MYSTICETUS PROJECT MANAGER GUIDE

AUDIENCE

This document is intended for the Project Managers (PM) or senior researcher responsible for final data Quality Assurance (QA) prior to final analysis. By this, the document targets what is often referred to as **the project reviewer/manager, typically onshore, who ensures that data coming out of the field is correct** before it moves further along the data "pipeline".

In many companies this is indeed the one who "manages the project". In other teams it may be one of their assistants, a hired contractor, lead observer onboard with expanded duties, etc. Whoever this person is, "PM" or not: if you are the first human reviewing data after it has been reviewed and signed off by onboard observers at the point of collection and who typically follows our companion "PSO and Lead PSO QA/QC Guide". This document is for you.

The point of this document is to establish procedures and practices to obtain the highest quality data possible as close to the point of collection as practicable. It outlines the knowledge and tools for successfully accomplishing this task. This includes new tools emerging in Mysticetus OnCloud services starting in 2021.

Last updated April 2022.

OVERVIEW

Quality Data Pipeline

During QAQC, we review the Mysticetus file and identify errors. QAQC is done 3-6 times, the final 2 times are optional, depending on project.

End-of-shift by PSO in the field (check for blanks, quick review of all new rows)

End-of-day by the Lead PSO (same as PSO, but also first formal QA)

Daily by the Project Manager (this document)

Daily by the data analyst assigned to the project (*some projects or teams may not have this step)

After the survey while creating charts, tables, and maps for the final report (*some projects or teams may not have this step)

BACKGROUND INFO

FEEDBACK TO THE LEAD PSO

Feedback goes opposite the data flow, back towards the field

As the first person to see the data as it comes out of the field, it is up to the PM to perform QA checks on the data as detailed below. In theory, the PSO and the Lead PSO have already checked their data (they refer to the *PSO & Lead PSO QA/QC Guide*) – but we're all human, new PSOs sometimes need additional training and practice, or once in a while things just get crazy out there. Stuff Happens™

In the case where the PM finds errors or ways to improve, it is incumbent on them to provide feedback to the Lead PSO. The goal is to find and fix errors as close to the source (e.g. boat) as possible – when that doesn't happen, this is a "Training Moment" for the person upstream.

We engage in **Continuous Process Improvement** (CPI): we fix things, document the fix, teach and train the person upstream, and try again.

Most projects setup email, Slack or other communications mechanisms with the field – coordinate with your Mysticetus representative to determine the most appropriate feedback communication mechanism.

GPS TRACKING

Accurate GPS tracking is critical for data collection.

There are two PSO GPS devices on each ship. The GlobalSat BU-353-S4 USB GPS (aka "mushroom" or "hockey puck") is plugged into the laptop. This GPS device automatically records GPS coordinates and stores the information in Mysticetus.

The second connection is a backup, handheld Garmin eTrex. Lead PSOs are responsible for uploading the track from this daily and clearing the track this GPS. There are PM steps (below) that describe how to check this actually happens.

DATA COLLECTION TIME PERIODS

Data is collected daily in 24-hour periods for 24/7 operations, or over the course of a single day for daylight-only operations. PSOs are responsible to ensure the Mysticetus data collection application is closed at the end of a 24-hour period (or earlier if data collection is, for example, daylight only). The exception to this is if an observation day is shorter due to anchoring, docking or leaving dock.
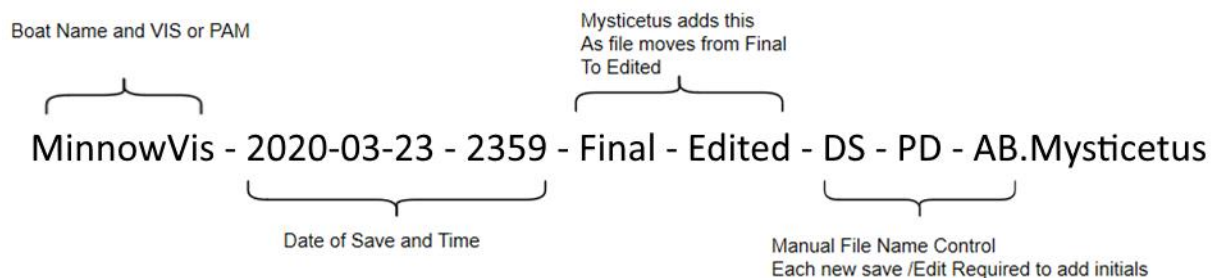
Data collection happens in UTC (computers are configured to run in UTC). Data collection stop and restart is at midnight UTC.

Mysticetus saves several intermediary files throughout the day, typically at 2-hour intervals to the cloud and 3-minute intervals to in-field storage (e.g. SD cards in computers). Mysticetus then saves a Final file at the end of the data collection period. These files are automatically uploaded to the Mysticetus cloud. These files are a valuable source of information about what happened and when – useful to check if PSOs and Lead PSOs performed the appropriate QA tasks in the field.

FILE NAMES

Each survey has a standard file naming syntax generated by Mysticetus. The filename includes the station id (typically vessel name plus Vis or PAM) and the date and time from the final time stamp in the file.

As the file progresses through the QAQC process, each team member appends their initials to the filename. By the end of the process, the filename will appear as:

Boat Name and VIS or PAM

Mysticetus adds this
As file moves from Final
To Edited

MinnowVis - 2020-03-23 - 2359 - Final - Edited - DS - PD - AB.Mysticetus

Date of Save and Time

Manual File Name Control
Each new save /Edit Required to add initials

PROJECT MANAGER TASKS

OVERVIEW

Project managers are a critical step in setting up the project unique variables in the master PSO template to be pushed to the local project per below. The final QAQC process of gathering data for your projects. With the QAQC process you are the first step for the onshore data quality, and it is typical that these QA steps are required by your prime.

Reliable data requires quality data collection at the source and checks every step of the way. Progress in these steps is tracked and displayed to energy developer via a graphical dashboard.

Quality Reporting Requires Solid Data

MANAGING YOUR TEMPLATE

The following tasks are required to be performed by Project Managers, both at initial project setup and as things change over the course of time. PMs need to perform these tasks because they are best positioned to know the relevant situations and data (i.e. Mysticetus has no insight into these things).

TEMPLATE HIERARCHY

Templates are organized in a hierarchy, where the top level (Energy Developer) defines all the required data collection fields, and the next level defines PSO-provider specific items as well as vessel-specific items such as which PSOs are assigned to which boat, project variables, etc.

Researchers are recommended to consider a structured naming convention with their project names as well. By structured consider who you are, location, type of data collection or purpose, year at a minimum.

The hierarchy looks like this:

Energy developer -> EnergyDeveloper.PSOProvider -> Local Project

The **Energy developer**, aka root template, defines all core collection requirements they require to satisfy regulatory and their unique needs. This template is managed by Mysticetus personnel based on energy developer requirements. We often refer to this as the Grandparent template.

The **EnergyDeveloper.PSOProvider** or PSOProvider template refers to the root (Energy Developer) template, plus defines all active vessels, personnel assigned to boats (along with PSO eye heights), exclusion zones around vessels, etc. The project PM edits all unique project information in this template. Once unique information is edited into this template the project manager saves the template and **deploys** it to relevant project(s) per the below example on defining crew members and their eye heights. This one is often called the parent template. Not all environments will have a parent template, there is one case today.

The **Local Project** template is the template unique to a given project and is never edited directly. It is deployed from the PSO Provider template.

The local project naming convention is:

EnergyDeveloper.LeaseArea.VesselProvider.PSOprovider.Vessel.Type.Year

Type is typically shorthand for things such as GT for GeoTechnical or GP for GeoPhysical and is defined by Mysticetus for you.

NOTE: It is critical for PSO project management to set up local project parameters in the PSOProvider template then to save and deploy the changes to that Local Project. See the next section for details.

For any operation the following project parameters must be set:

1) Observation Platform Heights
2) Crew Members and their eye heights
3) Security Alerts list (recommended for any operation)

For Western Atlantic based projects the Project Manager must setup all of the above three sets of project parameters plus:

4) Dead animal sighting alerts
5) Entangled animal sighting alerts
6) North Atlantic Right Whale sighting alerts
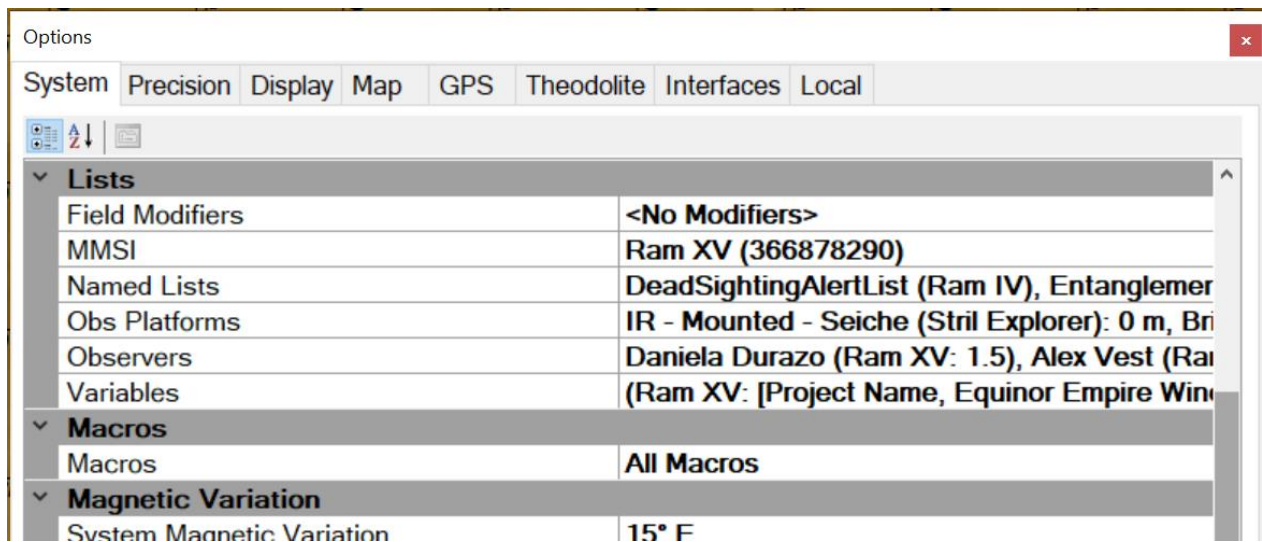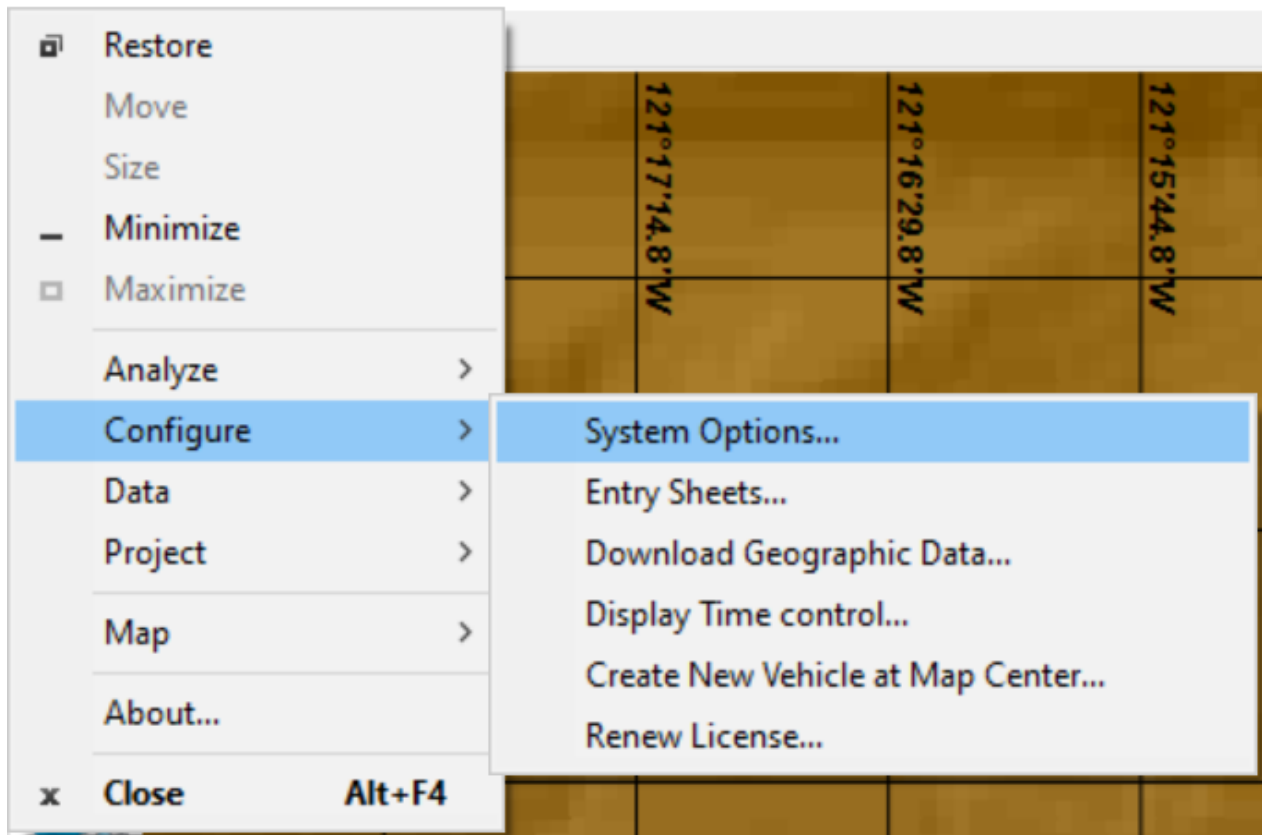
These project parameters are described below in detail.

