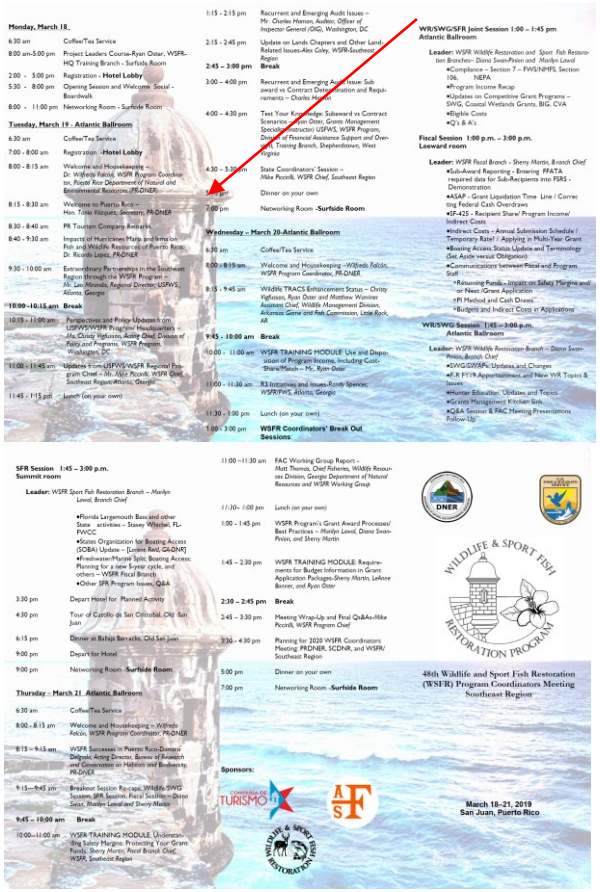
Impacts of Hurricanes Maria and Irma on Fish and Wildlife Resources of Puerto Rico

48th Wildlife and Sport Fish Restoration (WSFR) Program Coordinators Meeting Southeast Region March 18–21, 2019, San Juan, Puerto Rico



Monday, March 18_

6:30 am Coffee/Tea Service

8:00 am-5:00 pm Project Leaders Course-Ryan Oster, WSFR-HQ Training Branch - Surfside Room

2:00 - 5:00 pm Registration - Hotel Lobby

5:30 - 8:00 pm Opening Session and Welcome Social - Boardwalk

8:00 - 11:00 pm Networking Room - Surfside Room

Tuesday, March 19 - Atlantic Ballroom

6:30 am Coffee/Tea Service

7:00 - 8:00 am Registration -Hotel Lobby

8:00 - 8:15 am Welcome and Housekeeping – Dr. Wilfredo Falcón, WSFR Program Coordinator, Puerto Rico Department of Natural and Environmental Resources, PR-DNER

8:15 - 8:30 am Welcome to Puerto Rico – Hon. Tomás Rodríguez, Secretary, PR-DNER

8:30 - 8:40 am PR Tourism Company Remarks

8:40 - 9:30 am Impacts of Hurricanes Maria and Irma on Fish and Wildlife Resources of Puerto Rico – Dr. Ricardo López, PR-DNER

9:30 - 10:00 am Extraordinary Partnerships in the Southeast Region through the WSFR Program – Mr. Leo Miranda, Regional Director, USFWS, Atlanta, Georgia

10:00 -10:15 am Break

10:15 – 11:00 am Perspectives and Policy Updates from USFWS/WSFR Program Headquarters – Ms. Christy Hightower, Acting Chief, Division of Policy and Programs, WSFR Program, Washington, DC

11:00 – 11:45 am Updates from USFWS/WSFR Regional Program Chief – Mr. Mike Piccirilli, WSFR Chief, Southeast Region/Atlanta, Georgia

11:45 - 1:15 pm Lunch (on your own)

1:15 - 2:15 pm Recurrent and Emerging Audit Issues – Mr. Charles Hansen, Auditor, Office of Inspector General (OIG), Washington, DC

2:15 - 2:45 pm Update on Lands Chapters and Other Land-Related Issues-Alex Coley, WSFR-Southeast Region

2:45 – 3:00 pm Break

3:00 – 4:00 pm Recurrent and Emerging Audit Issue: Sub award vs Contract Determination and Requirements – Charles Hansen

4:00 – 4:30 pm Test Your Knowledge: Subaward vs Contract Scenarios – Alex Oster, Grants Management Specialist (Instructor) USFWS, WSFR Program, Division of Financial Assistance Support and Oversight, Training Branch, Shepherdstown, West Virginia

4:30 – 5:30 pm State Coordinators' Session – Mike Piccirilli, WSFR Chief, Southeast Region

6:00 pm Dinner on your own

7:00 pm Networking Room -Surfside Room

Wednesday – March 20-Atlantic Ballroom

6:30 am Coffee/Tea Service

8:00 – 8:15 am Welcome and Housekeeping –Wilfredo Falcón, WSFR Program Coordinator, PR-DNER

8:15 - 9:45 am Wildlife TRACS Enhancement Status – Christy Hightower, Ryan Oster and Matthew Weimer Assistant Chief, Wildlife Management Division, Arkansas Game and Fish Commission, Little Rock, AR

9:45 - 10:00 am Break

10:00 - 11:00 am WSFR TRAINING MODULE Use and Disposition of Program Income, Including Cost-Share/Match – Mr. Ryan Oster

11:00 – 11:30 am R3 Initiatives and Issues-Randy Spencer, WSFR/FWS, Atlanta, Georgia

11:30 – 1:00 pm Lunch (on your own)

1:00 - 3:00 pm WSFR Coordinators' Break Out Sessions

WR/SWG/SFR Joint Session 1:00 – 1:45 pm Atlantic Ballroom

Leader: WSFR Wildlife Restoration and Sport Fish Restoration Branches– Diana Swan-Pinion and Marilyn Lewal

- Compliance – Section 7 – FWS/NMFS, Section 106, NEPA
- Program Income Recap
- Updates on Competitive Grant Programs – SWG, Coastal Wetlands Grants, BIG, CVA
- Eligible Costs
- Q's & A's

Fiscal Session 1:00 p.m. – 3:00 p.m. Leeward room

Leader: WSFR Fiscal Branch - Sherry Morris, Branch Chief

- Sub-Award Reporting - Entering PFATA required data for Sub-Recipients into FSRS - Demonstration
- ASAP - Grant Liquidation Time Line / Correcting Federal Cash Overdraws
- SF-425 - Recipient Share/ Program Income/ Indirect Costs
- Indirect Costs - Annual Submission Schedule / Temporary Rate? / Applying in Multi-Year Grant
- Boating Access Status Update and Terminology (Set Aside versus Obligation)
- Communications between Fiscal and Program Staff
- Rebanking Funds – Impact on Safety Margins and or Next /Grant Application
- PI Method and Cash Draws
- Budgets and Indirect Costs in' Applications'

WR/SWG Session 1:45 – 3:00 p.m. Atlantic Ballroom

Leader: WSFR Wildlife Restoration Branch – Diana Swan-Pinion, Branch Chief

- SWG/DWSFN Updates and Changes
- F.R FY19 Apportionment and New WR Topics & Issues
- Hunter Education: Updates and Topics
- Grants Management Kitchen Sink
- Q&A Session & FAC Meeting Presentations Follow-Up

SFR Session 1:45 – 3:00 p.m. Sunmrit room

Leader: WSFR Sport Fish Restoration Branch – Marilyn Lewal, Branch Chief

- Florida Largemouth Bass and other State activities – Stassey Whichel, FL-FWCC
- States Organization for Boating Access (SOBA) Update – [Lonnie Reid, GA-DNR]
- Freshwater/Marine Split; Boating Access Planning for a new 5-year cycle, and others – WSFR Fiscal Branch
- Other SFR Program Issues; Q&A

3:30 pm Depart Hotel for Planned Activity

4:30 pm Tour of Castillo de San Cristobal, Old San Juan

6:15 pm Dinner at Bahaja Barracks, Old San Juan

9:00 pm Depart for Hotel

9:00 pm Networking Room -Surfside Room

Thursday – March 21 Atlantic Ballroom

6:30 am Coffee/Tea Service

8:00 – 8:15 am Welcome and Housekeeping – Wilfredo Falcón, WSFR Program Coordinator, PR-DNER

