

QA/QSea User Manual

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Introduction

QA/QSea is a Shiny app written in the R environment. This app was constructed to work in conjunction with SeaLog, a data logging application developed by Department of Interior researchers in Alaska for the collection of at-sea survey data. QA/QSea can read comma delimited text files (csv) output from SeaLog, provide proofing tools, and generate exportable data files in multiple formats including that used in the North Pacific Pelagic Seabird Database (NPPSD). Note this app cannot read dLOG or any other csv data, as it requires JSON configuration files from SeaLog. A previous version of the app (dLog_final) can be used for this purpose and is available.

Requirements and Setup

The app needs a recent version of R, 4.1 or higher, and is best run from RStudio, version 1.2 or higher. R can be downloaded from [CRAN](https://cran.r-project.org/), and RStudio is available at <https://posit.co/download/rstudio-desktop/>

Once these are installed, open RStudio and install the required packages using the following statement:

```
install.packages(c("shiny", "shinyjs", "shinythemes", "bslib", "tidyverse",  
  "stringr", "glue", "lubridate", "readxl", "hms", "knitr", "DT", "sp", "sf",  
  "viridis", "leaflet", "leaflet", "htmltools", "zoo", "jsonlite", "readxl",  
  "janitor"))
```

Installing these packages will take several minutes depending on the speed of your network connection and whether your computer is building them from source or installing pre-build binaries. On platforms where R libraries are compiled from source (Linux, OS X), you may need to install additional system libraries such as udunits, and libxml2. Note: if you cut and paste the above statement and get an error, try deleting and retyping the quotation marks.

If you are running an older version of R you can download the latest version, but if your version has changed significantly (either the major or minor number has changed, like 3.4 → 3.5 or 3.4 → 4.0) you will need to re-install the packages listed above.

To upgrade your existing packages to the latest version, you can do this in the console by running `update.packages(checkBuilt = TRUE, ask = FALSE)`, or go to the **packages** tab in RStudio and click the **Update** button.

Reference Files, Variables

Built-in reference files

There are two files installed in the **references** subdirectory that are used to set defaults in QA/QSea

Species Lists

Species lists are used to convert four letter species codes into common names and for summary and assignment of taxonomic classes for the NPPSD. The file is named **SeaLog-Species_CodeList.csv**.

Additional codes can be added to the taxonomic code list file using the same format as the existing lines.

Validation within the app is based on the configuration file **speciesValidationList.json** that was used by SeaLog during data collection. This file is used by SeaLog for real-time validation and is also required for QA/QSea to identify questionable observations.

NPPSD References

The **nppsd_reference_table_data.csv** file contains the list of valid behaviors, weather codes, platforms and survey types used by QA/QSea to validate these fields in your observational data. If you are not submitting data to the NPPSD and you want different codes for these fields, you can change this reference file using the same format.

SeaLog Data

You will also need three files from SeaLog. The observational data, and two JSON configuration files.

Observational Data From SeaLog

QA/QSea requires three files to operate. The SeaLog>export folder will contain the survey observations and settings csv files. Exported files may be identified by their time stamp included in the name, e.g. **observations_20210426.csv**. The settings file will identify the configuration file names and locations used for data collection. Note: in the settings file, forward and backward slashes are interchangeable.

Optional Fields

The app uses the SeaLog configuration file **optionalFields.json** to determine which of the fields used during data collection should appear in the outputs. With a few exceptions, such as *Latitude* and *Longitude*, *Date* and *Time*, and *GPSTime*, only the fields enabled in the SeaLog app will appear in your outputs. The input csv file (and any backups created by the app) will contain all possible Seabird fields, but those that aren't enabled will be empty (null in the CSV, NA in R).

Species List

You also need the species list file you used with SeaLog, **speciesValidationList.json**. This contains the list of species codes that are valid for your survey data. Codes in your data that aren't in this list will be flagged in QA/QSea so you can correct them.

NPPSD Species Crosswalk

One optional file, **nppsd_species_crosswalk.csv**, is a file that maps your species codes to those used with NPPSD. It has three columns: "Species Code", "Common Name", and "NPPSD Species Code". For example, if on your surveys you code adult and juvenile Bald Eagles (BAEA) separately, you'd use the following CSV file:

```
Species Code,Common Name,NPPSD Species Code
BAEAA,Bald Eagle (adult),BAEA
BAEAJ,Bald Eagle (juvenile),BAEA
```

You would also need to include BAEAA and BAEAJ in your **speciesValidationList.json** so they would be listed as valid species in SeaLog and QA/QSea.

Starting the App

Although the app will run directly from the R command window, most users will find running it in the RStudio environment will be easier.

To start the app in RStudio:

- Open RStudio
- Open the Project associated with the app, probably named something similar to seabird_data_nps. If you don't have a Project associated with the app (or you don't know what a project is), simply open RStudio and follow the directions below.

- In the **Files** pane, typically in the lower right, open the shiny_app folder. This folder should contain global.r, server.r, ui.r, and several subfolders.
- Click the **More** drop-down arrow (next to the blue gear icon) and select “Set As Working Directory”.
- Go to the R Console, which is typically either the full left pane or the lower left pane in RStudio.
- Load the shiny library:

```
library(shiny)
```

- Run the app:

```
runApp(launch.browser = TRUE)
```

A new window should launch in your web browser (Figure 1). If you close this window, the app will still be running within RStudio, and you can get back to it by scrolling up to where you entered runApp() in your RStudio console, copying the link shown below that statement, and pasting it into your web browser’s location bar. It looks something like http://127.0.0.1:3924, but the number at the end will vary each time you run it.

