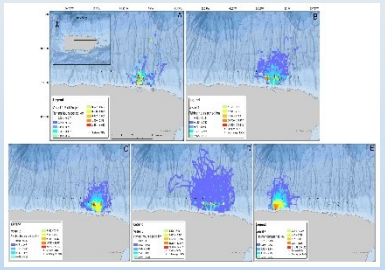
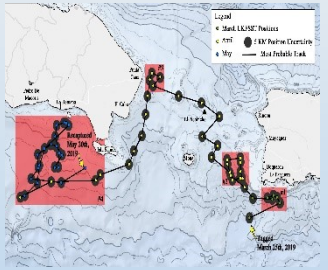
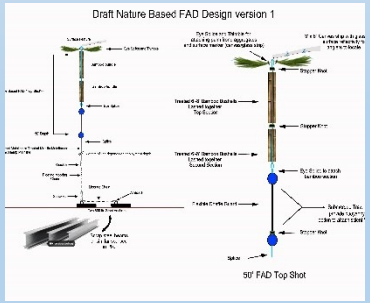
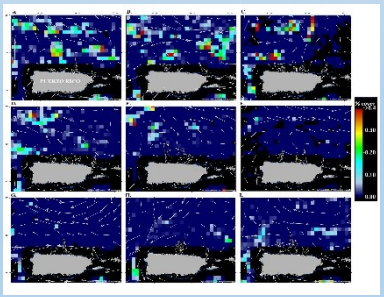
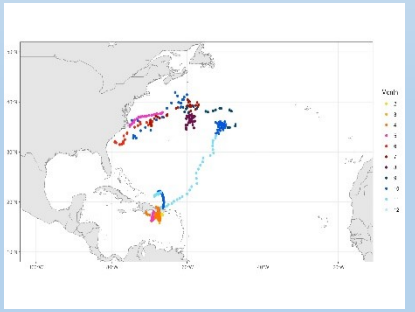
FAD Research Program







Dr. Wessley Merten

CFMC 8.12.2026

Beyond Our Shores Foundation

Newport, Rhode Island

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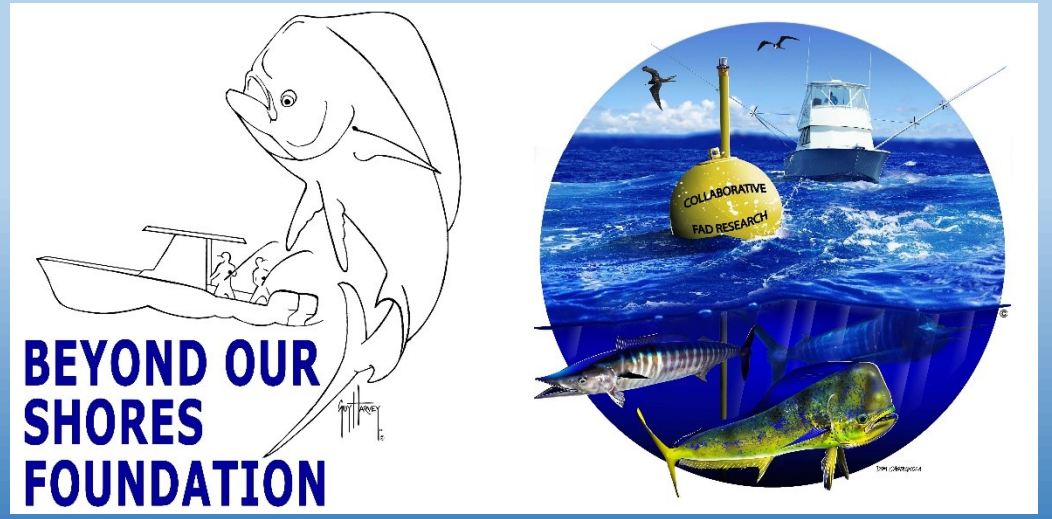
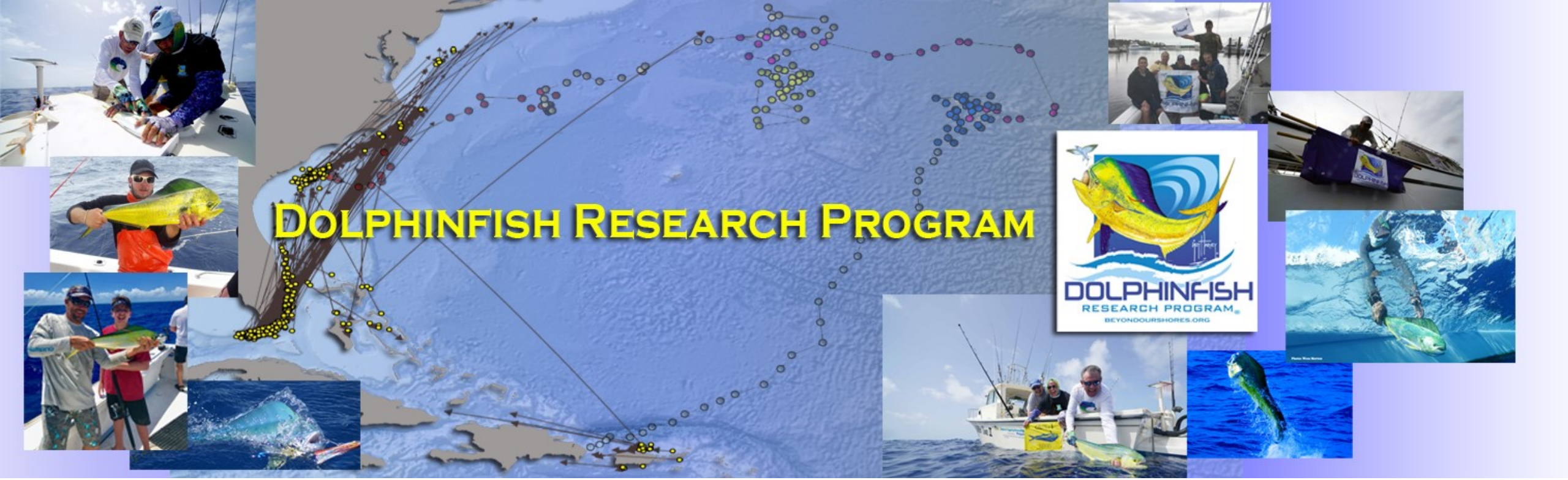
PRFADSYSTEM.ORG





- **International citizen science mark and recapture program for dolphinfish**
- **Designed to collect data on movements, life history patterns, and population dynamics**
- **Started in 2002 – Middle of 25th year**

40,663
Tagged

170 – 158 DOL, 12 WAH
Satellite tags deployed

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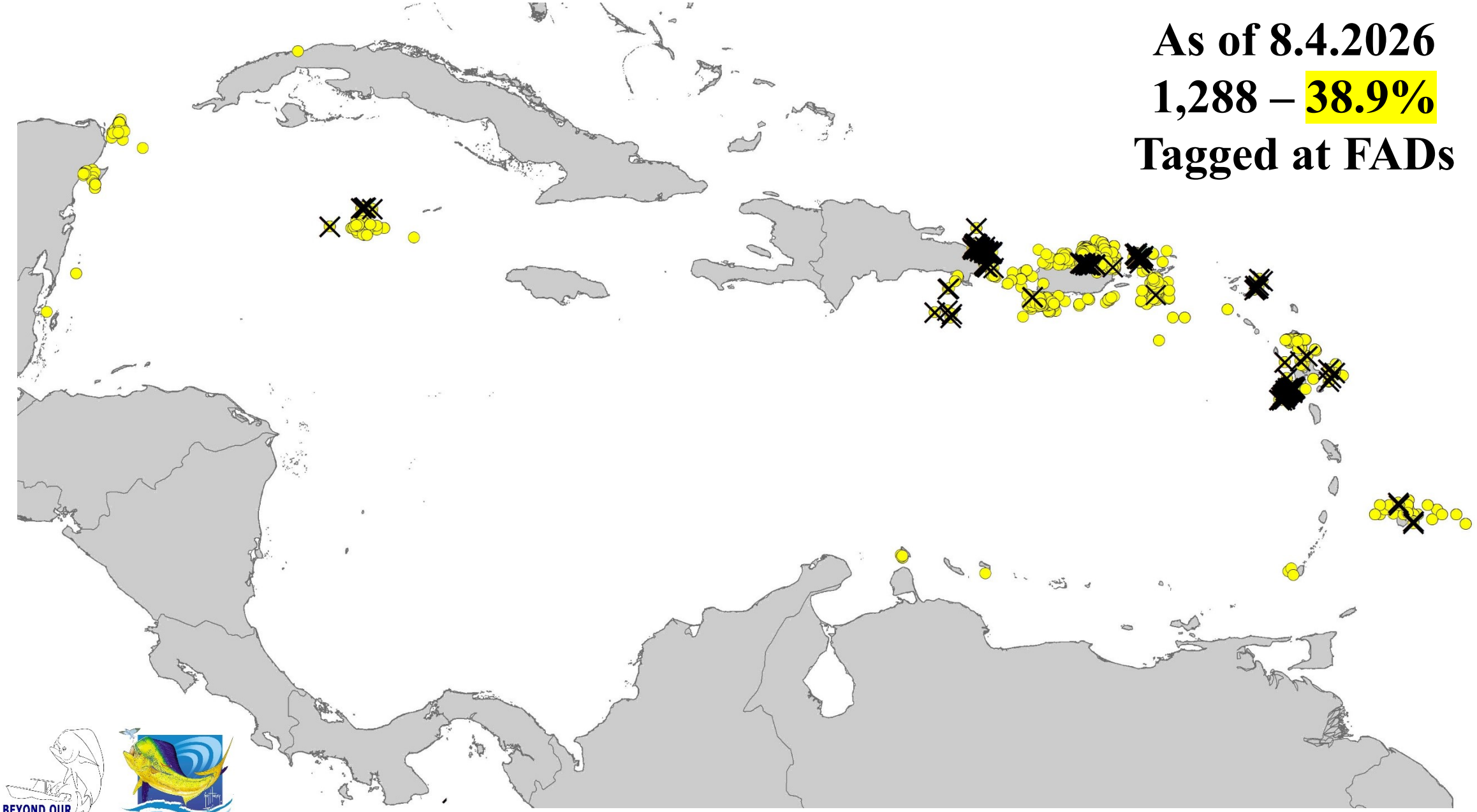
930
Recaptured

16
Publications



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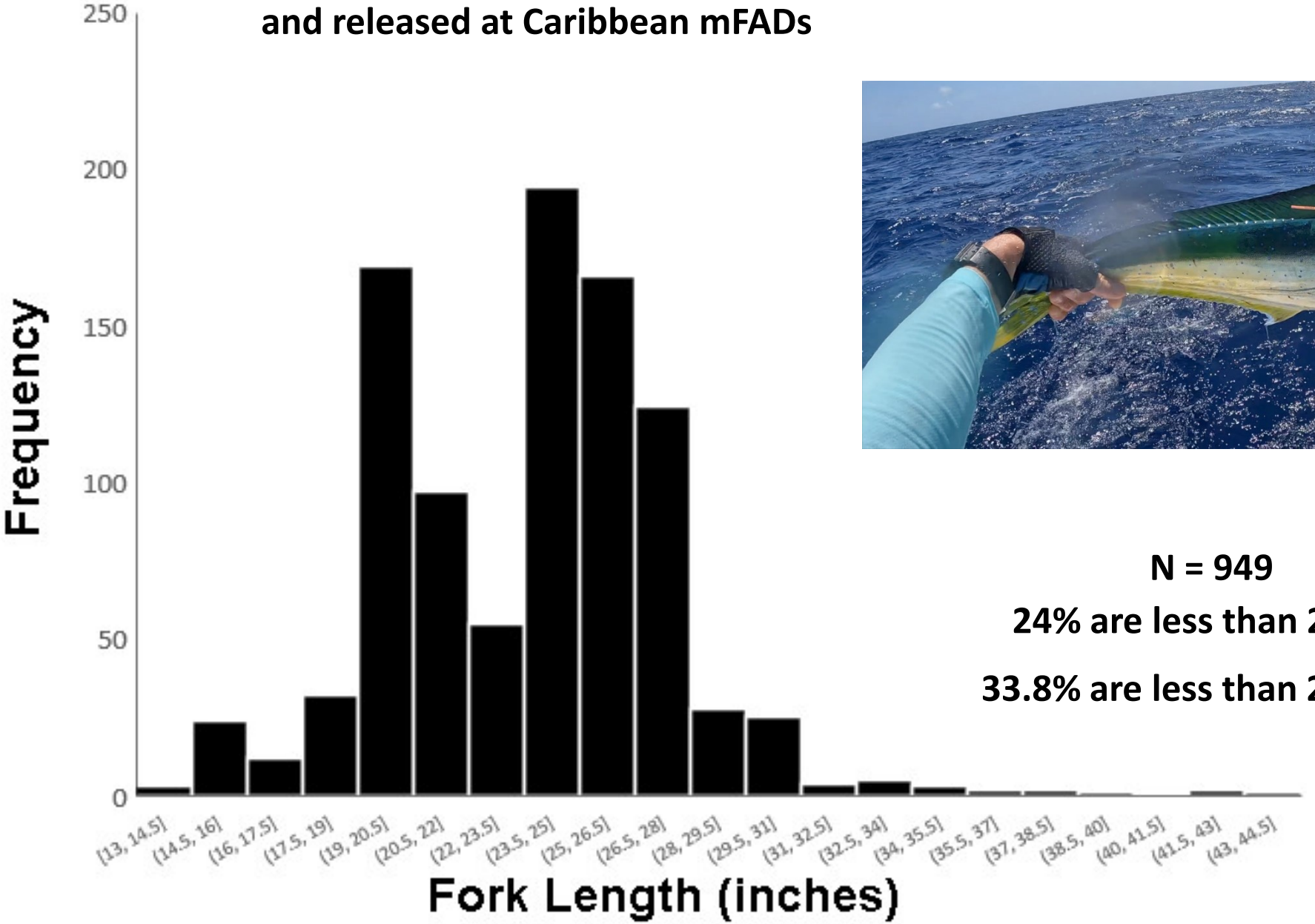
Length frequency of fish tagged and released at Caribbean mFADs



N = 949

24% are less than 20” FL

33.8% are less than 23.5” FL

History of our FAD Work in the U.S. Caribbean Sea

A.

Funded as an Independent Consultant

Funded as a Nonprofit Corporation

2014 Defended May 5 2014; Project #1

2015 Project #1 / Project #2

2016 Project #2 / Project #3

Beyond Our Shores Foundation Dolphinfish Research Program 501(c)(3) fromed 5.1.2017

2017 Project #3 / Project #4

2018 Project #4 / Project #5

2019 Project #5 / BOSF Project #6

2020 Project #6

2021 Project #6

2022

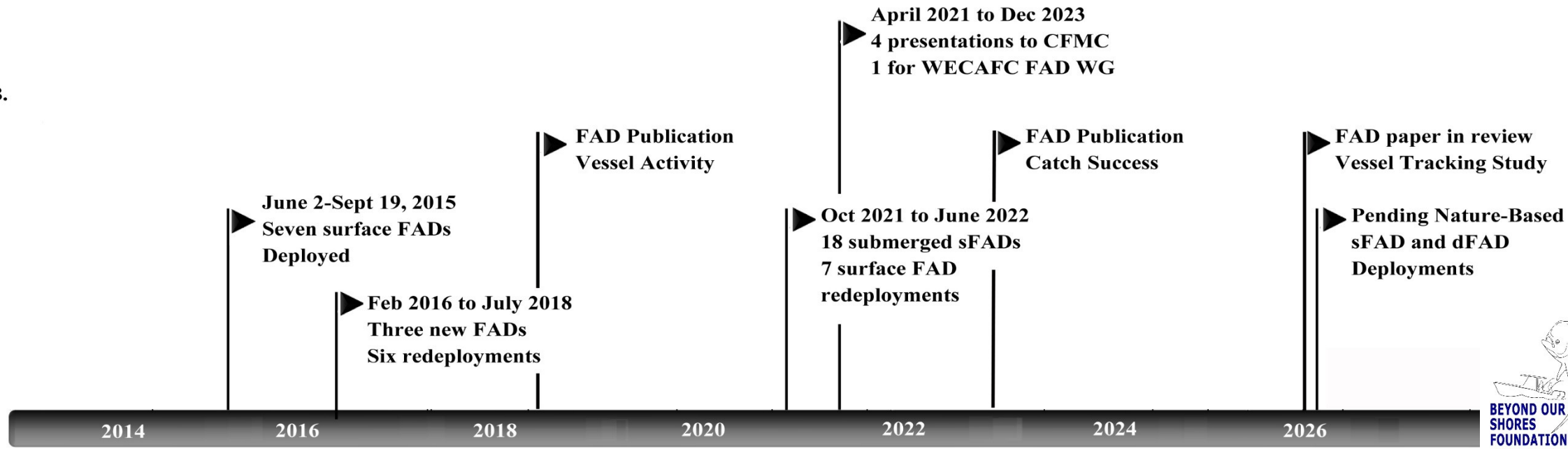
2023 Project #7

2024 Project #7

2025 Project #8

2026 Project #8

B.



