

Characterizing dFADs and assessing compliance with non-entangling netting guidelines (2018-2025): Preliminary results from the Hawaiian Archipelago

Caracterización de los dFADs y evaluación del cumplimiento de las directrices sobre redes no enmallantes (2018–2025): Resultados preliminares del Archipiélago de Hawái

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Introduction / *Introducción*

Escalle et al., (2022)

- Simulated drift trajectories of dFADs show greater connectivity of Hawaii with the Eastern Pacific Ocean than the Western and Central Pacific Ocean

Las trayectorias de deriva simuladas de los dFADs muestran una mayor conectividad de Hawái con el Océano Pacífico Oriental que con el Océano Pacífico Occidental y Central

Royer et al., (2023)

- Documented dFAD strandings and beachings throughout the Hawaiian Archipelago from 2015-2021

Eventos documentados de encallamiento y varamiento de dFADs a lo largo del Archipiélago de Hawái entre 2015 y 2021

- All dFADs from retrieved from the Hawaiian Archipelago (n=13) originated from the Eastern Pacific Ocean

Todos los dFADs recuperados del Archipiélago de Hawái (n=13) se originaron en el Océano Pacífico Oriental

IATTC Resolution Timeline

Línea de tiempo de las resoluciones de la CIAT

Resolution C-13-04: dFADs should be constructed in a manner that avoids entangling marine life

2013: Los dFADs deben ser contruidos de manera que eviten el enmallamiento de la vida marina

Resolution C-19-01: dFADs *should avoid* the use of entangling net (stretched mesh size 7cm or greater)

2019: Los dFADs deben evitar el uso de redes enmallantes (con un tamaño de malla estirada de 7 cm o más)

Resolution C-23-05: Starting January 1, 2025, the use of mesh net is *prohibited* for any part of a FAD

2025: A partir del 1 de enero de 2025, el uso de redes de malla estará prohibido en cualquier parte de un FAD

Objectives / *Objetivos*

I. Create a standardized naming system to visually characterize and identify dFADs throughout the Pacific

Crear un sistema de nomenclatura estandarizado para caracterizar y identificar visualmente los dFADs en el Pacífico

II. Assess the response of fisheries to recent non-entangling dFAD management resolutions

Evaluar la respuesta de las pesquerías a las resoluciones recientes sobre la gestión de dFADs no enmallantes

Methods / Métodos

1. Collect lost or abandoned dFADs that have beached across the Hawaiian Archipelago or have been encountered by Hawaiian longline fisheries offshore from 2018-2025 (n=41)

Recolectar dFADs perdidos o abandonados que hayan encallado en el Archipiélago de Hawái o que hayan sido encontrados por las pesquerías de palangre de Hawái

2. Create a concatenated name for each dFAD

Crear un nombre concatenado para cada dFAD

3. Measure stretched mesh size of any dFAD containing net to determine if it is 7cm or greater (C-19-01)

Medir el tamaño de malla estirada de cualquier dispositivo dFAD que contenga redes para determinar si es de 7 cm o más (C-19-01)

Methods / Métodos

3A) When a dFAD sample is available, take three measurements of the stretched mesh size and calculate the average

Cuando se dispone de una muestra del dFAD, tomar tres medidas del tamaño de malla estirada y calcular el promedio

3B) If no dFAD sample is available, use photos to estimate stretched mesh size

Si no hay una muestra del dFAD disponible, utilizar fotografías para estimar el tamaño de malla estirada



