iSEAS

iSEAS REDBOX MANUAL

(LIFE13 ENV/ES/000131)

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1. Introduction

This document describes the minimum requirements to start the RedBox system and gives a detailed explanation of each option and functionality offered by the application. Following this manual, with the help of the examples and screenshots included, any user can understand and work with the RedBox system.

1.1. Description of the system

The main task of the RedBox application is to collect the data generated by the iObserver species recognition system through artificial vision and contextualize the information relating it to the Trip and the Haul.

The application connects to different ship navigation instruments and collects position, heading, speed and depth information at regular intervals.

It also provides a simple user interface that allows to view and modify the information before being sent via satellite to the iSEAS project server at CESGA.

1.2. System environment

The RedBox software will be installed on a PC, typically located on the ship's bridge. The software has been designed so that the technical requirements of the computer on which it is installed remain low.

A connection, typically by serial cable, allows the acquisition of data in NMEA format generated by on-board instruments. The program can be configured to adapt to the existing connection type and to work with different models.

The data from the iObserver system will arrive from a network connection.

If there is a satellite router accessible for data transmission, it can also be connected to the RedBox. If there is no satellite router available, a cellular network router with WiFi connection can be used to carry out transmissions in coverage areas near the coast.

In a typical trip, the software will be operational as long as the trip lasts or, at least, during the time the ship is in the fishing area. This is so that the software can collect the GPS position data at any time and then automatically locate the hauls when the operator registers them.

2. Application requirements

2.1. Hardware requirements

The RedBox application has moderate hardware requirements. The following are the minimum hardware characteristics that must be met:

- x86 / x64 processor with at least 1GHz.
- 1GB RAM memory.
- Hard disk space 300MB.

The recommended hardware characteristics are:

- Core i3 processor at 2GHz or higher.
- 4GB RAM memory.
- Free hard disk space 1GB.

The software must have access to an instance of Microsoft SQL Server. For more information about the minimum requirements for the SQL Server database engine, see the following link:

http://technet.microsoft.com/en-us/library/ms143506.aspx

2.2. Software requirements

The RedBox application, as part of its installation, includes the necessary components for its proper functionality, however, the system must comply with:

- Microsoft Windows Vista operating system or higher.
- Microsoft .NET Framework 4.
- Microsoft SQL Server Express 2008 R2 or higher.
- Microsoft System CLR Types for SQL Server 2008 R2 or higher.

3. Software installation

3.1. Previous steps

For the correct functioning of the RedBox application, the system must comply with the software requirements indicated in the previous section:

- If it is necessary to install Microsoft .NET Framework 4 you can download and follow the instructions in the following link:

  https://www.microsoft.com/en-us/download/details.aspx?id=17718

- There must be access to an instance of Microsoft SQL Server. In case the installation is done in a system and / or network not managed by the user, he must contact the administrator to get access to an instance. In case the user is an administrator and there is not a SQL Server instance installed, you can download and follow the instructions for installing Microsoft SQL Server Express 2008 R2 in:

  https://www.microsoft.com/en-us/download/details.aspx?id=30438

- If it is necessary to install CLR Types for SQL Server you can download and follow the instructions in the following link:

  https://www.microsoft.com/en-us/download/details.aspx?id=16978

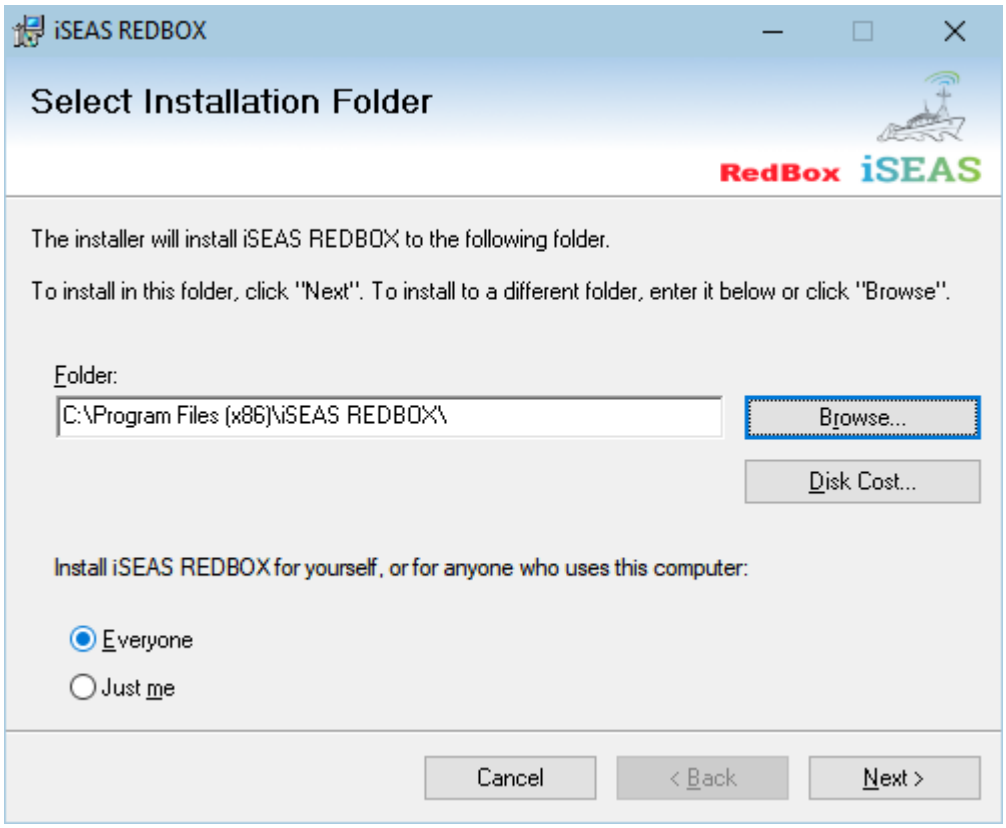
3.2. New installation

The installation of RedBox can be started by double clicking on its installation file or running on the command line.

iSEAS_REDBOX_SETUP.msi

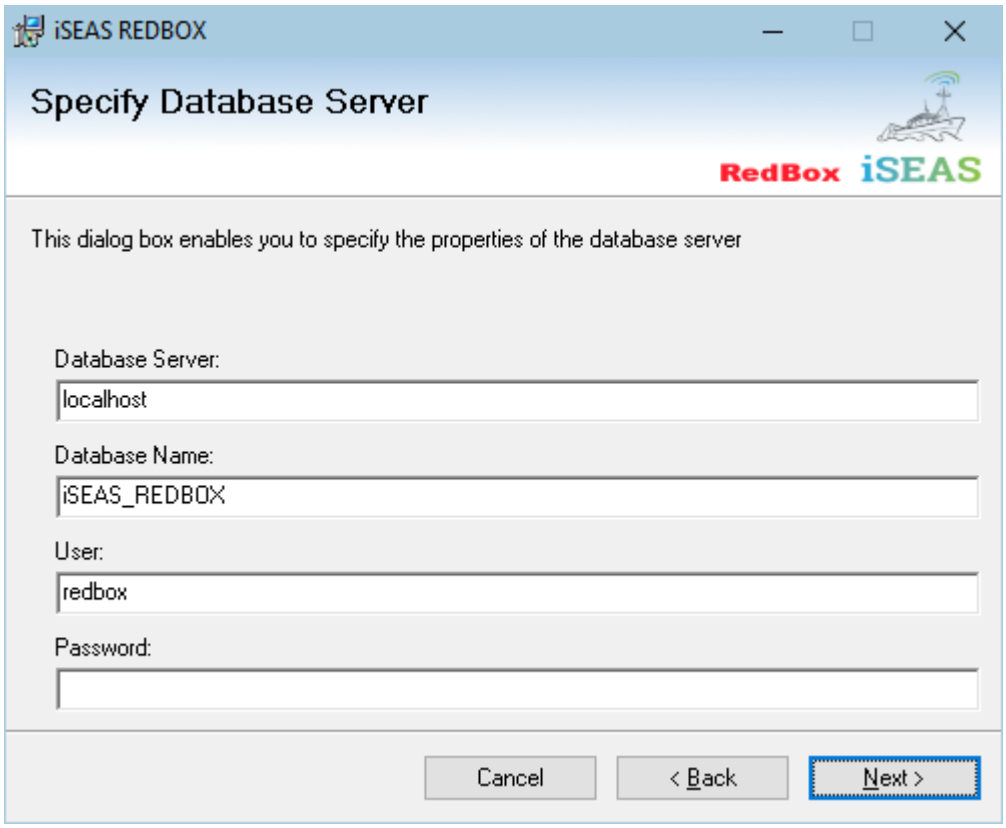
In both cases, the installation welcome dialog will be displayed:

Clicking on the "Next" button opens the window that allows selecting the destination folder as well as specifying whether the program will be accessible to all users or only to the current user.

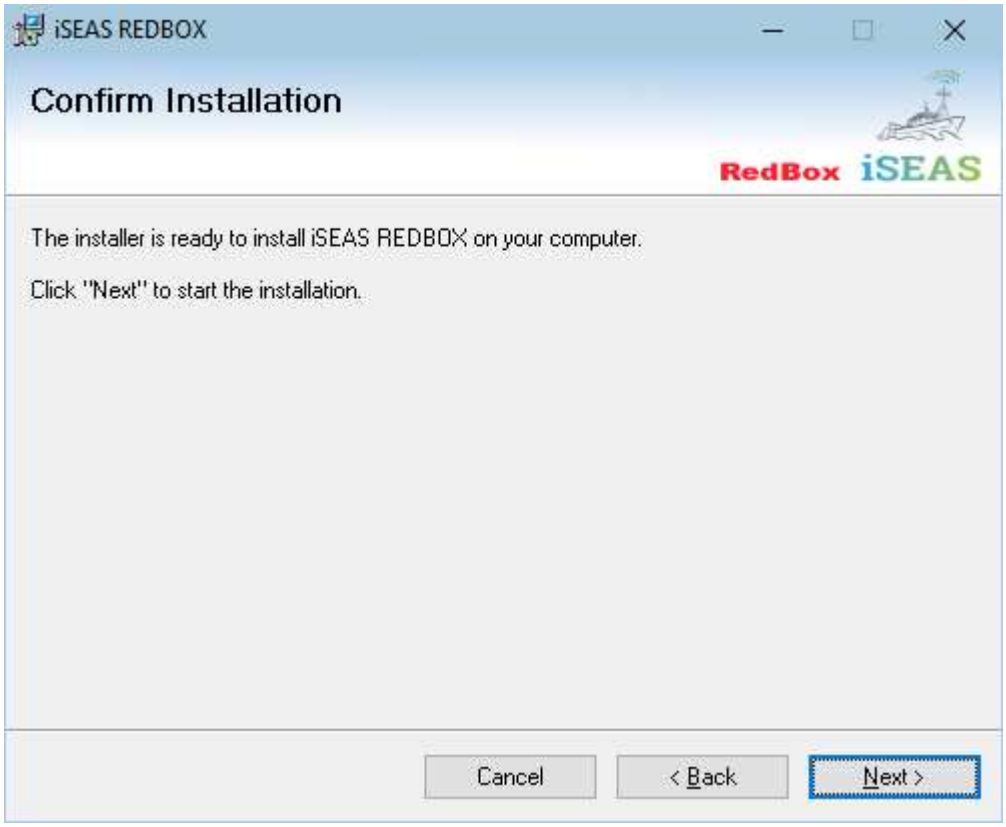


The following screen allows you to enter the connection data to the SQL Server database:

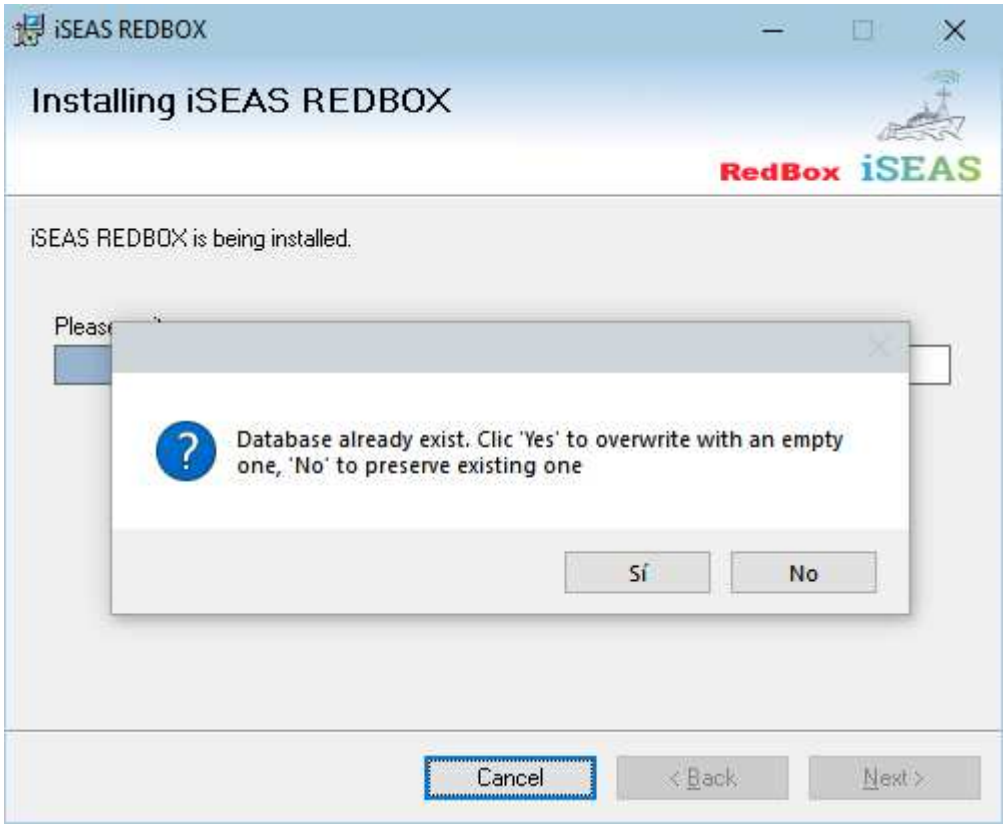
- **Database Server**: the address of the database server must be provided.
- **Database Name**: The name that will be assigned to the database created by the installer must be indicated. In the case of reinstallation, the name of an existing database can be indicated.
- **User**: name of the SQL Server database user. The user must have permissions to create new databases in case of new installation or read and write access if it is an existing database.
- **Password**: SQL Server user password.



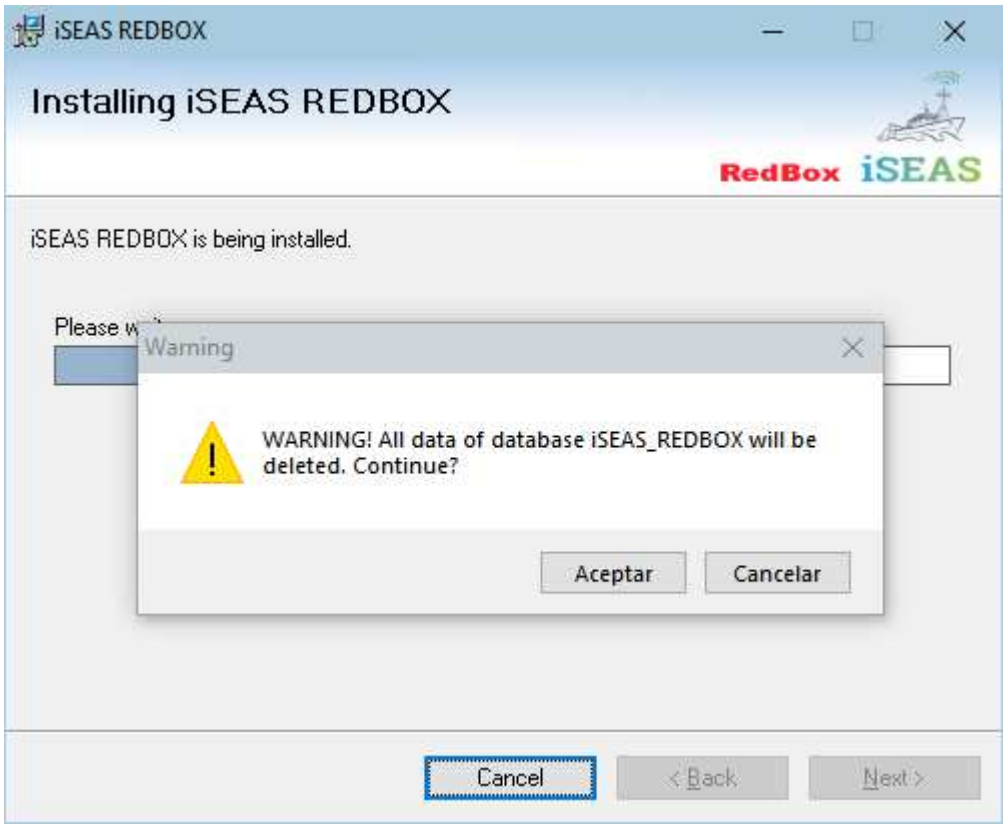
Once the above steps are completed, the installer will be ready to start the installation:



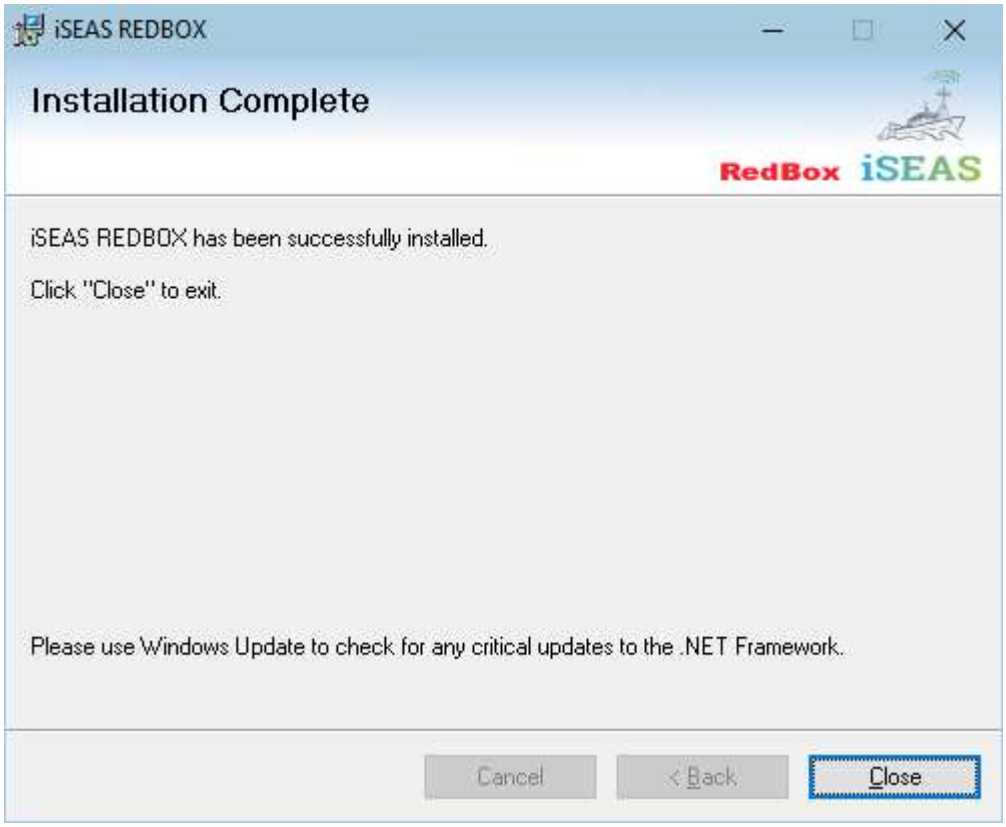
In case the database already exists, the installer will give a warning indicating if you want to keep the old version or delete it to create a new empty one:



In case the user presses "Yes", the installer will show a warning that the old database will be deleted. Pressing "Accept" confirms the deletion:



Once the installation is completed successfully, the installer will inform the user. The "Close" button will finish the installation:



At the end of the installation process, an "iSEAS REDBOX" group is created in the Windows "Start" menu with shortcuts to start the application and access its documentation.

3.3. Repair / uninstall existing installation

If there is already a previous installation of the RedBox software, running the installer allows you to repair the installation or uninstall the old version. The repair option will reinstall the application while keeping the existing configuration. The uninstall option will remove the software from the system.

Note: The uninstallation process does not erase the data stored in the database. The deletion of this data must be done manually.

As RedBox uses the standard Microsoft Windows installer, it can be safely uninstalled at any time by selecting the program entry in the "Add / Remove Programs" section in the Windows Control Panel.

4. Application user manual

4.1. Structure of the user interface

This section describes the structure and the main options of the user interface. The main screen is shown below:

- Window title: this area shows the name of the System and the name of the current open window; this will help the user to understand the use of the current action screen. If the open window is an edit window in which changes have been made and the user tries to open a new window, the system informs in the status bar that this action can not be performed until the changes are confirmed or canceled.
- Actions menu: this area allows the user to manage fishing data for the current trip such as hauls, catches, navigation data or regularization of the iObserver system data.

- Configuration menu: this area shows all the configuration options for the system as well as listing the master data synchronized with the central system (species, ports, metiers, areas, etc.) in addition to the finished trips data. The system also shows the status of services that run in the background: data capture from the iObserver system and navigation data. Finally, there is a window to manage the data synchronization between RedBox and the central system.
- Status bar: this area located at the bottom of the interface shows the current status of the system, with the last warning or error that the user has been informed of.

4.2. Buttons and toolbars

The intention of this point is to clarify the most common buttons and toolbars present in the RedBox system:

-

Save the last changes made in the current window. In some cases, this button can also close the window.
-

Cancel the last changes and close the current window.
-
Minimize, Maximize and Close the current window. If you choose Minimize, a small bar collapses to the bottom of the content area. Maximize restores the windows to the maximum size and Close does the same action as the Cancel button.
-
Open the appropriate search window to select and add some element in the current screen, such as Sale and Download Harbours or Target Species. It is also used to add new elements to the screens with lists of hauls and catches.
-
Remove the selected item from the current window.
-
Open the edit window of the selected item.
-

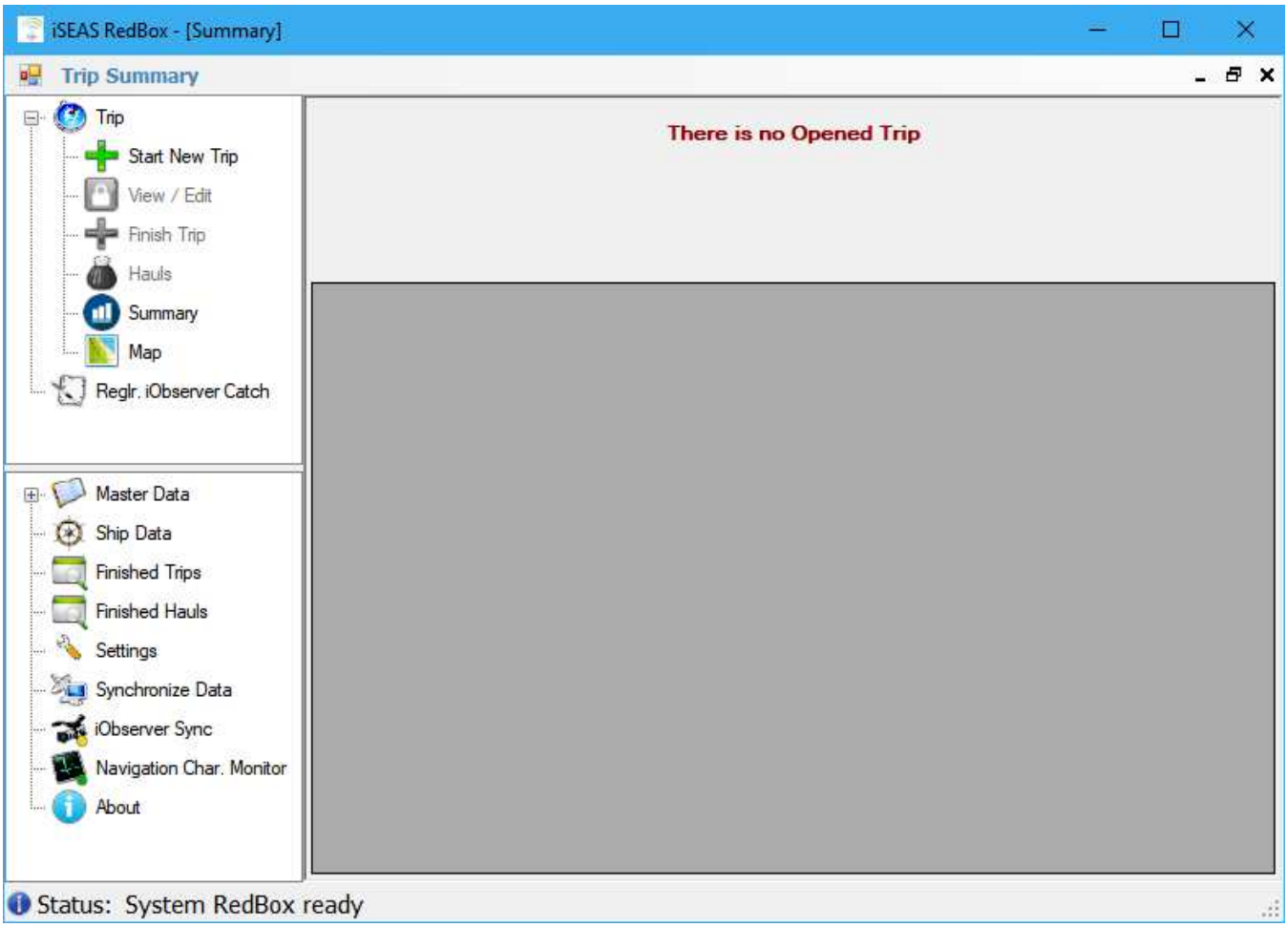
Search field: in fields of this kind the user can not write directly, he must double click inside the text box to open the appropriate search list form, so that the user can search and select an item from the list.
-
This search box is used to search for data that matches the text entered by the user.
- In the listings there will always be a header line with the names of each column. By clicking on the name of each column the data of the list will be sorted according to that column in ascending or descending order successively for each click.

4.3. Start RedBox

To start the RedBox system, the user only has to double click on the shortcut that the installer creates on the Windows desktop named "iSEAS RedBox".