If you closed the browser window and you do not want to return to the app, press Ctrl-c after clicking in RStudio’s Console window to close it.

The Shiny library only needs to be loaded once within an R session in RStudio, so if you want to start the app again, you only need to type runApp(launch.browser = T).

App Organization

The app is organized into nine tabs. Typically, users will work through the processing of your file or files from left to right in the app, though some tabs may not be of interest for all projects. Input files from SeaLog are below the “Default” field values.

Input Files

The first tab, **Input Files**, Users select values for *Platform Type*, *Survey Type*, and method used to count flying bird (*Fly Bird Method*). For the *Source* users should enter the name of the data manager (typically the person running QA/QSea) and the *Principal Investigator*. QA/QSea allows users to select the segment length using a slider. Note the results of this splitting will be shown only on the **Split Transects** and **Split Observations** tabs. The NPPSD tabs **tbl_LOCATION** and **tbl_DATA_OBS** will be based on 3.3 km length transect segments unless the check-box “Use split length for NPPSD” is selected. By default, the “Fix positive longitude” is selected to automatically correct for missing negative signs. Note: If users are operating in areas with a positive longitude, e.g. Russia, you will want to uncheck this box. In addition, once you have opened files, you cannot change the defaults without re-opening the files so be sure to populate all the fields in the Defaults section.

Metadata

Modified Platform Type

Small Boat

Source

Name of person submitting data

PI Credit

Modified Survey Type

Pelagic Survey-Strip

Survey Target

All

Other survey target

Maximum interval between points (seconds)

120

Fly Bird Method

Continuous

User-defined split length (km)

0

1

2

3

4

5

6

7

8

9

10

☐ Use split length for NPPSD (normally 3.3 km)

CSV Data Files

BROWSE...

observations_v2.2.8_20230802_121052.csv

Upload complete

filename	size_kb
observations_v2.2.8_20230802_121052.csv	6762

Optional Fields JSON File

BROWSE...

optionalFields_Nearshore_20230802_121052.json

Upload complete

Enabled	Fields
FALSE	18
TRUE	16

Species List JSON File

BROWSE...

speciesValidationList_Nearshore_20230802_121052.json

Upload complete

Species Codes
336

NPPSD Species Crosswalk CSV (optional)

BROWSE...

No file selected

Figure 1: Summary of ingested csv file text and numeric values. Unique values can be globally edited on this page.

If you do not change the default “split distance” on the slider it will split transects into smaller ~1 km segments. This process works similar to how transects are split to produce NPPSD-ready data, except you can choose your own split distance. The logic is the same: each transect will be split into pieces as close in length to the distance selected, with the last segment as least if the split distance and no longer that two times the split distance. This typically means the last segment is longer than the rest of the segments, rather than shorter than the rest. Note: splitting occurs within transect. For example, 2 transects each of 2.6 km in length will each yield 2 “split transects” one ~1 km and a second ~1.6 km (using a 1 km split length). Even if the transects were concurrent, the app will not join them prior to splitting. Thus, transect lengths should be a consideration during the survey design to maximize samples.

There are four file selection boxes, one for selecting one or more input CSV file (**CSV Data Files**), one for choosing the optional fields JSON file that was used during the data collection (**Optional Fields JSON File**), one for choosing the species validation JSON file used by SeaLog (**Species List JSON File**)(Figure 1). All three of these file entry fields need to be filled in before the app will read and process your data. There’s also an optional file, **NPPSD Species Crosswalk** that maps your species codes and common names to NPPSD codes.

After selecting the JSON configuration files used during data collection and one or more data files, click the **READ DATA** button and the app will read each file and bring the data into memory. A progress bar will appear in the lower right corner with details on what the app is working on. When the progress bar disappears, a variety of summary information appears below the two buttons.

In the RStudio Console window, you may see warnings while the app reads the data. These are normal and can happen when R attempts to convert empty values to particular types like dates or numbers.

Statistical Summary

Below the Input fields and buttons, is a statistical summary of the data ingested (Figure 2). This gives you an opportunity to identify statistical anomalies.

Global Changes

The next tab over **Global Changes** shows you the **Unique text values** (fields like observers, behaviors, species, and survey information), **Unique integer values** (Beaufort codes, condition, and transect width), and the species codes used on the survey that don’t match NPPSD codes, **NPPSD Species Crosswalk** (Figure 3).

At the top of the page is a checkbox labelled “Automatically update data when changing values”. This checkbox is typically left unchecked so you can make global changes to the values on this page without having to wait for the data processing to complete. When you are finished making changes, you need to be sure to check this box in order to reprocess your data. If you do not do this, the data shown in the subsequent tabs will not have your global edits.

