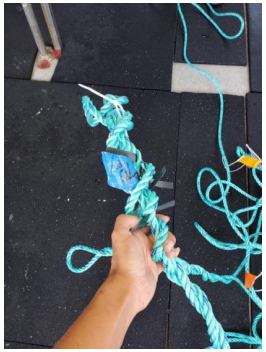
Seabird Bycatch Mitigation Experiments and Regulatory Updates in the Hawaii Longline Fishery





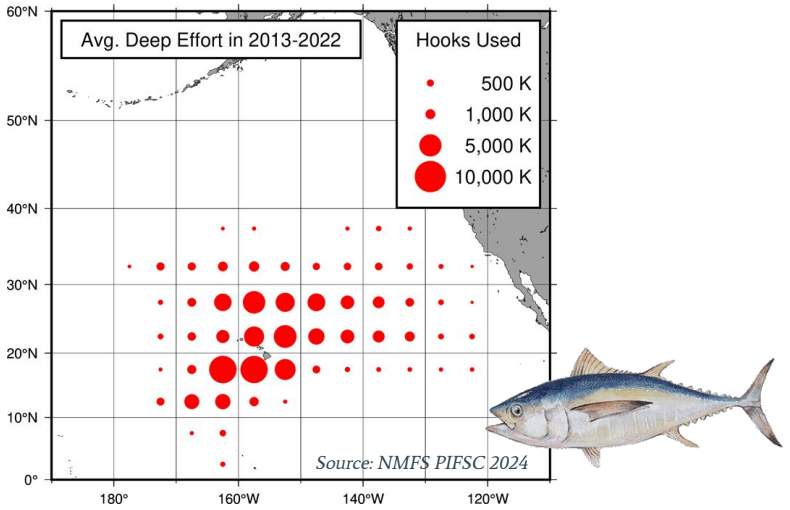
Second Informal Intersessional Meeting to Review WCPFC CMM 2018-03
May 7, 2024

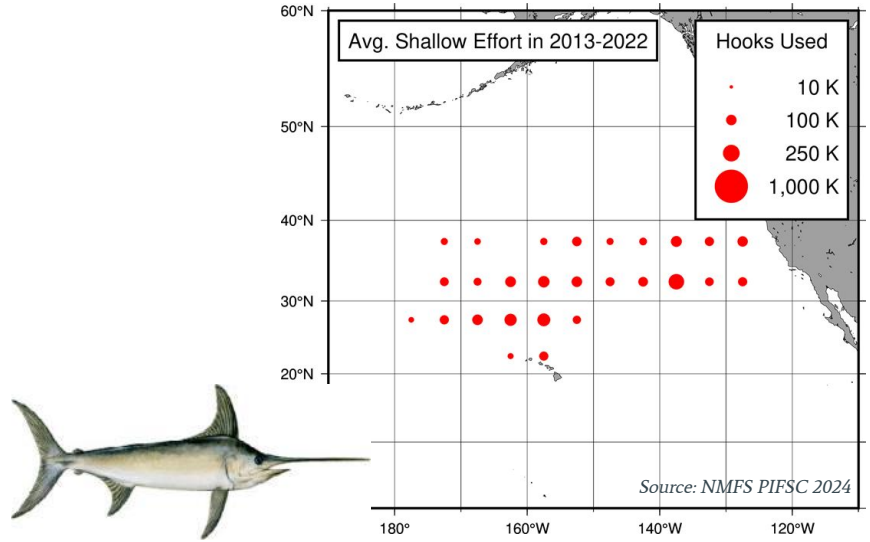
Asuka Ishizaki, Western Pacific Regional Fishery Management Council

