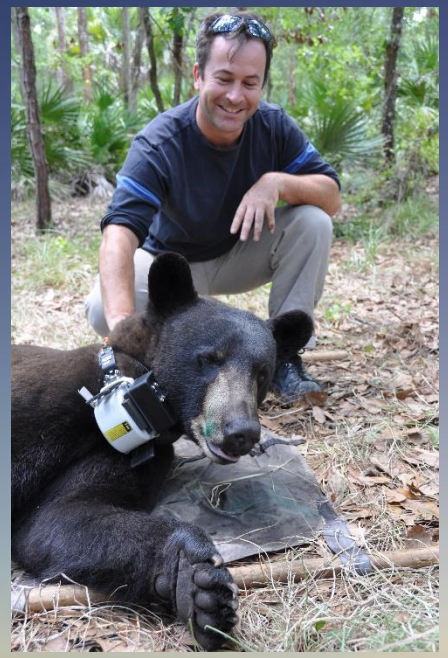


Lead Ecologist

Raoul Boughton, Ph.D

- Expert Opinion on Wildlife and Conservation Issues
- Research Oversight
- Conservation Land Management
- Mine Permitting and Wildlife Regulation
- Minimization and Mitigation Planning
- Permit Compliance and Reporting

Mosaic®

Roseate Spoonbills and the Hooker's Prairie

Florida Phosphate Production Permitting

FEDERAL AGENCIES

Environmental Protection Agency
Fish & Wildlife Service
Army Corps of Engineers

FLORIDA AGENCIES

Department of Environmental Protection
Department of Community Affairs
Fish & Wildlife Conservation Commission
Division of Historical Resources

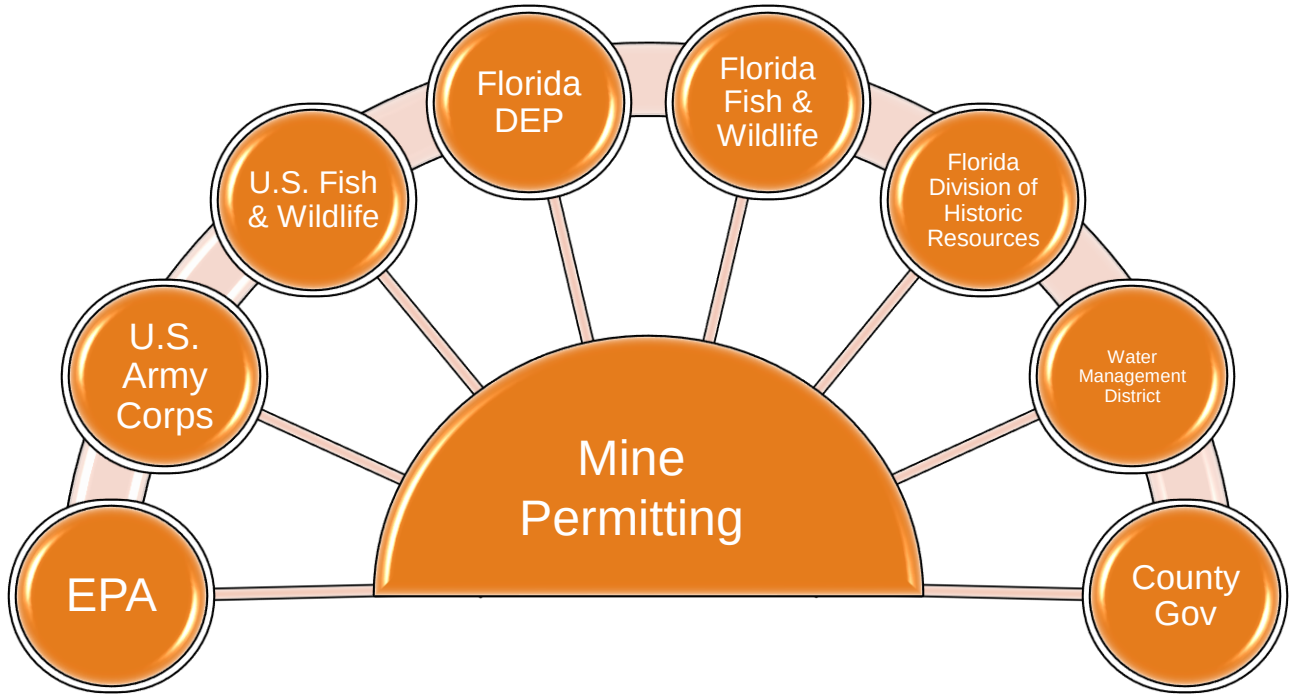
REGIONAL AGENCY

Southwest Florida Water Management District

COUNTY APPROVALS

Hillsborough
Manatee
Hardee
Polk
DeSoto

Multi-year, multi-agency process requires strict environmental standards to protect land, water and wildlife resources



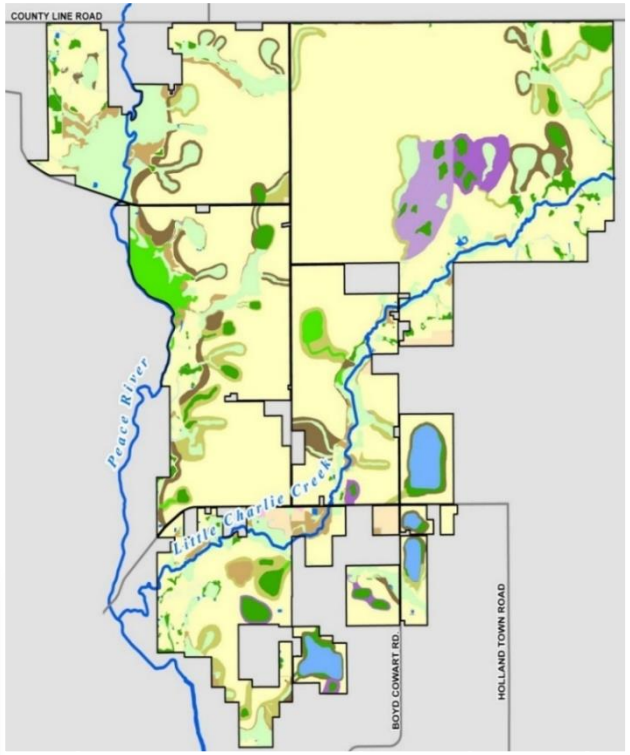
Since 1975 All Mined Lands Are Reclaimed

- Every acre mined and disturbed is reclaimed; reclamation must be approved by regulatory authorities

- Team comprised of biologists, ecologists, engineers, soils scientists, geologists, surveyors, and other professionals

- Advanced wetland & stream hydrologic modeling supports preserved areas and reclamation designs

- Reclaimed for many uses:
  - Land and lakes
  - Native Habitats / Wildlife
    - Scrub habitats
    - Wetlands
    - Streams
    - Forests
  - Residential, agricultural and industrial uses



Mosaic has to be specially approved to impact a wide variety of wildlife species that are either Federally protected through the ESA, or State threatened under Florida Wildlife Commission rulings. (these permits are over above the impact mining causes to habitats). During this process **Minimization** procedures and **Mitigation** for any take is assessed and implemented.

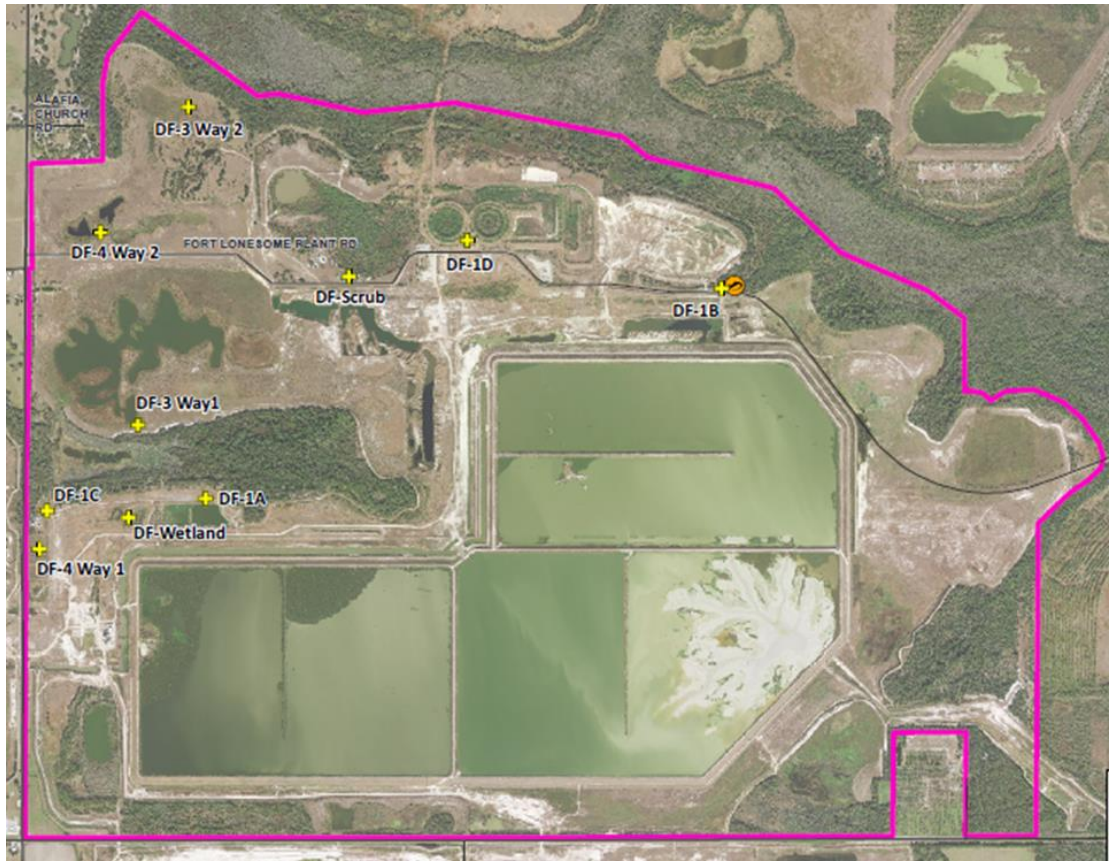
Eastern Indigo Snake - Federally Threatened - Study 2019-2022

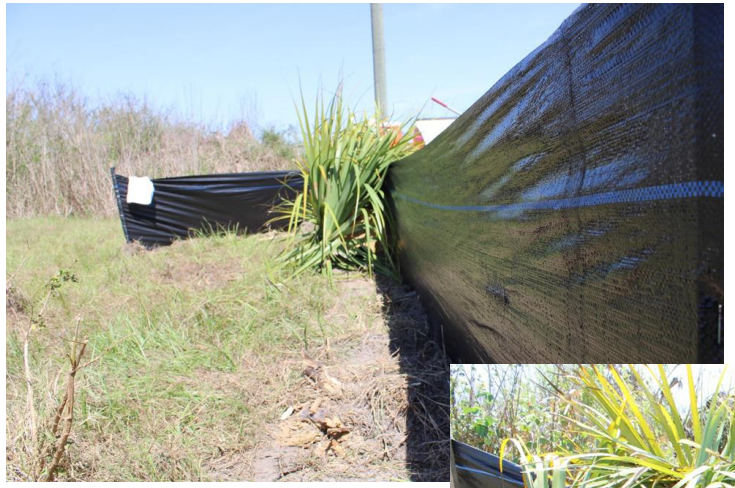
This is “Hank”

Objective: Quantify EIS use of the “mining landscape”, mined, reclaimed and conserved areas.

