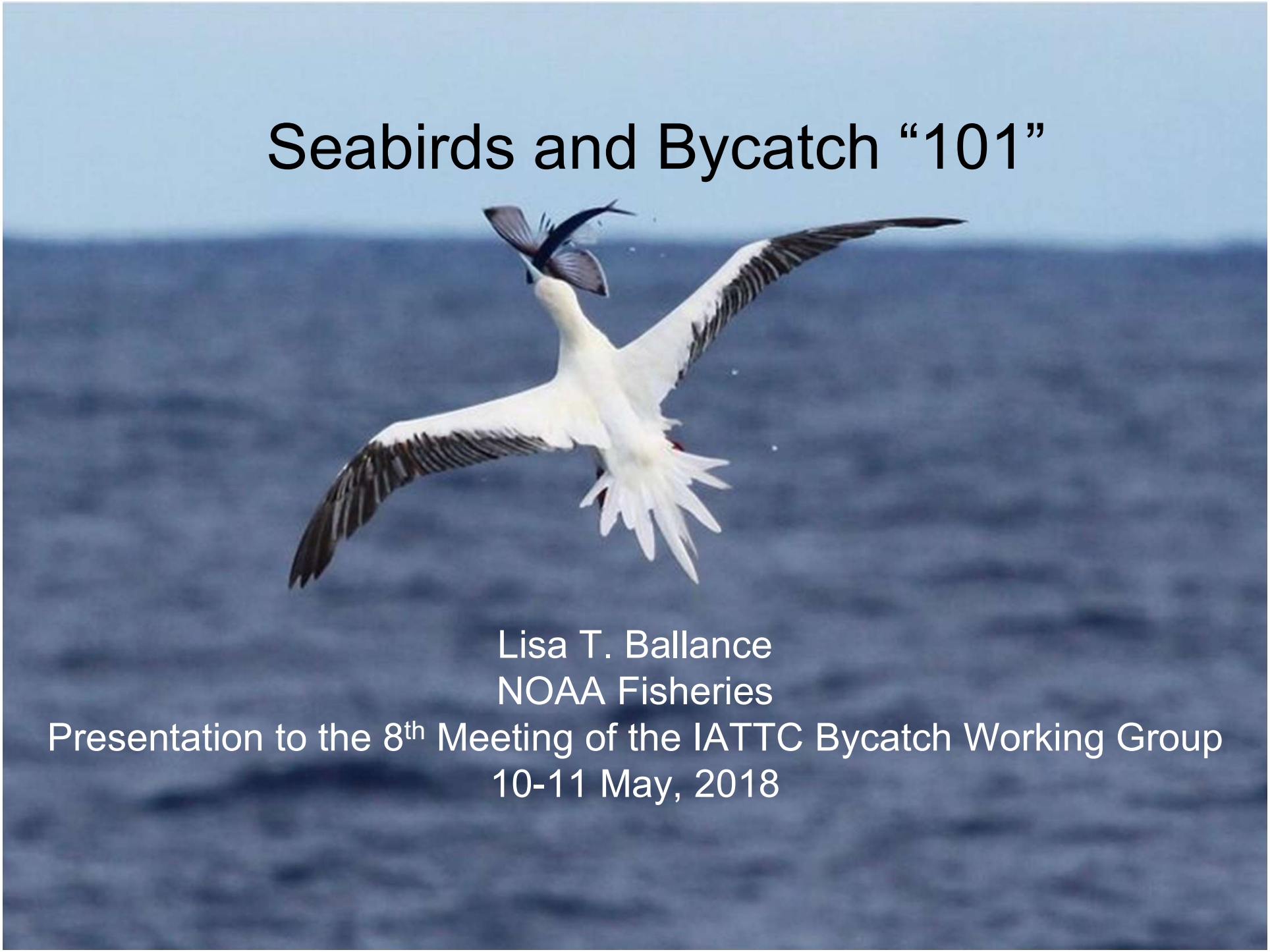
Seabirds and Bycatch “101”



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Presentation to the 8th Meeting of the IATTC Bycatch Working Group
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A seabird…

- …Is a bird
  - Flight - All seabirds fly or evolved from flighted ancestors
  - Feathers, scales, no teeth, skeletal modifications, homeothermic
  - Lay a hard-shelled egg that must be incubated

All seabirds must reproduce on land

- **…Feeds in the marine environment**

➢ The interaction between the constraints of breeding on land, and feeding in the sea results in a characteristic and distinctive life history strategy, and suite of behavioral and ecological traits that uniquely define seabirds.