8:15 – 9:15 am WSFR Successes in Puerto Rico-Dominica Delgado, Acting Director, Bureau of Research and Conservation on Habitats and Biodiversity, PR-DNER

9:15 – 9:45 am Breakout Session Recaps, Wildlife SWG Sessions, SFR Sessions, Fiscal Sessions – Diana Swan, Marilyn Lewal and Sherry Morris

9:45 – 10:00 am Break

10:00 – 11:00 am WSFR TRAINING MODULE Understanding Safety Margins: Protecting Your Grant Funds, Sherry Morris, Fiscal Branch Chief, WSFR, Southeast Region

11:00 – 11:30 am FAC Working Group Report - Matt Thomas, Chief Fisheries, Wildlife Resources Division, Georgia Department of Natural Resources and WSFR Working Group

11:30 – 1:00 pm Lunch (on your own)

1:00 – 1:45 pm WSFR Program's Grant Award Processes/ Best Practices – Marilyn Lewal, Diana Swan-Pinion, and Sherry Martin

1:45 – 2:30 pm WSFR TRAINING MODULE Requirements for Budget Information in Grant Application Packages-Sherry Martin, LeAnne Bonner, and Ryan Oster

2:30 – 2:45 pm Break

2:45 – 3:30 pm Meeting Wrap-Up and Final Q&As-Mike Piccirilli, WSFR Program Chief

3:30 – 4:30 pm Planning for 2020 WSFR Coordinators Meeting: PRDNER, SCDNR, and WSFR/ Southeast Region

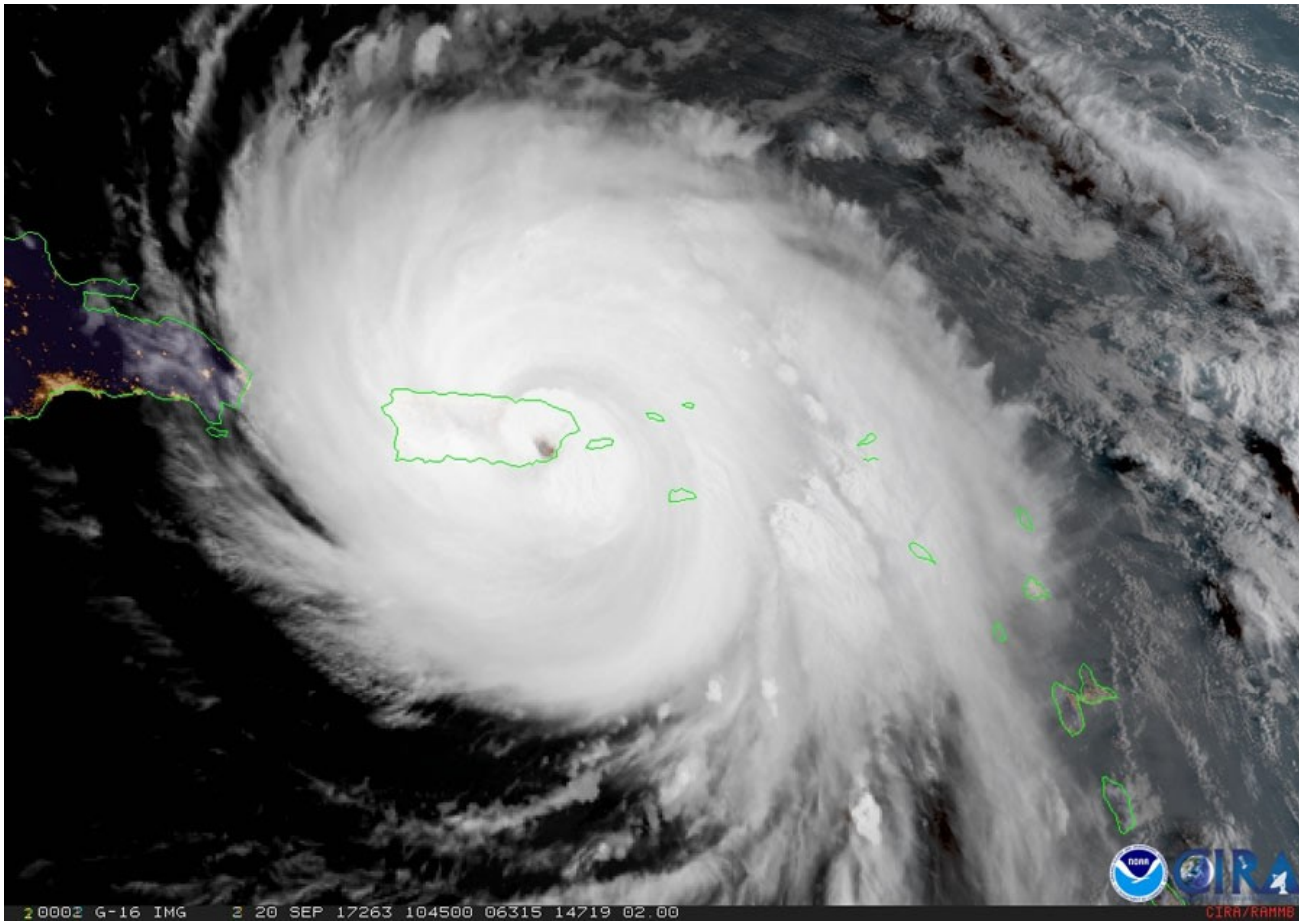
5:00 pm Dinner on your own

7:00 pm Networking Room -Surfside Room

48th Wildlife and Sport Fish Restoration (WSFR) Program Coordinators Meeting Southeast Region

Sponsors:

March 18-21, 2019 San Juan, Puerto Rico



Ricardo López Ortiz, MS, PhD
Acting Director, Commercial Fisheries Research & Management Division, DNER

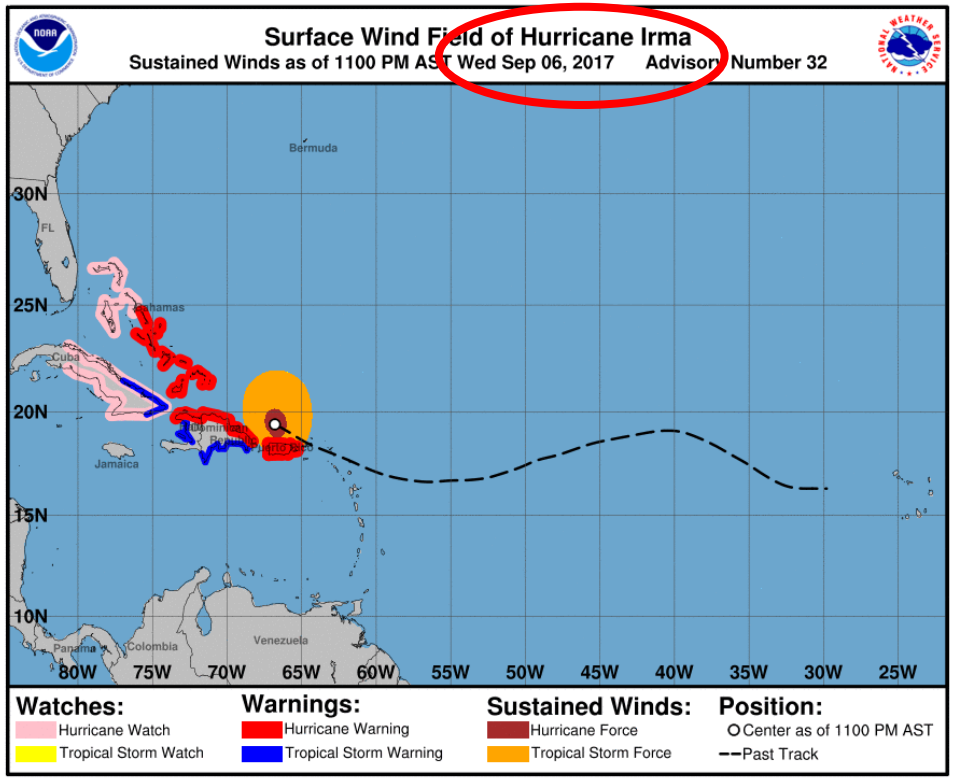
http://drna.pr.gov/, 787-833-2025, rlopez@drna.pr.gov
P.O. Box 3665 Marina Station, Mayagüez, PR 00680