Objective : Understand Eastern Indigo use of mining landscape

- Preservation non-disturbed
- Currently disturbed areas
- Reclaimed habitat





Very Cryptic Species – new trap designs

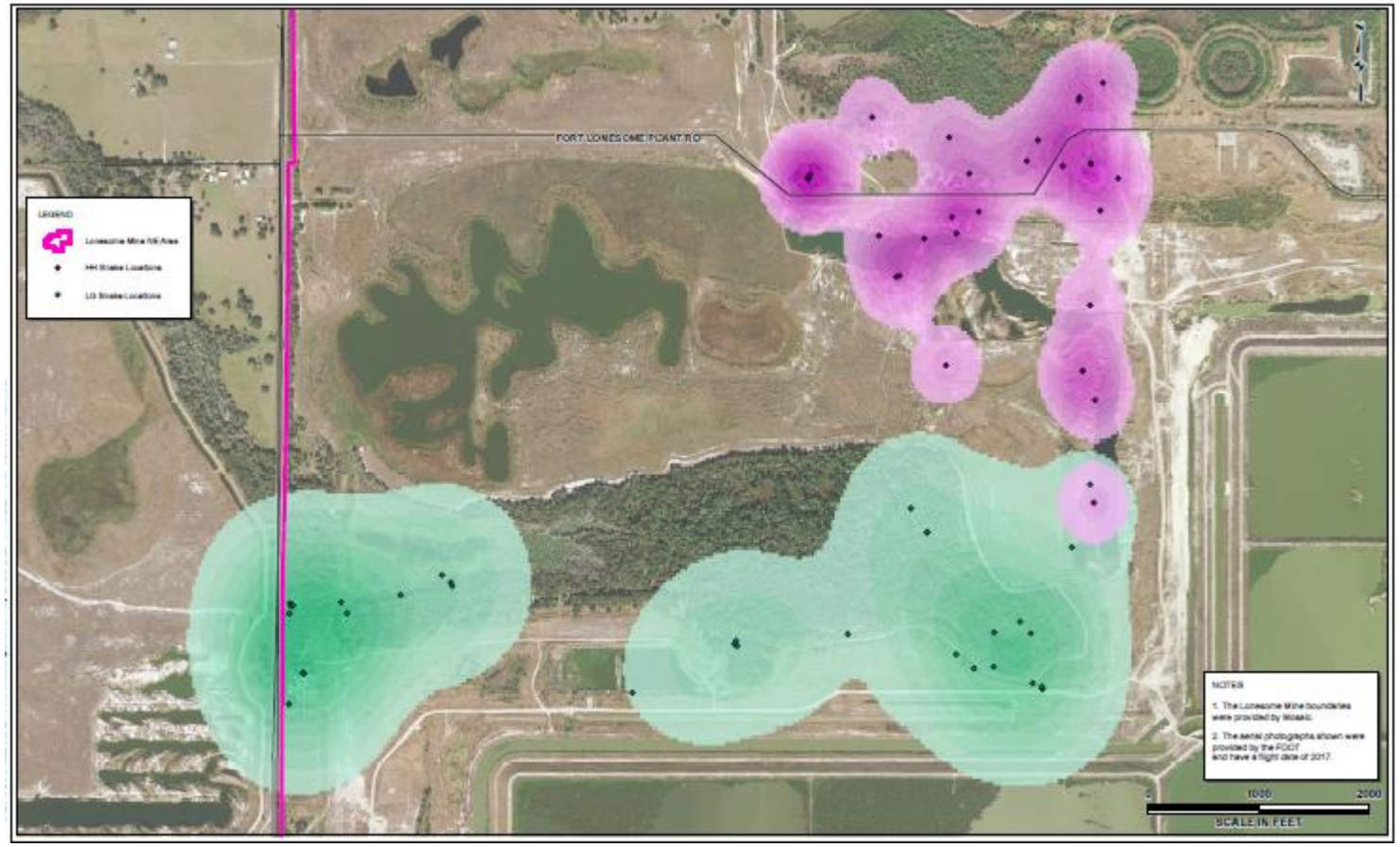
Big snakes (8.5 ft) need big traps!

Transponders are surgically implanted.

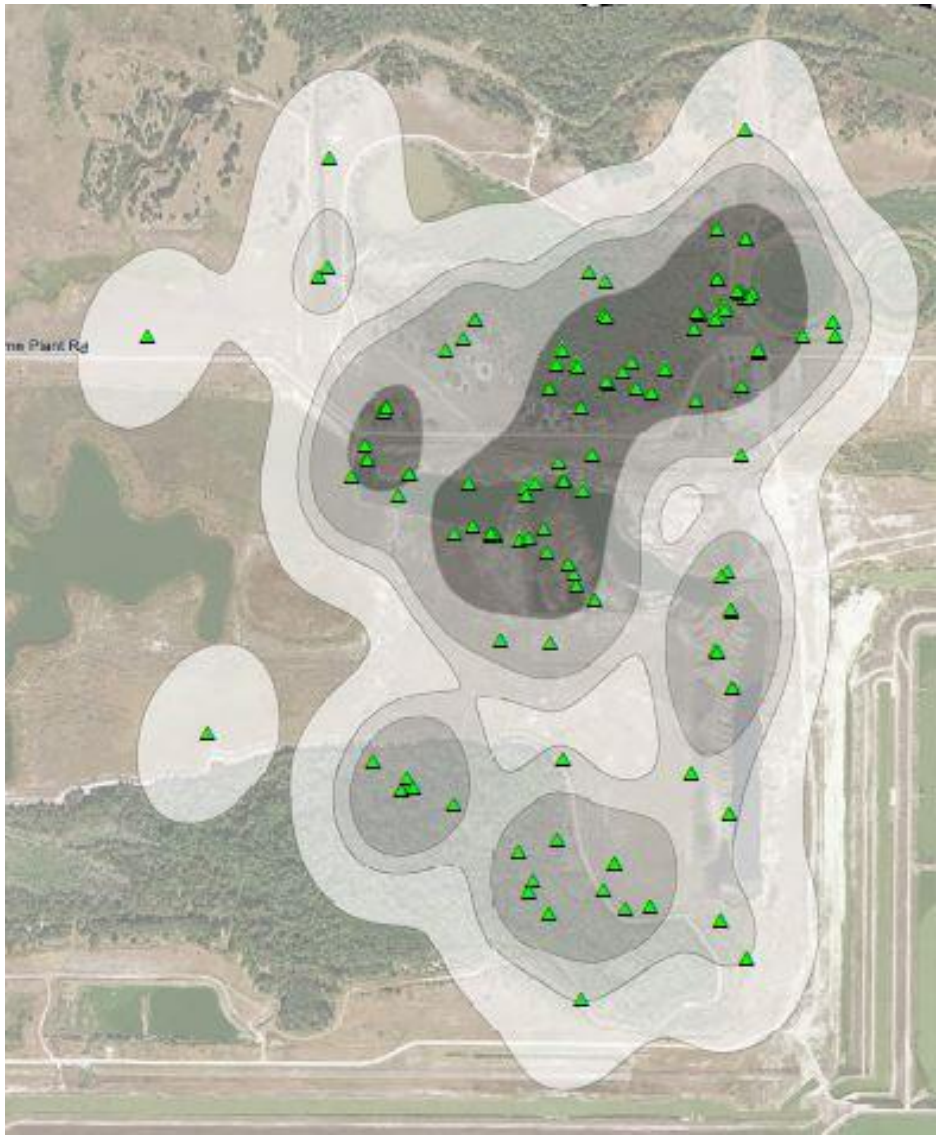
University of Florida Veterinarian Small Animal Clinic - implants transponders

- 8 Eastern Indigo Snakes
- 6 large enough for implants
- Longest tracked for 22 months

Mapping movements of behavior and habitat use



Question: How large an area are the snakes using?



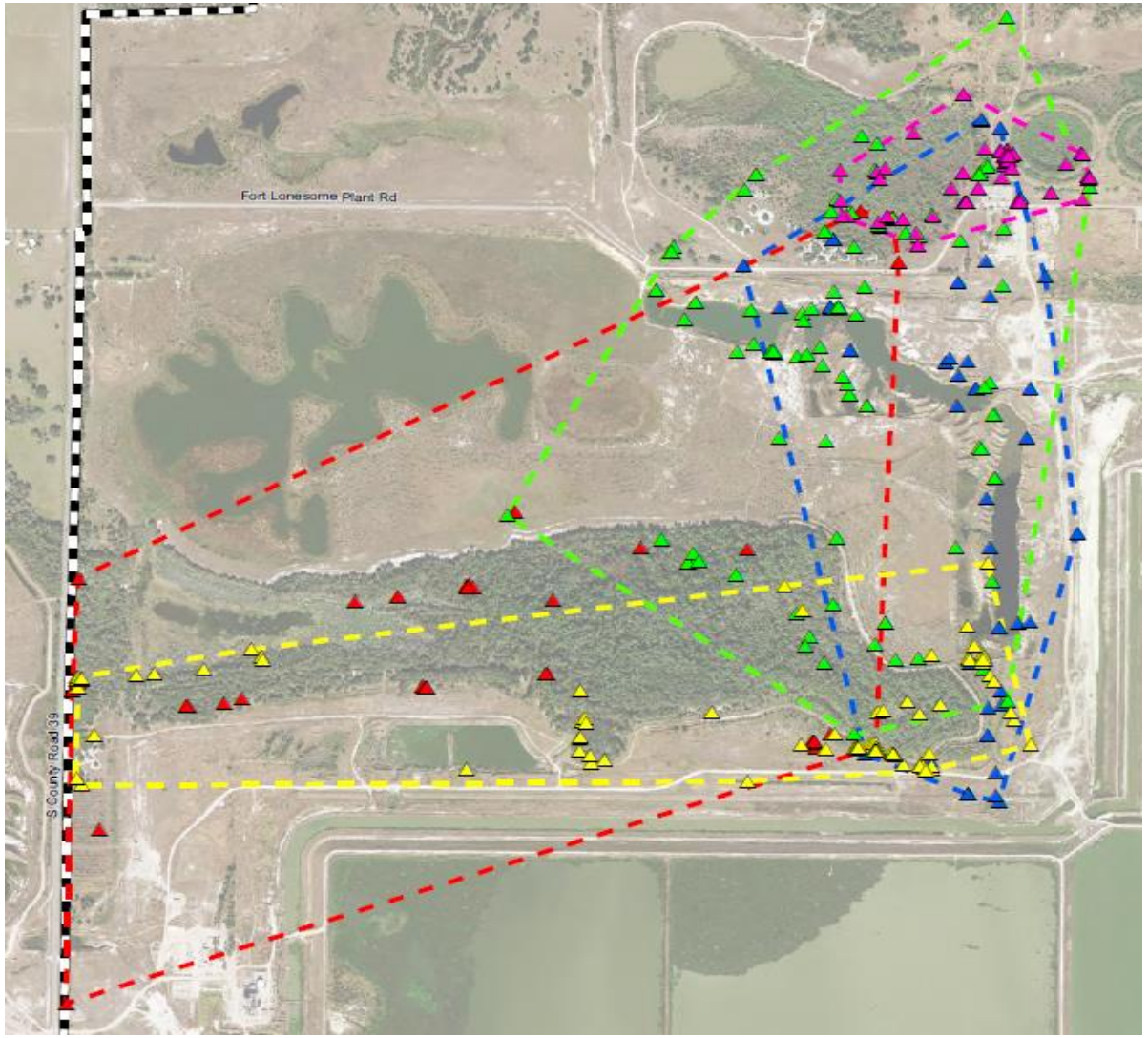
Let’s use Hank as an example!