The Seabird Syndrome*

*Gaston 2004; based on Lack 1968, Ashmole 1963, Rickleffs 1990, and many others

	Delayed Reproductive Maturity	Low Adult Mortality (High Chick Mortality)	Small Clutch Size	Long Period to Chick Independence	
	Age of first breeding (y)	Adult annual survival rate (%)	Clutch size	Incubation period (d)	Chick-rearing period (d)
Penguins	4-8	75-85	1-2	33-62	50-80
Albatrosses	7-13	92-97	1	60-79	116-150
Petrels	4-10	90-96	1	43-62	42-120
Pelicans	2-3	85	2-3	30	55-60
Frigatebirds	9-10	?	1	44-55	140-170
Auks	2-5	80-93	1-2	29-42	15-50

From Croxall 1987

1 year 2-6 eggs 13-14 days 12-19 days

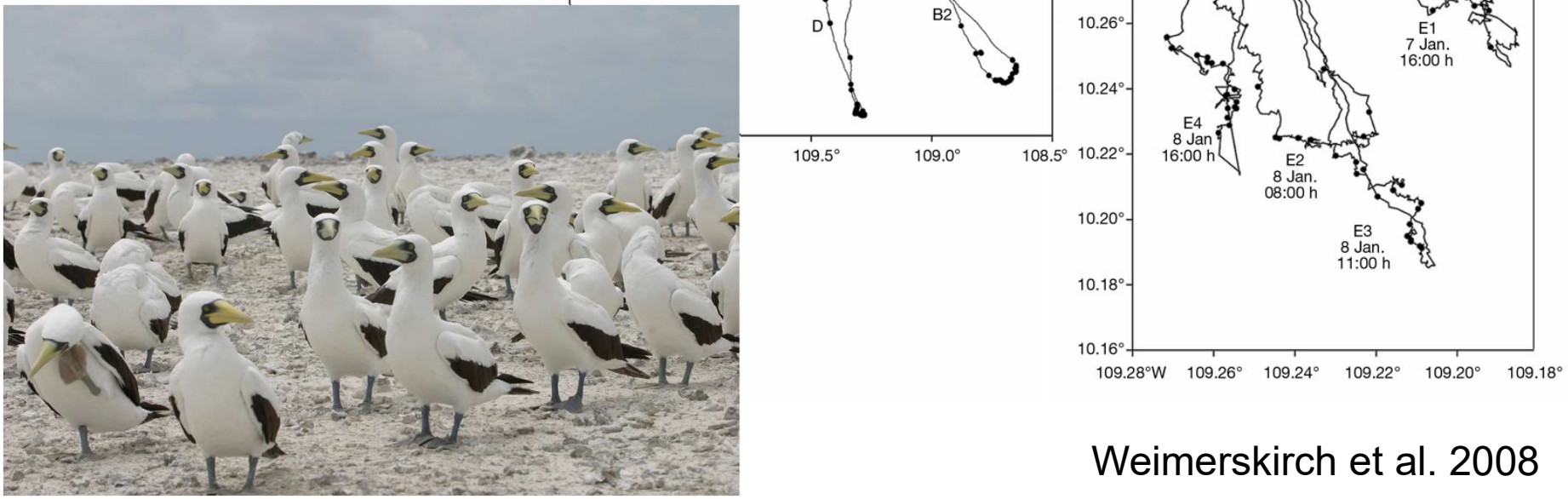
Seabirds tend to be on the K-side of the K- vs r-selected spectrum.