SYSTEM OPTIONS

Once the PSOProvider project has been selected, most settings managed by PMs are found in the System Options. Click **Ball -> Configure -> System Options** as shown in the next figure:

⬤ Mysticetus - PaulTestVis - Mode: Editing/QA - [Equinor.RPS: Equinor RPS Template]

⬜ Restore		
Move		
Size		
━ Minimize		
⬜ Maximize		
Analyze	>	
Configure	>	**System Options...**
Data	>	Entry Sheets...
Project	>	Download Geographic Data...
Map	>	Display Time control...
About...		Create New Vehicle at Map Center...
		Renew License...
✕ Close	Alt+F4	

121°17'14.8"W   121°16'29.8"W   121°15'44.8"W

Options ✕

System Precision Display Map GPS Theodolite Interfaces Local

Lists
Field Modifiers	<No Modifiers>
MMSI	Ram XV (366878290)
Named Lists	DeadSightingAlertList (Ram IV), Entanglemer
Obs Platforms	IR - Mounted - Seiche (Stril Explorer): 0 m, Bri
Observers	Daniela Durazo (Ram XV: 1.5), Alex Vest (Rai
Variables	(Ram XV: [Project Name, Equinor Empire Win

Macros
Macros	All Macros

Magnetic Variation
|	
System Magnetic Variation	15° E

OBSERVATION PLATFORM HEIGHTS

Correct observation platform heights are critical to accurate animal localizations. These heights are most accurately obtained by actual measurement (drop a weighted tape measure). If that is not possible, ship's diagrams are frequently available and provide a good estimate of deck height above water.

Observation Platform height will be added to PSO Eye Height for the relative viewing location onboard when determining distance to an animal based on reticle binoculars. This setting 'trickles' down from your parent template. Note that PSO's tend to do their effort records with their unaided eye and their visual sightings with reticular binoculars.

Each location a PSO could observe from gets its own Observation Platform. Name should be the location and method (e.g. Bridge-Fujinon7x50). Enter the height (e.g. 4.2 m or 13.775 ft), most reticle binoculars have a reticle to degree conversion factor of 0.2779, and select the appropriate boat.
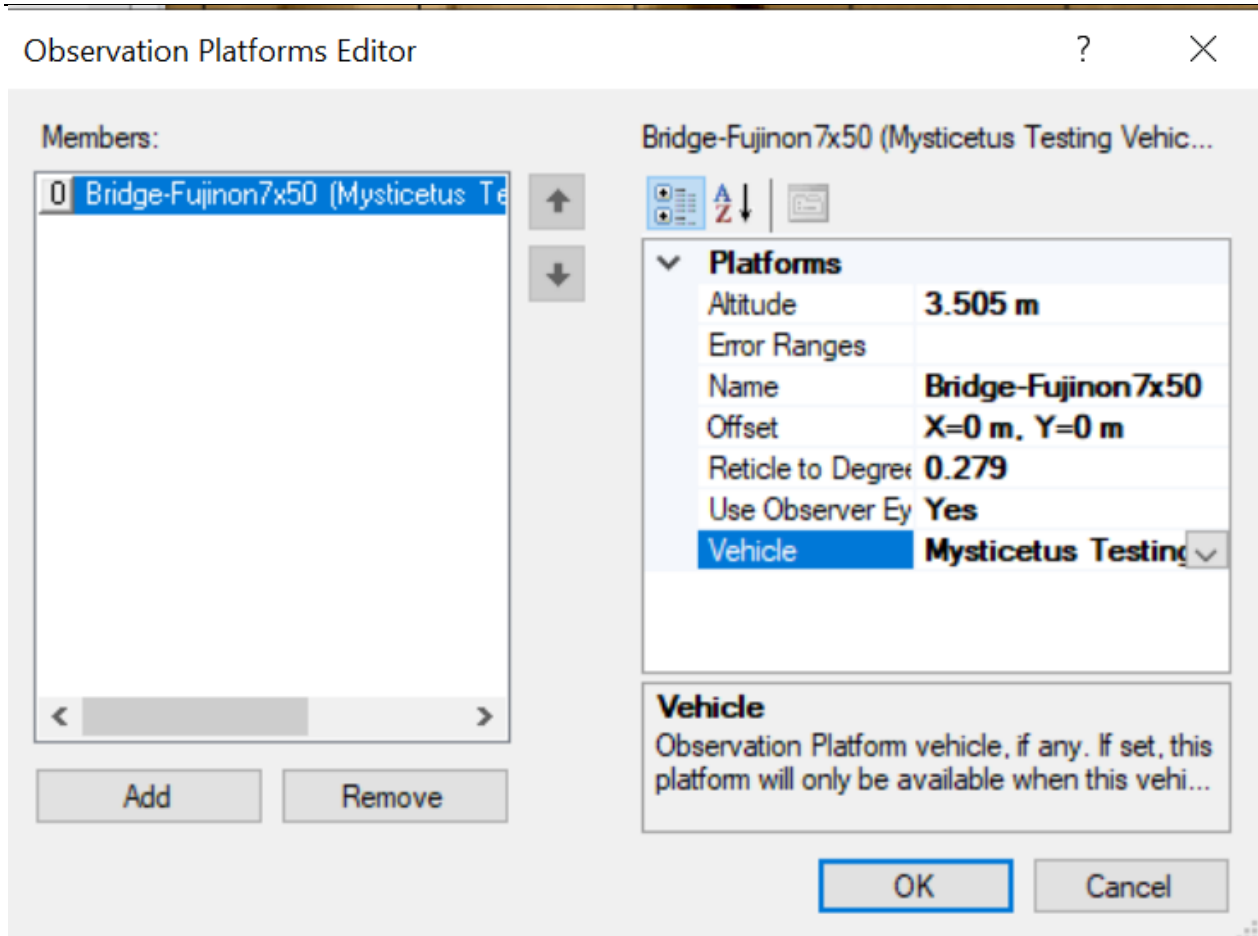
DEFINING CREW MEMBERS AND THEIR EYE HEIGHTS

Each PSO needs to be defined in the Observers settings. Add the PSO and assign them to the correct boat:
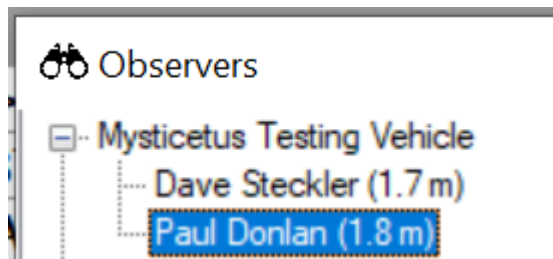
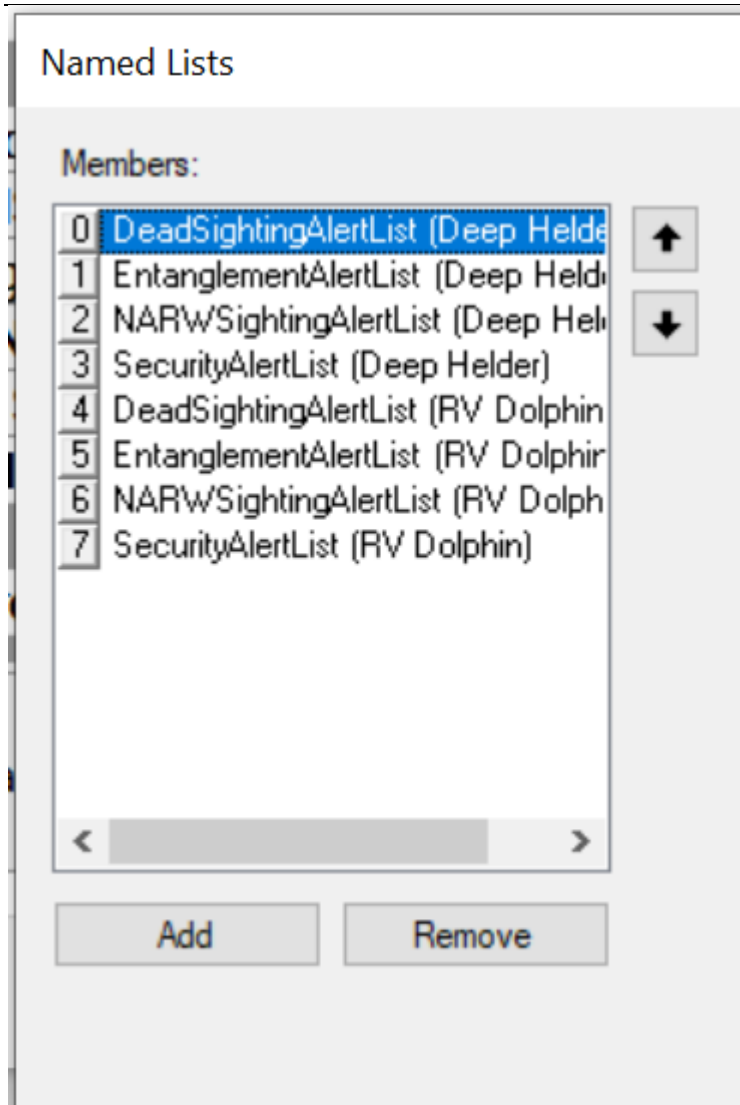Click the Edit button to change vessel or eye height.

Properties

CRITICAL ALERTS CONTACT LISTS

Named Lists hold the definition of contact lists for critical event notifications. They consist of a mix of email aliases and user/phone numbers for text messages. These critical event lists are an important component of starting the process of satisfying early alerting requirements for critical events as defined by the typical operator permit.

Last updated April 2022

Named Lists

Members:

0	DeadSightingAlertList (Deep Helde
1	EntanglementAlertList (Deep Held
2	NARWSightingAlertList (Deep Hel
3	SecurityAlertList (Deep Helder)
4	DeadSightingAlertList (RV Dolphin
5	EntanglementAlertList (RV Dolphir
6	NARWSightingAlertList (RV Dolph
7	SecurityAlertList (RV Dolphin)

Add   Remove

Typically, in the Western Atlantic the following alert lists must be created by the project manager. Each list name shown below has its own unique properties around compliance and due to this are broken out as separate lists.

➢ Dead animal sighting alerts, DeadSightingAlertList (VesselName)
➢ Entangled animal sighting alerts, EntanglementAlertList (VesselName)
➢ North Atlantic Right Whale sighting alerts, NARWSightingAlertList (VesselName)
➢ Security Alerts list, SecurityAlertList (VesselName)

As can be seen, each vessel has its own unique set of lists. The first three lists should contain the names of people to be notified when these events happen, and typically include wind

developer, vessel operator, and PSO provider personnel. Ask Mysticetus for help with the wind developer personnel who should be listed here if you don't already have a list to copy from.