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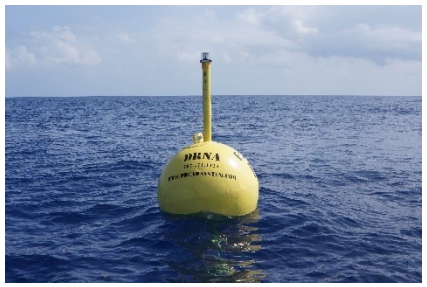
A.

Funded as an Independent Consultant

2014 **Defended May 5 2014; Project #1**

"Determining pelagic fish diversity, movements, and FAD fishery dynamics relative to a Stationary FAD system off San Juan, Puerto Rico"

B.





June 2-Sept 19, 2015
Seven surface FADs
Deployed

2014 2016 2018 2020 2022 2024 2026

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“Determining pelagic fish diversity, movements, and FAD fishery dynamics relative to a Stationary FAD system off San Juan, Puerto Rico”

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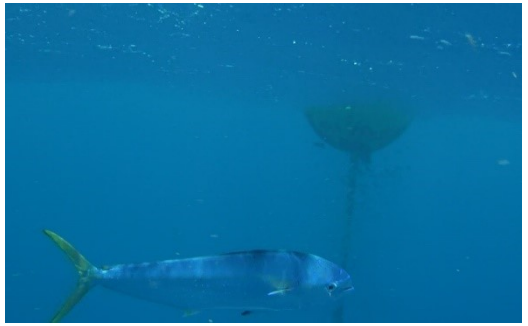

June 2-Sept 19, 2015
Seven surface FADs
Deployed

Feb 2016 to July 2018
Three new FADs
Six redeployments

2014 2016 2018 2020 2022 2024 2026

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A.

Funded as an Independent Consultant

2014 Defended May 5 2014; Project #1

2015 Project #1 / Project #2

2016 Project #2 / Project #3

Beyond Our Shores Foundation Dolphinfish Research Program 501(c)(3) fromed 5.1.2017

2017 Project #3 / Project #4

2018 Project #4 / Project #5

"Determining pelagic fish diversity, movements, and FAD fishery dynamics relative to a Stationary FAD system off San Juan, Puerto Rico"

SCIENTIA MARINA 82(2)
June 2018, 000-000, Barcelona (Spain)
ISSN-L: 0214-8358
https://doi.org/10.3989/scimar.04730.09A

Use of video monitoring to quantify spatial and temporal patterns in fishing activity across sectors at moored fish aggregating devices off Puerto Rico

Wessley Merten [1], Roberto Rivera [2], Richard Appeldoorn [3], Kelvin Serrano [3], Omar Collazo [3], Nilda Jimenez [4]

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[3] Department of Marine Sciences, University of Puerto Rico, Mayagüez, PO Box 9000, Mayagüez, PR 00681 (RA) E-mail: richard.appeldoorn@upr.edu. ORCID ID: https://orcid.org/0000-0003-2179-9496
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(OC) E-mail: ancollazo@drna.gobierno.pr. ORCID ID: https://orcid.org/0000-0003-2478-7285
(NJ) E-mail: njimenez@drna.pr.gov. ORCID ID: https://orcid.org/0000-0001-7513-8951

B.

Summary: A key challenge in small scale fisheries that use moored fish aggregating devices (mFADs) is the ability to accurately quantify multi-sector fishing activity through fishery-independent methods. Here, we present a novel fishery-independent assessment of multi-sector fishing activity associated with a newly developed open access mFAD programme off San Juan, Puerto Rico. We identified three fishing sectors (recreational, charter and commercial) and 158 individual fishing vessels that routinely operated in the vicinity of the mFADs. The results indicate that daytime fishing activity varied by time of day, day of week, location and sector. During fishing tournaments, the data revealed that fishing activity increased three-fold across monitoring periods, for fish charter vessels were the most consistent day to day user segment, and recreational activity peaked on weekends. Our study represents a new technique for rapidly identifying and detecting multi-sector fishing activity near mFADs and highlights the potential to gather comparable data when new mFADs are deployed. The results are used to discuss how this technique can be used to assess the performance of mFADs to identify sector overlap and guide management to determining deployment patterns and facilitate the design of cost-effective surveys to estimate mFAD vessel activity, and potentially catch, of mFAD-associated species.

Keywords: fish aggregating devices; fishery independent survey; video monitoring; small scale fisheries; recreational fisheries; Caribbean Sea.

Uso de video para cuantificar los patrones espacio-temporales de la actividad pesquera de los distintos sectores en los Sistemas de Agregadores de Peces de Puerto Rico

Resumen: Un reto crucial en las pesquerías artesanales que utilizan los sistemas de agregadores de peces fijos (mFAD, por sus siglas en inglés) es el poder cuantificar con certeza la actividad pesquera multisectorial a través de métodos independientes de la pesca. En este estudio presentamos un innovador análisis independiente de la pesca para la actividad de pesca multisectorial asociada a los nuevos mFAD establecidos en Puerto Rico. Se identificaron 3 sectores pesqueros (turístas, charter de alquiler y comercial) y 158 embarcaciones que rutinariamente operaban alrededor de los mFAD. Los resultados muestran que la actividad pesquera diaria variaba por hora del día, día de la semana, anglo y sector. Durante torneos de pesca la actividad pesquera se triplicó, a lo largo de los periodos evaluados los botes de alquiler mostraron mayor consistencia a por día y la actividad recreativa aumentó durante el fin de semana. Nuestro estudio plantea una nueva técnica para identificar simultáneamente y detectar actividad multisectorial pesquera cerca de los mFAD y resalta el potencial de tener datos comparables en otros lugares donde se coloquen los mFAD. Los resultados se utilizan para discutir cómo esta técnica puede ser utilizada para evaluar la ejecutoria de los mFAD, identificar solapes de uso por varios sectores y guiar las decisiones en cuanto a los patrones para colocar los mFAD y facilitar el diseño de estudios costo efectivos para estimar la actividad de embarcaciones y el potencial de captura de peces asociados de los mFAD.

Palabras clave: sistemas de agregadores de peces; estudios independientes de pesca; evaluaciones utilizando video; pesquería artesanal; pesquería recreativa; mar Caribe.

Citation/Como citar este artículo: Merten W., Rivera R., Appeldoorn R., Serrano K., Collazo O., Jimenez N. 2018. Use of video monitoring to quantify spatial and temporal patterns in fishing activity across sectors at moored fish aggregating devices off Puerto Rico. Sci. Mar. 82(2): 000-000. https://doi.org/10.3989/scimar.04730.09A

FAD Publication
Vessel Activity

June 2-Sept 19, 2015
Seven surface FADs
Deployed

Feb 2016 to July 2018
Three new FADs
Six redeployments

2014 2016 2018 2020 2022 2024 2026

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Descriptive Statistics:

139 FAD days = 233,520 images

81 calendar days (22.1 % of a year)

158 unique vessels characterized

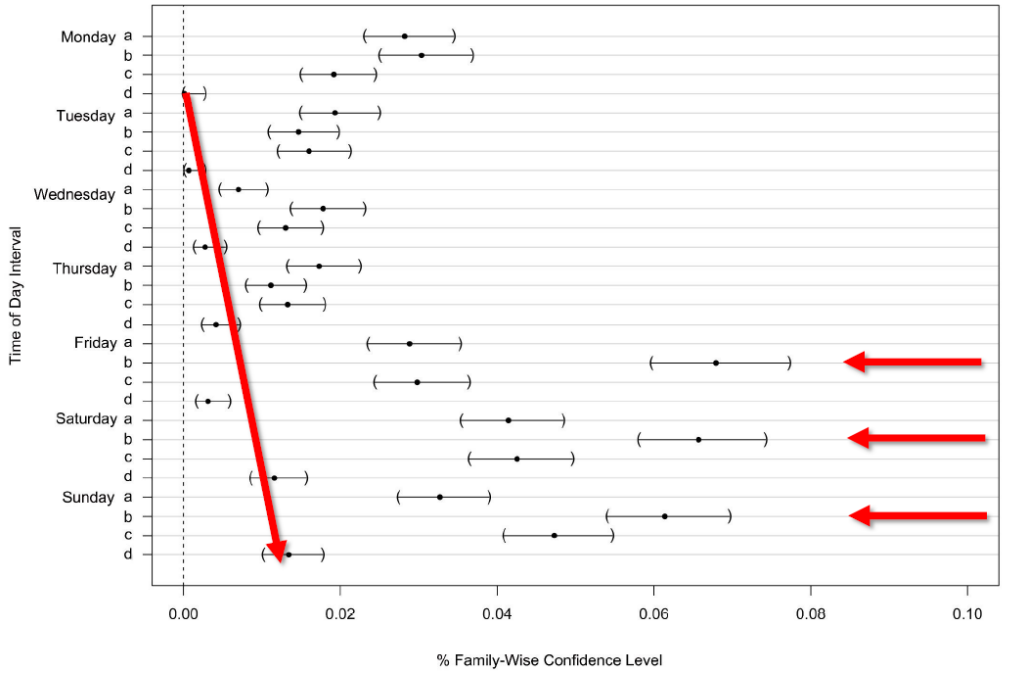
2.4% vessel detection rate

0.7%

at lea

Publication #1 (2018)

Results – Temporal Variation in Vessel Activity



Results – Temporal Variation

$$logit(y_{i,j,p}) = \beta_o + \beta_1 TOD_{i,t} + \beta_2 DOW_{j,t} + \beta_3 (TOD * DOW)_{i,j,t}$$

Found significant differences by time of day and day of week.

Table 2 Results of a two-way analysis of variance comparing vessel effort by time of day and day of week off San Juan, Puerto Rico.

Source of Variation	Degrees of Freedom	Sums of Squares	Mean Square	F Value	P Value
TOD	3	35	11.64	498.05	<0.001
Day	6	36	5.96	255.03	<0.001
Interaction	18	16	0.86	36.93	<0.001
Error	233492	5458	0.023		

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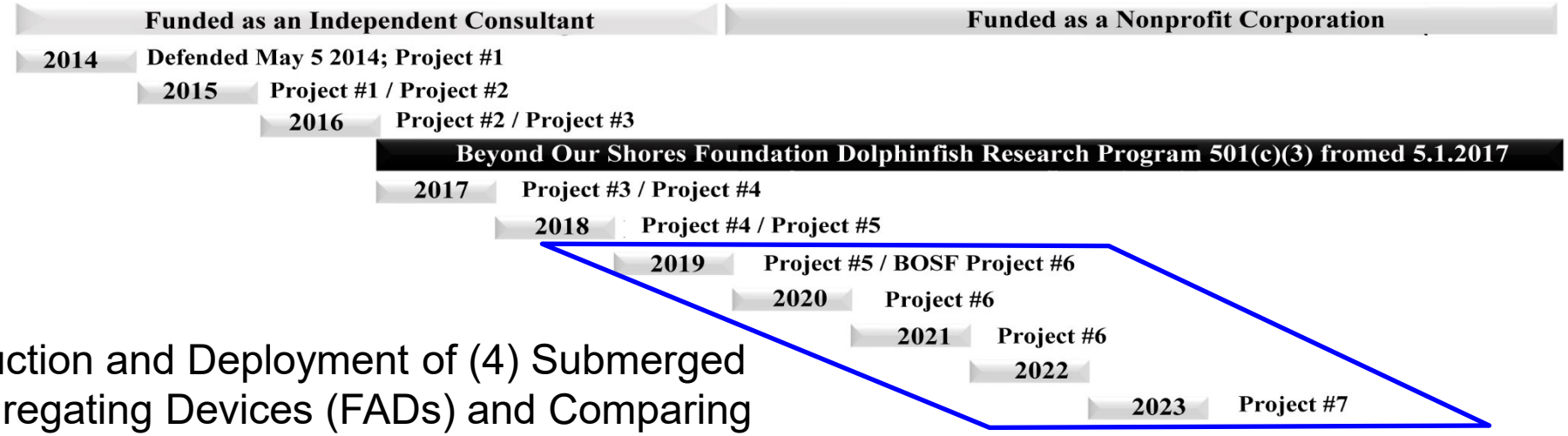
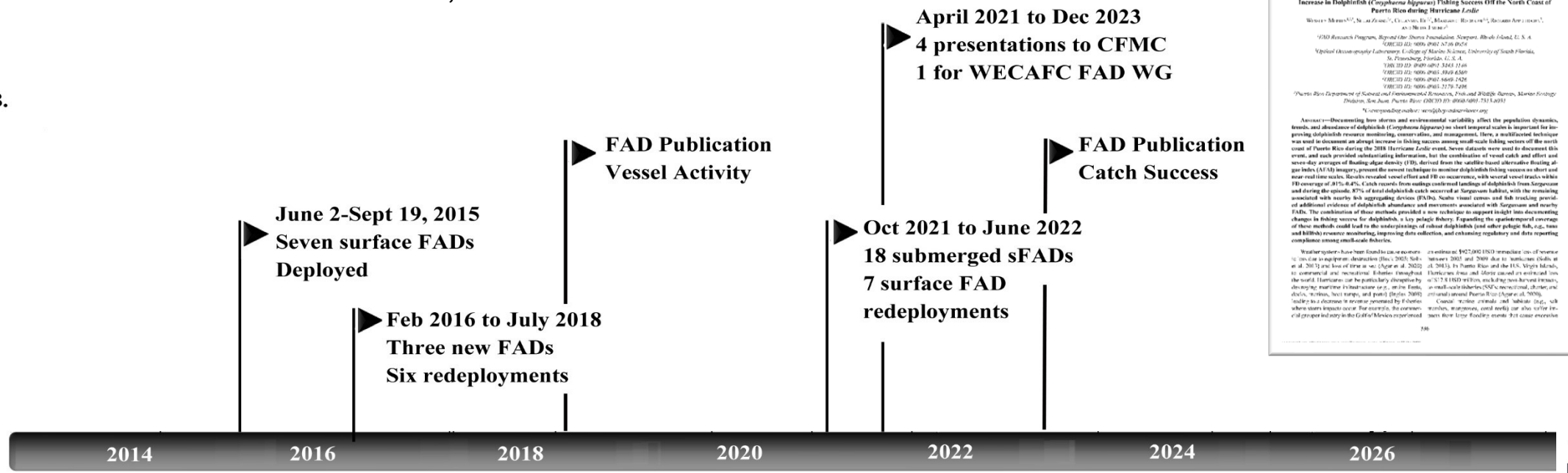
A.



"Construction and Deployment of (4) Submerged Fish Aggregating Devices (FADs) and Comparing Surface and Submerged FADs in Terms of Catch Per Unit Effort, Fish Abundance, Diversity, and Movements off San Juan, Puerto Rico."

B.