Life history strategies tend toward:

- Long lives
- Delayed reproductive maturity
- Low reproductive rates
- Monogamy

Recovery can be slow.

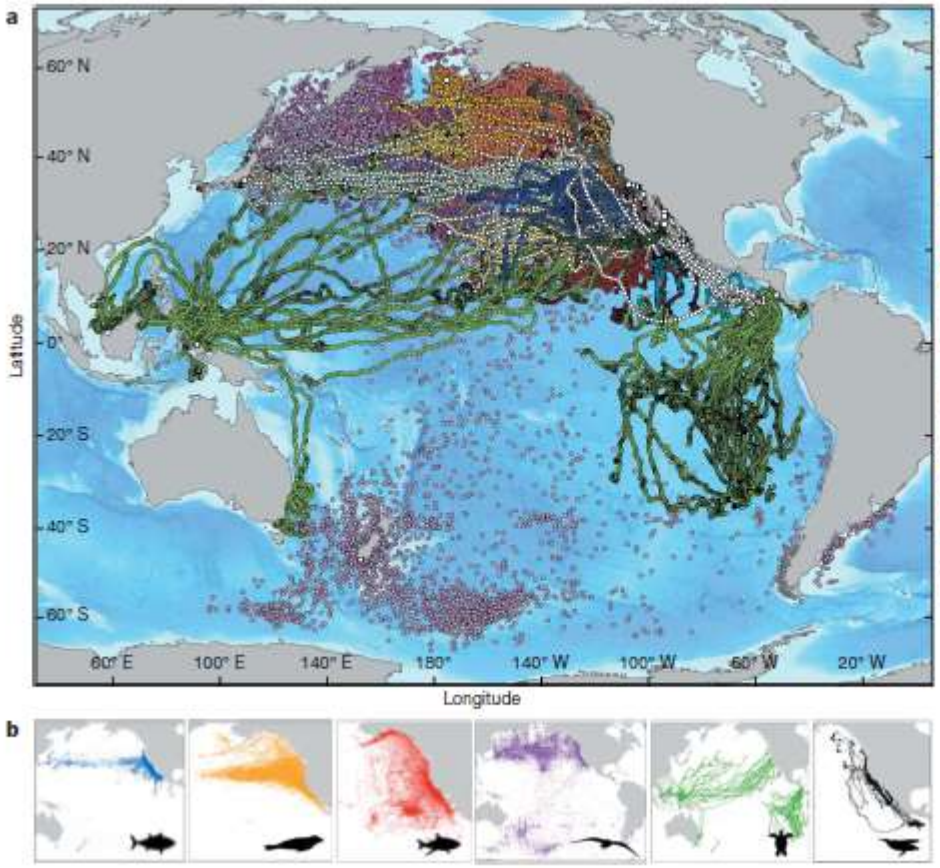
Seabirds are central place foragers when breeding (because they are tied to land).



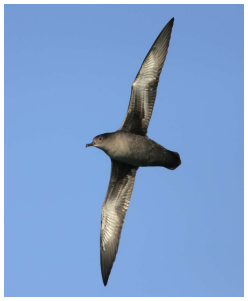
Weimerskirch et al. 2008

But seabirds can be highly migratory when not breeding.