Stretched mesh size $\geq 7\text{cm}$



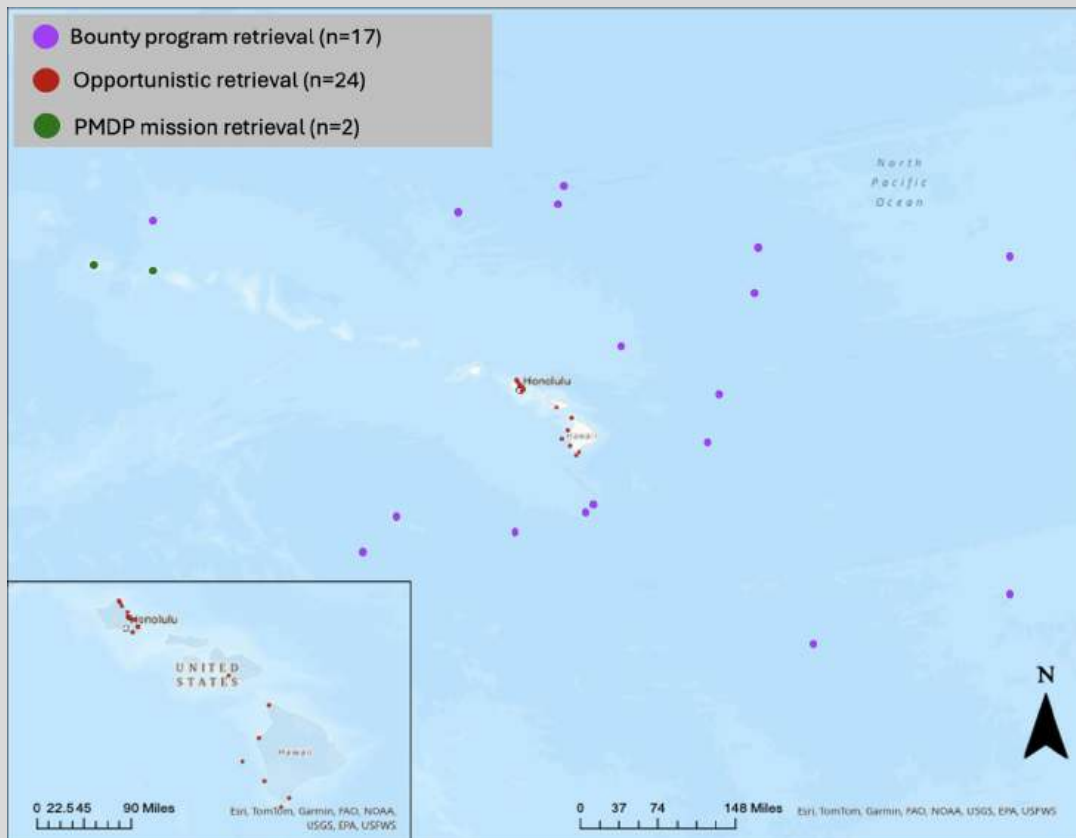
Stretched mesh size $< 7\text{cm}$

Collecting dFADs in Hawaii

Recolección de dFADs en Hawái

Total of 41 well-documented retrievals from 2018-2025

Un total de 41 recuperaciones viables entre 2018 y 2025



Proposed concatenated naming system for dFADs:

Sistema propuesto de nomenclatura concatenada para los dFADs:

Core Format: dFAD Design only

Formato básico: solo el diseño del dFAD

Formula:

Surface Raft Type

Submerged Tail Type

Accessory Types (if present)

Fórmula:

Diseño de la balsa superficial

Diseño de la cola sumergida

Accesorios (si los hay)

Expanded Format: Includes additional descriptors (i.e., covered or uncovered, specification of materials, etc.) for science and management purposes

Formato ampliado: Incluye descriptores adicionales (cubierto o descubierto, especificación de materiales, etc.) para fines científicos y de gestión

Surface Raft Types / *Diseños de balsas superficiales*

*only includes components that are visible from the surface

**solo incluye componentes que son visibles desde la superficie*

- Core Format:** {
- **RAFT TYPE A:** Pole Grid
 - **RAFT TYPE B:** Float Bundle
 - **RAFT TYPE C:** Long String

Expanded Format descriptors:

- Covered or Uncovered
- Specification of Materials

Descriptores del formato ampliado:

- *Cubierto o Descubierto*
- *Especificación de materiales*

Raft Type A: Pole Grid

Characteristics: Poles (commonly bamboo and/or plastic pipes) lashed together in a rectangular grid formation

Características: Postes (comúnmente de bambú y/o tubos de plástico) amarrados entre sí formando una rejilla rectangular



Core Format Name: "Raft A"

Expanded Format Name: Small mesh net-covered, bamboo, and purse seine cork "Raft A"



Core Format Name: "Raft A"

Expanded Format Name: Bamboo slat covered bamboo "Raft A"

Raft Type B: Float Bundle

Characteristics: Purse seine floats tied together in a matrix (usually 1x7 or 2x3)

Características: Flotadores de cerco atados entre sí en una matriz (normalmente 1x7 o 2x3)



Raft B: 1x7 matrix

Core Format Name: "Raft B"

