

Seahorse Key Rookery Recovery Project

A proposal for funding to support the **CKNWR Avian Colonial Recovery initiative**
An interdisciplinary collaboration, facilitated by the **2050 Consortium**



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Background

Cedar Key National Wildlife Refuge (CKNWR) is located in Levy County Florida. Beginning in 2019, a select network of public and private entities began discussing pathways to artificially increase avian interest in the (recently collapsed) Seahorse Key rookery. The resulting partnership has prompted an effort to implement a research project, ahead of the 2020 nesting season. This project relies on avian decoys and (regionally recorded) acoustics to artificially stimulate colonization. Targeted species include regional representations of (Great Blue, Little Blue, Tricolor) Heron, (Snowy; Great) Egret, (Brown) Pelican, White Ibis, (Roseate) Spoonbill, and (Florida; Great) Cormorant.

Problem Statement

In May of 2015, an unverified event caused the collapse of the avian rookery at Seahorse Key, Florida¹. The systemic and cascading effects of this rapid transition resulted in a range of micro-to-macro impacts on the ecology and biogeochemical signatures to the island and near shore area². In near proximity is Snake Key, which now serves as the primary rookery area. However, it lacks the same surface area and carrying capacity for seasonal nesting³.

The impacts for nesting adults in the (comparably limited) space on Snake Key, translates to less births per season and a greater competition for habitat⁴. Overcrowding correlates to a higher level of stress on individuals and the colony as a whole⁵. The collaborators within this proposal seek to re-establish avian activity on Seahorse Key towards a goal of improving individual and general outcomes for the targeted species, habitats, and beyond.

Justification

The proposed activities associated with the re-establishment of a rookery on Seahorse Key will provide positive net benefits to avian populations and the flora/fauna of the island. Re-introduction could help to mitigate the ecosystem and species related impacts of the (2015) incident¹. During 2019, refuge managers observed multiple avian species as demonstrating an increased level of (peripheral) interest in Seahorse Key. This could be due to pressures related to competition for habitat, or simply as an instinctual response.

This resurgence of interest could make re-colonization more likely in the coming seasons, especially when coupled with the right artificial incentives. Through the combined usage of audio and visual resources (i.e. decoys; acoustics), we can actively encourage resettlement, while reducing the population pressures on Snake Key. This significant expansion of viable avian habitat should increase in the combined net productivity, between both colonies, as compared to pre-2015 levels.

A network of researchers, agencies, and citizen groups agree to collaborate on this project. Partnership will help mitigate expenses and create citizen science opportunities, related to:

- 1) Acquisition of equipment
- 2) Logistics management
- 3) Research project implementation

This multi-faceted network seeks to refine and prototype a simple/novel approach to a globally relevant challenge. If successful, agencies and the public will be provided a replicable strategy towards applied management and revitalization of distressed rookeries.

Goals

1. Coordinate a regional stakeholder network to re-establish Seahorse Key rookery.
2. Establish audio and visual stimulus on Seahorse Key in order to attract avian nesting activity in the spring of 2020 and beyond.
3. Monitor and evaluate the effectiveness of artificial stimulus on nesting activity.
4. Produce (1) white paper and (1) publication, associated with project findings.

Forecasted Results

1. Regional stakeholders will increase their portfolio of inter-network collaborations.
2. Artificial stimuli will attract the interest of targeted avian species, resulting in the re-establishment of Seahorse Key as a seasonal rookery.
3. Artificial stimuli experiment will prove to be useful in other regions in North and Central America, where similar challenges have occurred.
4. Select coalition partners will collaborate on and successfully produce no less than two written reports, to be shared with agencies and the general public.

Activities

2019	2020
Capture Regional Audio Samples	Secure Research Materials
Coordinate Stakeholders	Set up Experiment Stations
Secure Funding	Collect and Analyze Data
Train Volunteers	Monitor and Evaluate

The scope of activities within this program would be developed and administered through public, private, and community partners; and facilitated through the (Gainesville, FL Based) “2050 Consortium”. The company/contractor will implement the program through its Coastal Programs Division, as supervised by Russell Anderson. The principle objective of this initiative would be to bring together (prospective) implementation partners, consultants, and stakeholders to discuss systemic opportunities related to advancing colonization of select avian species, onto Seahorse Key.

Methods

Direct Observations	Literature and Case Study Review(s)
Quantitative Field Sampling	Stakeholder Meetings
Qualitative Recording	Acoustic/Visual Manipulation

This research and its associated methods intend to generate awareness and data, related to the use of novel approaches in restoring use of abandoned avian habitat. Methods performed during this project relate to avian monitoring across a six-month timeline (February – August 2020). If nesting is established, site access will be extremely limited. Designated researchers, agency personnel, and citizen scientists will support direct observations and field sampling, as authorized by management authority. All activities should be performed in ways that limit or avoid colony disturbance.