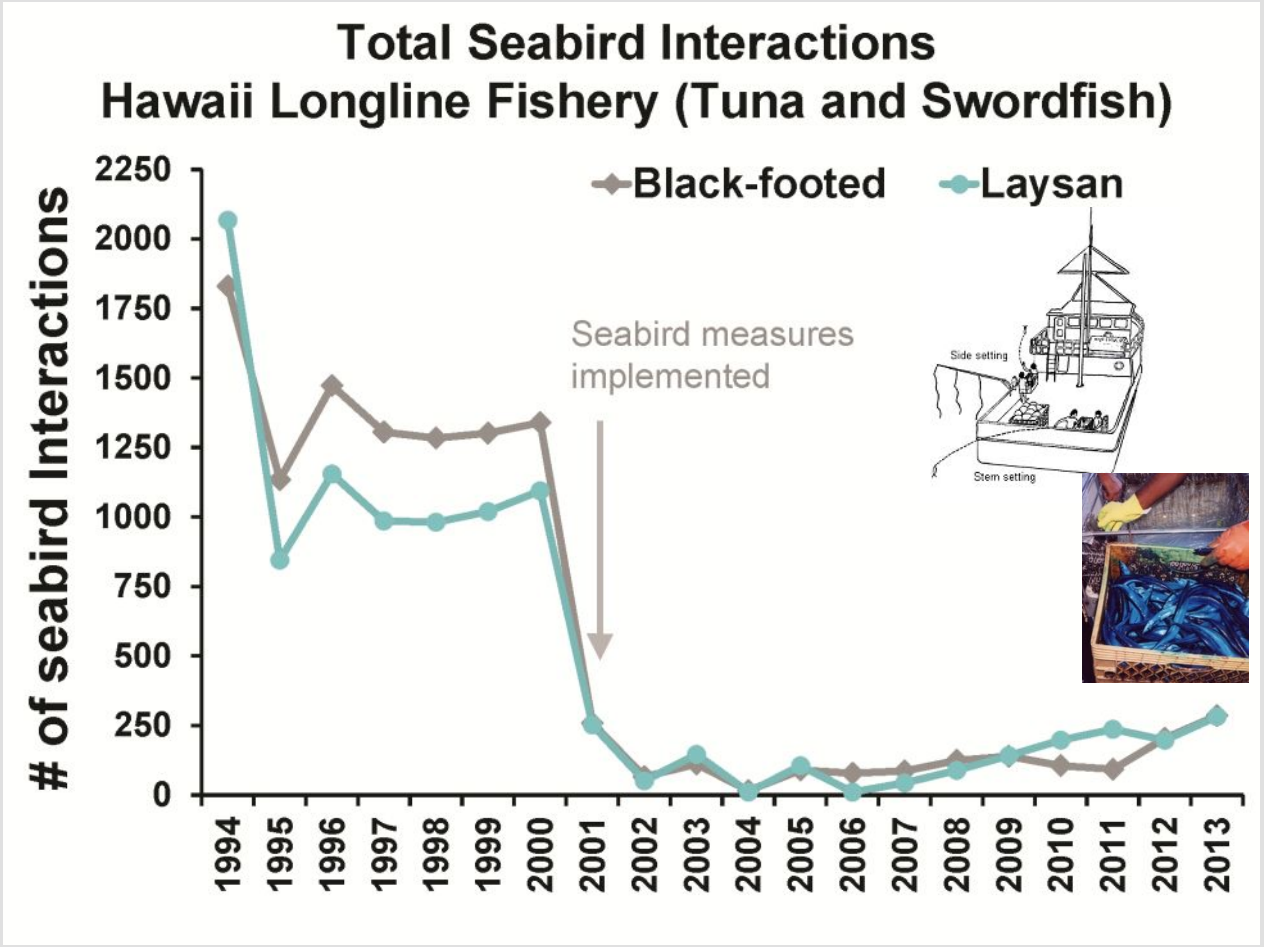
Hawaii Longline Fishery

Bigeye tuna-targeting deep-set (DSLL)

Swordfish-targeting shallow-set (SSLL)







Seabird measures implemented in Hawaii longline fishery since 2001 **reduced bycatch by 70-90%**

Domestic Seabird Regulatory Requirements for US Hawaii Longline Fishery (through 2023)

DSLL (applies north of 23°N)

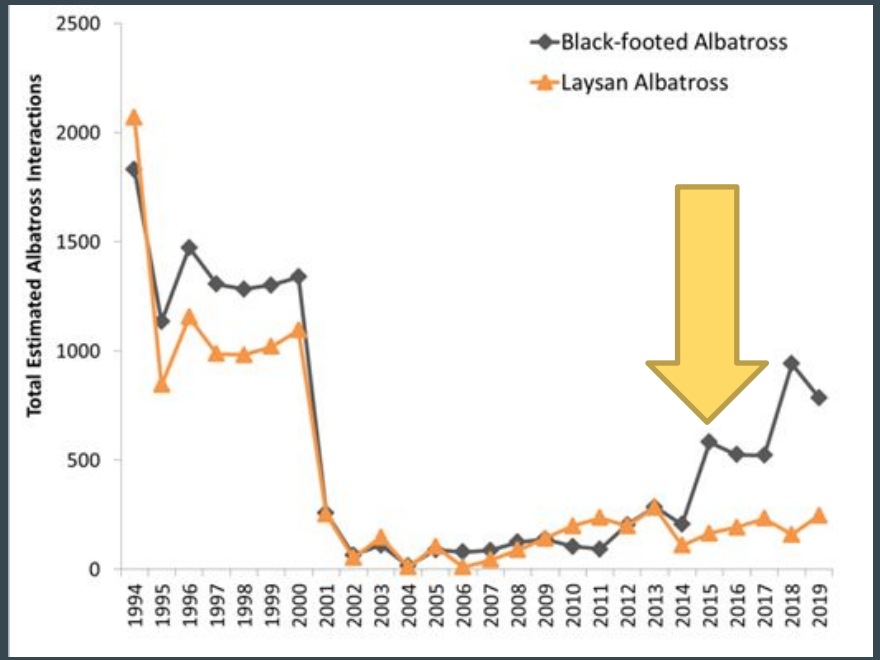
When side-setting, also use:	When stern-setting:
Bird curtain + >45g weight within 1m of hooks	Blue-dyed thawed bait + Strategic offal discards (when seabirds present) + >45g weight within 1m of hooks + Line shooter