Expanded Format Name: Screen Covered 1x7 "Raft B"



Raft B: 2x3 matrix

Core Format Name: "Raft B"

Expanded Format Name: Net covered 2x3 "Raft B"

Raft Type C: Long String

Characteristics: A “long string” of floats, plastic pipes, or bamboo tied on a rope

Características: Una cuerda larga de flotadores, tubos de plástico o bambú amarrados a una soga



Core Format Name: “Raft C”

Expanded Format Name: Net covered plastic pipe and two-ear float “Raft C”

Submerged Tail Designs / *Diseño de la cola sumergida*

Core Format names:

- **TAIL TYPE A:** Single Panel
- **TAIL TYPE B:** Multi-Panel
- **TAIL TYPE C:** Solo Sausage



"Net Bundle Border"



"Screen Rope Border"

For Expanded Format Only: state the material, *then* the tail border when present (bundle or rope), *then* tail type (i.e., "Screen rope border 'Tail B' " or "Net Bundle Border 'Tail C' ")

Solo para el Formato Ampliado: indicar primero el material, luego el borde de la cola cuando esté presente (manejo o cuerda), y después el tipo de cola (por ejemplo: "Borde de cuerda con malla tipo 'Cola B'" o "Borde de manejo con red tipo 'Cola C'")

Tail Type A: Single Panel Tail

Characteristics: A tail that only uses one panel of netting or screen throughout its whole length

Características: Una cola que utiliza solo un panel de red o malla a lo largo de toda su longitud



Core Name: "Tail A"

Expanded Name: Screen Rope Border "Tail A"

Tail Type B: Multi-Panel Tail

Characteristics: A tail that uses two or more panels of netting or screen throughout its whole length

Características: Una cola que utiliza dos o más paneles de red o malla a lo largo de toda su longitud



Core Name: "Tail B"

Expanded Name: Net Bundle Border "Tail B"

Tail Type C: Solo Sausage

Characteristics: A net or screen that has been twisted and lashed into a bundle called a “sausage” and stands alone as the only portion of the subsurface tail

Características: Una red o malla que ha sido enrollada formando un paquete llamado “salchicha” y que constituye por sí sola la única parte de la cola sumergida.



Core Name: “Tail C”

Expanded Name: Net “Tail C”

Accessory Types / *Tipos de accesorios*

- Core Format: {
- **ACCESSORY TYPE A:** Spreaders
 - **ACCESSORY TYPE B:** Tassels
 - **ACCESSORY TYPE C:** Three Dimensional

For Expanded Format Only: state the material, *then* the Accessory Type (i.e., Tarp Accessory B)

Solo para el Formato Ampliado: indicar primero el material y luego el tipo de accesorio (por ejemplo: Lona Accesorio B).

Accessory Type A: Spreaders

Characteristics: Crossbars that help to stabilize the tail, prevent twisting and increase surface area

Características: Barras transversales que ayudan a estabilizar la cola, prevenir enredos y aumentar la superficie.



Close up photo of a bamboo spreader



Core Name: "Accessory A"

Expanded Name: Bamboo "Accessory A"

Accessory Type B: Tassels

Characteristics: Tassels or attractors that are attached to the tail. Often made of tarp, or twisted lines.

***Características:** Flecós o atractores que se colocan en la cola. Frecuentemente hechos de lona o cuerdas torcidas*



Core Name: "Accessory B"

Expanded Name: Twisted line "Accessory B"



Core Name: "Accessory B"

Expanded Name: Tarp "Accessory B"

Accessory Type C: Three Dimensional

Characteristics: A three dimensional shape that acts as a subsurface drogue. May come in different three dimensional shapes.

Características: Una forma tridimensional que actúa como un ancla de deriva subsuperficial. Puede presentarse en diferentes formas tridimensionales.

*Additional Expanded

Format note: State the material of the frame, then shape, then material of the covering

*Nota adicional para el Formato Ampliado:

Indique primero el material del marco, luego la forma y después el material del recubrimiento



Core Name: "Accessory C"

Expanded Name: Metal Cube Screen "Accessory C"

Time to Concatenate! / *¡Es hora de concatenar!*

Formula:

Surface Raft Type

Submerged Tail Type

Accessory Types (if present)

Fórmula:

Diseño de la balsa superficial

Diseño de la cola sumergida

Accesorios (si los hay)



This would be a...