Increase in Dolphinfish (*Coryphaena hippurus*) Fishing Success Off the North Coast of Puerto Rico during Hurricane *Leslie*

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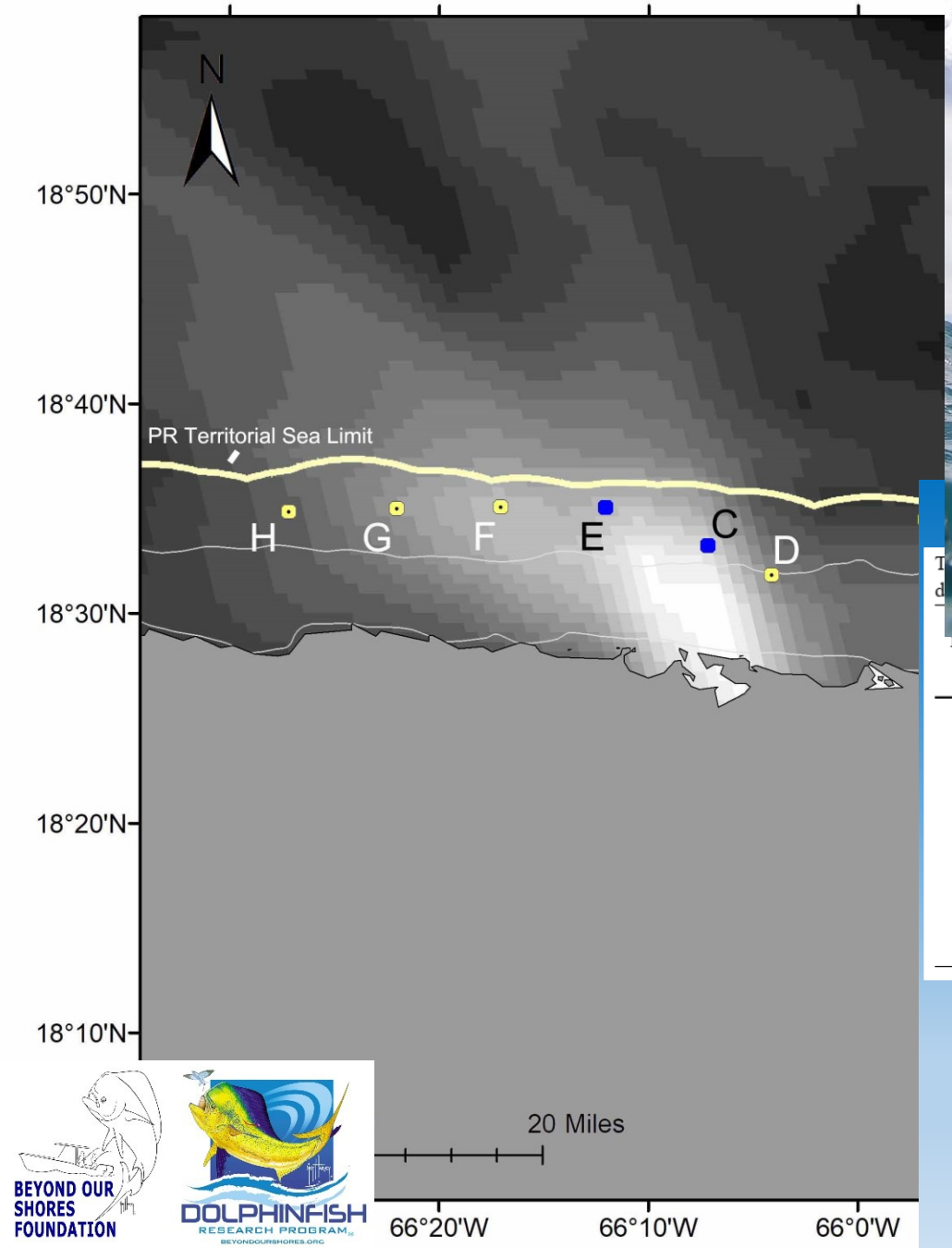

FAD ID	First Deployed	Depth (m)	Damaged or Lost	Days	Fixed or Deployed	Damaged or Lost	Days	Fixed or Deployed	Damaged or Lost	Days	Status	Total Days Moored	Number of Events
E	6/2/2015	550	2/19/2016	262	2/20/2016	11/28/2016	282	7/17/2017	9/20/2017	65	Inactive	609	3
F	6/3/2015	600	1/17/2017	594	5/15/2017	10/29/2017	167	7/21/2018	12/21/2021	1249	Inactive	2010	3
G	6/4/2015	598	9/20/2017	839							Inactive	839	1
D	6/8/2015	260	8/4/2017	788							Inactive	788	1
A	9/17/2015	305	12/10/2016	292							Inactive	292	1
B	9/18/2015	402	3/30/2016	291	7/17/2017	7/4/2018	352				Inactive	643	2
C	9/19/2015	349	12/29/2017	832	7/21/2018	8/1/2018	11				Inactive	843	2
H	2/10/2016	520	2/18/2018	739							Inactive	739	1
K	5/22/2017	500	6/4/2017	13							Inactive	13	1
L	5/22/2017	500	9/10/2018	476							Inactive	476	1

Maximum/Minimum longevity = 1249/12 days

Average longevity = 453

Average time to redeployment = 8.8 months

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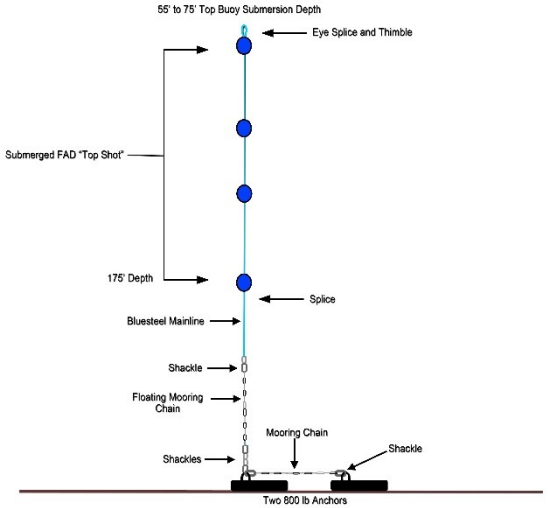
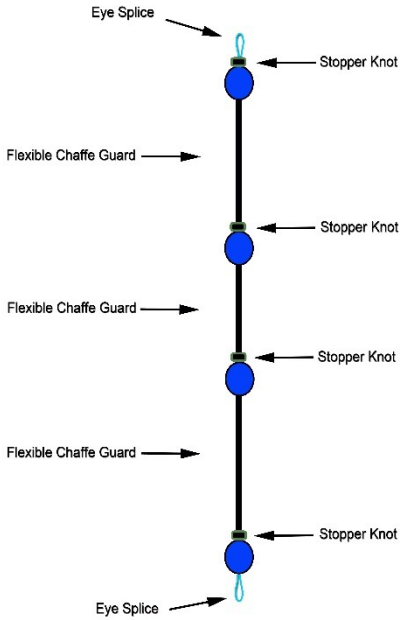
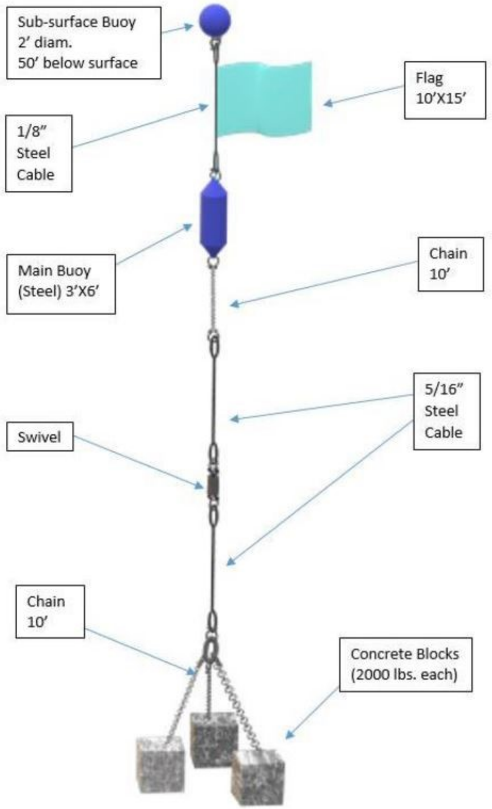
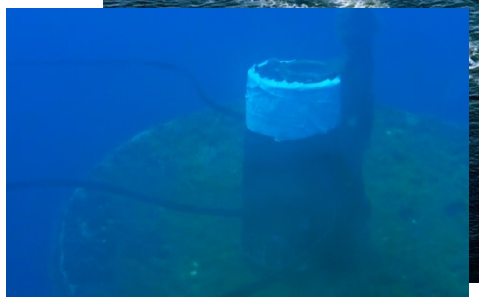
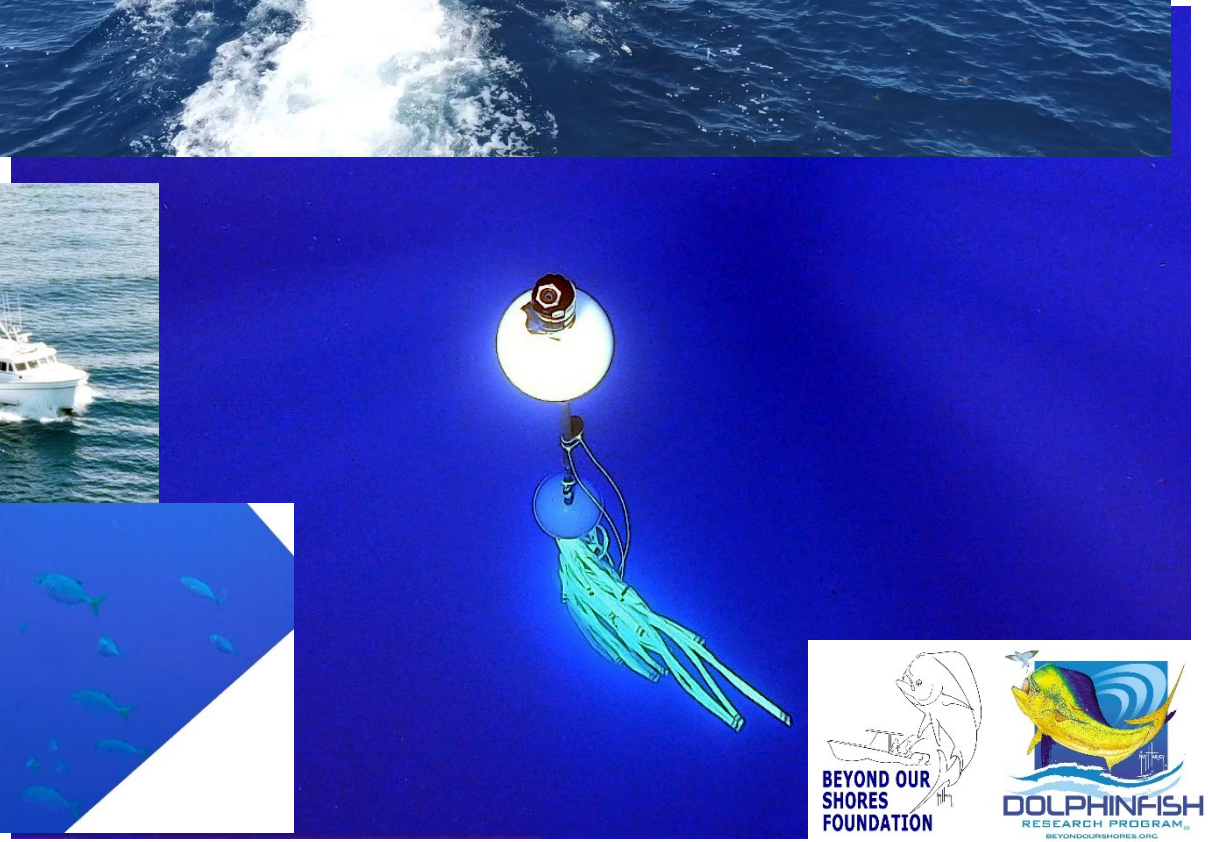




120' FAD Top Shot







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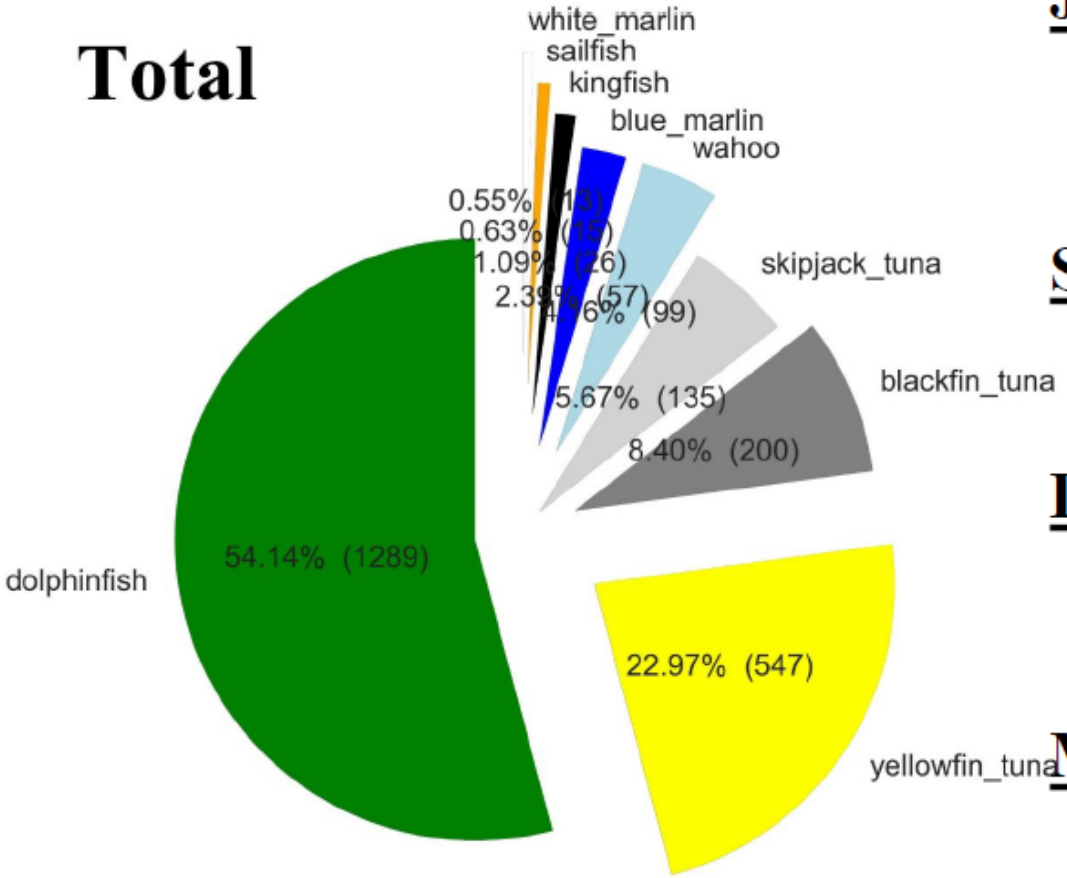
Seasonal Trends

Total



Jun-Aug 22’

dolphinfish
298
43%

FAD Dominated
Size range 1-20 pounds

Sept-Nov 22’

dolphinfish
302
42%

NonFAD Dominated
30% of catch 1-10 lbs

Dec-Feb 23’

dolphinfish
400
78%

FAD Dominated
30% of catch 11-20 lbs
> % of fish 30+ lbs than other periods

Mar-May 23’

dolphinfish
228
78%

FAD Dominated
But, Equal % of 1-10, 11-20 FAD vs. NonFAD; > amount of 21+ at FADs