The system will begin to verify the language, the ship and the services and will open a splash window like the following:

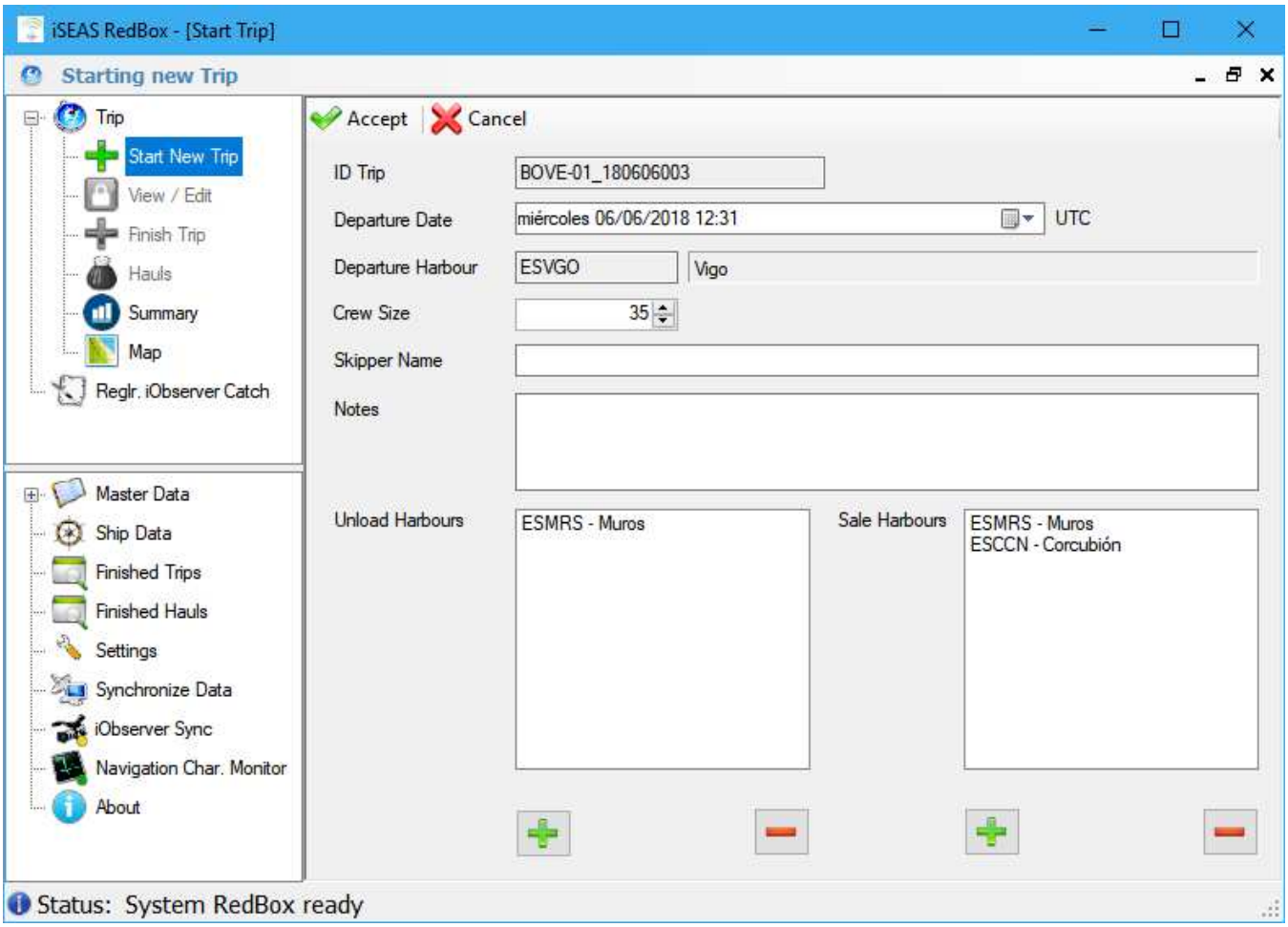
If all controls and services are ok, the application will automatically open showing the Trip Summary screen:



4.4. Actions menu

4.4.1. Start New Trip

The first action that the user of the application must do, once the configuration has been completed (see *4.5.5 Settings*), is to create a new trip. When you click on the menu entry, the following screen is shown:



- **ID Trip**: generated automatically by the system. Includes the ship's identifier, year, month, day and a sequential number. In the example of the image the trip identifier is "BOVE-01_180504003":

  "*BOVE-01*": ship's identifier

  "*180504*": date

  "*003*": sequential number

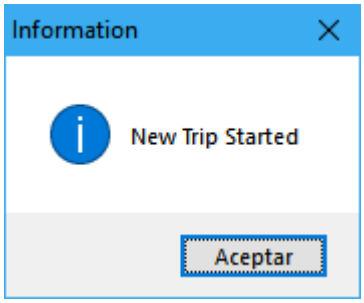
- **Departure date**: by default it is the current day; the user can change it using the calendar.

  Note: The dates are registered by default in UTC format, if you want to work with a date format with the local time zone you can configure the application in the "*Preferenes*" section, see *4.5.5.1 General*.

- **Departure Harbour**: when you double-click on this text box, a search list of the harbours will be displayed.
- **Crew**: With the keyboard or the Up / Down buttons, the user can specify the crew on board for this trip.

- **Skipper Name**: indicate the name.
- **Notes**: free text field where the user can specify any consideration or annotation for the trip.
- **Unload and Sale Harbours**: by using the and buttons the user can add or remove harbours from the list of sale and unload harbours to configure the place where the ship will download and sell catches for the trip.

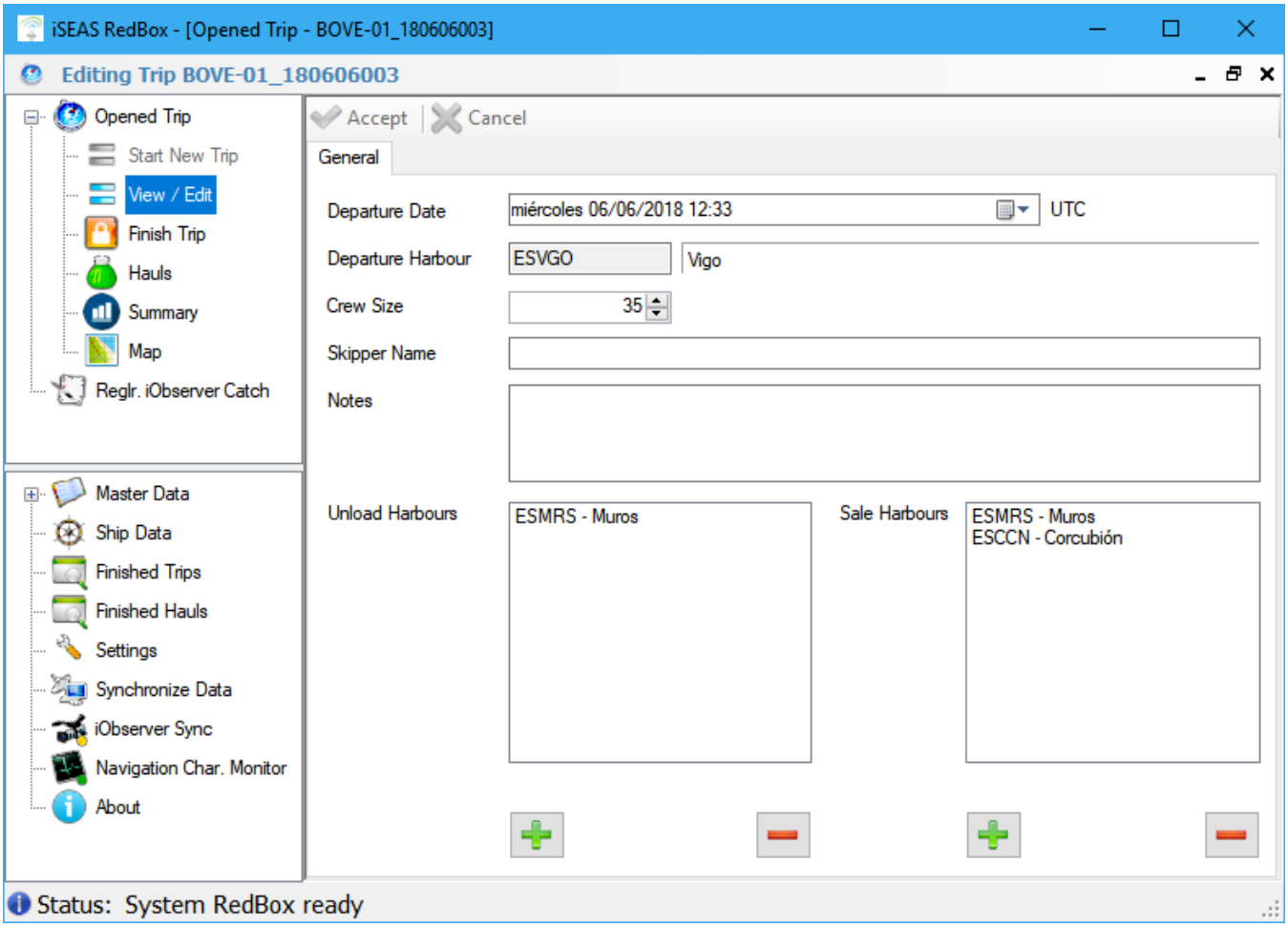
When the desired fields have been filled and the user presses "*Accept*", the system creates and stores the Trip in the system and displays an information message:



The Trip is stored locally and marked as pending to be sent. The central system will not have notice about this Trip until the user synchronizes the data with the central server. Analogously, this will happen with the rest of the data that is registered in the system, see "Synchronize Data" *4.5.6.2 Fishing Data*.

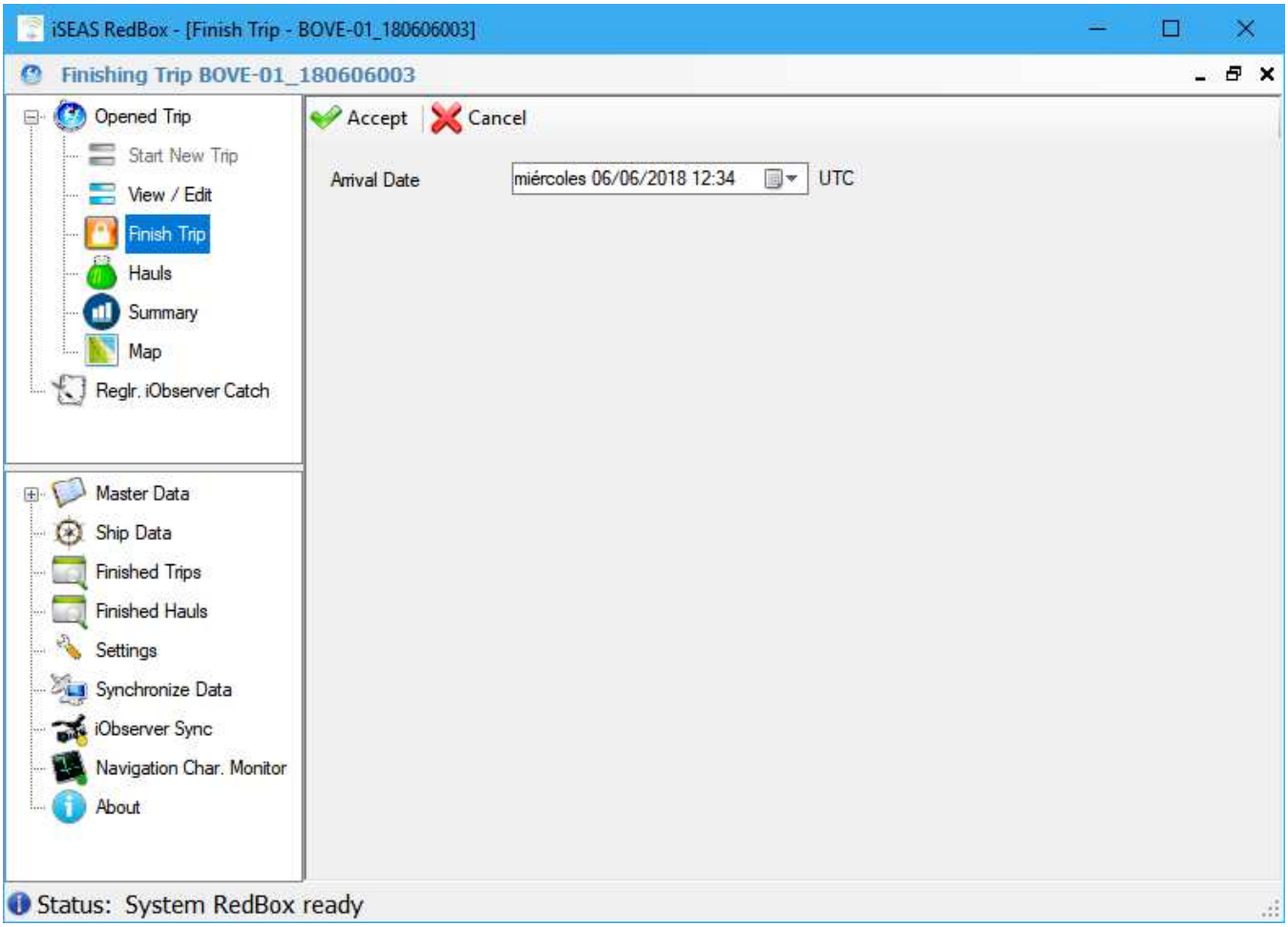
4.4.2. View / Edit Trip

This screen is similar to the "Start New Trip" screen. All data can be modified except the Trip identifier.

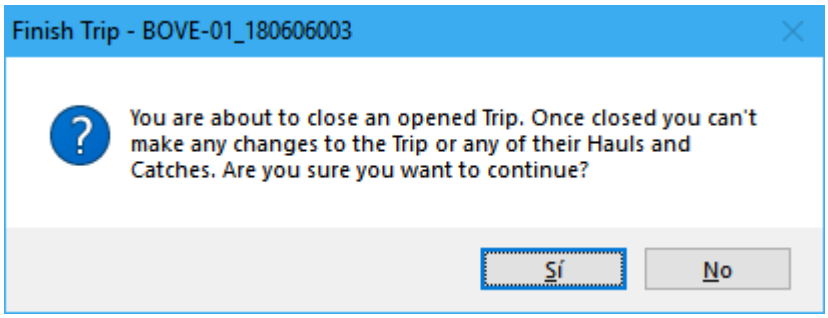


4.4.3. Finish Trip

When the trip is finished and hauls and catch data entry has been completed, the user can finish the trip. To do this, the date and time of arrival will be recorded.



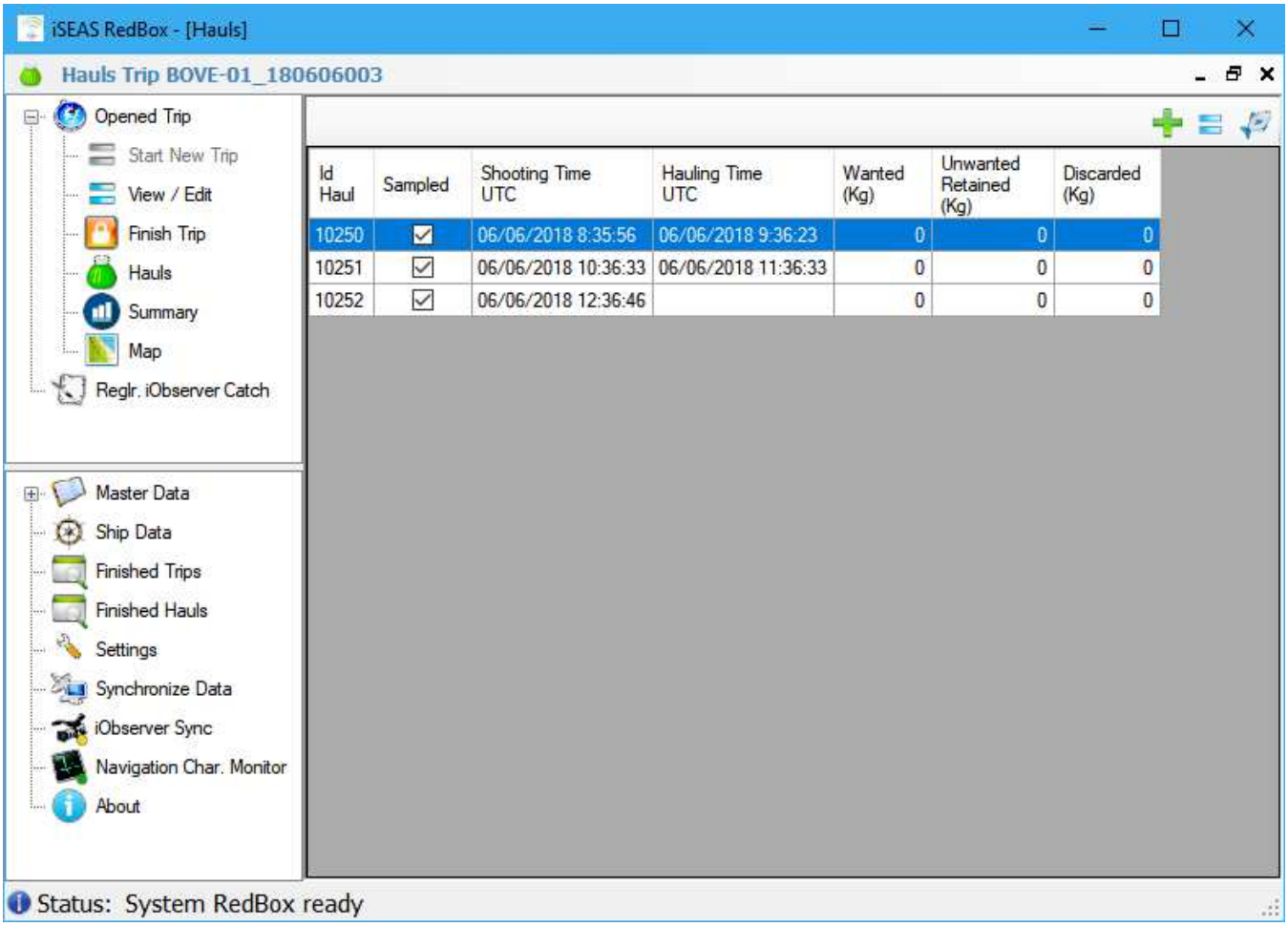
IMPORTANT: At the end of a trip the software will ask for confirmation and will inform that, once the trip is finished, it will be archived and no modifications of any kind can be done to the trip data.



4.4.4. Hauls

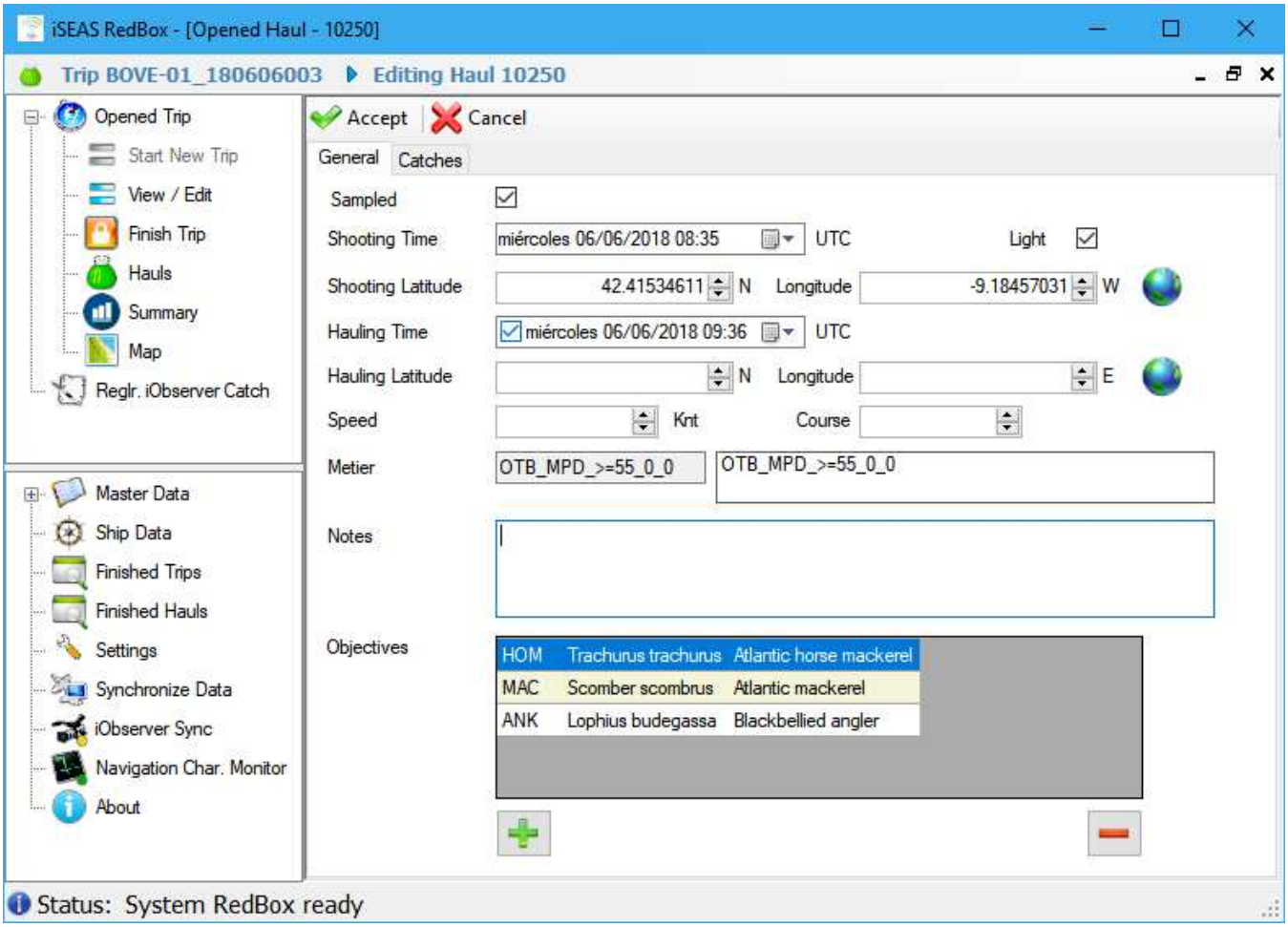
On this screen, the hauls recorded for the open trip are displayed. The user can see the list of the hauls with the summary of the catches for each of them.

With the buttons you can add a new haul , modify a haul and open the catches screen .



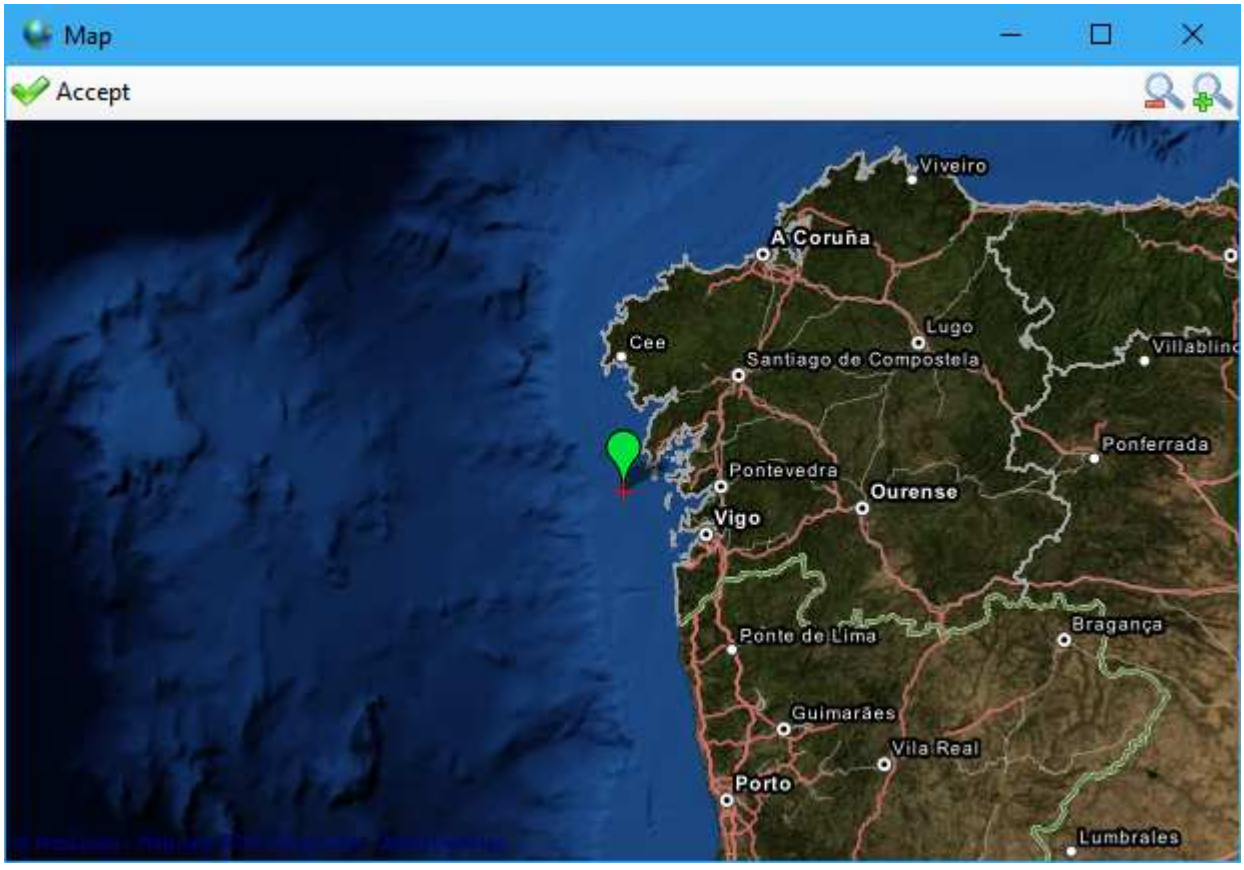
4.4.4.1. Add / Edit Haul

When there is an open trip, the user can register new hauls. When a new haul is created from the haul list, the following window is shown:



- **Sampled**: Enabled by default; if it is disabled, it invalidates the haul. It is important to note that hauls can not be deleted for reasons of consistency with the data synchronized with the central server, so any haul that you want to invalidate should be marked as not sampled.
- **Shooting Time**: date and time of shooting. By default it is the current day. The software will make all the necessary checks so that the shooting and hauling times of the hauls are coherent with each other, avoiding overlaps and taking into account the start time of the trip. The system will only show and allow to enter valid times.

- **Light**: whether the haul takes place in daylight or not. It will be calculated automatically by the software according to the shooting and hauling times and the GPS position. It can be modified manually by the user.
- **Shooting Latitude and Longitude**: geographical position of the shooting point. By default, the system obtains this parameter from the saved positions through the navigation characteristics registration service. Clicking on the globe icon opens a window with a map to select the geographical position visually. In the map window, the point is selected with the left mouse button and the displayed area can be moved with the right one. By means of the mouse wheel or the buttons you can zoom in or out.