The last list, Security Alerts list, is for HSE events that allow your PSO team to silently alert onshore personnel of onboard HSE violations. Its design is to allow a team member to discretely alert the OnShore managers of a threatening situation. It is triggered when the PSO (or other crew) pushes the Life Preserver button:
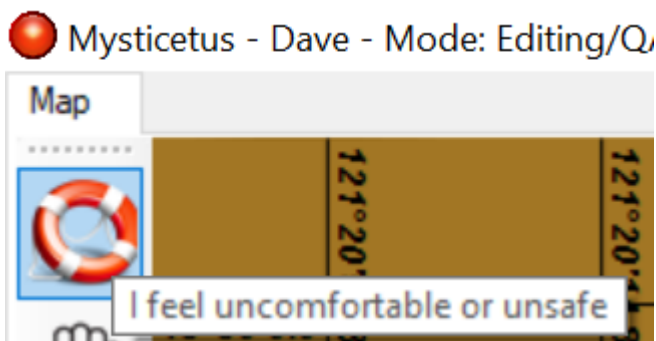
SAVING AND DEPLOYING TO A VESSEL PROJECT

Last updated April 2022

Choose: Project -> Save Template and Deploy to Other Projects:
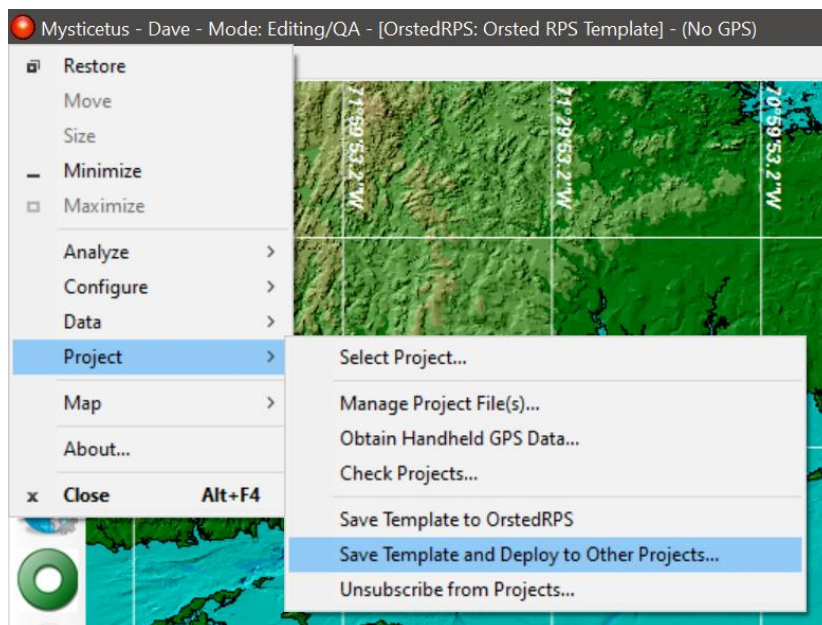
Select the appropriate project and press Deploy.
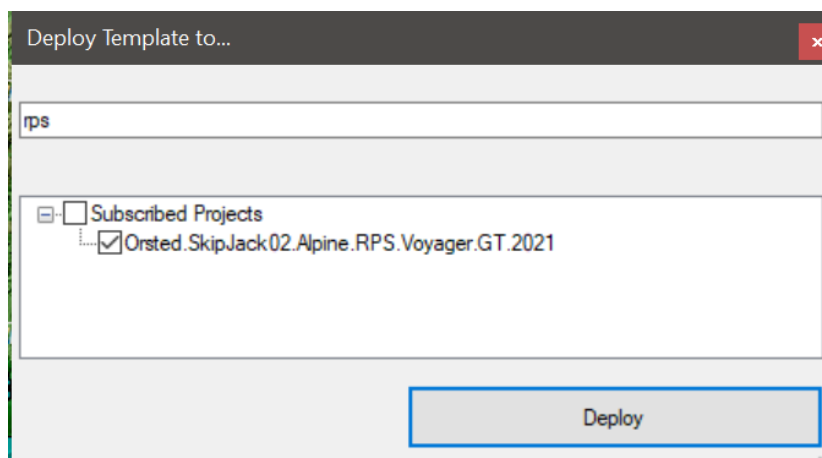
Exit the Mysticetus Editor application when finished (do not save on exit, the previous step did it for you).

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The next time the Voyager PSO crew restarts their Mysticetus app onboard, it will pick up these changes assuming a healthy internet connection. The PSOs onboard will be signaled that an update is pending via the relevant watchdog.
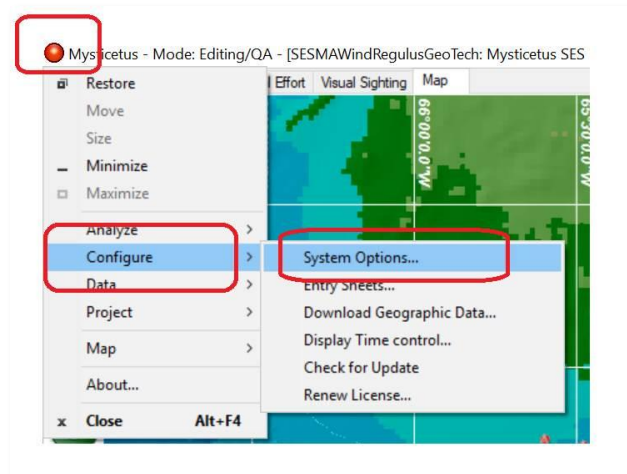
PROCESS YOUR FIRST FILE

These steps are to aid you when you are just starting a new project or a new role as a data reviewer. **This is completed once** on your PC.

SET YOUR STATION ID

The Station Id attaches your identity to your work. Template changes, directories, and analysis reports associated with you will display this ID. This is completed once when initially configuring Mysticetus for a data analyst or project manager. You need to do this once on each PC you use.

1. Open Mysticetus Editor and click on the **red ball** at the top left off the screen to open the Mysticetus menu.

2. Select Red Ball > Configure > System Options.

3. Select **Local** tab

4. Scroll to **Station ID** field

5. Enter your full name in the **Station Id** field. Spaces will be removed automatically.

6. Select Done.

While you are setting your station ID check your other local settings per the below section:
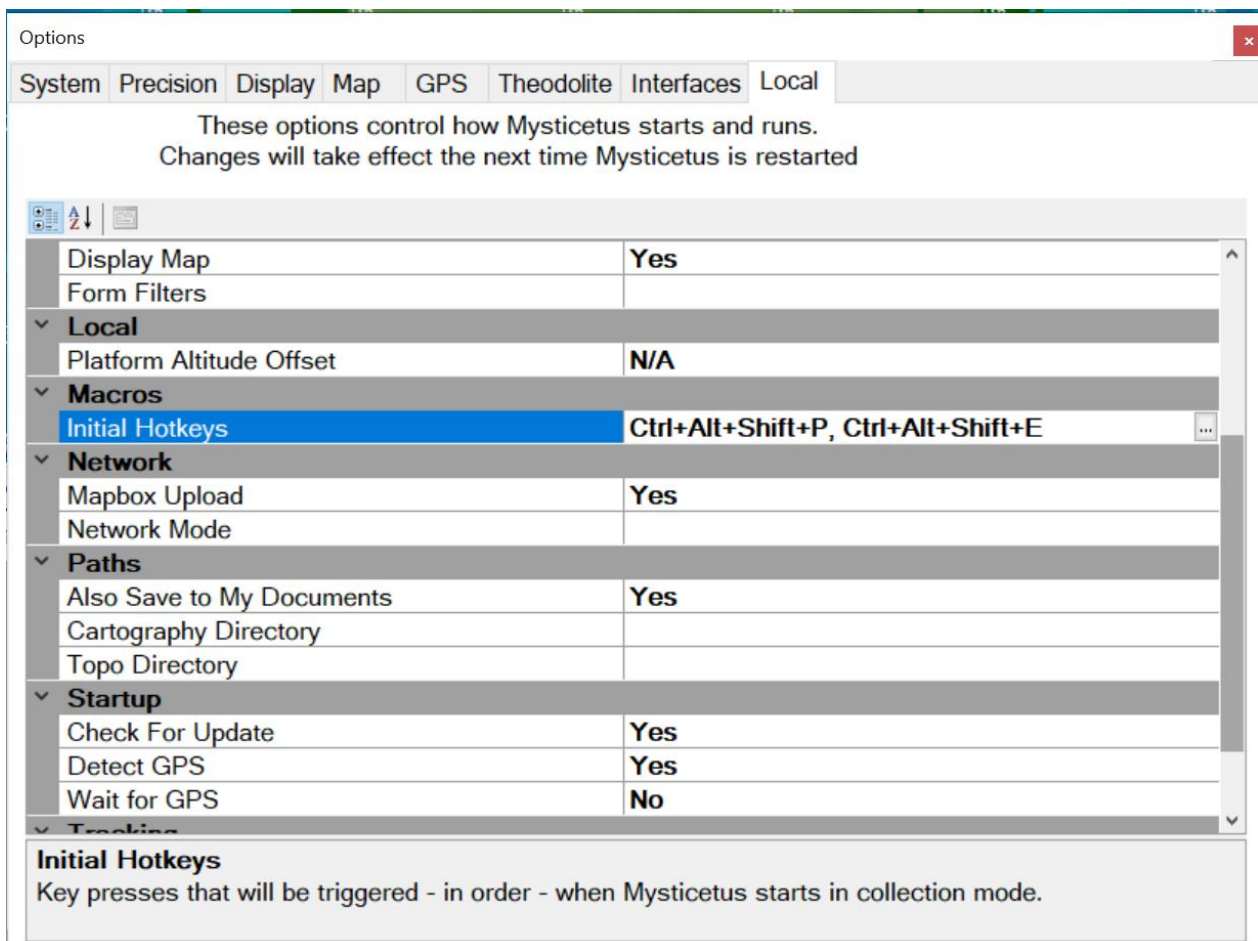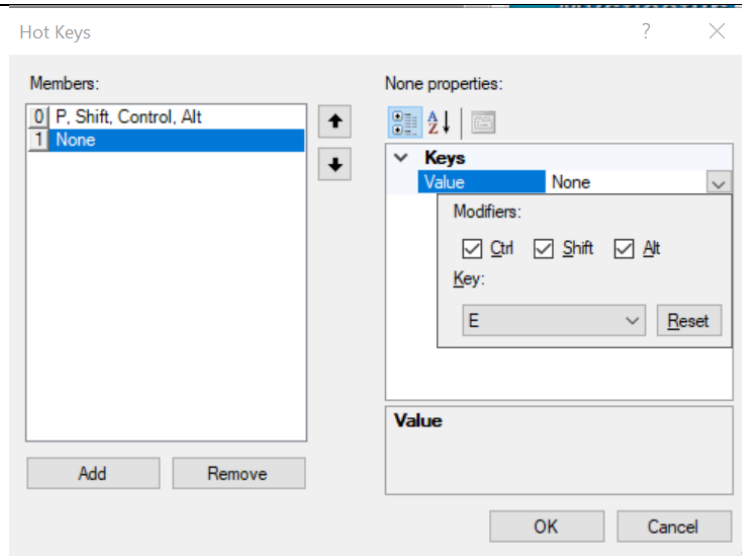
OTHER LOCAL SETTINGS

Set "check for update" to "True"

Set "Detect GPS" to "False"

Set "Wait for GPS" to "False"

Define Initial Hot Keys -> Ctrl+Alt+Shift+P then Ctrl+Alt+Shift+E

Hot Keys   ?   ✕

Members: None properties:

0 | P, Shift, Control, Alt   ▾ **Keys**
1 | None   Value   None   ▾
                                      Modifiers:
                                      ☑ Ctrl ☑ Shift ☑ Alt
                                      Key:
                                      E   ▾   Reset

                                   Value

      Add   Remove

                                         OK   Cancel

Options   ✕

System Precision Display Map   GPS   Theodolite Interfaces Local

These options control how Mysticetus starts and runs.
Changes will take effect the next time Mysticetus is restarted

Display Map	Yes
Form Filters	
⌄ **Local**	
Platform Altitude Offset	N/A
⌄ **Macros**	
Initial Hotkeys	Ctrl+Alt+Shift+P, Ctrl+Alt+Shift+E
⌄ **Network**	
Mapbox Upload	Yes
Network Mode	
⌄ **Paths**	
Also Save to My Documents	Yes
Cartography Directory	
Topo Directory	
⌄ **Startup**	
Check For Update	Yes
Detect GPS	Yes
Wait for GPS	No
⌄ Tracking	

Initial Hotkeys
Key presses that will be triggered - in order - when Mysticetus starts in collection mode.