SSLL (applies everywhere; most effort north of 23°N)

When side-setting, also use:	When stern-setting:
Bird curtain + >45g weight within 1m of hooks	Blue-dyed thawed bait + Strategic offal discards (when seabirds present) + Night set

- First implemented in 2001; modified in 2006
- Select from side-setting or stern-setting option (each with combination of measures)
- ~82% of DSLL vessels & nearly all SSLL vessels used stern-setting & blue-dyed bait option
- Fishermen also required to handle live seabirds to maximizes survival & owners/operators required to attend annual workshop
- New DSLL stern-setting measures implemented in 2024 (no changes to SSLL)

Interactions gradually increased through 2014, and higher BFAL interactions in DSLL starting in 2015



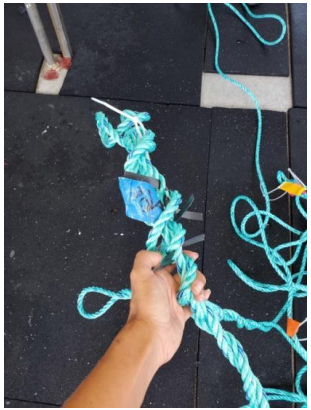
2017: Council workshop to improve understanding of factors underlying increased interactions

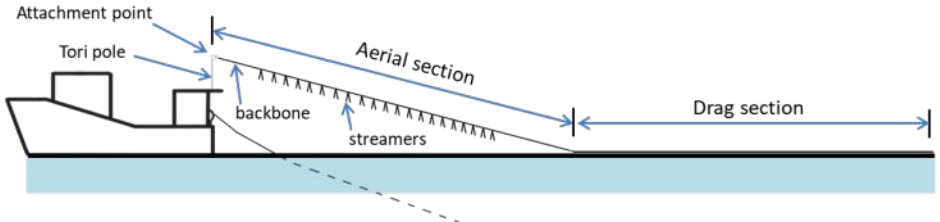
2018: Council workshop to review existing Hawaii longline seabird measures and prioritize other measures warranting testing

- High priority = **TORI LINES**
- Candidate for removal = **Blue-dyed bait**
- Night setting not suitable for DSLL
- Side-setting still effective for DSLL

Hawaii Deep-set Longline Tori Line Project (2019-2021)

- Tori lines previously tested in Hawaii longline fishery (McNamara et al. 1999, Boggs 2001) but not adopted due to entanglement and safety concerns
- Design and test tori line suitable for use in Hawaii deep-set longline fishery
- Collaboration between industry, Council, NMFS and researchers
- Input from Hawaii longline fishermen throughout project
- Trials conducted on commercial longline vessels