Kernel Density Estimates

Probable use is based on number of locations and how close together they are to each other

90% use area maps out to 380 acres

Question: How are snakes using the landscape?



Female (Yellow, Pink)

Male (Red, Green, Blue)

Observation – Males are chasing Females.

Observation – Females less likely to move outside of dense native habitat

Mosaic

Education and Conservation - Hank (the snake) goes to a captive breeding program.

CENTRAL FLORIDA ZOO

ORIANNE CENTER FOR INDIGO CONSERVATION

Federal and State Eastern Indigo reintroduction

| WILDLIFE |

Indigos Return: A Florida Breeding Program Raises Eastern Indigo Snakes for Reintroduction

BY JUSTINE E. HAUSHEER

AUGUST 17, 2015 | Follow Justine

An eastern indigo snake at the Orianne Center for Indigo Conservation. Photo © Justine E. Hausheer / TNC

Biology and diet of the EIS

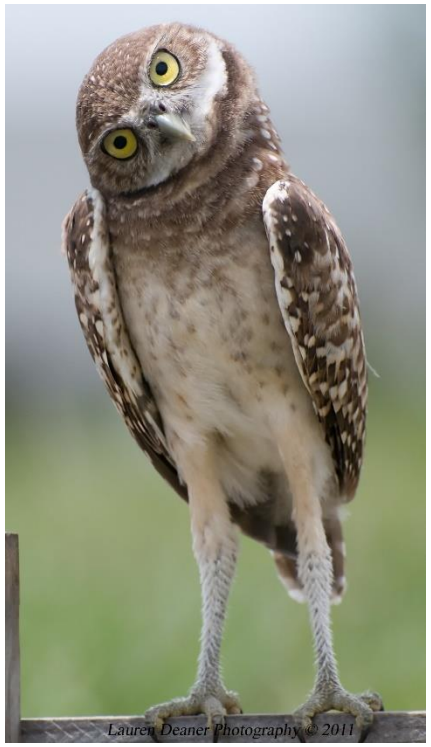
Mosaic's Commitment to Wildlife

- Minimization procedures
- Education of all staff and contractors
- Mitigation through onsite and offsite conservation easements and protection of habitat
- Conducting reclamation planning on a regional scale interconnection of habitats and riparian areas
- Working with Federal, State and Local agencies to produce the best outcomes for wildlife


Florida Burrowing Owl
(State Threatened)

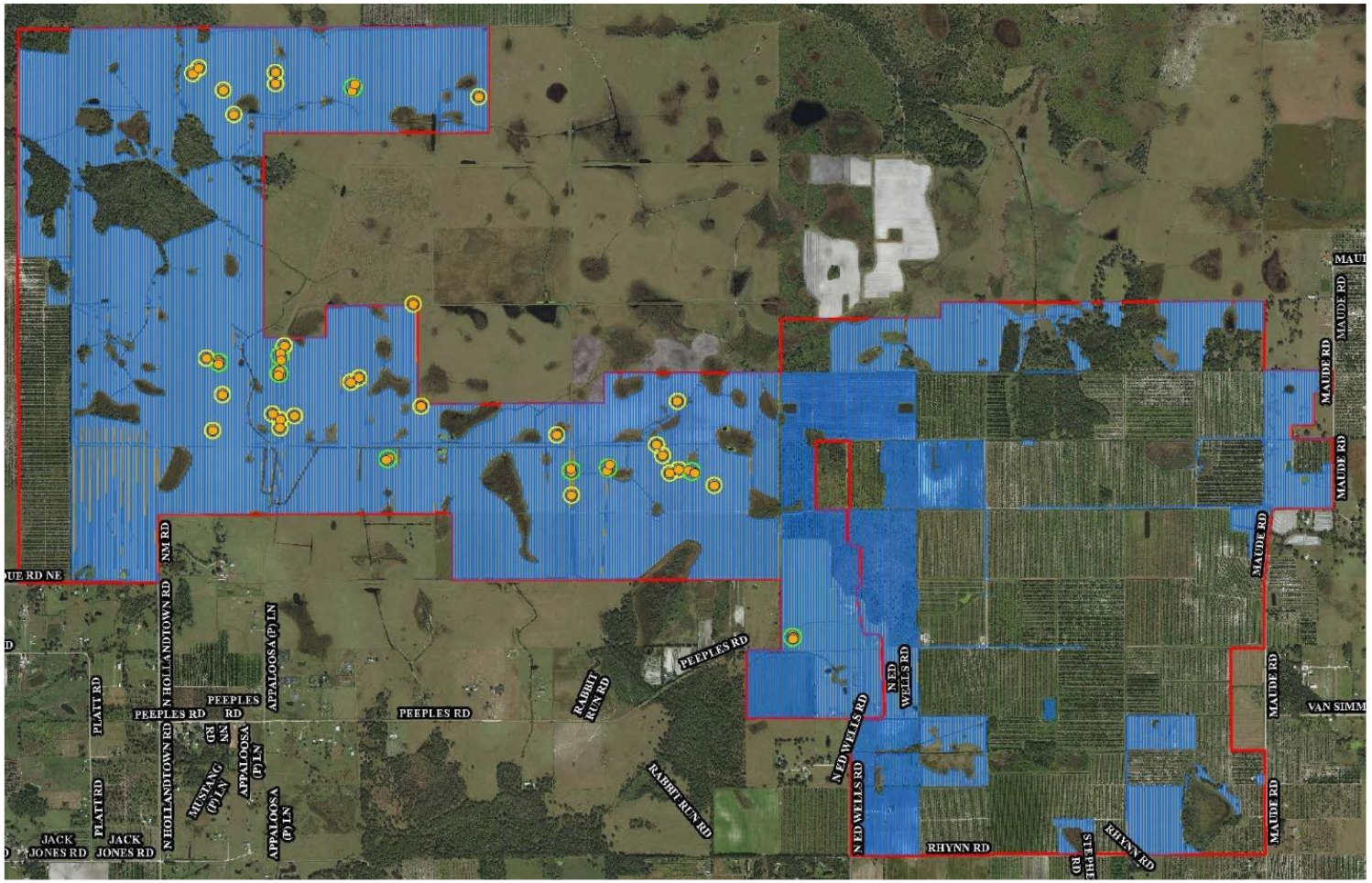
18 Subspecies – 2 now extinct

Florida Burrowing Owl – Permit Compliance



- State threatened on January 11, 2017 - adopted 2018
- Incidental Take – Mitigation Needed
  - Protect habitat elsewhere
  - Pay fee (>$20k/burrow clusters)
  - Undertake research project
- ~145 burrows in Mosaic's future mining areas
- Mosaic in collaboration with FWC decided on a partial fee ($1,900/cluster) and a research project to mitigate impacts to the species

Florida Burrowing Owl – Eastern Reserves



Survey Results

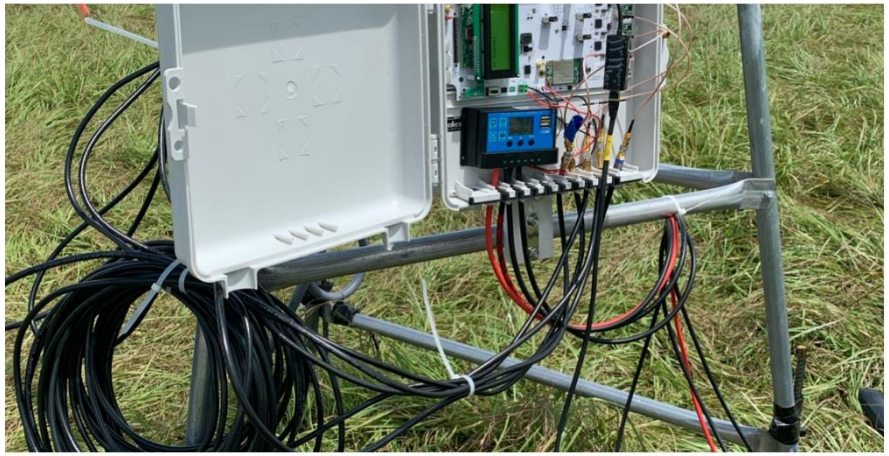
- Identified 36 potential burrow clusters - 49 total burrows
- Field observations +/- 20 pairs

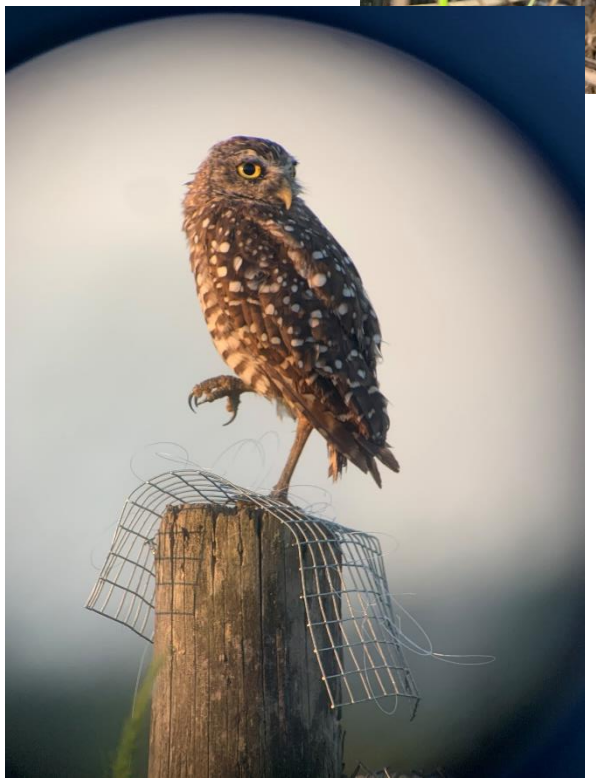
Incidental Owls – Commitment to minimization

- Followed all permit guidelines
  - Surveyed
  - Area cleared
  - Grass regrew…
- Six weeks before dragline walk – active (with eggs) located