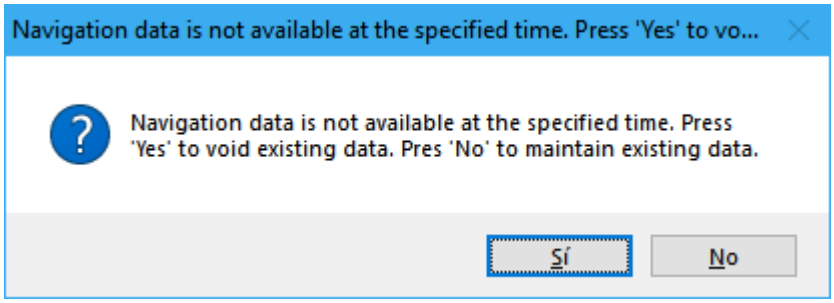


- **Hauling Time**: hauling date and time. Similar to the shooting date. To activate this field, as well as the hauling latitude and longitude, and mark the haul as completed, the associated check box must be marked.
- **Hauling Latitude and Longitude**: geographical position of the hauling point. Analogous to the shooting one.
- **Speed**: Average ship speed during the haul. By default, the system obtains this parameter through the navigation characteristics service.

- **Course**: average course during the haul. By default, the system obtains this parameter from the navigation characteristics service.
- **Metier**: Double-clicking on this text box will display a window with the search list of the metiers. The metier is used for the study and characterization of fishing data. It is mandatory to record this information. As the metier does not usually change for a ship, when a new haul is added, the metier by default will be the same as the previous one. From the metier and the geographical position of the haul, the target species will be determined in addition to other data that will be recorded as fishing area, fishing grounds and gear used.
- **Notes**: Free text field where the user can specify any consideration or annotation for the haul.
- **Objectives**: target species of the haul. From the metier and the position of the haul, the usual target species will automatically be included. These will be shown in the list highlighted with yellow background. Additionally, the user can add other species or remove the existing ones using the corresponding buttons.

When all the required fields have been filled and the user presses "Accept" the software creates and stores the haul.

In the event that the user modifies the shooting or hauling date and there is no recorded navigation data for the time indicated, a warning window will be displayed:



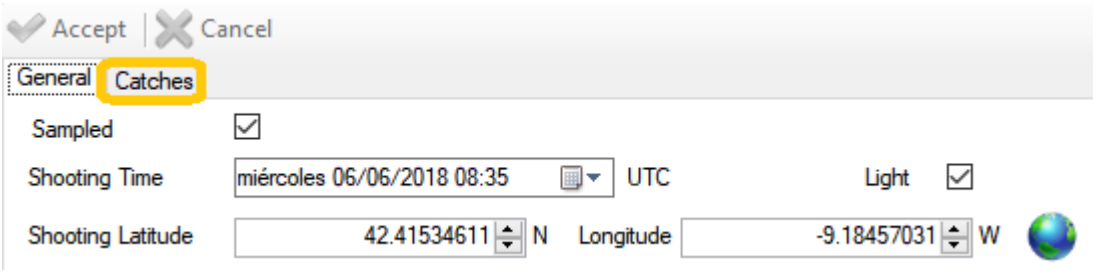
Pressing the "Yes" button will delete the existing position data. Pressing "No" will keep it.

Once the haul is saved, it is stored locally and marked as pending to be sent. The central system will have no notice of this haul until the user synchronizes the data with the central server, see "Synchronize Data" *4.5.6.2 Fishing Data*.

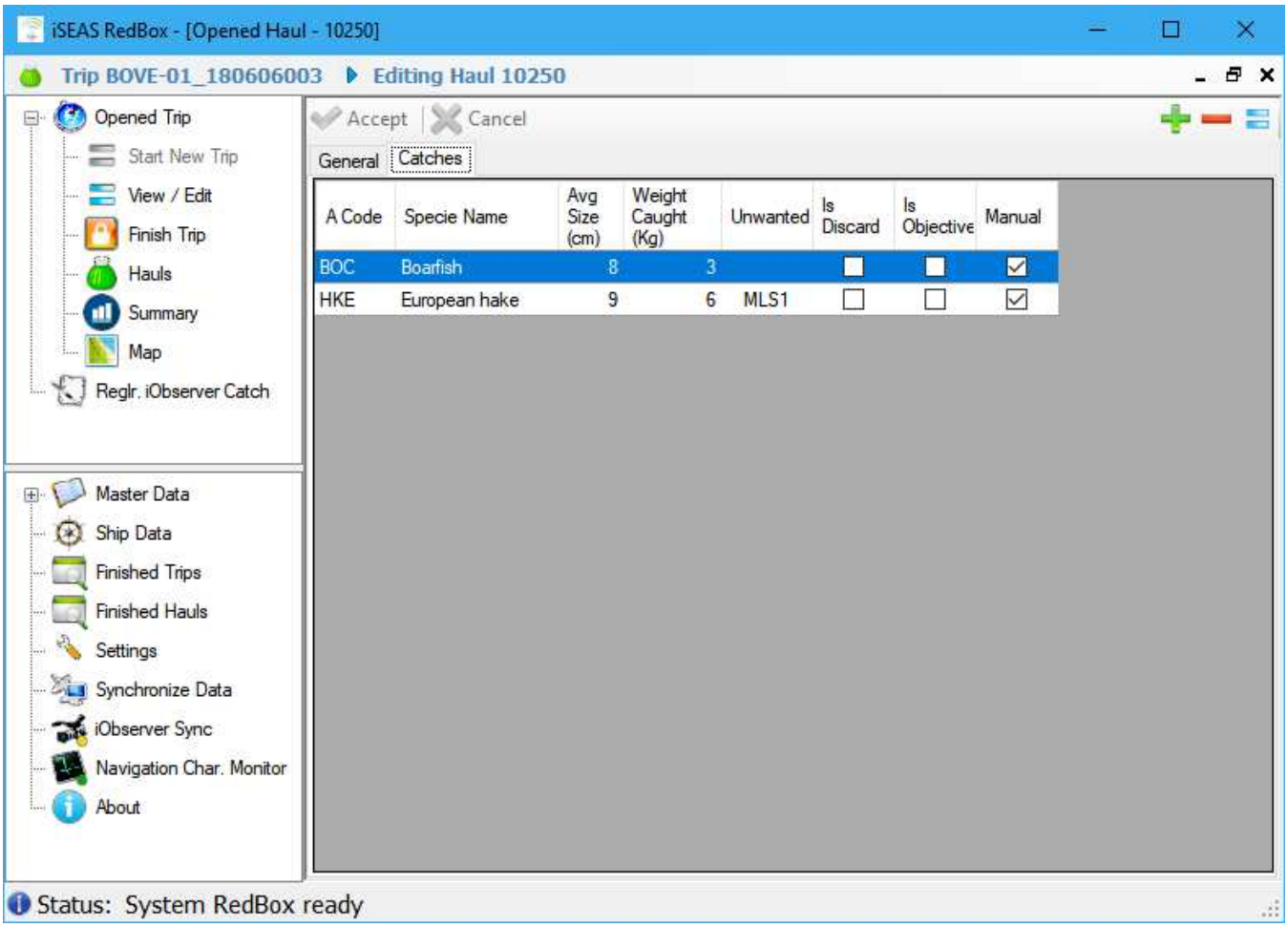
Although all fields are editable by the operator, the application automates data capture to the maximum to reduce the workload. In a typical haul the user will only have to enter the shooting and hauling times, the rest of the fields are covered automatically.

4.4.4.2. Catches

For hauls that have already been created, you can access the list of catches from the hauls list screen, see *4.4.4 Hauls*. It can also be accessed through the catches tab in the haul edit screen:



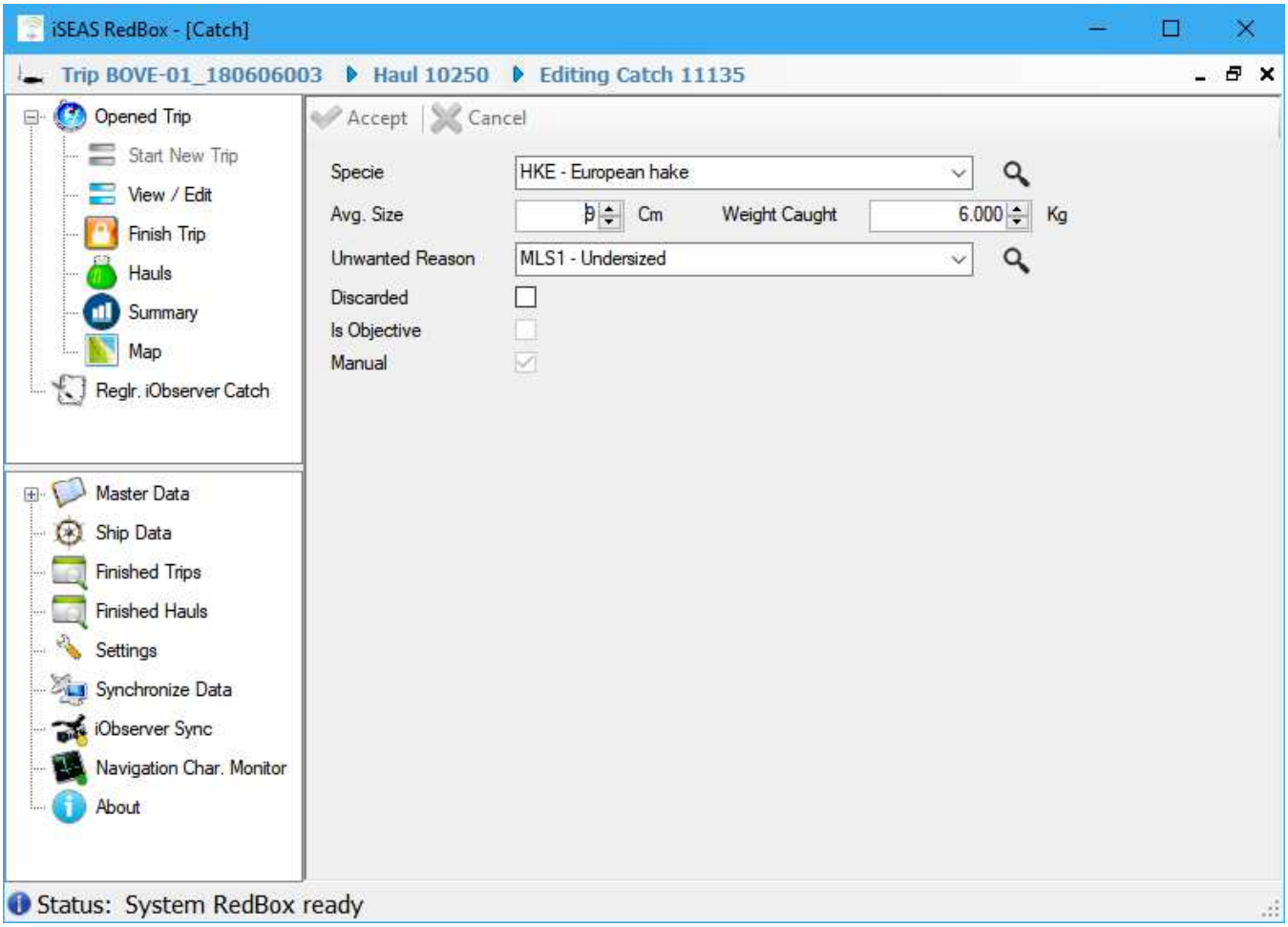
Once the list of catches is open, the catches for each species and the reasons to be unwanted will be shown.



You can add a new capture , modify a capture and delete a capture .

4.4.4.3. Add / edit catch

For each haul the user can register new catches. When you create or modify a catch from the list of catches, the following screen shows:



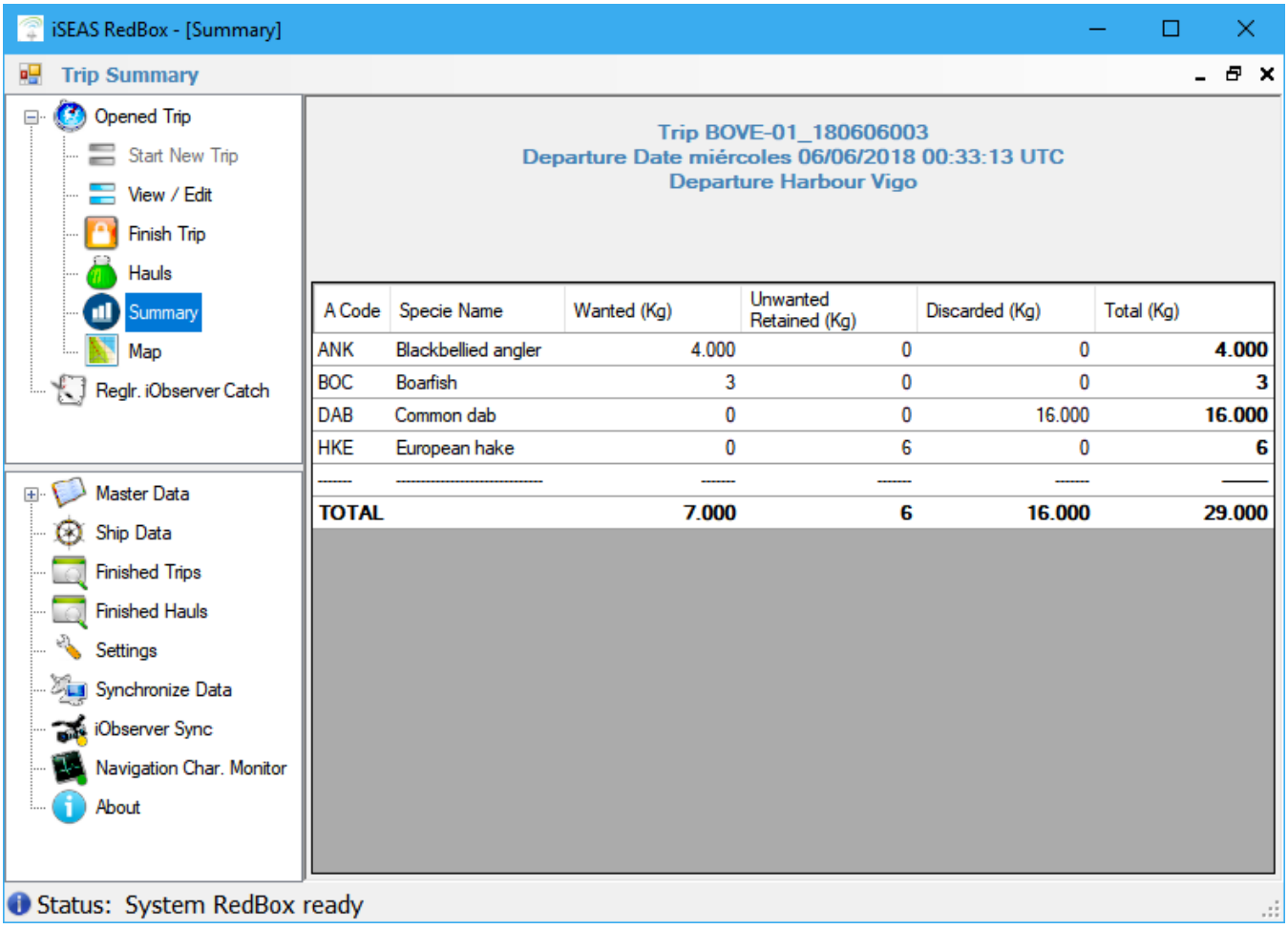
- **Species**: you can select the species from the drop-down menu or open a window to search for it by clicking on the 🔍 button.
- **Average Size**: average size of the lot in cm.
- **Weight Caught**: total weight of the lot in Kg.
- **Unwanted Reason**: if the catch is unwanted, the reason must be indicated by selecting one from the drop-down list or searching for one by means of the 🔍 button. For each catch, only one reason for non-desirability will be indicated. If there are several, the observer will choose the one that is conditioned by regulation restrictions.
- **Discarded**: if the catch is unwanted and is discarded, check this check box.

- **Is Objective**: If the species is one of those selected as target species for the haul, this check box will be automatically checked.
- **Manual**: whether the capture is recorded from the data of the system iObserver or manually edited this box will be shown as marked or not.

When all the required fields have been filled and the user presses "Accept" the catch is saved.

4.4.5. Trip Summary

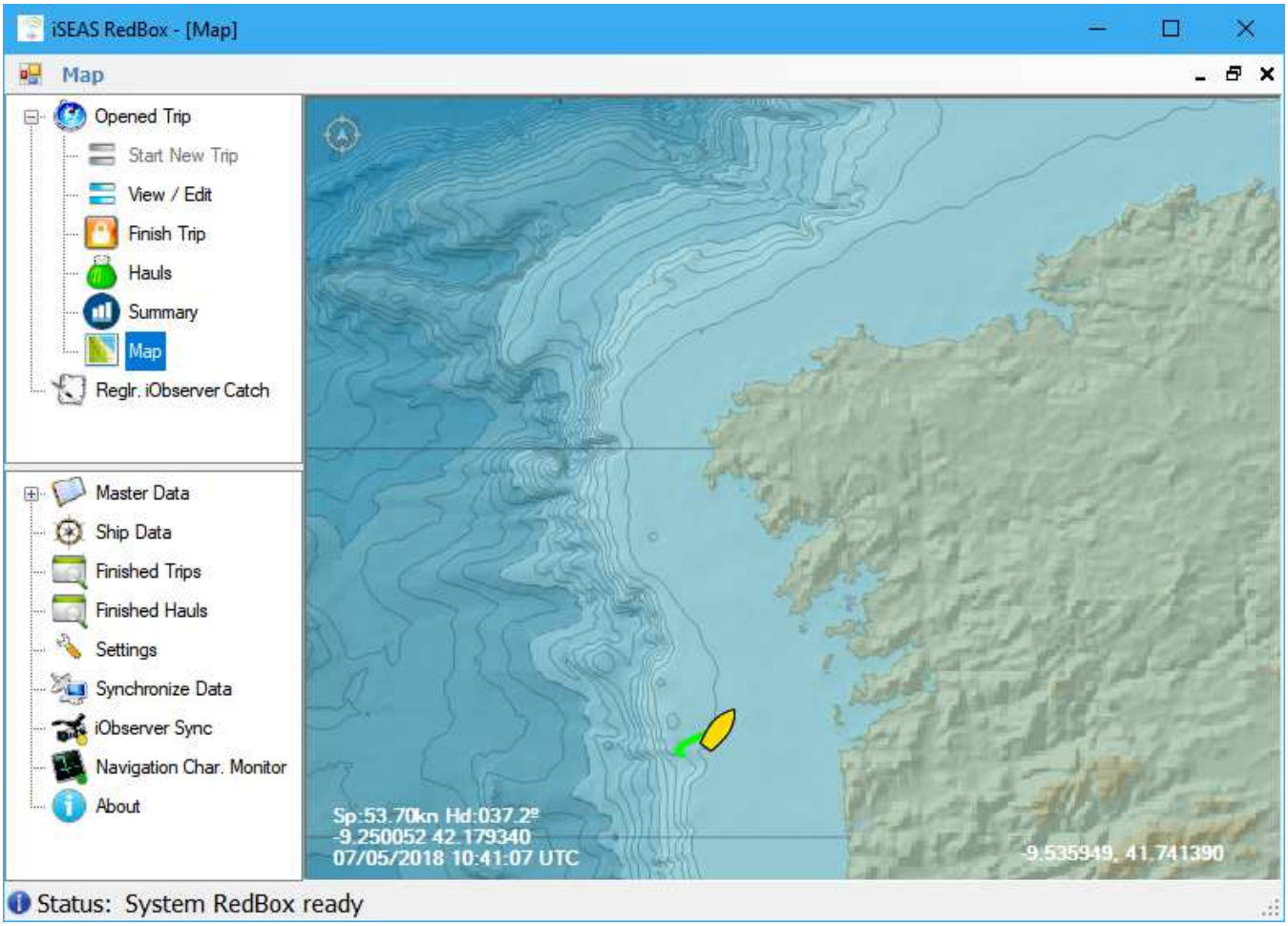
This screen shows a summary of the catches for the open trip grouped by species and totalizing the desired catch weight, retained unwanted catch and discarded unwanted catch.



4.4.6. Trip Map

The map screen shows the position of the ship, the route it takes and the hauls registered so far.

As background, the software uses a shaded map with isobats every 200 meters for the reference fishing areas from the bathymetry "General Bathymetric Chart of the Oceans (GEBCO)", with a resolution of 30 ".



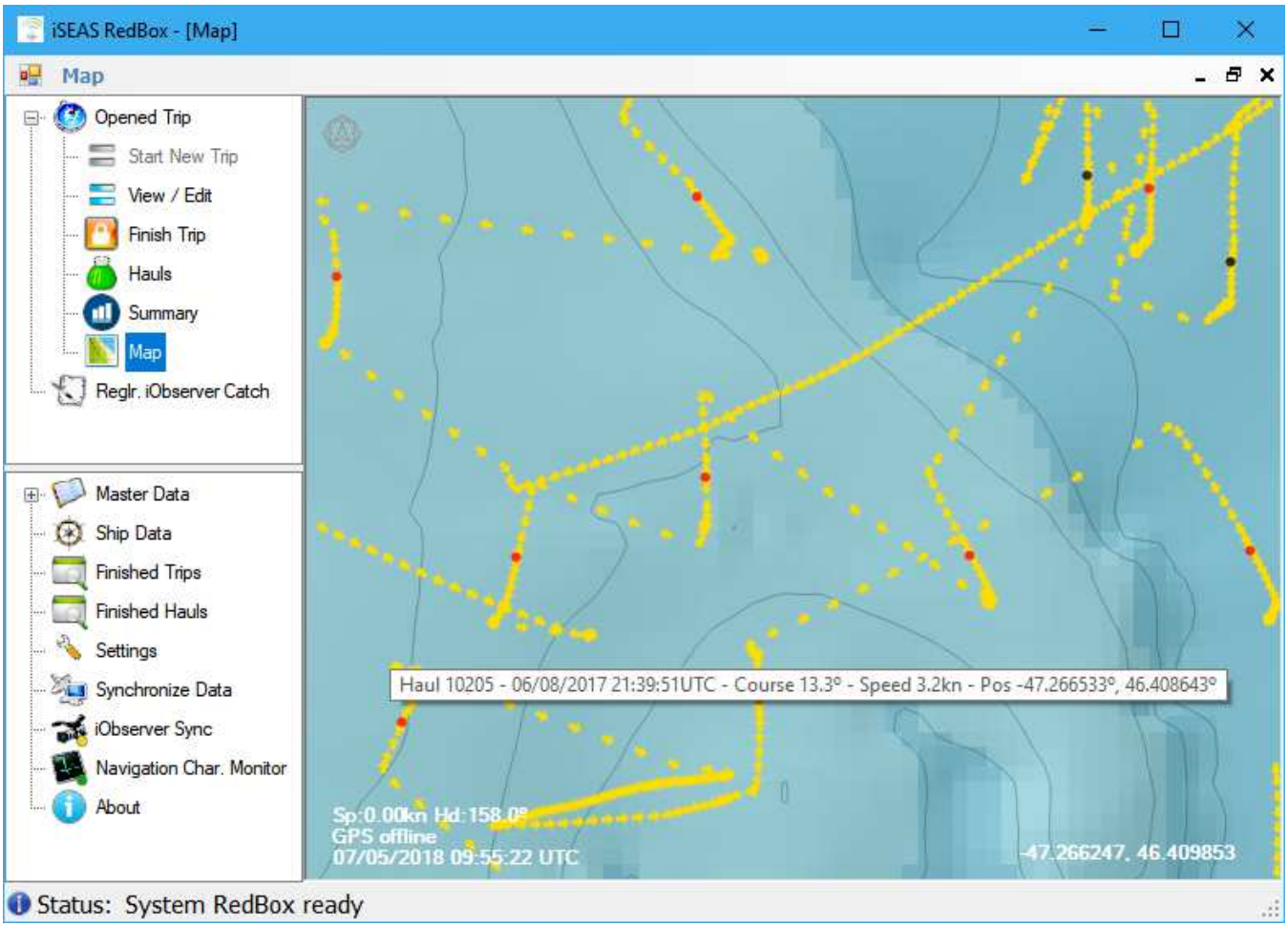
Every five seconds the ship's navigation data is updated on the map. By selecting the option of automatic tracking of the boat with the button, the map will be always centered in the current position of the ship.

The yellow arrows show the position and heading of the ship at periodic intervals, typically between 1 and 5 minutes. This period can be edited in the “Settings” section, see

4.5.5.4 Navigation Characteristics.The red points show the shooting positions of the sampled hauls and the black points show the unsampled hauls.

Hovering the mouse over the navigation or haul points, a popup appears with the information associated with the specific point.

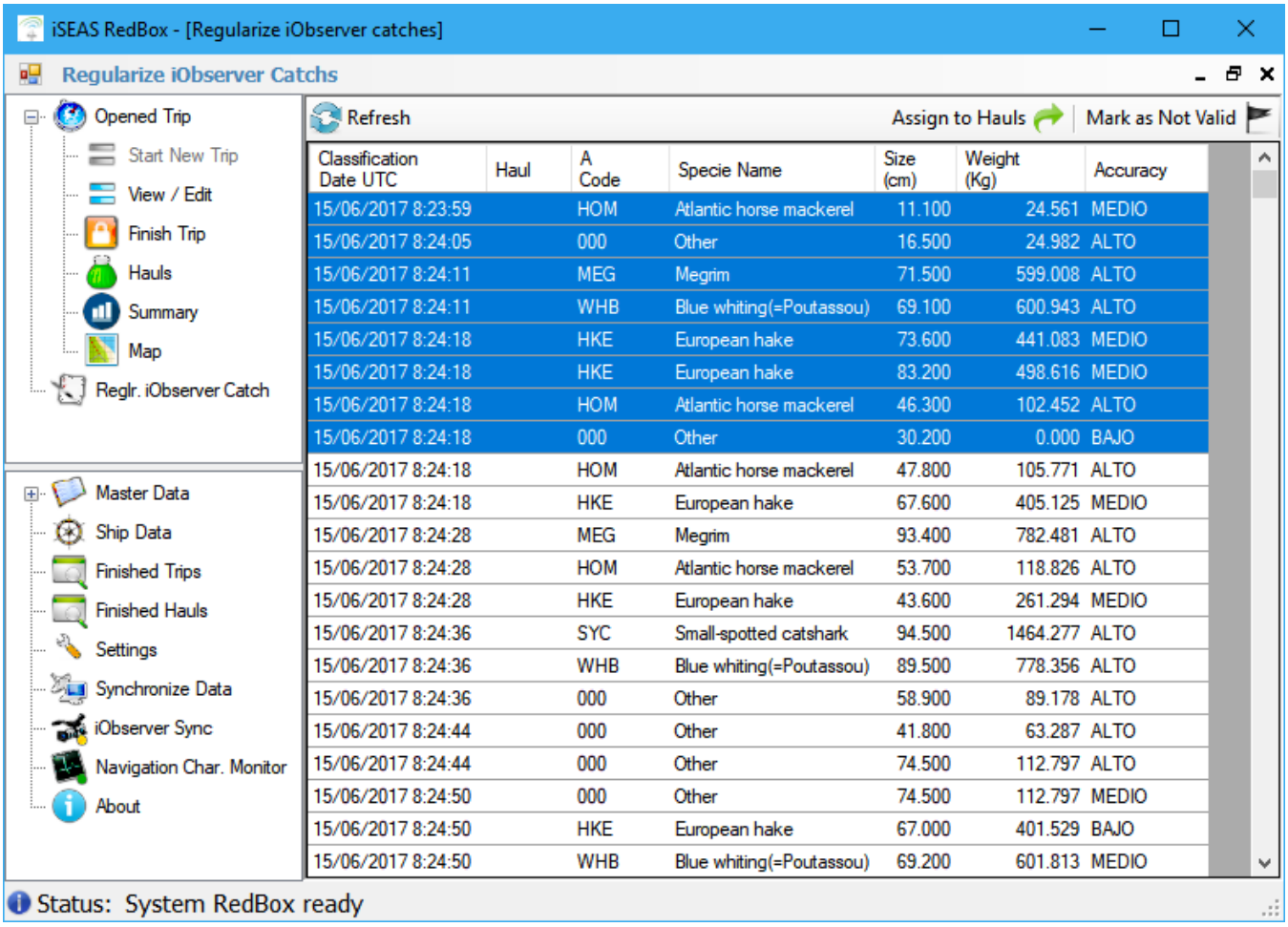
Clicking the right mouse button on a haul opens the corresponding haul edition screen.