In advance of the 2020 season, stakeholder meetings will be used to solicit feedback and participation from (potentially) partnered entities. These entities include nonprofits (Audubon, Friends of CKNWR), agencies (FWS), and institutions (UF). These meetings will help to sustain a high degree of public transparency on the project. A literature review of organizational and institutional materials from entities working on similar conservation/remediation efforts continues to influence and contextualize strategy.

Data will be collected, observed, and assessed at three intervals (pre/interim/post), assuming successful colonization. Qualitative data was captured/recorded via SWIFT ARUs throughout the spring 2019 nesting season at Snake Key. These acoustic files serve as the foundation for our ability to produce (regionally-specific) colonial and individualized projections.

Field sampling will help researchers quantitatively measure the ecosystem services, provided by increased seasonal rookery activity. Sampling shall be performed on/near Seahorse Key and Snake Key. During the 2020 nesting season, field-sampling activities should focus on low cost assessments of targeted populations and ecosystems.

Water Quality (<100m Shoreline)	Seasonal Avian Population Density	Herpetological Impacts
Soil Nutrient Analysis (Shoreline)	Nesting Canopy Coverage Density	Invertebrates (Upland)
Soil Nutrient Analysis (Upland)		Invertebrates (Shoreline)

Planned Sampling Activities

Assessment activities should include direct observations, and the use of photo/video to accurately estimate bird count. Water quality sampling and general health screenings of chordate, invertebrate, serpent representations will be performed at the discretion of the associated management authority. We will utilize previous year samples for comparisons.

During February/March of 2020, a designated team will install decoys and audio equipment. Decoys will focus on Ibis and other (non-site dependent) colony representations. Once audio equipment has been thoroughly tested, monitoring and management of recording system is anticipated to be bi-weekly, or every 3-4 days. Equipment should be placed in positions that a) limit/avoid colony disturbance b) limit risks associated with theft c) limit maintenance complexity and burden.

The utilized acoustics shall correlate to the projections from neighboring Snake Key, as seasonally relevant as possible. Multiple “playlists” will be created from the raw audio files and loaded/shuffled as the season progresses.

Roles and Responsibilities

Entity	Point of Contact	Focus	Contact Information
U.S. Fish & Wildlife Service	Larry Woodward Victor Doig	Refuge Management; Access Authorization	Larry_woodward@fws.gov Victor_doig@fws.gov 352-493-0238
UF IFAS/NCBS	Dr. Mike Allen	Fisheries Ecology	msal@ufl.edu 352-273-3624
University of Florida (IFAS) (WEC)	Dr. Peter Frederick	Conservation Science Avian Ecology	pfred@ufl.edu 352-846-0565
University of Florida (NCBS)	Dr. Savanna Barry	Research Support	Savanna.barry@ufl.edu 352-325-6080
University of Florida (SFRC)	Dr. Katy Sieving	Avian Ecology	chucuo@ufl.edu 352-846-0569
University of Florida (FMNH)	Dr. Harvey Lilliwwhite Dr. Mark Sandfoss	Seahorse Key Herpetology	hbill@ufl.edu mrsandfo@ufl.edu
University of Florida (IFAS)	Capt. Kenny McCain	Boat Captain; Steward	352-493-3150
2050 Consortium, Inc.	Russell Anderson	Research/Administration	352-519-6946 consortium2050@gmail.com
Friends of CKNWR	John McPherson	Research Support	352-317-7431 jkmpherson@att.net
Audubon Society (Levy Co.)	Boyd Kimball	Research Support	352-521-3990 blkimbal@hotmail.com

The partners and affiliates of this project are considered as local/regional stakeholders. Representatives from University of Florida and US Fish & Wildlife Service are the co-owners/managers of Snake Key. Research authorization and site access are managed through their personnel.

{UF} Institute of Food & Agricultural Science (IFAS) is the management authority over the Nature Coast Biological Station (NCBS). This station serves as a critical resource to advance regional knowledge and access to graduate/undergraduate researcher volunteers. UF's Wildlife Ecology & Conservation (WEC); UF School of Forest Resources & Conservation (SFRC) departments provide access to avian and coastal ecology experts. Personnel from the Florida Museum of Natural History serve as a resource for herpetological data sets.

The U.S. Fish & Wildlife (FWS) service is the principle funder and regulatory authority. Associate personnel are charged with site monitoring and enforcement. The agency is supported by non-profit citizen groups; Friends of Cedar Key National Wildlife Refuge; Audubon Society of Levy County. These organizations provide valuable stakeholder feedback from both citizen and stewardship perspectives.

Founded 2018, The 2050 Consortium is an (501c3) international sustainable-development consulting firm. This organization provides sub/contracted research and management services for social and environmental programs. They advance interdisciplinary collaborations that foster positive and meaningful public and private outcomes; low-cost, high impact solutions to social and environmental challenges. This firm emphasizes interdisciplinary and regionally adapted strategies that address multi-national challenges.