Florida Burrowing Owl Study

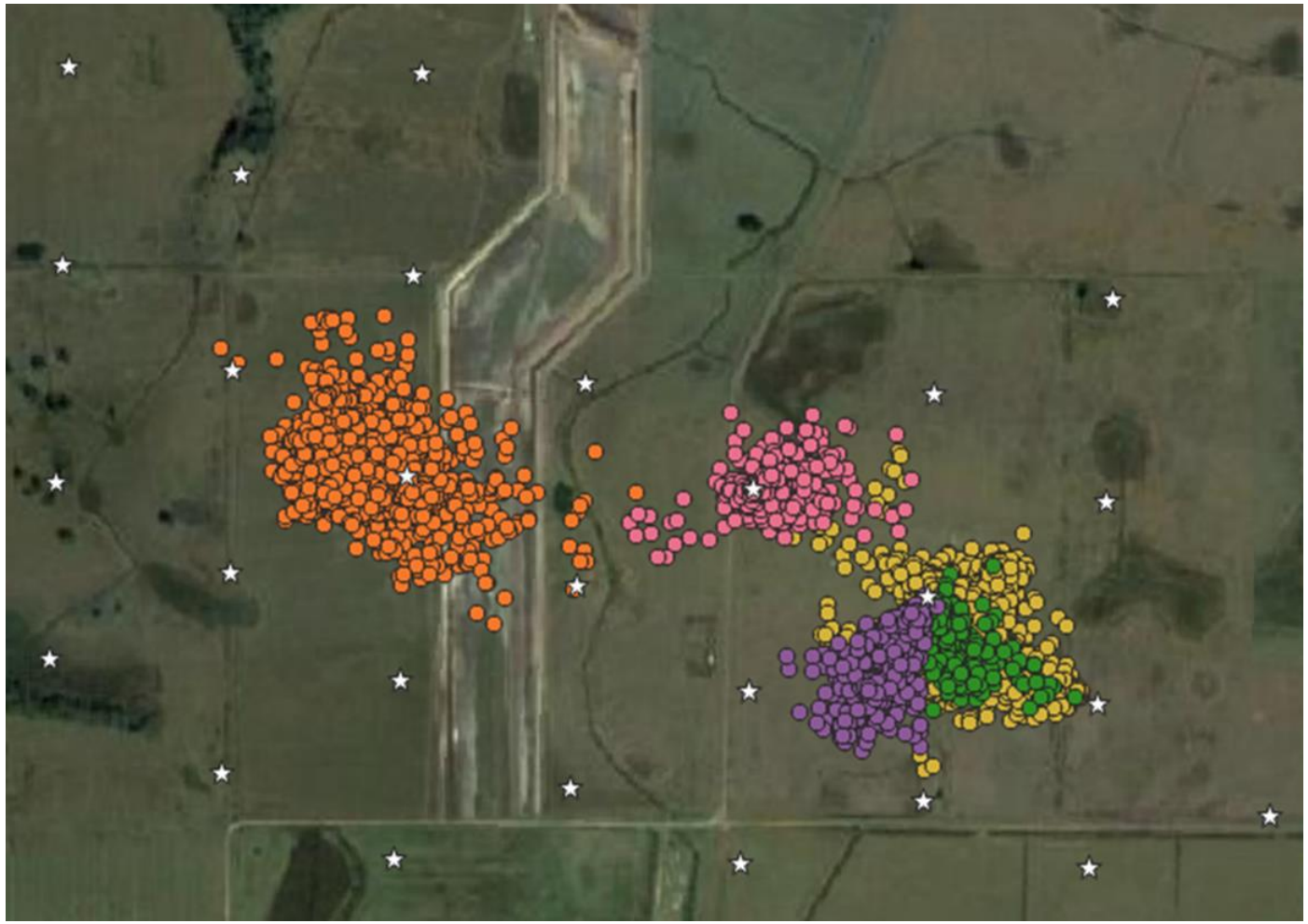
Burrowing Owls are quite tolerant of activity. Caught at burrow a few 100ft from drilling crew.