4.4.7. Regularize iObserver catches

The RedBox software periodically analyzes and stores in its database the files that arrive from the iObserver system as it processes the fish that passes through the belt. These files are saved by the iObserver system in a shared folder whose location the user must configure in the "Settings" section, see *4.5.5.5 iObserver Integration*.

The "Regularize iObserver Catches" screen displays the catch data that has arrived from this system and that has not yet been assigned to the hauls. Among the information shown is the processing time, the associated haul, identified species, size, weight and a label with the confidence on the identification.

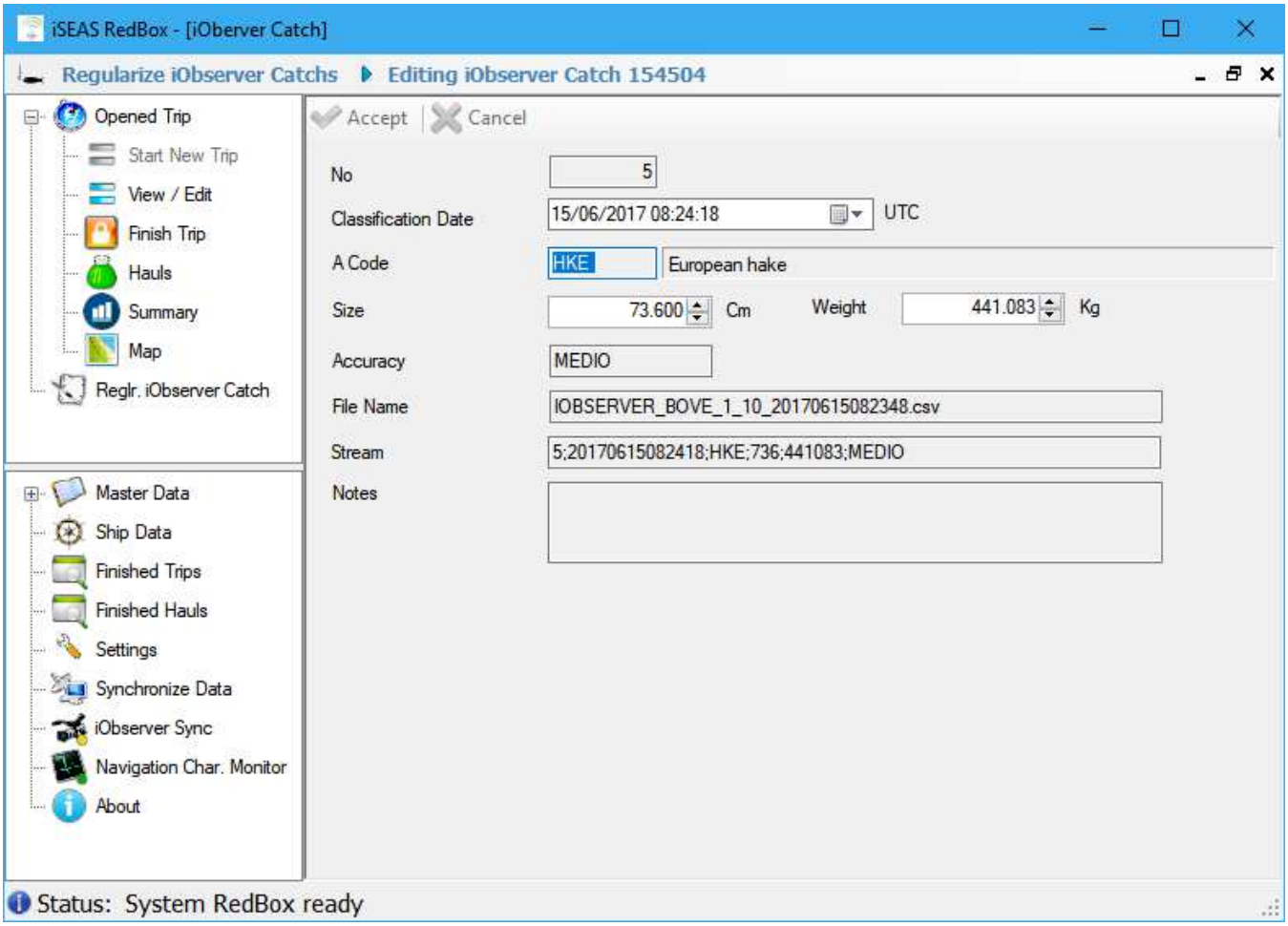


This screen is useful for checking all the catches registered by the iObserver system that do not match any haul or that have invalid data that require user intervention, these are the only two reasons why a catch registered by iObserver should be regularized by the

user manually. To do this, the system will show a detailed list of the pending catches to be regularized.

4.4.7.1. Edit iObserver Catch

By clicking on one of the catch lines of iObserver you can review and modify in more detail the associated data:



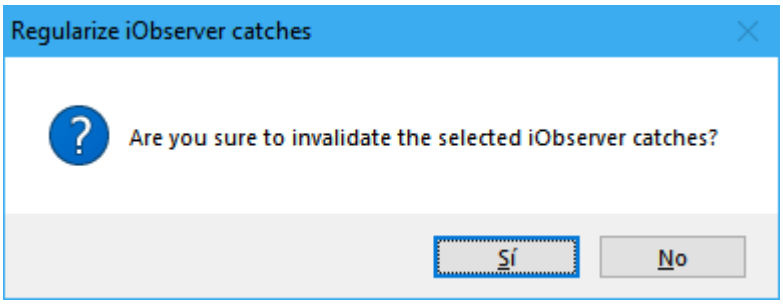
- **No.**: sequential number of catch within the haul.
- **Classification Date**: time at which the photo used for the identification of the captured specimen was taken.
- **A Code**: code and name of the identified species. If the species is not included in the list of species contemplated by RedBox, see *4.5.1.4 Species*, it is labeled 000 "Other".
- **Size**: estimated size in cm. of the specimen.

- **Weight**: estimated weight in Kg of the sample (calculated from the size).
- **Accuracy:** estimation of the reliability of the identification.
- **File**: name of the iObserver file from which the data was captured.
- **Input string**: line inside the iObserver file corresponding to the displayed specimen.
- **Notes**: the software uses this field to report possible errors in the processing of the input string.

The user can modify the date of classification, species, size and weight if he considers it appropriate. In case you modify any of these data, the capture will be counted as manual.

4.4.7.2. Invalidate iObserver Catch

The catch data from the iObserver can be eliminated at the user's discretion. To do this, you have to select the catch lines that you want to delete and press the Anular button and confirm the invalidation:



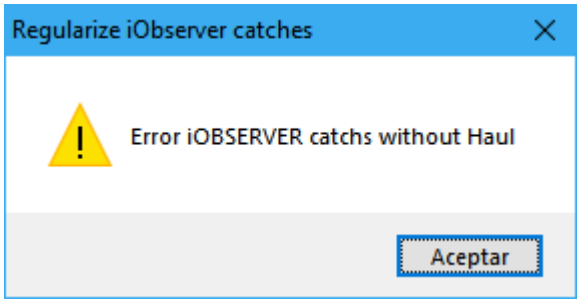
Invalidated catches will disappear from the list.

4.4.7.3. Manual assignment to Hauls

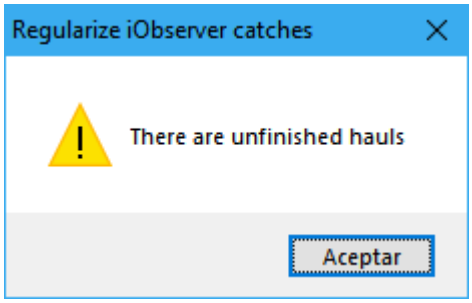
Once the user has reviewed the data, selected the desired iObserver catches and pressed the Asignar a Lances button, the system assigns the catches to the hauls calculated from the time stamp of the camera and the periods defined by the shooting and hauling times of the hauls registered in RedBox.

Note: The key combination <CTRL> + <A> selects all lines.

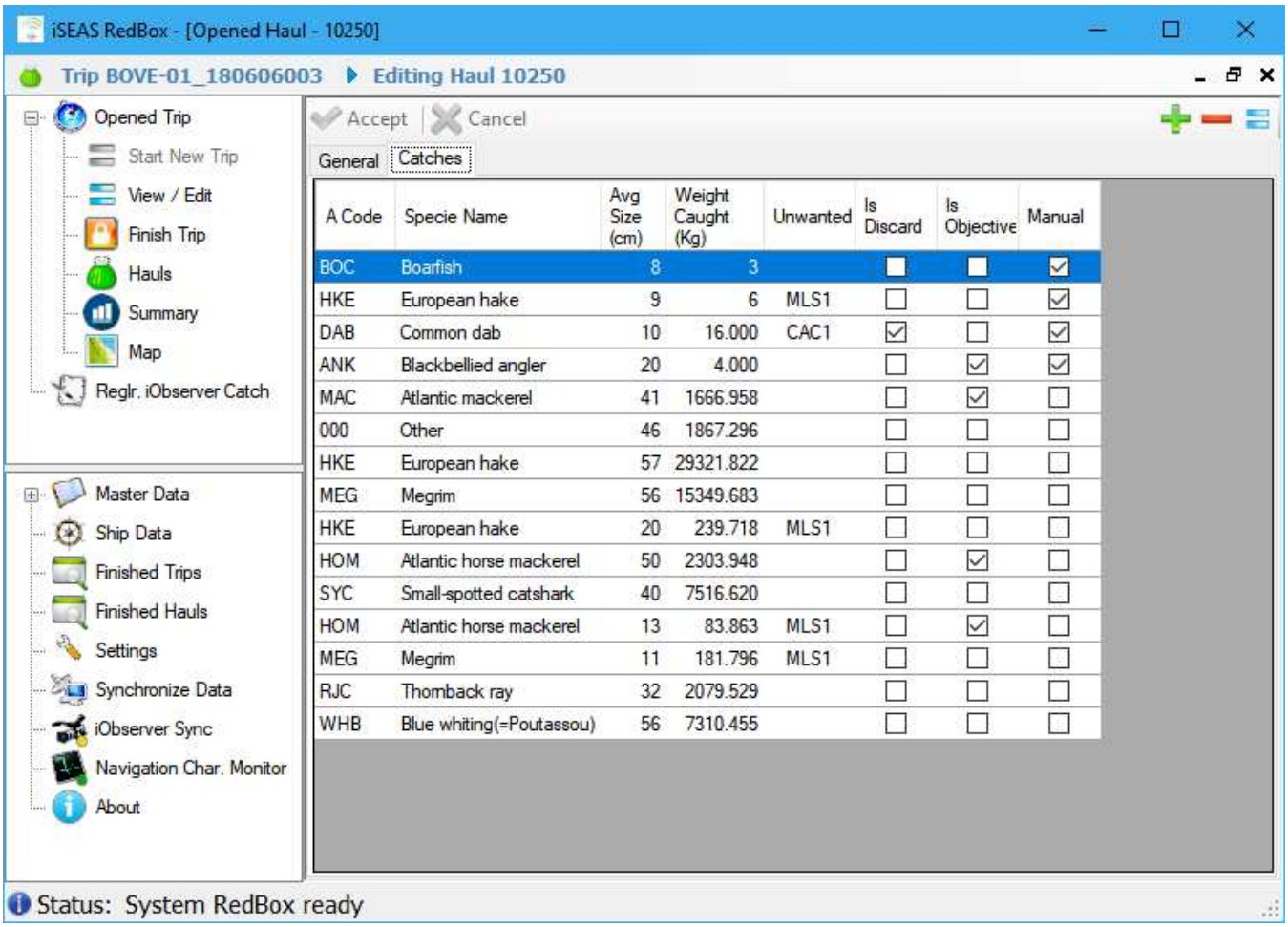
Only the catches that have an associated haul can be assigned, if any catch of the selected ones does not have an assigned haul, an error message will be displayed.



All the hauls must be saved as finished, otherwise the software will show an error message and the iObserver captures can not be regularized.



Once the regularization process has been completed, the catch data from the iObserver system disappears from this screen and is assigned to the corresponding hauls. The catch data will be grouped in batches according to the species, on the one hand the desired catches and on the other the unwanted catches and according to the reason of non-desirability. An example of how a haul is left after regularizing the catches is shown:



The system has grouped the catches by species and has separated them by size according to the minimum size.

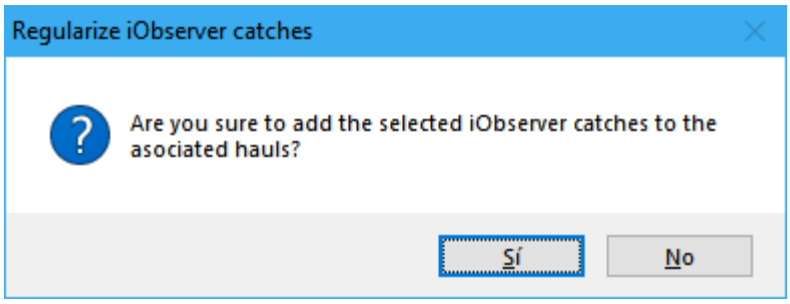
The target species will be marked as such and the "Manual" box will appear unchecked because they are automatically processed catches from the iObserver data.

4.4.7.4. Automatic assignment to catches

The RedBox system can be configured so that the assignment of the iObserver catches to the hauls is made automatically, avoiding the process of reviewing the data received from the iObserver.

For this, the option "Process iObserver Data Auto" must be activated in the Settings section, see *4.5.5.5 iObserver Integration*.

If this option is activated, when the user presses the menu entry "Reglr. IObserver Catch ", the system will assign the iObserer catches to the hauls automatically. A confirmation window will be shown to confirm the action:



4.5. Configuration Menu

This section will focus on the configuration menu, where the user can edit the RedBox configuration, search historical data, navigate through master data, control the data exchanged with the central system and see the status of the services that are executed in background.

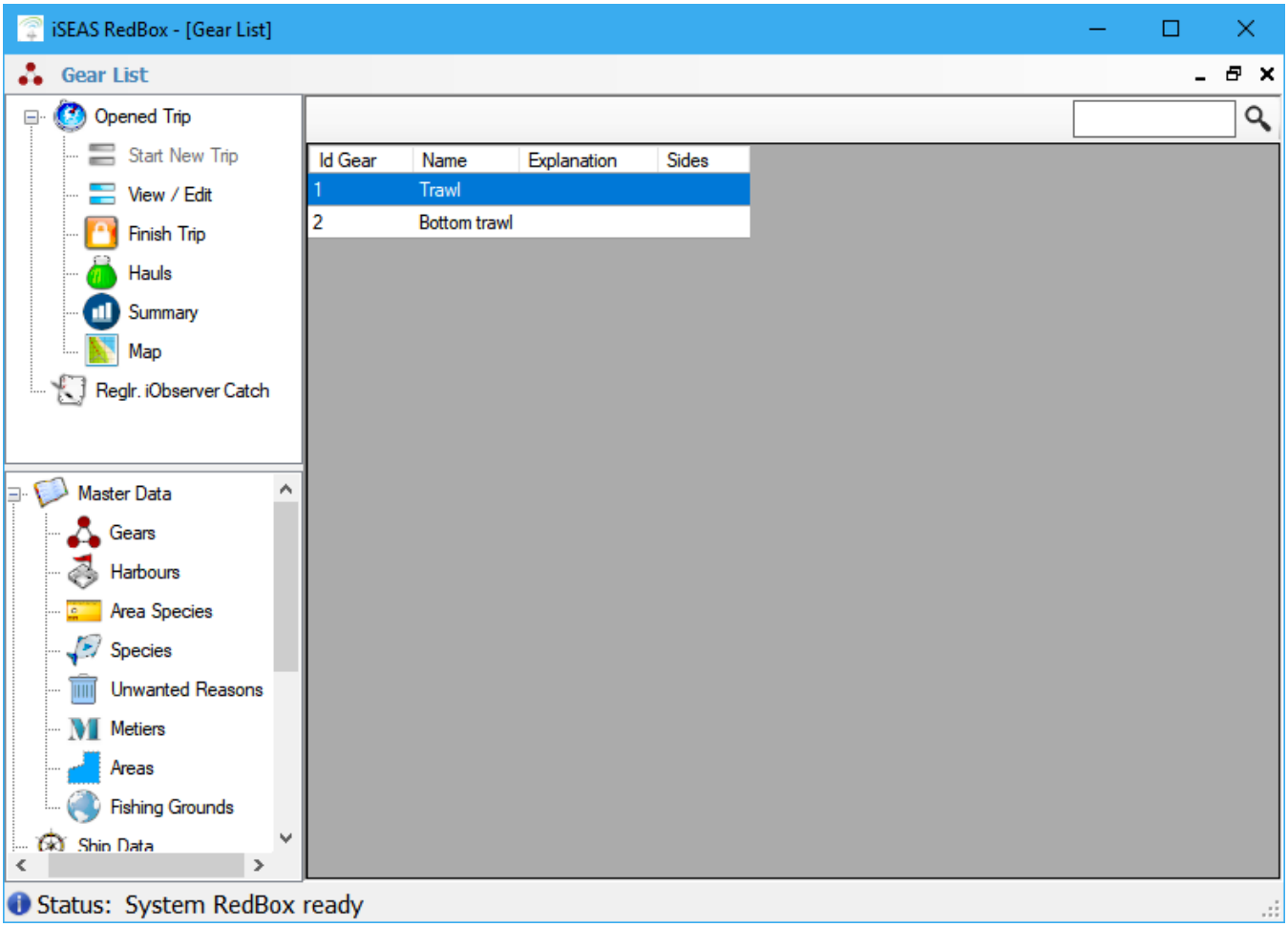
4.5.1. Master Data

The master data comprises all the information that is downloaded from the central system and stored in the database of the application. They are data that RedBox uses to simplify the usability of the system and help the user in entering data. There are eight categories of master data:

For each master data entry, the user will find a detailed list of all the elements with a search text box.

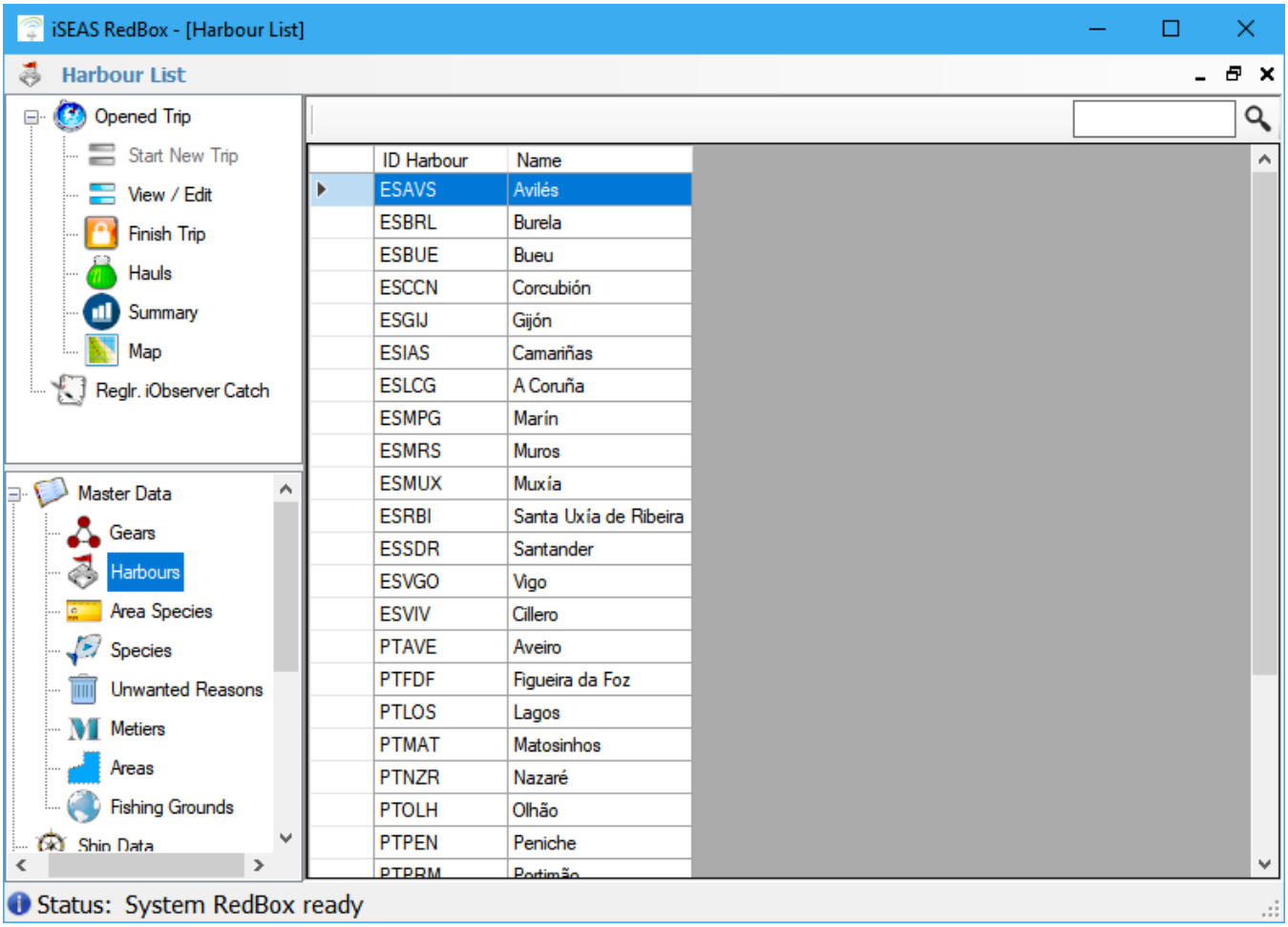
4.5.1.1. Gears

A list of all fishing gears downloaded from the central system.



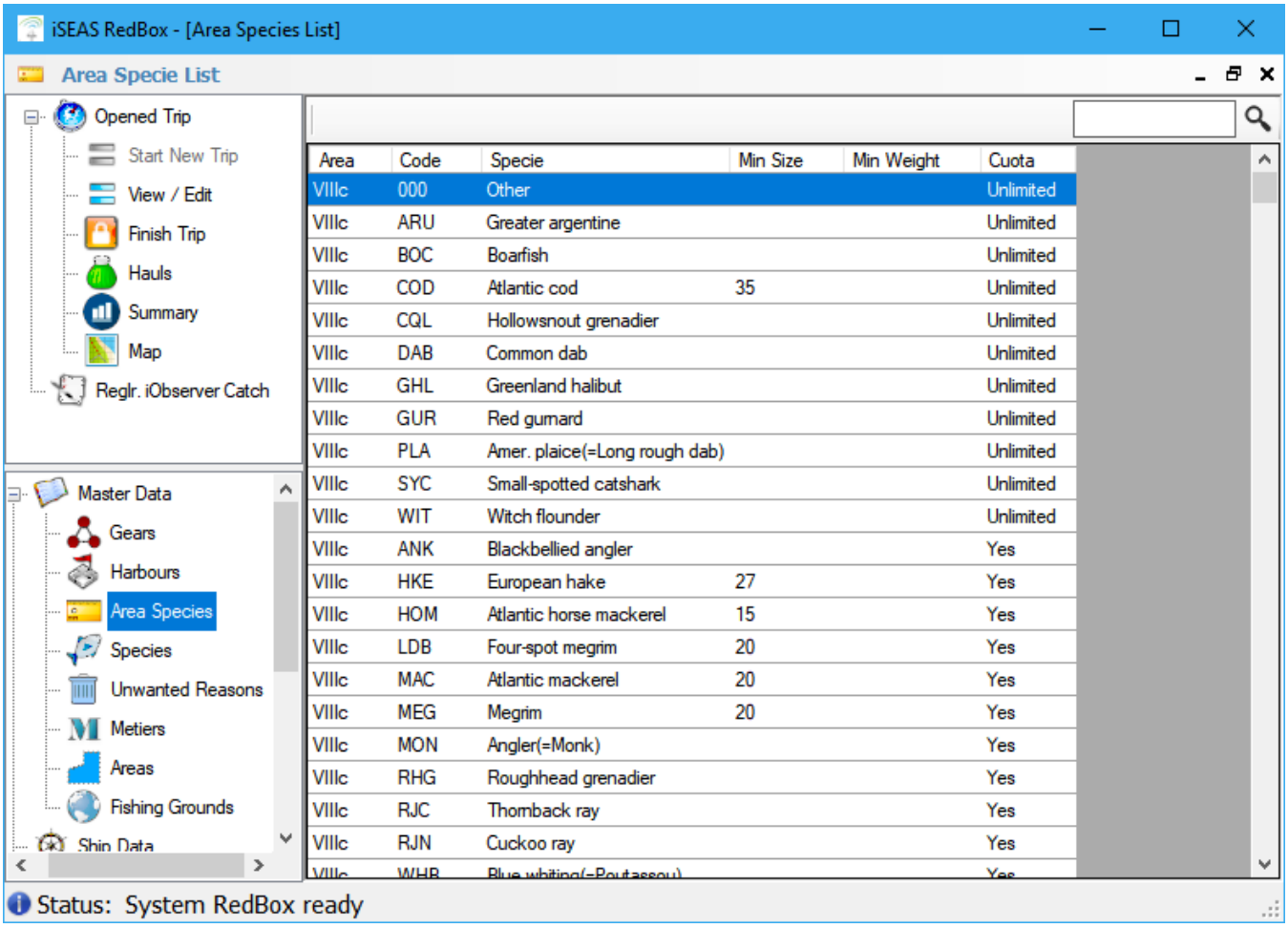
4.5.1.2. Harbours

List of all harbours (base, sales or download harbours) registered in the central system.



