



EcoCast: Real time data tools for dynamic fisheries management

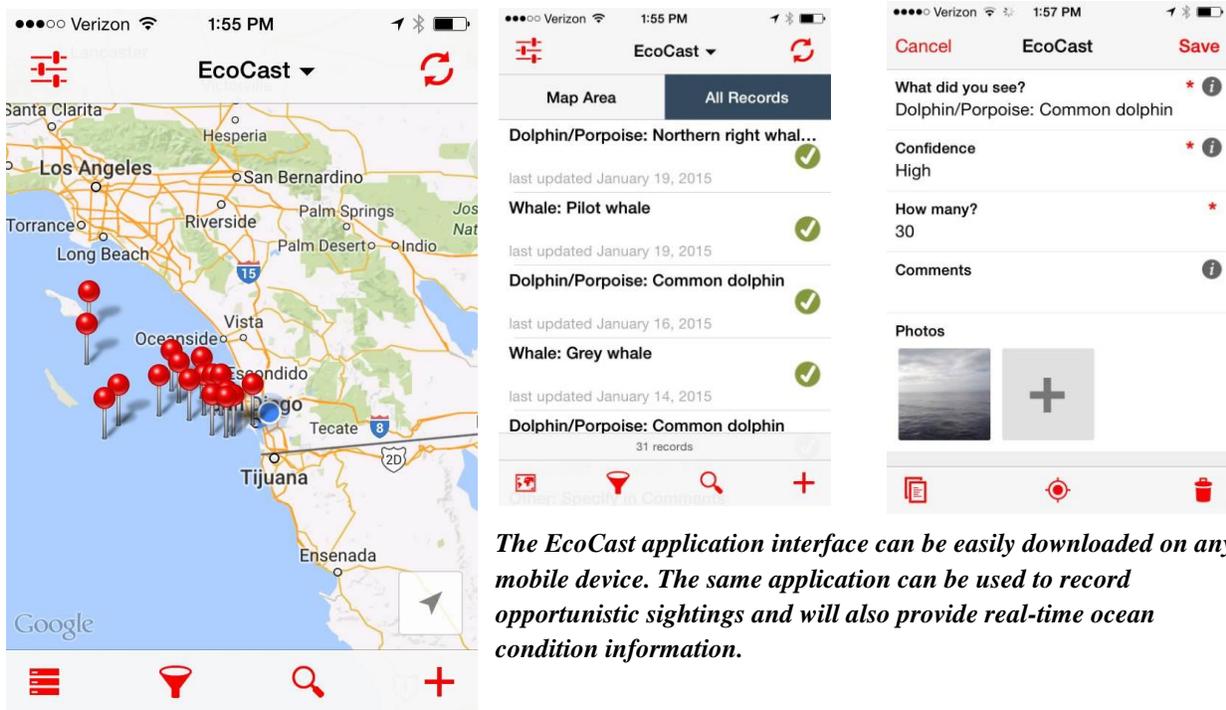
What we're doing: EcoCast is an exciting new fishery management tool that will predict in near real-time the spatial distributions of important highly migratory ocean species, including non-target species (such as leatherback sea turtles) and target catch (e.g. swordfish). Using this tool, fishers and managers can determine how to best allocate fishing effort across space and time to improve fishery performance. EcoCast is being developed by a team of collaborators from several universities, NOAA, and non-profit sectors (see below), in direct collaboration with the fishing industry and other stakeholders.

Why: The open ocean is a dynamic environment where ocean conditions, animals and fishing vessels move across space and time. Sometimes fishers targeting marketable species like swordfish and tuna end up entangling marine mammals or sea turtles. Our project aims to put a powerful modelling tool into the hands of fishermen and managers that predicts the catch and bycatch probability in near real time, resulting in significant bycatch risk reduction. In time, this tool may allow managers to better balance ecological and economic objectives by improving accessibility to valuable swordfish fishing areas during times of low bycatch risk.

How: Our team has built habitat models for four common pelagic species (swordfish, leatherback sea turtles, California sea lions, and blue sharks) based on tagging and fishery observer data. We then overlaid these models with oceanographic data (such as sea surface temperature, chlorophyll, bathymetry, etc.) to predict each animal's distribution under current environmental conditions.

What's happening: In the first year, we validated our methodological approach, and developed preliminary models for four focal species (swordfish, leatherback sea turtles, California sea lions, and blue sharks). We also launched an app for fishers to record opportunistic sightings of non-target species (primarily cetaceans and sea turtles) as they travel to and from fishing locations. As we move in Year 2, we are continuing model development, building a smartphone app that will serve near real-time oceanographic data and our predictive distribution models to fishermen and managers. The smartphone app will include a number of additional capabilities:

1. It will include the ability to see important oceanographic conditions that fishermen rely on, such as sea surface temperature, on its own.
2. It will serve as a data collection tool so fishermen can continue to report sightings of non-target species. This will allow us to develop better models for predicting species that are difficult to observe (such as sperm whales), thereby continually improving the functionality of the model across the fleet.



The EcoCast application interface can be easily downloaded on any mobile device. The same application can be used to record opportunistic sightings and will also provide real-time ocean condition information.

What's next: The project team will continue to develop model products and work with DGN fishermen to test usability of the EcoCast app and how visualization of the models and data inputs can improve fishery performance

How is EcoCast different than eCatch?: eCatch is a product developed by TNC to help fishers report their logbook data electronically. eCatch is current used by the California Groundfish Collective (a group of groundfish trawlers from Morro Bay to Fort Bragg), and there is interest in extending its use into other fisheries, like the swordfish DGN. By using eCatch, participating fishers will be able to view catch data in real and near-real time and contribute their observations toward the fleet's ability to reduce bycatch risk.

EcoCast is a model-based product that uses near real-time information from satellites, coupled with previously collected biological and fisheries data, to help managers and fishers map where target and non-target species are likely to be within a fishing area. EcoCast could use data from eCatch to improve model predictions but eCatch data are not required to generate the EcoCast product.

There is interest in integrating eCatch and EcoCast in the future. Having real-time catch data in EcoCast would provide even better data to incorporate into the predictive models. Likewise, feeding eCatch into EcoCast would provide fishers and managers with more information on which to make fishing decisions.

Funding provided by: NASA Biodiversity and Ecoforecasting program, NOAA Bycatch Reduction Engineering Program, Center for Ocean Solutions

Who's involved:

Our collaborative project team is made up of scientists from academia, managers from government agencies, and project leaders from NGOs. Stakeholders (the Council, fishers, advisory boards and committees) are also included in the project development process.

The Nature Conservancy: Melissa Stevens, Matt Merrifield, Mary Gleason

NOAA Southwest Fisheries Science Center: Elliott Hazen, Steven Bograd, Tomo Eguchi, Scott Benson, Heidi Dewar, Suzanne Kohin, Tim Sippel (SWFSC)

Old Dominion University: Sara Maxwell

San Diego State University: Rebecca Lewison

Stanford University/Center for Ocean Solutions: Dana Briscoe, Larry Crowder, Lucie Hazen

University of California Santa Cruz: Dan Costa

University of Maryland: Helen Bailey