NORTH ATLANTIC RIGHT WHALE ANTHROPOGENIC EVENTS DATABASE

The new North Atlantic Right Whale Anthropogenic Events Database consists of a front-end data entry web-portal and backend data tables stored in the existing North Atlantic Right Whale Identification Database (Identification Database). The web-based portal is password protected site that consists of two interfaces: the Injury Case portal and the Monitoring Case Portal (Figure 1).

Figure 1. Home screen for the North Atlantic Right Whale Anthropogenic Events Database web interface.

Once logged into the web interface, the user selects a portal (Injury or Monitoring) with which to interact. Here we will look first at the Monitoring Cases portal.

MONITORING CASES PORTAL

Clicking on the "Manage/View Monitoring Cases" brings the user to into the Monitoring Case portal (Figure 2). By default, the first Monitoring Case in the database is retrieved and viewable.

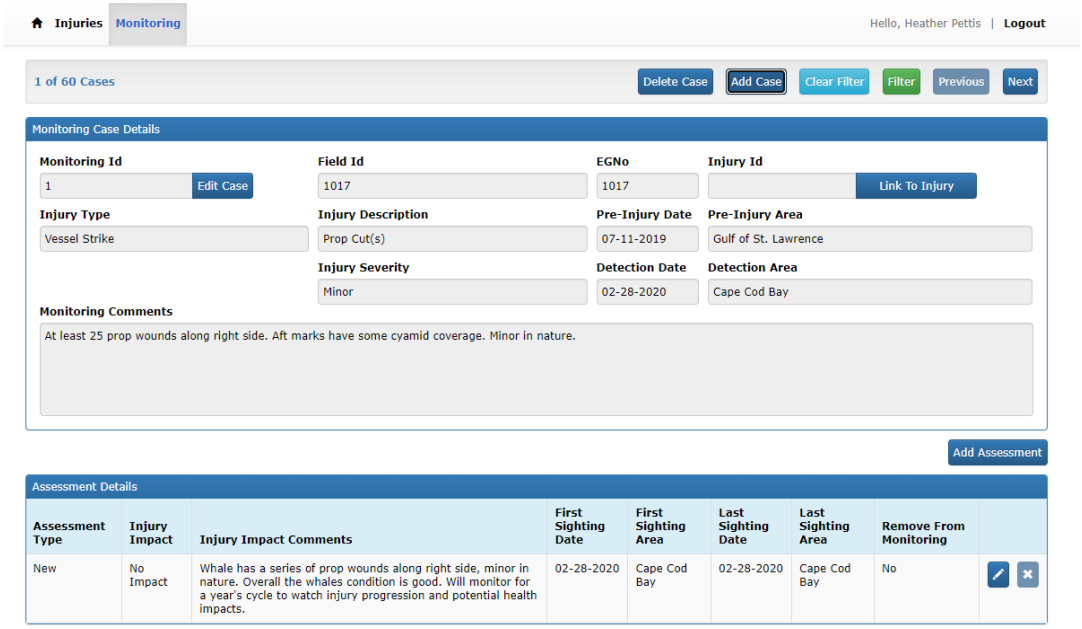


Figure 2: Monitoring Case portal screen. Shown here is the first Monitoring Case entry in the new web portal, with an assessment of injury impact on the whale.

There are several ways the user can navigate through the Monitoring Case portal. First, one can simply scroll through Monitoring cases by clicking the “previous” and “next” button located at the top of the screen (Figure 3). This will scroll through Cases by Monitoring ID which is an auto-generated number, ordered by chronological entry of Monitoring Cases. Additionally, the user can use the “Filter” function, also located at the top of the page (Figure 3).

Figure 3: To navigate through the Monitoring Case portal, the user can (a) move through cases by Monitoring ID using the “previous” and “next” button (red circle) or (b) click on the “filter” button (red arrow).

Using the “Filter” function, the user can sort through Monitoring Cases by ID, Field ID, EGNO, Injury Type, and/or Injury Detection Year (Figure 4). Additionally, the user can exclude any cases that have been removed from monitoring and/or cases that have not yet been linked to an Injury ID (see “Linking Monitoring and Injury Cases” section below). The filter function is executed by clicking the “Apply Filter” button at the bottom of the Filter Criteria screen. Once the user no longer needs the data to be filtered, clicking the “Clear Filter” button at the top of the Monitoring Case Details page will clear the filter and return all monitoring cases.