Esto sería un...

Core Format Name:

Raft B (1x7 Float Bundle)

Tail A (Single Panel Net)

Accessories A + B (Spreaders + Tassels)

Expanded Format Name:

Covered 1x7 Raft B

No Border Net Tail A

Bamboo Accessory A

and Tarp + Twisted Line Accessory B



This would be a...

Esto sería un...

Core Format Name:

Raft C (Long String)

Tail A (Single Panel Tail)

Accessories A+C (Spreaders + Three Dimensional)

Expanded Format Name:

Covered plastic pipe and two-ear float Raft C

Rope Border Screen Tail A

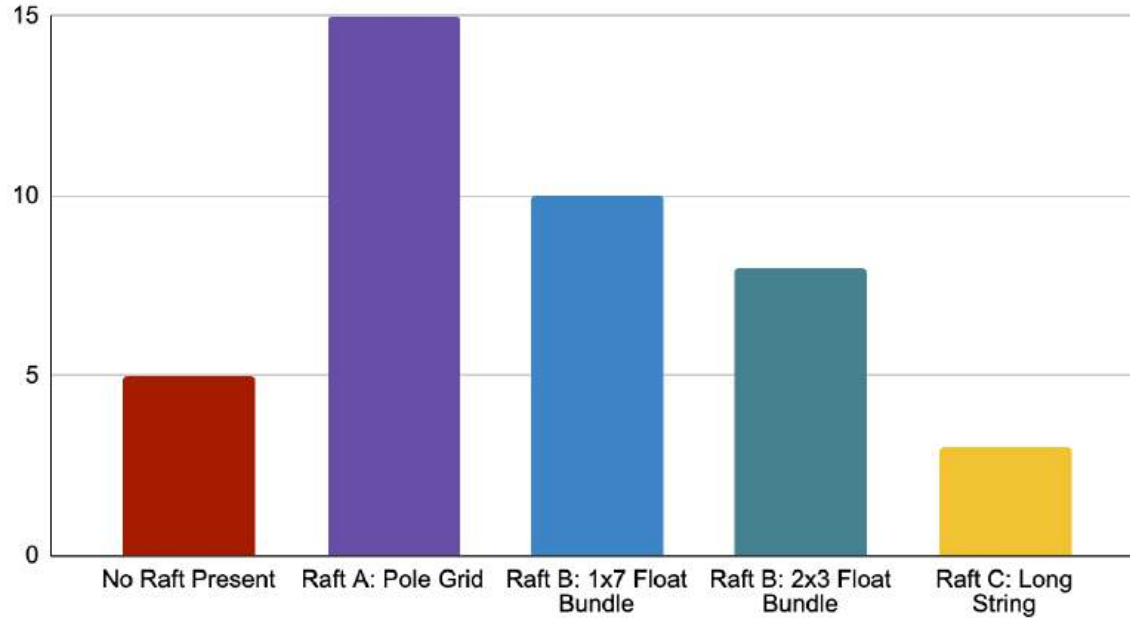
Bamboo Accessory A

and Screen Metal Cube Accessory C

Results / Resultados

Count of Most Common Raft Designs

Conteo de diseños de balsas más comunes