Timeline

Task	Accountable	Due By	Completed?
2019			
Initial Solicitations (Institutes, Agencies)	Russ A.	3/01/19	Y
Secondary Solicitations (Consultants, Orgs)	Russ A.	3/15/19	Y
Present to Friends of CKNWR	Russ A.	3/20/19	Y
Acquire/Install SWIFT Recording Units	Larry W.	3/31/19	Y
Dismount/Transfer Data from SWIFT Units	Larry; Russ	4/31/19	Y
Submit Draft Proposal (Primary Collaborators)	Russ A.	6/21/19	Y
Internal Funding Solicitation (US FWS)	Larry W.	7/01/19	Y
Proposal Edits/Feedback Submitted to Russ	All	7/15/19	Y
Submit Final Proposal (Secondary Collaborators)	Russ A.	7/31/19	
Internal Funding Solicitations (UF, Audubon, FCKNWR)	Russ A.	8/15/19	
Schedule Follow-ups to All Collaborators	Russ A.	8/15/19	
Submit Edited Playlist of SWIFT Data Files	Russ A.	8/15/19	
External Funding Solicitations (Grants, Private)	Team 2050	9/01/19	
Identify Training Dates for Accountable Team(s)	Russ A.	9/15/19	
Prepare Training and Presentation Materials	Russ A.	10/15/19	
Present to Cedar Key Audubon	Russ A.	11/15/19	
2020			
(Pre-Season)			
Purchase Audio Equipment	Russ A.	02/01/20	
Secure Decoys from Peter F.	Russ A.	02/05/20	
Facilitate the install of decoys at Seahorse	Peter F / Russ	2/15/20	
Install Audio at Seahorse	Team TBD	3/01/20	
Quantitative/Qualitative Data Collection	Team TBD	3/01/20	
- Physical, Statistical, Chemical (Sampling)	-	-	
(Early Season)			
(Audio) Battery Swaps (3/5 - 4/15)	Audubon, FWS	Weekly ?	
Audio Equipment Removal	Team TBD	(TBD)	
Quantitative/Qualitative Data Collection	Team(s) TBD		3/15 - 6/15
- Physical, Statistical, Chemical (Sampling)	-	-	
Consolidate and Share Initial Findings	Russ A.	6/01/20	
Submit (initial) Press Materials to Regional Media	Team 2050	6/15/20	
(Late/Post Season)			
Monitoring & Evaluation	Team 2050	7/01/20	
White Paper (Draft)	Team 2050	7/15/20	
White Paper Peer Review	All	8/15/20	
White Paper Final (Submitted)	Team 2050	9/01/20	
Publication Drafted and Review Period	Team TBD	9/15/20	8/15-10/15
Team Wrap Up & Discussion of Next Steps	All	10/01/20	
Publication Finalized and Submitted	Team 2050	11/01/20	
Media, Marketing, Presentation Materials Drafted	Team 2050	11/05/20	
Media, Marketing, Presentation Materials (Final)	Team 2050	11/10/20	