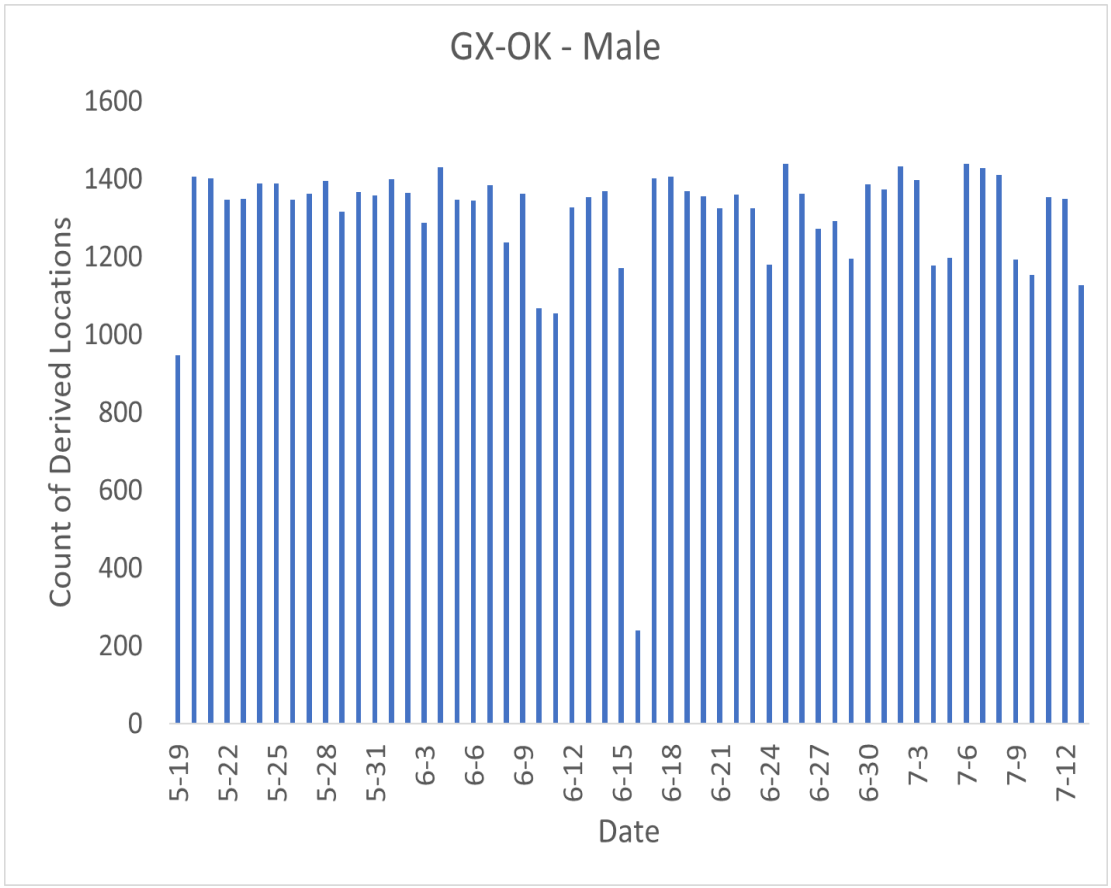
Mosaic

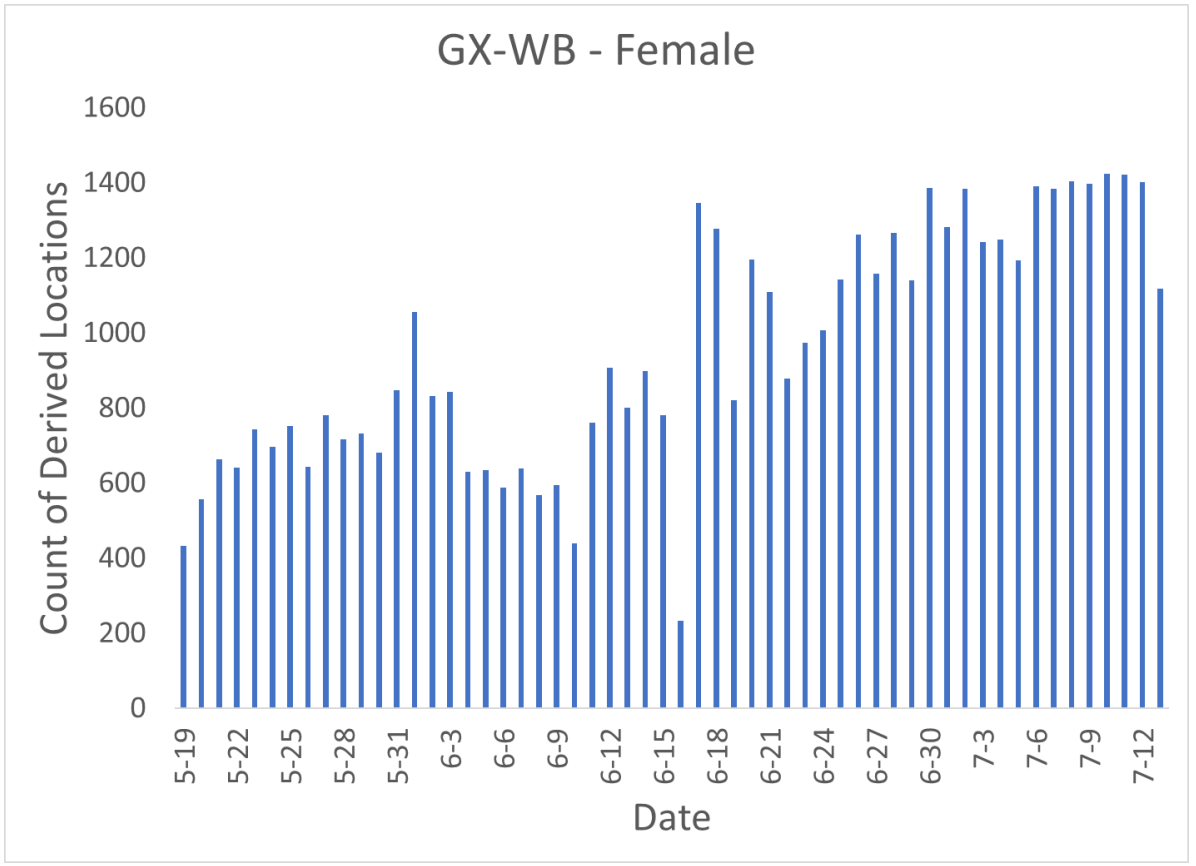
Spatial Data of 5 Owls



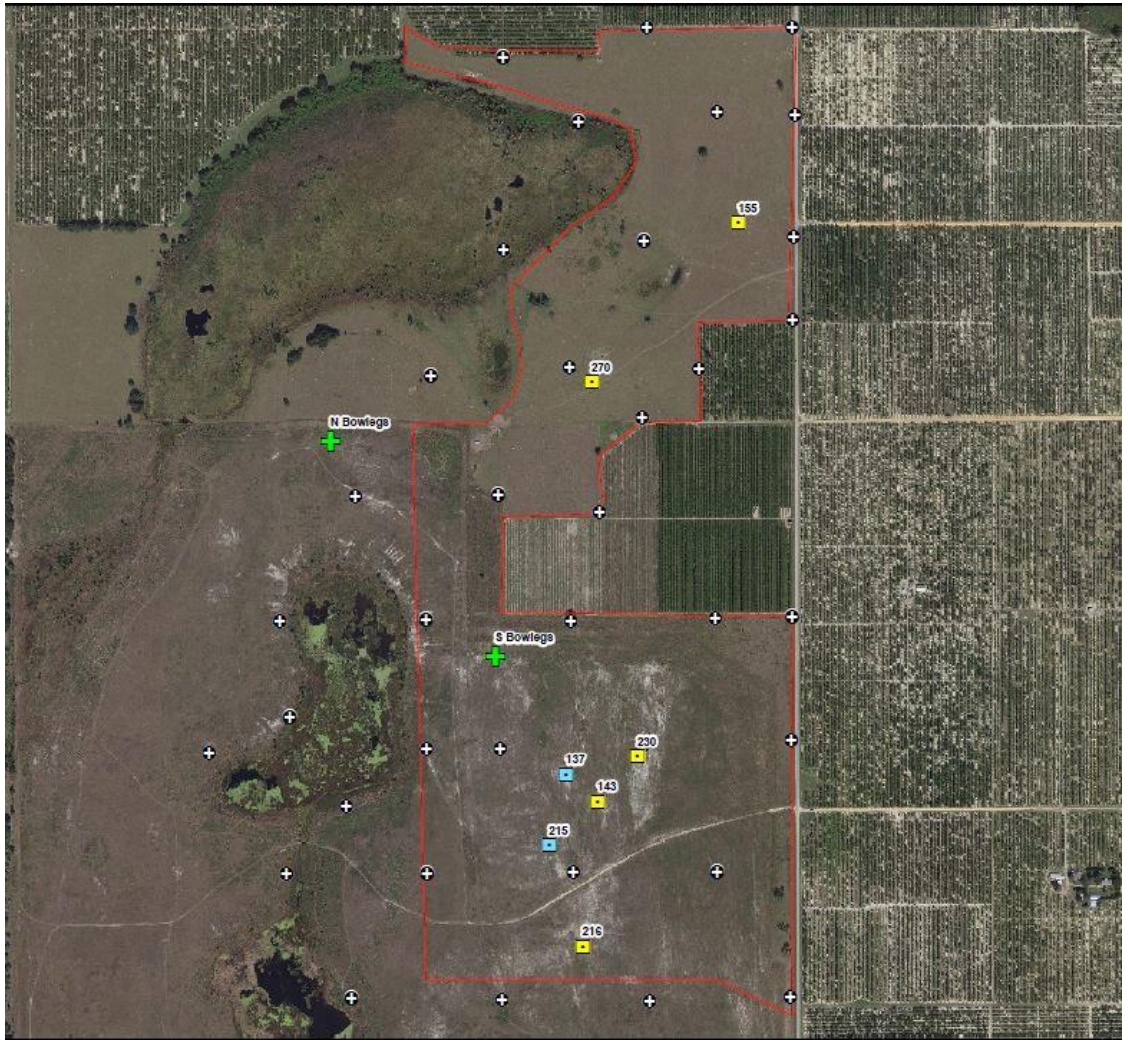
We can now track Owls almost real-time

Hundreds of locations per day





Wildlife on Reclamation – Burrowing Owls naturally disperse to Northern Bowlegs



What we have done so far 2020-2022

- In total **69** Adult Owls banded and tagged since August 2020
- Of the 69, **45** Adults have been captured and tagged since February 4, 2022
- In 2022 we have 32 confirmed breeding pairs
- In 2022 we have 31 chicks observed so far with 10 chicks old enough to band
- **120 Nodes** are being maintained with 4 main receiver towers and cellular uploads. Over **10 million** transmissions have occurred from which we derive **1200 to 1400** locations a day for each owl. **~50,000 locations a day!**
- We have installed 37 burrow cameras that are daisy chained up to 12 cameras together to send images through a singular cellular link. These cameras give us all sorts of information!!!

Copulation events and rates

Activity patterns

Threats

Threats

Coyote capture 1 chick during this event

Welfare observations – BUOW destroying transmitter

Reproductive Output

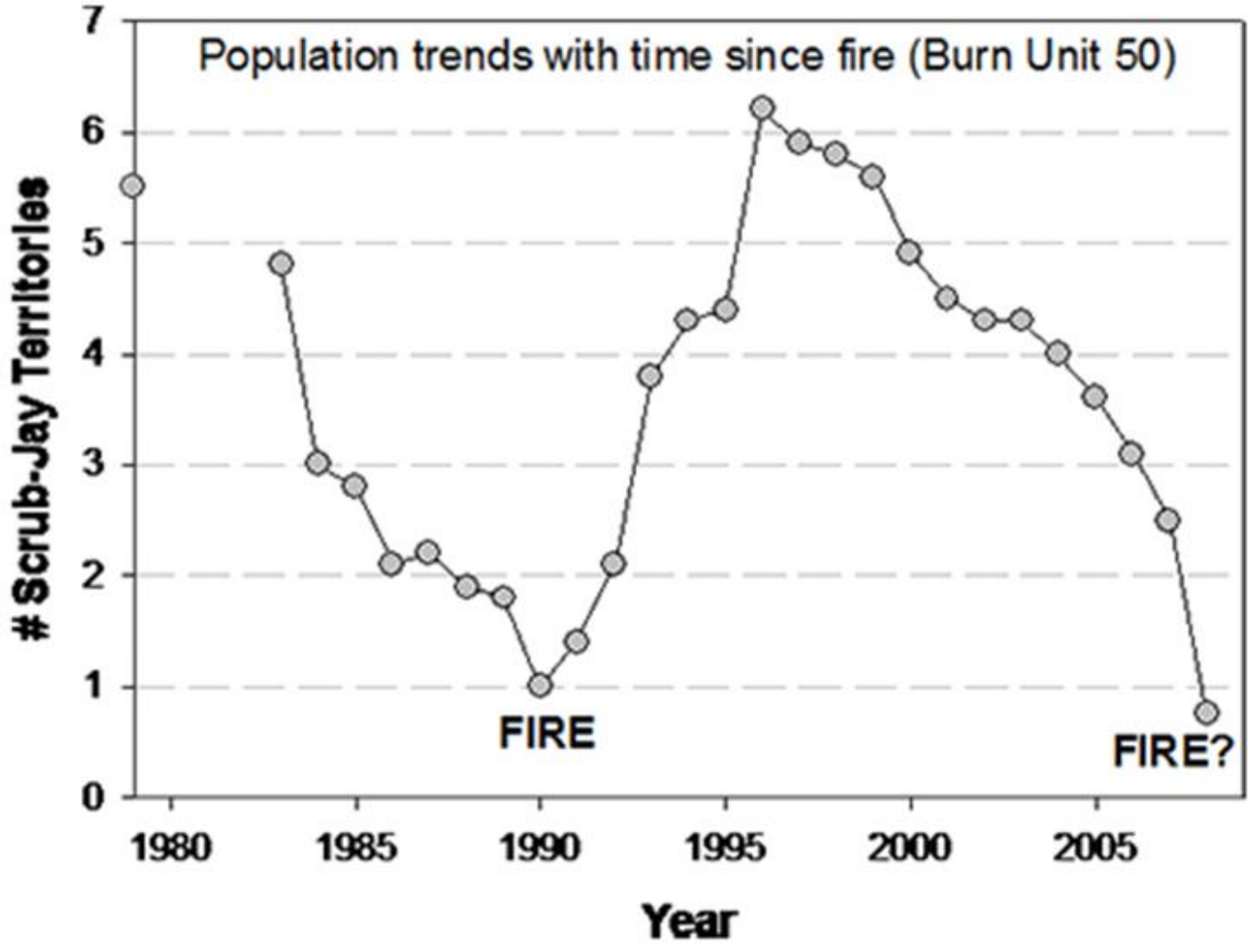
Pure Art!

Mosaic and the Road to Recovery for Florida Scrub-Jay's

Bill Brammell and Dr Raoul Boughton – Mosaic, Lauren M. Deaner – Flatwoods Consulting
Dr Reed Bowman – Archbold Biological Station, David Gordan – Quest Ecology,
Mike Elswick – Manatee County

Florida Scrub-Jay Biology

Florida Scrub-Jay Biology



Florida Scrub-Jay Biology

- Defend territories - Despotic
  - Year round
  - For life

Photo Credit: Lauren Deaner

Florida Scrub-Jay Biology

- Monogamous family groups
- Helpers aid in territory defense, and bringing food to young
- Helpers typically disperse & form new groups at 2-4 years