Block et al. 2011

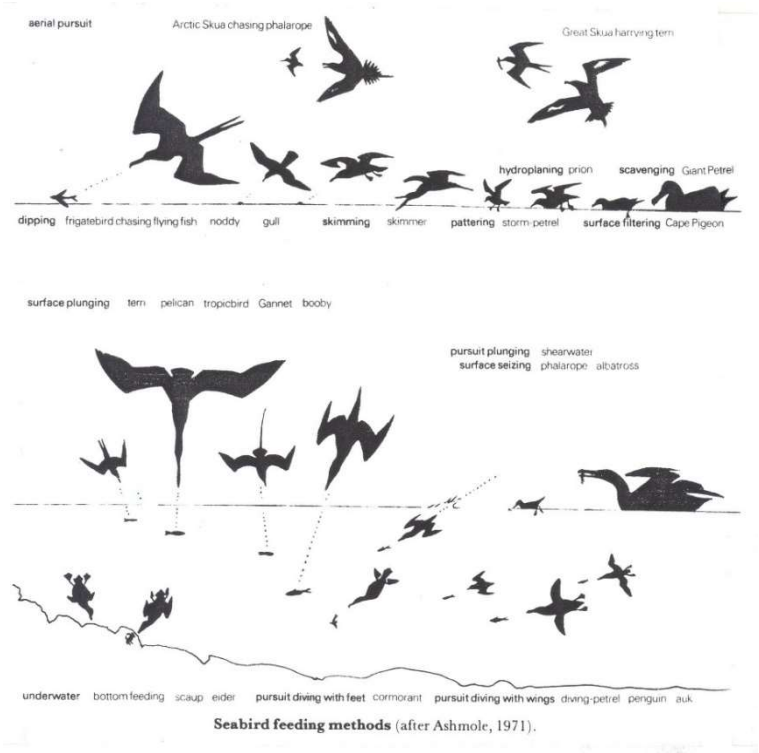


- Humpback whale
- Fin whale
- Sperm whale
- Sooty shearwater
- California sea lion
- Northern fur seal
- Blue whale
- Northern elephant seal
- Thresher shark
- Yellowfin tuna
- Albacore tuna
- Blue shark
- Mako shark
- White shark
- Loggerhead turtle
- *Mola mola*
- Pacific bluefin tuna
- Leatherback turtle
- Salmon shark
- Laysan albatross
- Black-footed albatross
- Humboldt squid



Comprehensive protection cannot be place-based.

Knowledge about a species' foraging ecology provides insights about risk of fisheries bycatch.



Seabird feeding methods (after Ashmole, 1971).

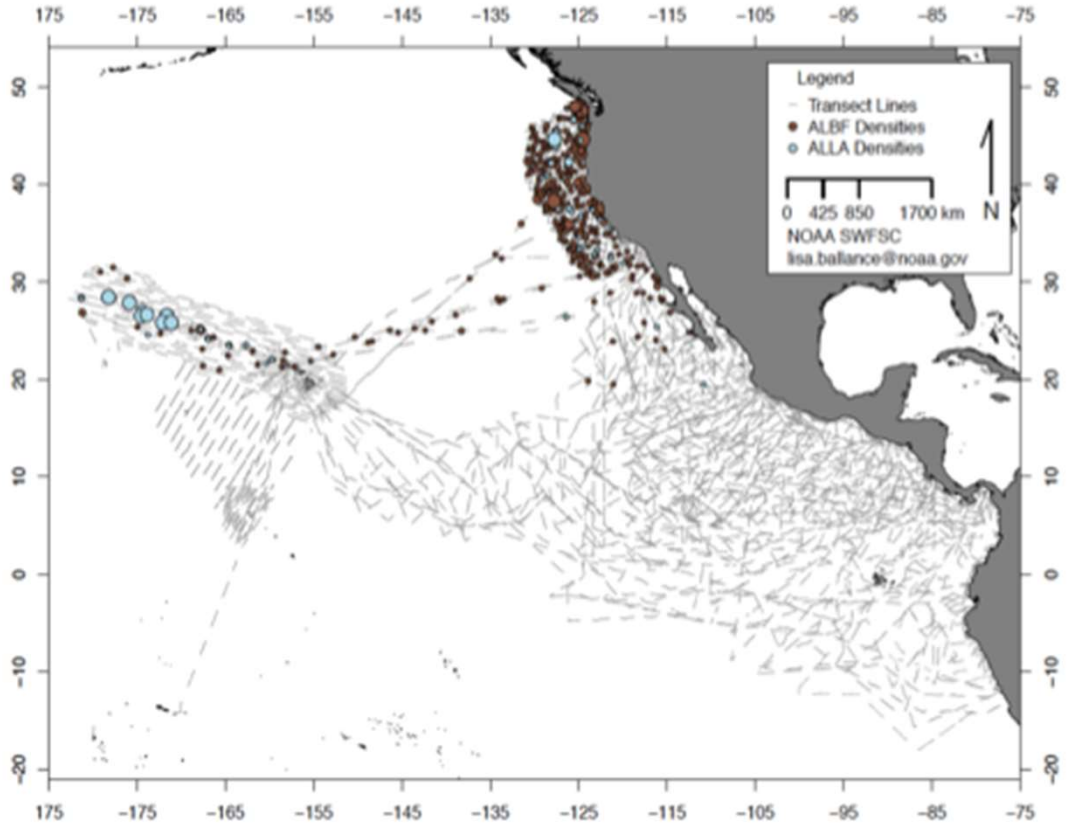
Scavengers tend to be vulnerable to fisheries bycatch.