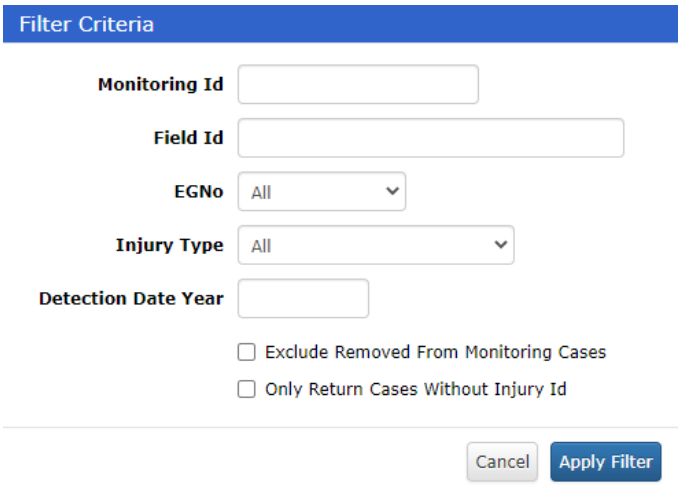


Figure 4: Using the Filter button, users can select a subset of Monitoring Cases to view and/or work with.

Add New Monitoring Case

Once in the Monitoring Case portal, there are several operations that can be performed. First, the user may add a new case. To do this, the user clicks “Add Case” and a data entry screen is retrieved (Figure 5).

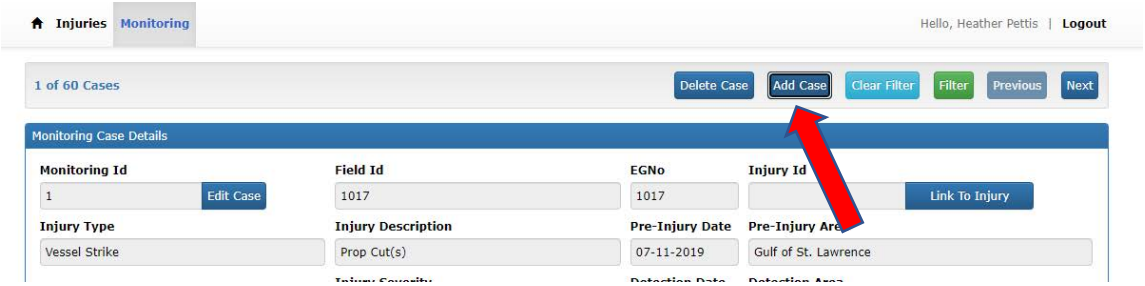


Figure 5. To add new Monitoring case, user click on “Add Case” button.

When “Add Case” is selected, a new Monitoring Case data entry screen is returned (Figure 6). Here, the user will use a combination of text entry and drop-down boxes to enter details related to the new Case (see Appendix 1 for data field options for dropdown fields in the Anthropogenic Events Database) in the tab called “Case Details.” Fields for which data entry is required are marked by an asterisk. Once data are entered, the “Save & Close” button is selected. There is also an option to “Cancel” the data entry screen.

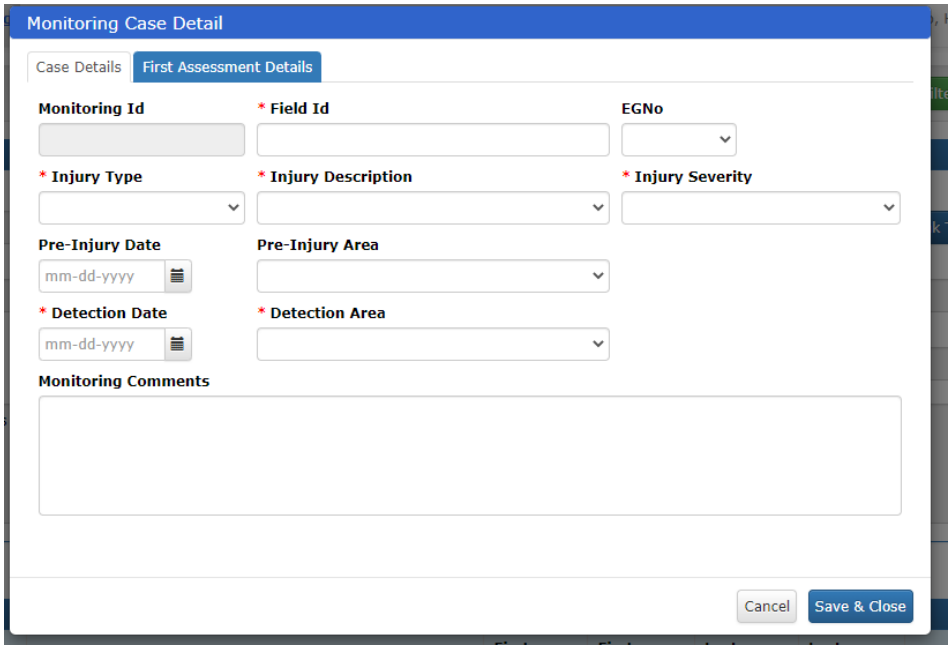


Figure 6. New Monitoring Case data entry screen retrieved with “Add Case.”