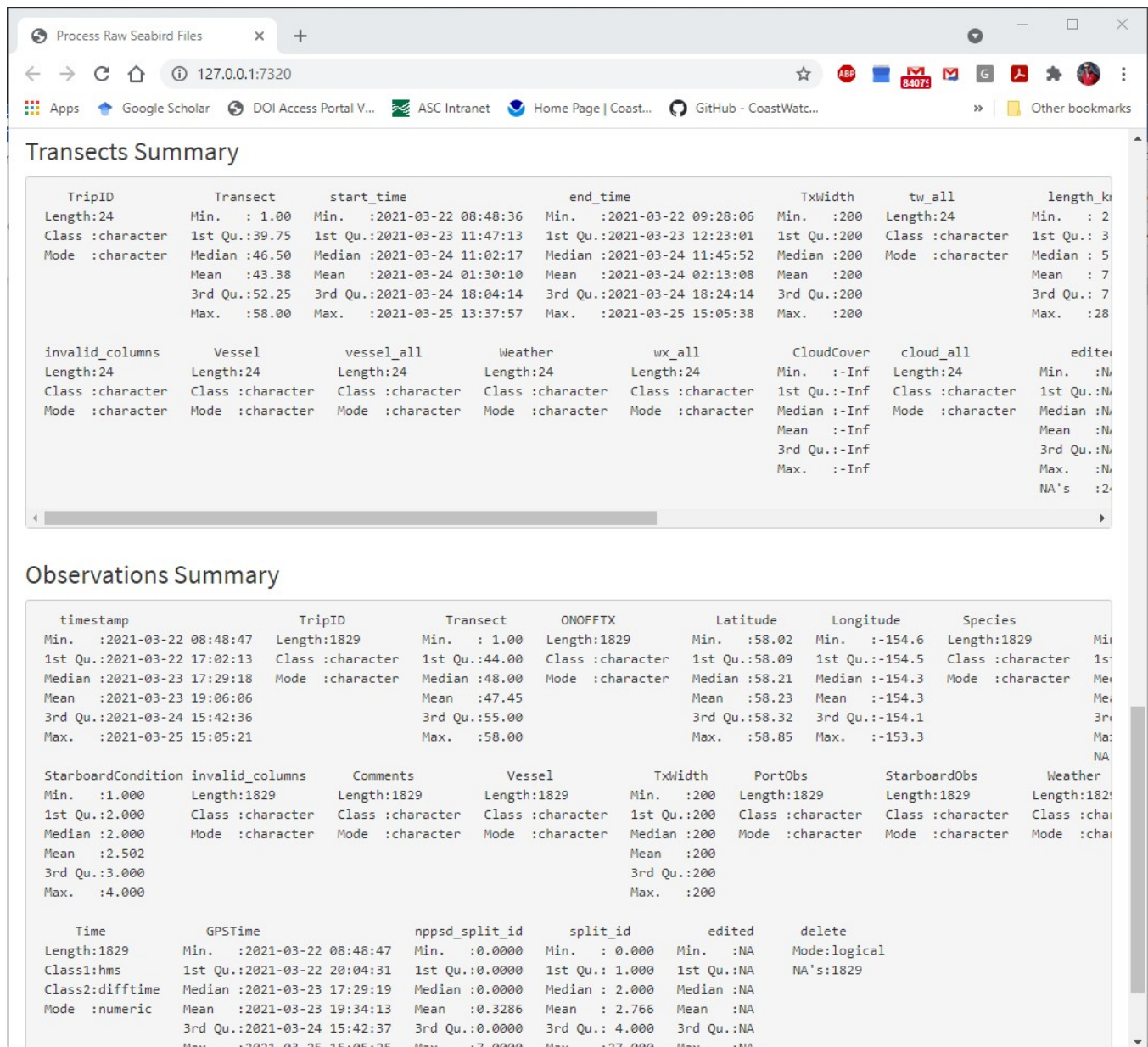


Figure 2: Statistical summary of ingested data.

In cases where the data for a field was absent, text fields have been populated with the word **NULL**, and integer fields with the number **9999**. Be sure you find and replace these values with the proper code or number. Also keep in mind that these changes are global, so if you have a situation where you left Transect blank for multiple transects, you cannot use the **Global Changes** tab to correct the issue because any replacement of NULL with a proper transect will replace *all* off the missing values.

In order to make changes, double-click in the cell you want to change, edit the value, then hit the Tab key or click outside the box. The table will refresh itself and recount each category.

Pay particular attention to the **Transect**, **TripID** (text values) and **TxWidth** (integer) fields. These are used to generate unique transect IDs and calculate densities, so if they are incorrect, you will wind up with incorrect or split transects and miscalculated densities. Also be sure to either correct, or resolve situations with **NULL** or **9999** in the value column.

Input Files

Global Changes

Transects

Observations

User Transects

User Observations

NPPSD Transects

NPPSD Observations

Species Summary

Map

Automatically Update

☐ Automatically update data when changing values

Unique text values

Show 10 entries

Search:

name	value	count
PortObs	TM1T11	57
PortObs	TMUU	35
PortObs	TBS	3
PortObs	L	1
PortObs	S	1
PortObs	TMU	1
PrimaryBehavior	WATER	1726
PrimaryBehavior	FLY	399
Species	MAMU	429
Species	BLKI	291

Showing 11 to 20 of 123 entries

PREVIOUS

1

2

3

4

5

...

13

NEXT

NPPSD Species Crosswalk

Show 10 entries

Search:

custom_species_code	custom_common_name	nppsd_species_code
BUSH		
NPE		
LEFB		
GTBH		
TRSW		
CAGO		
NOSH		
NEI		
STIL		
BBSP		

Showing 1 to 10 of 24 entries

PREVIOUS

1

2

3

NEXT

Figure 3: Graphical user interface, Global Changes

! Important

Before moving to the next tabs, be sure to check the **Automatically update data when changing values** checkbox at the top of the page.

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Transects Tab

Location information is presented in the next 3 tabs, **Transects**, **Split Transects**, and **tbl_LOCATION**. Following the processing of the data files and display of summary information, users should select the **Transects** tab to examine and, if necessary, edit the transect level data. Transects are grouped by *TripID*, *Transect* and date, calculated from the timestamps of each point (both GPS and observational data) (Figure 4.)