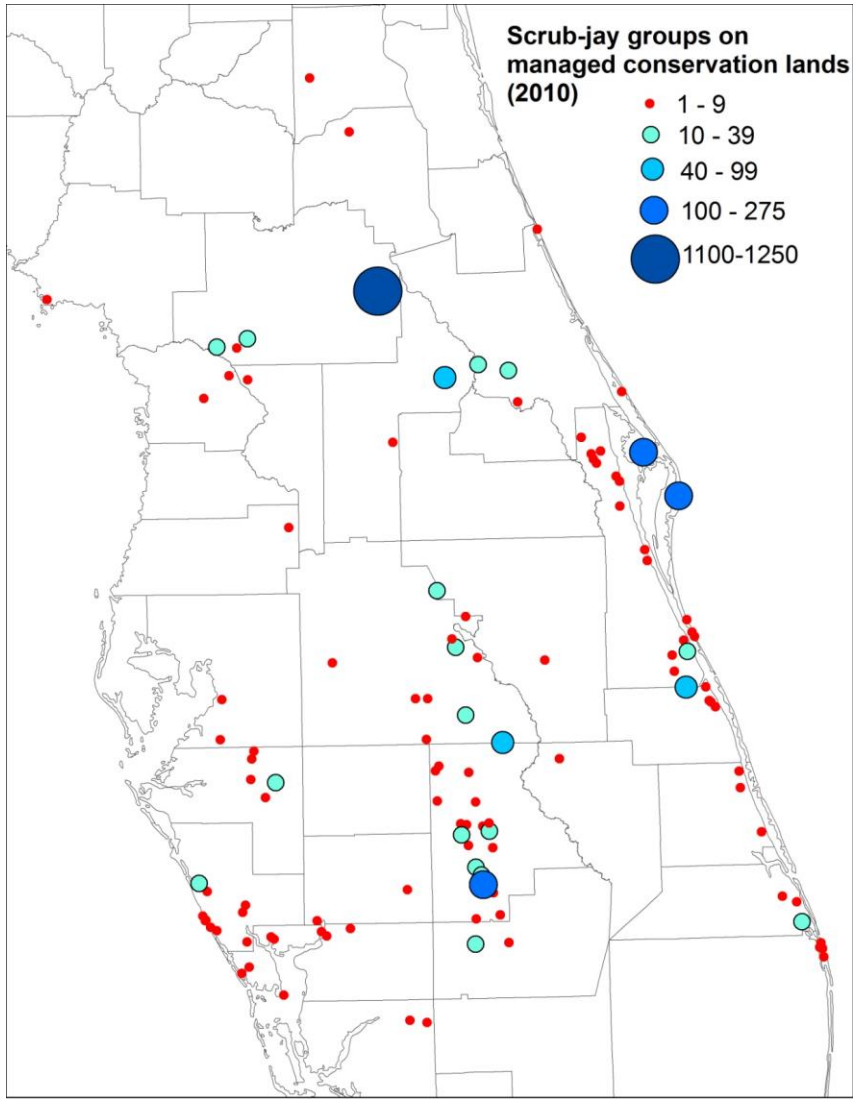
Photo Credit: Lauren Deaner

Declining FSJ populations

Only **4** populations

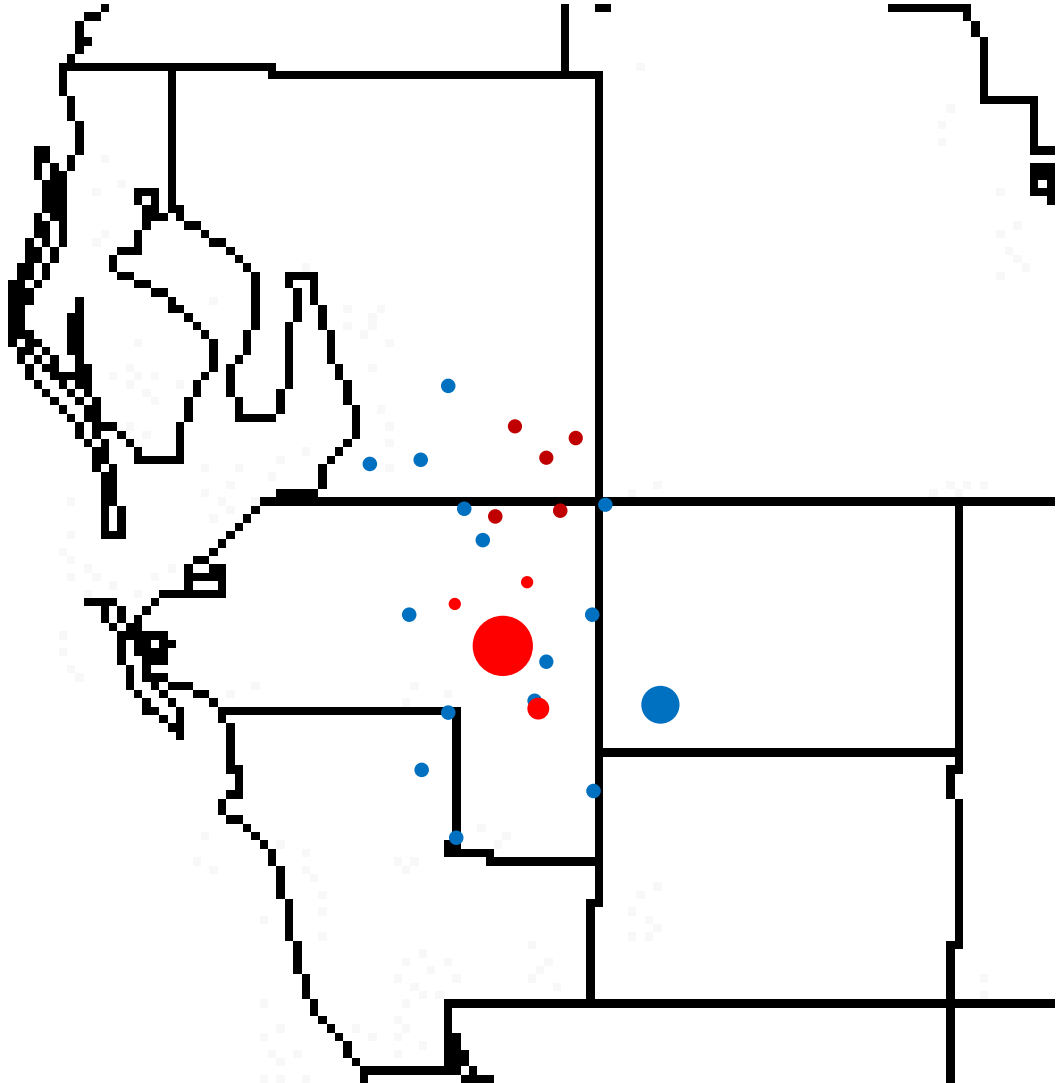
>

100 breeding pairs



Mosaic's Translocation

Increase the long-term survival potential for the M4 scrub-jay metapopulation

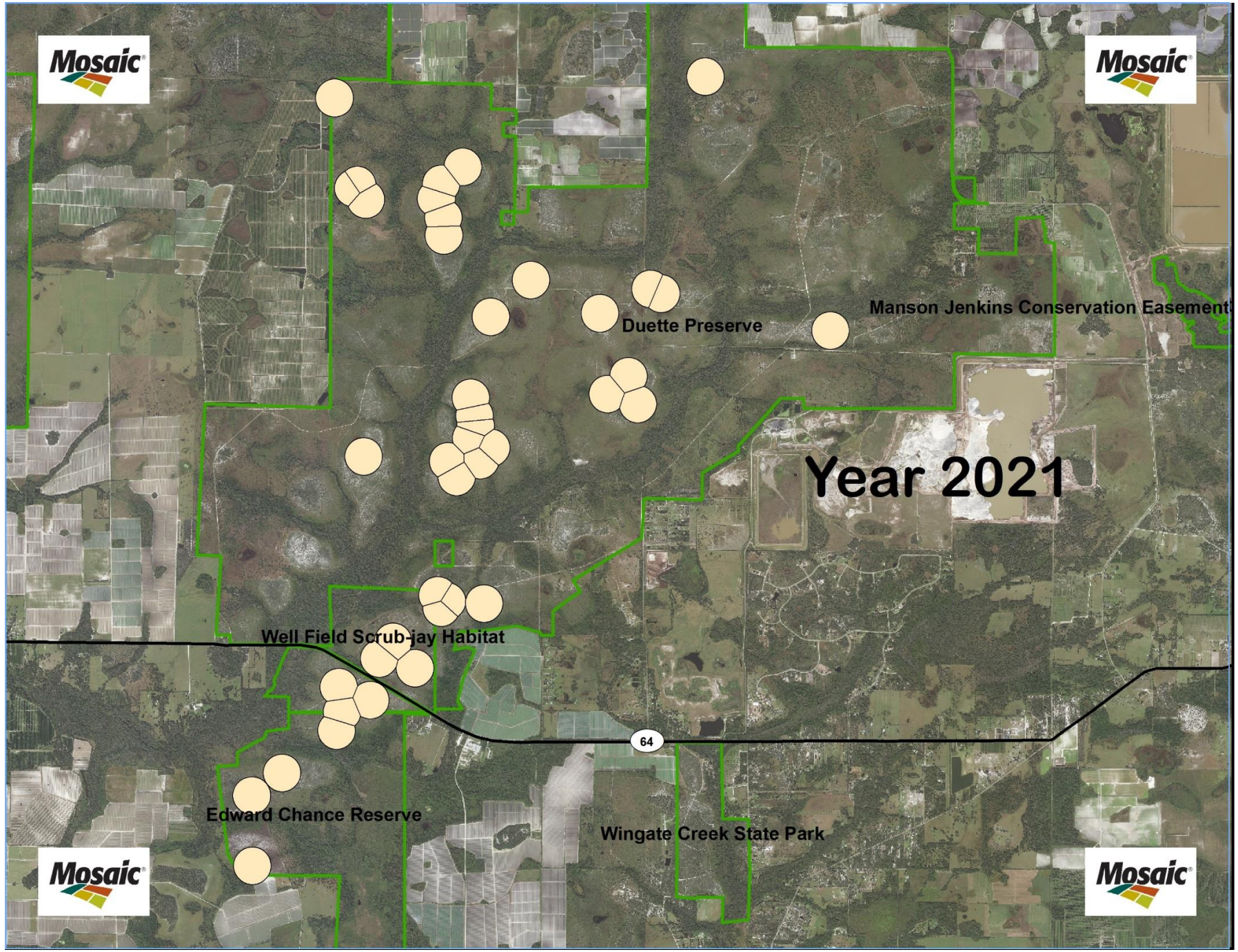


Peanuts and Scrub-Jays

Long-term Monitoring Success

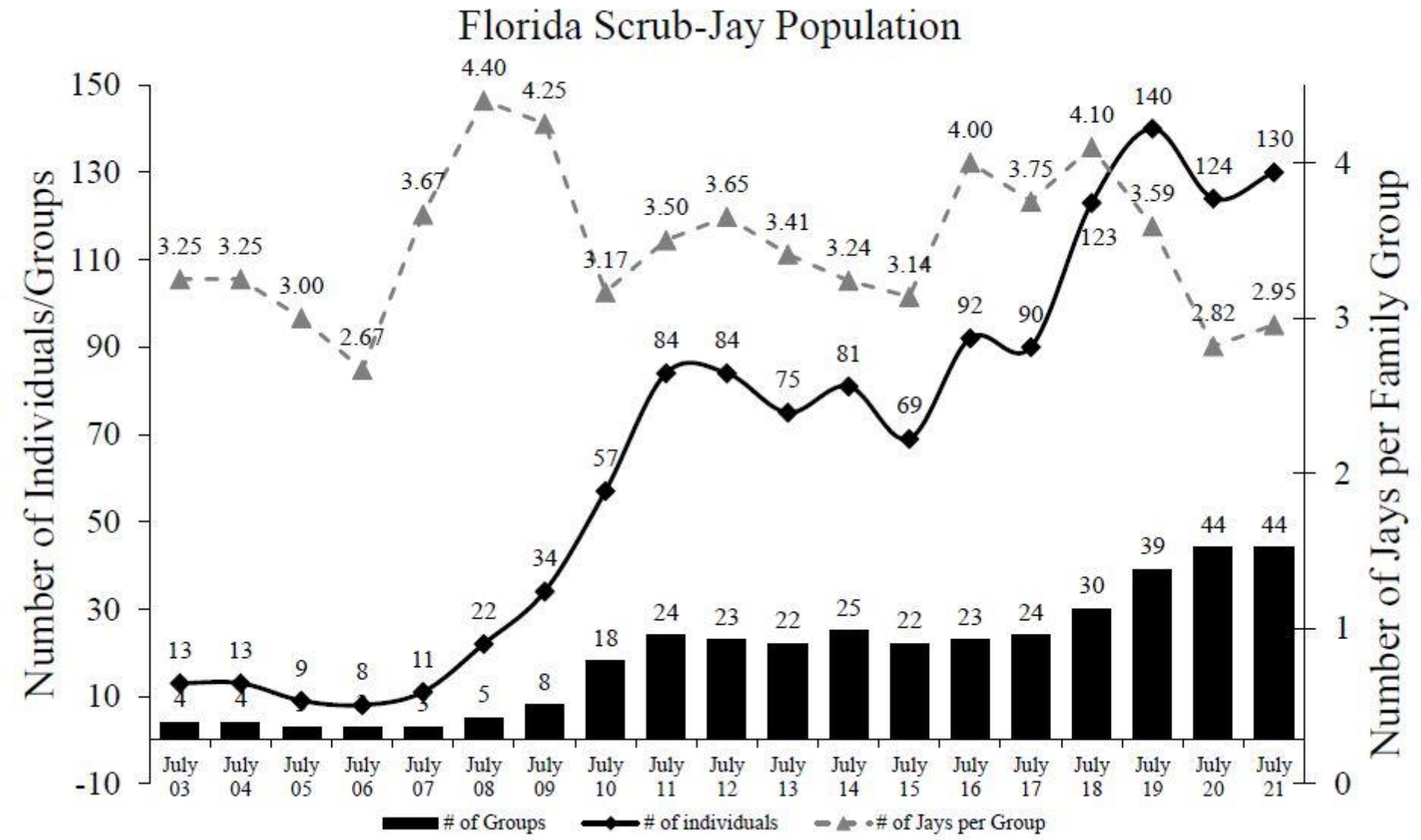
Long-term Monitoring Success

Success = survival and reproduction


Mosaic
Mosaic
Duette Preserve
Manson Jenkins Conservation Easement
Year 2021
Well Field Scrub-jay Habitat
64
Edward Chance Reserve
Wingate Creek State Park
Mosaic
Mosaic