Once the initial data are entered for the Monitoring Case, the user selects the “First Assessment Details” tab at the top of the screen. Should the user attempt to save without first entering first assessment details, they receive an error message instructing them to do so. The user enters all data pertinent to this initial assessment (Figure 7). It is in this assessment screen where the impact of injury on the whale’s health is captured, including an assessment of the impact of the whale’s condition as a result of the injury (i.e. no impact, decline).

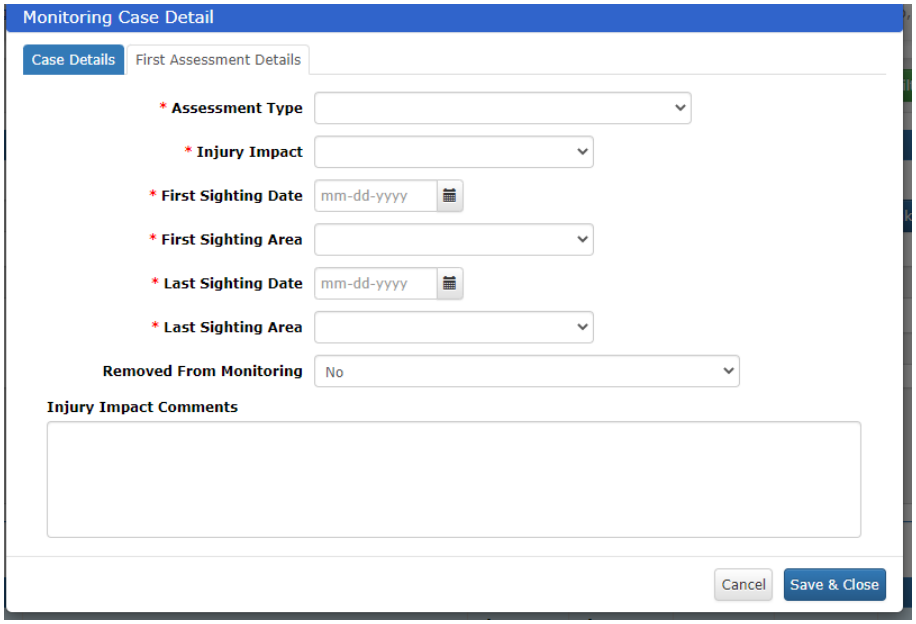


Figure 7. Data entry screen for the assessment of injury impacts on right whale health.

Adding/Editing/Deleting Monitoring Case Assessments

When there are additional sightings of a whale on the monitoring list, additional assessments can be added via the Monitoring Case page by clicking on "Add Assessment" (Figure 8). The assessment screen (Figure 5) opens and details for the new assessment are added and saved. It is in these follow up assessments where the user tracks changes in injury impact to the whale as well as the status of the whale on the monitoring list (i.e. remain on the monitoring list, removed for improvements in condition, removed because whale died or became presumed dead). Once data are entered, the user saves the screen and is returned to the main monitoring case page for the event. Additionally, previously entered assessments can be edited or deleted from the main monitoring screen by clicking either the pencil icon (edit) or the "X" (delete).