TripID	Transect	start_time	end_time	TxWidth	tw_all	length_km	area_sampled_km2	port_obs	po_all	starb
KATMW2021	1	2021-03-25T02:30:50Z	2021-03-25T02:42:50Z	200		3.0412	0.6082	KG		RC
KATMW2021	2	2021-03-25T02:52:40Z	2021-03-25T03:25:10Z	200		5.3117	1.0623	KG		RC
KATMW2021	35	2021-03-25T21:37:57Z	2021-03-25T23:05:38Z	200		10.1066	2.0213	DK		KG
KATMW2021	36	2021-03-25T20:02:42Z	2021-03-25T20:47:32Z	200		7.8335	1.5667	DK		KG
KATMW2021	38	2021-03-25T18:37:24Z	2021-03-25T18:55:24Z	200		2.9507	0.5901	KG		DE
KATMW2021	39	2021-03-25T17:04:15Z	2021-03-25T18:55:14Z	200		28.8009	5.7602	DK		DE
KATMW2021	40	2021-03-25T01:55:22Z	2021-03-25T02:18:02Z	200		4.0231	0.8046	KG		RC
KATMW2021	42	2021-03-25T00:34:53Z	2021-03-25T01:05:43Z	200		3.7155	0.7431	DE		KG
KATMW2021	43	2021-03-24T23:59:03Z	2021-03-25T00:27:23Z	200		4.1448	0.829	DE		KG
KATMW2021	44	2021-03-24T20:35:41Z	2021-03-24T20:51:21Z	200		2.7266	0.5453	DK		RC
KATMW2021	45	2021-03-24T21:00:33Z	2021-03-24T21:33:43Z	200		4.8577	0.9715	DK		RC
KATMW2021	46	2021-03-	2021-03-	200		4.5993	0.9199	KG		DE

Figure 4: Transects tab listing transects based on ID. Fields are sortable using the button next to each field name (red circle).

Additional QA/QSea columns have been added to the data from SeaLog. Because the transects table is an aggregation of field values during a transect, it is possible for there to be differences between values

in a field within a transect. In those cases, you will see all the values in the column just to the right of the data column. For example, if you had a *TXWidth* of 200 m for some observations in a transect and 300 m for others in the same transect, you would see **200, 300** in the *tw_all* column. If the value that's actually in the *TXWidth* column isn't correct because the app chose the wrong one, you can change it to the other value.

The other QA/QSea columns include **invalid_columns**, which displays a list of columns that contain values that don't match the list of accepted values or are outside the acceptable ranges for them. The table is sorted by this column, so all the potentially incorrect rows appear at the top.

To change values, double-click on the cell you want to change and edit the value. When you leave the cell, the data in memory is updated, any derived data is re-calculated (like the data in the **tbl_LOCATION** or **Split Transects** tabs), and a row will appear at the bottom in the section titled "Edited rows (original content)". This table displays what the original data was for any row that you've modified. Rows that have been edited will also have today's date in the edited column, the second from the right side of the table.

If you want to delete a column from the views and downloaded results, enter any text in the last column, delete.

Whenever an edit is made, the app saves a backup copy of all the data in the backups directory, directly under the shiny_app directory you started from. These files are named raw_data_ with a timestamp in YYYYmmddHHMMSS format at the end so they will sort correctly. If the app crashes, or you realize you made an edit in error, you can re-load the raw data from one of these backup files instead of the original SeaLog CSV file and any changes you made prior to the timestamp will be preserved.

Split Transects

The next tab "Split Transect" presents data where the original transects have been split into lengths based on the slider on the Input Files tab. The transect segments can be identified by a new ID based on **TripID_Transect Number_Start Time_segment number**. This retains linkage to the original transect (Figure 5). Fields in this tab behave similarly to those in the Transects tab but are summarized by transect-segment, not transect. Note: **invalid_columns** data identified in the **Transects** tab are not shown in the **Split Transects** tab. Editing of transect data should be done in the **Transects** tab. This file in csv format can be downloaded using the button at the bottom of the page.

master_key	TripID	Transect	Latitude	Longitude	start_time	end_time	transect_width_m	transect_lengt
KATMW2021_1_20210324_00	KATMW2021	1	58.4179	-154.0421	2021-03-25T02:30:50Z	2021-03-25T02:34:40Z	200	
KATMW2021_1_20210324_01	KATMW2021	1	58.4265	-154.0399	2021-03-25T02:34:50Z	2021-03-25T02:37:50Z	200	
KATMW2021_1_20210324_02	KATMW2021	1	58.4369	-154.0359	2021-03-25T02:38:00Z	2021-03-25T02:42:50Z	200	
KATMW2021_2_20210324_00	KATMW2021	2	58.4405	-154.0285	2021-03-25T02:52:40Z	2021-03-25T03:00:00Z	200	
KATMW2021_2_20210324_01	KATMW2021	2	58.4447	-154.0194	2021-03-25T03:00:02Z	2021-03-25T03:06:27Z	200	
KATMW2021_2_20210324_02	KATMW2021	2	58.4491	-154.0088	2021-03-25T03:06:30Z	2021-03-25T03:11:40Z	200	
KATMW2021_2_20210324_03	KATMW2021	2	58.4539	-153.9937	2021-03-25T03:11:50Z	2021-03-25T03:16:44Z	200	
KATMW2021_2_20210324_04	KATMW2021	2	58.459	-153.9827	2021-03-25T03:16:50Z	2021-03-25T03:25:10Z	200	
KATMW2021_35_20210325_00	KATMW2021	35	58.8063	-153.3685	2021-03-25T21:37:57Z	2021-03-25T21:43:27Z	200	
KATMW2021_35_20210325_01	KATMW2021	35	58.8149	-153.3648	2021-03-25T21:43:37Z	2021-03-25T21:48:47Z	200	
KATMW2021_35_20210325_02	KATMW2021	35	58.8239	-153.3632	2021-03-25T21:48:57Z	2021-03-25T21:54:07Z	200	
KATMW2021_35_20210325_03	KATMW2021	35	58.8295	-153.357	2021-03-25T21:54:07Z	2021-03-25T21:59:17Z	200	