DOWNLOAD MAPS

Before you can start looking at Mysticetus map data you will need to add maps to your copy of Mysticetus. Be advised that if you have trouble downloading and seeing map data in Mysticetus you may need to consult with your IT department to allow for writing map data to the public/documents directory.

1. Open Mysticetus Editor.

2. Select Red Ball -> Configure -> Download Geographic Data

3. Click to download the following map files:

   - US Florida CRM
   - US Southeast CRM
   - US Northeast CRM
   - Contiguous USA

4. Click "Download Checked Items

5. Let the downloads complete

6. Click "Done"

7. This is performed once for each computer running Mysticetus
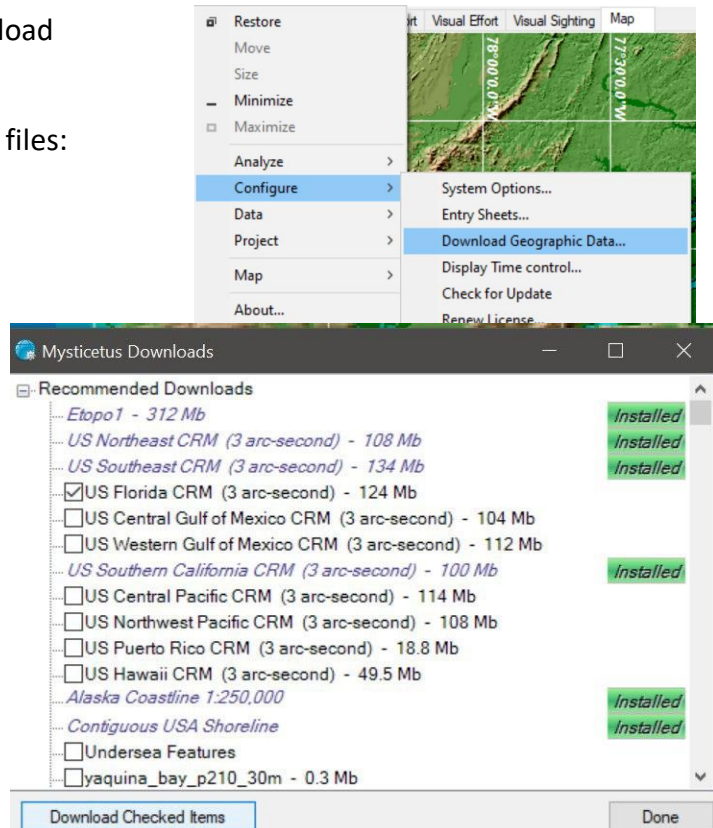
SUBSCRIBE TO A PROJECT

Before you can open Mysticetus files for your vessel, you must subscribe to the vessel project.

8. Open Mysticetus Editor.

Select Red Ball -> Project > Select Project.

Select the Subscribe **to new project** button (at the bottom)

Enter the **Project** name and **Password**.

Select OK. Mysticetus will restart with your new project active.
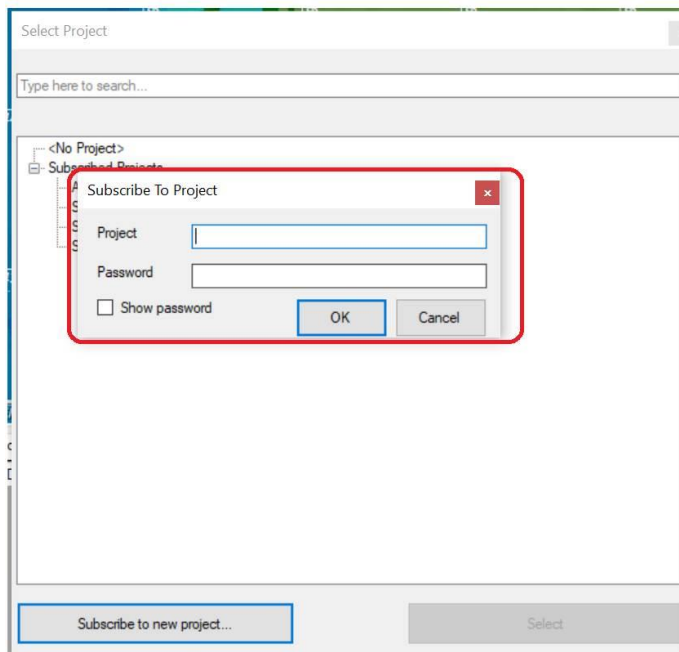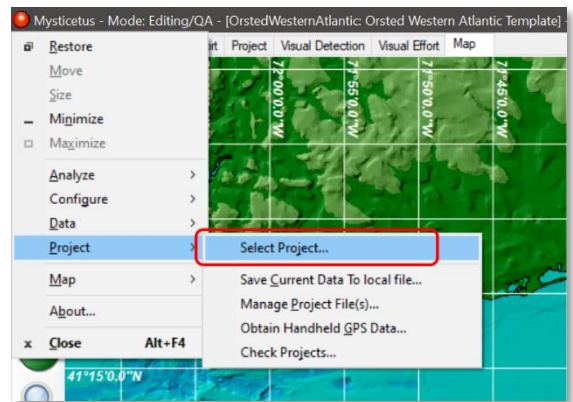
PROJECT MANAGER DAILY QA/QC OVERVIEW

Before the PM gets their crack at the data, both the PSO (at the end of their shift) and the Lead PSO (at the end of the day) perform QA steps as outlined in *Mysticetus PSO and Lead PSO QAQC Checklist*. At the end of each day, the lead PSO reviews the final data file. This operation is performed in the Mysticetus Editor onboard the vessel.

There are several items a Lead PSO is responsible for as part of the daily QAQC - a detailed description is found in the *PSO and Lead PSO QAQC CheckList*.

This document addresses the PM's review of the day's data, including:

1. Look for blank cells (in general there should be no blank cells)
2. Ensure that every mitigation request has a subsequent mitigation response

3. Check for unusual species
4. Check for odd GPS tracks
5. Check for unlikely/non-sensical weather combinations, etc.

Clarify any questions with the Lead PSO as soon as possible. You also must confirm that the GPX files are uploaded and the Lead PSO performed the daily reporting.

Any errors found by PMs are a "Training Opportunity" for Lead PSOs. Data coming off the boats should be nearly perfect by the time it reaches the PM. When that doesn't happen, engage the Lead PSO to figure out what happened and fix it for the future. People further down the data pipeline will be doing the same with you.

DAILY GPX FILES

There are two GPS devices on each vessel. One is connected to the data collection Mysticetus laptop. The second GPS is a hand-help Garmin eTrex. The Lead PSO is responsible for ensuring that the detailed track file from the Garmin eTrex is uploaded to the Mysticetus cloud. (this is a single button push in the Mysticetus Editor on the boat.

The Garmin eTrex is a backup GPS device in the case of a failure with the primary GPS, disconnection, etc. The data collected from the Garmin eTrex is used to 'repair' and 'stitch' together missing track information by the data analyst team and provide a back-up for any potential gaps in the GPS data collected by the GPS device connected directly to the laptop.

CONFIRM AND REVIEW DAILY GPX FILE

Confirm the Lead PSO uploaded the GPX files from the hand-held Garmin Device.

Confirm Lead PSO uploaded the Garmin GPX files and ran an analysis report for the date you are preparing your Daily QAQC.

To reach the listing of data files follow these steps:

Select Red Ball

Select Project -> **Manage Project Files**

Note: This allows you to view and download all saved project files.
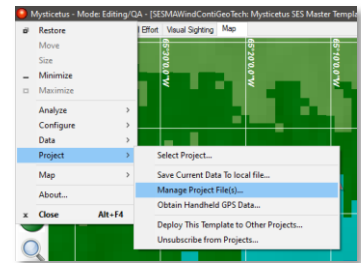
To confirm the GPX files where uploaded to the CLOUD data storage. Select the + under GPX then the + for your Vessel and confirm the GPX files are there for the day.
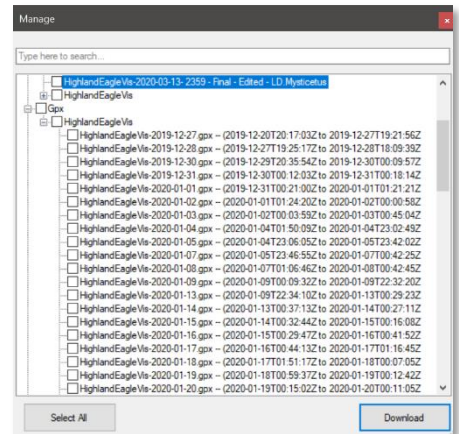
Mysticetus also displays the date and time range the Garmin collected data

There are two main errors to check for:

1. Failure to clear the GPS track after uploading the data the previous day. In this case the track will span multiple days.

2. Failure to upload the file at all. In this case it will simply be missing.

GIS ANALYSIS TOOLS

Mysticetus has a variety of standard analysis built in that display effort and sighting data, and perform instant analysis over these data. These analysis are useful for spotting errors. Lead PSOs are instructed to run GIS analysis tools as part of their daily QAQC efforts.

As the project manager this is the starting path on your daily QAQC efforts. You should verify the Lead PSO has indeed run these tools. This is accomplished in the **Project** -> **Manage Project Files** window (like GPX upload).

