

# Online mapping tool shows fishery managers how to reduce bycatch

May 27 2015, by Lauren Ingram

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The mapping tool can help fishermen worldwide reduce seabird bycatch. Credit: Melissa G. Wiedenfeld

Spotting a scarlet tanager perched delicately on a nearby branch, David Wiedenfeld peers through his binoculars to get a closer look at the small bird's ruby plumes. Wiedenfeld, a long-time birder, often stops at a favorite wooded area near his home just west of Washington D.C. for an early-morning songbird sighting. He also appreciates the beauty of the seabirds he observes just a few dozen miles down the road at the Chesapeake Bay.

But Wiedenfeld does more than enjoy watching the winged creatures; he also cares about saving their lives.

As a senior conservation scientist at the American Bird Conservancy (ABC), a nonprofit in Virginia dedicated to avian conservation, Wiedenfeld is leading an initiative to reduce seabird bycatch, which happens when seabirds are unintentionally killed by fishing nets and lines.

To catch large quantities of tuna, cod and other marine creatures, the commercial fishing industry uses longlines (which can reach up to 60 miles) armed with thousands of barbed hooks. But ABC estimates that, at the very least, millions of seabirds die each year as a result of fishing practices.

The bycatch happens when puffins, gulls, penguins and other [birds](#) dive or swim to catch bait attached to the lines and get snagged by the hooks, dragged under the water and drowned. Birds also become entangled and fall prey to gillnets, which are curtains of netting submerged beneath the surface of the water. The result is that, today, seabirds are the most threatened group of birds on Earth, and 15 of the 22 species of albatross, for example, have been identified by scientists as vulnerable or endangered, according to the ABC.

"Bycatch is a preventable problem decimating entire populations of

seabirds," said Wiedenfeld. "Fortunately, many fisheries care about saving these birds and want to make changes to their fishing processes to do so, in part due to consumer demand for sustainably caught [fish](#)."

To help fisheries around the world adopt more environmentally friendly fishing practices, ABC turned to Penn State's Center for Environmental Informatics (CEI), a group of earth scientists and geographers who turn scientific data into usable decision-making tools, to build a one-of-a-kind online mapping application.

The tool can help fisheries determine the most frequently found birds within their [fishing zones](#), access information about endangered and threatened species within those zones, and learn about tactics for reducing bycatch.

# Comprehensive Species Report



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## Hawaiian Petrel

*Pterodroma sandwichensis* (PROCELLARIIFORMES)  
**IUCN Status:** Vulnerable (VU)  
**Population Size Range:** 9,000 to 16,600 **Population Trend:** decreasing

### Foraging Ecology

**Daily Foraging Period:** Diurnal  
**Sea Surface Feeder:** Yes **Benthic Feeder:** No **Ship Follower:** Unknown  
**Diver:** Not a diving species **Normal Diving Range(m):** Not Applicable to Not Applicable  
**Max. Diving Depth(m):** Not Applicable  
**Main Diet:**  
 Squid, fish

### Distribution and Seasons



**Fishery:** Pacific Fish A

**Percent of fishery where species occurs:** 22%  
**Percent of species' range in fishery area:** 0.23%  
**Social Behavior:** Solitary, Gregarious  
**Coastal Breeder:** Yes **Colonial Breeder:** Yes

### Seasonality

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Notes
Onshore:													
Inshore:													
Offshore:													

**Ecology Notes:**  
 See Bartle (1993) and Spear et al. (1995) for more information on pelagic distribution and marine habitat choice; frequents waters with a deeper thermocline when compared with Galápagos Petrel *P. phaeopygia*; usually solitary, but will join mixed-species flocks; will follow cetaceans; may feed at night based on diet; see Wiley et al. (2013) for historical perspective on diet and relationship to fisheries.

The mapping application provides such information as seabird flying areas and diving depths. Credit: Center for Environmental Informatics

## **Putting data to work**

"The crux of what we do at CEI is take environmental data and information from research and put it into an easy-to-understand form—usually an interactive web tool that is tailored to a specific question or problem people are facing at the University or beyond," said Brian Bills, associate director of CEI. "In the case of ABC, they approached us with a database of information for about 400 seabird species they wanted to make accessible to fisheries worldwide."

And after months spent in development, the online tool will soon be ready to use.

To get started with the mapping tool, fishery managers will draw a polygon over their fishing zones on a digital map that spans the globe. From there, fishermen gain access to a detailed map of the flight areas and birds that are known to migrate, mate and breed within those fishing zones at different times of year.

Larger fisheries might have 100 different birds intersecting a fishing area, which can be difficult to cull, so the interactive tool enables them to sort, filter and view information for various species.

"The results might show that only a sliver of a bird's range is contained on the edge of a zone or that nearly 80 percent of an endangered bird's range intersects the zone," Bills said. "The tool provides the facts, but from there, it's up to the fishery to determine which birds to focus on—for example the long-tailed duck, black scoter or both—and how

to make changes to their operations to protect those birds."

To help with these decisions, the [mapping application](#) also reports data about each seabird found within a fishing zone (for instance, how deep they dive) and displays inexpensive tactics to reduce bycatch. Some ideas include fishing at night when birds are less active, dyeing bait blue to make it less attractive and using weights to make longlines sink quickly out of reach of diving birds.

Another inexpensive strategy called "bird scaring" has been shown to drastically reduce bycatch, according to Wiedenfeld. It works by attaching fluorescent orange streamers above longlines, which flap erratically in the wind to scare birds away as the line sinks into the ocean.

For seabirds like Wiedenfeld's favorite waved albatross (of which only an estimated 20,000 remain in the wild) these strategies could mean the difference between extinction and survival.

"Keeping our oceans healthy is something that affects everyone, and [seabirds](#) are an important part of that ecosystem," Wiedenfeld said. "At ABC, we work frequently and directly with fishermen and marine councils, but this tool is another way we can have an even broader impact."

At Penn State, Bills agrees.

"It's very rewarding to see our tools helping people solve important problems," he said. "The more we learn about birds, where they live and their susceptibility to certain practices, the better it will be for conservation."

Provided by Pennsylvania State University

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