Williams, DR[1,2*†], Clark, M[3*†], Buchanan, GM[4], Ficetola, GF[5,6], Rondinini, C[7], Tilman, D[2,8] (2021) Proactive Conservation to Prevent Habitat Losses to Agricultural Expansion *Nature Sustainability* **4** 314-322

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Files Included

Contained are the files for running the analyses and creating the figures. For ease of understanding, we uploaded multiple zipped files:

- **Data.zip** Input data: crop and pasture coverage in 2010; data for fitting the land allocation models ("/ModellingData"); rasters for each country ("CountryRasters'); a map of regions from the IMPACT model, which EAT-Lancet uses; and various files for land cover targets, look-ups for which regions countries are in, translating ISO3 codes to IMPACT regions.
- **Code.zip** Scripts for analyses, see note below.
- **Outputs.zip** Contains three directories:
  - **ESHTables/** contains datatables with the extent of habitat loss for each species under different scenarios
  - **Model_Coefficients/** Coefficients for the land allocation models (produced by scripts 1 and 2).
- **FigureData.zip** Rasters of species richness, richness of species losing >25% of their habitat, and mean loss of habitat.

Directory organisation

The code assumes that the following directories are set up:

- "./Data/ModellingData/" —containing the .csv files with the prefix "ModellingData_..."

- "/Data/" —containing "MollweideCountryID_1.5km_IMPACT.tif", "ProportionCrop_2010.tif", "ProportionPasture_2010.tif", "ISO_translation.csv", "ProportionalTargets.csv", "RegionLookUp.csv"
- "./Data/CountryRasters/" —containing the raster identifying countries and with cell indices
- "Data/ESHFiles/" —containing the habitat maps for species. **NOTE:** These data are not available to be shared. Please contact the corresponding authors for more information.
- "Data/HabitatSuitabilityData/" — containing habitat suitability data for species
- "./Outputs/Model_Coefficients/" —containing the .rda files which end "..._Coefs.rda"
- "./Outputs/BAU/tifs" —where the country-specific projections will be stored. Change "BAU" to whatever scenario you are running
- "./Outputs/WorldAgProjections/..." —where scenario-specific agricultural projections will be stored. **NOTE**: These data are not included in this repository. Please email the corresponding authors so we can keep track of how the data are being used (we will share them freely, we just want to be able to advise).
- "./Outputs/ESHTables_EATLancet/" —containing the estimates of the loss of extent of suitable habitat

Running the scripts

Scripts need to be run in order. File names are numbered; the sequence is:

1. Model fitting scripts
2. Converting agricultural land
3. Combining the rasters produced into a world map
4. Overlaying this world map with maps of suitable habitat
5. Calculating habitat loss from these

Additional information

Data for creating the figures are in "./Outputs/FigureData/". Some additional manipulation is probably needed.

Note that R is very slow and memory intensive for raster calculations of the kind being done here. We ran the scripts across 40 cores, using up to ~200GB of RAM at a time. You have been warned….