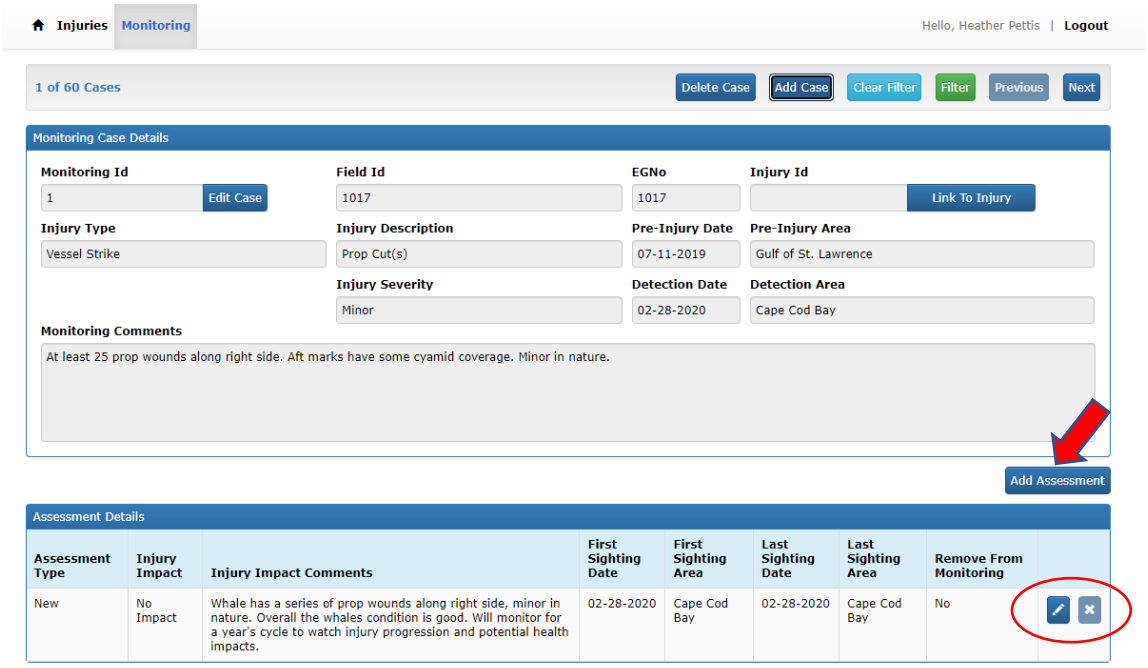


Figure 8. Additional assessments for a Monitoring Case can be added by clicking the "Add Assessment" button (red arrow). Previously entered assessments can be edited (pencil icon) or deleted ("X").

Deleting Monitoring Case

There may be a scenario in which one would want to delete an entire Monitoring Case (i.e. the case is a duplicate of another). To do this, the user would navigate to the appropriate Monitoring Case and click on "Delete Case." A warning window will appear asking the user if they wish to proceed (Figure 9). By confirming "delete" the Monitoring Case and all associated assessments will be deleted.

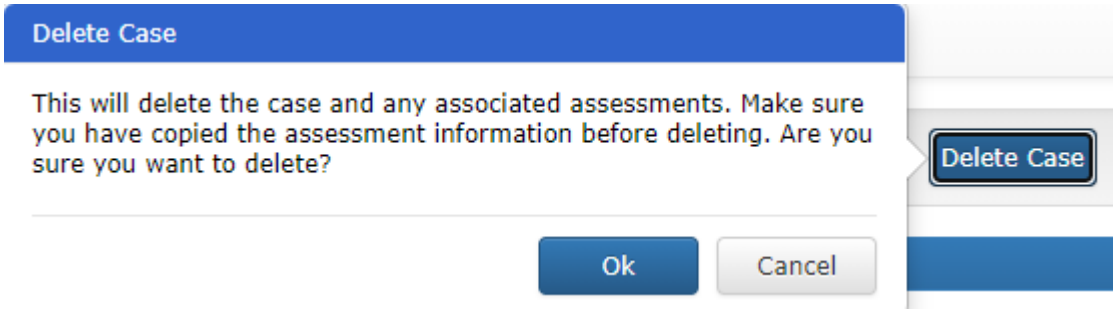


Figure 9. Warning message to user prior to deleting a Monitoring Case and its associated assessments.

<u>INJURY CASE PORTAL</u>

The Injury Case portal serves two primary functions: 1. To synthesize and return data related to annual right whale injury event assessments from the Right Whale Identification Database, and 2. To receive and link ancillary information about

the injury source. First, the Injury Case portal retrieves anthropogenic event data processed annually through the Identification Database. Each year, images from photographed right whale sightings are inspected to determine whether or not there are new injury events to right whales. This process assesses all sightings of right whales for evidence of any entanglement or vessel strike injuries. Because this process requires that all right whales from a given year are processed, the assessment typically lags real time by ~2 years. Once injury assessments are made in the Identification Database, data are automatically pushed to the Injury Case portal and auto-populate the Injury Case Detail screen for each event with injury type, severity, pre-injury sighting information, detection sighting information and general comments (Figure 10). Additionally, because the injury data are linked to sighting information and life history data, the Injury Case Detail screen also auto populates with demographic information (age, age class, and sex) as well as calculated injury acquisition timeframes, date the whale was last sighted, and whether or not any medical intervention was administered for the injury event. The data that auto populate this single screen are a synthesis of data previously accessible only by multi-step data queries and calculations external to the database.

