



Marine-life Data and Analysis Team (MDAT) Avian Product Updates Summary of Changes for April 2024 Update, version 3.0

Overview

Avian individual species models were updated by NOAA NCCOS in 2023. These products were reviewed by species experts, and are documented in detail in Winship et al. (2023). This document contains a brief summary of the changes to the base-layer models and the MDAT group summary products. Additional details on the base-layer models and summary products can be found in the MDAT Technical Report (Curtice et al., 2018).

April 2024 Release, v3.0

Avian layers

1. The updated avian products do not include data prior to 1998 and include data up to 2020, whereas the previous release included data from the 1970s and up to 2016.
2. Spatial resolution was decreased from 2 km x 2 km grid cells to 10 km X 10 km grid cells for all individual species and summary product layers. This change was implemented to better match the spatial resolution of the environmental datasets used as inputs in the models.
3. A single model was developed for each species rather than independent seasonal models.
4. The temporal resolution of individual species layers was changed from seasonal to monthly. Annual layers are still included, as well as both annual and monthly sampling efforts.
5. The color ramp for both individual species and summary products was changed from Viridis to Turbo. A summary of the differences and improvements with Turbo can be found [here](#).
6. Fewer environmental variables were used in order to model avian relative abundance.
7. Avian data were matched with contemporaneous environmental data rather than climatologies when modeling avian relative abundance.
8. Three new species were modeled in this release: black tern, Forster's tern, and lesser black-backed gull.
9. One species that was previously modeled, bridled tern, was not modeled in this release.

Avian Summary Product Changes

1. This release changes the threshold used to convert the non-stratified species model layers to presence/absence for inclusion in the species richness summary products from 95% to 99%. The process filters out very low density values where a given species is effectively absent. Species that were modeled as habitat-based density models are considered present in a cell if that cell is included in the area holding 99% of the total predicted abundance for the species.
2. Black tern, a newly modeled species, has been added to the nearshore, state listed, AMBCC medium, surface feeders, surface plungers, fish eaters, Northeast and mid-Atlantic feeding, Northeast and mid-Atlantic migrant, and higher collision sensitivity summary product groups.



3. Forster's tern, a newly modeled species, has been added to the nearshore, state listed, BCR30 priority, surface plungers, fish eaters, Northeast and mid-Atlantic breeding, Northeast and mid-Atlantic feeding, Northeast and mid-Atlantic resident summary product groups.
4. Lesser black-backed gull, a newly modeled species, has been added to the surface feeders, fish eaters, Northeast and mid-Atlantic feeding, Northeast and mid-Atlantic migrant, and higher collision sensitivity summary product groups.
5. Species groupings were updated based on feedback from the Regional Wildlife Science Consortium (RWSC) Bird Subcommittee to include royal tern in the state-listed group and black guillemot, Leach's storm-petrel, and Atlantic puffin in the nearshore group.
6. Following a review of the AMBCC lists, surf scoter was added to the medium summary product group.
7. Following a review of Wilmott et al. 2013, band-rumped storm-petrel, black-capped petrel, and brown pelican were added to the higher collision sensitivity group and black-capped petrel was added to the higher displacement sensitivity group.

June 2018 Release, v2.0

Individual species base-layer updates

1. Additional survey data. The number of datasets increased from 75 to 92 and now include new data collected since the previous modelling effort (January 1978 through October 2016), new types of data (aerial high resolution digital video), and new data from previously underrepresented areas (e.g., Canadian waters). Previously, source data were from the 'Compendium of Avian Occurrence Information for the Continental Shelf waters along the Atlantic Coast of the U.S.' database developed and maintained by USGS and USFWS; the sources data for this update are now from the Northwest Atlantic Seabird Catalog (US Fish and Wildlife Service) and the Eastern Canada Seabirds at Sea database (Canadian Wildlife Service, Environment and Climate Change Canada).
2. Improved modelling methodology. NCCOS incorporated an effort offset allowing better standardization of survey effort across datasets. With this change, model results now predict *relative density of individuals* (or relative number of individuals per unit area), while the v1.0 products predicted *relative abundance of individuals per strip transect segment*. This update also includes more models per species-season (4 instead of 2) resulting in a wider selection of models from which to choose the best model. In this phase, all models are bootstrapped, while in v1.0 several models were not bootstrapped.
3. Additional species. This update includes model predictions for the following seven additional species:
 - Bridled Tern
 - Great Skua
 - Parasitic Jaeger
 - Red-breasted Merganser
 - Sooty Tern