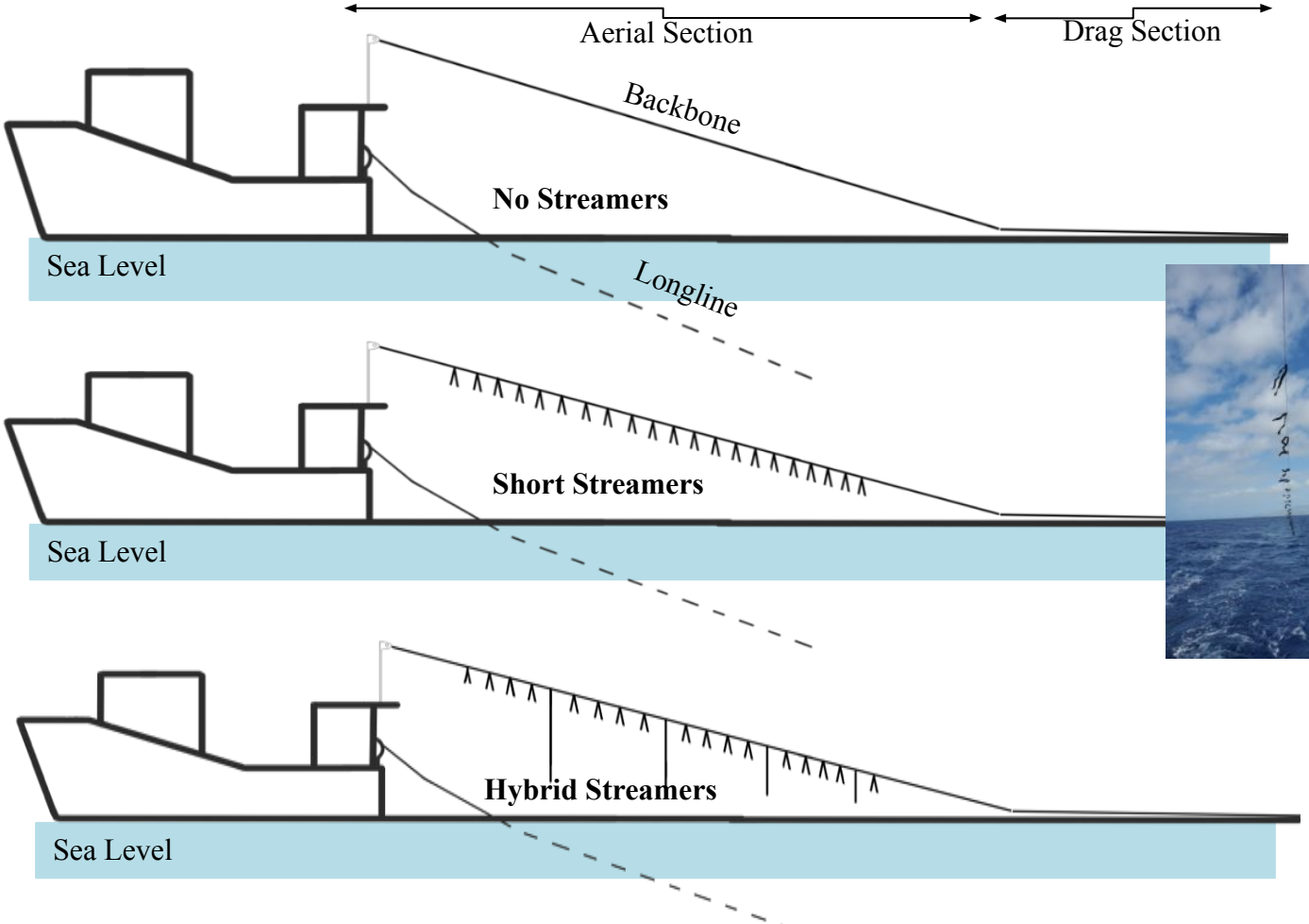


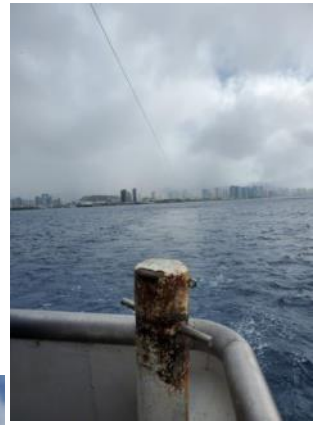


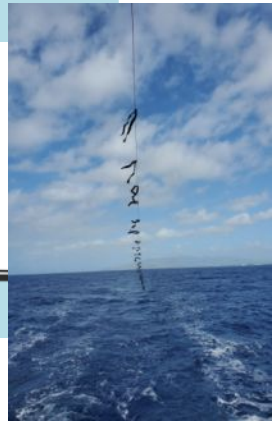
Designing a tori line for the Hawaii deep-set longline fishery

- Relatively small vessels (<101ft/30.8m)
- No diving birds
  - Primarily Laysan and black-footed albatrosses
  - Dive depth < 2m
  - ~40m aerial coverage needed
- Focus on minimizing tangles
- Light weight & streamlined
- Materials available from local vendors
- Input from Hawaii longline fishermen
- Input from NZ and Japanese tori line experts working with small vessels