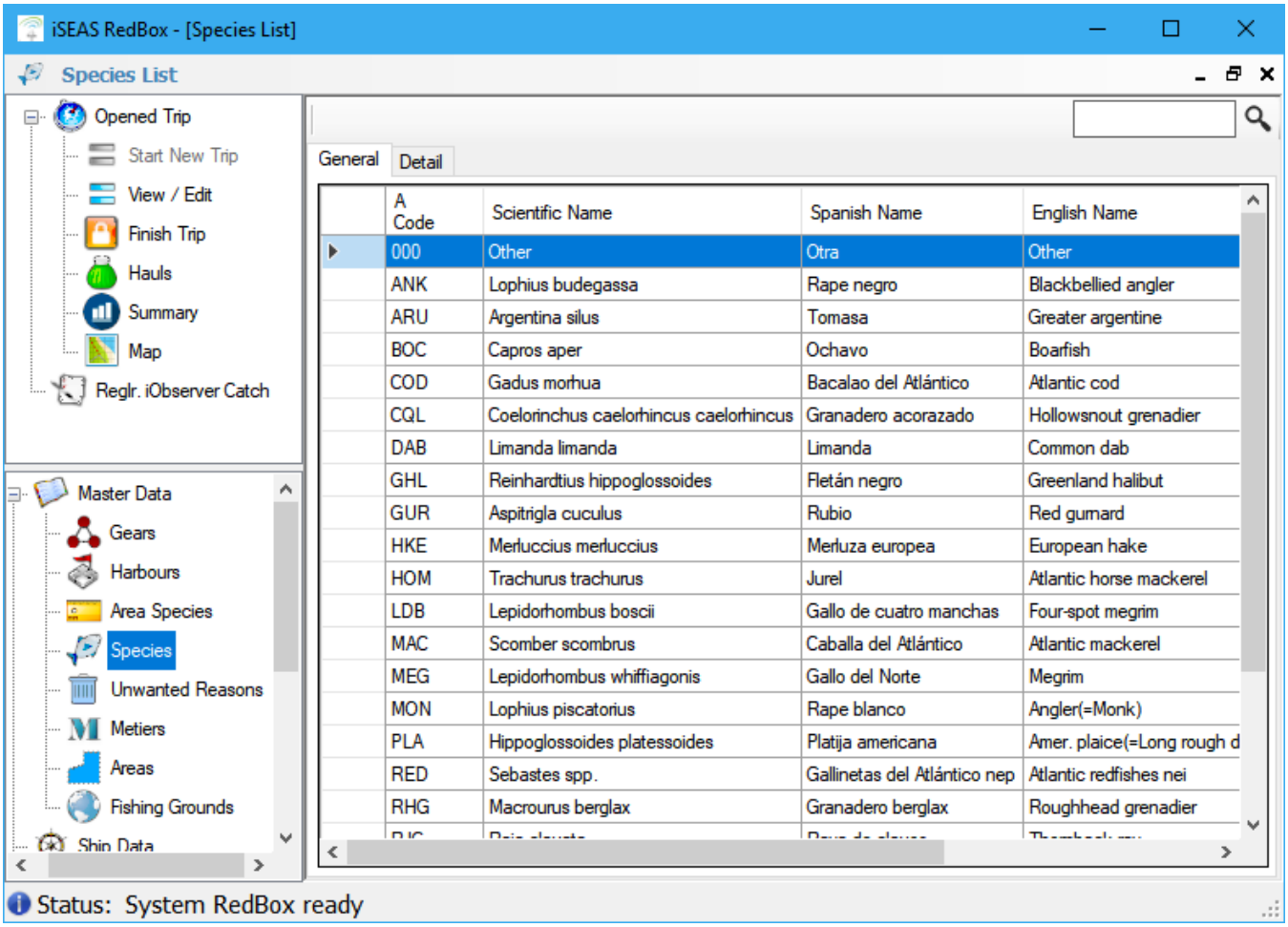
4.5.1.3. Areas Species

List of species by fishing reference area with the minimum sizes and indicating the existence of quota. The software uses this table as a reference to regularize the catches received from the iObserver system and determine if they are allowed and meet the minimum size.

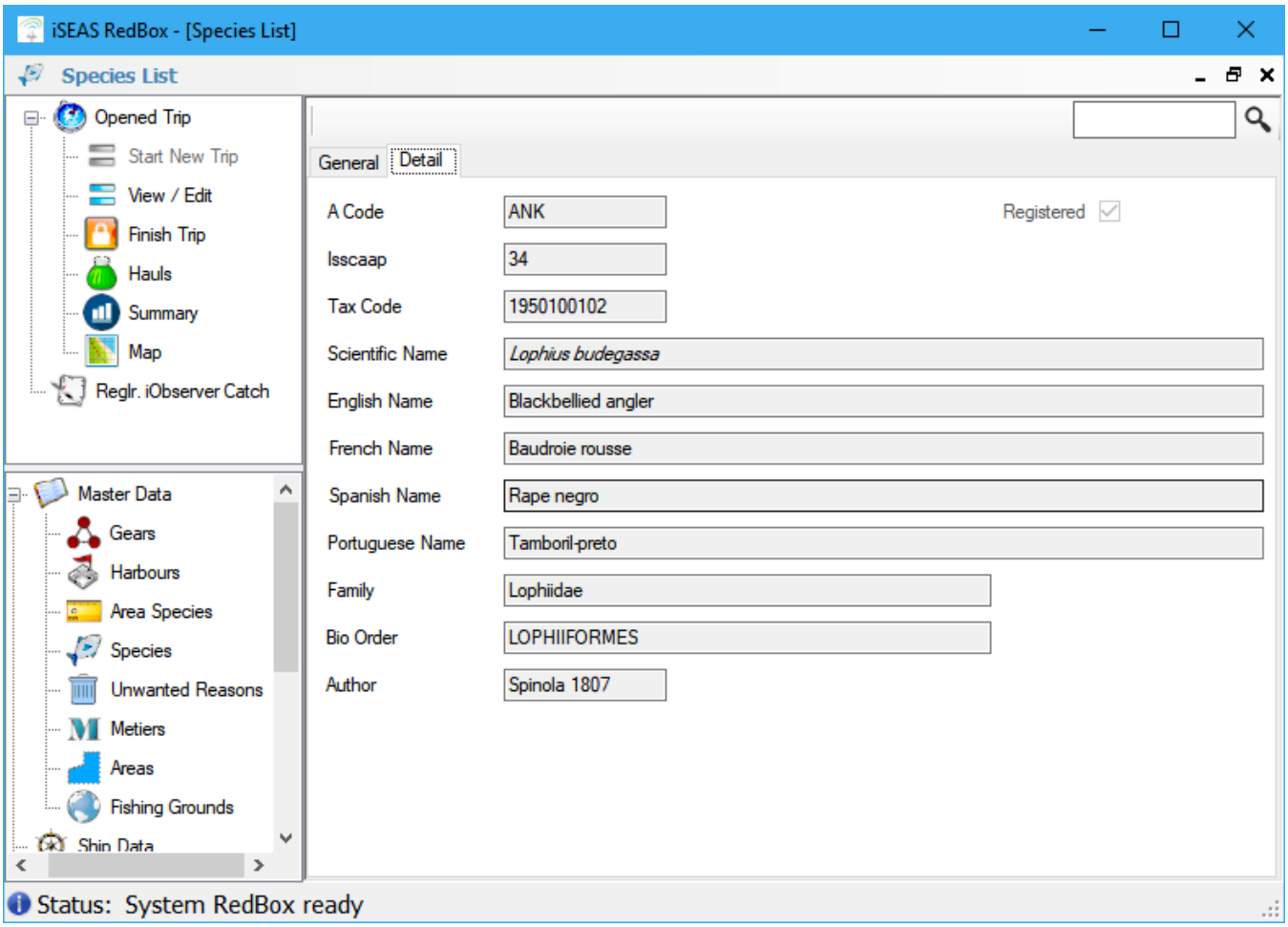


4.5.1.4. Species

List of species recognized by the software.

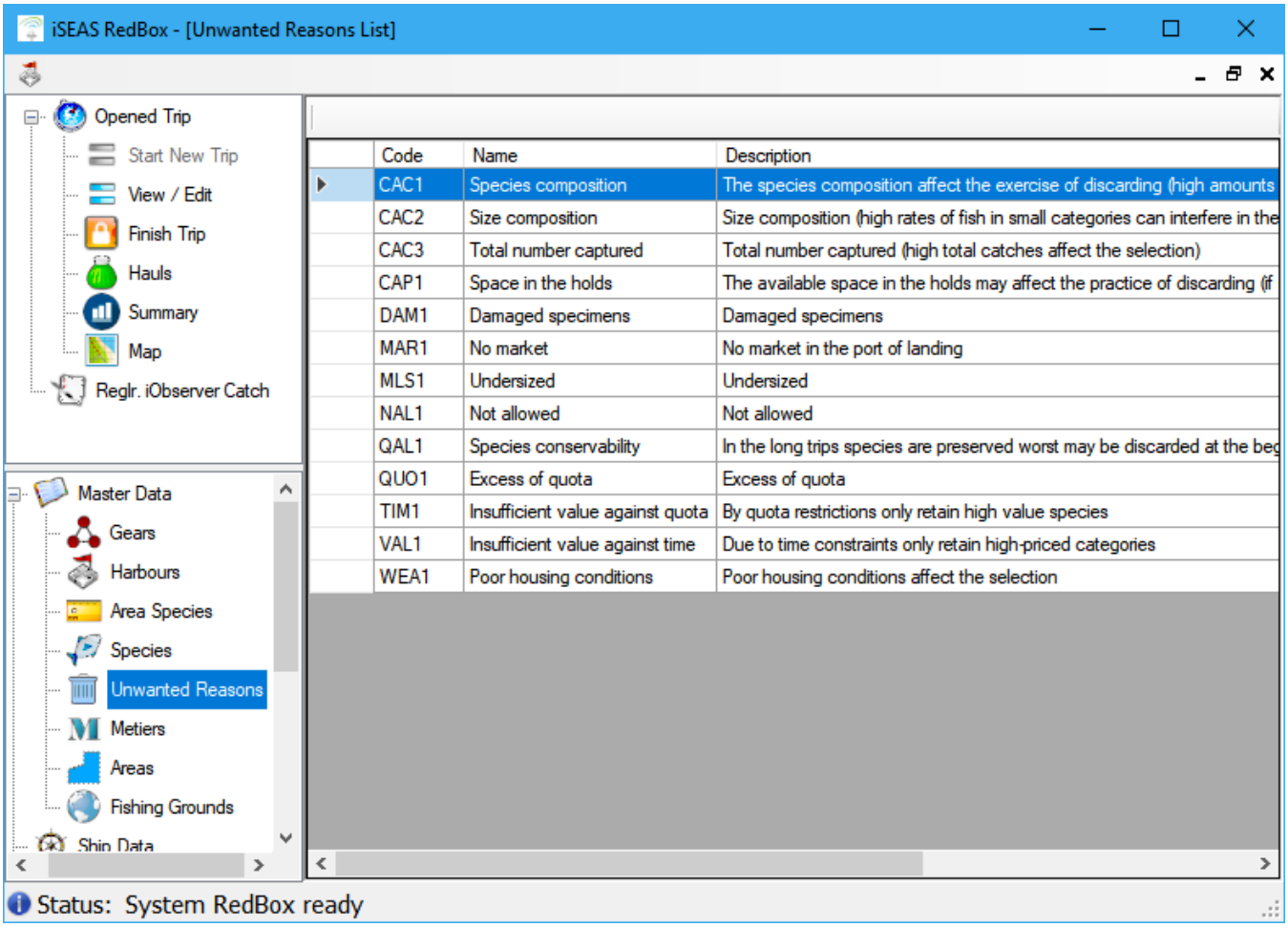


Clicking on the "Details" tab shows more detailed information:


iSEAS RedBox - [Species List]
Species List
Opened Trip
Start New Trip
View / Edit
Finish Trip
Hauls
Summary
Map
Reglr. iObserver Catch
Master Data
Gears
Harbours
Area Species
Species
Unwanted Reasons
Metiers
Areas
Fishing Grounds
Ship Data
General
Detail
A Code
ANK
Registered
Isscaap
34
Tax Code
1950100102
Scientific Name
Lophius budegassa
English Name
Blackbellied angler
French Name
Baudroie rousse
Spanish Name
Rape negro
Portuguese Name
Tamboril-preto
Family
Lophiidae
Bio Order
LOPHIIFORMES
Author
Spinola 1807
Status: System RedBox ready

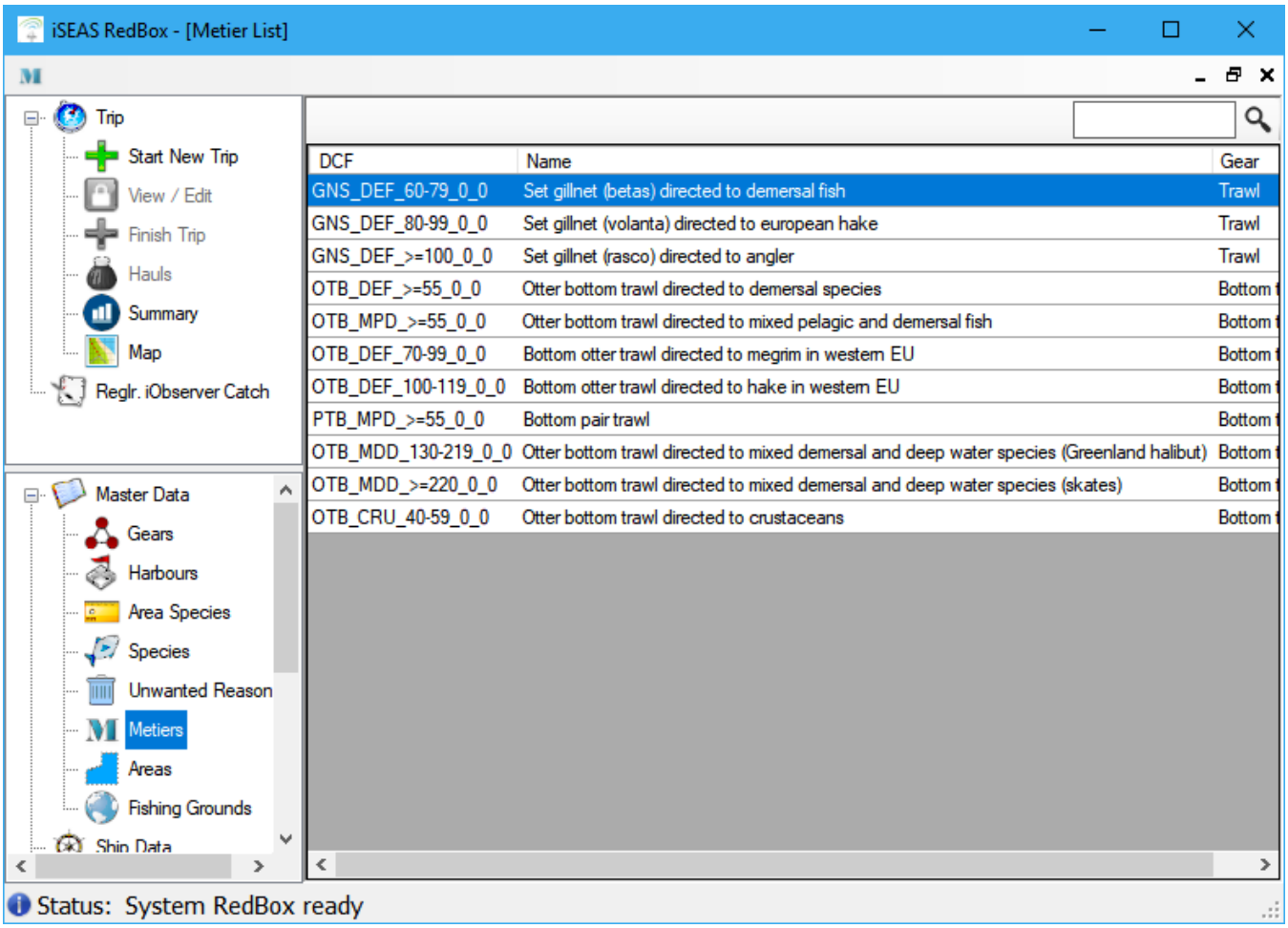
4.5.1.5. Unwanted Reasons

List of reasons for non-desirability.



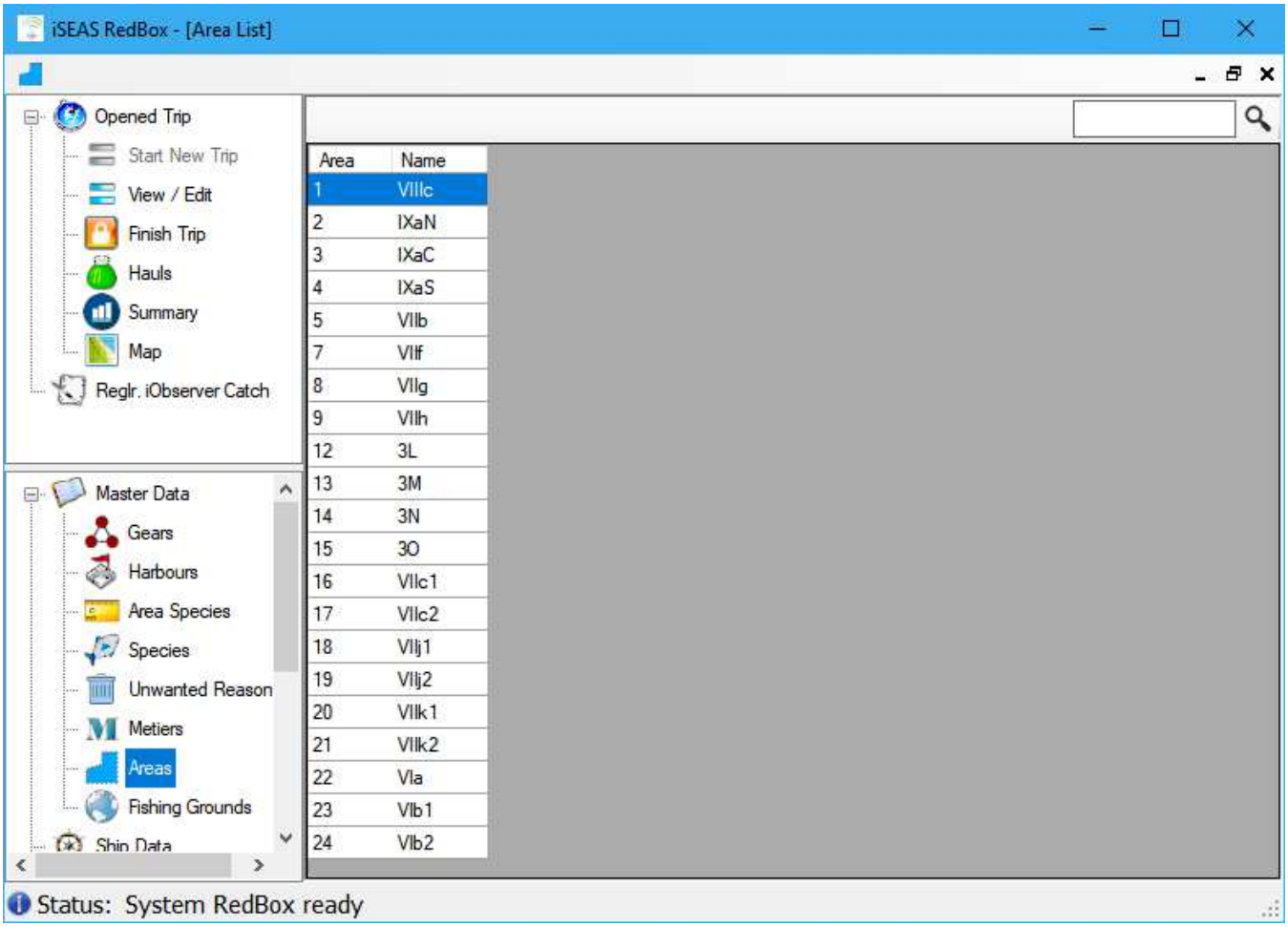
4.5.1.6. Metiers

List of metiers. The metier is used for the study and characterization of fishing data. From the metier and the geographical position of the haul, the target species, fishing area, fishing grounds and gear used in one haul are determined.



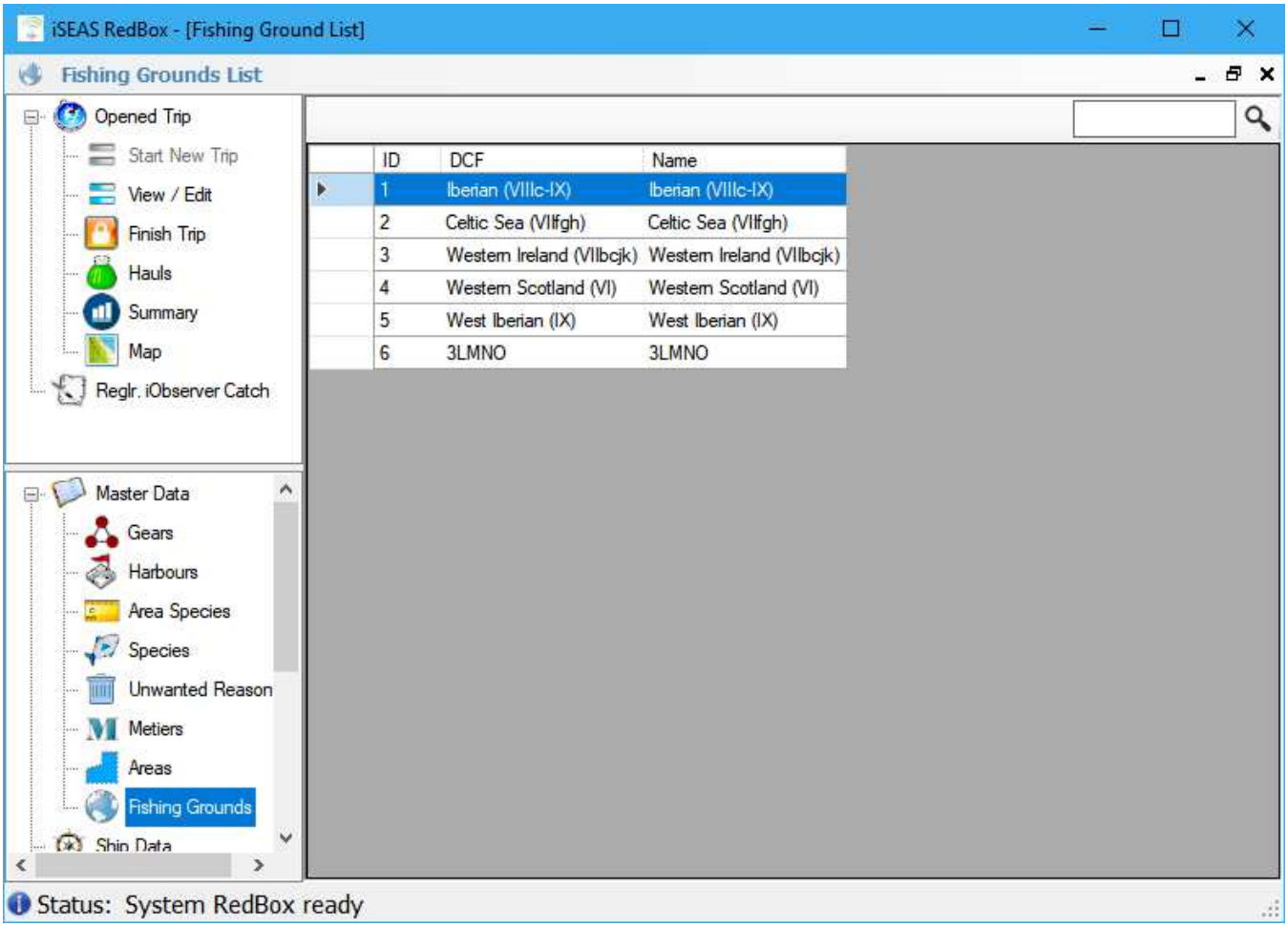
4.5.1.7. Areas

Reference fishing areas.



4.5.1.8. Fishing Grounds

A list of the different fishing zones registered in the central system.