Jun-Present

dolphinfish
61
30%

FAD Dominated
Majority less than 10 lbs

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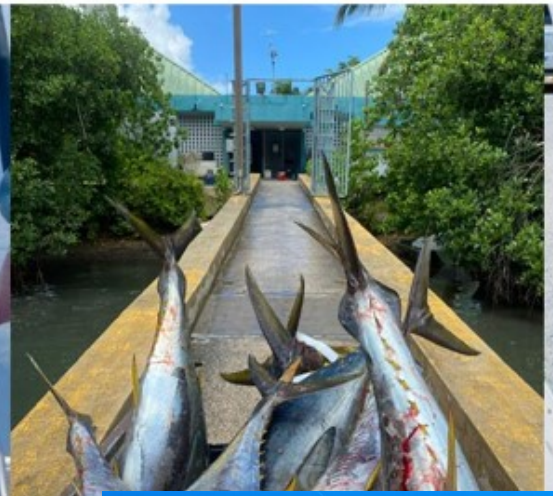
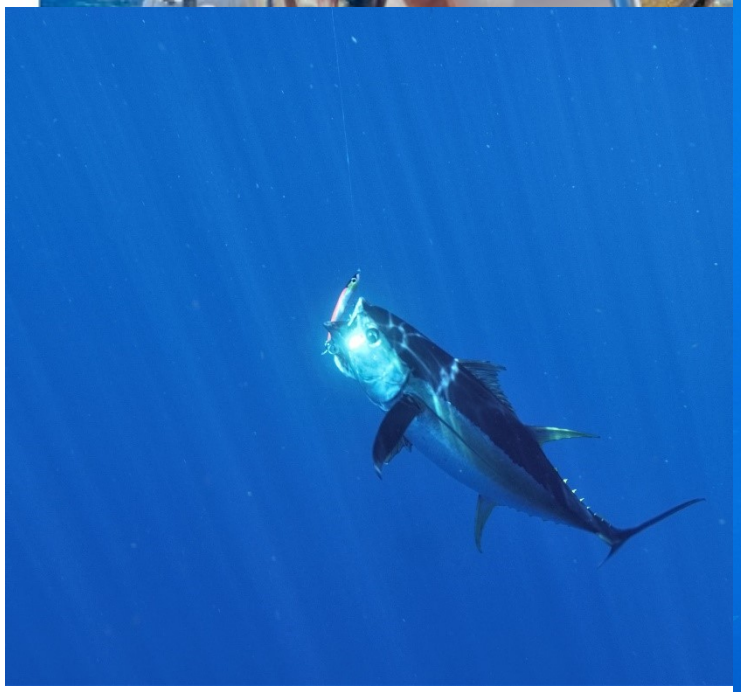
Puerto Rico Vessel Tracking Data – YFT Catch Examples from sFAD Clusters

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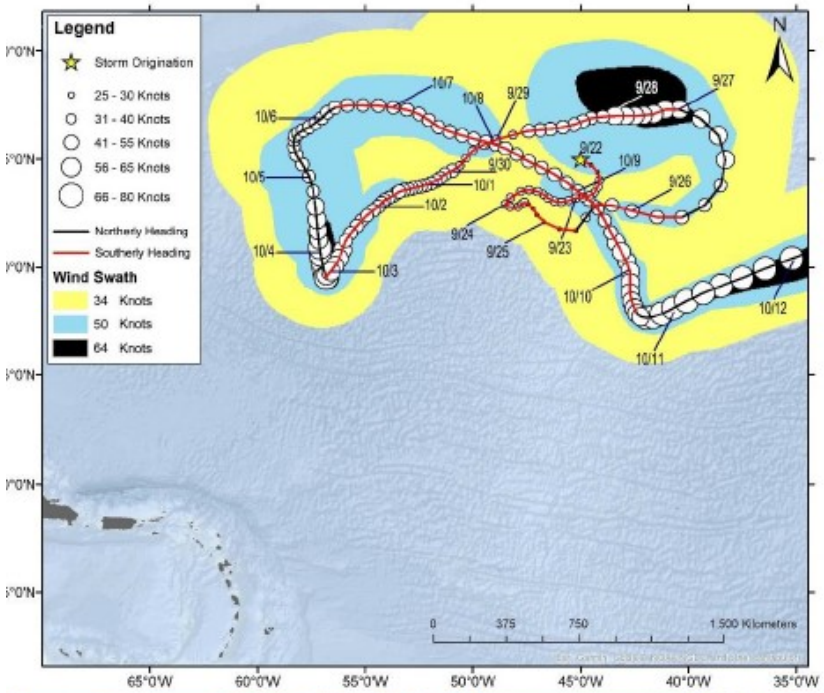
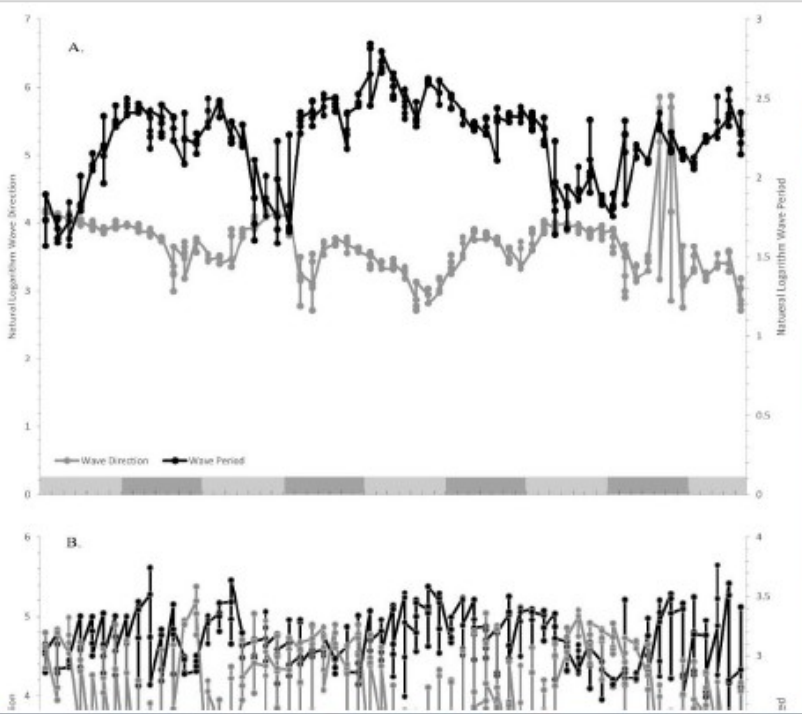
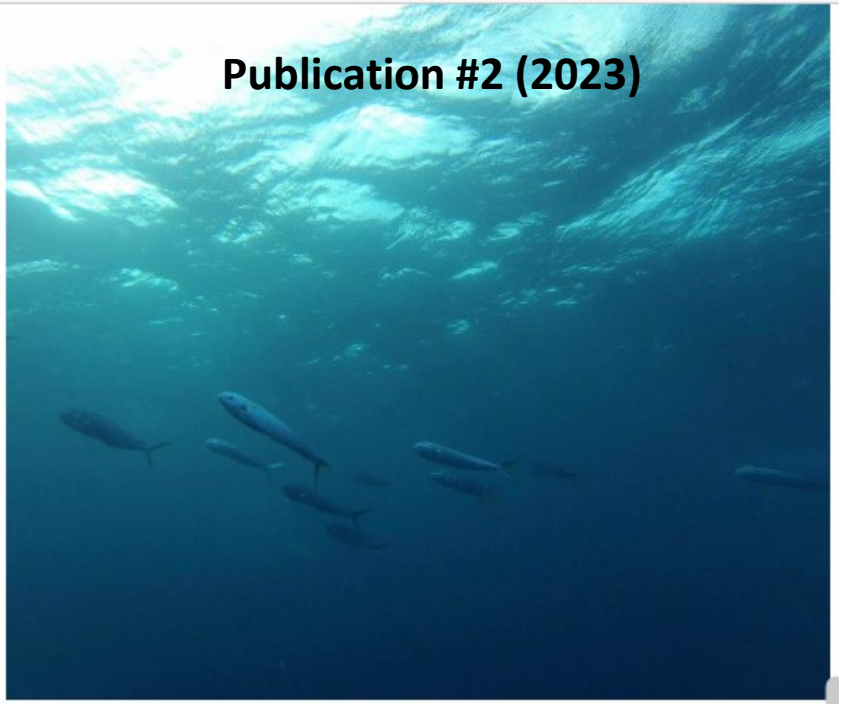
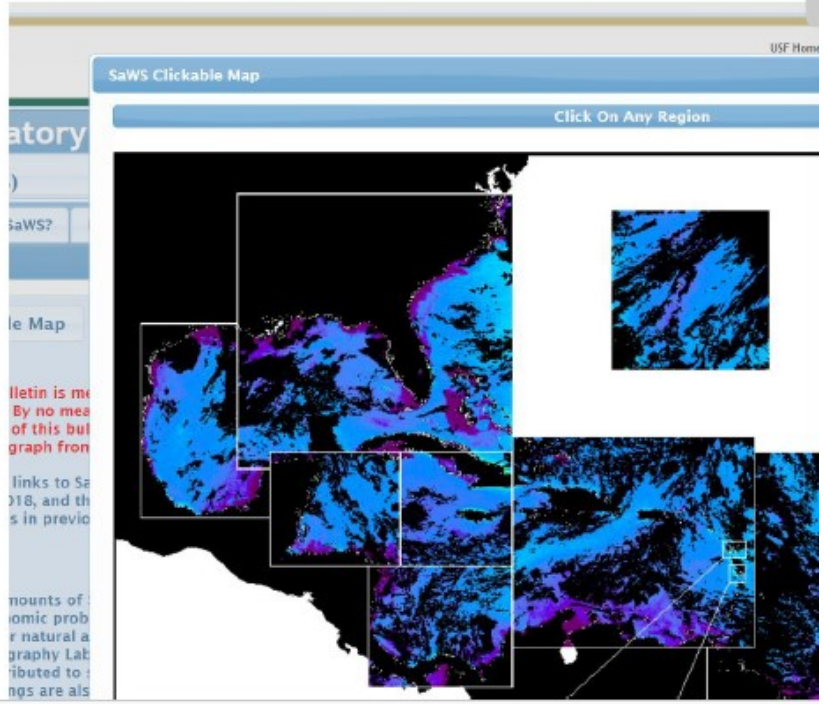
Publication #2 (2023)









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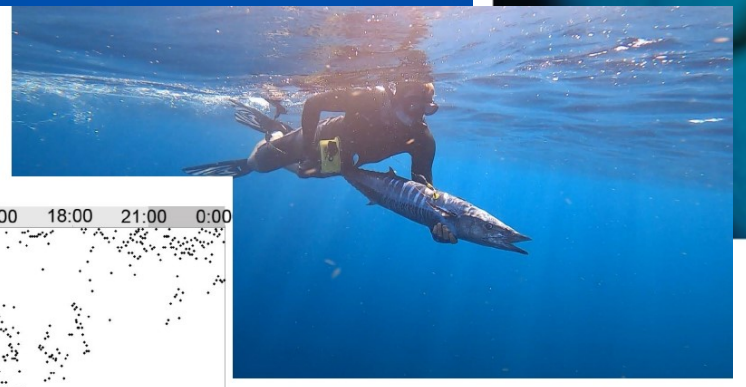
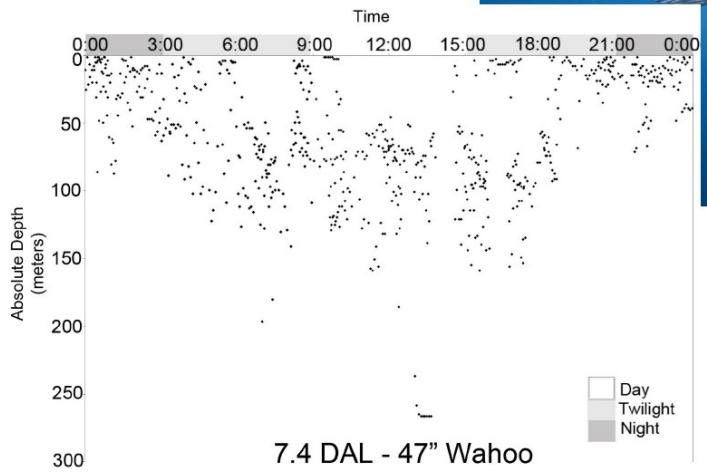
Vessel Detection using Sound

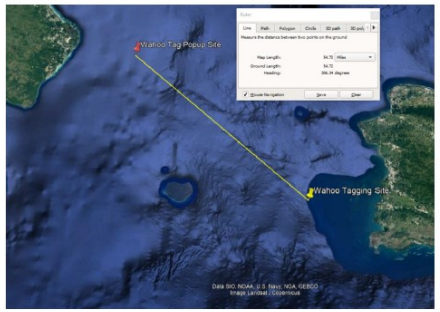
Wahoo Tagging





7.4 DAL - 47” Wahoo

Tag ID = 170108 PR Max Z = 266.3 m / 878.9 feet



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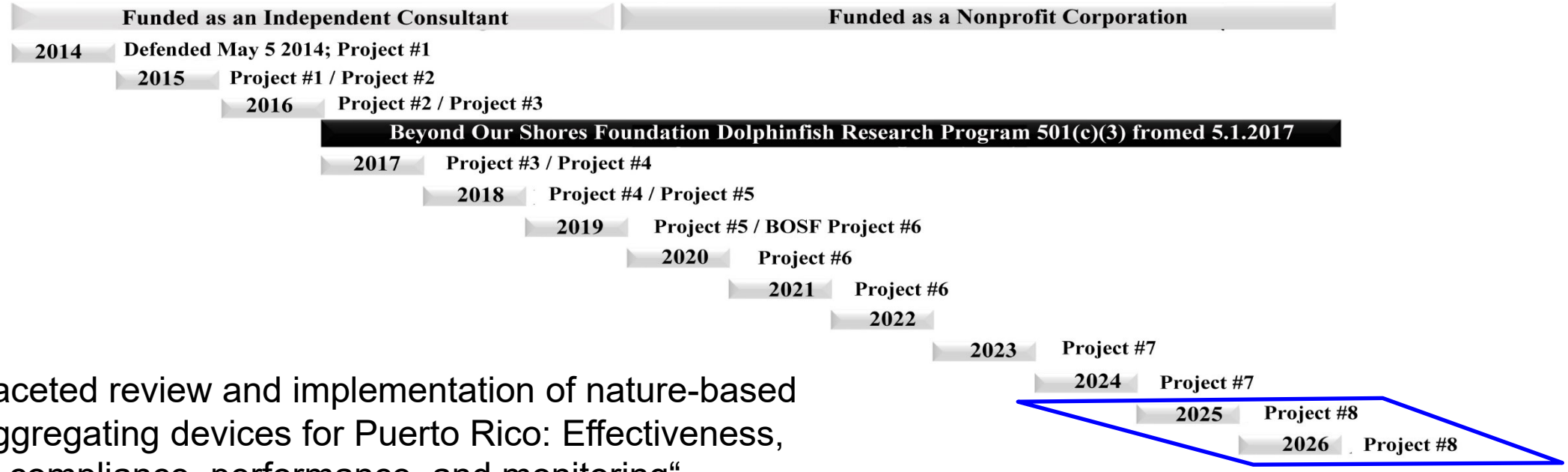
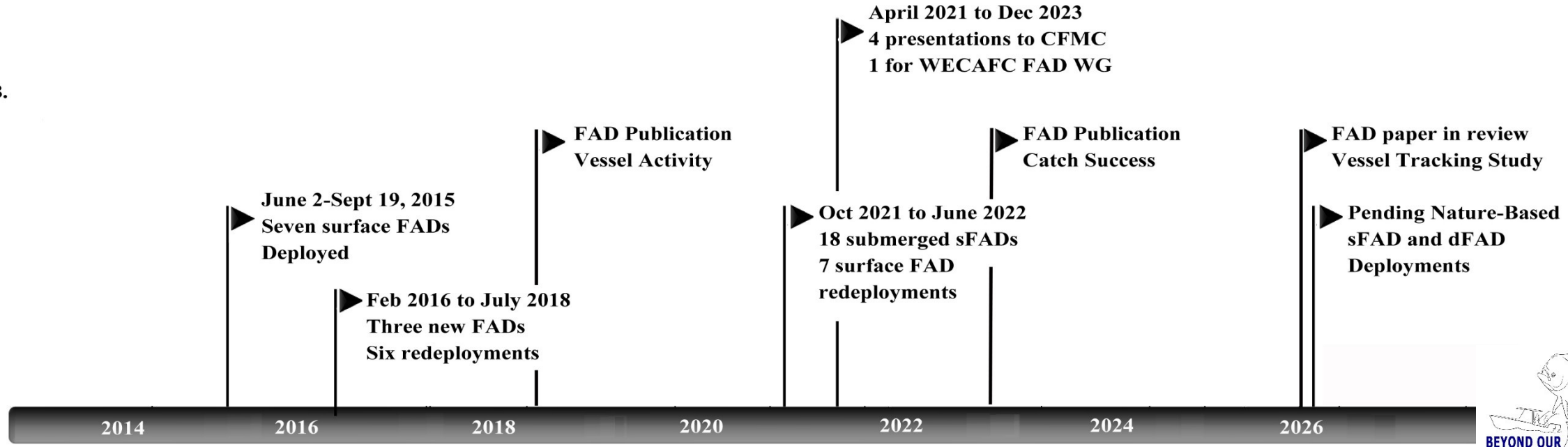
A.