Impacts of Hurricanes Maria and Irma on Fish and Wildlife Resources of Puerto Rico

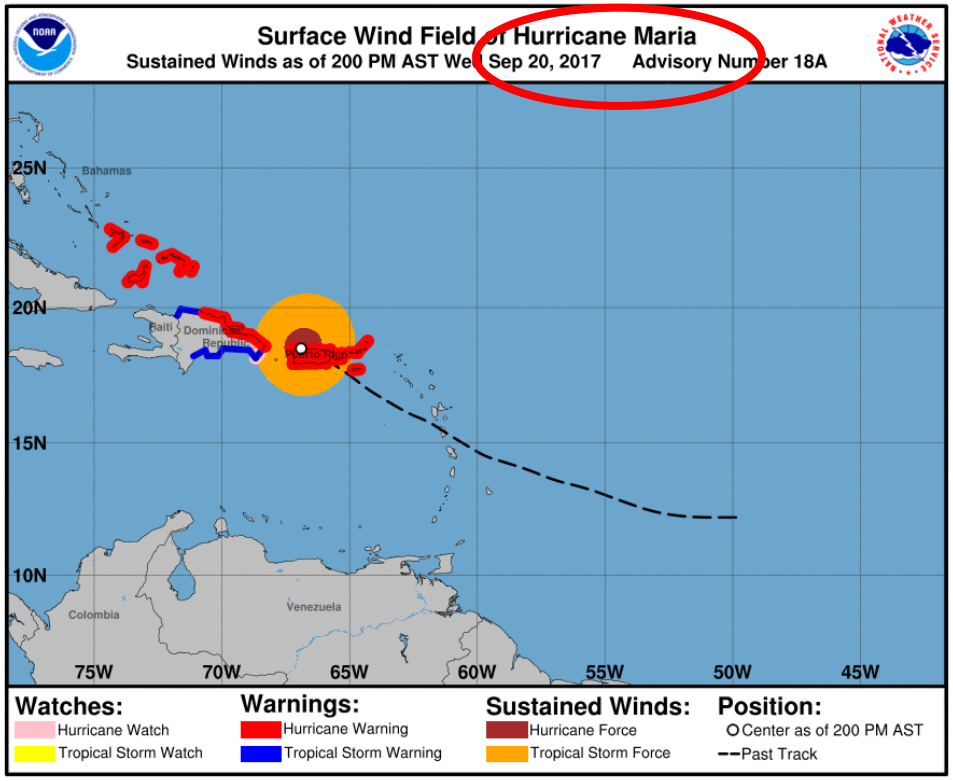
48th Wildlife and Sport Fish Restoration (WSFR) Program Coordinators Meeting Southeast Region March 18–21, 2019, San Juan, Puerto Rico

- On September 6, 2017, Hurricane Irma passed northeast of Puerto Rico and caused damage to parts of the east and north coasts of the island.
- Two weeks later, on September 20, 2017, the eye of Hurricane Maria passed through Puerto Rico, affecting the entire island and causing severe damage in most areas.

https://www.nhc.noaa.gov/archive/2017/IRMA_graphics.php



https://www.nhc.noaa.gov/archive/2017/MARIA_graphics.php



Impacts of Hurricanes Maria and Irma on Fish and Wildlife Resources of Puerto Rico

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Six case studies:

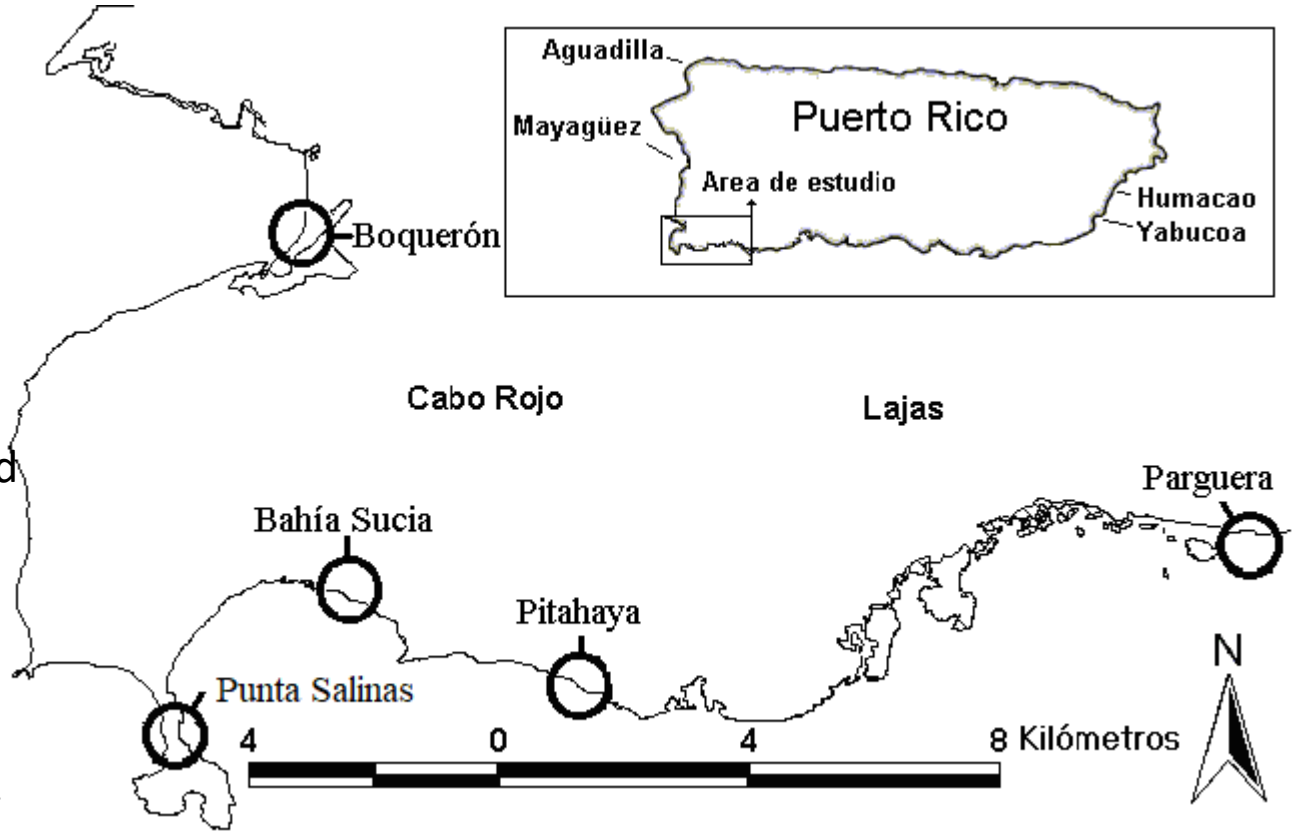
The Yellow-shouldered blackbird in southwest PR
The Yellow-shouldered blackbird in Salinas, PR
The Puerto Rican Parrot
The migratory and native birds in Guánica
The coral reefs
The seagrasses in Culebra Island

Impacts of Hurricanes Maria and Irma on Fish and Wildlife Resources of Puerto Rico

48th Wildlife and Sport Fish Restoration (WSFR) Program Coordinators Meeting Southeast Region March 18–21, 2019, San Juan, Puerto Rico

The Yellow-shouldered blackbird in southwest PR

All the information was provided by Katsí Ramos, Project Leader of the Yellow-shouldered blackbird Recovery Project, and from a previous work presented in the 15th Regional Meeting, Society for the Conservation and Study of Caribbean Birds, Guadeloupe, 1-5 August 2005: "Immediate Effects of Climatic Events in the Population Recruitment of the Yellow-shouldered Blackbird, *Agelaius xanthomus*. Ricardo López-Ortiz, Katsí R. Ramos-Álvarez, Roseanne Medina-Miranda and Marelisa T. Rivera Ricardo Lopez"



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The Yellow-shouldered blackbird in southwest PR

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The Yellow-shouldered blackbird in southwest PR