Raft Design Nickname



Raft A: Pole Grid



Raft B: Float Bundle

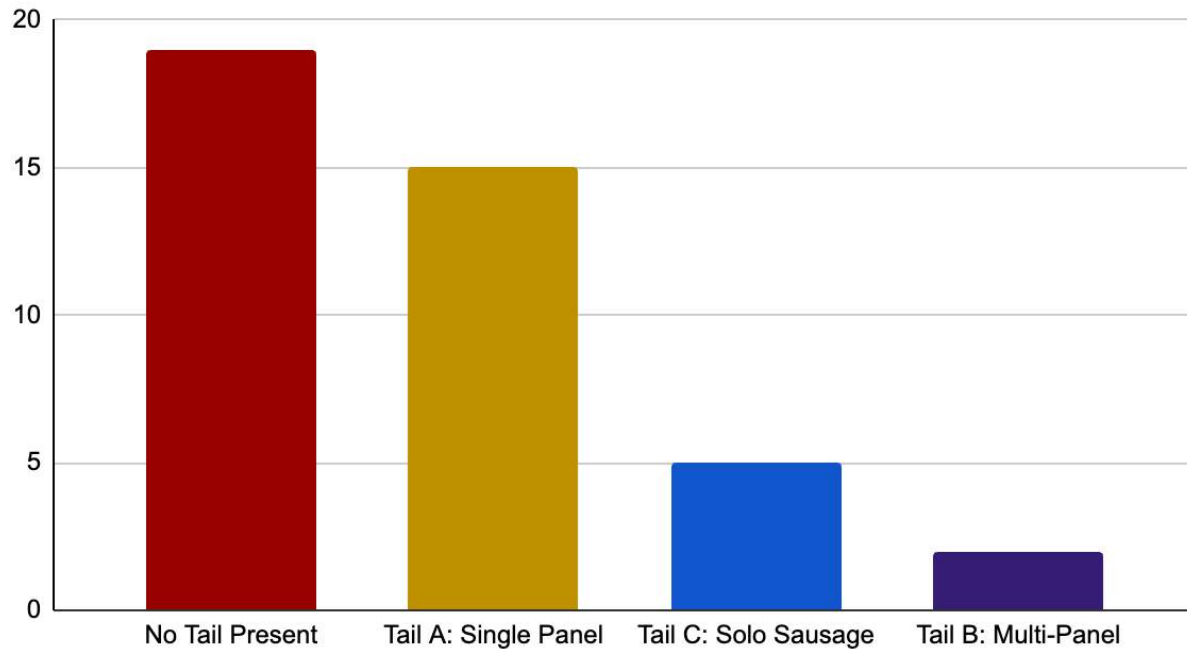


Raft C: Long String

Results / Resultados

Count of Most Common Tail Designs

Conteo de diseños de colas más comunes



Tail Design Nickname



Tail A: Single Panel



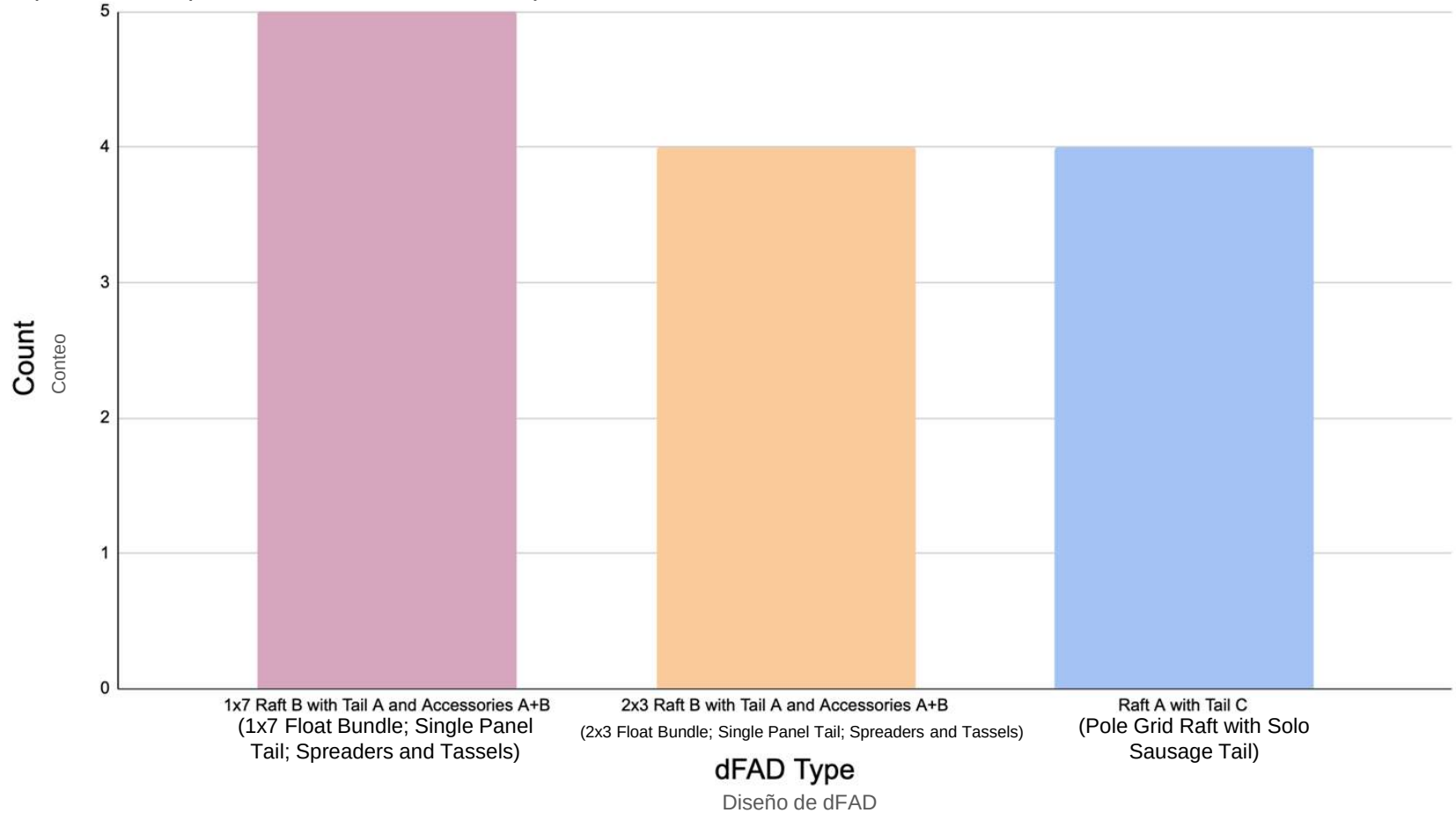
Tail B: Multi-Panel