"Multifaceted review and implementation of nature-based fish aggregating devices for Puerto Rico: Effectiveness, compliance, performance, and monitoring"

B.



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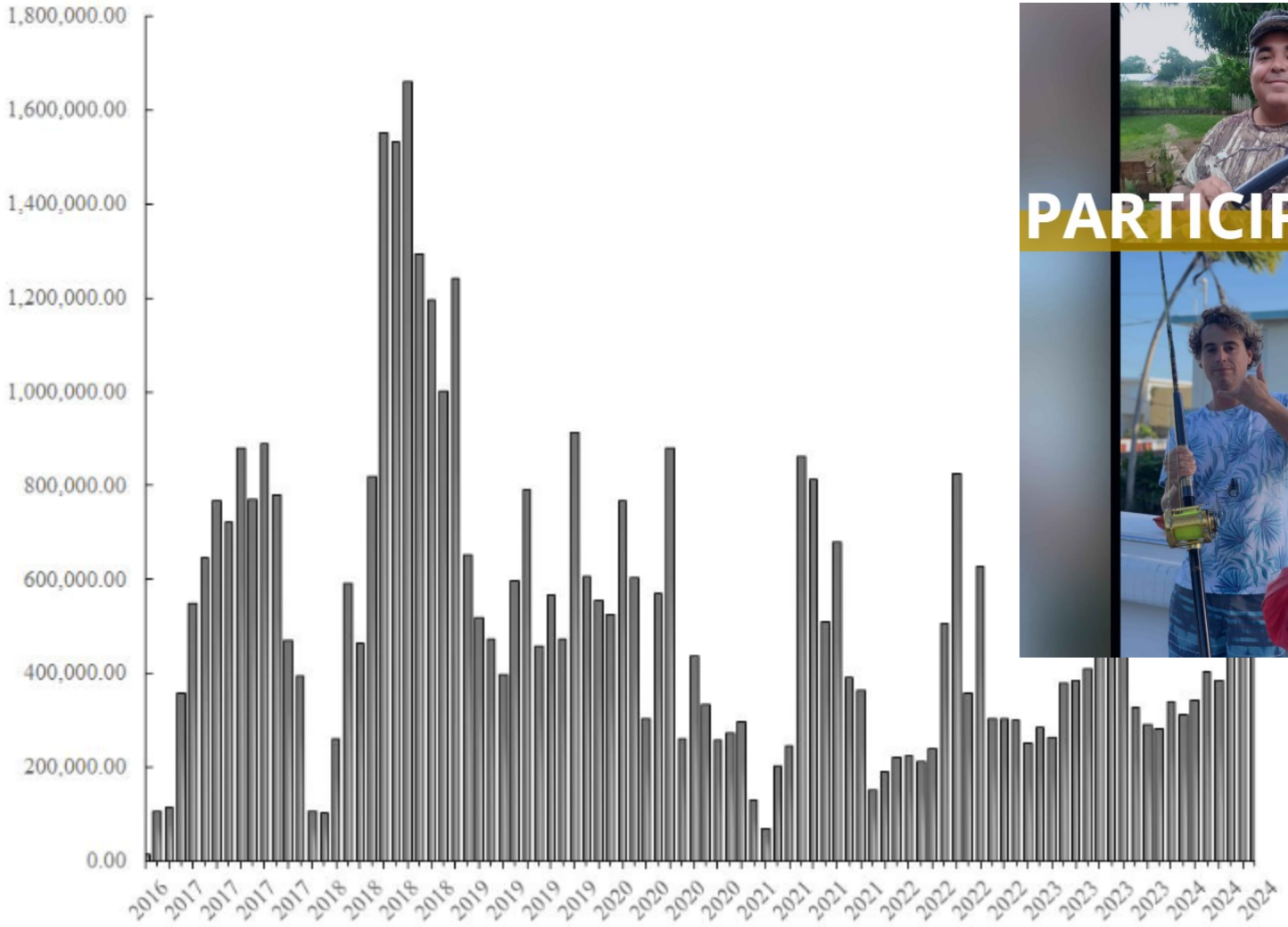

Figure 1. Number of vessel tracking points for all monitored vessels by month and year from October, 2016, through July 31st, 2024.

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Table 2. Final generalized linear mixed models selected for each analysis based on the Akaike Information Criterion (AIC), degrees of freedom (df), Kolmogorov-Smirnov (KS), and dispersion tests.

Analysis	Distribution	Model	AIC	df	KS	Dispersion
FAD Catch	NB	Catch ~ Vessel*Location + Season + (1|Date) - 1	3696.5	16	0.83	0.18
FAD CPUE	NB	Catch ~ Vessel*Location + Year + log(offset(Distance)) + (1|Date) - 1	3682.5	14	0.79	0.15
Vessel Catch	NB	Catch ~ Vessel + Year + (1|Date) - 1	2926.9	10	0.57	0.18
Vessel Distance	Gamma	Distance ~ Vessel + Season + Year + (1|Date) - 1	6960.5	13	0.88	0.49
Vessel CPUE	NB	Catch ~ Vessel + Year + log(offset(distance) + (1|Date) - 1	2929.3	10	0.31	< 0.05

FAD = Fish Aggregating Device; CPUE = Catch per Unit Effort; NB = Negative-binomial

Table 3. Negative-binomial generalized linear mixed model results, back-transformed from the log scale, for catch comparison between locations during the case study around San Juan and Arecibo.

Vessel #	Location	Response	SE	Ratio	Interpretation
1	FAD	1.01	0.19	1.86*	86% more catch
	nonFAD	0.55	0.11	-	-
2	FAD	0.58	0.11	1.20	20% more catch
	nonFAD	0.48	0.09	-	-
3	FAD	3.29	0.48	3.08*	208% more catch
	nonFAD	1.07	0.17	-	-
4	FAD	0.04	0.02	0.03*	97% less catch
	nonFAD	1.20	0.35	-	-

* Denotes statistical significance (< 0.05)

Table 4. Negative-binomial generalized linear mixed model results, back-transformed from the log scale, for catch per unit distance averaged over seasons and years between locations during the case study around San Juan and Arecibo.

Vessel #	Location	Response	SE	Ratio	Interpretation
1	FAD	1.24	0.24	1.93*	93% more catch per kilometer
	nonFAD	0.64	0.13	-	-
2	FAD	0.74	0.14	1.31	31% more catch per kilometer
	nonFAD	0.57	0.11	-	-
3	FAD	3.49	0.49	3.65*	265% more catch per kilometer
	nonFAD	0.96	0.14	-	
4	FAD	0.05	0.03	0.03*	97% less cat
	nonFAD	1.49	0.41	-	

* Denotes statistical significance (< 0.05)

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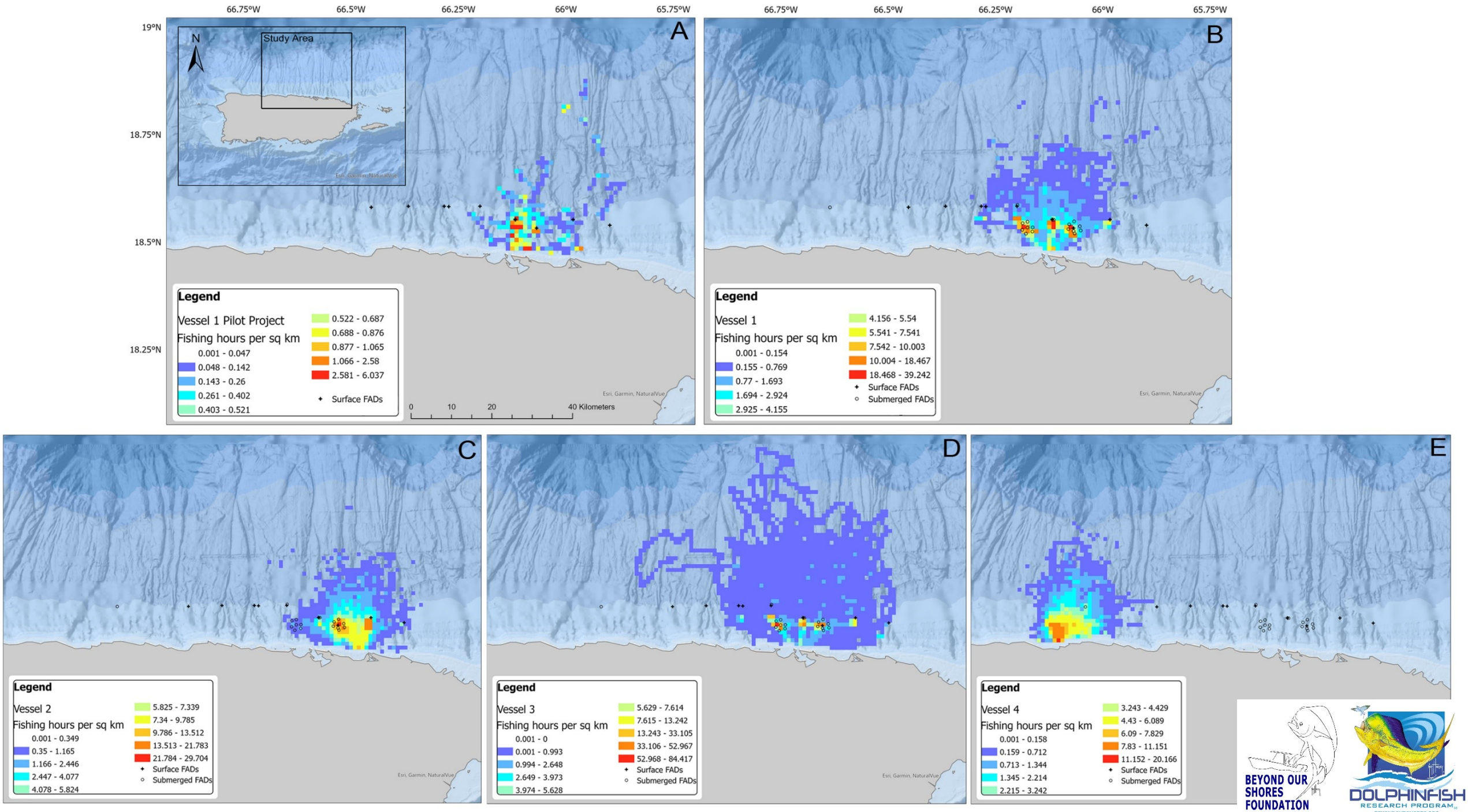

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Table 1. FAD deployments (MM/DD/YYYY), damage or loss events, durations moored, total years moored, and number of deployment events for all surface FADs deployed in the Puerto Rico FAD System beginning June 2nd, 2015, to April 1, 2023. The estimated depths of the FADs are as follows: E(550 m); F(600); G(598); D(260); A(305); B(402); C(349); H(520); K(500); L(500); Single Submerged Fajardo (SSFa)(339); Single Submerged el Morro (SSMo)(690); Single Submerged Radares (SSRa)(954); Single Submerged Arecibo (SSAr)(1069); Hotels Central (HC)(628); Hotels 1(H1)(750); Hotels 2 (H2)(651); Hotels 3(H3)(606); Hotels 4(H4)(621); Hotels 5(H5)(545); Hotels 6(H6)(606); Radares Central (RC)(643); Radares 1(R1)(727); Radares 2(R2)(590); Radares 3(R3)(484); Radares 4(R4)(431); Radares 5 (R5)(530); Radares 6(R6)(636). UNK= unknown date of loss; ~ = approximate; D= days.

	First Deployment			Second Deployment			Third Deployment			Fourth Deployment			
FAD ID	First Deployed	Damaged or Lost	D	Fixed or deployed	Damaged or Lost	D	Fixed or deployed	Damaged or Lost	D	Fixed or deployed	Damaged or Lost	D	Total Years Moored
E	6/2/2015	2/19/2016	262	2/20/2016	11/28/2016	282	7/17/2017	9/20/2017	65	6/1/2022	3/5/2023	304	2.5
F	6/3/2015	1/17/2017	594	5/15/2017	10/29/2017	167	7/21/2018	12/21/2021	1249	6/1/2022	1/2/2024	580	7.1
G	6/4/2015	9/20/2017	839	5/31/2022	12/2/2022	185							2.8
D	6/8/2015	8/4/2017	788										2.1
A	9/17/2015	12/10/2016	292	6/2/2022	1/31/2024	608							2.5
B	9/18/2015	3/30/2016	291	7/17/2017	7/4/2018	352	5/30/2022	10/22/2023	510				3.2
C	9/19/2015	12/29/2017	832	7/21/2018	8/1/2018	11	5/30/2022	10/29/2023	517				3.7
H	2/10/2016	2/18/2018	739	5/31/2022	UNK	na							~2.8
K	5/22/2017	6/4/2017	13	6/2/2022	7/15/2024	774							2.15
L	5/22/2017	9/10/2018	476										1.3
SSFaj	3/1/2022	UNK	395										na
SSMo	10/16/2021	9.24.2023	532										1.5
SSRa	3/1/2022	3/2/2022	1										na
SSAr	10/16/2021	UNK	na										na
HC	4/12/2022	~12/7/2023	605										1.6
H1	4/25/2022	~11/1/2023	na										na
H2	4/18/2022	~11/1/2023	na										na
H3	4/18/2022	~11/1/2023	na										na
H4	4/18/2022	~3/12/2024	701										1.9
H5	4/12/2022	~11/1/2023	na										na
H6	4/25/2022	~3/31/2024	720										1.9
RC	4/25/2022	~10/31/2023	na										na
R1	4/27/2022	~10/31/2023	na										na
R2	4/27/2022	~10/31/2023	na										na
R3	4/27/2022	~10/31/2023	na										na
R4	4/26/2022	~10/31/2023	na										na
R5	4/26/2022	~10/31/2023	na										na
R6	4/26/2022	~10/31/2023	na										na

Average overall FAD longevity 471.86 days (n=29)

13 FADs with unknown loss dates (mostly submerged FADs)

Average overall submerged FAD longevity 590.60 days (n=5)

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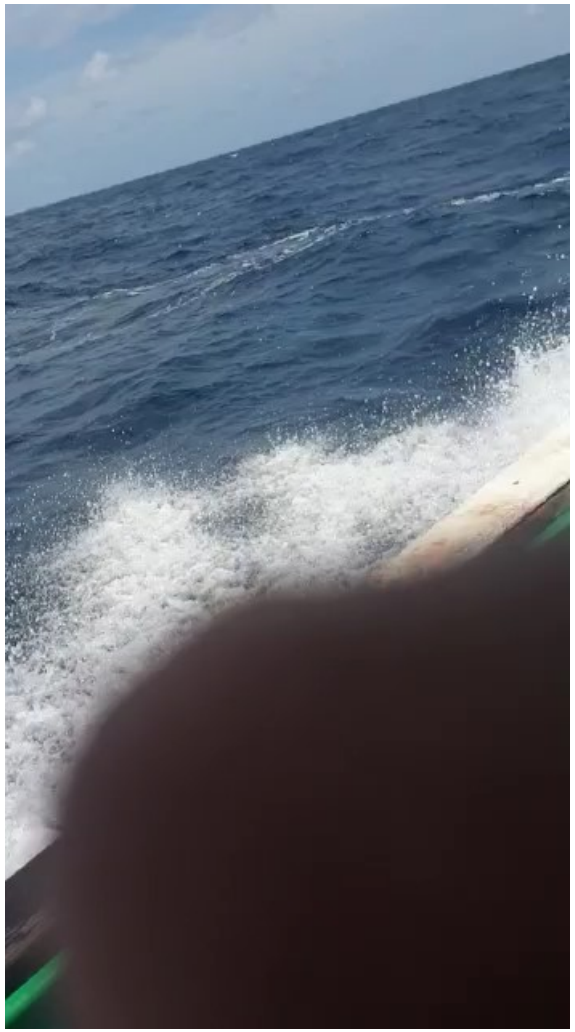
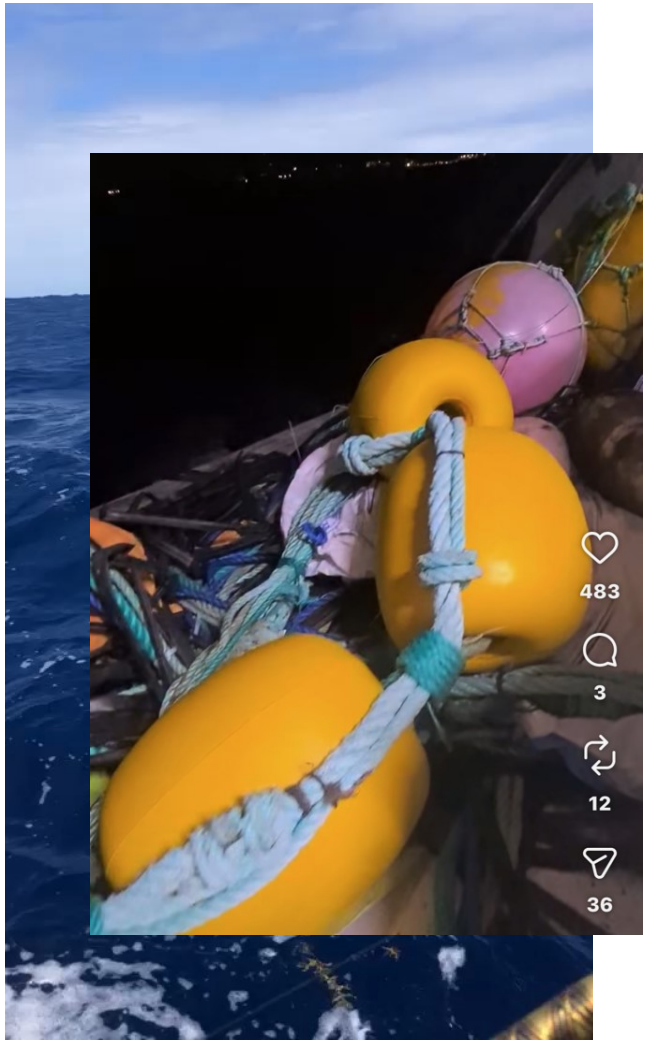
Currents are another major cause for FAD loss

This year, an angler we monitor has lost 24 of 29 FADs deployed off DR.