Three Design Options: Streamerless, Short Streamers, Hybrid Streamers





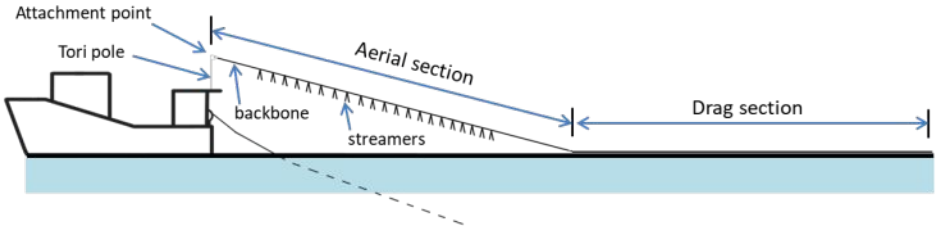


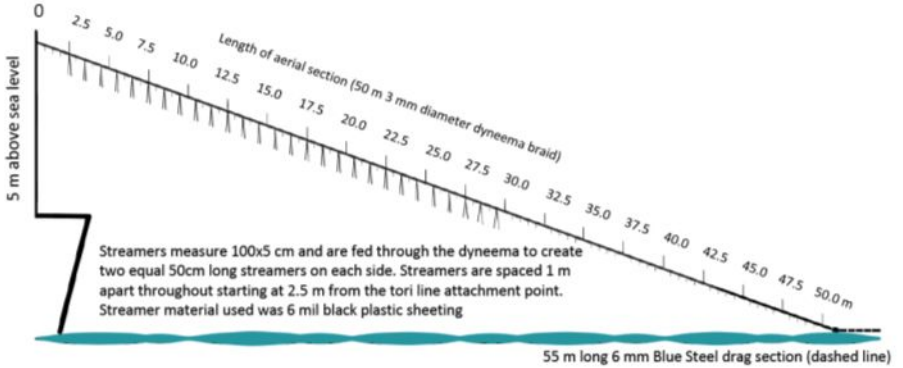
Building & testing components

Detailed process described in Gilman et al. 2021 (SC18-EB-IP-14)

Tori Line Design

- Short streamer design selected for trials
- 50m aerial section (dyneema with short streamers spaced 1 m apart)
- 55m drag section (6mm braided rope only)
- Attached at 5m height
- Participating fishermen found design easy to use, safe, and durable
- Consistent with CMM 2018-03 short steamer specifications





Field Trials in the Hawaii DSLL Fishery

Trial 1 (Feb-July 2020)

- Used tori lines in conjunction with existing required seabird measures (blue-dyed bait, weights, line shooter, and strategic offal discharge when N of 23N)
- Alternating sets with/without tori line
- Data collected through stern-mounted EM camera
- 4 vessels, 16 trips, 189 sets

Trial 2 (Feb-June 2021)

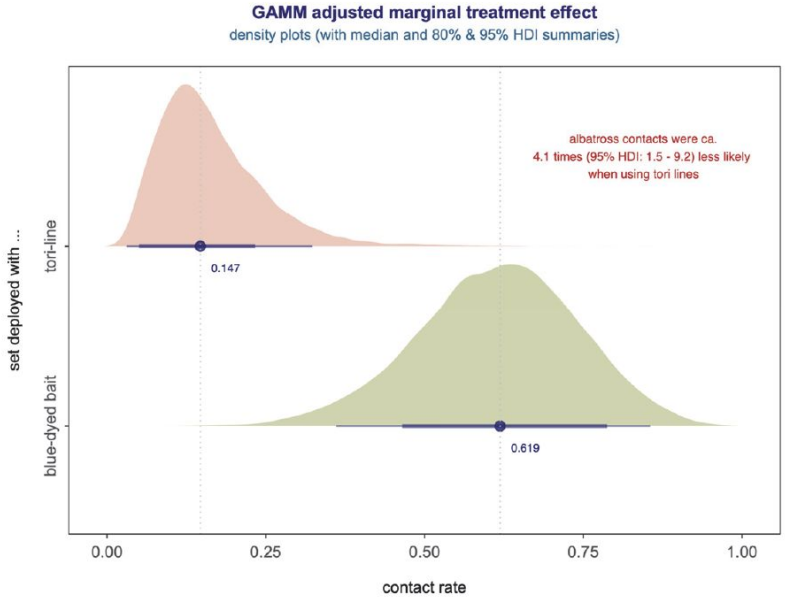
- Test efficacy of tori lines compared to blue-dyed bait
- Alternating sets using tori lines or blue-dyed bait
- All sets using weights and line shooter
- No strategic offal discharge (eliminate confounding factor)
- Data collected through stern-mounted EM camera
- 3 vessels, 7 trips, 87 sets

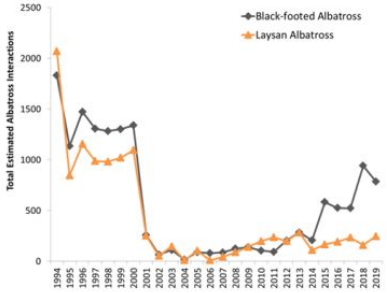
Trial Results

- Albatrosses 4x less likely to make contact with baited hooks, 14x less likely to get caught when tori lines used instead of blue-dyed bait (small sample size for captures)
- >99% of interactions <50m astern
- Trials did not test efficacy of blue-dyed bait compared to regular bait