Mosaic

Long-Term Success

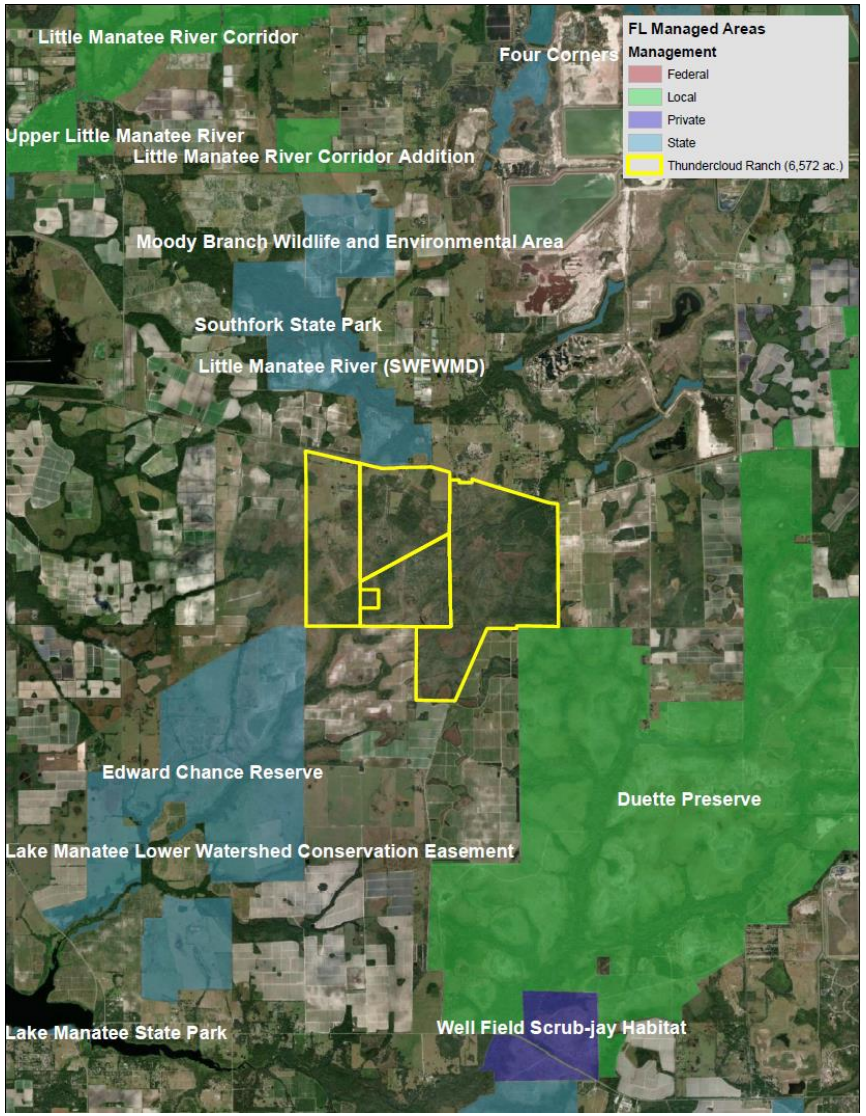


Discussion – Many Partners

Mosaic's translocation mitigation project ***so far*** is a great success, with the help of Manatee County

- Moving FSJ's to central location kick started a population recovery
- The meta-population including surrounding lands is ~ 60 breeding pair
- Continued success is dependent on many partners working together

The M4 FSJ Population Working Group



Mosaic

Manatee County FLORIDA

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

FLORIDA PARK SERVICE ENVIRONMENTAL PROTECTION

U.S. FISH & WILDLIFE SERVICE DEPARTMENT OF THE INTERIOR

The Nature Conservancy

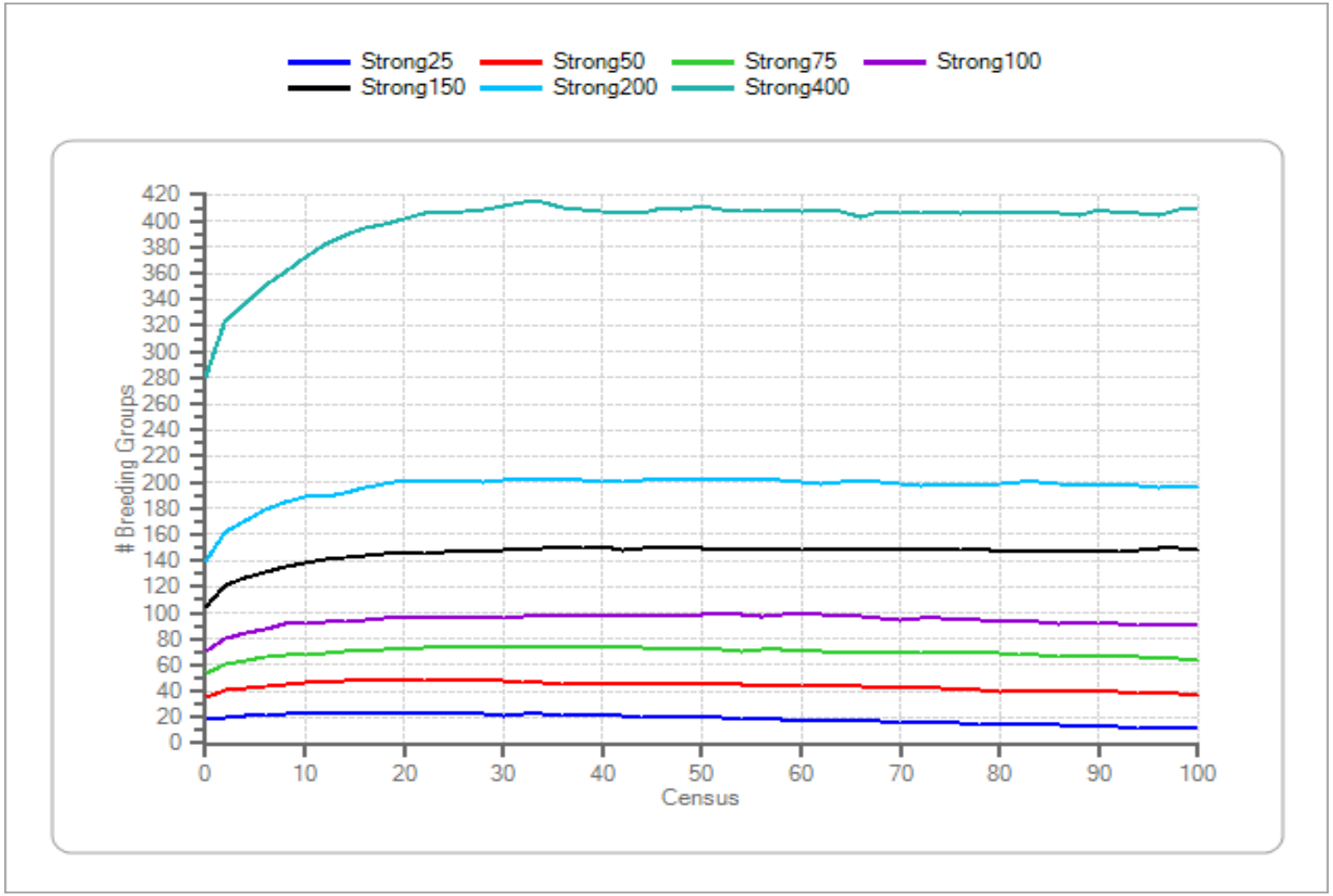
Mosaic

How to make it to Recovery?

- Grow the M4 population >100
  - Increase connectivity
  - Bring neighbors together to manage FSJ in the M4 population
- Support publication of this successful mitigation and recovery, to allow methods to be applied to other FSJ declining populations

Recent work by Dr Bob Lacey – min 100 pairs

Need about 100 Strong potential territories (about 80 pairs) to sustain population size long-term

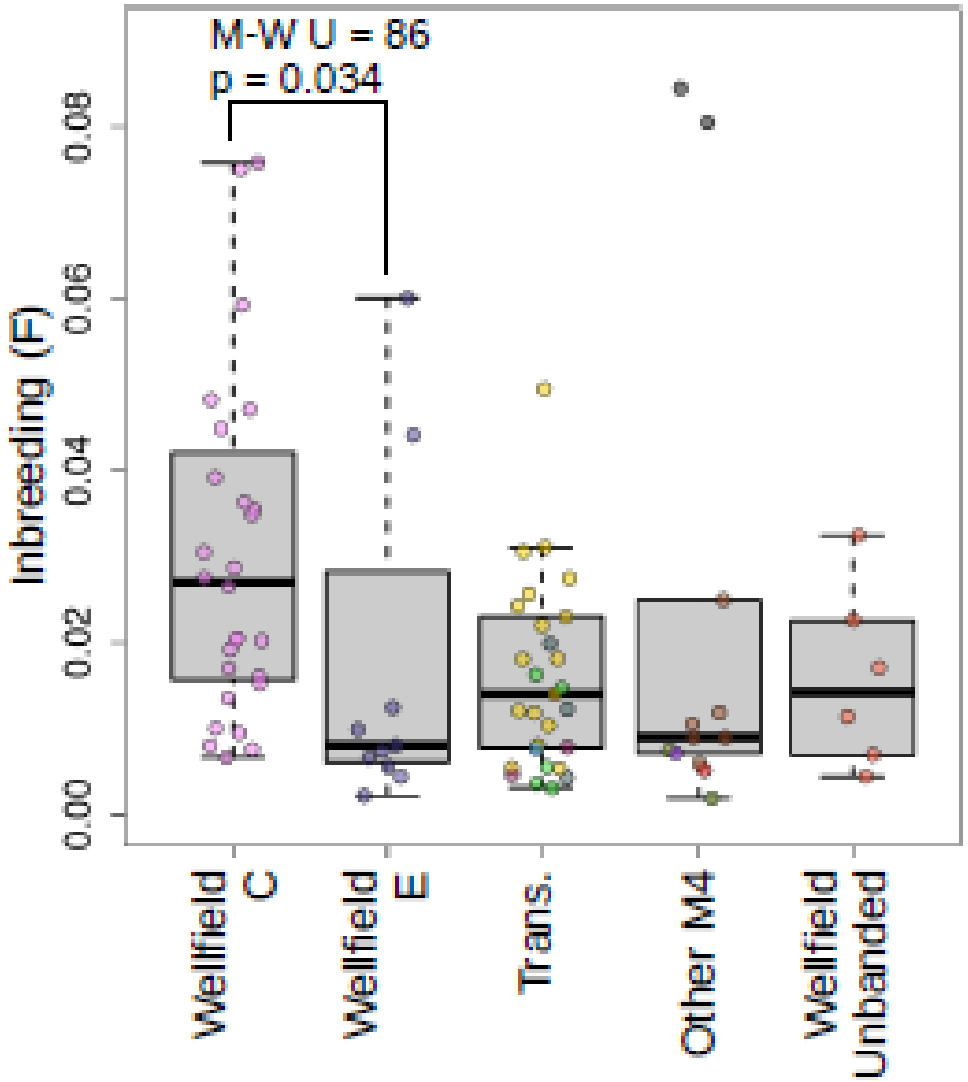


How can we make it to 100?