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Current project: "Multifaceted review and implementation of nature-based fish aggregating devices for Puerto Rico: Effectiveness, compliance, performance, and monitoring"

Step 1: Global Review of dFAD and mFAD use and designs

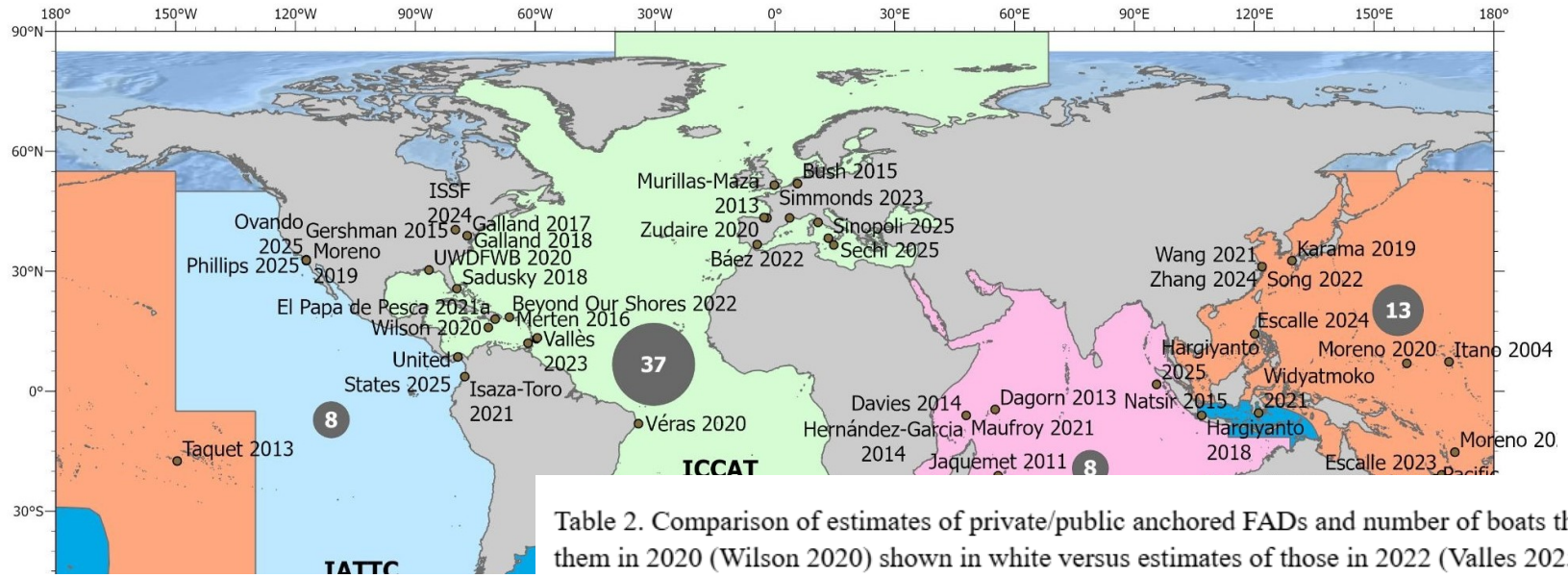

Table 1. Descriptive statistics table including number of references (from scientific manuscripts, government reports, videos), number of designs, and number of FADs (deployed annually) for each RFMO. (updated 11/25/25)

RFMO	# of references	# of designs	# of dFADs deployed annually	# of aFADs deployed annually
CCBST	5	n/a	n/a	n/a
IATTC	8	1	8,000 - 12,000	
ICCAT	37	11	9,000 - 12,000	9,000
IOTC	8	2	9,000 - 12,000	2,000
WCPFC	13	9	20,000 - 40,000	3,000
Total*	71	23	46,000 - 76,000	14,000

*CCSBT designs and FADs deployed are accounted for in the other RFMOs as it overlaps with 3 out of 4 of them

Table 2. Comparison of estimates of private/public anchored FADs and number of boats that use them in 2020 (Wilson 2020) shown in white versus estimates of those in 2022 (Valles 2025) shown in gray.

State	Public aFADs	Private aFADs	aFAD boats
Anguilla (British OT)	0	25	15
Anguilla	2	20	30
Antigua and Barbuda	8	20	15
Antigua and Barbuda	0	0	0
Aruba	0	0	0
Bahamas	0	0	0
Barbados	1	0	NA
Barbados	NA	NA	NA
Bermuda (British OT)	1		
Bermuda	0		
Bonaire (European Union-Netherlands)	6		
Bonaire	0		

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Step 2: Rank materials in terms of biodegradability

Table 1. Fish aggregating device (FAD) components by materials based on a ranking of the materials biodegradability.

Component	Biodegradability Ranking				
	Least Biodegradable				Most Biodegradable
Float	Plastic buoys	Steel	Glass	Purse seine corks	Coconut foam
Device to make FAD float and visible from the surface of the water	Not great from biodegradability standpoint but they are relatively cheap	Hollow, buoyant steel can be used as pontoons or floats that are strong and durable, however not biodegradable	Not super biodegradable, just breaks down into smaller pieces	Typically made from plastic-based foams, older versions used to be made with cork from trees	Made from coconut waste, eco-friendly alternative to synthetic foams
Structure	Plastic	Purse seine netting		Cotton/manila canvas	Bamboo
Subsurface material attached to line to attract fish	High-strength synthetic materials used to attract fish and strengthen underwater components, contributes to microplastic pollution	Often made from synthetic materials such as nylon, also cause bycatch and entanglement issues		100% biodegradable so will most likely need to be treated with water-repellent or durable press applications to slow process	Most likely our best option, will need to be treated to withstand elements
Lines	Polyethylene	Polypropylene	Nylon	Hemp and manilla	Cotton
Used to attach the different materials together and keep the FAD in place	Very durable with high strength-to-weight ratio, with high resistance to UV, abrasion, and water but contributes to microplastic pollution	Rot-proof, lightweight, resistant to water and UV, but when breakdown occurs it contributes to microplastic pollution	Most commonly used rope for FADs as it is highly rot-proof, can take decades to break down but when it does, it contributes to microplastic pollution	Strong, natural fibers with good durability against salt water and relatively low cost	Completely biodegradable but absorbs liquid so it is susceptible to rotting, can be treated using linseed oil or paraffin wax
Ballast	Steel/Lead		Rock/Sand	Concrete	
Anchor to hold FAD in place	Metals are not biodegradable but will corrode or oxidize over long periods of time		Composed of inorganic materials but when they erode they don't contribute to pollution	Durable, non-toxic and resistant to degradation	
Tackle	Galvanized steel	High-modulus polyethylene	Bioplastic		Natural fiber soft shackles
Materials such as shackles that are used to hold everything together	Carbon steel coated with zinc oxide for rust protection, very strong but creates persistent marine debris if lost	Synthetic fiber used to make soft shackles that are strong, lightweight, and resistant to corrosion, not biodegradable and contribute to microplastic pollution	Growing area of research that involves using bioplastics like polyhydroxyalkanoates that can biodegrade in natural environments		Ropes and cords made from natural fibers can be used for low-to-mid-load applications

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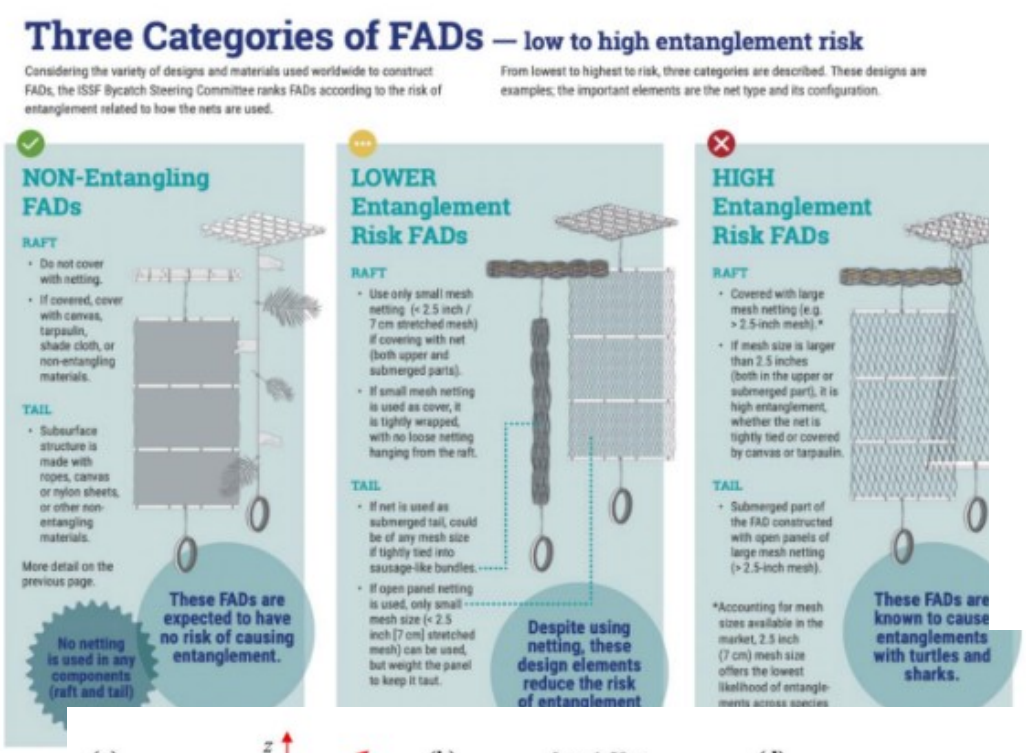
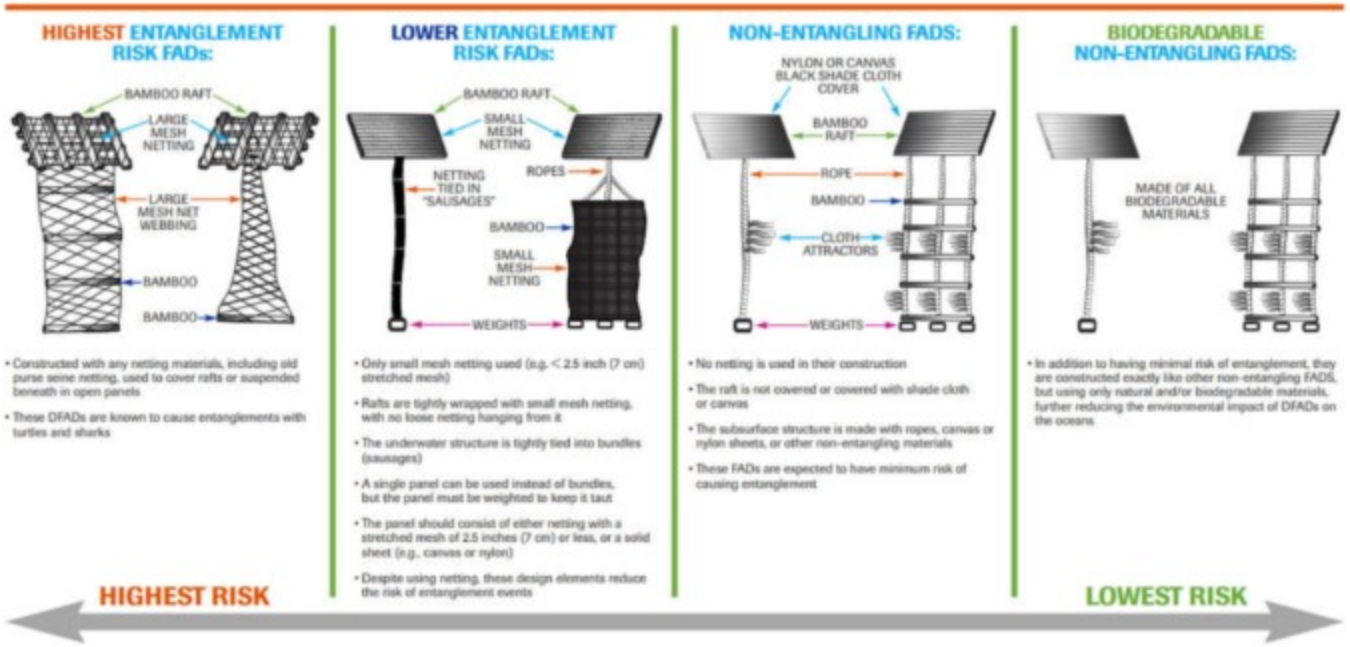
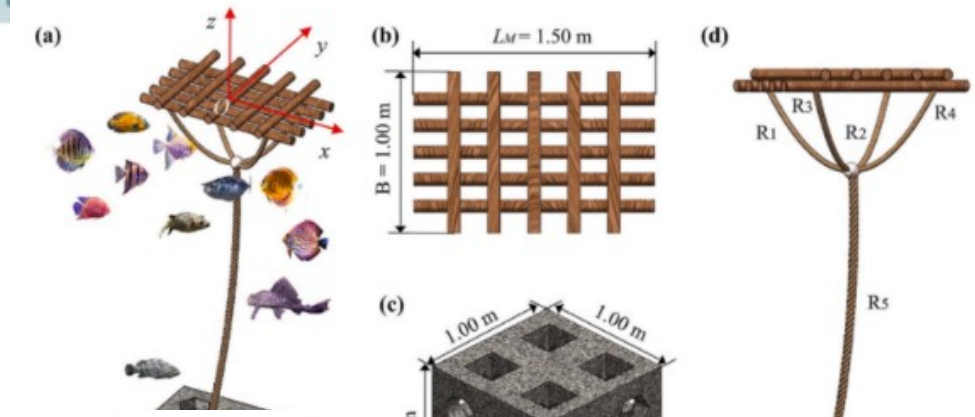
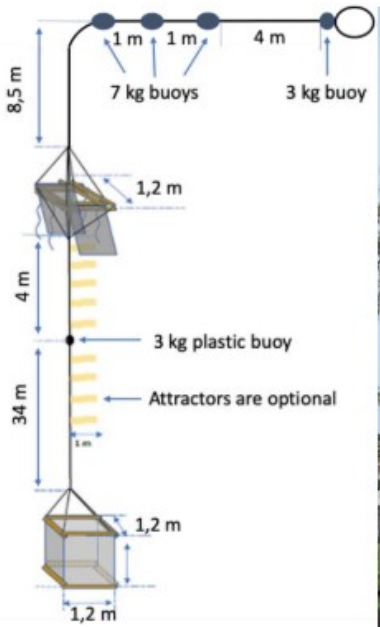
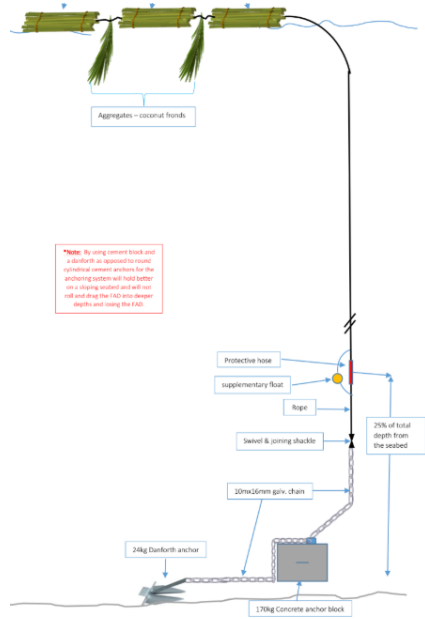
Step 3: Create FAD design library