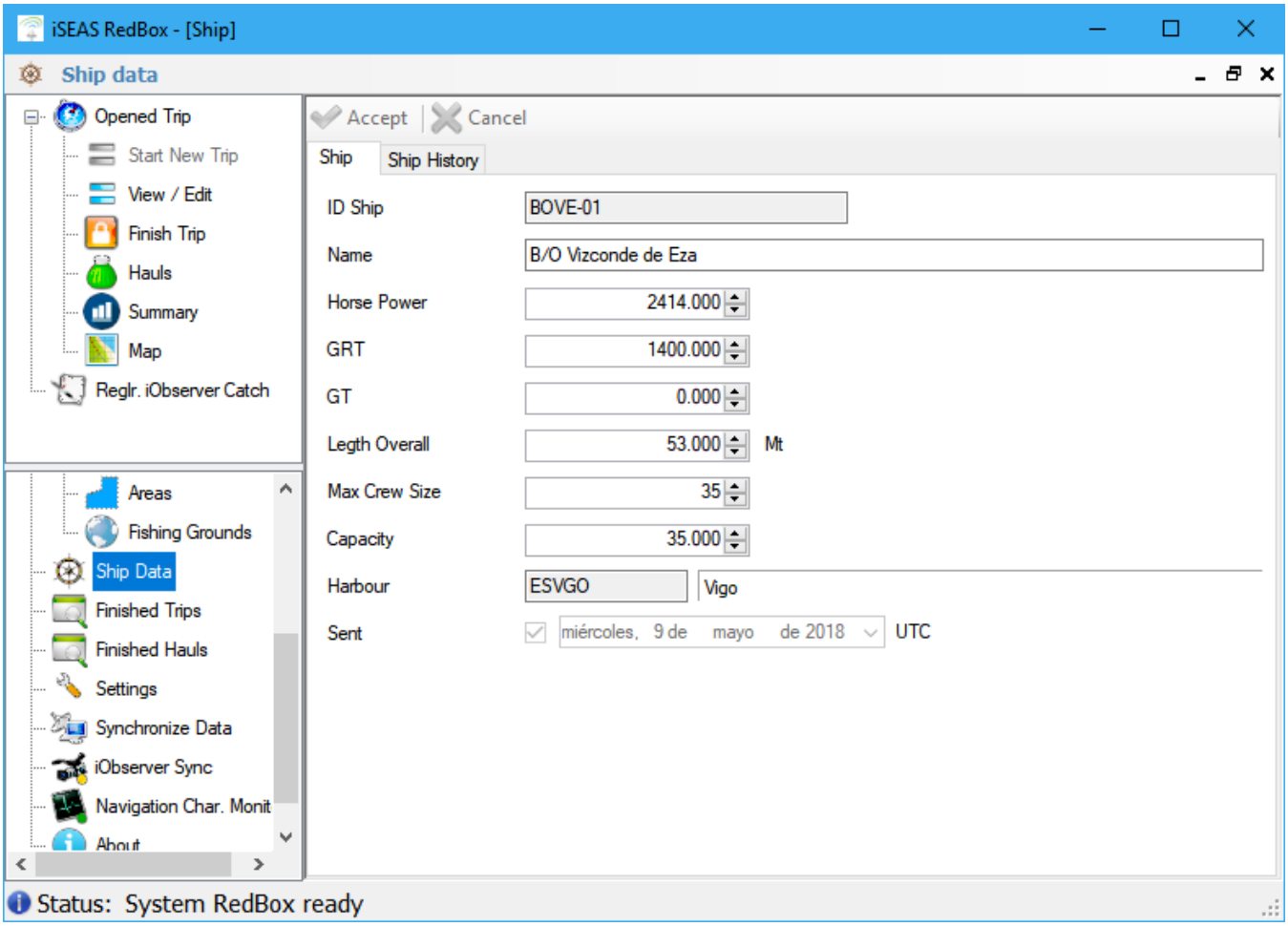


4.5.2. Ship Data

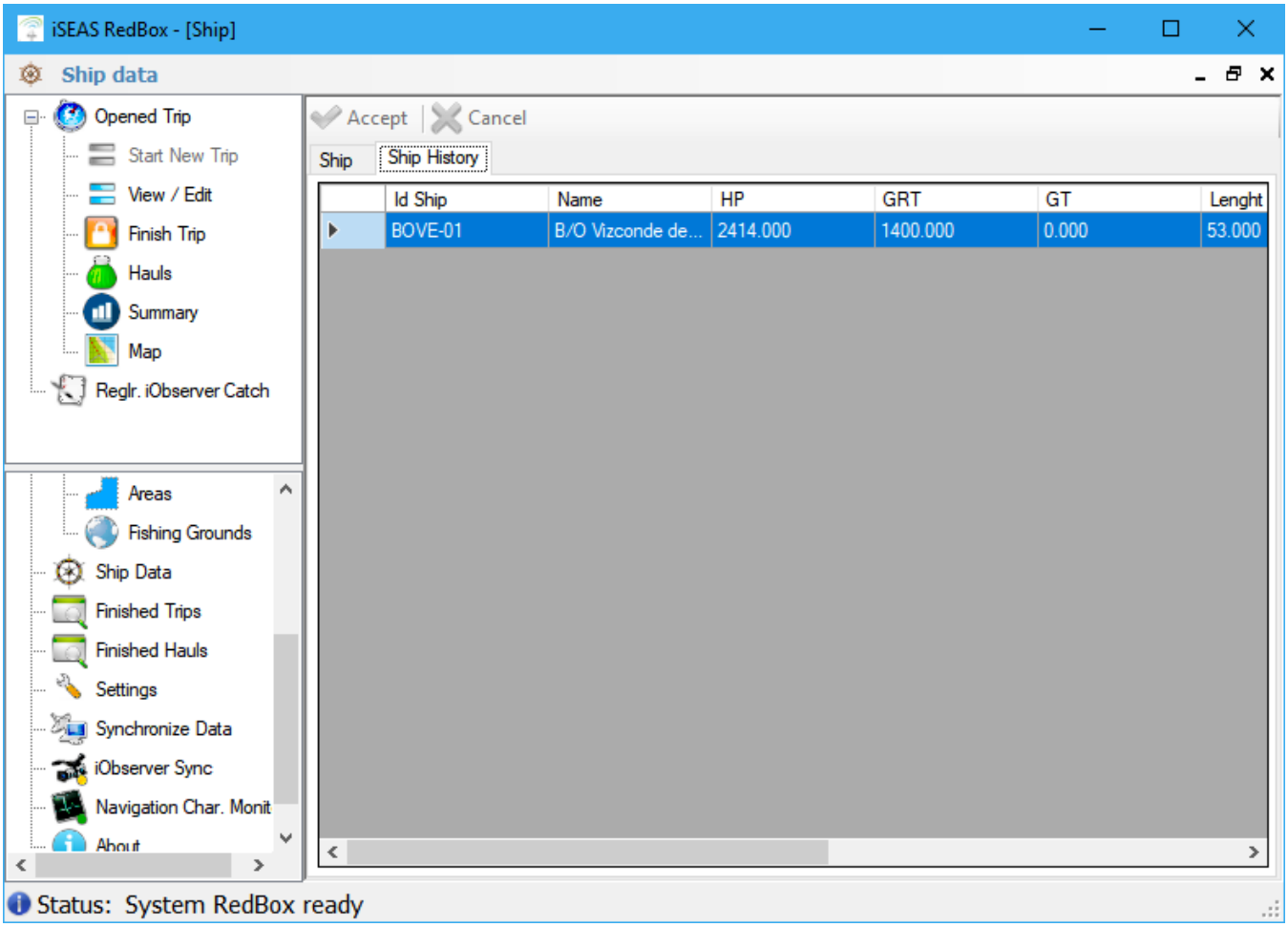
On this screen you can set the name of the boat and its main characteristics:

- **Name**
- **Horse Power**
- **Gross register tonnage**
- **Gross tonnage**
- **Lenght Overall**
- **Max Crew Size**
- **Capacity**
- **Base Harbour**

The date of the last modification of the data is also shown.

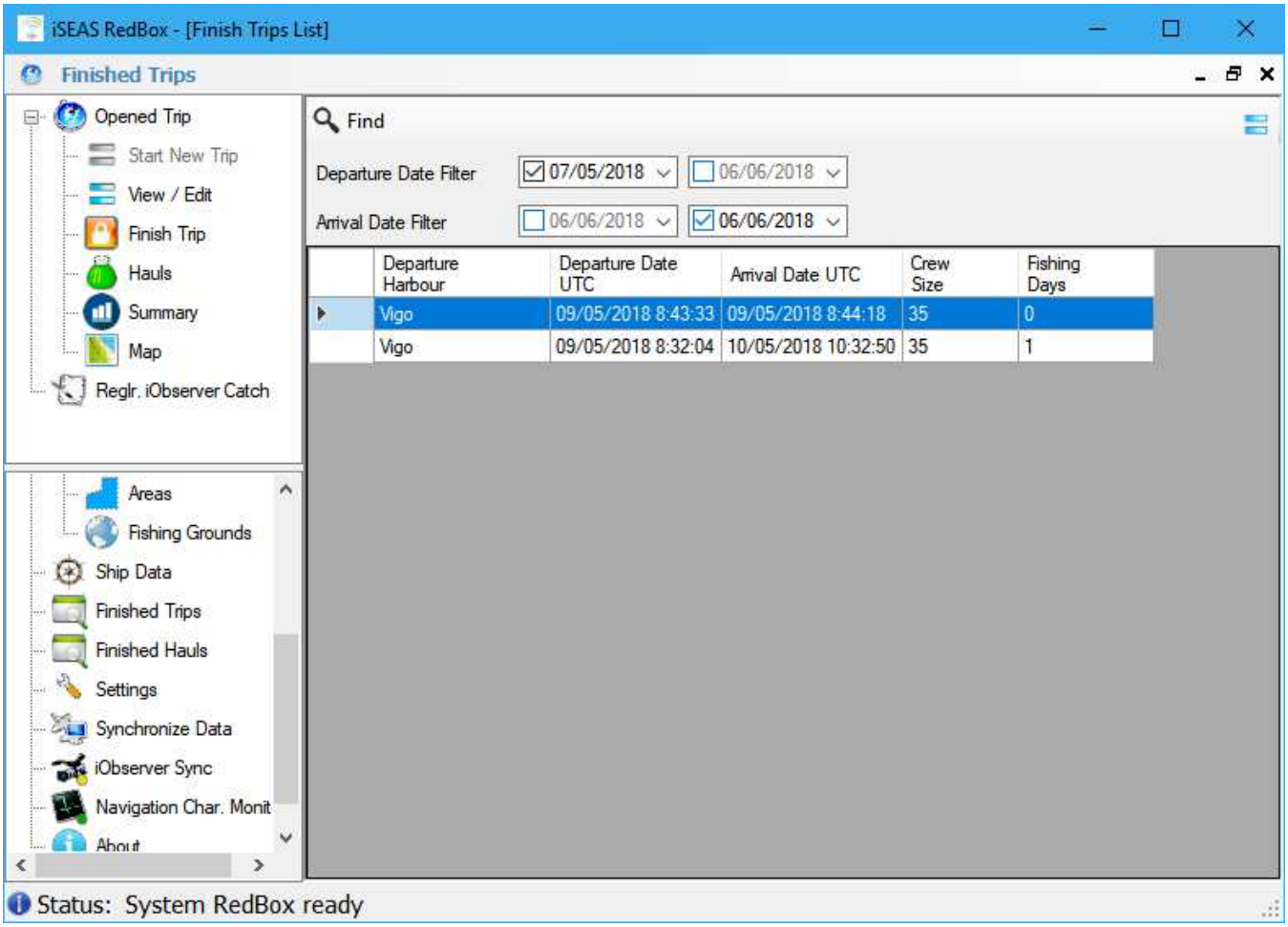


A history of changes that can be reviewed by clicking on the "History" tab where a screen showing a list of these changes is displayed:



4.5.3. Finished Trips

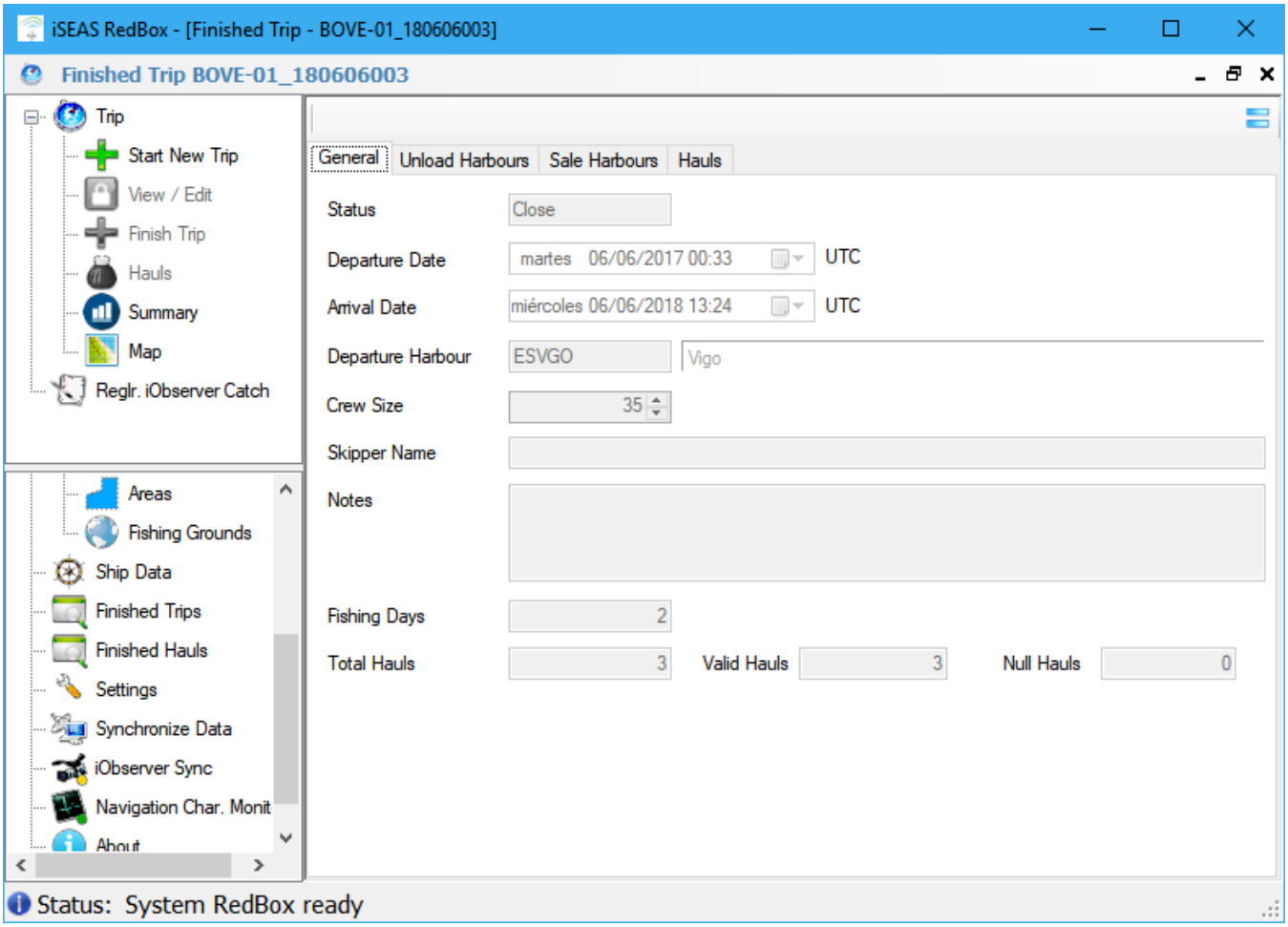
On this screen, the user can search for the finished trips stored in the local database, this action does not access the central system, it applies only to the local database.



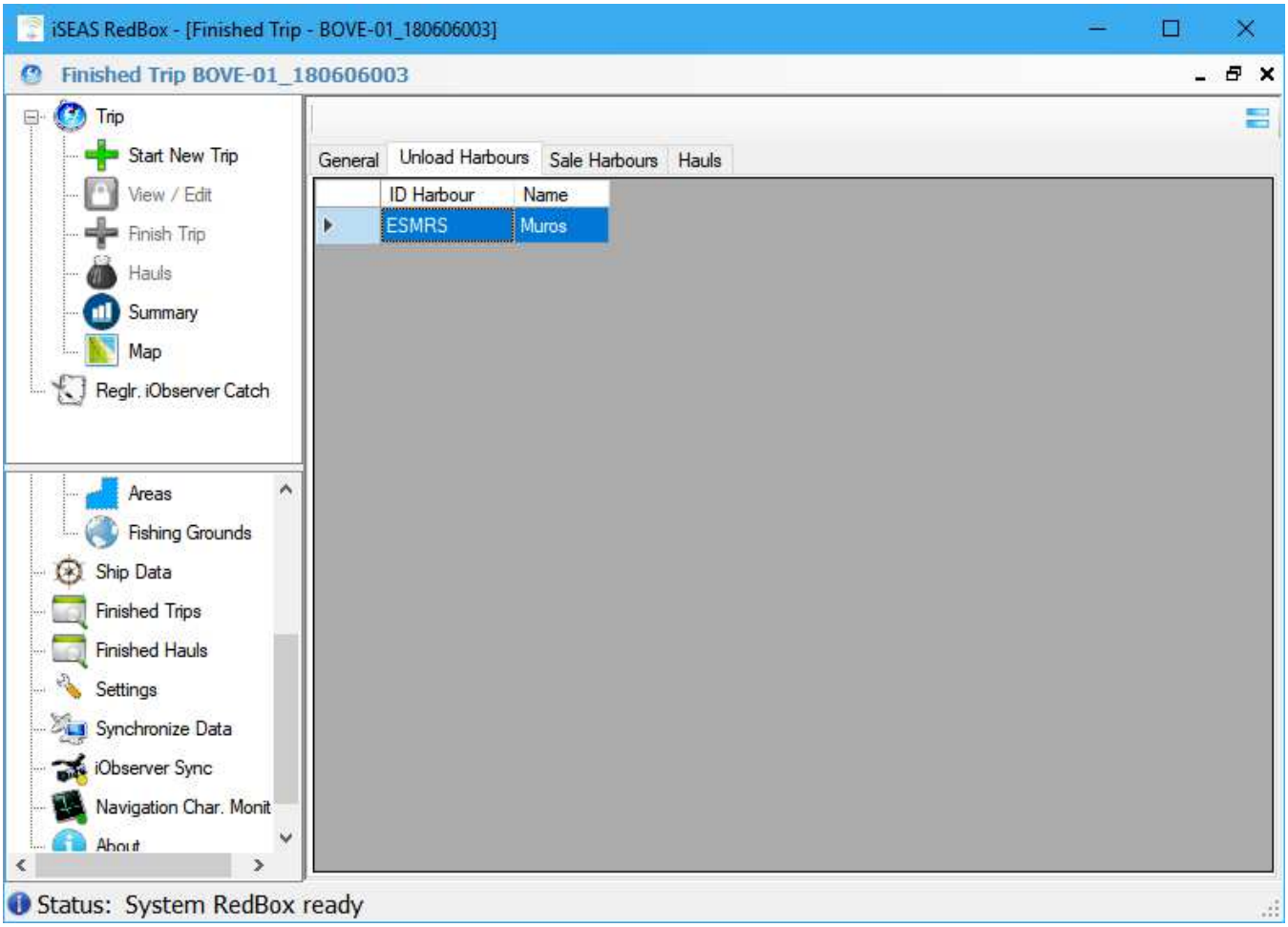
The user can filter by temporary periods for the date of departure and arrival; when clicking on , the results are displayed in a list. When using the button a new screen shows the details of the trip, including general data, ports of sale and download, hauls and catches; all this data in read-only mode.

4.5.3.1. Finished Trips General Data

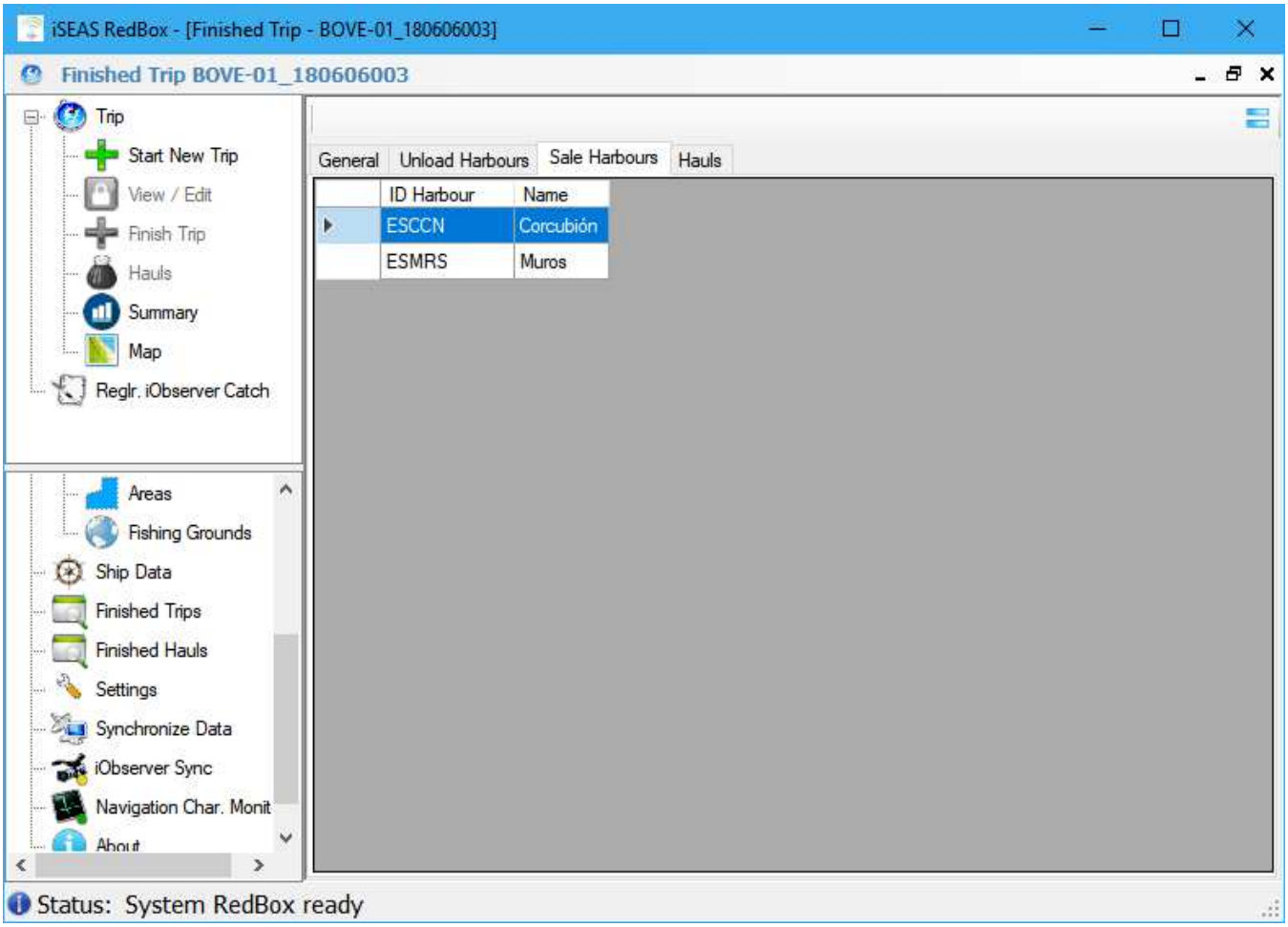
It shows the general data of the trip. It also shows a summary of fishing days, valid and null sets. Clicking on the upper tabs you can access the harbours and hauls data.



4.5.3.2. Finished Trip Unload Harbours

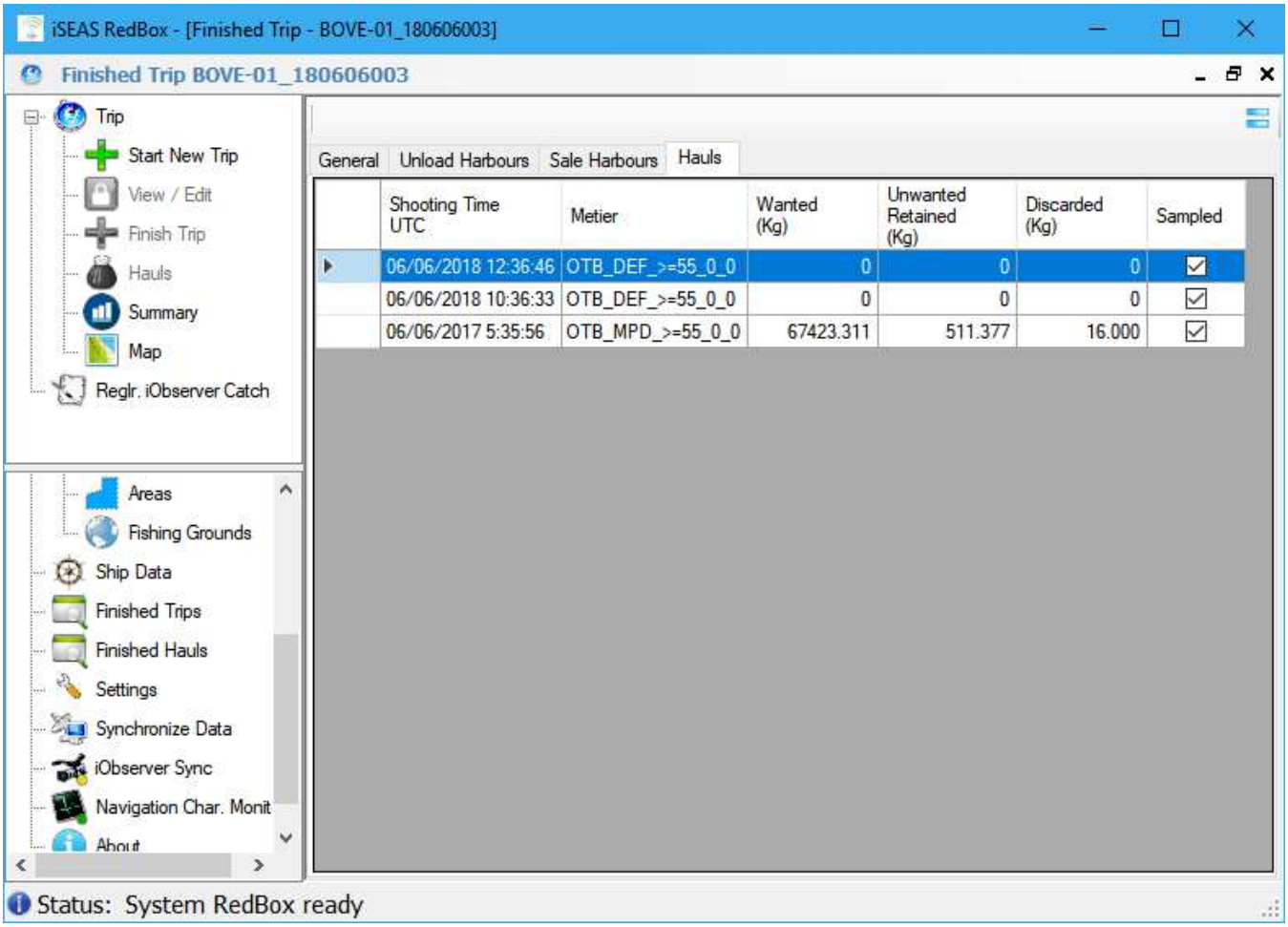


4.5.3.3. Finished Trip Sale Harbours



4.5.3.4. Finished Trip Hauls

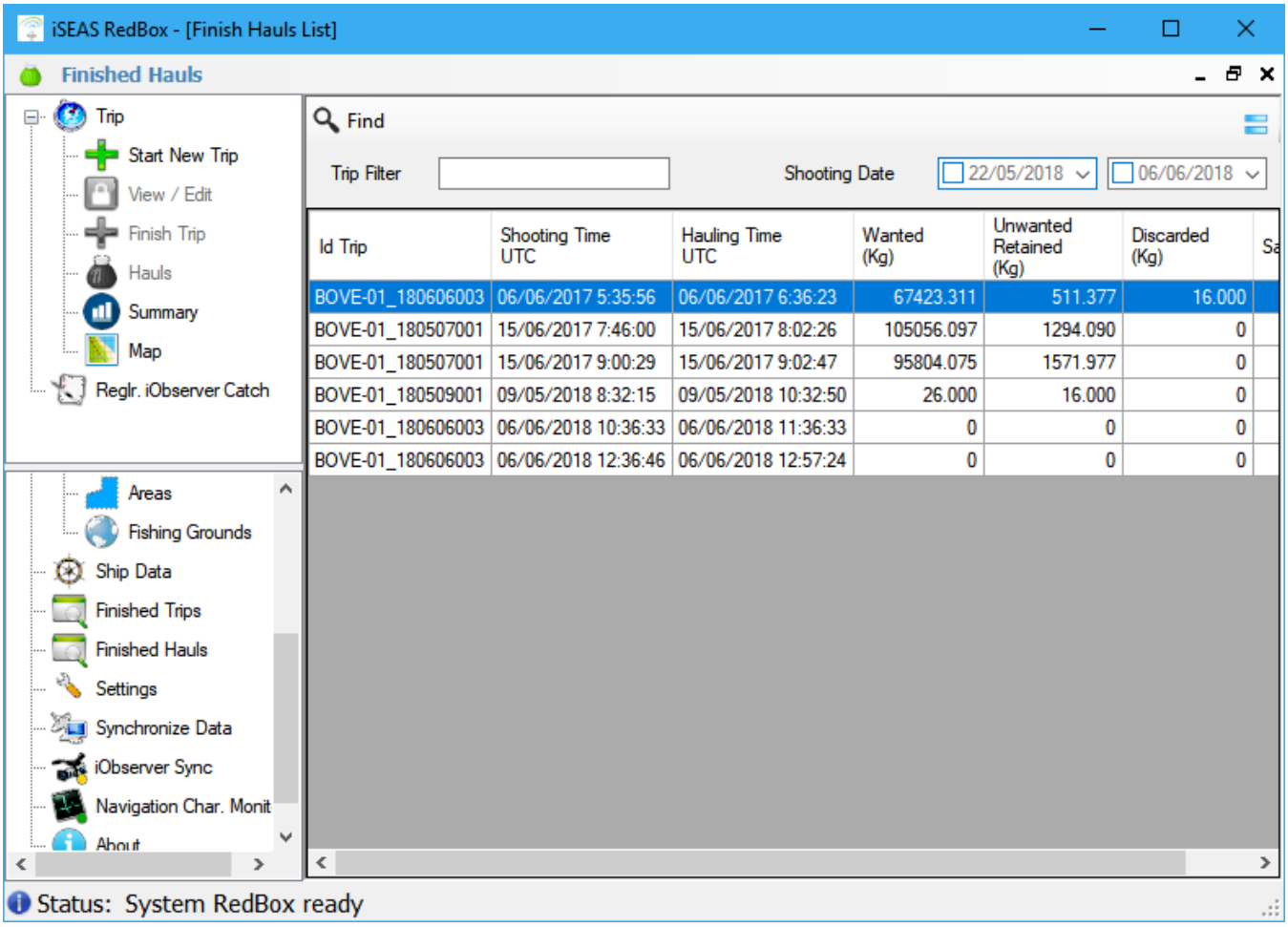
Shows the list of hauls of a trip. Double clicking on a haul or selecting it and pressing the button opens a new screen showing the details of the haul, see *4.5.4.1 Finished Haul general tab*.



