## **Process Overview**

**Data Provided & Data Access:**

Included on github are data are processed input files used in the R processing scripts below. The file locations are currently hard coded in the scripts, so the file paths would need to be adjusted to read and write data.

Raw AMAPPS sightings data are available on the OBIS-SEAMAP website. If you have trouble accessing these data, please contact Debi Palka at NOAA ([debra.palka@noaa.gov](mailto:debra.palka@noaa.gov)).

Similarly, raw AMAPPS echosounding data is available through the NODC. Please contact Mike Jech at NOAA if you have trouble accessing these data ([michael.jech@noaa.gov](mailto:michael.jech@noaa.gov)).

Please contact me ([chris.orphanides@noaa.gov](mailto:chris.orphanides@noaa.gov)) for general questions or questions on the processing steps below.

**Echoview Processing – Python automation of exports, Echoview template**

*Note: this is to illustrate the process. The raw echosounding files are not provided here given the size and number of files used. See notes above for access to the echosounding data used in this study.*

1. Hand processed 2011, 2013, and 2016 echosounding data (bad data regions, added bottom, updated templates for outputting more variables (with and without schools – did not use school detection in the end - raw frequencies, Urmy variables, etc.). One Echoview file per trackline. EV file template is provided (Example\_EV\_file.EV)
2. Wrote python script to create schools, standardize things, and export data. Processed echosounding data in Echoview to export species groupings. One Echoview file per trackline. Python files:
   * loop\_through\_EV\_files.py
     + This file creates a function that loops through EV files by year and creates new EV files, exports bottom csv files, creates a new variable of 38 kHz to 1200 m (which may not have been necessary), cleans up a thing or two, does school detection, and outputs integration
     + See bottom of loop\_through\_EV\_files.py for history of re-runs, etc.
     + Moved 1200 m files to their own folder - they are not needed, duplicative

**p(*a*) estimates**

1. select.sightings.R - Used this to select sightings on shelf break with acoustic data to use in p(a) calculations
2. pa.calcs.R - Used the select.sightings.R dataset to calculate pa for all species (but read in p(a)s from other files for white-sided dolphin & humpbacks)
   * hump.shelfbreak.pa.R & wsd.shelfbreak.pa.R - Calculated p(a)s for humpbacks and white-sided dolphins using the whole shelfbreak (includes areas that did not have echosounding data recorded, but did limit to the three years in this study - 11, 13, 16). P(a)s from the more limited dataset used for most species in the pa.calcs.R script did not have a good model fit.

Combining echsounding and sightings data

1. **Data.Process8.R** - Creates combo.f function that combines marine mammal and acoustic data outputs
2. **Run.HBXX03.transects.R** - Three programs (one for each year) that employ combo.f from the above step. Runs each transect separately and then combines and writes out output at the end
   * Used t**est.process.R** to troubleshoot
3. Data.prep.R -- Not made yet
4. Density.models.fin.R - A work in progress
5. Test.looop.fin.R - A work in progress, testing looping through all variables to build models - here or in data.prep fix missing value issues
6. k\_cross\_validation\_to\_Chris.R - Sam's program that creates a function [gam.cv()] that does k-fold cross validation and outputs several error estimators