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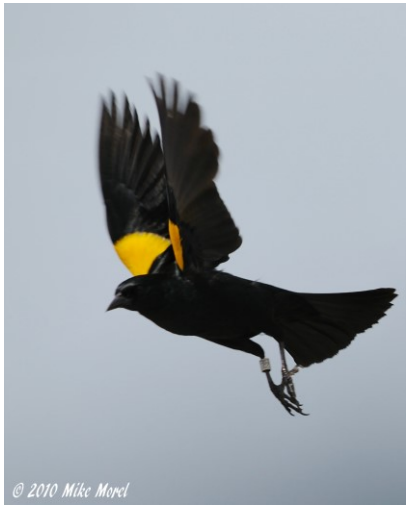
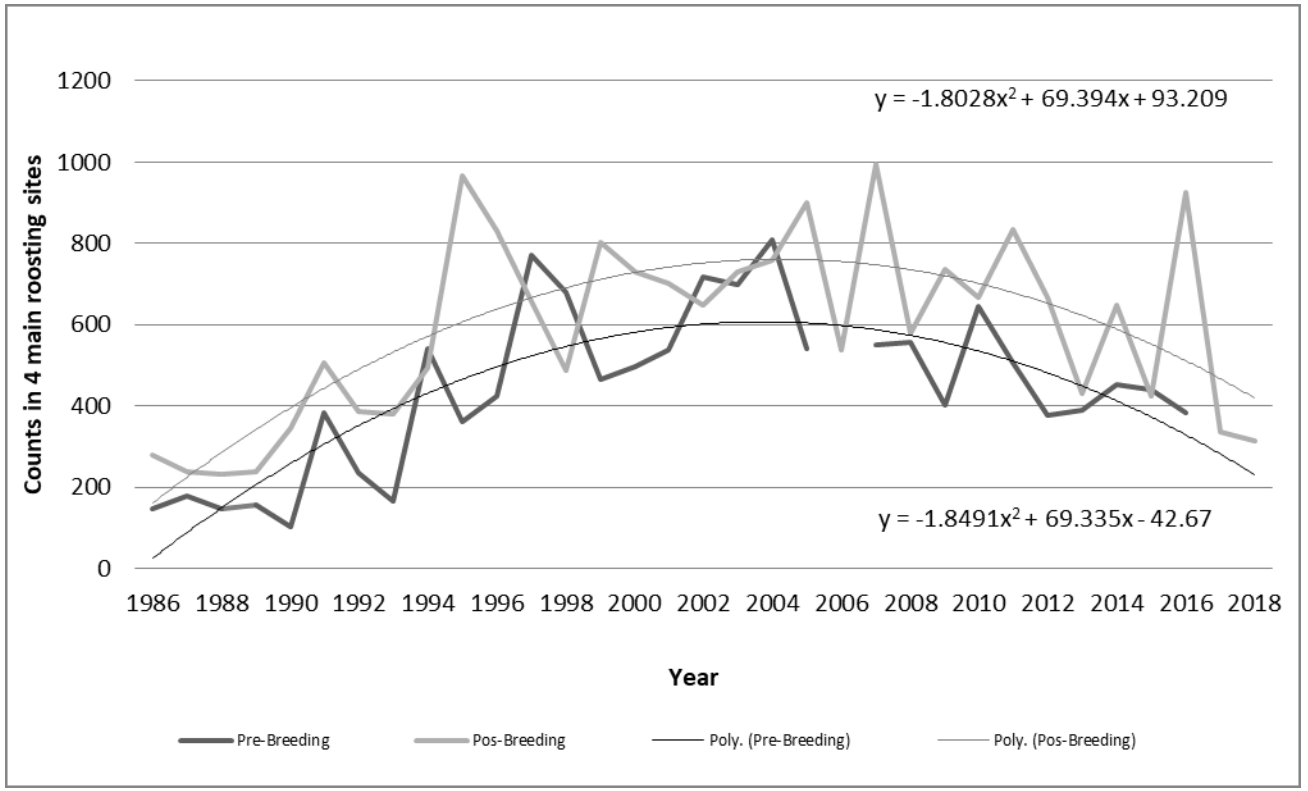
The Yellow-shouldered blackbird in southwest PR

Surveys (counts) of YSBLs before and after each breeding seasons.

Similar trends for both surveys.





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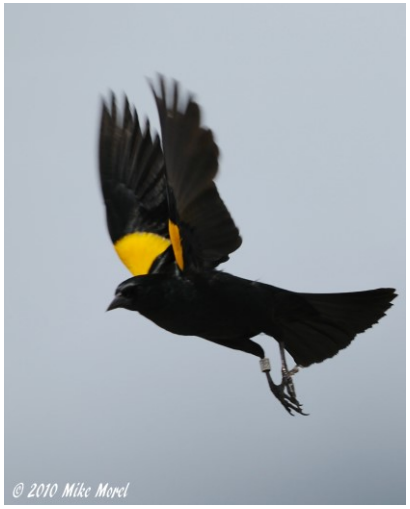
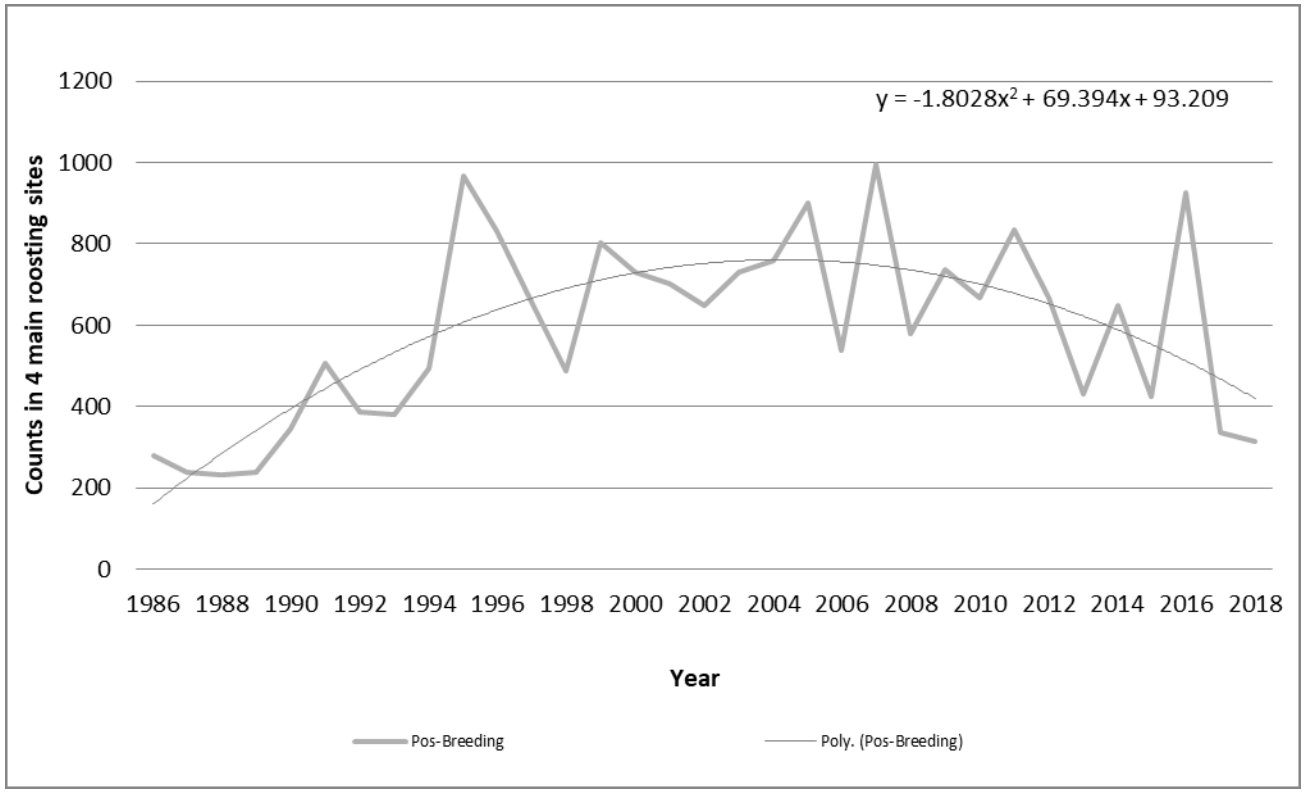
The Yellow-shouldered blackbird in southwest PR

Complete set of surveys (counts) of YSBLs after each breeding seasons.

Inflection point to a decreasing population started near 2004.





