**Archival Tag Location Processing Protocol**

Mitchell S. Lovell – 2/13/23

1. **Run LAT Viewer Studio**
   1. Click the green “TAG” button
      1. Adjust folder path to desired tag
      2. Click “Start Import” (This typically takes a couple minutes)
      3. Set *Release* *Time* to 0:00:00
      4. Adjust *Release* *Date* information
      5. Adjust *Release* *Longitude* and *Latitude*
      6. Set *Recapture* *Time* to 23:59:59
      7. Adjust *Recapture* *Date* information
      8. Adjust *Recapture* *Longitude* and *Latitude*
      9. Click “Save” (LAT Viewer will buffer, then add the new tag to column)
      10. Click “Close”
   2. Double click on newly imported tag
      1. Right click on “Log1”
      2. Click “Template Fit (TF)”
         1. \*Pop-up box\*
            1. Click “Calculate”
         2. Click “Export as CSV…”
         3. Save in desired location
         4. Click “Close”
   3. Double click “Log1”
      1. Right click “ExtTemp”
         1. Export as ASCII file to desired location
      2. Right click “Pressure”
         1. Export as ASCII file to desired location
   4. Close LAT Viewer Studio
2. **Open “tagnumber.csv”**
   1. Delete datapoints that fall outside of the release and recapture date range
   2. Select the *Sunrise* data
      1. Change data format to “Time” or “1:30:59 PM”
   3. Select the *Sunset* data
      1. Change data format to “Time” or “1:30:59 PM”
   4. Calculate the average for both *Sunrise* and *Sunset*
      1. Do not include the first or last day in the average (these are typically erroneous)
   5. Subtract one hour from *Sunrise* (this value will be used to filter raw data in Access when obtaining sst values) \*write this value down, because it will be used later
   6. Add one hour to *Sunset* (this value will be used to filter raw data in Access when obtaining sst values) \*write this value down, because it will be used later
   7. Save and close the Excel spreadsheet
3. **Open “tagnumber\_ExtTemp.csv”**
   1. Create a copy in a blank Excel spreadsheet
   2. Close “tagnumber\_ExtTemp.csv”
4. **Open “tagnumber\_Pressure.csv”**
   1. Copy and paste the *Pressure* data into the newly created Excel spreadsheet
   2. Close “tagnumber\_Pressure.csv”
5. **Working within the newly created Excel spreadsheet**
   1. Delete datapoints that fall outside of the release and recapture date range
   2. Separate the single column of *TimeS* into two separate columns
      1. \*Notice that the order of Date and Time is not consistent throughout the *TimeS* column; therefore, we will need to work around this.\*
      2. Highlight the *TimeS* data
      3. Click “Sort & Filter”
         1. Click “Sort A to Z” (this will group the data according to their format)
            1. Select “Expand Selection”
            2. Click “Sort”
      4. Insert 2 columns after *TimeS*
      5. Find where the data switches formats (somewhere in the middle) and highlight the entirety of one specific format
         1. For the “**Date/Time**” format style (typically the one on top)
            1. Click the “Data” tab
            2. Click “Text to Columns”

Select “Fixed Width”

Click “Next”

Adjust arrows to where the data is encompassed in two columns

Click “Next”

Select “Date” for the first column format

Change the format to “DMY”

Leave column two as “General”

Select “Do not import column (skip)” for the third column

Click “Finish”

* + - * 1. With the date data still selected in the first column, click “Home”

Change the number format to “Short Date” (this gets rid of the 0:00:00 time component at the end)

* + - 1. For the “**Time/Date**” format style
         1. Highlight the remaining data (typically the bottom half)
         2. Click the “Data” tab
         3. Click “Text to Columns”

Select “Delimited”

Click “Next”

Under “Delimiters”, select “Space”

Click “Next”

Leave the first column as “General”

Select “Date” for the second column format

Change the format to “DMY”

Click “Finish”

* + - * 1. With the time data still highlighted in the first column, “click “Home”

Change the number format to “Time” (this gets rid of the 0:00:00 time component at the end)

* + - 1. Unify the “Time” and “Date columns
      2. Delete the blank column between the new “Time” column and *ExtTemp*
      3. Relabel the first and second column headings to *Date* and *Time*
      4. Highlight the Date data
         1. Click “Sort & Filter”
         2. Click “Sort Oldest to Newest”

Select “Expand Selection”

Click “Sort” (the data should now be in chronological order)

* 1. Save the document as “tagnumber\_ExtTemp\_Pressure.xlsx”
  2. Close the file