Navigate to the **Analysis** folder and verify there is one for the day from the Lead PSO:
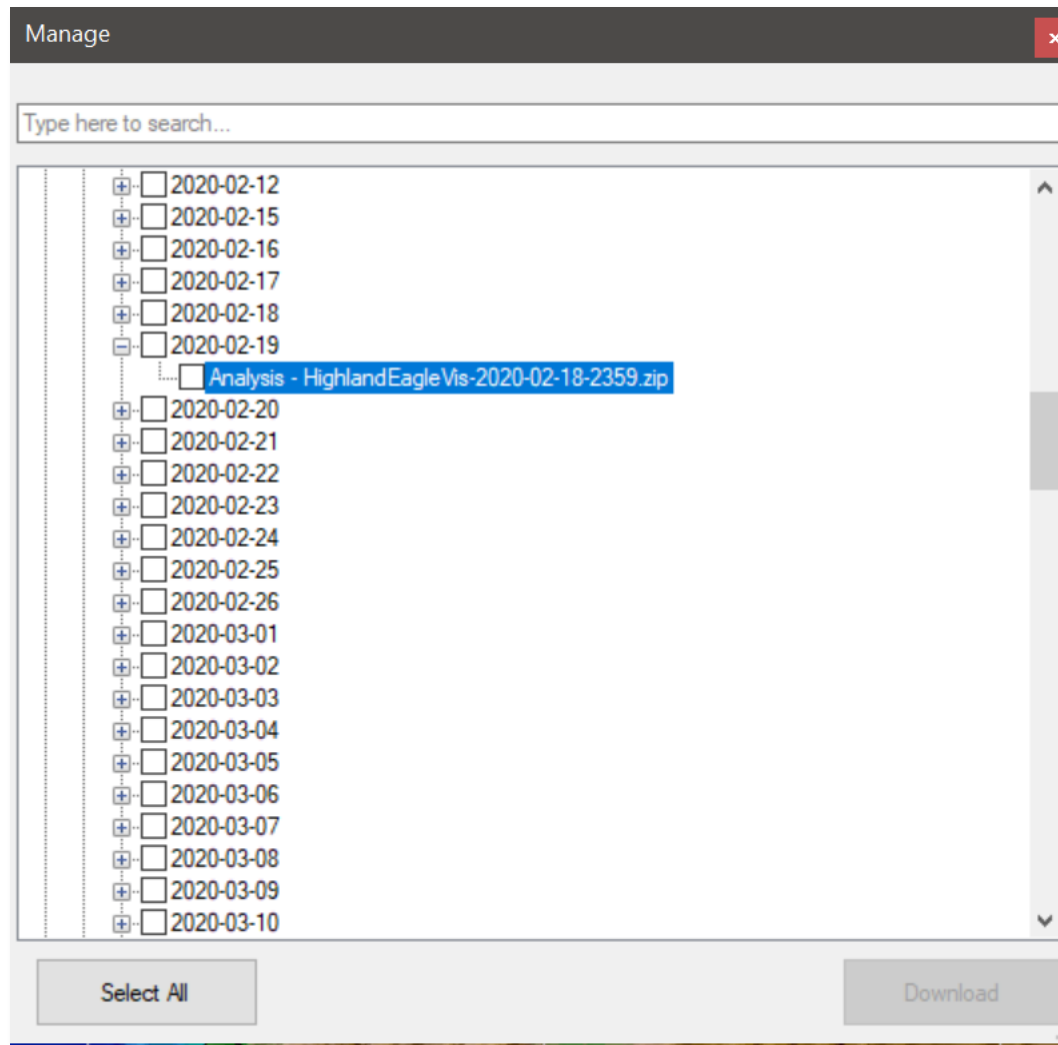
Check the box, download this file – Mysticetus will automatically open it in File Explorer for you. The contents will look something like the following.
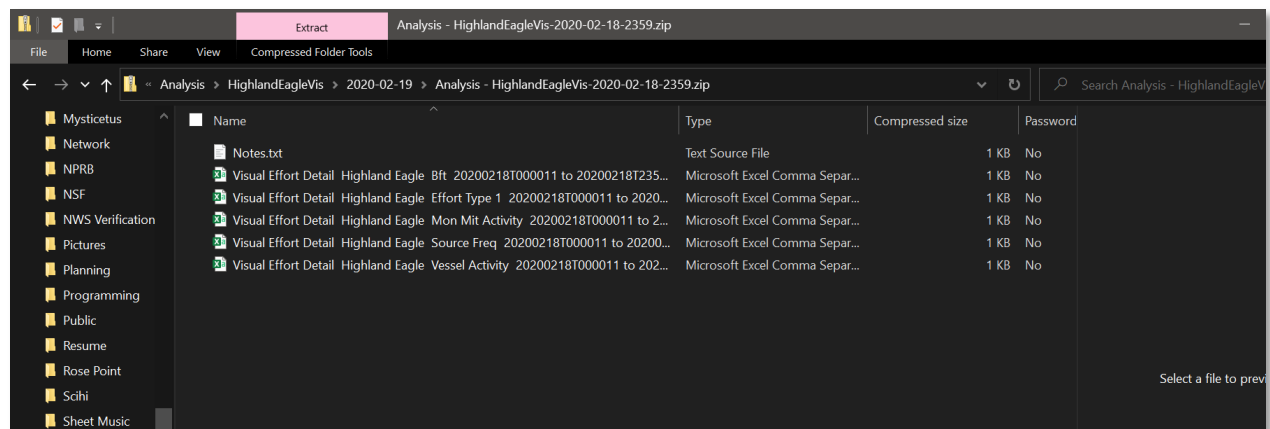
There will be a number of CSVs containing analysis, as well as a Notes file. Check the Notes file for any communication from the Lead PSO.

Then quickly scan through each of the CSVs in Excel (just double click) – the data in there should "make sense". Effort totals should be appropriate, sightings should match expectations.

There should be no <Blank> or <No Data> Flags

There should be no Missing Track flags.

RUN THE GIS ANALYSIS TOOLS

You should run the GIS Analysis tools yourself (people downstream will be similarly checking that you did so). When prompted, indicate you are performing PM QA/QC:
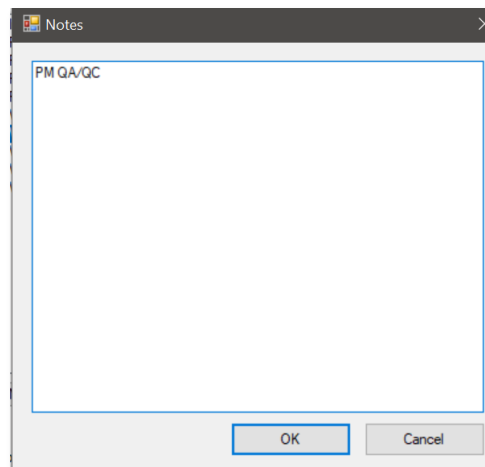
Check that your results make sense, no <Blank> or Missing Track flags.

PROJECT MANAGER'S USE OF THE GIS ANALYSIS TOOL

If there are several updates and changes during the QAQC process to the data file – or if there are additional checks you want to make – you can run the GIS Analysis Tool as a final step of your review to ensure all issues are resolved.

The template provides standard reports for the various types of detections and effort.

> **NOTE:** If the primary GPS fails or starts late during data collection, you will see a message in the reports stating *Warning: No GPS Track found for vehicle 'SS Minnow' at effort times: 2018-08-12 00:00:00.1 EDT, 2018-08-12 00:36:09.6 EDT*.

If the time loss is significant, more than 5 minutes in a 24-hour period, this requires a fix by the data analyst team from the secondary GPS information (the Garmin eTrex GPX data files). **Notify your data analyst contact to correct this issue.**

Also, if the GPS track is missing for only the first effort entry, this means the PSOs started Mysticetus without waiting for a GPS signal – this is a teachable moment: talk with the lead PSO to make sure this doesn't happen (there is a big red flashing light in the center of their screen until the GPS has a fix, they should not be ignoring that).

ISSUES TO LOOK FOR IN DAILY ANALYSIS REPORTS

The most common clue to a problem is a cell containing <blank> or <unknown>. These entries indicate a blank field in the Mysticetus file. There should be no blanks – this is an education opportunity for your PSOs.

Effort reports display distance and hours of effort. The total hours in an effort report should not exceed 24 hours.

If the report displays more than 24 hours, first confirm there is an OFF Effort row at the end of the day. If the OFF Effort row does exist and the effort report exceeds 24 hours – contact your data analyst to review the Vehicle Tracks and GPS data. The data file may have extra or duplicate tracks. If it slightly (a few minutes) exceeds 24 hours, this may be a slightly delayed restart of Mysticetus for the next day – **this is ok**.

Review the results from the LEAD PSO. Does the information in the analysis reports "Make Sense"? This is where your expertise and project requirements come in. These files are a summary of the day's efforts. Looking for…

1. Missing & Incomplete data

2. Bft (Beaufort) ranges or time in certain values that do not make sense

3. Animal sightings that do not make sense for the region

4. Missing GPX track detail (at the top of the report)

5. Overall time for visual effort that is greater than 24 hours. (this indicates either a missing OFF Effort row or PSOs did not shut down Mysticetus).

6. Overall time effort of less than 24 hours. Verify this makes sense. Did the Vessel dock and wasn't out for a 24-hour period or did the PSO crew shut down Mysticetus for the day prematurely?

Summary: The PM should ***NOT*** be finding errors. This is not a productive use of your time. 99.9% of errors should be caught and fixed on the boat. When a PM finds an error, this is an "educational opportunity" to teach the PSOs and their lead how to do it better.

It is expected that new projects and new PSOs will need a lot of coaching and instruction – the QA process is great for driving this discussion. After a week or so, PSOs should be generating nearly flawless data.

MANAGING YOUR ANALYSIS TOOLS

You own your set of analysis tools. You can remove them, modify their settings, or create all sorts of new ones yourself. Don't forget to deploy to the individual boats so they are included in the data gathered.
You should probably consult with other interested members of your team before changing analysis settings and hence the analysis tools available to all of your vessels operating under the **DeveloperVesselOperator** project (as per below)***.***
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More Details
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1. When running analysis, **you don't have to check all the boxes, all the time**. Uncheck the ones you don't want to run at that moment.


The above example will only run "PAM Effort Detail", "Sightings Summary", and "Visual Effort at Night", using their settings at that moment in time.

2. **The set of available analysis tools is a compilation** of:

(a) the "parent" Developer project, eg Ørsted, Equinor, Avangrid, etc, which has the following pre-configured analysis available to all PSO providers, should they choose to use them:
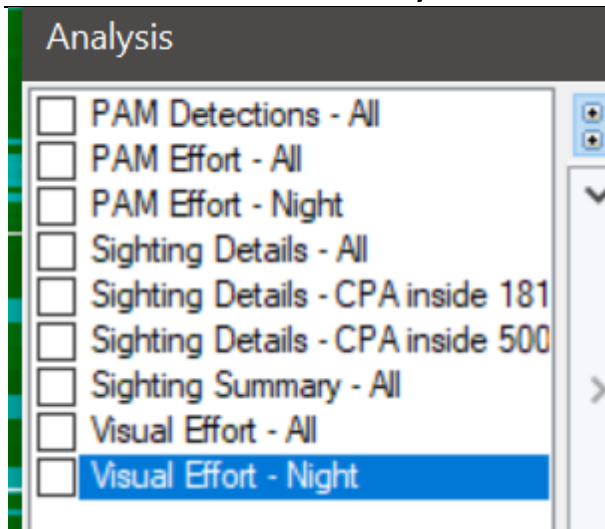
(b) the ("child") **DeveloperVesselOperator** project, which has analysis tools and settings a PSO operator supporting that vessel operator cares about at this moment, which might be:
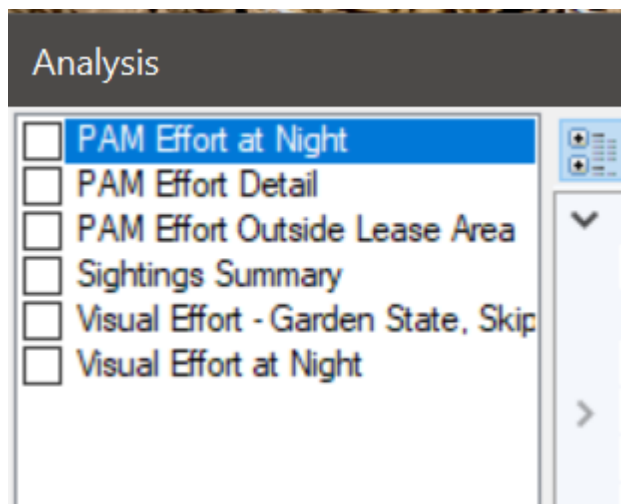
3. In your **DeveloperVesselOperator** project, you can **delete whatever you want** (and deploy to the particular boat project).

4. You can **create new ones** in the **DeveloperVesselOperator** project that have whatever settings you want (and deploy to the boat project):

5. You can **modify any** OrstedGardline settings (and deploy):

Analysis	
Analysis Description	Look at me annoying my fellow Gardline peeps by changing stuff in here without talking to them
Analysis Name	PAM Effort at Night
End Time	3000-01-01 23:59:59.9 PST
Polygons	We doan need no steenkin polygons
Start Time	2000-01-01 00:00:00.0 PST
Total by Day	No
Use Polygons	No
Effort	
Effort Bucket Fields(s)	PAM Effort
Effort Sheet	Yo Wazzup
Effort Vehicle	Ocean Observer
Restrictions	
Close-To Range	N/A
Close-To Vehicle	
Effort Restrictions	Breaking Things Woo!Dill = Pickles
Ignore States	Off
Ignore States Cell	PAM Effort
Stop State	I have so mangled these settings, mwahahaha
Stop State Cell	Vessel Activity

===================================

One can delete or change whatever in the Analysis tools. Or if you find issues (like it just hangs forever), please let us know to take a look. Or if something seems out of whack in the Developer parent project, we can fix that too.

These tools are there for you the PSO provider. You can do what you want with them (settings, create, delete, etc.) in the **DeveloperVesselOperator** project, and you don't have to wait around for us to get to it.

Pro-Tip: please read any errors that pop up. Generally, there's a typo or old setting that no longer applies - (i.e. wrong field or sheet name). The error message will tell you precisely what it is looking for and can't find.