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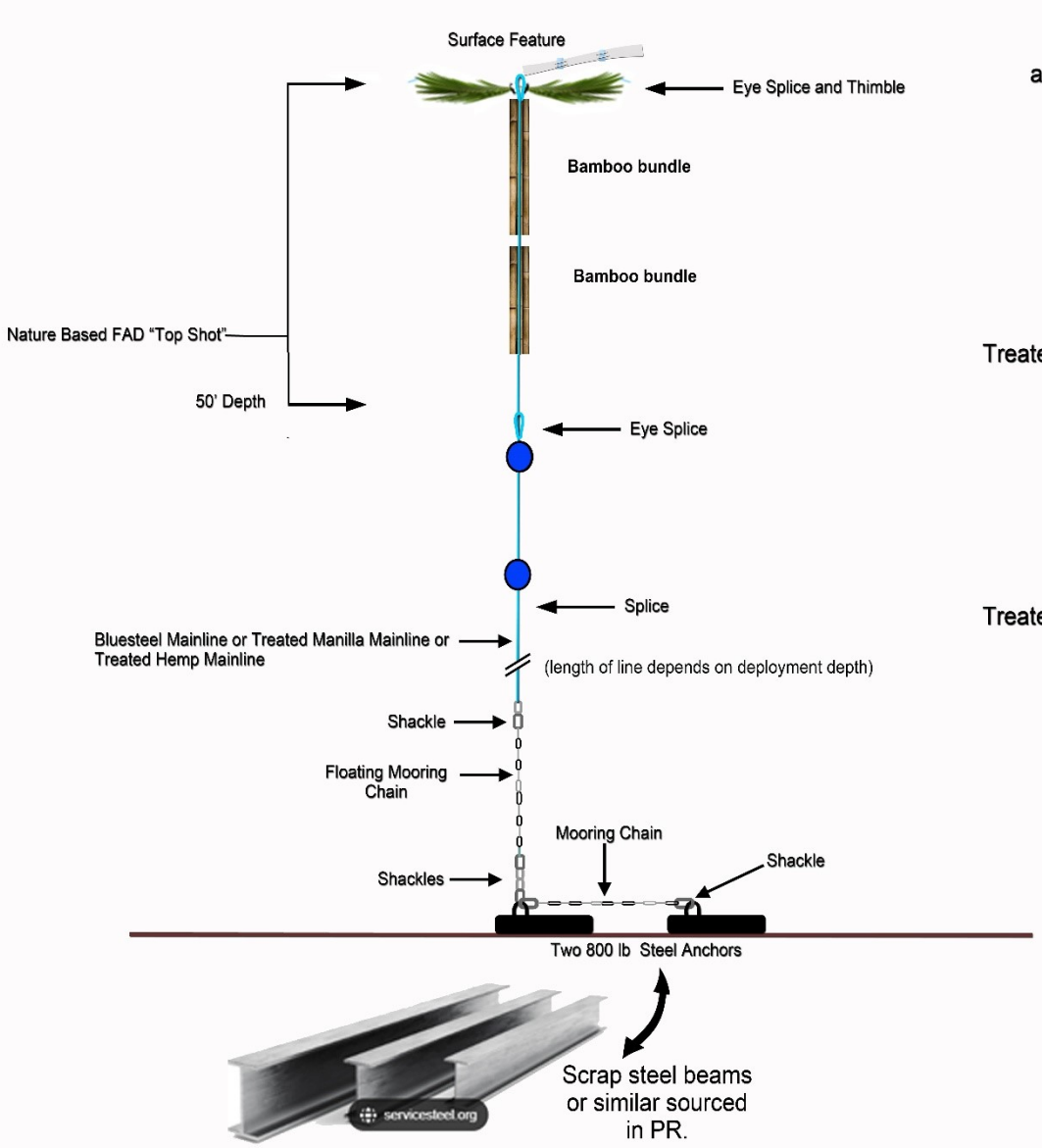
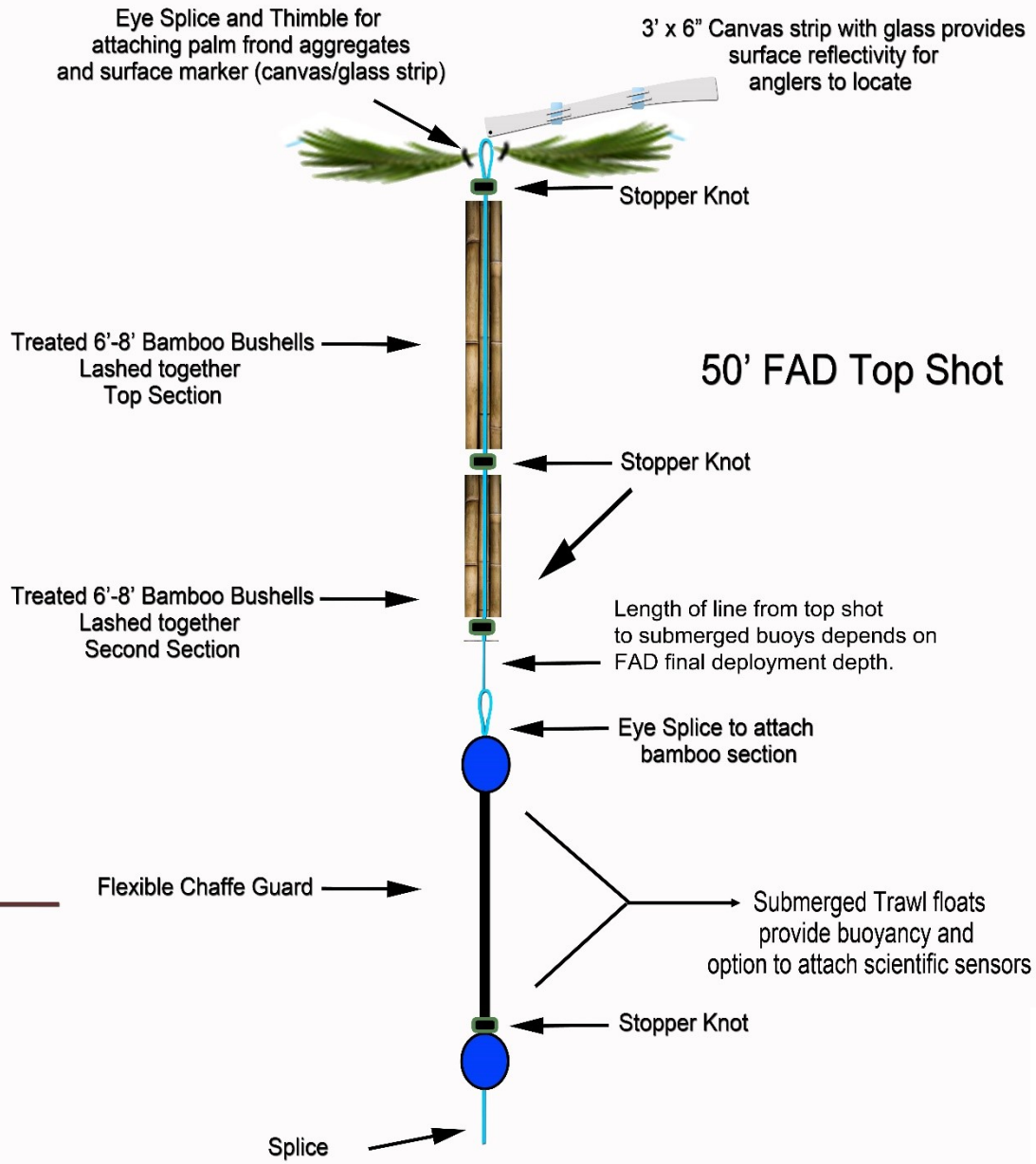
Step 4: Design sFAD and dFAD

Stationary Fish Aggregating Device





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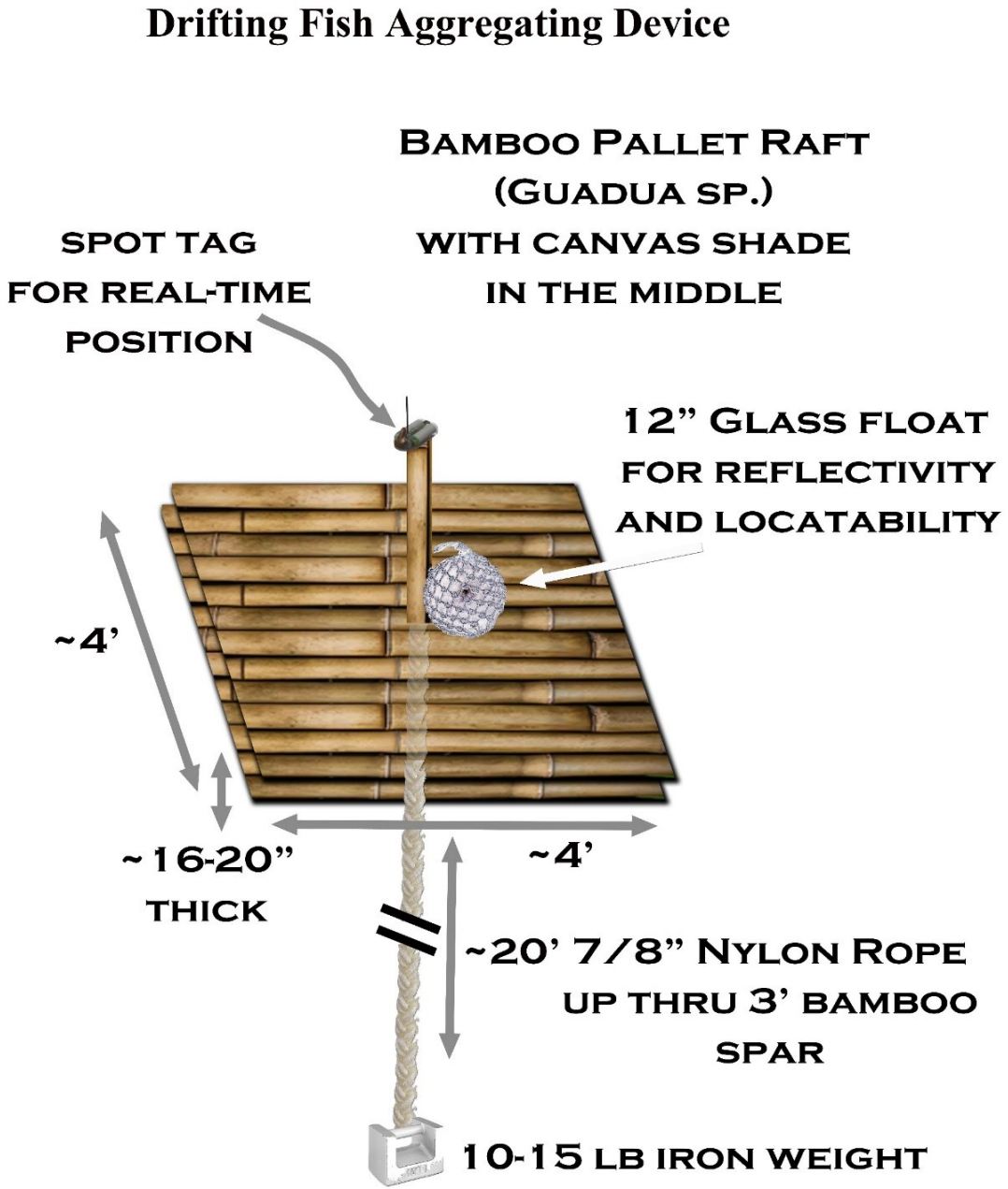
Step 4: Design sFAD and dFAD



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Step 4: Design Approval & Permitting

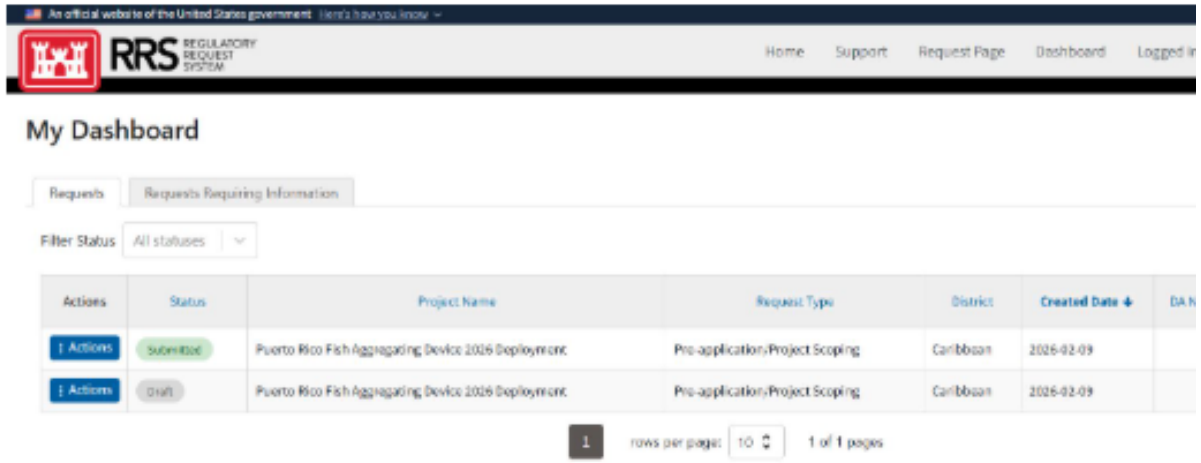
#1. Army Corps of Engineers (ACE) Approval

Compliance

Department of the Army

[Regulatory Request System (RRS)]

Pre-application/Project scoping



#2. U.S. Coast Guard Aids to Navigation Application

DEPARTMENT OF HOMELAND SECURITY
U.S. Coast Guard
PRIVATE AIDS TO NAVIGATION APPLICATION
(See attached instructions and copy of Code of Federal Regulations, Title 33, Chap. 1, Part 66)

OMB Approval: 1625-0011
Expiration Date: 05/31/2021

NO PRIVATE AID TO NAVIGATION MAY BE AUTHORIZED UNLESS A COMPLETED APPLICATION FORM HAS BEEN RECEIVED (14 U.S.C. 83; 33 CFR. 66. 01-5).