- Mosaic required to:-
  - Protect 700 acres of Scrub
  - Establish 14 pair, the # impacted
  - Monitor the project for 30 years

At Year 20 there are now 40 breeding pair descended from the original translocated birds. Demographically ~130 individuals.

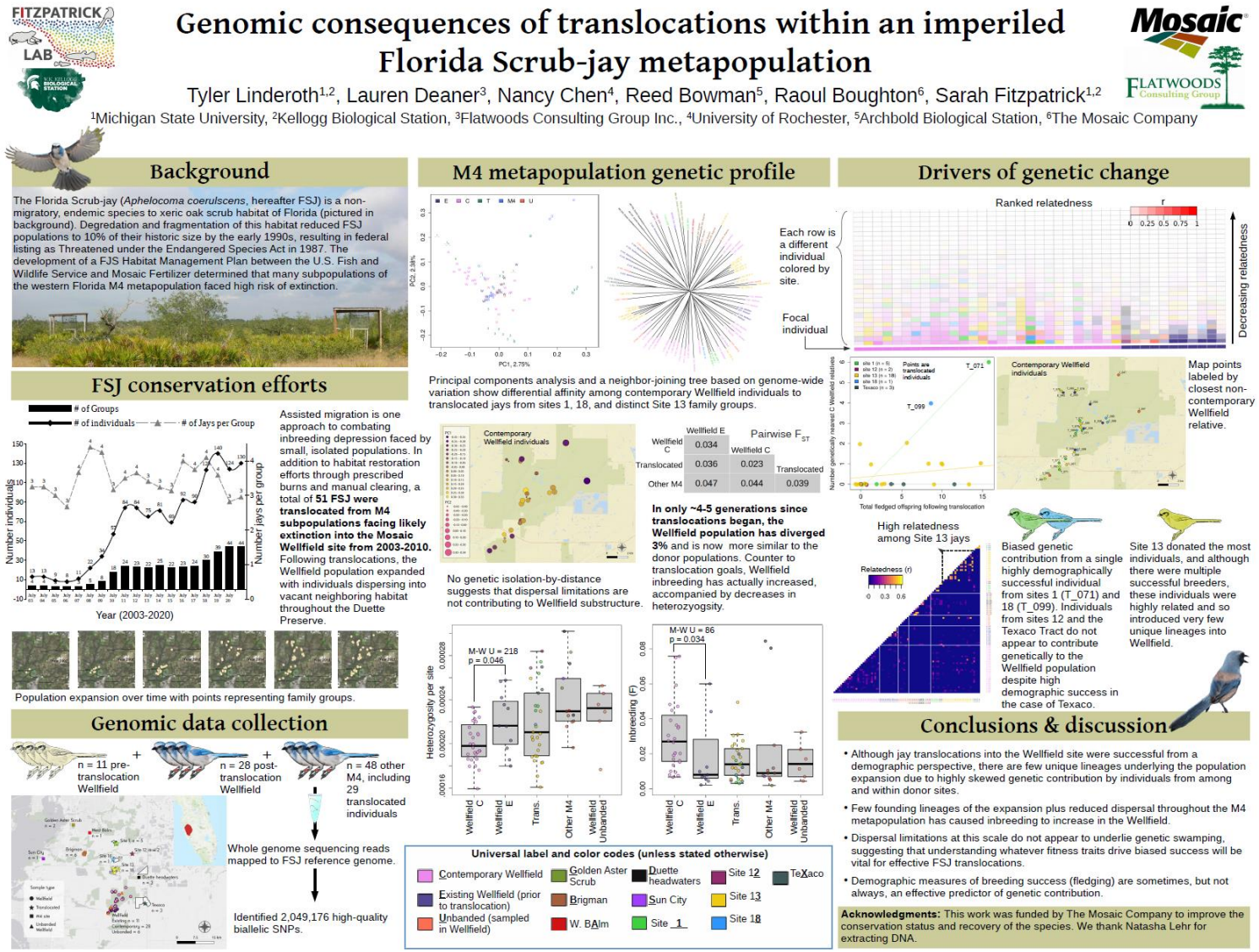
Genetic Studies – reveal increased inbreeding



Potential need for new genetic material to reduce inbreeding possibilities

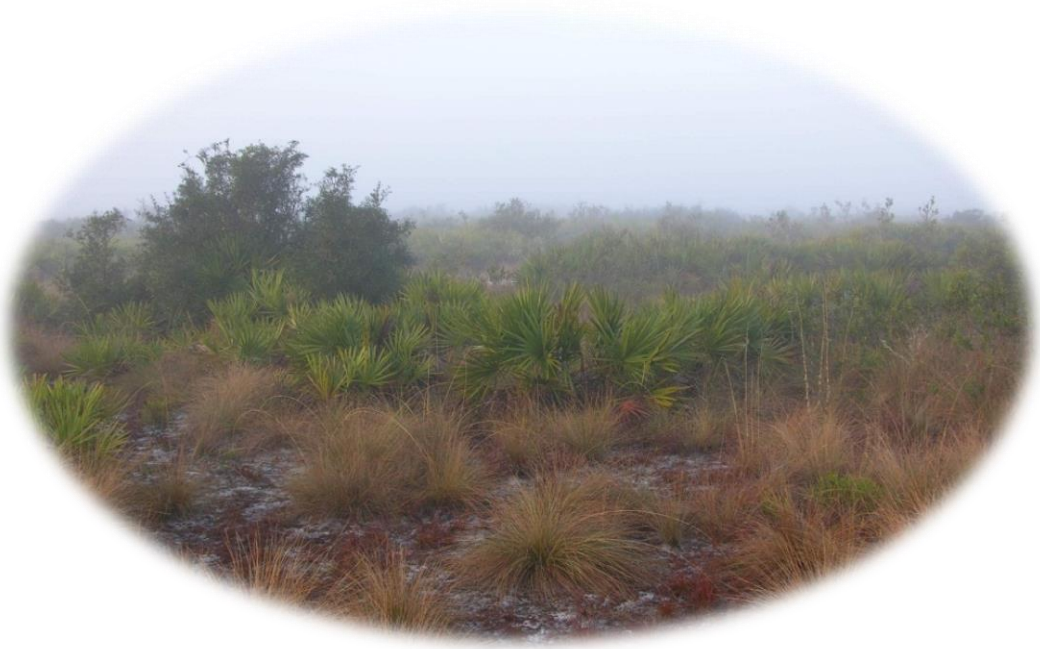
Mosaic committed to providing support to continue the recover of the FSJ M4 population

Committed to publication

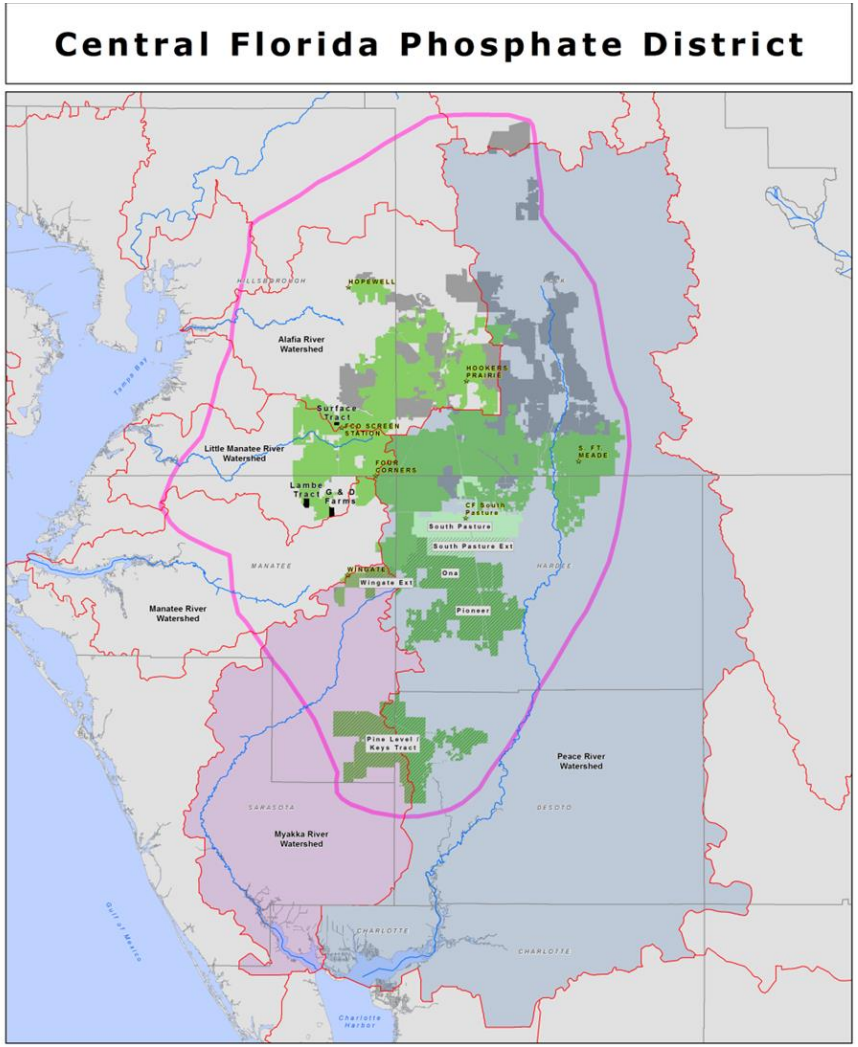


- Presented at the **2022 Evolution Conference**
- **3 science papers** to be published on the Florida Scrub-Jay project this year
- **Leading the conservation community** in how to implement recovery of small populations through translocation
- Supporting the M4 population growth through **advocacy and partnerships** with neighbors

Mosaic's 30 Year MOA for Gopher Tortoises



Provides a comprehensive approach to tortoise management & conservation on Mosaic Land



Reclaimed GT sites

Reclaimed Tortoise Recipient Site

Why was a MOA developed?

Mosaics Permitting Challenges

- Flexibility - mine plans change frequently
- Length of typical permits too short
- Survey requirements – cost / time prohibitive
- Emergency situations / relocations – not adequately addressed for long-term projects

MOA Solutions

- 5 year permits based on 15 year mine plan
- Calibrated modeling to estimate 5 year donor site tortoise estimates
- Unanticipated Relocations-no more than 15 per year prior notice to FWC provided

MOA has greater benefit to conservation

Mosaic Recipient Sites

- Over 2,000 acres placed under long-term protection
- Targeted recipient sites adjacent to public lands or IHN
- Typically relocate entire populations to one recipient site
- Most relocations with proximate geographic area (< 30 miles)

Other Conservation Measures

- Provide $60,000 annually (total of $1.8 million) to TNC for tortoise management on other public/private land

- Approximately $5.4 million in per tortoise mitigation contributions (more now)

Offsite Recipient Sites

- Long-term protected sites established primarily to receive tortoises from Mosaic
- Initial site was approximately 3,320 acres, several new sites of several hundred acres also.

Mosaic's MOA with FWC established 2014

- 30-year Duration of the MOA – FWC permits still required
- 18,000 gopher tortoises expected to be relocated
- Relocation on-site and off-site to long-term protected recipient sites
- Conservation measures in exchange for regulatory certainty
- Protection of historic recipient sites

Mosaic