GIS ANALYSIS WITHIN POLYGONS

We recently added an update to how 'Use Polygons' works. The problem is there are approximately 14 million (give or take, well too many anyway) polygons in a given template, and running the effort analysis over all of them can take an unacceptable number of hours or days.

So now you can specify which polygons you want to run against:

For example (separate polygon names with a comma)

This can still take a decent amount of time depending upon your computer (like two hours), with the gazillions (or so) of track marks in that aggregate. Mysticetus does in-or-out polygon detection on each track mark...that takes time even on fast computers. But it doesn't take all year.

If you want to further reduce the time, reduce the number of Bucket Fields - Mysticetus iterates through all track marks (each 24-hour day is ~16,000 track marks) times each bucket field times each polygon.

EFFORT ANALYSIS USING ONCLOUD

Mysticetus OnCloud has automated many time-consuming tasks required for reporting. Notably here is effort analysis where data aggregation over days or months is required. OnCloud has automated the aggregation of data over any range of time for performing effort analysis. As a project manager you should have access to OnCloud today if your project is part of the Western Atlantic Wind development work underway.

OnCloud is used to aggregate all "Final" saves made by the Lead PSO and the latest "Signed off" save made by the project manager. Oncloud does not see any other files outside of those two designations. This includes files edited and saved under the "other" directory.

OnCloud can be found navigating to: Https://oncloud.mysticetus.com

Upon initial login the project manager is presented with two options in particular here.

First is the OnCloud query builder which allows for increasingly complex queries against a scope of data you define.
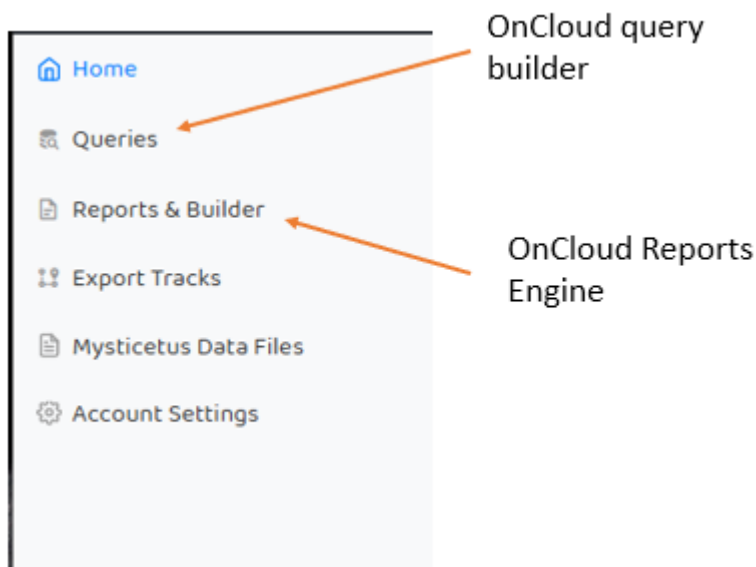
Second is the OnCloud reports engine. This pathway allows the lead PSO to generate their daily reports. Also available to the program manager is the ability to generate other report types.

Report Types to Generate*

Select a report type...

Detection Summary
Selecting this report type will prevent you from generating any other report types in this report.

Effort Analysis Detail
Selecting this report type will prevent you from generating any other report types in this report.

Lead PSO Daily Report

PM Signed-Off Daily Report

Here there are multiple report options as seen in the above figure. These reports are generated in a fashion analogous to the Mysticetus application. The big difference is the easy ability to generate for any range of data over the life of the project saving the project analyst hours if not days of effort to simply aggregate the daily data for analysis by any other means. The computational horsepower of a cloud based service too serves to dramatically reduce analysis time by many more hours to days. To capture the entire life of the project one can set the start date to an earlier year until current date. OnCloud will only analyze across existing data.

1) Detection summary for a given vessel/project pair. This report will summarize and tabulate all recorded detections for the specified time period.

2) Effort Analysis Detail – replicates the effort analysis model in Mysticetus. Bucketed fields are the data types desired for the effort analysis. Ignore stop states field is the field type to analysis for conditions where the data should be ignored for a particular analysis. Mysticetus defaults to the typical condition where the vessel is inactive during a stop at the dock.

Effort Analysis Detail

Data version type*

Signed Off

Data Types*

Visual Effort

Bucketed fields*

Ignore states field

Effort Type 1 ×

Ignore states

Off ×

Stop states field

Vessel Activity ×

Stop states

Anchored × Docked ×

Bucketed fields*

Air Temp

Atmospheric Conditions

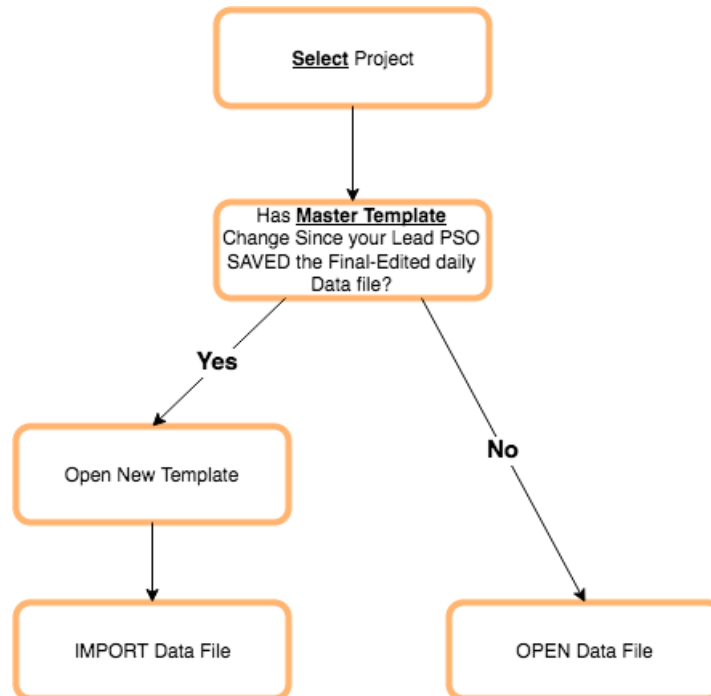Beaufort Sea State

Borehole Drilling

Chirps

Cloud Cover

Coring

Vessel Activity ×

REVIEWING MYSTICETUS DATA FILES - OTHER

If the Mysticetus template has changed since the file you wish to QAQC was created, you must import the Mysticetus file into the most current Mysticetus template. If the Master template has not change then proceed to Opening a Data File

SELECT A PROJECT

These steps assume you have already subscribed to the project. If not see directions above.

1. Open Mysticetus Editor.

Select Red Ball > Project > Select Project. The Open dialog box appears.

Select your project from under the Subscribed Projects heading within the dialog box and then the **Select Project** button.

Hint: If you do not see your project, it is possible the **Subscribed Projects** heading is collapsed. Click the plus(+) sign adjacent to **Subscribed Projects** to expand the heading and see all projects to which you have subscribed.
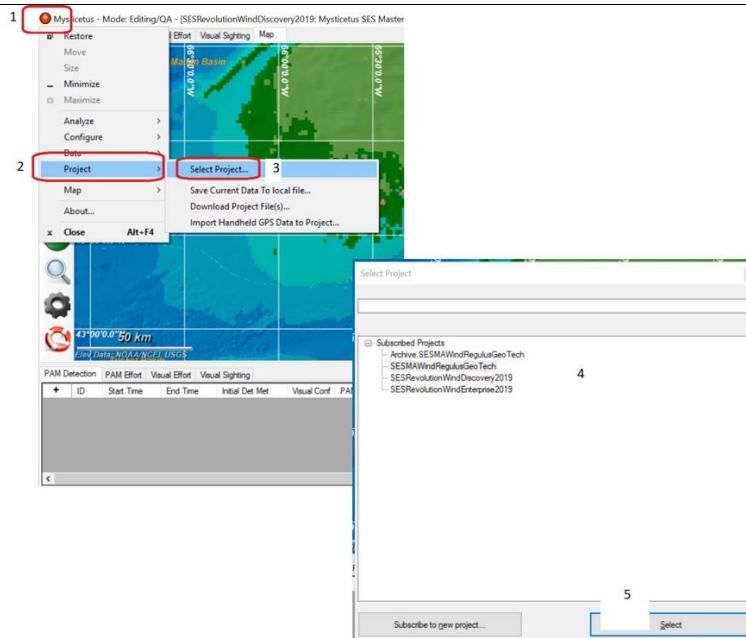
Hint: If you are managing one project or you do not need to switch between projects – you can skip this step. This is required to switch between projects.

OPEN TEMPLATE & IMPORT DATA FILE

If the Mysticetus template has changed since a file was created or this is your first-time running analysis, you must import the Mysticetus file into the most current Mysticetus template (because it has the most current definitions and GIS tools – the old file, from the old template does not contain these things).

1. Use Data > Import > From other Mysticetus file(s) to locate your file in the Edits directory.

2. Select your Mysticetus file and **Open**.

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OPEN DATA FILE

1. Go to the Mysticetus main menu to retrieve the final data file:

Red Ball -> **Data** -> **Open Mysticetus File**

Navigate to "EDITS" and select the Mysticetus file marked "FINAL-edited-{Lead PSO's Initials}". This is a manual procedure to indicate the stage the data files are in. Note: There could be times this isn't accurate – if in doubt, check with your Lead PSO for the final data file for the day and correct the naming convention during your data file save.

For example: DiscoveryVIS-2019-06-17-2359-**Final-Edited-ND**.Mysticetus

Click "Open"
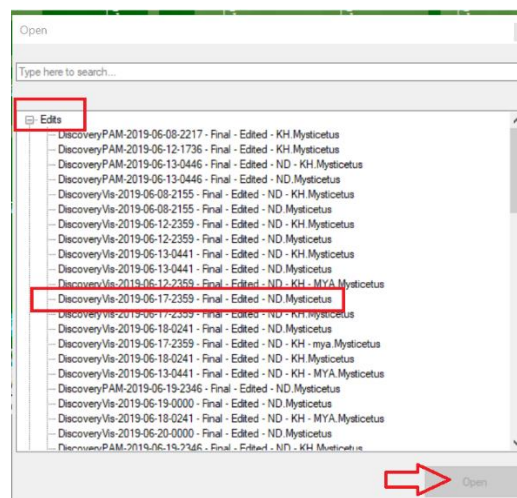
Perform the QA/QC effort

TO COMBINE MULTIBLE FINAL SAVE DATA FILES

When PAM data collection is underway in conjunction with Visual sighting work – two different final save data files are created and need to be merged for each date by the project manager. Another scenario this addresses 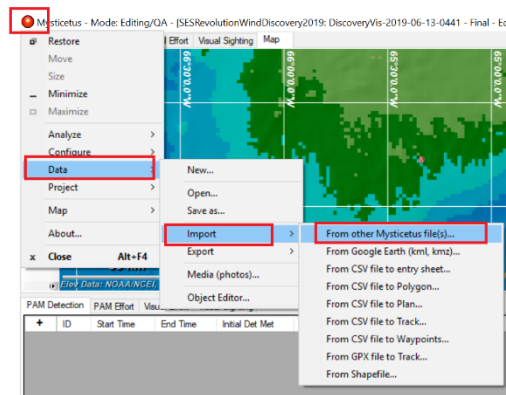is when a given collection day has several Final Saves. These need to be merged as part of the QA/QC process, typically by the lead PSO or project manager, then saved as an edited file as discussed further below.

1. Open the daily VIS data files

The **Open** dialog box appears.
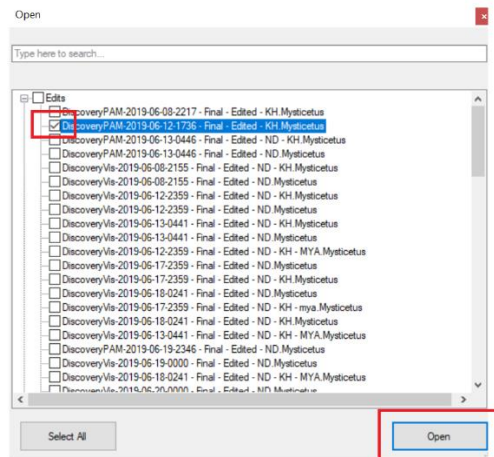
Select the PAM file to combine with the VIS file. Click **Open.** On the next screen Select **IMPORT**

Several data fields are referenced from the Visual Effort tab. When you integrate PAM with visual Effort data files, you'll need to "recalculate the column.

a) Mouse over the column

Mysticetus Proprietary Information   Last updated April 2022

b) Right click your mouse

c) Select Recalculate formulas for Column.

d) Repeat this for all columns that are auto-filled and are missing data.