Budget

Project: Seahorse Key Rookery Recovery Operations Budget (2019 – 2020)	DESCRIPTION	Estimated Expenditure
PERSONNEL		
Project Administrator (Contracted)	2050 Consortium: Russell Anderson	\$2,500
Research Administrator (Contracted, Temporary)	2050 Consortium: TBD	\$2,000
Research Technician (Contracted, Temporary)	UF Graduate Student: TBD	\$2,500
Site Supervisor and Access Point of Authority	UF IFAS: Kenny Long	\$1,500
Research Technician (Contracted, Temporary)	Monitoring and Evaluation {Post Activity}	\$1,000
Gross Personnel Expenses		\$9,500
OPERATIONS	Description	2019-2010
Item		
Equipment: Reimburse U.S. FWS: CKNWR	(2) SWIFT Acoustic Recording Units	\$650
Equipment: Reimburse U.S. FWS: CKNWR	(4) 64GB SD Cards/ D-Batteries (Swifts)	\$50
Equipment: Decoys (20 @\$10/ea)	New/Replacement Decoys + modifications	\$200
Equipment: Audio Playback/Transmission	MP3 Player: Outdoor Wireless Bluetooth	\$100
Equipment: Audio Projection	Wireless Bluetooth Speakers (Outdoor)	\$1500
Equipment: Wireless Battery Resources	Power Sources: Solar and Battery	\$500
Equipment: Wireless Bluetooth Expander	Range Expander for Wireless Signal	\$250
Equipment: Engineering Logistics	Speaker/Decoy Wire(s), Power accessories, ...	\$150
Travel: Fuel {UF IFAS}	Outboard/Boat	\$250
Travel: Fuel {U.S FWS}	Outboard/Boat (MOCC Certification Req.)	\$250
Travel: Fuel {2050 Consortium}	Standard/Car	\$125
Travel: Fuel {Audubon; FCKNWR}	Outboard (Volunteer Reimbursement)	\$250
Training: Printed materials	Volunteers, planning meetings, ...	\$150
LABS: Sample Testing	Water, soil, biological materials.	\$750
Postage	Shipping and shipping material costs	\$250
Website and Information Technology	Webs resources, software, and digital storage	\$200
OPERATIONS SUB-TOTAL		\$5,625
TOTAL (Operations + Personnel)		\$15,125
Capital and In-Kind Contributions	Description	(Requested)
Income: Capital: U.S. FWS	Partial coverage of personnel & operations	\$10,000
Income: Capital: Florida Fish & Wildlife CC	Partial coverage of personnel & operations	\$1500
Income: Capital: UF IFAS; Nature Coast Bio Sta.	Partial coverage of personnel & operations	\$1500
Income: Capital: Friends of CKNWR	Partial coverage of personnel & operations	\$1500
Income: Capital: Levy County Audubon Society	Partial coverage of personnel & operations	\$1000
Fiscal Capital		\$15, 500
Income: Grants:	(3) Grants at +\$500 each	\$1500
Grant Target	10% of total expenses	\$1500
In Kind: 2050 Consortium	40 Service hours (\$25/hr value)	\$1000
In Kind: US FWC	Transport, Set up, Management & Logistics	\$1500
In Kind: UF; Dr. Peter Frederick	Decoys (48+) from (approx) 3/1 – 7/1 '20	\$1500
In Kind: UF IFAS / Nature Coast	25 Graduate student (research) hours	\$500
In Kind: Friends of CKNWR	40 volunteer hours + fuel (10 week period)	\$1000
In Kind: Audubon Society (Levy County)	40 volunteer hours + fuel (10 week period)	\$1000
(In-Kind) Total Value:		\$6500
Total Value of All Contribution Sources		\$23,500

Budget Narrative

Costs for this research-driven project are not expected to exceed \$15,500. Approximately \$6k (40% of expense) is associated with acoustic technology and associated installation costs (labor, fuel). Approximately \$9k (60% of expenses) is associated with labor, quantitative/qualitative field research, and reporting.

This project will rely on contracted managers, term-limited specialists, and citizen science volunteers. The Project (and Research) Administrator(s) will serve as the central coordinators. The time commitment for these roles will be approximately (100) hours at \$25/\$20 hr (respectively). Project Administrator will ensure timelines are maintained and deliverables are achieved. Research Administrator will ensure volunteers are trained and data is captured, quantified, utilized, and disseminated to partners.

Specialists and citizen scientists will assist in the capture of raw data, as well as the set up and removal of equipment. Researchers and select volunteer personnel will support the creation of materials, review of literature, and assist administrators, as appropriate.

Indirect costs and overheads will likely be incurred by all partner organizations. These will most likely take the form of staff time and fuel dedicated to supporting the program. Program administrator(s) and development consultants will actively seek diverse funding opportunities towards the goal of autonomy and self-sufficiency.

Conclusion

As a result of this partnerships activity, this coalition intends to artificially stimulate renewed interest in the Seahorse Key Rookery. While select avian species are targeted, the net positive impacts should improve outcomes for resident serpentes (*A. piscivorus*), chordate, and invertebrate populations. If successful, conservation managers will have a regionally tested strategy for low-cost, high yield returns. Citizen scientists and academic researchers will have a tangible management experience, with empowering results for the individuals and organizations involved.

References

1. Kevin, B. The Mystery of Seahorse Key's Missing Bird Colony Veers Into Strange Territory. [www.audubon.org](https://www.audubon.org/magazine/winter-2016/the-mystery-seahorse-keys-missing-bird-colony). Audubon Magazine. <https://www.audubon.org/magazine/winter-2016/the-mystery-seahorse-keys-missing-bird-colony>
2. Sandfoss, M.R. Collapse of a Unique Bird-Snake Relationship on Seahorse Key. [www.blogs.ifas.ufl.edu](http://blogs.ifas.ufl.edu/ncbs/2018/08/02/snakes/). UF IFAS. <http://blogs.ifas.ufl.edu/ncbs/2018/08/02/snakes/>
3. Cedar Keys National Wildlife Refuge. [www.fws.gov](https://www.fws.gov/refuge/Cedar_Keys/) U.S. Fish & Wildlife Service. https://www.fws.gov/refuge/Cedar_Keys/
4. Florida's Imperiled Birds. [www.audubon.org](http://fl.audubon.org/birds/floridas-imperiled-birds) Audubon Florida. <http://fl.audubon.org/birds/floridas-imperiled-birds>