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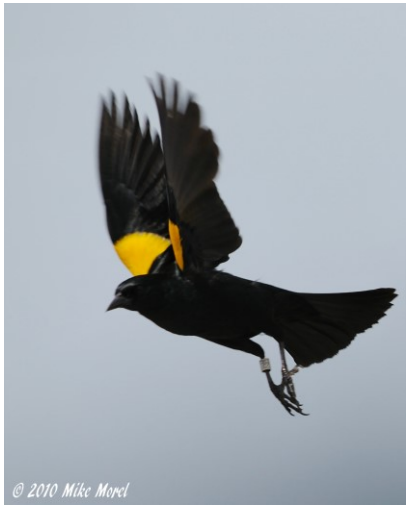
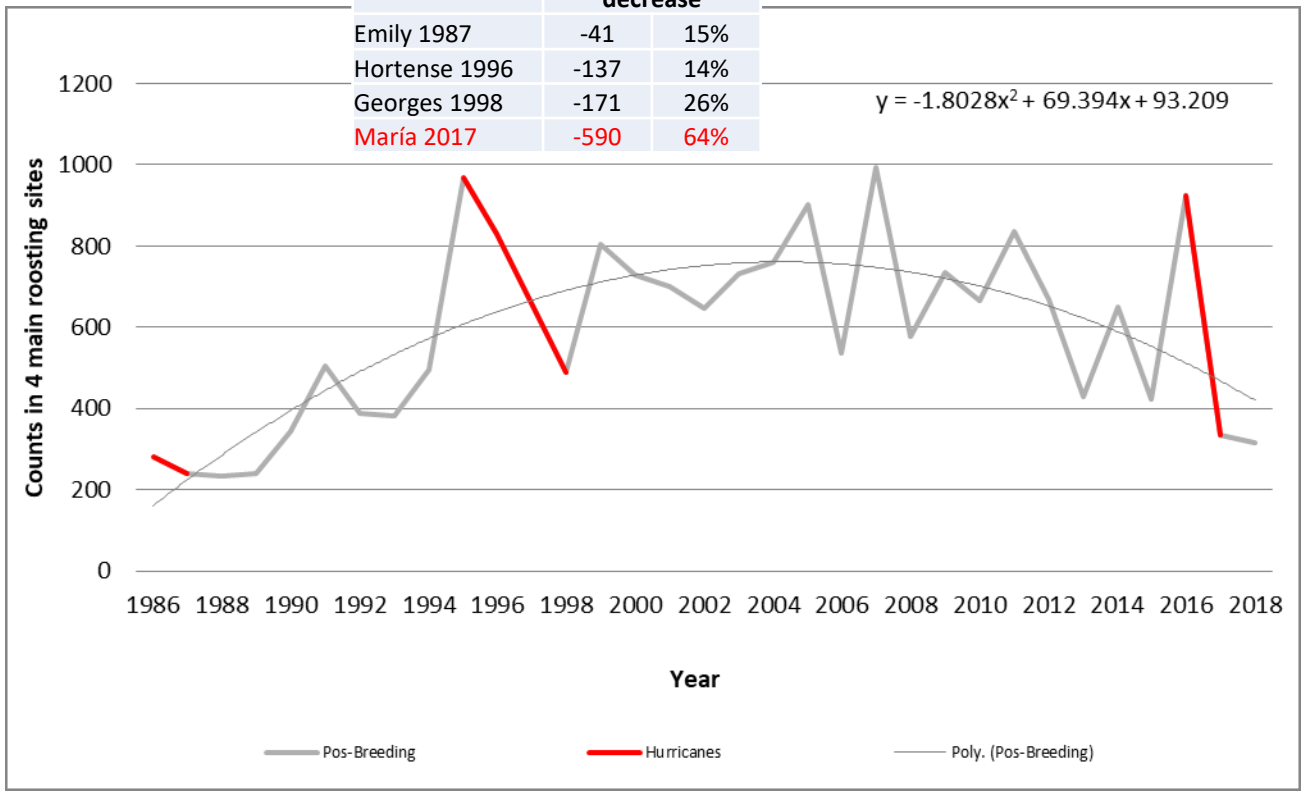
The Yellow-shouldered blackbird in southwest PR

Hurricanes that passed through the southwest coincided with the strongest population reductions.

Within the study period, Hurricane Maria was the most devastating.



Hurricane	Population decrease	
Emily 1987	-41	15%
Hortense 1996	-137	14%
Georges 1998	-171	26%
María 2017	-590	64%



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The Yellow-shouldered blackbird in southwest PR

In the picture frome left to right, Brian Ramos, Katsí Ramos (Project Leader), Roseanne Medina, Alana Rodríguez, Ashley Velázquez, Nashaly Cortés, “yo” y Jean P. González.

Not in the picture: Miguel Román, Rubén Oneill, Arnaldo Falcón, Rossana Vidal, Ramón Luis Rivera, José Sustache, Carlos Pacheco, Jan P Segarra, Marielle Peschiera, Ed López, Eliacin Agosto, Nahiomi Ramos, Hansel Montalvo, Yamaris Hernández and Jian Sayas.

Impacts of Hurricanes Maria and Irma on Fish and Wildlife Resources of Puerto Rico

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The Yellow-shouldered blackbird in Salinas, PR

The last count in Salinas was in April 2014 with a total of 18 individuals, and the highest count was in November 2005 with 113 individuals.

Impacts of Hurricanes Maria and Irma on Fish and Wildlife Resources of Puerto Rico

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The Yellow-shouldered blackbird in Salinas, PR

In the afternoon of December 27, 2018, 27 YSBLs were counted. Hundreds of skulls were counted. The Engineer Luis H. Estremera and other employees reported that the day after hurricane María, the cyclone fences seems painted in black color, due to the high amount of blackbirds embedded on it. The smell of death and scavengers were perceived in their first visit.

Impacts of Hurricanes Maria and Irma on Fish and Wildlife Resources of Puerto Rico