- South Polar Skua
- Thick-billed Murre

This update also provides predictions for the following additional species-seasons combinations:

- Common Eider spring-fall
 - Dovekie summer
 - Least Tern fall
 - Ring-billed Gull summer
 - Red Phalarope fall
 - Red-necked Phalarope spring
4. Updated environmental predictor data. New models include climatologies with additional years for dynamic predictors whose datasets are ongoing. The bathymetry predictor layer has been revised to include additional datasets and to improve the methods used to create the predictor.
 5. New masking method. In v1.0, the avian base-layer models contained a built-in “mask” (grey area) where predictions were beyond 100 km from a minimum-distance path connecting the raw sighting location data for a species (to avoid interpreting predictions that are far from recorded observations), and a hatched mask was applied to the area that lies outside 95% of all survey effort for each model time period (i.e., each season and annually). This update allows the models to predict to the full extent of the study area, and provides an updated hatched mask delineating areas with no survey effort in the dataset. Mid-points of survey transect segments (~4 km in length) were gridded at a 10 x 10 km resolution, and hatched areas indicate grid cells with no segment mid-points (i.e. minimal or no survey effort).
 6. For v2.0, NOAA NCCOS did not update the relative occurrence base-layer products. MDAT has removed these layers from the provided web services and data download packages.

Species group summary product updates

1. The annual predictions for newly modeled species were added in the appropriate species groups (see MDAT Technical Report for full species / group information).
 - Bridled Tern: offshore/pelagic, ABMCC low, surface plungers, use NE shelf for feeding, migrant, higher collision sensitivity, higher displacement sensitivity
 - Great Skua: offshore/pelagic, fish eaters, use NE shelf for feeding, migrant, higher collision sensitivity
 - Parasitic Jaeger: nearshore, surface feeders, fish eaters, use NE shelf for feeding, migrant, higher collision sensitivity
 - Red-breasted Merganser: nearshore, coastal waterfowl, divers and pursuit plungers, fish eaters, use NE shelf for feeding, migrant, higher collision sensitivity
 - Sooty Tern: offshore/pelagic, ABMCC low, surface feeders, fish eaters, use NE shelf for feeding, migrant, higher collision sensitivity, higher displacement sensitivity
 - South Polar Skua: offshore/pelagic, surface feeders, fish eaters, use NE shelf for feeding, migrant, higher collision sensitivity



- Thick-billed Murre: offshore/pelagic, divers and pursuit plungers, fish eaters, use NE shelf for feeding, migrant, higher collision sensitivity, higher displacement sensitivity
2. Summary products are created from individual species predictions that were first normalized by their mean. Summary products are calculated using the full prediction area. The new hatched mask that delineates areas with no survey effort in the dataset is then overlaid on the product to indicate areas where caution should be used in interpreting results.
 3. In the previous release, four species were not included in the summary analysis products because their maximum prediction values were too large: Audubon's shearwater, black guillemot, black-capped petrel, and common eider. In this v2.0 release, these species are now included in summary products.

September 2016 - Initial Release, v1.0

MDAT member NCCOS developed a comprehensive synthesis of models and data on marine and coastal birds as part of a 5-year BOEM funded project "Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf.

References

Curtice, C., Cleary J., Shumchenia E., Halpin P.N. 2018. Marine-life Data and Analysis Team (MDAT) technical report on the methods and development of marine-life data to support regional ocean planning and management. Prepared on behalf of the Marine-life Data and Analysis Team (MDAT). Accessed at: <http://seamap.env.duke.edu/models/MDAT/MDAT-Technical-Report.pdf>.

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