



Questions & Answers Session Part 3

Please type your questions in the Question Box. We will try our best to answer all your questions. If we don't, feel free to email Amber McCullum (amberjean.mccullum@nasa.gov), Juan Torres-Pérez (juan.l.torres-perez@nasa.gov) or Zachary Bengtsson (bengtsson@baeri.org).

Project websites and contact information:

- MAPPPD: <http://www.penguinmap.com/>, Contact: info@penguinmap.com
- Wildlife Insights: <https://www.wildlifeinsights.org/>, Community Forum: <https://groups.google.com/u/0/g/wildlifeinsights>, Contact: info@wildlifeinsights.org
- Map of Life (MOL): <https://mol.org/>, Contact: <https://mol.org/contact-us>
- Circuitscape: <https://circuitscape.org/>, Circuitscape GitHub: <https://github.com/Circuitscape/Circuitscape.jl/blob/master/README.md#Installation>, Omniscape Github: <https://github.com/Circuitscape/Omniscape.jl#installation>
- FaCeT: <https://fisheriesclimatetoolkit.sdsu.edu/>

Question 1: I was wondering if there are data on pest-species distribution that could be used to map the current and future occurrence of pest species on crop lands?

Answer 1: Yes, please refer to session 1 where we discussed EDDMaps for invasive species and pests: <https://www.eddmaps.org>. You can also check out GBIF (<https://www.gbif.org>) or Map of Life (<https://mol.org/>).

Question 2: What are the sources of data for MAPPPD? Landsat has 30 m spatial resolution, what objects on the ground that were detected by Landsat image to indicate penguin's presence? Can you name other species MAPPPD can study?

Answer 2: The primary satellite data source of MAPPPD is Landsat. Occurrence data from the field and drone imagery are also used in MAPPPD's penguin estimates. The team used the coloration of the penguin guano to map penguin colonies. In the image on slide 7 you can see that the penguin poo creates a pinkish color on the snow. Their algorithm then uses the extent of the discoloration to estimate the species abundance. MAPPPD is used for Emperor, Adélie, Gentoo, and Chinstrap penguin populations. MAPPPD species information link: <http://www.penguinmap.com/Species/>

That is how Landsat is used to estimate presence and abundance. Occurrence data from the field is used and drone imagery.



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Question 3: Can the bands of a multispectral image like landsat 8 or sentinel 2 be used as environmental variables in SDM's as a way to find the distribution of a species by it's reflectance?

Answer 3: Yes! The variables/indicators we have discussed throughout this training are derived from sensor band information. For example, a vegetation index like NDVI or EVI derived from landsat or sentinel could act as an indicator for SDM development. Band information is typically manipulated to obtain these indicators, so we typically do not use raw, unprocessed band data for SDMs.

Question 4 : Are there any similarities between IUCN RED LIST category and SSII?

Answer 4: The IUCN Red list provides information about threatened species including: range, population size, habitat and ecology, use and/or trade, threats, and conservation actions that will help inform necessary conservation decisions. The SSII is related as it provides information about how much data we have (how well documented a particular species is), in order to identify gaps in our data/knowledge about certain species. The IUCN Red List also has a list of taxons that are Data Deficient (DD), which more directly relates to the SSII. The DD list makes note of when there is inadequate information to make a direct or indirect assessment of the risk of extinction based on the distribution and/or population status. So all of these lists are related and support one another, but provide slightly different information.

SSII Documentation:

https://cdn.mol.org/static/files/indicators/coverage/SSII_BIP_Factsheet_2019.pdf

IUCN Red List: <https://www.iucnredlist.org/>

Question 5: Can wildlife insights work with drone imagery?

Answer 5: I believe Wildlife Insights only works with camera trap data. But you can find more information here: <https://www.wildlifeinsights.org/about>

Question 6: Wildlife Insights looks like a great tool to identify species from camera trap data. Is there a similar platform for remote sound recordings?