Figure 5: Split transects tab.

tbl_LOCATION

The **tbl_LOCATION** tab is similar to the **Split Transects** tab, but it splits the transects into 3.3 km lengths and includes all NPPSD data fields. As with the Split Length tab, transect segments are identified using the *master_key* a field based on *TripID*, *Transect Number*, *Start Time*, and *segment number* (Figure 6). This csv file can be downloaded using the button at the bottom of the page. Note: the default 3.3 km length of NPPSD transects can be overridden on the inputs page if the provided check box is selected.

master_key	survey_id	station_number	modified_platform_type	modified_survey_type	fly_bird_method	loc_method
KATMW2021_1_20210324_00	KATMW2021	1	Small Boat	Pelagic Survey	Continuous	Centroid
KATMW2021_2_20210324_00	KATMW2021	2	Small Boat	Pelagic Survey	Continuous	Centroid
KATMW2021_35_20210325_00	KATMW2021	35	Small Boat	Pelagic Survey	Continuous	Centroid
KATMW2021_35_20210325_01	KATMW2021	35	Small Boat	Pelagic Survey	Continuous	Centroid
KATMW2021_35_20210325_02	KATMW2021	35	Small Boat	Pelagic Survey	Continuous	Centroid
KATMW2021_36_20210325_00	KATMW2021	36	Small Boat	Pelagic Survey	Continuous	Centroid
KATMW2021_36_20210325_01	KATMW2021	36	Small Boat	Pelagic Survey	Continuous	Centroid
KATMW2021_38_20210325_00	KATMW2021	38	Small Boat	Pelagic Survey	Continuous	Centroid
KATMW2021_39_20210325_00	KATMW2021	39	Small Boat	Pelagic Survey	Continuous	Centroid
KATMW2021_39_20210325_01	KATMW2021	39	Small Boat	Pelagic Survey	Continuous	Centroid
KATMW2021_39_20210325_07	KATMW2021	39	Small Boat	Pelagic Survey	Continuous	Centroid
KATMW2021_40_20210324_00	KATMW2021	40	Small Boat	Pelagic Survey	Continuous	Centroid
KATMW2021_42_20210324_00	KATMW2021	42	Small Boat	Pelagic Survey	Continuous	Centroid
KATMW2021_43_20210324_00	KATMW2021	43	Small Boat	Pelagic Survey	Continuous	Centroid
KATMW2021_44_20210324_00	KATMW2021	44	Small Boat	Pelagic Survey	Continuous	Centroid
KATMW2021_45_20210324_00	KATMW2021	45	Small Boat	Pelagic Survey	Continuous	Centroid
KATMW2021_46_20210324_00	KATMW2021	46	Small Boat	Pelagic Survey	Continuous	Centroid
KATMW2021_47_20210324_00	KATMW2021	47	Small Boat	Pelagic Survey	Continuous	Centroid
KATMW2021_48_20210323_00	KATMW2021	48	Small Boat	Pelagic Survey	Continuous	Centroid

Figure 6: Tab tbl DATA_OBS formatted for the NPPSD.

Observations

Observations, like transect data, is presented in 3 tabs: **Observations**, **Split Observations**, and **tbl_DATA_OBS**. The first Observations tab is used to edit the observational data. In this tab, potentially erroneous data is elevated to the top of the data listing and includes an *invalid_columns* field that displays which fields in that row of data contain potential issues. Note: users may have to scroll over as the invalid columns field may not be visible depending on window size. Double-clicking a cell with an issue and correcting it will clear the *invalid_columns* field and the row will be sorted according to trip, transect number and timestamp columns. The table also contains a density column, which is re-calculated each time the data is edited, and a pair of columns to identify which split transect

segment the observation falls in for both the NPS and NPPSD transect splits (Figure 7). A backup copy of the raw data is saved in the SeaLog>backups directory with each change (up to the 5 most recent), and a table showing the original data from the edited rows appears below the current data.

timestamp	TripID	Transect	ONOFFTX	Latitude	Longitude	Species	Count	density	PrimaryBehavior	Beaufort
2021-03-24T18:16:23Z	KATMW2021	47	ON	58.2844	-154.1099	BLSC	320	260.9202	WATER	
2021-03-23T21:23:44Z	KATMW2021	53	ON	58.0504	-154.4268	PEFA		0	LAND	
2021-03-25T03:19:09Z	KATMW2021	2	ON	58.4578	-153.9799	BBMA	1	0.9413	LAND	
2021-03-25T22:49:59Z	KATMW2021	35	ON	58.8425	-153.3227	CORA	1	0.4947	LAND	
2021-03-25T23:05:21Z	KATMW2021	35	ON	58.8364	-153.2886	BBMA	2	0.9894	FLY	
2021-03-25T17:05:33Z	KATMW2021	39	ON	58.4962	-153.9255	BBMA	1	0.1736	FLY	
2021-03-25T17:46:00Z	KATMW2021	39	ON	58.5206	-153.9164	BBMA	1	0.1736	LAND	
2021-03-25T02:11:33Z	KATMW2021	40	ON	58.4259	-154.0537	CORA	1	1.2428	LAND	
2021-03-25T02:11:40Z	KATMW2021	40	ON	58.4261	-154.0537	CORA	1	1.2428	FLY	
2021-03-25T00:45:31Z	KATMW2021	42	ON	58.345	-154.1314	NOCR	2	2.6915	LAND	
2021-03-25T00:52:21Z	KATMW2021	42	ON	58.3408	-154.1216	GWGUU	8	10.7658	FLY	
2021-03-24T23:20:31Z	KATMW2021	46	ON	58.3032	-154.1942	NOCR	1	1.0871	LAND	
2021-03-	KATMW2021	46	ON	58.3042	-154.1918	BBMA	1	1.0871	LAND	

Figure 7: **Observations** tab where editing of individual observations should be done.