Trial 1 results: see SC18-EB-IP-21

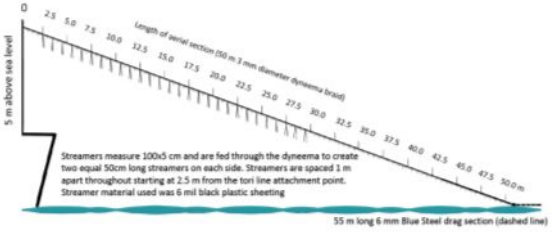
Trial 2 results: see SC18-EB-IP-15





Higher Albatross Interactions
Higher albatross interactions in the DSLL fishery observed.

Council Second Workshop
Review seabird measures. Tori line identified as high priority research for DSLL. Blue-dyed bait candidate for removal.



Trial 1 Results
& Council Direction on Regulatory Amendment
Council recommends initiation of regulatory amendment development.

Tori line roll-out & Rulemaking

2015 — 2017 — 2018 — 2019 — 2020 — 2021 — 2022-2023

Council First Workshop
Workshop to improve understanding of factors underlying increased interactions.

Council Recommends Research & Cooperative Research Initiated
Tori line design development and first at-sea trial.

Trial 2
& Council Action
Second trial to test tori line efficacy compared to blue-dyed bait under region's first EFP. Council takes final action in Dec.

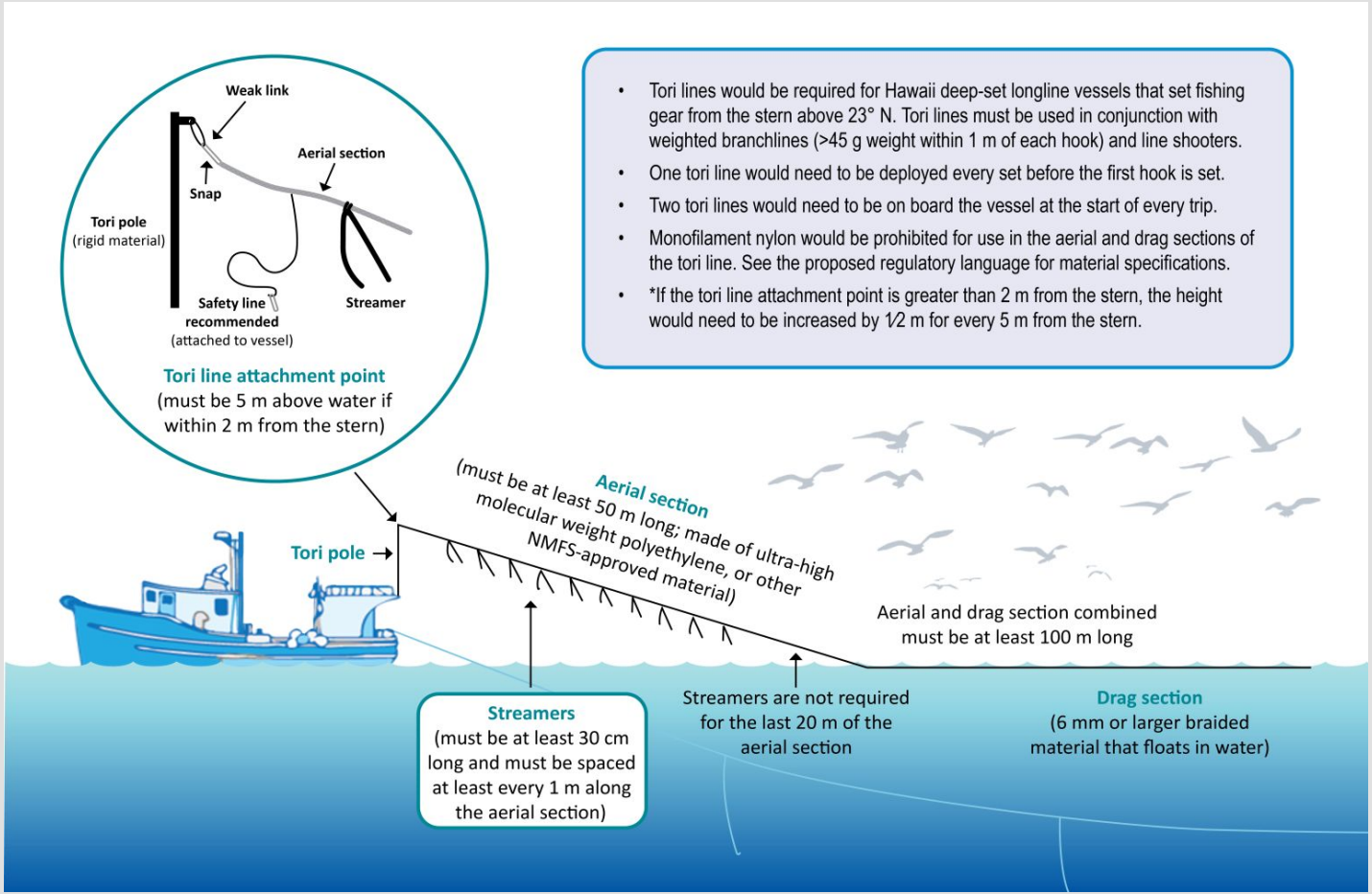
New Regulatory Requirements for Hawaii DSLL (April 1, 2024)