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The Puerto Rican Parrot

Picture from Ricardo Valentín

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The Puerto Rican Parrot

Figure from Dr. Thomas White Report December 13, 2018

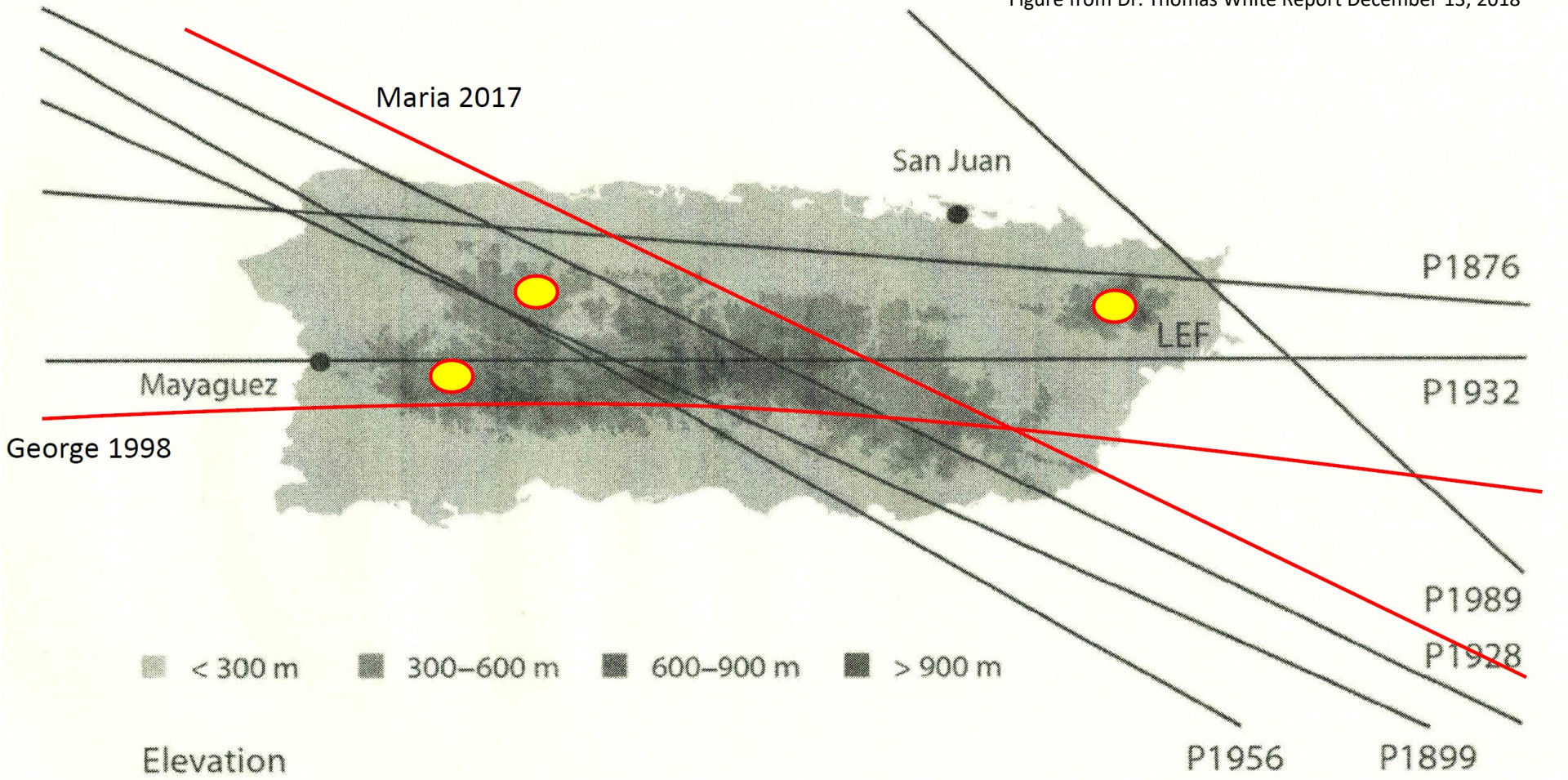

FIG. 1. Tracks of six hurricanes that caused F3 damage on the Fujita scale (see Table 1) during the period 1851–1997. LEF is the Luquillo Experimental Forest.

Impacts of Hurricanes Maria and Irma on Fish and Wildlife Resources of Puerto Rico

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The Puerto Rican Parrot

Wild population sites	Hurricane María		Aftermath and Dr. Thomas White Report (TWR) December 13, 2018	Hurricanes' death toll
	Just before	Just after		
El Yunque Rain Forest	~56	~5	April 2018 and November 2018, three and two parrots, respectively. TWR =1	~54 (96%)
Rio Abajo State Forest,	~130	~107	February 2018, 74 parrots	~56 (43%)
Captive population sites				
Iguaca Aviary	196	189	Seven deaths between September 23, 2016 and October 3, 2017. 43 were transferred from Maricao Aviary. TWR = 243	7 (3%)
José L. Vivaldi Aviary	174	174	TWR = 207	0
TOTAL	**~556**		Near 526 parrots by December 2018	**~117 (32%)**

Habitat pictures and comparison from TWR (2018)

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The Puerto Rican Parrot

Data provided by Tanya Martínez, Roseanne Medina and Dr. Thomas White

Surveys after Irma and María performed by: Damaris Román, Gustavo Olivieri, Roseanne, Jesús Ríos and Jong P. Banchs in Maricao; Ricardo Valentín and Brian Ramos in Rio Abajo; and Thomas and Arelys Johnson in El Yunque.

Roseanne and Damaris

Alberto, Brian, Jong P., Ricardo, Magaly, Tanya, Gustavo y Jesús

Arelys and Thomas

Impacts of Hurricanes Maria and Irma on Fish and Wildlife Resources of Puerto Rico

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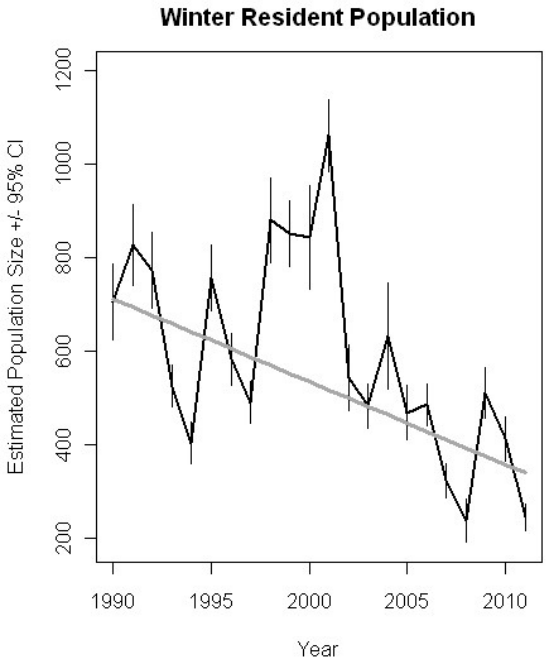
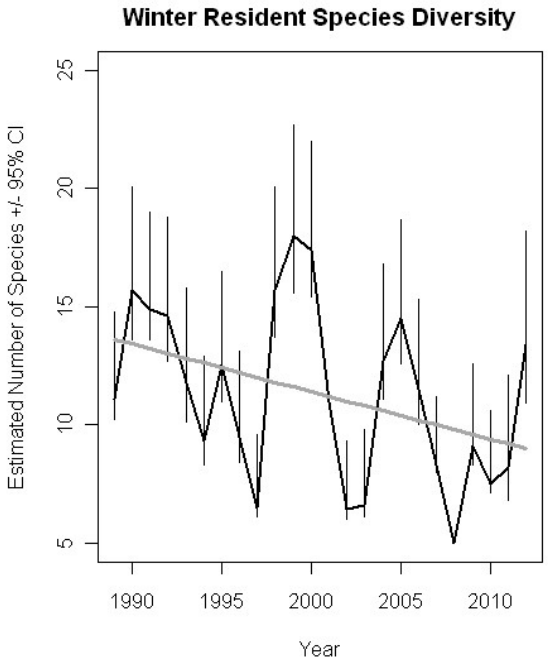
The migratory and native birds in Guánica





Scientists have been monitoring bird populations in the Guánica Dry Forest, southwest Puerto Rico since 1972, making it the longest continual monitoring study in the Neotropics. Mist-nets to mark and recapture birds are set during February of every year. This year, US federal government was shutdown in February. A call was made by Dr. Wayne Arendt and Miguel Canals asking for DNER to urgently coordinate with **Dr. Judith Toms** a bird banders' recruitment mission to avoid missing the 2018 monitoring window of opportunity; just the second winter after Hurricane María. The mission was successfully accomplished.

Faaborg, J., W.J. Arendt, J.D. Toms, K. Dugger, W.A. Cox and M. Canals Mora. 2013. Long-term decline of a winter resident bird community in Puerto Rico. Biodiversity and Conservation 22:63-75.

https://judithtoms.wordpress.com/

Impacts of Hurricanes Maria and Irma on Fish and Wildlife Resources of Puerto Rico

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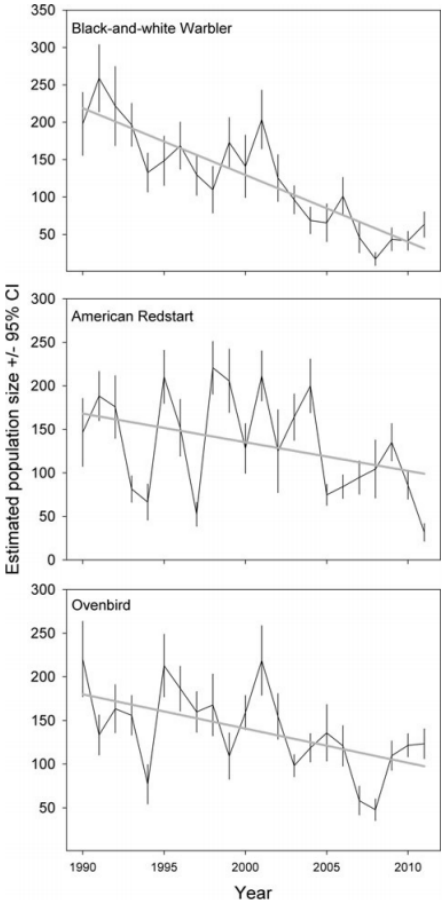
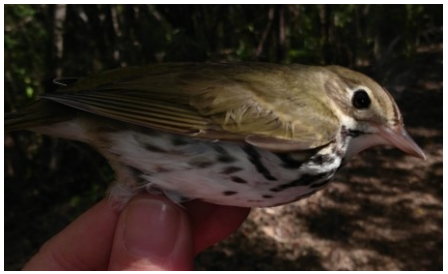
The migratory and native birds in Guánica

Each netline consists of 16 nets (each 12 m long), strung end-to-end along a trail. Nets are open from dawn to dusk for three consecutive days, so the monitoring effort is constant from year-to-year. When we capture a bird, we put an individually-numbered band on its leg, which allows us to track that bird over time. We also take a few basic measurements to assess the relative body condition of each individual. The bird is then released unharmed after only a few minutes to carry on its daily activities.