Split Observations

This tab presents views of the observational data separated by transect segment as indicated by **Split Transects** (Figure 8). The *master_key* is shared between **Split Transects** and **Split Observations**. As with the transect data, edits to observations should be made in the **Observations** tab, not in the in this tab. The observations are grouped by **Species** and **PrimaryBehavior**. These data in csv format may be downloaded using the button at the bottom of the page.

master_key	sample_area	common_name	number	density	nppsd_4_letter_code	modified_behavior	taxon
KATMW2021_1_20210324_00	0.6082	Glaucous-winged Gull	1	1.6441	GWGU	Fly	Bird
KATMW2021_1_20210324_00	0.6082	Long-tailed Duck	2	3.2882	LTDU	Water	Bird
KATMW2021_1_20210324_00	0.6082	Mew Gull	1	1.6441	MEGU	Fly	Bird
KATMW2021_1_20210324_00	0.6082	Pelagic Cormorant	2	3.2882	PECO	Fly	Bird
KATMW2021_1_20210324_00	0.6082	Sea Otter	4	6.5763	SEOT	Water	Mammal
KATMW2021_1_20210324_00	0.6082	Surf Scoter	7	11.5086	SUSC	Water	Bird
KATMW2021_2_20210324_00	1.0623	Bald Eagle	1	0.9413	BAEA	Fly	Bird
KATMW2021_2_20210324_00	1.0623	Bald Eagle	7	6.5892	BAEA	Land	Bird
KATMW2021_2_20210324_00	1.0623	Black-billed Magpie	1	0.9413	BBMA	Land	Bird
KATMW2021_2_20210324_00	1.0623	Black Oystercatcher	2	1.8826	BLOY	Land	Bird
KATMW2021_2_20210324_00	1.0623	Common Loon	2	1.8826	COLO	Water	Bird
KATMW2021_2_20210324_00	1.0623	Common Merganser	2	1.8826	COME	Fly	Bird
KATMW2021_2_20210324_00	1.0623	Glaucous-winged Gull	4	3.7652	GWGU	Fly	Bird
KATMW2021_2_20210324_00	1.0623	Glaucous-winged Gull	4	3.7652	GWGU	Land	Bird
KATMW2021_2_20210324_00	1.0623	Glaucous-winged Gull	1	0.9413	GWGU	Water	Bird
KATMW2021_2_20210324_00	1.0623	Harbor Seal	17	16.0023	HASE	Water	Mammal

Figure 9: Tab for **tbl_DATA_OBS** showing the observations organized by transect segment and taxa.

Species Summary

The Species Summary tab (Figure 10) shows a series of species summary tables, one table for each trip and transect number. Each table is grouped by species and presents total counts, observations, and density for each species. These tables can be downloaded by using the button at the bottom of the page.