4.5.4. Finished Hauls

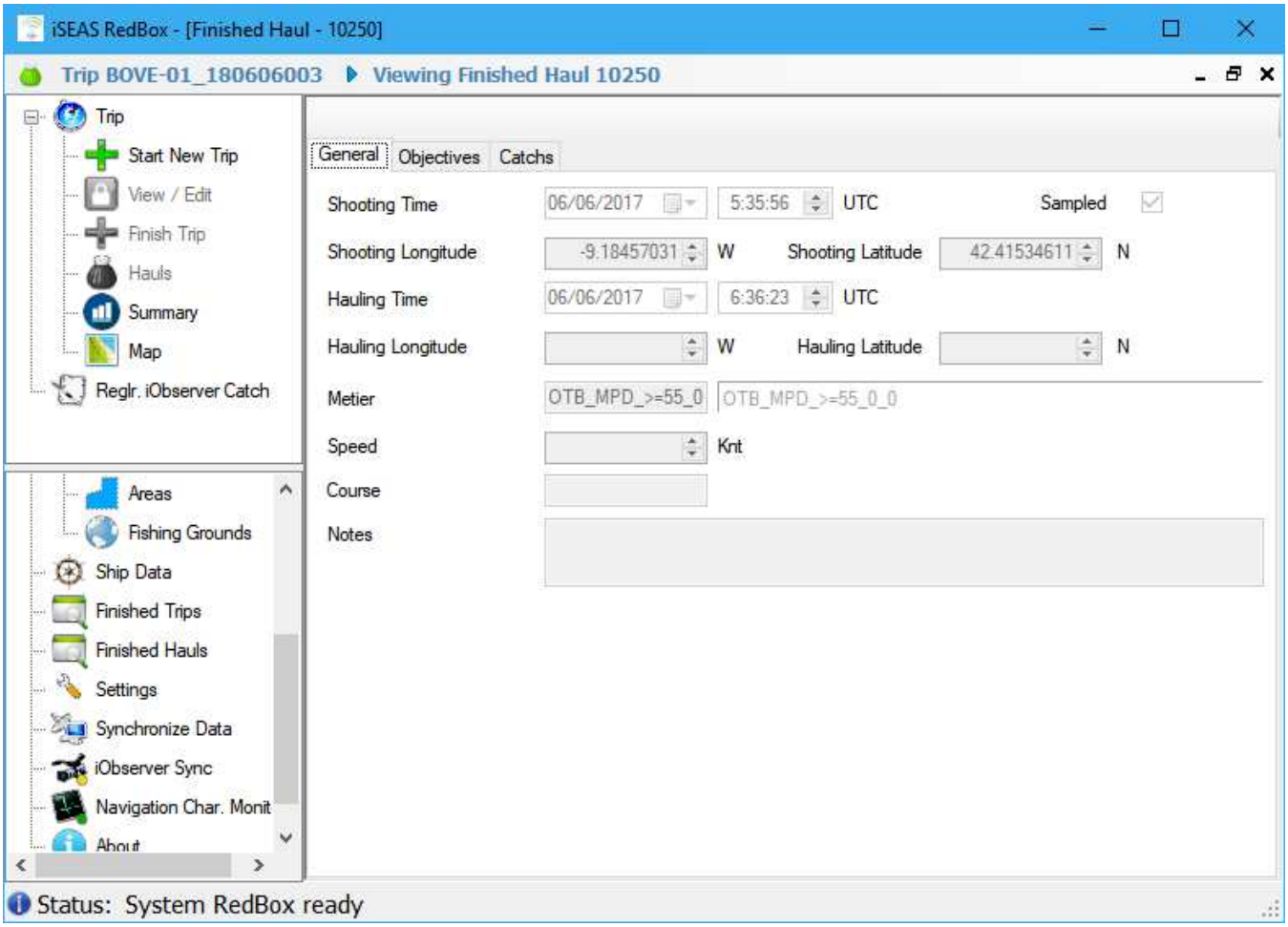
On this screen, the user can search for the finished hauls stored in the local database, this action does not search the central system, it only applies to the local database.

The user can filter by trip ID and shooting date and, when clicking on , the results are shown in a list. Selecting a haul and clicking on , a new screen shows the details of the haul, including general data, objectives and captures; all this data in read-only mode.

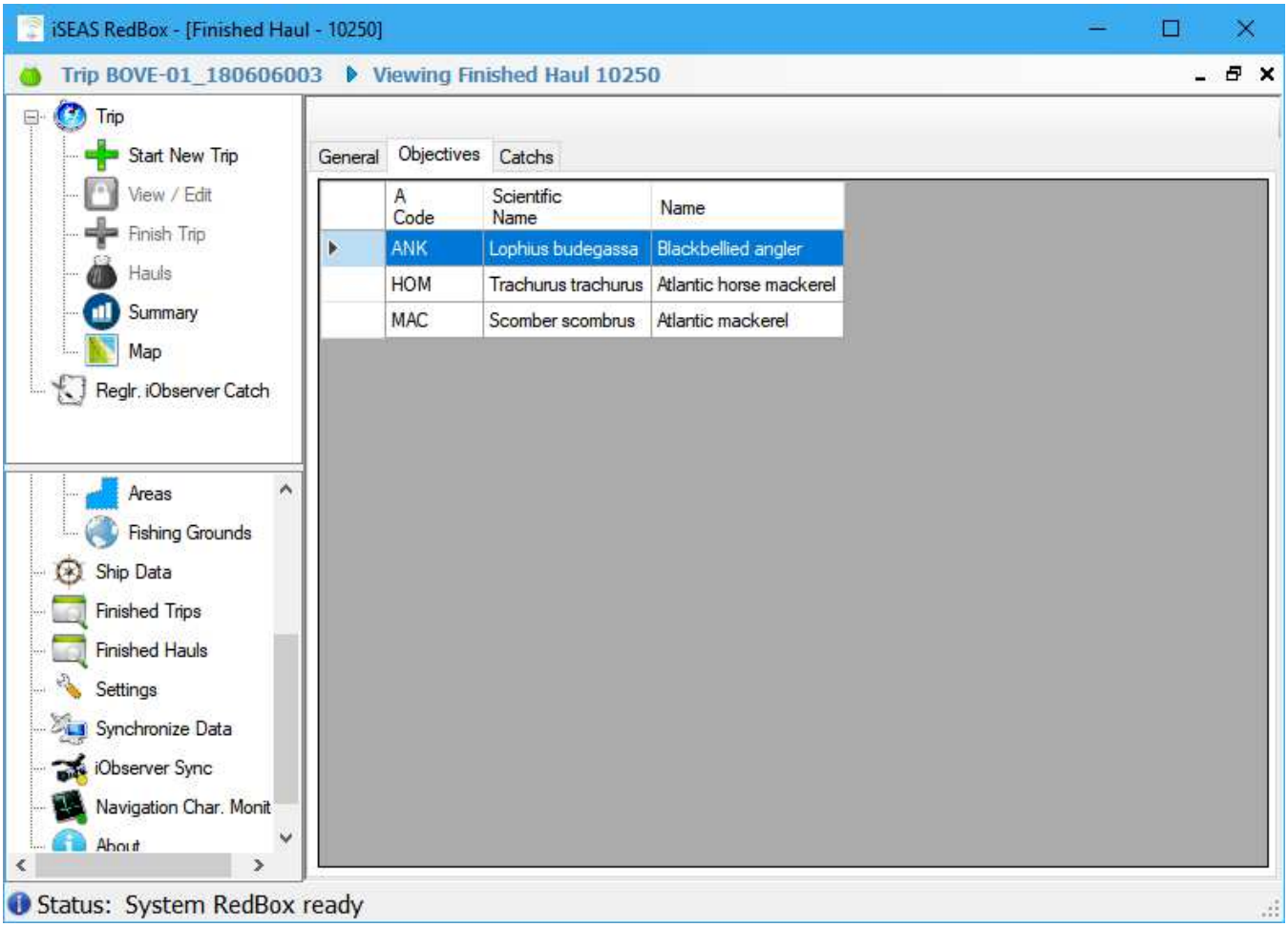


4.5.4.1. Finished Haul general tab

Shows the general data of the haul. Clicking on the upper tabs you can access the data of target species and catches.

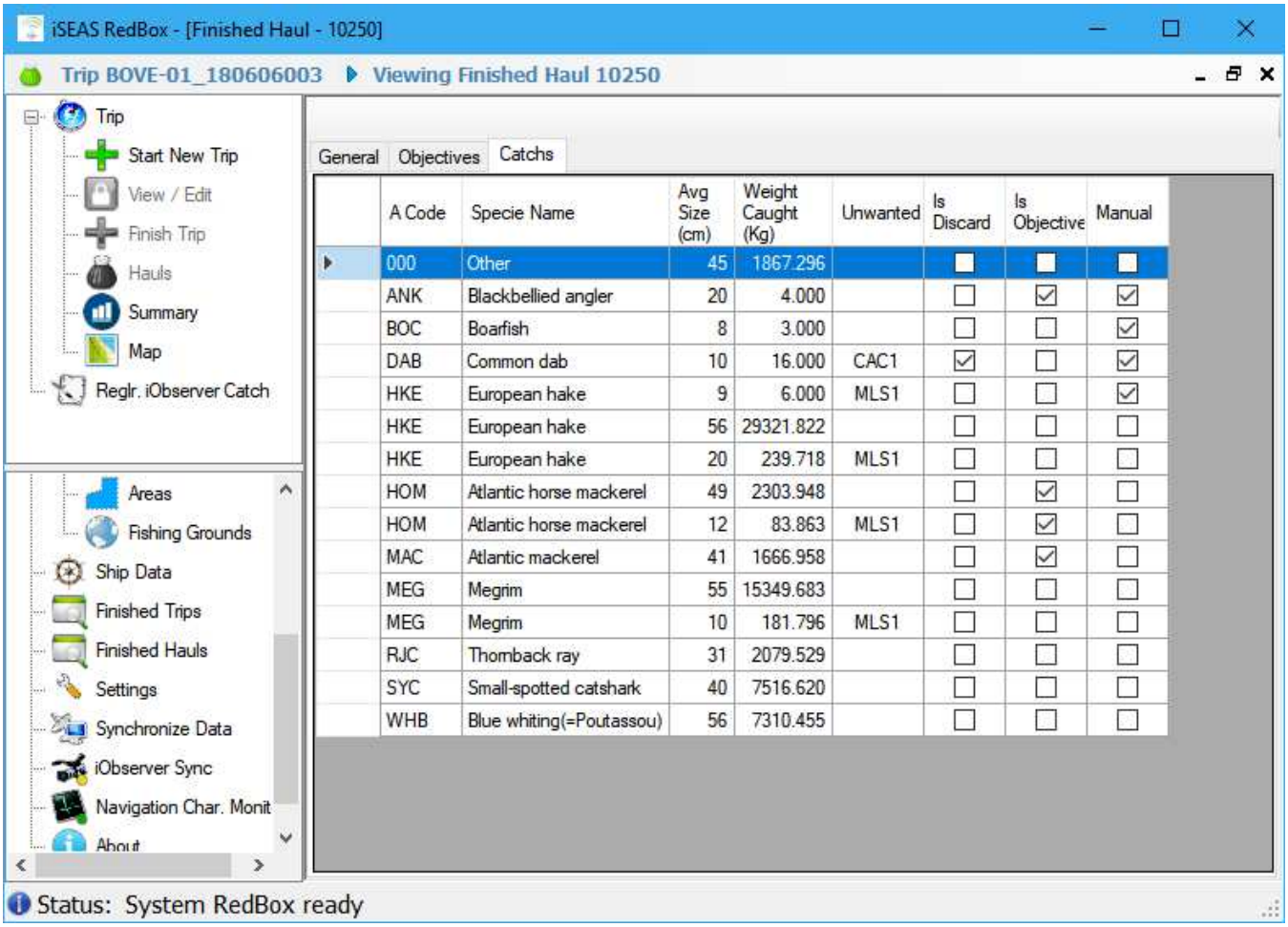


4.5.4.2. Finished Haul target species



4.5.4.3. Finished Haul catches

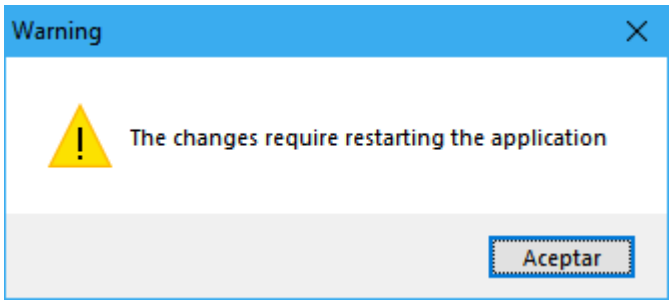
It shows a list with the basic data of the catches of the haul.



4.5.5. Settings

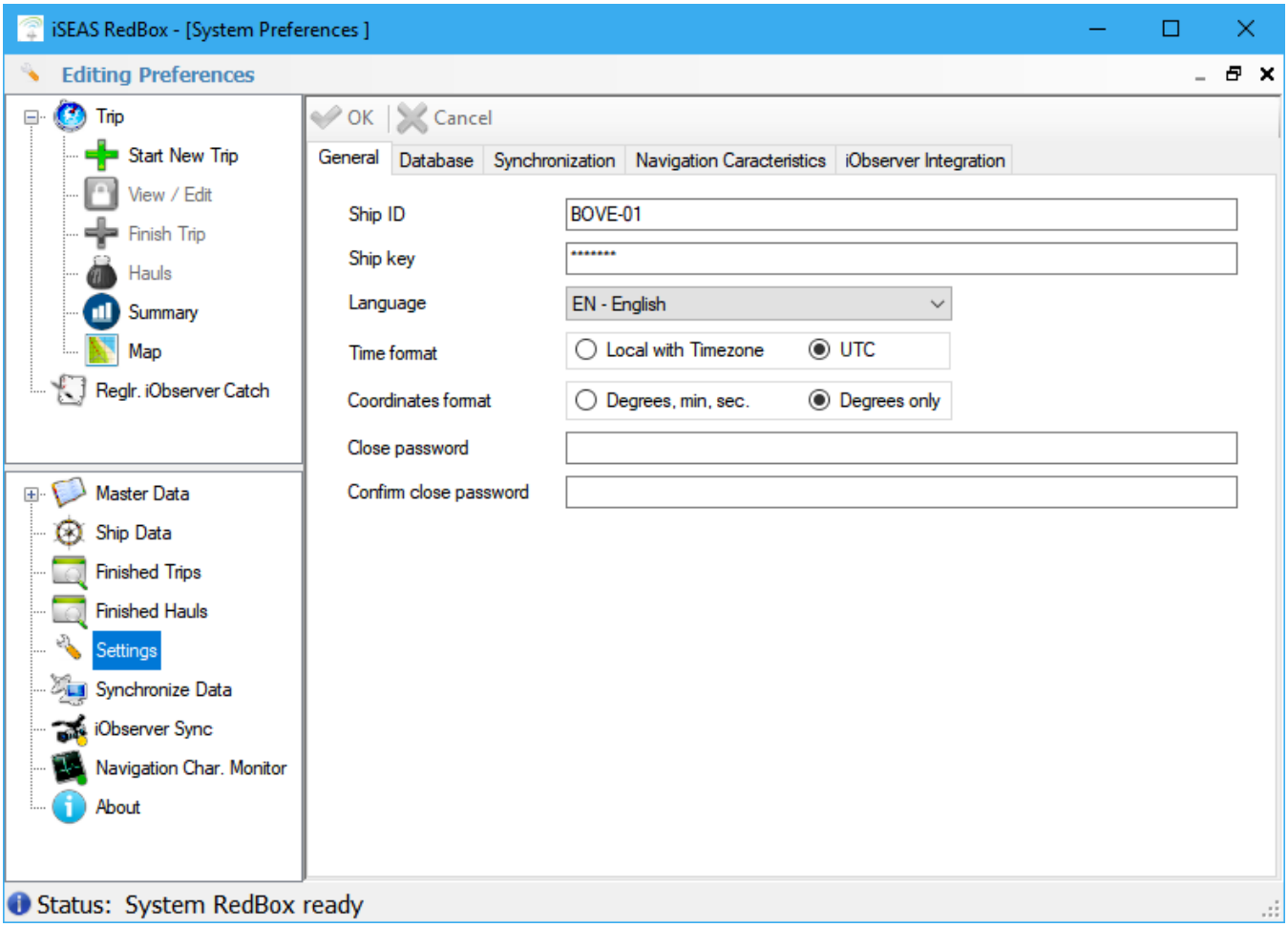
This screen is reserved for administrators. The configuration is organized into 5 groups: General, Database, Synchronization, Navigation characteristics and iObserver integration.

Each change that is saved in the settings section implies the reboot of the application. The restart will be automatic once the user confirms the changes.



4.5.5.1. General

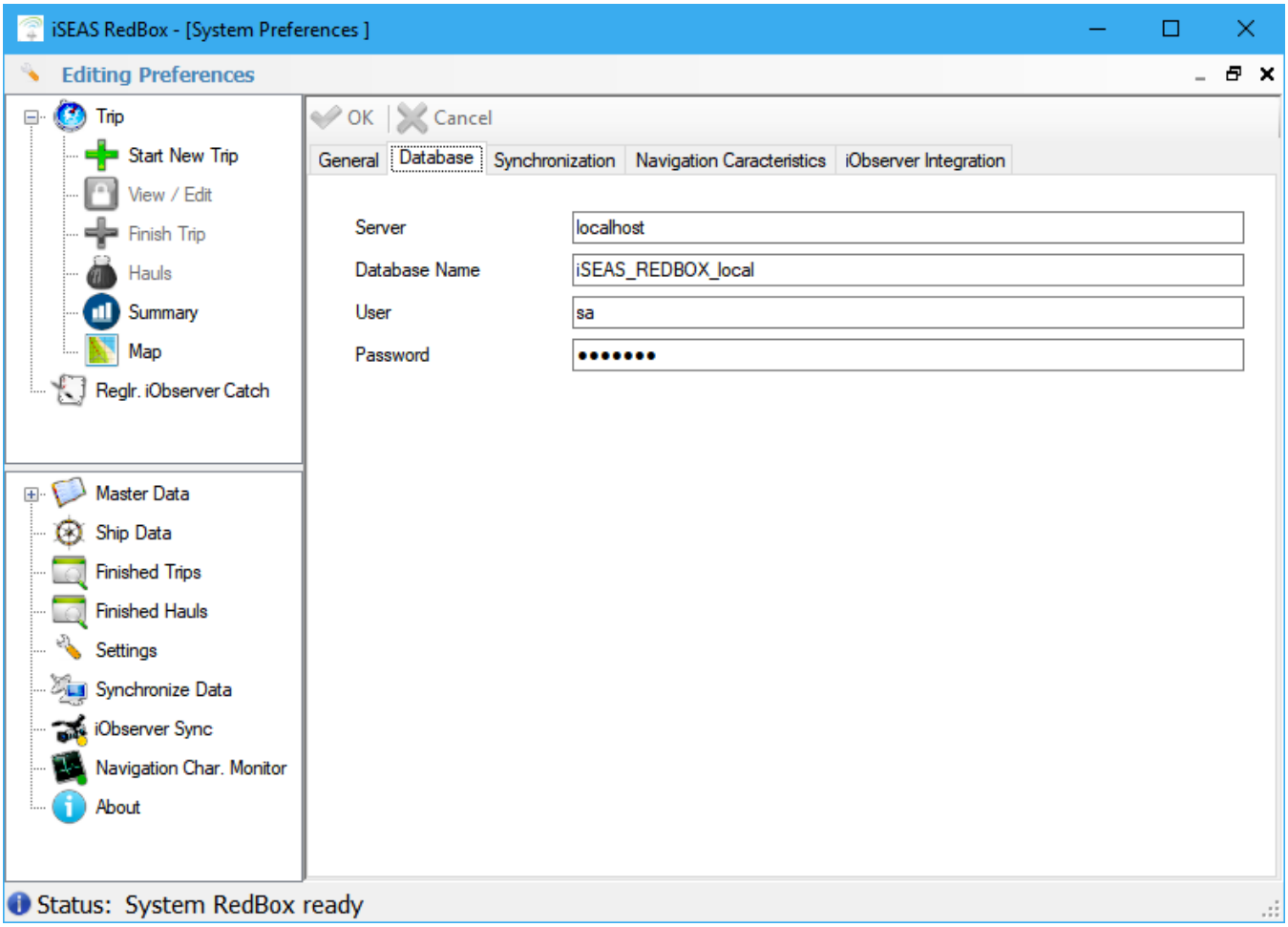
This screen presents several configuration parameters related to the general operation of the application:



- **Ship ID**: This parameter will be provided by the administrators of the central system on land and will serve to identify the ship for which the instance of the RedBox system is running.
- **Ship Key**: This parameter will also be supplied by the central system administrators and, together with the ship ID, it will serve to authenticate and codify the fishing data transmitted to the central system.
- **Language**: language in which the RedBox software will be presented. There are two options available: English and Spanish.
- **Time format**: the user of the application can work with time data referenced to the local time zone or use time data in Coordinated Universal Time (UTC). Internally, all time data will be stored in UTC. For the correct operation of the application when it is configured to work with the local time zone, it must be correctly configured in the Windows operating system.
- **Coordinates format**: the user can configure the application to accept the position data in degrees, minutes and seconds or in GPS format.
- **Close password**: password to close the RedBox system. This password will be useful to prevent a user from closing the system to avoid errors and not stop the data capture of the services. The password must be entered in the two fields provided.

4.5.5.2. Database

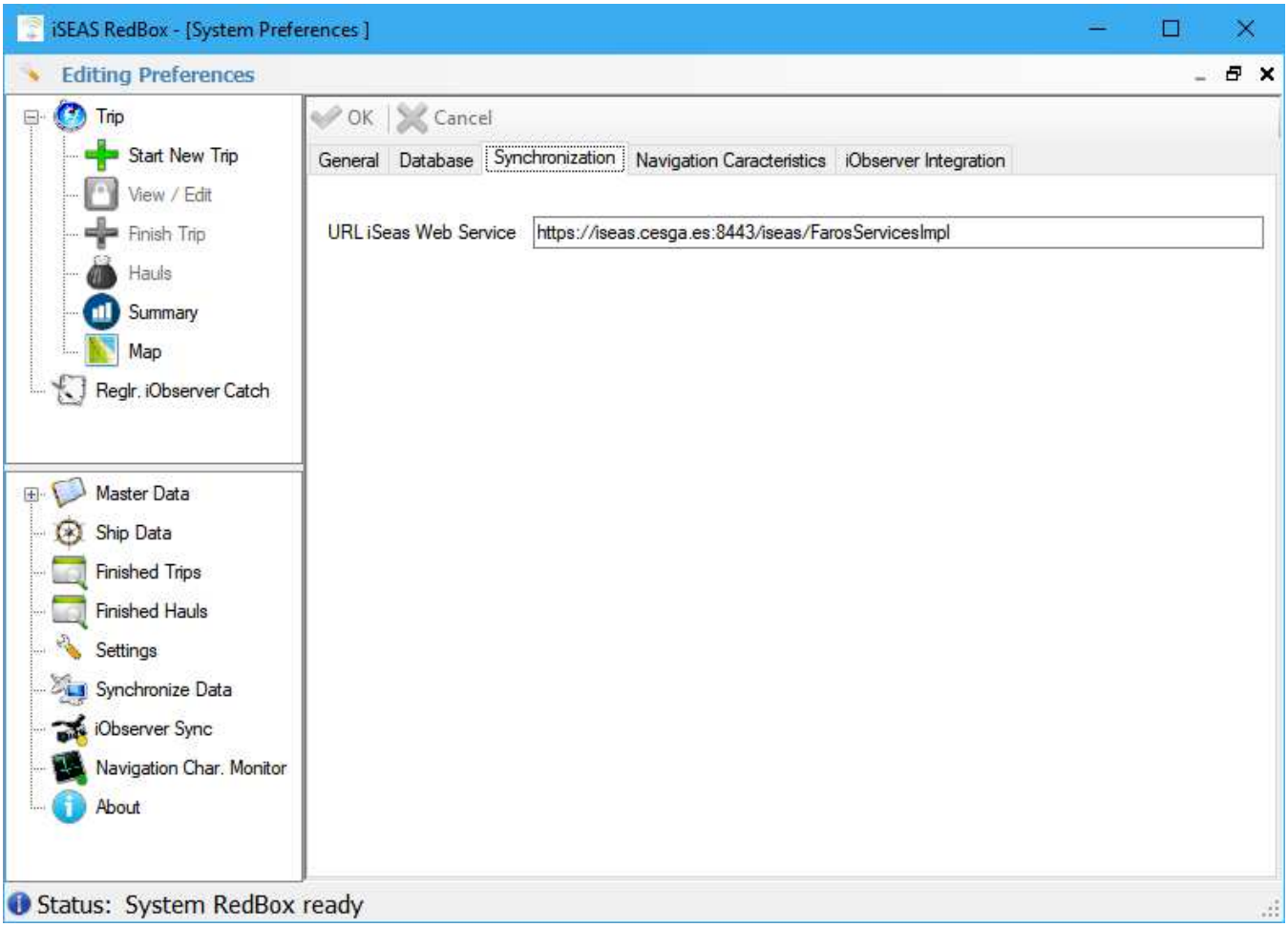
The system uses a SQL Server database to store all the information captured during the trip, access to this database can be configured on this screen:



- **Server**: address of the database server.
- **Database name**: Database name.
- **User**: name of the user of the database. The user must have read and write access permissions.
- **Password**: user's password.