Declining population estimates for the three most common species captured in the study, computed using MARK. Error bars are 95 % confidence intervals

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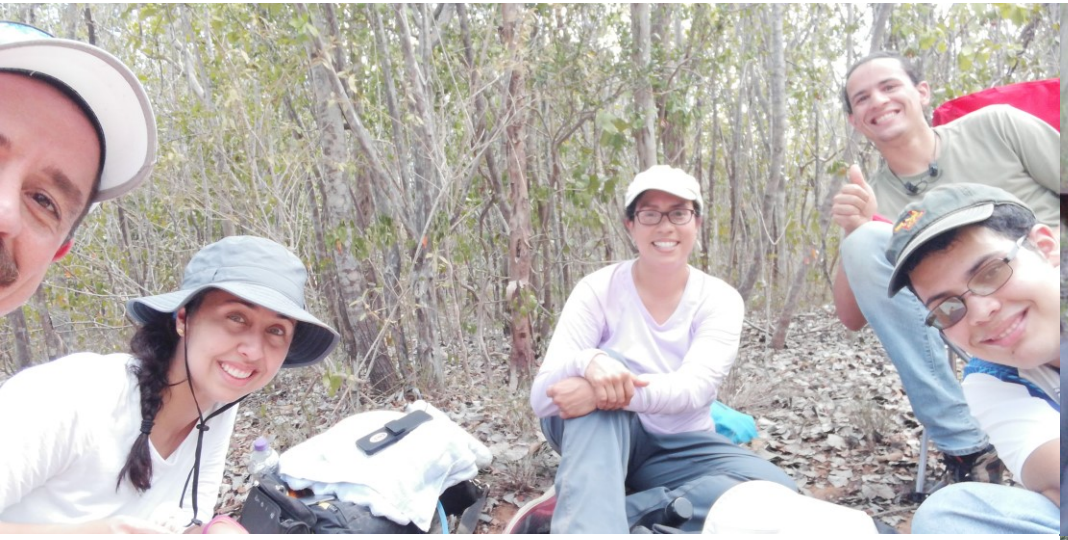
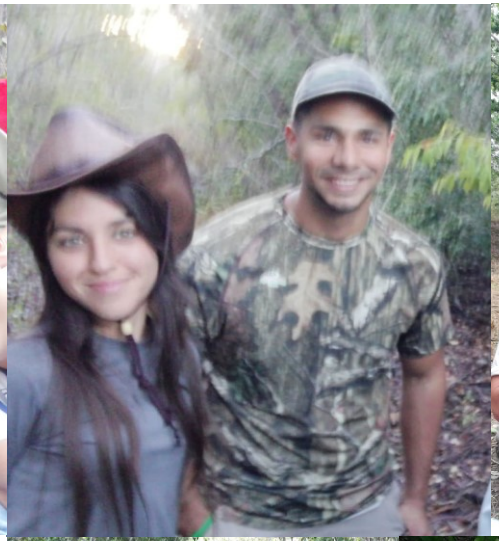
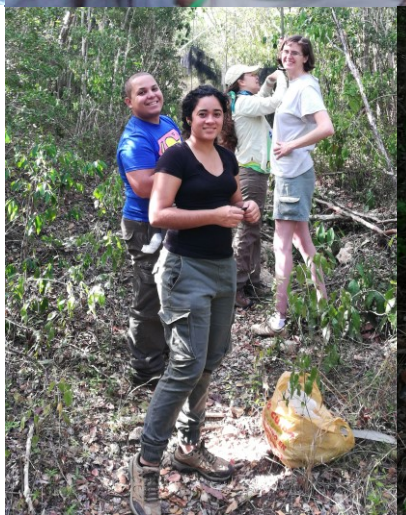
The migratory and native birds in Guánica





After Hurricane María, the captures increased the Guánica State Forest (GSF). One possibility that will be studied by Judith, is that the quality of the habitat in the GSF remained almost untouched, but the quality in the northern forests was reduce by the Hurricane.



The bird banders: Katsí, Ivellise, Guillermo Plaza, Arnaldo Falcón, Ricardo, Cristina Olan, Jerry Agosto, Judith, Mara Feliciano, Ed López, Eliacim Agosto, Jean, Nashaly. Nicole Gutierrez y José Orozco

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The coral reefs

DNER's Coral Reef Conservation and Management Program has been an ongoing effort to conserve, manage, and protect coral reef ecosystems. The Program has monitored Puerto Rico's coral reefs since 1999, in order to collect important data that can be used to support management of coral reefs and associated ecosystems.

http://drna.pr.gov/coralpr/

Jorge R. Garcia-Sais, Stacey M. Williams, Jorge Sabater-Clavell, Milton Carlo

Reef Research, Inc.
P. O. Box 178
Boquerón, PR 00622

goingdeep49@gmail.com

December 2018

Garcia-Sais, J.R., Williams, S.M., Sabater-Clavell, J., and Carlo, M. for the Department of Natural and Environmental Resources (DNER). Puerto Rico Coral Reef Long-term Monitoring Program: 2017-2018 Survey. DNER's Coral Reef Conservation and Management Program

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The coral reefs

A general decline of live hard coral (ex. Elkhorn and Brain corals) cover and octocoral (ex. soft corals and gorgonians) densities was detected and appear to be directly related to mechanical breakage of colonies due to extreme surge and abrasion effects caused by extreme waves such as those during Hurricanes Irma and Maria.

Garcia-Sais, J.R., Williams, S.M., Sabater-Clavell, J., and Carlo, M. for the Department of Natural and Environmental Resources (DNER). Puerto Rico Coral Reef Long-term Monitoring Program: 2017-2018 Survey. DNER's Coral Reef Conservation and Management Program

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The coral reefs

Increments of reef substrate cover by brown fleshy algae and cyanobacteria, probably due to nutrient enrichment and increased availability of reef primary substrates associated extreme events of wave action, as those caused by the hurricanes. Reef primary substrates were produced by mortality and mechanical breakage of coral colonies, whereas nutrient enrichment may have occurred via river loading, laminar watershed rainfall runoff, and upwelling currents.

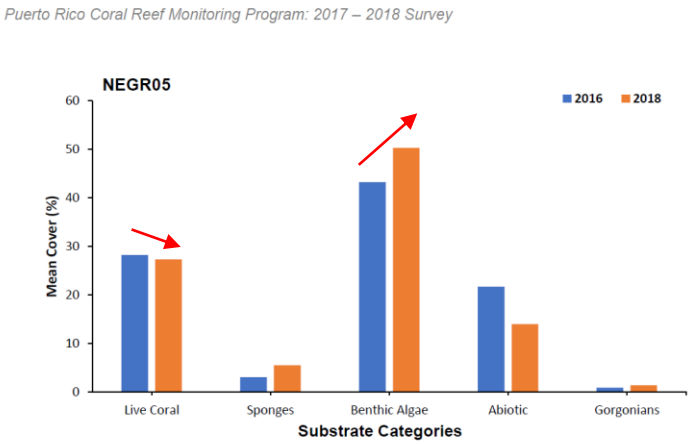

Figure 18. NEGR05. Annual variations (2016 -18) of mean substrate cover by sessile-benthic categories at Negro Reef 5m, Cabo Rojo

Garcia-Sais, J.R., Williams, S.M., Sabater-Clavell, J., and Carlo, M. for the Department of Natural and Environmental Resources (DNER). Puerto Rico Coral Reef Long-term Monitoring Program: 2017-2018 Survey. DNER's Coral Reef Conservation and Management Program

Impacts of Hurricanes Maria and Irma on Fish and Wildlife Resources of Puerto Rico

48th Wildlife and Sport Fish Restoration (WSFR) Program Coordinators Meeting Southeast Region March 18–21, 2019, San Juan, Puerto Rico

The coral reefs

A declining pattern of fish density and species richness was found and directly related to the inability of small fish individuals to withstand the extreme surge and abrasion effects caused by hurricanes.

