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www.cetabase.info and www.aviste.me - Web tools to enhance data gathering and sharing and public outreach on endangered species

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**Web tools to enhance data gathering and sharing and public
outreach on endangered species**

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Abstract

Here we present two web-tools developed to enhance data collection and sharing of distribution and identification of pelagic fauna. 1) Cetabase (www.cetabase.info) is a multilingual (Spanish and English) virtual catalogue of marine mammal sightings and photoID data. It contains analytical tools to filter and download ID data in formats ready to be used in analytical software such as programs MARK for capture-recapture analysis, or SOCPROG for social analysis. Cetabase is designed to share information among scientists working on photoID of the same species in different areas, and to integrate the public in science, contributing sightings and photographs of identifiable animals. 2) Avisteme (www.aviste.me) is a Spanish database of sightings of marine fauna in different regions. It has started with CetAVist: the Cetacean and Seabirds Sighting Net of the Canary Islands. Here, trained volunteers gather sighting data associated to environmental data along line-transect surveys performed from inter-insular ferries. From December 2012 to February 2015, CetAVist performed 416 surveys by more than 100 observers, gathering more than 1000 sightings of at least 13 species of cetaceans (some 60% of the sightings were identified to species level). At least 18 species of seabirds were recorded, including expert observations providing first cites for the archipelago. Both www.cetabase.info and www.aviste.me have been developed in the Canary Islands but are easily expanded to be used by any interested research group worldwide.

Background

Studies of abundance and distribution of species of megafauna with large movement capabilities are challenging but essential for the conservation of these often endangered species. For marine mammals, photo-identification data provide key information about the spatial range and connectivity of animals found in different areas. However, long range movements of the animals and the difficulties inherent in applying a homogeneous research effort throughout the distribution of the species result in missed identifications and partial data. Even when dedicated research is applied in several areas of distribution

of a species, the difficulties in coordinating the different research groups involved in the research often results in keeping separate identification catalogs and abundance estimates. This impedes a correct estimation of the overall population abundance of the species, since biases in the assumptions about the movements of individuals among different sub-areas of distribution will result in over or underestimations of the total population abundance. To enhance data sharing and rapid turnover of the information is important to provide tools that allow different entities to contrast their data as close as possible as real time, while respecting the intellectual property and publishing rights of data contributors. Such tools already exist for some species, such as sperm, humpback or right whales.

In addition to researchers, the general public constitutes an increasing source of sightings and photo-video records of endangered species. People are acquiring knowledge about natural fauna, travel to natural spaces and have access to good technology to record visual proof of their sightings. These people are interested on nature and most of them would be keen to contribute to the conservation of the species they just observed. Accessible tools are welcomed by these naturalists to contribute their sightings to local researchers. This serves the triple purpose of effectively increasing the research effort on the species at no or low cost, serving as educational material and integrating the public in conservation work. On the other hand, sightings require confirmation by an expert on the observed taxa, and this is not always possible in absence of good quality photographic data.

Research on the distribution and abundance of pelagic fauna such as marine mammals and seabirds is challenged by the high costs involved in sampling offshore. Dedicated surveys using standardized line or point sample methods and performed by professional observers are essential to obtain accurate data on abundance or distribution trends. However, these dedicated surveys do not occur as frequently as desired, leaving large temporal gaps in data collection. Platforms of opportunity such as ferries provide a low-cost platform for visual surveys associated to a repeated track line, with the potential to gather environmental data informing about detection probability.

Programming Cetabase and Aviste.me

Cetabase.info and Aviste.me have been programmed using only open software tools, building a database-intensive web application using */PHP and MySQL/* development technologies. The chosen web server has a Debian GNU/Linux OS to guarantee system stability in any situation. The databases are based on a logic database structure to store all the information from the sightings and the individual animals. This logic structure allows data to be linked according to defined data-fields and enables further expansion of the structure in an ordered manner. It also enables further expansion of the analytical capabilities of the database, by allowing the programmer to design flexible queries to extract parts of the data and export results in user friendly formats, such as comma separated tables of jpeg images, as they are required by the users. The advantage of using a web application is that the server makes all the programmed analytical tasks once the

data are entered in the database. Cetabase.info and Aviste.me do not require any client software and thus it is possible to access these databases using just a PC with any operative system and any web navigator connected to internet. The database uses few hardware resources and thus any relatively old PC is enough to work with it. While all data are centralized and a periodic back-up in the server maintained at ULL guarantees the security of the information, all updates are accessible to all users all over the world in real time.

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