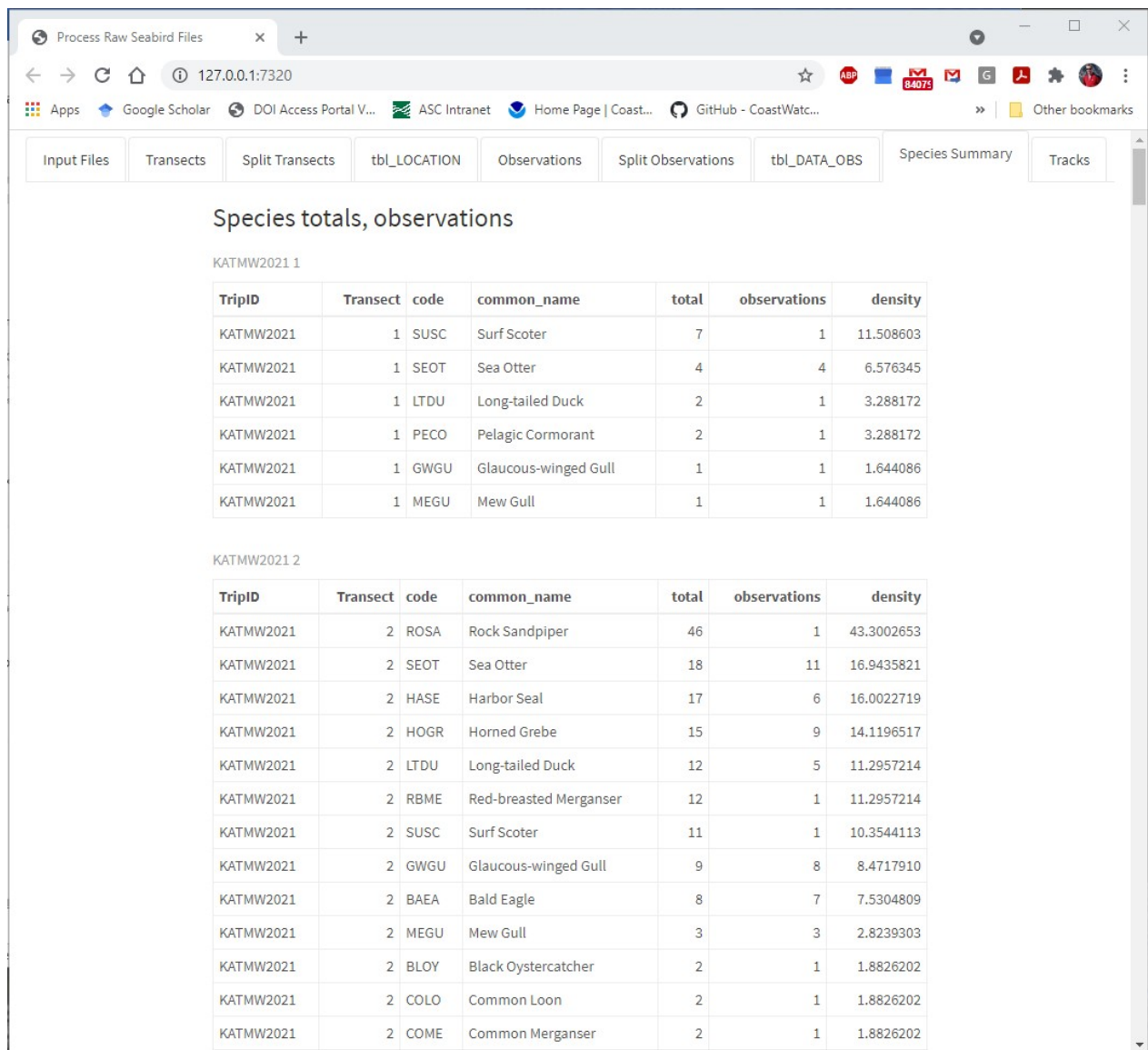


Figure 10: **Species Summary** tab

Tracks

The last tab is a map view of the data ingested by the app. It defaults to a zoomed-out view of the transects (Figure 11). Transects are colored by timestamp, and the number of species observations within dynamically generated polygons is shown within the large circles on the map. The “+” and “-” buttons allow users to adjust their map extent. If you hover over a circle, you can see the polygon over which that number of observations is contained.

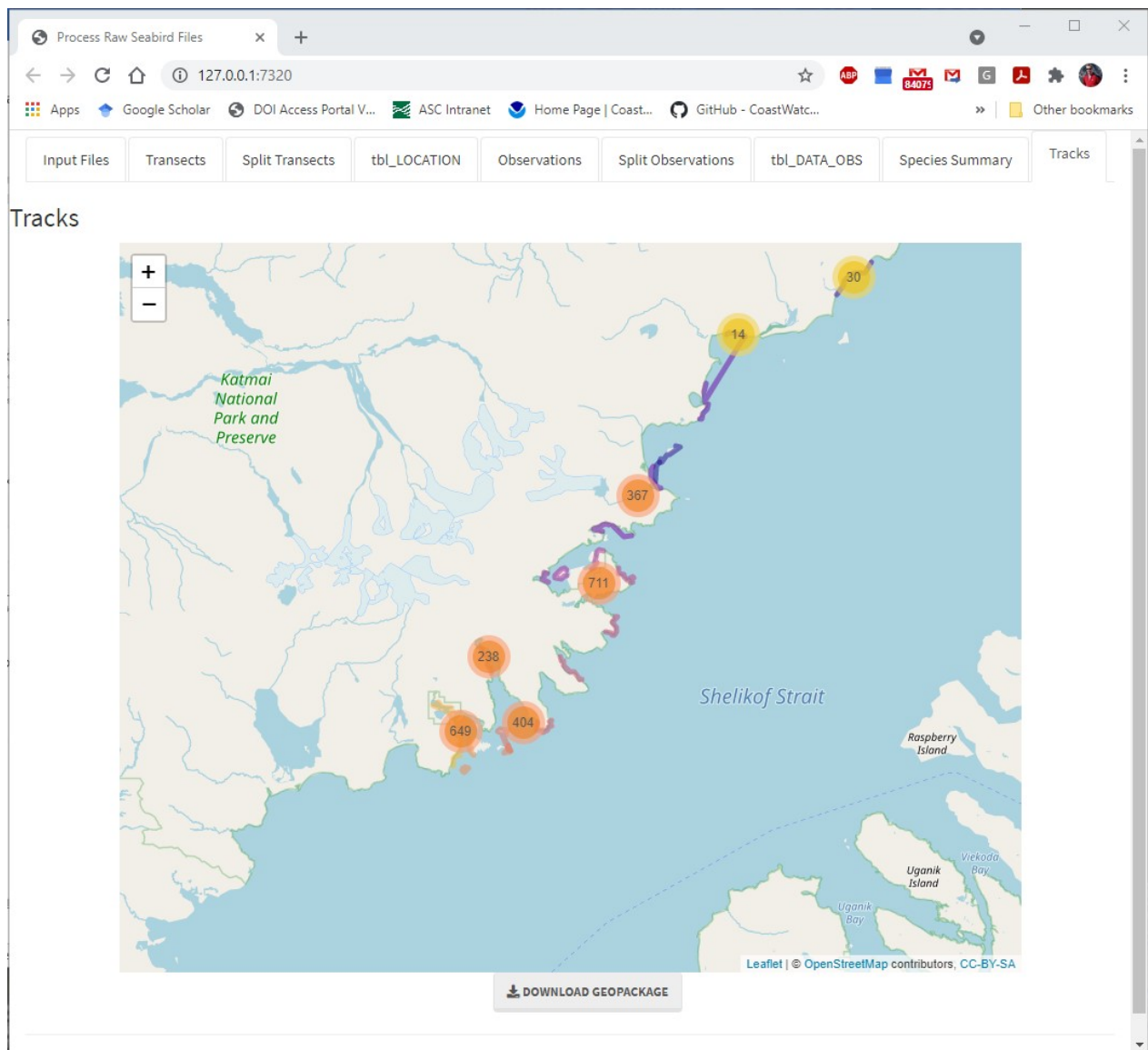


Figure 11: Initial map view showing the full extent of the sample area.