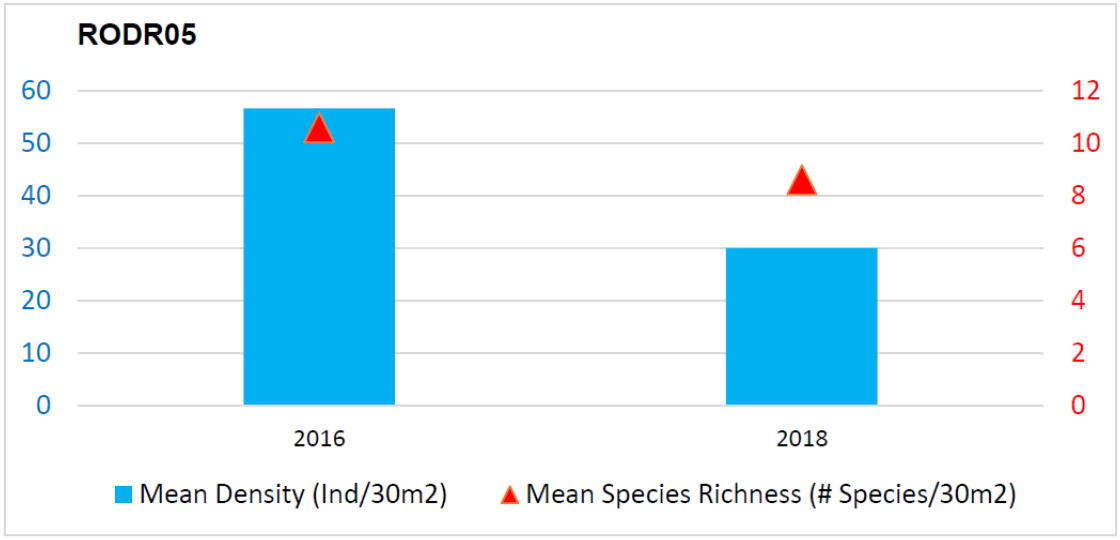

Figure 11. Monitoring trends (2016 – 18) of mean fish density and species richness within 10 x 3m belt-transects at Bajo Rodriguez Reef 5m, Mayaguez

Garcia-Sais, J.R., Williams, S.M., Sabater-Clavell, J., and Carlo, M. for the Department of Natural and Environmental Resources (DNER). Puerto Rico Coral Reef Long-term Monitoring Program: 2017-2018 Survey. DNER's Coral Reef Conservation and Management Program

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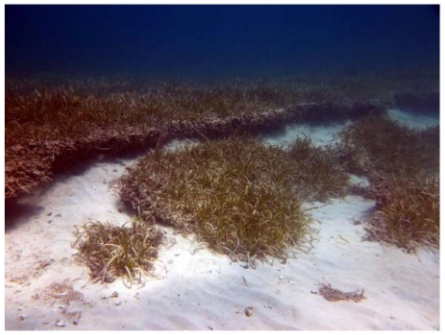
The seagrasses in Culebra Island

Seagrass habitats are important feeding habitat for endangered species al Green turtles and commercial species as Queen Conch.



SEAGRASS RAPID ASSESSMENT OF HURRICANE MARIA IMPACTS – NORTHEAST RESERVES SYSTEM HABITAT FOCUS AREA (NER-HFA), CULEBRA ISLAND, PUERTO RICO

FINAL REPORT SUBMITTED TO:

Department of Homeland Security, Federal Emergency Management Agency (FEMA) and Department of Interior, Coordination of Natural and Cultural Resource Recovery

PREPARED BY:

SAM

"Sociedad Ambiente Marino"
PO Box 22158, San Juan, PR 00931
Tel.: (939) 642-7264, eMail: sam_org_pr@yahoo.com

May 10, 2018

Seagrass Rapid Assessment of Hurricane María Impacts – Northeast Reserves System Habitat Focus Area (NER-HFA), Culebra Island, Puerto Rico – Final Report. Edwin A. Hernández-Delgado*, Carlos Toledo-Hernández, Claudia P. Ruíz-Díaz, Nicolas X. Gómez-Andújar, Jeiger L. Medina-Muñiz, & Samuel E. Suleimán-Ramos. Sociedad Ambiente Marino, PO Box 22158, San Juan, PR 00931-2158
*Corresponding autor: edwin.hernandezdelgado@gmail.com

Impacts of Hurricanes Maria and Irma on Fish and Wildlife Resources of Puerto Rico

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The seagrasses in Culebra Island

Most of the documented impacts were associated to:

- Sediment bedload horizontal transport, which resulted in seagrass burial and suffocation.
- Physical disruption of the seagrass habitat matrix, creating major scars on the sea bottom, and exposing seagrass structure to further disintegration by future storm events.
- An increase in the spatial extent and localized dominance of invasive Sea vine, *Halophila stipulacea*, which has largely displaced native seagrasses at some segments. Present in 78% of the surveyed locations. Highly resistant and resilient to hurricane disturbance.

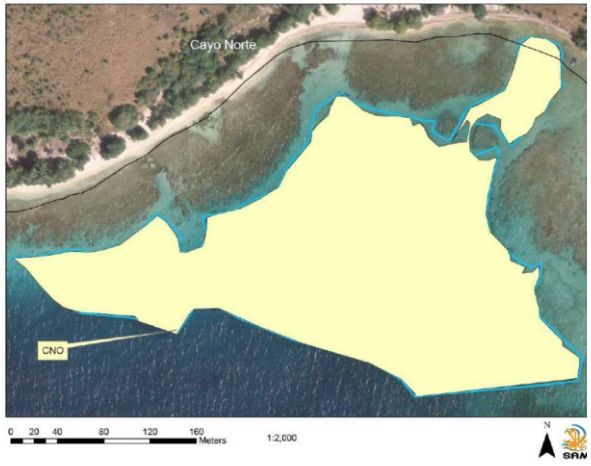


FIGURE 60. Spatial extension of seagrass habitats at CNO *before* hurricanes (2007).

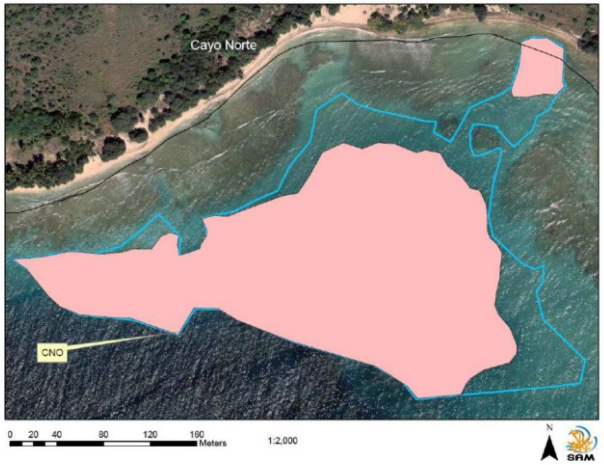
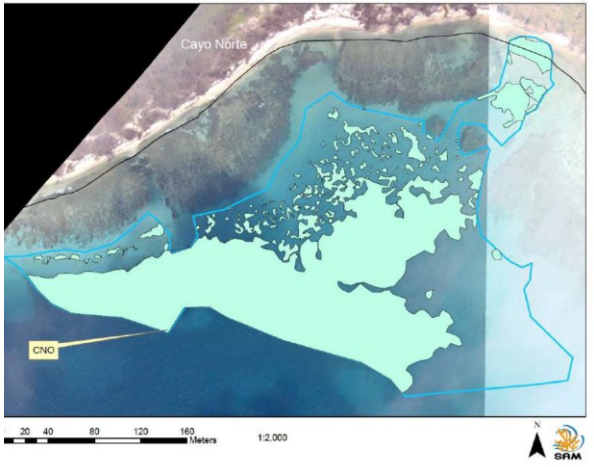


FIGURE 61. Spatial extension of seagrass habitats at CNO *before* hurricanes (2010).



IGURE 62. Spatial extension of seagrass habitats at CNO *after* hurricanes (2017).

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