4.5.5.3. Synchronization

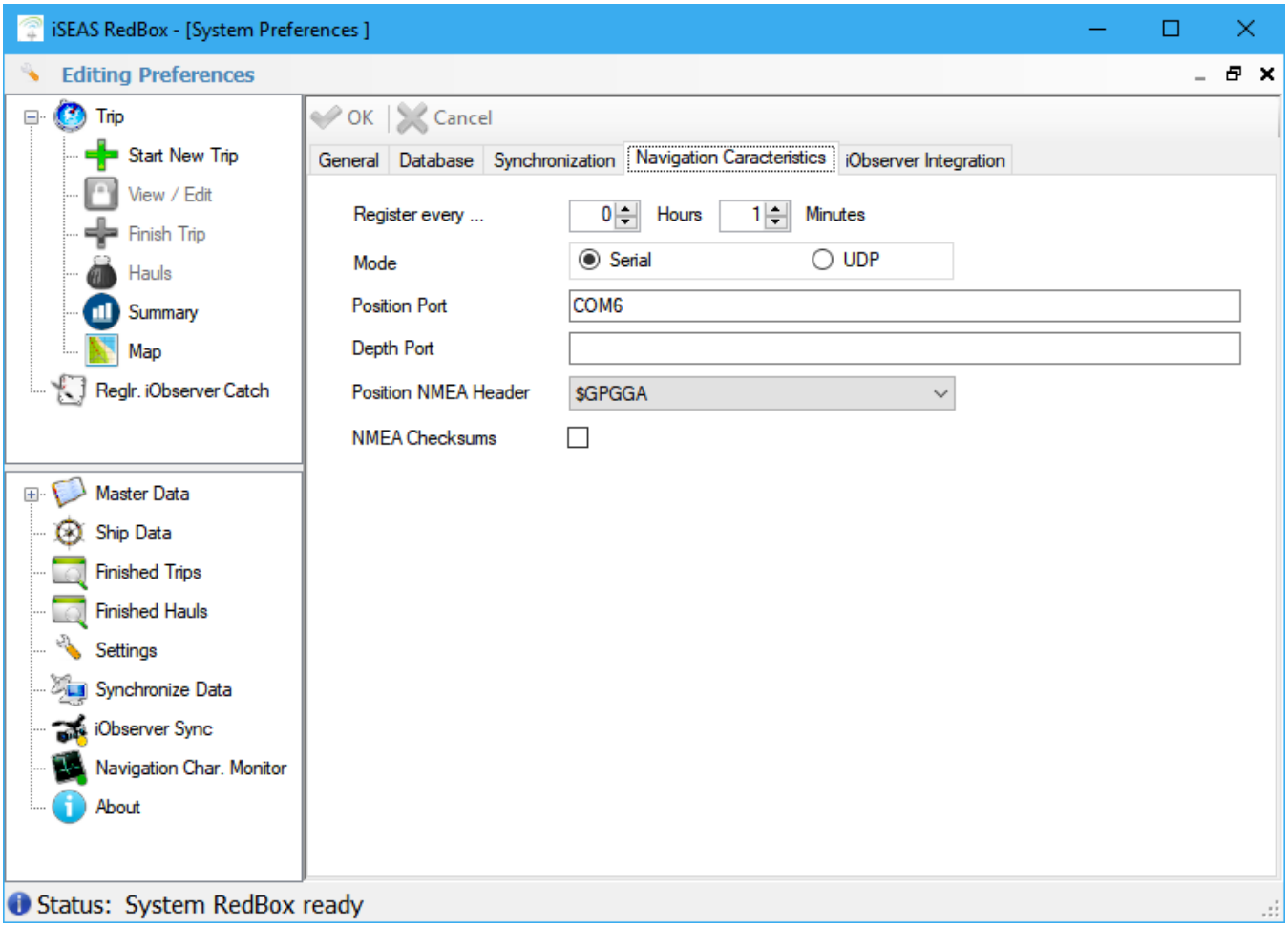
One of the main objectives of the RedBox system is to send data from the ship to the central system, where the data of all the ships that run RedBox are stored and added by means of geolocation services. Data transmission uses a web service whose address can be configured on this screen.



- **URL iSeas Web Service**: address of the web service used for connection to the central system on land.

4.5.5.4. Navigation Characteristics

This screen allows you to configure the service responsible for capturing data from the instruments on board the ship.

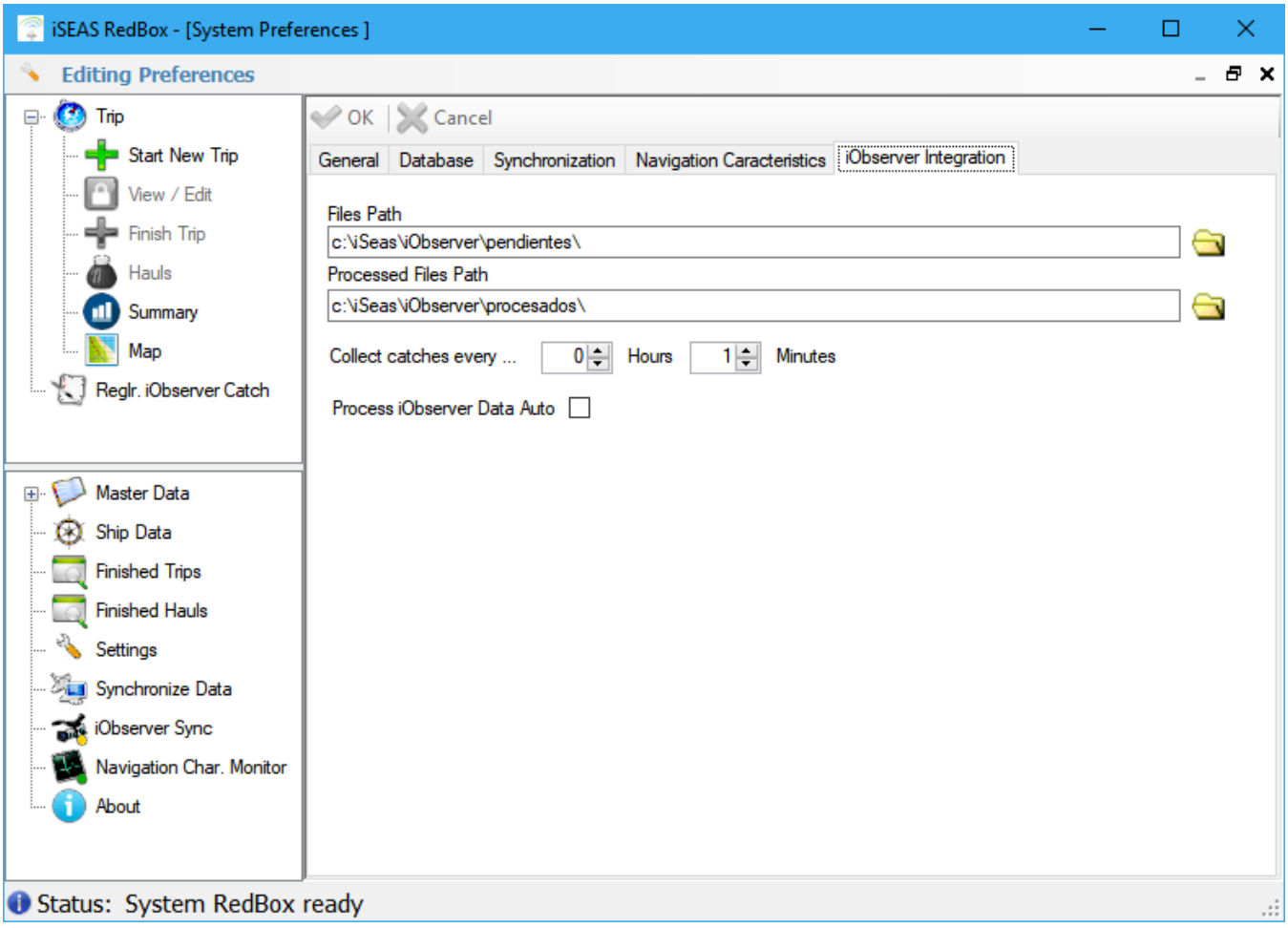


- **Registrar every...**: It allows to indicate the interval in hours and minutes between each record in the database of the navigation data. The shorter the period, the more accurate the location of the hauls will be.
- **Mode**: the application allows two modes of connection to the navigation instruments: by serial port, which will typically be implemented by means of a serial cable connected to a NMEA concentrator or directly to the output of the instrument, or via the network via the UDP protocol.
- **Position Port**: name of the serial port or UDP of the GPS instrument or service.
- **Depth Port**: name of the serial port or UDP of the depth probe instrument or service.

- **Position NMEA Header**: the application supports the capture of position data from the $GPGLL or $GPGGA statements. This parameter allows choosing the appropriate one for the instrument used on board.
- **NMEA Checksums**: if this check box is activated the software will check the integrity of the NMEA data received; This is the recommended configuration. Some instruments do not provide NMEA sentences with error checking code, in this case this box must be unchecked.

4.5.5.5. iObserver Integration

The integration between RedBox and the iObserver system is done through CSV files copied by the iObserver system in a shared folder.



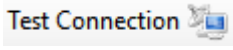
- **Files Pathc**: path of the shared folder in which the iObserver system files are copied.

- **Processed Files Path:** path to the folder to which the CSV files will be moved once they are processed. Files that can not be processed will be moved to a subfolder called "erroneos".
- **Collect catches every...:** interval in hours and minutes for the processing of data from the iObserver system.
- **Process iObserver Data Auto**: If this check box is activated, the software will assign the capture data from the iObserver system to the hauls without manual review by the user.

4.5.6. Synchronize Data

This section allows the user to see and start the pending synchronizations with the central system as well as the download of the master data.

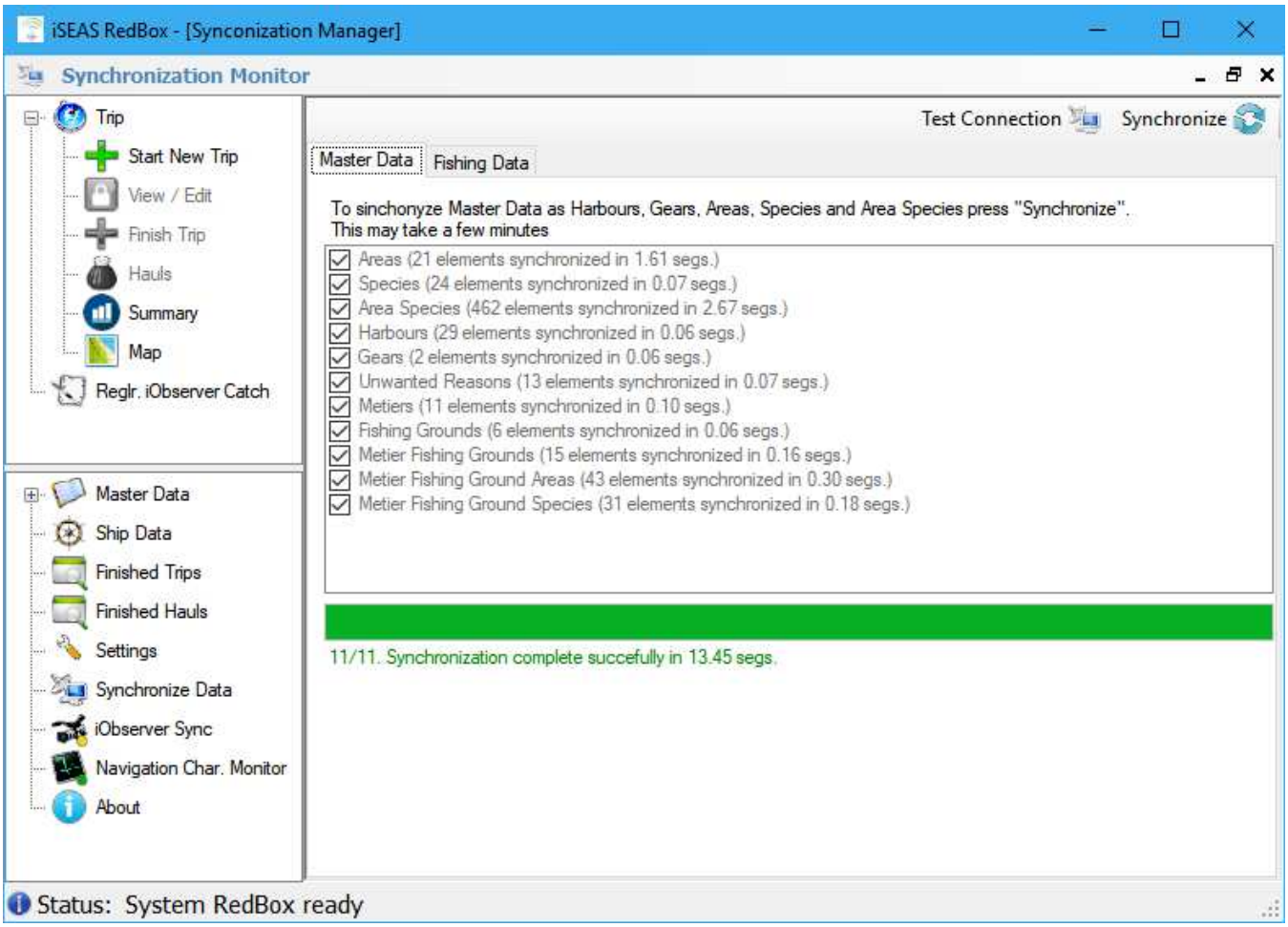
The software synchronizes fishing data with the central iSEAS server through a web service that provides access to the database. The web service implements a secure connection mechanism by SSL so that each ship has a unique key to ensure the transmission of the data of the captures. This key is configured in the "Settings" section, see *4.5.5.3 Synchronization*.

Since satellite transmissions can be slow or without coverage, an option to test the connection is available by pressing the 

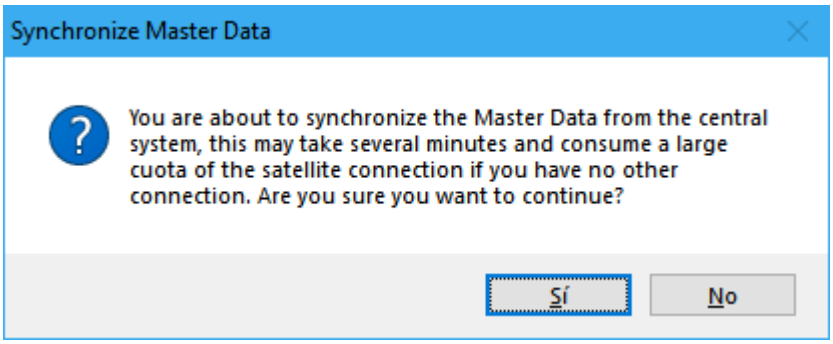
button. This option will be useful in cases in which the ship navigates through areas with coverage problems and has a considerable volume of data to be transmitted pending.

4.5.6.1. Master Data

This action, provided there is no fishing data to be sent, will allow all master data to be downloaded from the central system and stored in the local database. If the user presses the system it will go through 11 entities as shown in the image below:



Important: this type of synchronization may require more bandwidth than fishing data; It is recommended to perform this action when a cellular network connection is available. The software will show a warning to the user to confirm the action:

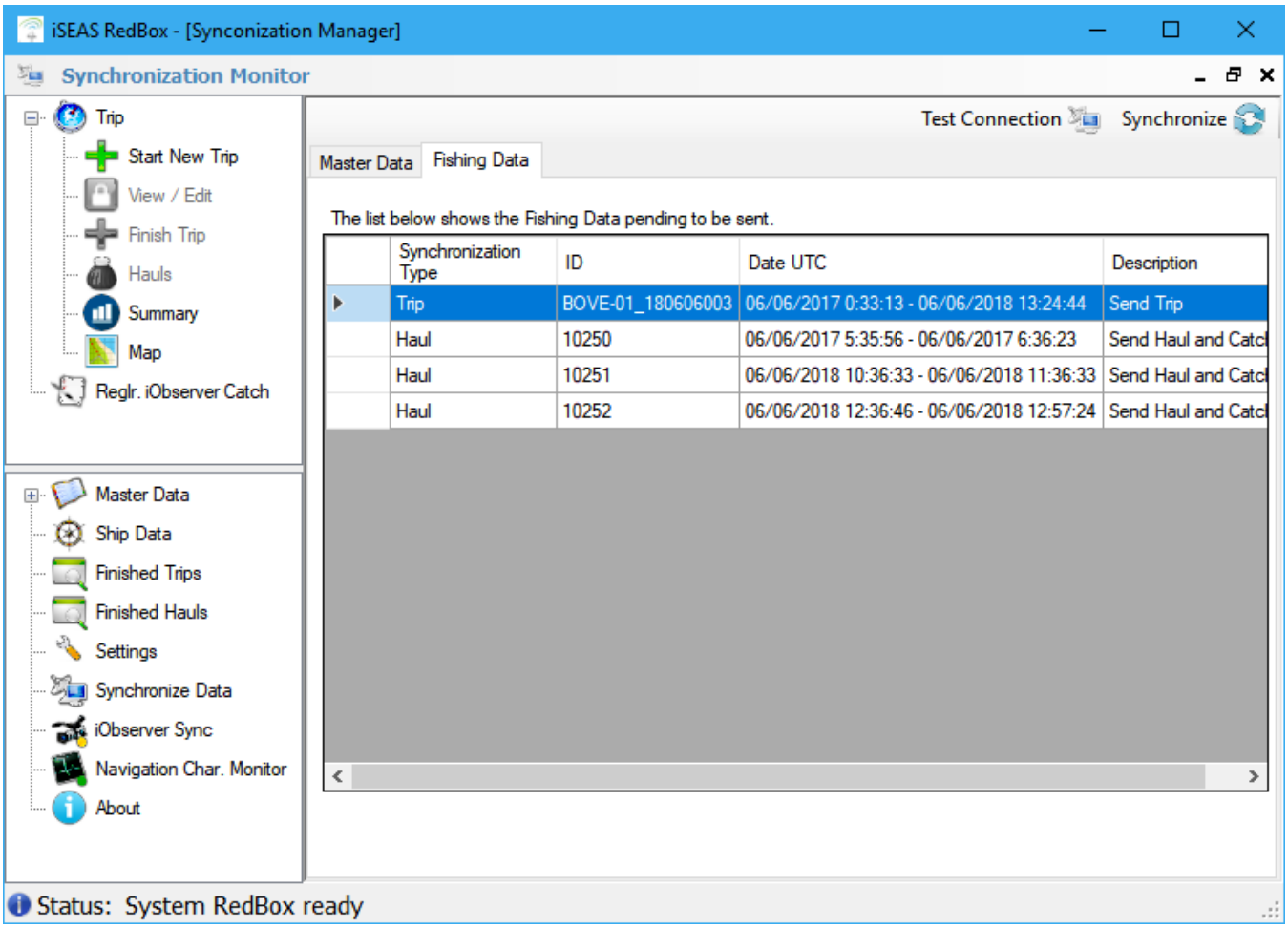


4.5.6.2. Fishing Data

This tab allows the user to see the fishing data pending to be sent. Pressing the Sincronizar button starts the synchronization. If the data is sent correctly to the central system, the corresponding line disappears from the list; if there is an error during transmission, it stops and the user is informed and the data remains marked as not sent in order to repeat the operation the next time.

The navigation data will be synchronized with the trip data. The catch data will be sent with the synchronization of the corresponding haul.

While the current trip is not closed, the information already synchronized with the server can be updated.



If the connection is made via satellite, it is recommended to make the synchronizations with a frequency that prevents the accumulation of too much data that prolongs the

sending. If the software detects a lot of accumulated data, a warning will be displayed to the user.

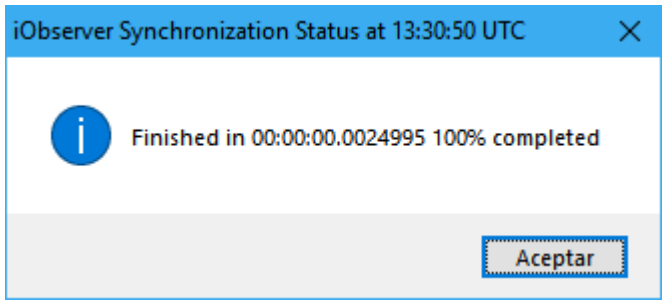
4.5.7. iObserver Synchronization

This service will verify and import the captures sent by the iObserver system using the parameters configured in the settings section, see *4.5.5.5 iObserver Integration*.

The status of the service is notified in a colored circle associated with the menu entry. There are three different states:

- Waiting: the service was launched and awaits the next execution.
- Working: the service is doing its job.
- Stopped: the service was stopped due to an error.

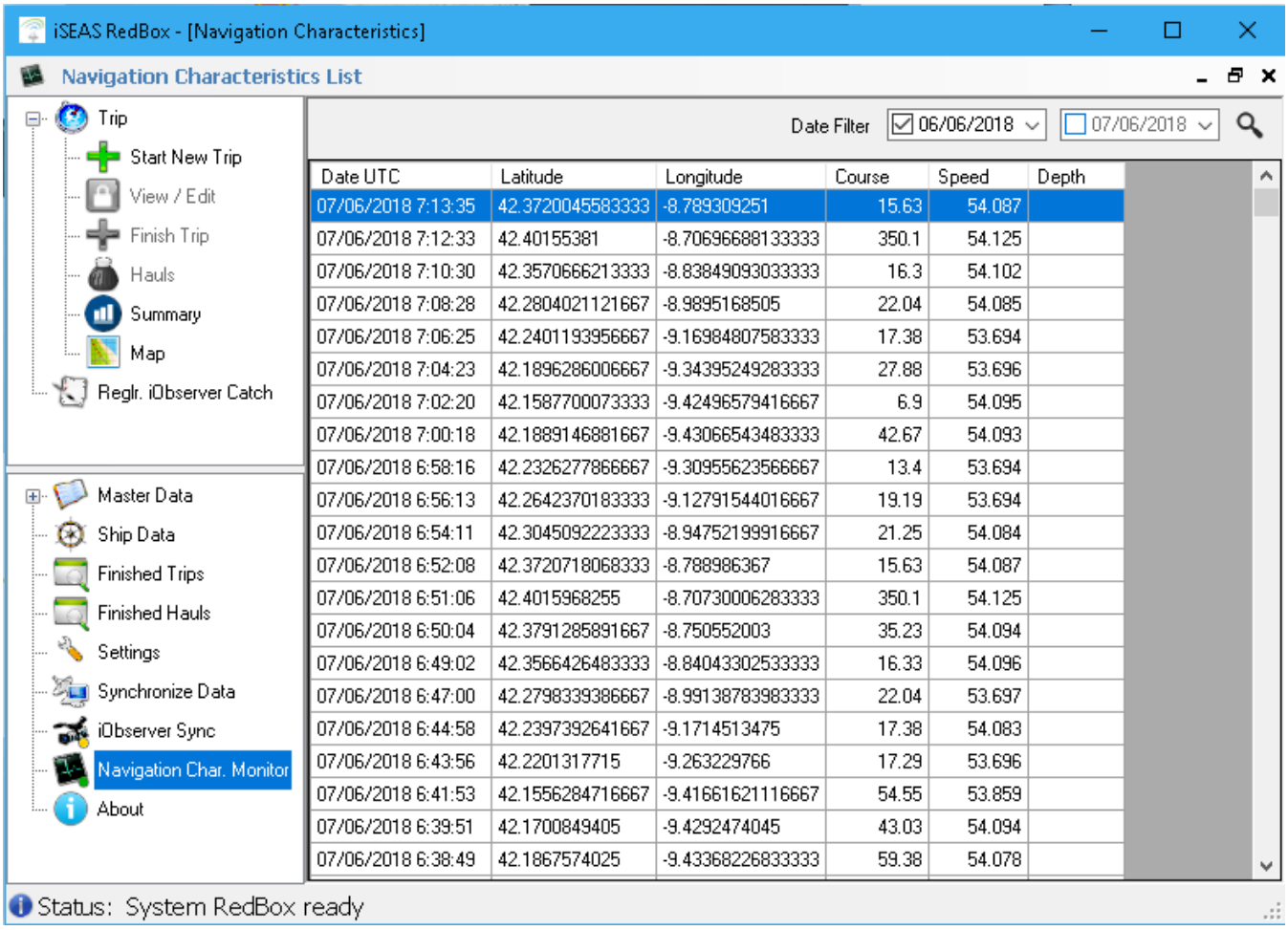
Pressing the menu entry will show a window informing of the last synchronization.



4.5.8. Navigation Characteristics Monitor

This service captures the navigation data of the ship's instruments and stores them using the interval set in Settings, see *4.5.5.4 Navigation Characteristics*. The captured data includes speed, depth, longitude, latitude and heading of the ship in addition to the timestamp in which they were taken.

The screen shows a list with the last recorded navigation data. The user can modify the time interval for which the navigation data is displayed by means of the "*Date Filter*" and by pressing the button.



The status of the service is notified in a colored circle associated with the menu entry. There are three different states:

- Waiting: the service was launched and awaits the next execution.
- Working: the service is doing its job.
- Stopped: the service was stopped due to an error.

4.5.9. About RedBox

Displays a window with information about the RedBox application.