1. **Open “AT Data Filtering for R Analysis.accdb” \*\*\*IATTC & NOAA will need to consult on how to build the queries in Access\*\*\***
   1. Click “External Data”
      1. Click “New Data Source”
      2. Click “From file”
      3. Click “Excel”
         1. Click “Browse” and set the file path for the newly made “tagnumber\_ExtTemp\_Pressure.xlsx”
      4. Click “OK” (takes a few seconds)
   2. \*Pop-up box\*
      1. Click “Next”
      2. Click “Next”
      3. Select “No Primary Key”
      4. Click “Next”
      5. Click “Finish”
      6. Click “Close”
   3. Open the new table
   4. Right click “Query1” (Time) **\*\*\*IATTC & NOAA will need to consult on how to build the queries in Access\*\*\***
      1. Click “Design View”
      2. Under “Query Design”, click “Add Tables”
         1. Select the “Table” tab
         2. Select the recently imported table
         3. Click “Add Selected Tables”
      3. Change “Query1” to analyze the newly added table
      4. Change the “Time” criteria to match the unique sunset and sunrise times for the tag being analyzed (this was calculated from earlier)
      5. Click “Run”
      6. \*\*\*MAKE SURE TO SAVE BEFORE RUNNING QUERY2\*\*\*
   5. Right click “Query2” (Pressure) **\*\*\*IATTC & NOAA will need to consult on how to build the queries in Access\*\*\***
      1. Click “Design View”
      2. Click “Run” (this will run on the updated “Query1”)
   6. Right click “Query3” (ExtTemp) **\*\*\*IATTC & NOAA will need to consult on how to build the queries in Access\*\*\***
      1. Click “Design View”
      2. Click “Run” (this will run on the updated “Query2” to get the average SST)
   7. Copy the data to be pasted into a blank Excel spreadsheet
2. **Open a blank Excel spreadsheet**
   1. Copy and paste the *Date* and *AvgOfExtTemp* from Access “Query3” into the blank Excel spreadsheet
      1. Delete the top row labelled “Query3”
   2. Insert 6 additional columns between *Date* and *AvgOfExtTemp*
   3. Highlight the new columns and change their format to “General”
   4. Separate the *Date* into day, month, and year columns
      1. In the second column
         1. Label *day*
         2. Use function =DAY(A2)
         3. Autofill the data down
      2. In the third column
         1. Label *month*
         2. Use function =MONTH(A2)
         3. Autofill the data down
      3. In the fourth column
         1. Label *year*
         2. Use function =YEAR(A2)
         3. Autofill the data down
      4. Copy and paste all the data as “**Values (V**)” back into A1 (this breaks the reference function)
      5. Delete the first column
   5. Copy and paste (Ctrl + C 🡪 Ctrl + V) *dd/mm/yy*, *TRLon,* and *TRLat* data from the original tag data file into the 3 blank columns
      1. Make sure the data aligns, this may have you deleting certain datapoints
   6. Delete the *dd/mm/yy* column
   7. Relabel *TRLon*, *TRLat, and AvgOfExtTemp* to *lon*, *lat, and sst*
   8. Overwrite the existing release and recapture locations with the known release and recapture data
      1. If the tag doesn’t provide data up until the recapture date, then we cannot assign an end *lon* and *lat*
   9. You will also likely need to delete the first *sst* value, because it is likely a half day that can skew the data
   10. Insert a scatter plot for *lon* and *lat* to remove extreme datapoints
       1. Inspect data for values of 200 in *lon* and values of 100 in *lat* \*\*\*this is basically an “N/A” and will need to be delt with in a specific manner later\*\*\*
   11. Insert a new column between *lon* and *lat*
       1. Label it *lon*
       2. Add 360 to the existing *lon* value (UKFSST code will not read negative values)
          1. Autofill down
       3. Copy and paste all the data as “Values (V)” back into cell E1 (this breaks the reference function)
       4. Delete the original *lon* column
   12. Save Excel spreadsheet as “tagnumber\_R.csv”
   13. Save and close all opened files
3. **\*\*\*ONLY PERFORM STEP 8 IF YOU HAVE VALUES OF 200 IN LON OR 100 IN LAT\*\*\***
   1. Sometimes Lotek ArcGeo’s can’t provide locations
      1. In this scenario, the tag will respond with a “200” for *lon* and “100” for *lat*
      2. Other situations include times at which the tag is at liberty during the equinox
   2. For this reason, we will need to “trick” the get.sst.from.server() function by assigning an averaged value of the cells surrounding the “200” or “100” – I typically go 10 cells above and 10 cells below
   3. Create a copy of the “tagnumber\_R.csv” in a new book
   4. In the new book, go to where the “200” or “100” is and delete them
   5. Fill in the blank cells with the averaged value
   6. Save the new book as “tagnumber\_R\_sst.csv”
   7. Delete the “200” or “100” from the “tagnumber\_R.csv” file now so the UKFSST model can predict its location based off the averaged values from above
4. **Open R Studio**
   1. Copy and paste Location Processing code into a new R Script
   2. Replace the existing tag ID with the new tag ID
      * 1. Ctrl + F and replace
   3. Load in sources file and tag data csv file
   4. Start with UKFSST model where…
      1. bx.a = F
      2. by.a = T
      3. bsst.a = F
   5. Once model convergence has been obtained, take the resulting model parameters, and try to turn model parameters back to “T”
   6. Use the fit2csv() function
   7. Save the file as “tagnumber\_R Code.R”
   8. Close R Studio