DMA Status	Vessel Activity	Source Freq	GPS Pos		Water Depth	Speed	Course
☐		Recalculate Formulas for Column		W	NaN	0 kts	0°
☐		Delete Rows Containing	▸	W	NaN	0 kts	0°
☐		Delete Rows NOT Containing	▸	W		0 kts	0°
☐			43°40'34.0"N 65°26'42.5"W			0 kts	0°
☐			43°40'34.0"N 65°26'42.5"W			0 kts	0°
☐			43°40'34.0"N 65°26'42.5"W			0 kts	0°
☐			43°40'34.0"N 65°26'42.5"W			0 kts	0°

Some of the data values are referenced from the Visual Effort tab. When you combined the two data files; need to "recalculate" the formula for the column. Mouse over the column header -> Right Click your mouse and select recalculate formulas for column

Once the merge is completed the QA/QC procedure can be followed.

QA/QC PROCEDURES AND PM SIGN OFF

INTRODUCTION

Data flow from daily, ongoing collection to final project manager (PM) sign off is designed to address the quality assurance and quality control procedures (QA/QC) that are increasingly common in the energy industry today. These processes are designed to address regulatory requirements and have become critical to addressing the terms of development permits common today.

Data flow, in summary, essentially works along these lines:

Active data collection -> Final end of day save -> lead pso QA/QC -> PM QA/QC -> PM Sign Off

Once the above is completed the PM then must record any take events discussed below. Take and suspected take tracking is evolving as the industry moves towards construction and change to these procedures can be expected over time.

PM QA/QC PROCEDURES

Data Procedures and checks are project specific. As the project manager, *you are looking for information or data errors that do not make sense.* Your expertise in the area and the project requirements is a critical step.

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HIGH LEVEL ANALYSIS CHECK POINTS

1. Review GIS Analysis tools for issues

Review data fields per the data dictionary and QAQC checks

a) Review all the fields, looking for blank cells, ensure all data fields are complete. If not, put an explanation in the notes (example: equipment down, didn't write down, etc.)

Below are a few common items to check

b) Read notes; fix typos

c) Review the sighting records and attach any photos from the day to the proper sighting

d) Make sure the "Night" box is checked for all nighttime hours

e) Make sure DP thrusters are checked for any time that the thrusters are on or the correct equipment is noted as operating

f) Look for inconsistent times

g) Ensure that for every Mitigation request there is a Mitigation response

h) Ensure sighting reports have the appropriate and correct data

i) Check that bearings and headings are entered correctly

j) Check that reticles and distances are appropriate

k) If times look off, note that Mysticetus uses whatever time the laptop is set to run. For example, if times in Mysticetus need to be in UTC, set the laptop's time to UTC.

Review, looking for anomalies. Check for blanks; go back to the Mysticetus user interface and fill in any blank cells there.

Look at the map to check for odd vessel track lines.

Remember: For any changes created by the PM or data analyst – a note must be added in the notes field with your initials stating the change.

SIGNING OFF DAILY DATA

For 2021 and beyond the project manager must sign off the daily data within 72 hours of that day. The process for doing this is to open the edited file for that day. The edited file is essentially the final QA/QC file created by the Lead PSO as part of their end of day work. This is not the final save, but the resulting, edited file from the final save.

There are multiple files in the capturing and validating data for a given collection day. Saves, Edits, and Signed Off are of interest here and discussed below.
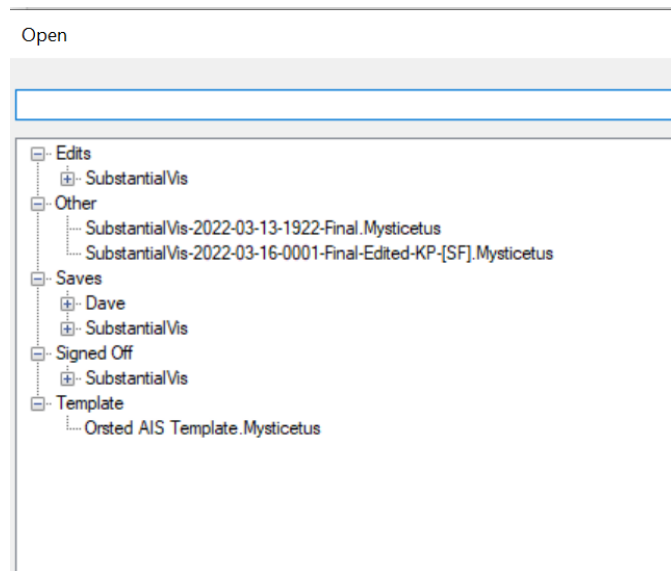
Saves – this is where incremental saves and the final saves are stored. The Lead PSO will edit/validate the final save then they will 'Save Edit to…'. Mysticetus will complete the file naming convention and include the lead PSO's initials in the save.
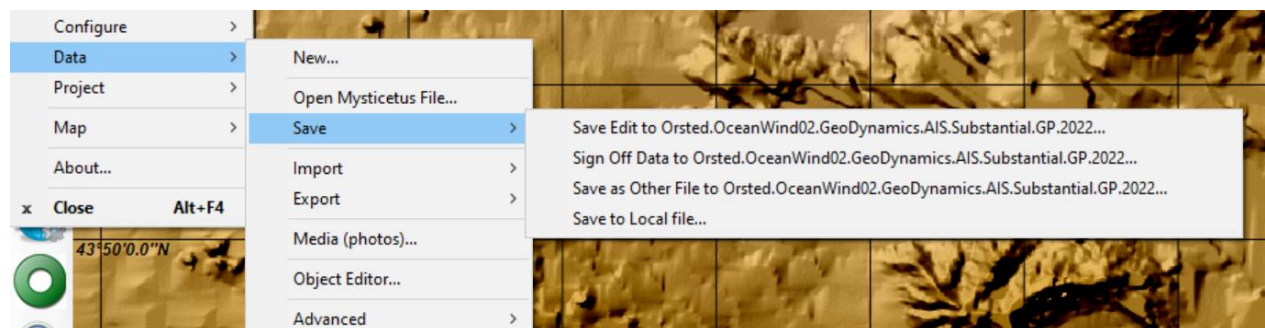

Edits – this is where the PSO's QA/QC'd file is stored. The file names under Edits will indicate "Final-Edited" in its name here. To sign off data the PM will **open the Final-Edited file**. Some things to check for:

> If the Final-Edited file is missing for the day of concern, reach out to your Lead PSO to finish this task or do it yourself. It really should be done by the lead PSO! Note the file's absence may be do to internet transmission delays.

> If there are multiple Final-Edited files, then open the latest save. To determine this, it will have multiple sets of initials. Open the file with the highest sets of initials – typically there is only one file.
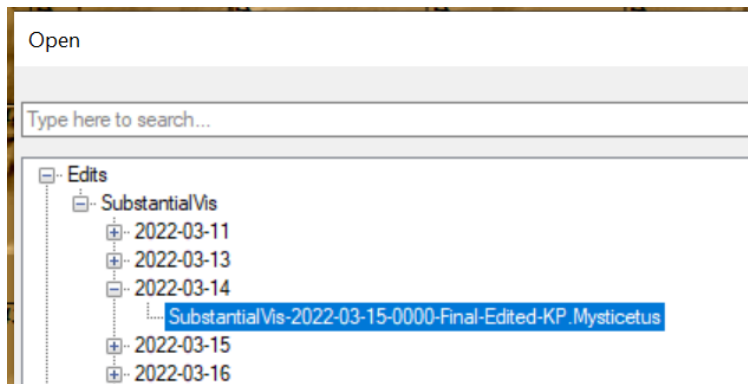
Signed Off – this is where all signed off files are located. The PM, after reviewing the final, edited file by fixing any data entry errors, providing other edits such as determining critical events are correctly accounted for, and including useful images (your lead PSO should of done this) will save that file as the signed off file. You will save the "Signed Off Data to …". Below example is for an Ørsted project.
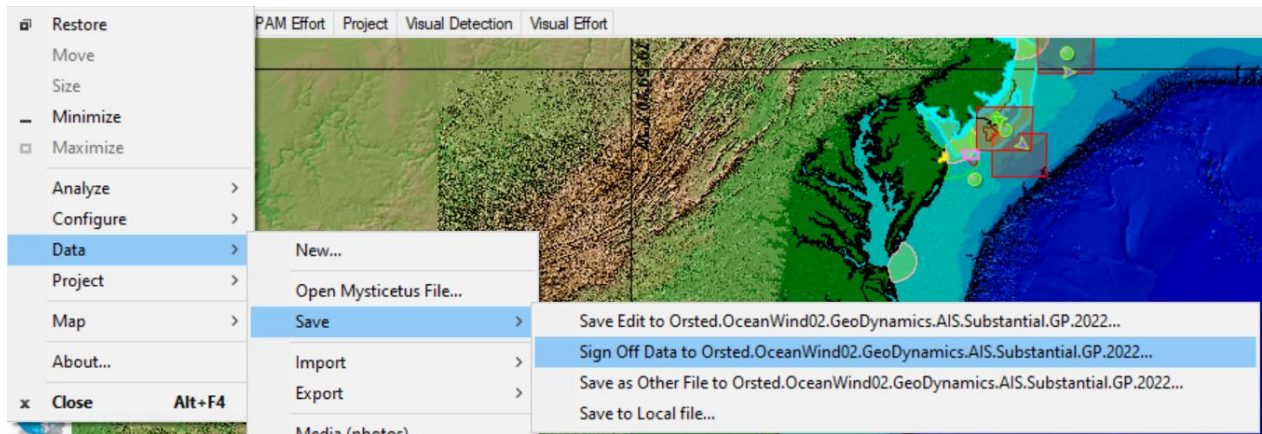
Other – this is where the project manager can work on files and store them off for later retrieval.

Last updated April 2022

INPUTTING TAKES VIA ONCLOUD

New for 2021 is the IHA Take tracker in Mysticetus OnCloud services. OnCloud is now also being used for daily report generation by lead Observers, effort query analysis for report generation, and the general data query engine. It is incumbent on the PSO Provider's Project Manager or their delegate to enter takes via this tool. This data is viewable by the permit holder, typically the project developer (developer). The developer only has view access to this data as recorded by the PSO providers. Developer viewing of cumulative takes for any given IHA permit are cumulative across all active vessels in the permit area as well as take summaries per vessel. The PSO provider can only see takes relevant to the vessels they're contracted to.