When you zoom in, these polygons are recalculated until you are zoomed in sufficiently and individual observations (in blue) appear (Figure 12). Hovering over a transect displays the track id and clicking it shows the track id and start and end timestamp. Hovering over an observation displays the species code and count made at that location. Note: the transect information will be for the transects as collected, not split transects.

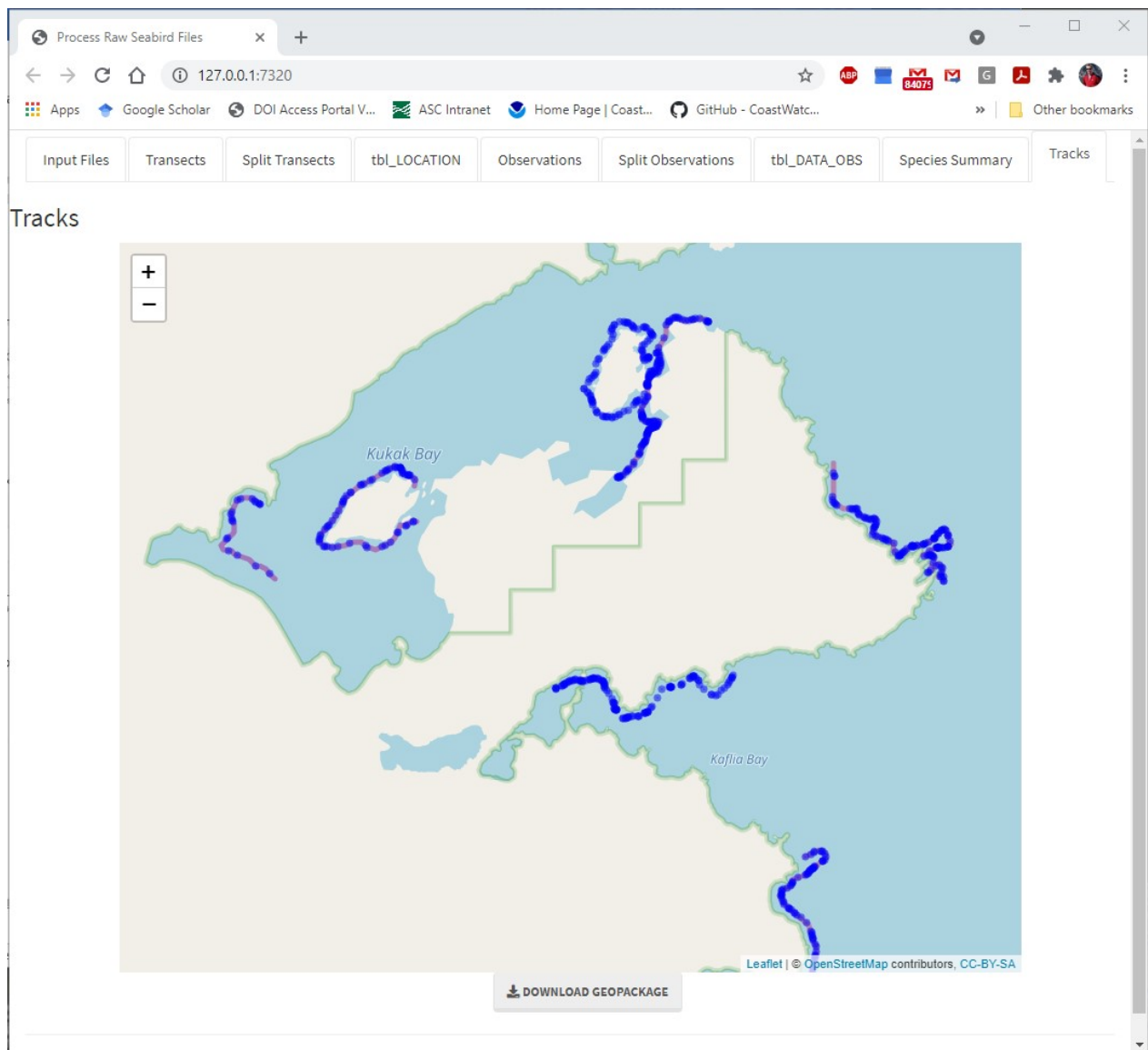


Figure 12: Map under the **Tracks** tab zoomed in to show individual observations.

At the bottom of the map is a button to download a [geopackage](#) containing the tracks (both original, and the two split versions), and the observations. The geopackage is also saved in the `Sealog>geopackages` directory. Geopackages are similar to ESRI's proprietary File Geodatabase format, but can be created without access to ArcMap/ArcGIS Pro. They can be read into ArcMap/ArcGIS Pro, as well as other GIS programs.

Troubleshooting

There are several conditions that can affect the operation of QA/QSea. If difficulty is encountered during the initial ingestion, check to be sure that the correct JSON files are being selected. Another issue with

ingestion can be related to the raw datafile having been edited outside of QA/QSea. Some changes may make the app unable to read the file. In that case, test on the original data file and compare with the edited file. Attempting to edit data outside of editable tabs (**Input Files, Transect, Observations**) can also cause a lockup. Closing the browser window will release the R command line and the app can be relaunched immediately by typing `runApp(launch.browser = T)` in the command window.

For bugs that are not resolved by the strategies above, take note of the specific action or series of actions that triggers the behavior and contact Chris Swingley at cswingley@abrinc.com, 907-455-6777 x105.