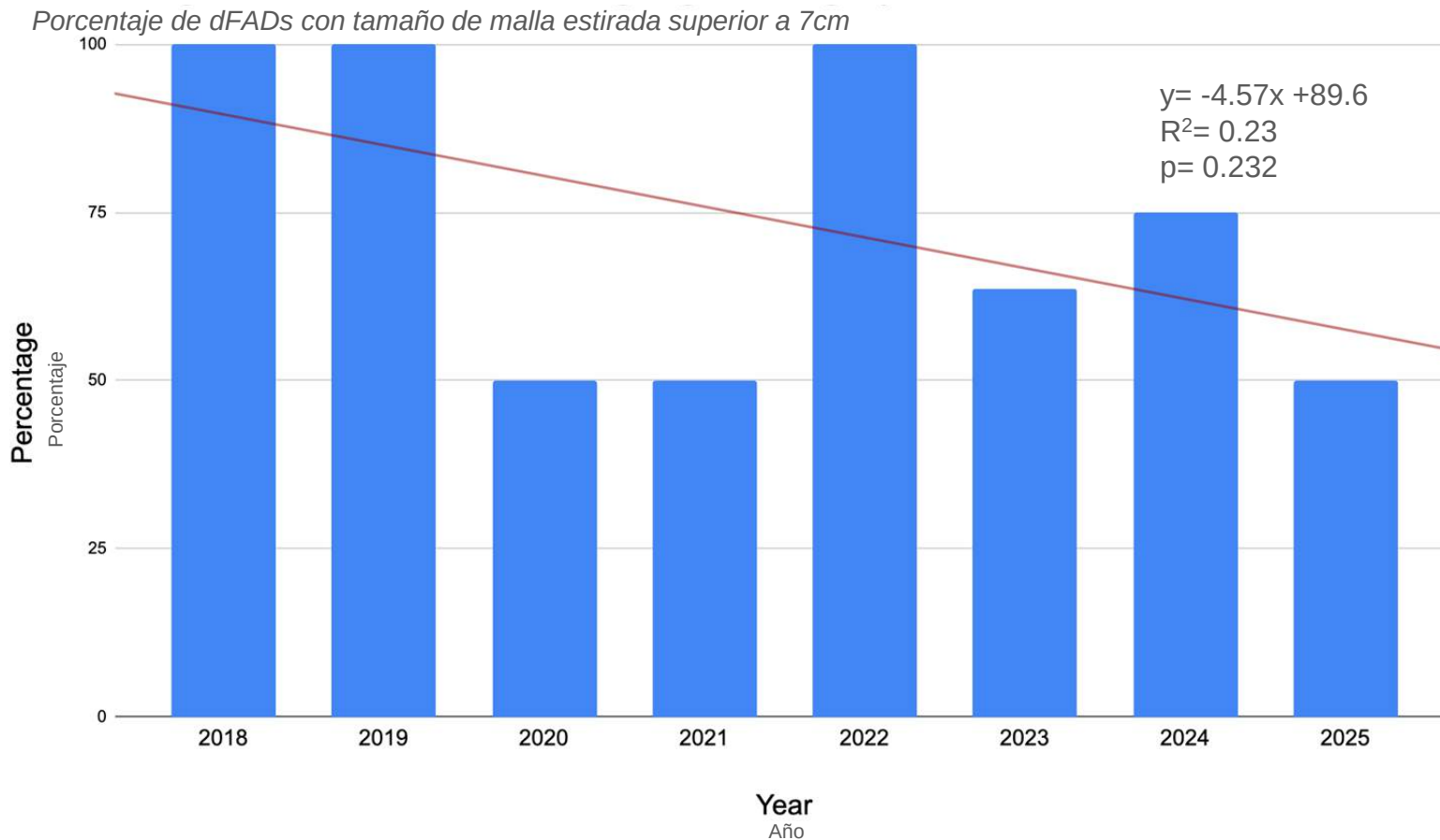
Tail C: Solo Sausage

Most Common Full dFAD Designs

(Diseños completos de dFAD más comunes)



Percentage of dFADs with stretched mesh size >7cm

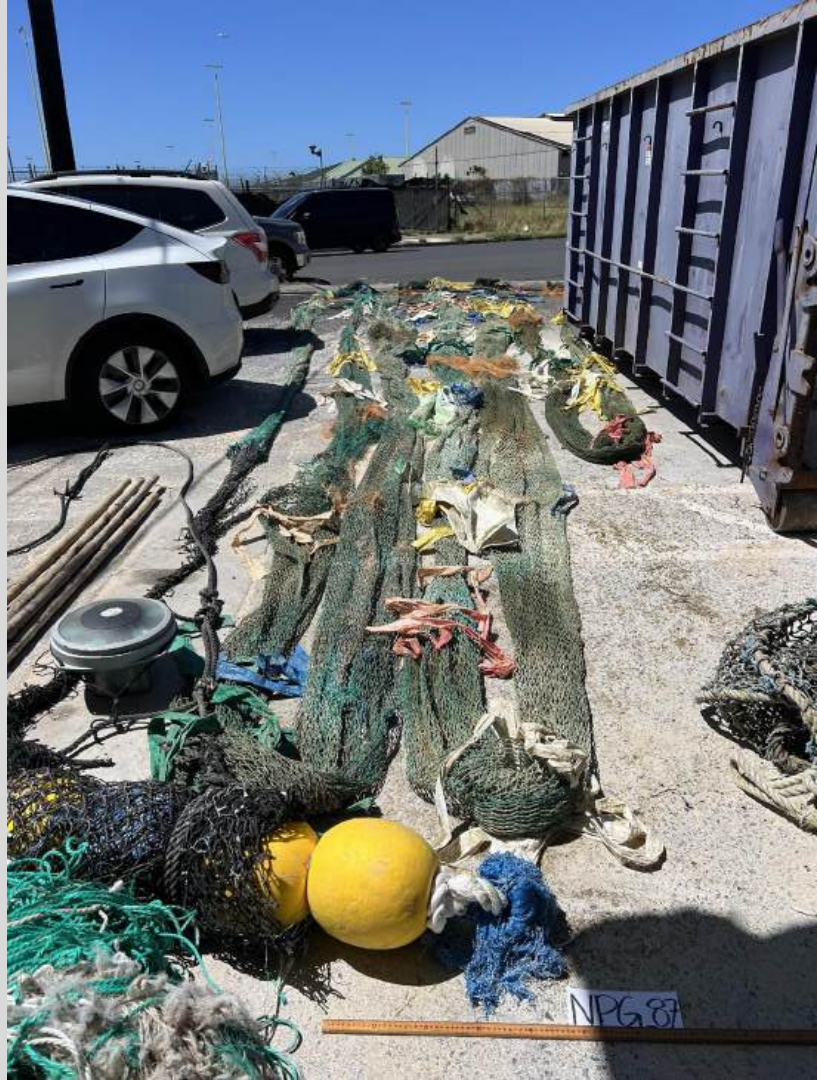


Conclusions / Conclusiones

The most common dFAD designs retrieved near the Hawaiian Archipelago from 2018-2025 are:

Los diseños de dFAD más comunes recuperados cerca del Archipiélago de Hawái entre 2018 y 2025 son:

1. **1x7 Raft B with Tail A and Accessories A+B**
(1x7 Float Bundle Raft; Single Panel Tail; Spreaders and Tassels)
1. **2x3 Raft B with Tail A and Accessories A+B**
(2x3 Float Bundle Raft; Single Panel Tail; Spreaders and Tassels)
1. **Raft A with Tail C**
(Pole Grid Raft; Solo Sausage Tail)



Conclusions / Conclusiones

Preliminary data suggest a non-significant decreasing trend ($p = 0.232$) in the percentage of dFADs with stretched mesh size $>7\text{cm}$ from 2018 to 2025

Los datos preliminares sugieren una tendencia decreciente no significativa ($p = 0.232$) en el porcentaje de dFADs con un tamaño de malla estirada superior a 7 cm entre 2018 y 2025



Stretched mesh size $\geq 7\text{cm}$



Stretched mesh size $< 7\text{cm}$

Next Steps / *Próximos Pasos*

- Continue data collection through 2025

Continuar la recolección de datos hasta el fin de 2025

- Conduct a polymer identification and mass-fraction analysis on each dFAD from 2018-2025 to determine any changes in the proportion of biodegradable materials in dFADs over time

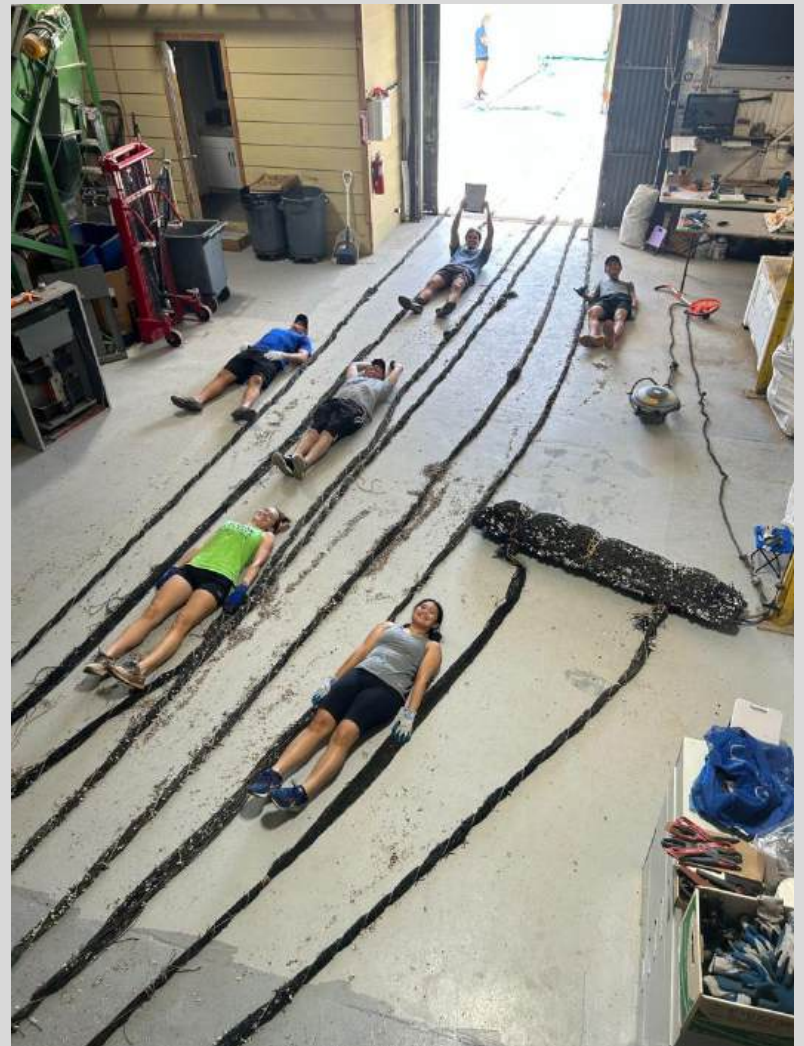
Realizar un análisis de fracción de masa en cada dFAD de 2018 a 2025 para determinar cualquier cambio en la proporción de materiales biodegradables en los dFADs a lo largo del tiempo

Thank you

Gracias

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References / *Referencias*

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