Issued On: June 11, 2021 | Expires On: June 10,
As of 2021-07-19 8:20 PM UTC

Species	Total Take Allowance	Aggregated Total Exposures
North Atlantic Right Whale	14	0
Fin Whale	9	0
Sei Whale	1	0
Minke Whale	3	0
Humpback Whale	4	0
Sperm Whale	3	0
Atlantic white-sided dolphin	15	0
Atlantic spotted dolphin	9	0
Common Bottlenose Dolphin Offshore Stock	437	0
Common Bottlenose Dolphin Migratory Stock	1192	0
Short-finned pilot whale	10	0
Long-finned pilot whale	10	0
Risso's dolphin	30	0
Common dolphin	112	0
Gray seal	9	0
Harbor seal	9	0

An alerting mechanism exists to notify the developer when take counts are reaching permitted limits. The Incidental take tracker is found at https://oncloud.mysticetus.com/permits/ . Contact

Mysticetus staff for access if you do not have a login and feel you should or are having trouble logging in.
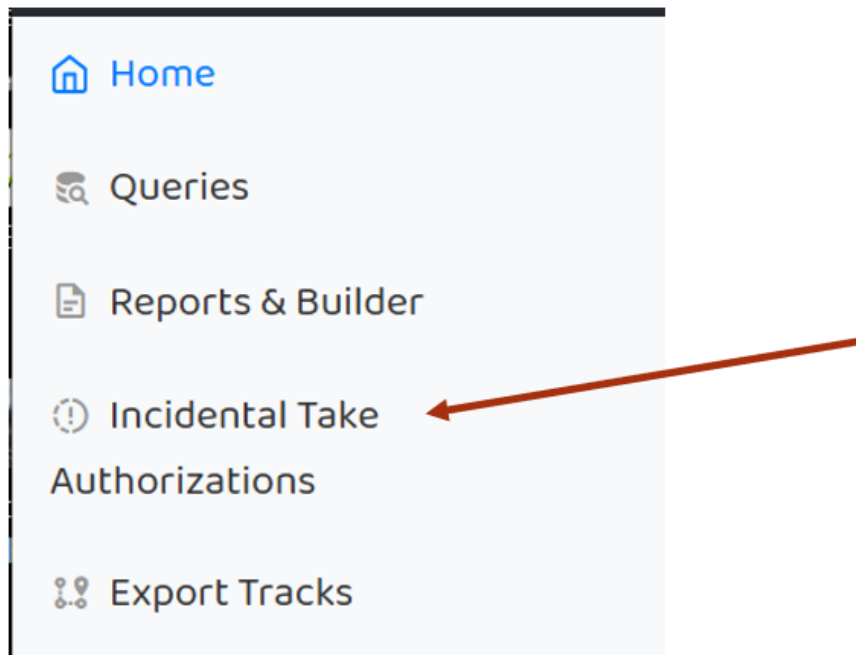
Clicking the above option will take you to the permits page allowing you to view any of the active permits your organization is working in. Click the "View" option to the right of the particular permit that you wish to view and add/edit takes. Only permits your marine observer service providers are supporting will be displayed for that provider.

Not all operations are governed by IHA permits and take reporting will not be required.

For more on IHA permits see both:

https://www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection-act

https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable

The PM has the option to mark existing detections as takes or to add detections to a particular day as a take. The table allows for adding animals not included in the original permit. These entries will be appended to the end of the table and shown to be not included under permit terms.

Mark Takes for Garden State IHA

Vehicle

Select a vehicle ▾

Date

Please select a vehicle and date above to begin marking or entering takes.

First pick your vehicle under review from the drop down. Then you will pick the date for editing detections as takes. OnCloud will show you which days there are data for review as per the Data Presence Legend in the below image. Dates in which there is a diagonal slash through it indicates no available data.

Upon selecting a day for marking takes the PM has two options to either "manually enter takes" which is effectively recording a new detection event or "mark recorded detections as takes".

The above dialog indicates to you two things:

1) There are sighting detections.
2) That currently no sightings have been marked as takes.

This dialog, above, indicates there is no recorded data on that day and thus no takes can be marked from detections or created manually. In short, pick another day or contact Mysticetus per the email alias shown. It is extremely important on any email reporting issues that very verbose information is provided: Vessel, IHA permit area, project filename in use that day, and what is expected.

MARKING DETECTIONS AS TAKES

Marking recorded detections as takes is the expected common way to indicate such events. Clicking on "Mark Detections as Takes" takes you to the below example. The PM can then select which detections were take events as defined to you. In the below example you might select the detection ID V213 then click the Mark as Takes button to confirm your choice.

Detections for 2021-07-16

Use the checkboxes below to mark which detections count as takes for the **Ocean Researcher**.

	Detection ID	Date & Time (UTC)	Species	Count	CPA Distance (m)	Exposure	Type	Mitigation Request	Mitigation Response	Mitig
☑	V213	2021-07-16 11:50	Unidentified Sea Turtle	1	13	true	Visual Detection	Shutdown	Shutdown	2021
☐	V214	2021-07-16 12:16	Leatherback Sea Turtle	1	180		Visual Detection	Detection Delay	Detection Delay	2021
☐	V215	2021-07-16 12:51	Leatherback Sea Turtle	1	140		Visual Detection	Detection Delay	Detection Delay	2021
☐	V216	2021-07-16 12:57	Leatherback Sea Turtle	1	300		Visual Detection	Detection Delay	Detection Delay	2021
☐	V217	2021-07-16 13:35	Unidentified Sea Turtle	1	15		Visual Detection	Detection Delay	Detection Delay	2021
☐	V218	2021-07-16 14:06	Unidentified Sea Turtle	1	200		Visual Detection	Detection Delay	Detection Delay	2021
☐	V219	2021-07-16 18:46	Unidentified Sea Turtle	2	336.423		Visual Detection	Other (see notes)	Other (see notes)	2021
☐	V220	2021-07-16 19:19	Leatherback Sea Turtle	1	461.402		Visual Detection	None	None	

Showing 1 to 8 of 8 records.

First Prev 1 Next Last

Close   Mark as Takes

Then confirm your decision per the below:

Are you sure?

Selecting "Confirm" will mark **no** detections as takes for 2021-07-16.

Confirm

Any takes marked this way can be removed as well should further analysis require it.

MANUALLY ENTERING TAKES

Entering takes manually is as simple as selecting the desired animal in the drop down dialog, indicating a count, time in the UTC timezone (be careful to get timezone right!), and add the optional data. The PM has full edit capability to address any corrections including removing a specified take. If there are no recorded takes for a given day manual entry of takes will not be allowed.

Manual Take Entry Form

Use the form below to manually enter takes into Mysticetus OnCloud.

Species*	Count*	Time* (UTC)	Station ID (optional)	Notes (recommended)	Delete
Atlantic Spotted Dolphin ▲	1				Remove

Atlantic Spotted Dolphin
Atlantic Sturgeon
Atlantic White-sided Dolphin
Blainville's Beaked Whale
Blue Whale

...count >500 must be split into several takes, or please contact info@mysticetus.com for assistance.

Save

...cean Researcher has no take(s) for 2021-07-18.

Manually Enter Takes   Mark Detections as Takes

No matching records found

Showing 0 to 0 of 0 records.

First Prev 1 Next

COMMON ERRORS

For a complete listing of data fields; QAQC checks and definitions please see the project Data Dictionary.

The following section is for common and reoccurring errors in the data files.

Ensure that you document all changes you make to the file by adding your initials and an explanation in the Notes field.

EFFORT TABS

BLANK CELLS

Are there blank cells? As of July 1 2019 – all data fields must have a data value. If your Lead PSO or yourself find there isn't a value that meets the situation, address with the overall Project management and Mysticetus teams.

If you have a blank cell that should auto-fill from another tab, mouse over the column heading and select **Recalculate formulas for column**. This command prompts Mysticetus to get that data and add it here.

OFF EFFORT ROW

PSOs add an *off effort* row when effort stops, such as when the vessel is docked, at anchor, or at the end of the day for 24-hr operations. This row signals Mysticetus to stop tracking time and distance. An *off effort* row is a data row that has **Visual Effort** or **Effort Type 1** (depending on the template) set to **Off**.

For 24-hour surveys, Mysticetus requires a file boundary to happen at a regular time. An *off effort* row performs this function. Ideally, this is done by the PSO before restarting Mysticetus at

SIGHTING TABS

Common errors include:

1. Are sighting id numbers sequential? Do the contain simply Vnum (e.g. "V32") instead of "My Awesome Visual Sighting 32" or "V32.1"? (PSOs sometimes think they are being creative, and instead are breaking downstream analysis)

Are there extra characters in the sighting id? For example, change VIS91 to V91.

Are there any blank fields? (GIS Analysis is a huge help here – you don't have to scan every field to find things).

A **Mitigation Request** field should have a corresponding **Mitigation Response** field.

Tip: To see both "halves" of a row at the same time, select the sighting tab in both the top and bottom pane of the Mysticetus screen. In the bottom pane, scroll to the far end of the row, to display the "last half" of the record.

MAPS

- Are the track lines the correct color?

    On Effort = Green

    Off Effort = Red

- Are there gaps in the line? (surveys started before July 2019 may have short gaps during lead PSO editing)

- Are there marine animals on land?

Tip: If your map appears empty, select the time stamp on any tab. Right-click to select **Position Vehicle at This Time**. Then select the **Toggle Follow Vehicle** control. The map will display your vessel's position at that time.

MISSING MEDIA

If there is a name in the **Image Credit** field mouse over the **Images** cell icon and ensure the media is attached. If not, this message appears:

1. Locate the missing media by opening Mysticetus saves from earlier in the shift. Use the time stamp of the sighting as a guide.
2. Click in the **Images** cell. The **Media** dialog box appears.
3. Select the image(s) and use the **Save** button to save them to your local computer.
4. Re-open the edited Mysticetus file.
5. Click in the **Images** cell. The **Media** dialog box appears.

Use the **Add** button to add the graphics from your local directory to the sighting record.

Like all missing data, this is a teachable moment for your lead PSO. They should be doing this on the boat.

MISSING TRACKS

If you see **Warning: No GPS Track …** in an GIS Analysis Tools -> Effort Report or the report indicates a section of tracks is missing, there is a gap in the track details.

The data analyst team needs to quantify and summarize effort for the Final Report. If there is a gap in the GPS track for that day, it needs to be addressed. A gap in the track is common at the beginning of the day during a 24 hour a day survey when the PSO restarts Mysticetus. This gap is usually negligible. If the gap is significant (more than 15 minutes), you need to repair that gap.

This requires the data analyst to import the daily GPX files from the Garmin Handheld.

	A	B	C	D	E
1	Bft	Overall_Totals			
2	GPS Track coverage of effort: Complete				
3	2019-06-21 00:00:29.6 to 2019-06-21 23:59:12.0 UTC				
4					
5	Overall Le	164994.1			
6	2	38853.27			
7	3	35621.22			
8	4	49163.82			
9	5	41355.81			
0					
1	Overall Tir	23:58:42			
2	2	5:26:03			
3	3	6:07:55			
4	4	7:56:21			
5	5	4:28:24			
6					

SAVING EDITED FILES

Include in the NOTES column for any row of data you edited. If you make a change to a value in the data – document the change in the NOTES field with your initials and the change.

Finally, save the QA/QC'ed file. Go to the Mysticetus main menu and:

    a) Select Red Ball -> "Data" > "Save As…"

    b) Add your initials at the end of the file name in the format of:

ContiVis-2019-05-01-Final-Edited-{Lead PSO Initials}-{Project Manager's Initials}.Mysticetus

PROJECT MANAGER CHECK LIST

Once the Lead PSO completes the daily QAQC review. Project managers perform an analysis of the data quality prior to having the data analyst team review and aggregate the daily data for submittal against permit requirements.

	Description	
1	Start the Mysticetus Editor program	
2	Select your project	
3	Confirm Garmin GPX files are in Cloud Storage	
4	Review daily email communication from Lead PSO	
5	Confirm Lead PSO ran the GIS analysis files	
6	If project has PAM – ensure PAM files are combined (merged) into one file with the Visual sighting file	
7	Review the Lead PSO's GIS analysis files. Check NOTES data file for communication. Ensure nothing is of concern in the reports.	
8	Open the daily data file from Mysticetus. This is the one labeled [Project Name][File Date and time]-[Final]-[Lead PSO Initials]	
9	Run the GIS Analysis Reports	
10	Review data for issues and quality problems. Check for abnormal data and no missing data.	
11	Confirm Off Effort Rows occur when Docked; at anchor or at the end of the day for 24-hr operations.	
12	Review Map. Track lines correct color? On effort = Green Off Effort = Red Are there gaps in the Line (review the GIS Analysis tools for GPS Gaps)	

	Are marine animals on land?	
13	Review sightings – is all information complete	
14	If have PAM operations – review PAM tabs for completeness.	
15	Save a new copy of the data file with your initials	
16	If you made significant changes run the GIS analysis reports to ensure all issues are resolved.	
17	Notify Data Analyst of issues you are unable to resolve (for example track lines)	
18	Follow up with Project managers/Mysticetus of issues that require review (for example new values in the drop-down fields)	
19	Follow up with Lead PSO on training issues/common issues found	
20	Mark takes as they occur in the Mysticetus OnCloud IHA take tracker	