1. ACTION REQUESTED FOR PRIVATE AIDS TO NAVIGATION: ☐ A. ESTABLISH AND MAINTAIN ☐ B. DISCONTINUE ☐ C. CHANGE ☐ D. TRANSFER OWNERSHIP — 2. DATE ACTION TO START:
3. AIDS WILL BE OPERATED: ☐ A. YEAR-ROUND ☐ B. TEMPORARILY UNTIL ☐ C. SEASONAL FROM ____ TO ____
4. NECESSITY FOR AID *(Continue in Block 8)* — 5. GENERAL LOCALITY — 6. AUTHORIZING PERMIT FOR THIS STRUCTURE OR BUOY USACE ☐ PERMIT AND/OR STATE ☐ PERMIT (Valid Permit Number)

FOR DISTRICT COMMANDERS ONLY — 7. APPLICANT WILL FILL IN APPLICABLE REMAINING COLUMNS

LIGHT LIST NUMBER	NAME OF AID	LIGHT: NO. OR LTR (7a)	LIGHT: FLASH PERIOD (7b)	LIGHT: FLASH LENGTH (7c)	LIGHT: COLOR (7d)	POSITION (7e)	DEPTH OF WATER (7f)	CANDELA (7g)	FOCAL PLANE HEIGHT (7h)	STRUCTURE: TYPE, COLOR, AND HEIGHT ABOVE GROUND (7i)	REMARKS *(See instructions)* (7j)

8. ADDITIONAL COMMENTS

9a. NAME AND ADDRESS OF PERSON IN DIRECT CHARGE OF THE AID(S)
9b. TELEPHONE NO.
9c. E-MAIL ADDRESS
10a. NAME AND ADDRESS OF PERSON OR CORPORATION AT WHOSE EXPENSE THE AID(S) WILL BE MAINTAINED
10b. THE APPLICANT AGREES TO SAVE THE COAST GUARD HARMLESS WITH RESPECT TO ANY CLAIM OR CLAIMS THAT MAY RESULT ARISING FROM THE ALLEGED NEGLIGENCE OF THE MAINTENANCE OR OPERATION OF THE APPROVED AID(S).
10c. DATE
10d. SIGNATURE AND TITLE OF OFFICIAL SIGNING

FOR USE BY DISTRICT COMMANDER
SERIAL NO.
CLASSIFICATION OF AIDS(S)
RECD
CHART
LNM
DATE APPROVED
SIGNATURE *(By direction)*

CG-2554 (05/18) — Reset — Page 1 of 5

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Step 4: Design Approval & Permitting

#3. Section 7 ESA / NMFS and Section 106 Consultations

ESA consultation: https://www.fws.gov/service/esa-section-7-consultation
NMFS consultation: https://www.fisheries.noaa.gov/southeast/endangered-species-conservation/esa-section-7-interagency-consultation-southeast-united-states
Section 106: https://www.oech.pr.gov/

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1875 Century Blvd
Atlanta, Georgia 30345

In Reply Refer To:
FWS/R4/WSFR/PR FADs

August 18, 2020

Honorable Rafael Machargo-Maldonado, Secretary
Puerto Rico Department of Natural and Environmental Resources
San José Industrial Park
1375 Ave Ponce de Leon
San Juan, Puerto Rico 00926
DUNS: 090469086

Subject: Delegation for the PR-DNER to serve as non-federal representative for ESA Section 7 consultations for U. S. Fish and Wildlife Service (USFWS) Sport Fish Restoration Grants

Dear Secretary Machargo-Maldonado:

We have received your request for delegation of the Puerto Rico Department of Natural and Environmental Resources (PR-DNER) to serve as a non-federal representative for the Endangered Species Act consultation requirements for USFWS Sport Fish Restoration Program grant awards to PR-DNER for fish attracting devices (FADs) design and deployments.

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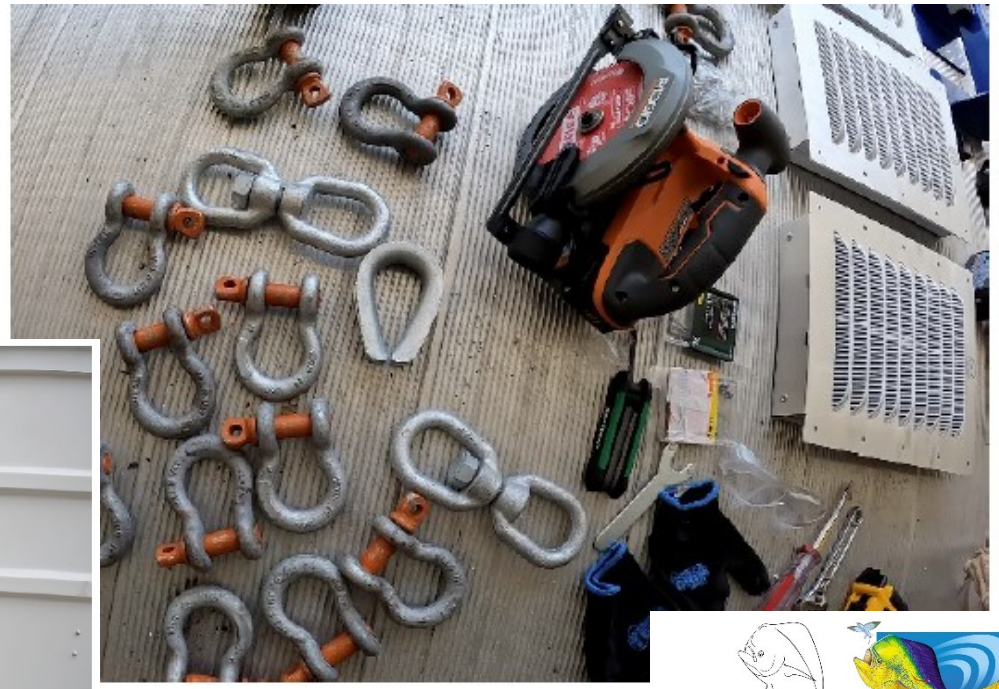
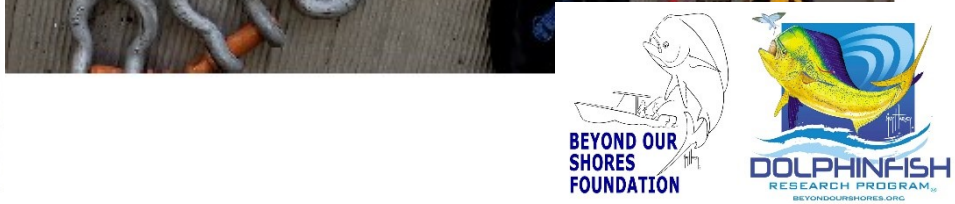
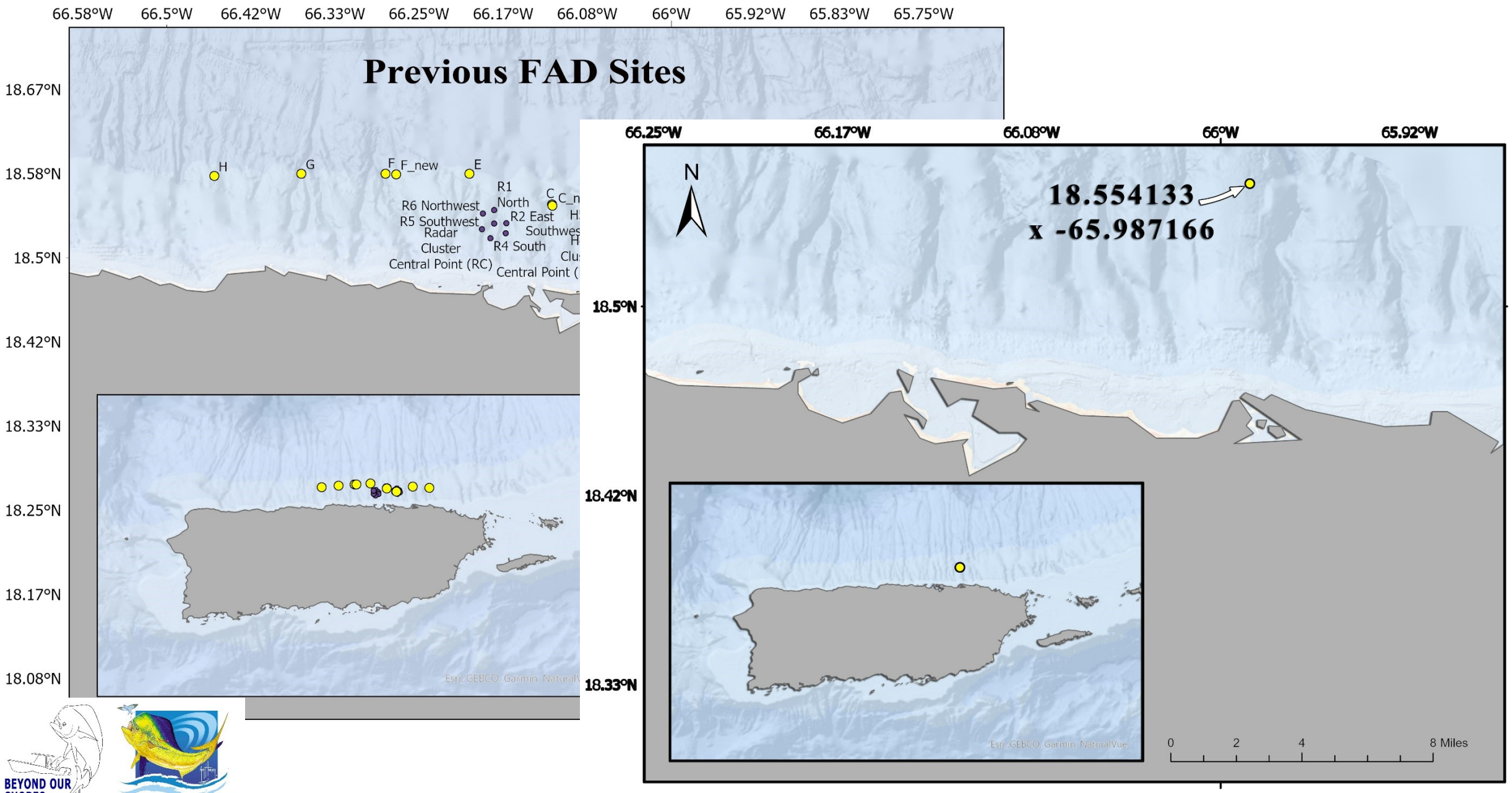
Step 5: FAD Component Sourcing and Construction





Step 6: Nature-Based sFAD and dFAD Deployment



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In Summary:

Building experience in FAD research themes through time:

Projects 1-5: FAD visual census, vessel activity, catch & effort, tagging (acoustic, satellite, conventional)

Projects 6-7: Funding submerged FAD construction & deployment, enhancing VTS study, new sensors introduced

Project 8: Nature-based FAD design research, component sourcing, permitting, VTS study, pending deployment & monitoring (effectiveness)

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41
Total de FAD Desplegados

FADs Activo
0

3835
Informes

1288
Fish Tagged en FADs en el Carib

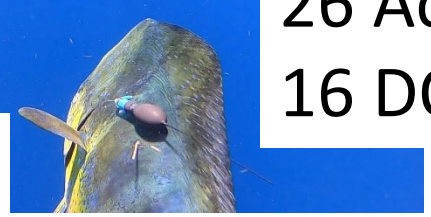
As of 8.4.2026

24 Surface / 17 Subsurface

Trips up to August 4th, 2026

2 Published
1 in review
1 in prep

37 Satellite Tag Deployments
28 DOL, 6 WAH, 1 FAL, 1 YFT, 1 BUM



26 Acoustic Tag Deployments
16 DOL, 5 YFT, 3 WAH, 1 BLK, 1 FAL

FAD Research Program

51 Vessels Involved

Scientia Marina 82(2)
June 2018, 000-000, Barcelona (Spain)
ISSN-L: 0214-8358
https://doi.org/10.3989/scimar.04730.09A

Use of video monitoring to quantify spatial and temporal patterns in fishing activity across sectors at moored fish aggregating devices off Puerto Rico

Wessley Merten[1], Roberto Rivera[2], Richard Appeldoorn[2], Kelvin Serrano[2], Omar Collazo[2]

Increase in Dolphinfish (*Coryphaena hippurus*) Fishing Success Off the North Coast of Puerto Rico during Hurricane *Leslie*

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Acknowledgements

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Captain Luis Lagradier (Puerto Rico Sportfishing Charters)
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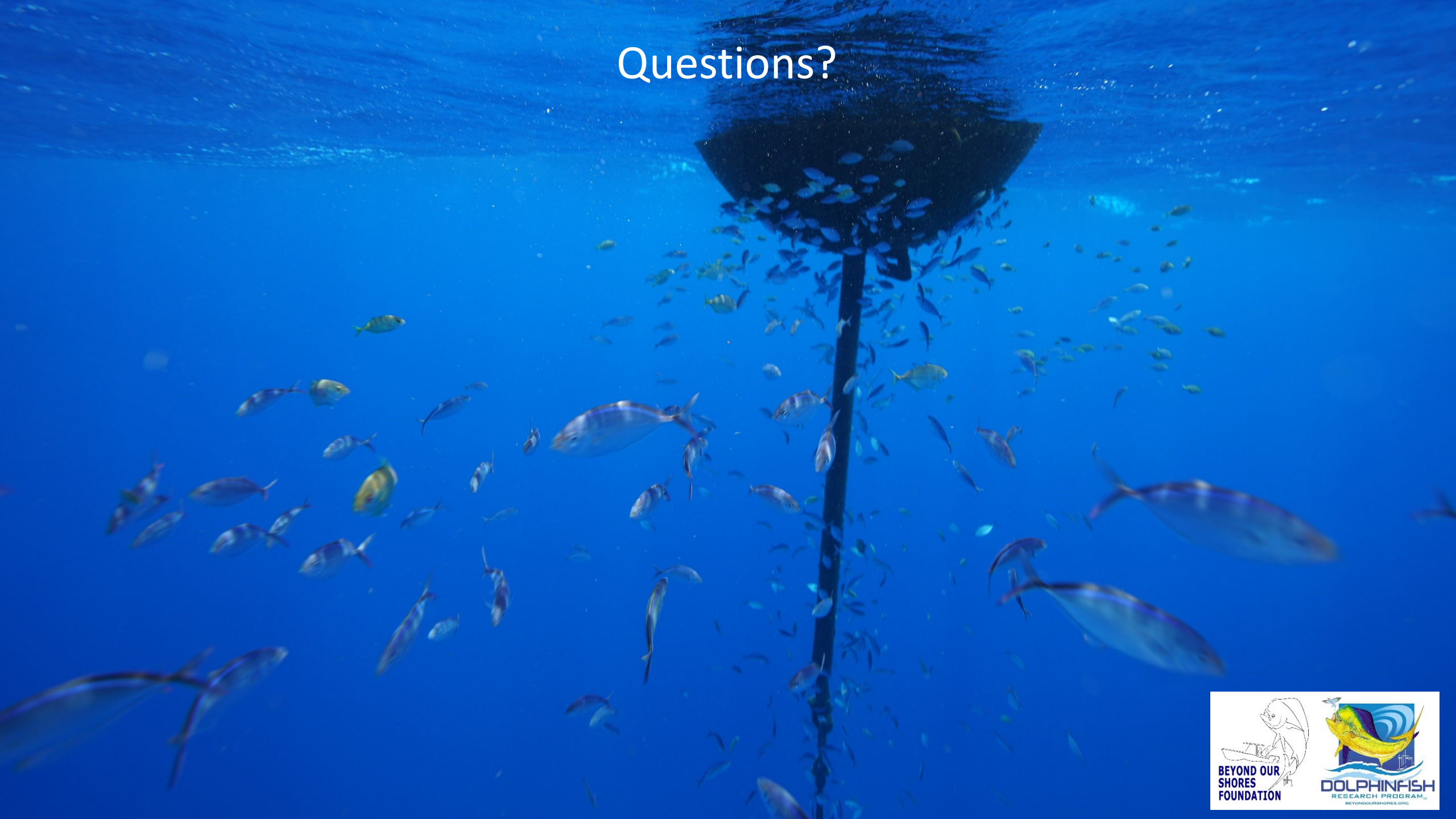
Captain Ron Teke (Colorado Magic)
Captain David Neblett (Hit That)
Captain Hunter Stokes (Painkiller)
Captain Chris Jobes (Pair of Docs)
Captain Rick Perrson (Swamphopper)
Captain Dan Gates (No Name)
Captain Don Gates (Killin' Time II)
Captain David Wamer (Wam-Jam)
Captain Kenny Midgett (Marlin Gull)

Questions?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