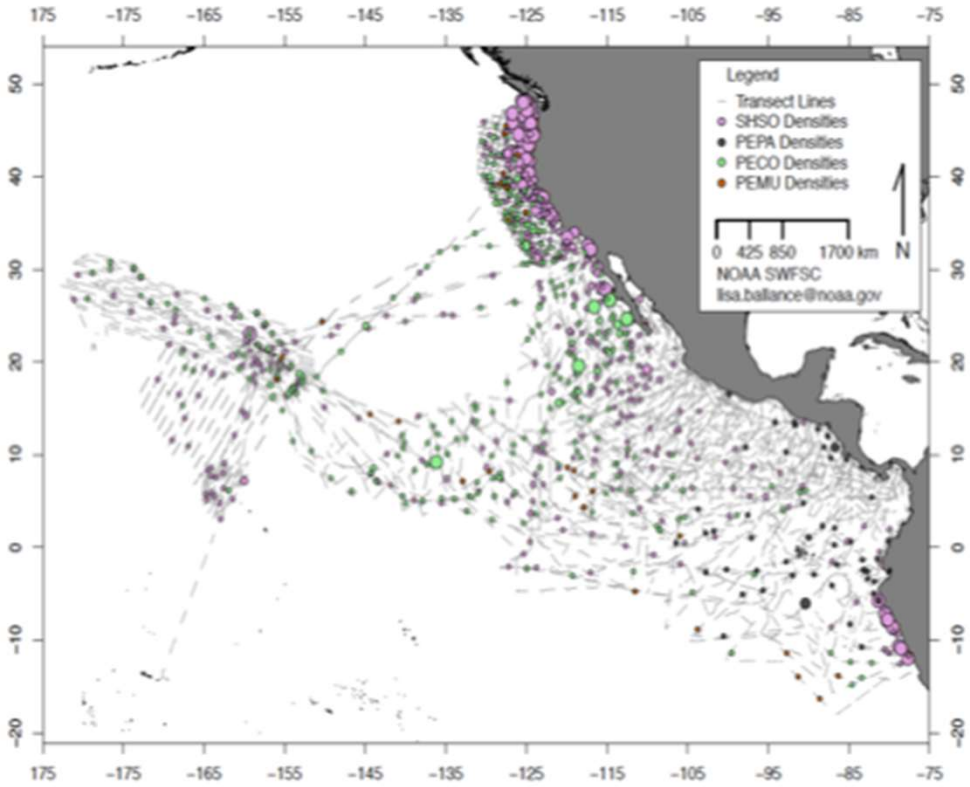
- Seabirds that scavenge are attracted to vessels at sea because many of these vessels, especially commercial fishing operations, provide an easily-located and predictable source of food through discards and bait.

- These seabirds are particularly vulnerable to bycatch in longline fisheries and hundreds of thousands are estimated to be killed incidentally in these fisheries every year. (Anderson et al. 2011)

- Some of these seabird species are threatened or endangered.

Knowledge about a species' distribution provides insights about risk of fisheries bycatch.





Overlap in distribution of fisheries and seabirds vulnerable to bycatch provides an indicator of bycatch risk – even when bycatch data are lacking.