Answer 6: This is a little outside the scope of this training, since we primarily work with optical data, but there are various ongoing efforts to identify species presence from audio recordings. Many of these platforms work similarly to Wildlife Insights. Here are a couple

- Animal Sound Identifier (ASI):

<https://onlinelibrary.wiley.com/doi/full/10.1111/ele.13092>



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- Wildlife Animal Sound Identification System (WASIS): <https://lis-unicamp.github.io/current-projects/wasis/>
- ebird (highlighted in Part 1): <https://ebird.org/home>

Question 7: What are the benefits of depositing the data of your project into the wildlife insight data base?. Can you benefit from publications when your data is use?

Answer 7: Including your data into the repository helps to create a community of the use of your data to assist with conservation and policy decisions. When you upload your data to the platform you can include your information so that you can be cited properly, so this could also benefit you as a researcher for publications.

Question 8: Does Map of life shows global distribution of Species or can be used for desirable selected area?

Answer 8: Both, you can view species distributions globally or you can refine your search/analysis to a particular region of interest. You can filter by political boundaries, select your own point of interest on the map, or filter specifically for mountain ranges.

Question 9: Does MOL also cover marine species?

Answer 9: Yes! It includes many marine invertebrate and vertebrate species. You can search for a particular species of interest here: <https://mol.org/species/>

Question 10: Hello, in the "map.half-earthproject.org", there is a species protection index sorted by countries. Where can we find the method and indicators to calculate human modification value and additional protection needed?

Answer 10: The Species Protection Index (SPI) is an indicator of global biodiversity change that is featured in the National Report Cards. The SPI is one prominent example of a family of metrics — collectively known as [Essential Biodiversity Variables](#) — vital for guiding a global strategy of biodiversity conservation, and are an integral part of international policy frameworks, including the [Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services \(IPBES\)](#) and the [Group on Earth Observations Biodiversity Observation Network \(GEO BON\)](#). See the ARSET Training on Conservation and Biodiversity (<https://appliedsciences.nasa.gov/join-mission/training/english/arset-remote-sensing-conservation-biodiversity>)

Question 11: How can we assure the accuracy and precision of resistance data layers for circuit and omniscape? What are your suggestions on how to fine-tune these



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models? Are occurrence data and information from citizen science be used to confirm the results of the models? What statistics can be used to quantify accuracy?

Answer 11:

Please refer to the Circuitscape userguide:

https://circuitscape.org/downloads/circuitscape_4_0.pdf

Also, last session, we talked about how to assess model performance: some general rules of thumb are to select the optimal model based on performance metrics that balance predictive ability, model sensitivity, and model specificity, e.g. the (average test) omission error and the (average test) area under the receiver operating characteristic curve (AUC). With smaller sample sizes or for users who are concerned about overly complex or overfit models, it is also advisable to choose the model with the lowest delta Akaike Information Criterion (AICc – small sample size corrected) score, and/or by looking at the number of parameters included in the final model.

Question 12: I observed that most of the SDM presented here are applied for terrestrial species (except FACET). Is there any SDM that is specifically for analyzing coastal and marine species, like, coral, fish, turtle, cetaceans etc ?

Answer 12: Many of the SDM algorithms we presented in session 1 can be used for coastal and marine species, such as Maxent, BIOCLIM, ENFA, GLMs, etc. Here is a great review paper of SDMS in marine environments:

<https://www.frontiersin.org/articles/10.3389/fmars.2017.00421/full>

Question 13: In taking photos for model training, are all the photos of scenes with no animals random? or do these photos need to be taken at specific locations? Thank you.

Answer 13: In the example we discussed the camera traps take photos of locations where the species of interest is thought to occur, and then the images without the presence of an animal are removed prior to the modeling. Some models do require the use of background data or pseudo-absence data. Here is a great resource for a comparison of presence/absence and pseudo-absence:

<https://besjournals.onlinelibrary.wiley.com/doi/10.1111/j.2041-210X.2011.00172.x>