Stern-setting deep-set vessels must use (N of 23N):	
Old Requirements	***NEW* Requirements**
Blue-dyed thawed bait	**Tori line**
Strategic offal discards (when seabirds present)	
>45g weight within 1m of hooks	>45g weight within 1m of hooks
Line shooter	Line shooter

- Tori line specifications included in regulations
- Tori line & pole free distribution with bilingual outreach in advance of rule change
- No change to side-setting option
- Best practices for offal management included in annual protected species workshop in lieu of regulatory requirement

For detailed analysis on the regulatory change, see Regulatory Amendment and Environmental Assessment for the Modification of Seabird Interaction Mitigation Measures in the Hawaii Deep-set Longline Fishery
https://www.fisheries.noaa.gov/action/tori-line-requirement-stern-setting-vessels-hawaii-deep-set-longline-fishery

Hawaii DSLL Tori Line Specifications



DSLL Offal Management Best Practices (non-regulatory)

	DAY	NIGHT
DSLL fishing activity	**Setting**	**Hauling & Catch processing**
Fish waste generated	**Minimal** during setting	Offal/spent bait generated & discarded during hauling
Bird activity	Active foraging	**Low** activity
Overall bird interaction risk from fish waste discard	Low	Low
DSLL Best Practices	**No offal discard**	**Discharge offal during hauling on opposite side of vessel when seabirds are actively pursuing baited hooks**

Why not apply the DSLL requirements to the SSLL fishery?

Fishery-specific solutions are needed for safe, practical and effective seabird mitigation measures

Effort distribution: SSLL fishery operates further north than DSLL → rougher conditions; different seabird overlap (but same two species)

Night vs day: SSLL is a primarily a night-setting fishery, DSLL is a day-setting fishery

Haul speed: SSLL hauls gear at faster speed than DSLL → greater safety concerns with branchline weighting

Gear sink rate: SSLL gear sinks at slower speed → greater aerial coverage needed for tori lines

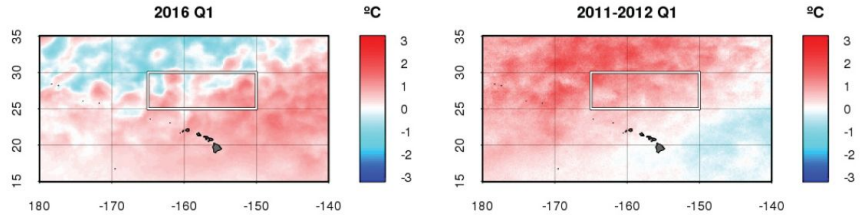
Hawaii Shallow-set Longline Tori Line Project (ongoing)

- Pilot Study
  - Improve seabird mitigation measures in the SSLL fishery while improving practicality and promote operational efficiency
  - Preliminary testing of tori lines in the SSLL fishery as an alternative to blue-dyed bait
  - Explore alternative combinations of seabird mitigation techniques to allow flexibility in start of set time (historically adjusted set time according to lunar phase to optimize catch)
- Study Design
  - 1 vessel, minimum target 40 sets (20 paired sets)
  - Alternate control and experimental sets
    - Control: blue-dyed bait & night set
    - Experimental: double tori lines & start set 1 hr before local sunset
  - No strategic offal discard during setting
  - EM stern camera & observer data collection
- Field trials recently completed

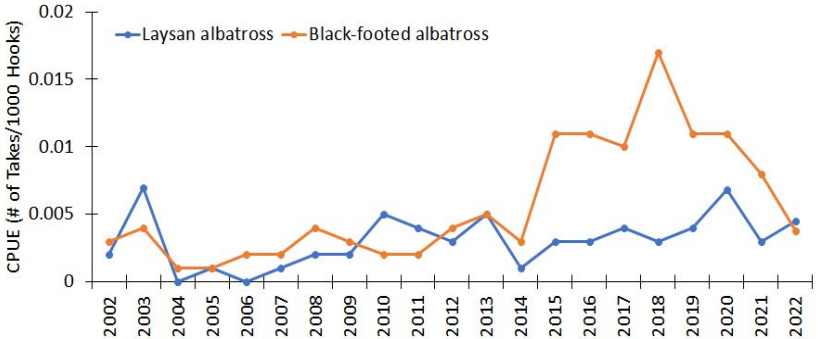
BFAL & LAAL Interaction Patterns and Overlap with Hawaii Longline Fishery

- 2017 Workshop & associated publications (e.g., Wren et al 2019)
  - Positive PDO, strong westerly winds, and sea surface temperature fronts explained the increase in DSLL black-footed albatross sightings in recent years

- DSLL interactions declining since 2021
  - Likely associated with La Nina and negative PDO conditions (less bird-fishery overlap)



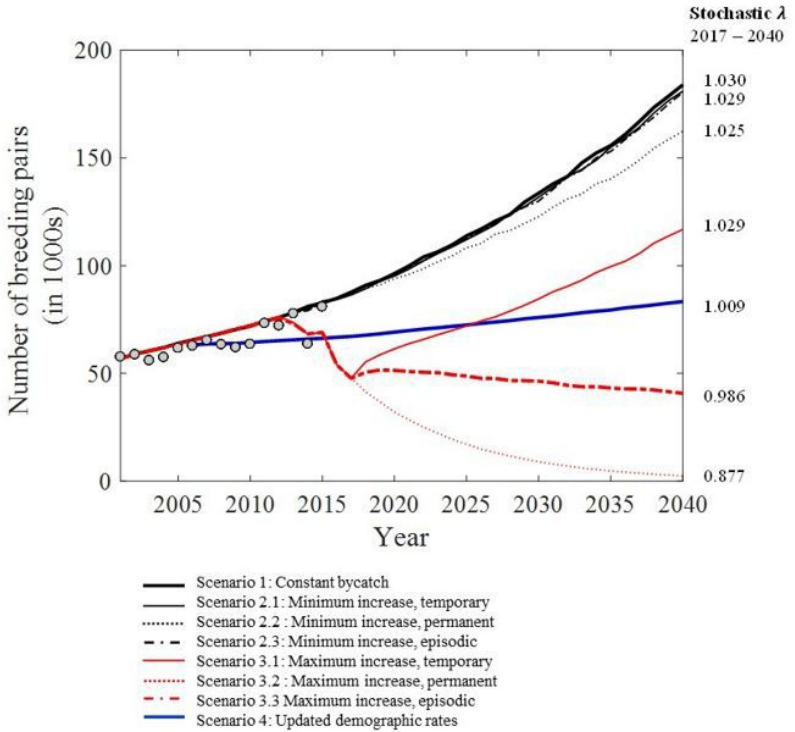
SST anomalies during 2016 Q1 (El Niño & positive PDO) & 2011-2012 Q1 (La Niña & negative PDO). *Source: Polovina & Abecassis in Hyrenbach et al. 2021.*



Hawaii DSLL seabird interaction rates, 2002-2022. *Source: Pelagic FEP 2022 Annual SAFE Report.*

BFAL Population Trends and Impact of the Hawaii Longline Fishery

- 2017 Workshop
  - Evaluated potential impacts of Hawaii longline fishery BFAL bycatch scenarios
  - Increased DSLL interactions in 2015-2016 likely to have imperceptible impact on BFAL population growth (even if stabilized at the higher level)
  - Populations projected to decline if elevated bycatch rates consistent throughout the NP longline fisheries with BFAL interactions



BFAL population projection under various longline impact scenarios.
Source: Bakker & Finkelstein in Hyrenbach et al. 2021.

MAHALO!

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2017 workshop report: Hyrenbach, K., Ishizaki, A., Polovina, J., and Ellgen, S. (Eds.) 2021. The factors influencing albatross interactions in the Hawaii longline fishery: towards identifying drivers and quantifying impacts: Report of a workshop in Honolulu, Hawaii, 7-9 November, 2017. U.S. Dept. of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-122, 163 p. doi:10.25923/nb95-gs31TM-PIFSC-122.

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Trial 1 Publication: Gilman, E., Chaloupka, M., Ishizaki, A., Carnes, M., Naholowaa, H., Brady, C., Ellgen, S., and Kingma, E. 2021b. Tori lines mitigate seabird bycatch in a pelagic longline fishery. Reviews in Fish Biology and Fisheries, pp.1-14. [also available as SC18-EB-IP-21]

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