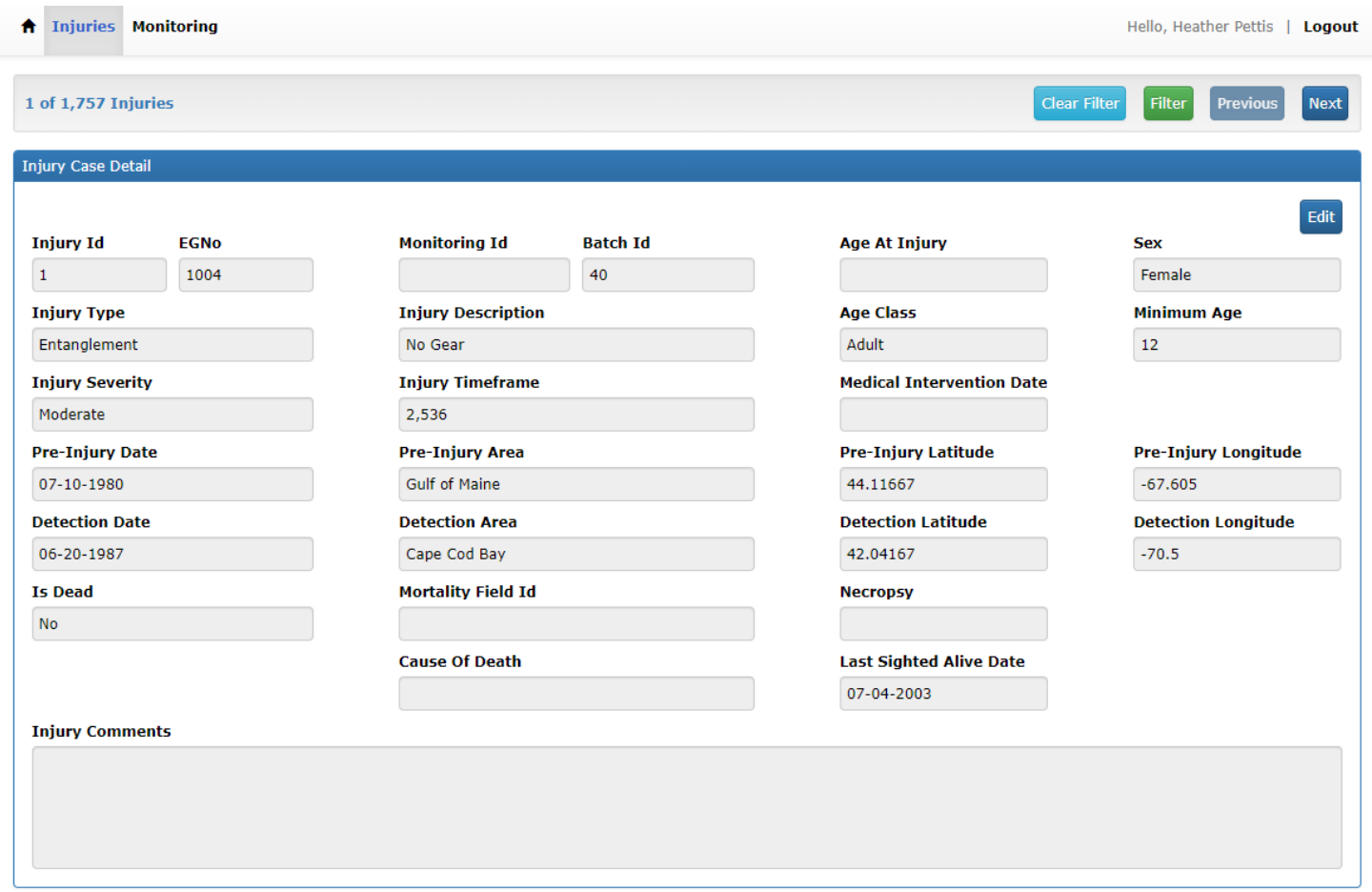


Figure 10. The Injury Case Details screen within the Injury Case web portal. Data on this screen, with the exception of Cause of Death, Mortality Field ID, and Necropsy, are auto-populated from injury event assessments, life history, and sightings data in the Right Whale Identification Database.

On this Injury Case Details screen, there are three fields that are not auto populated and can be entered here manually when available, including Cause of Death, Mortality Field ID, and Necropsy. Data entry for these fields is achieved by clicking the “Edit” button on the Details page. A pop-up screen allows for manual text entry for this three field, as well as the ability to edit the Injury Comments field (Figure 11). All other fields are only editable in the Identification Database.

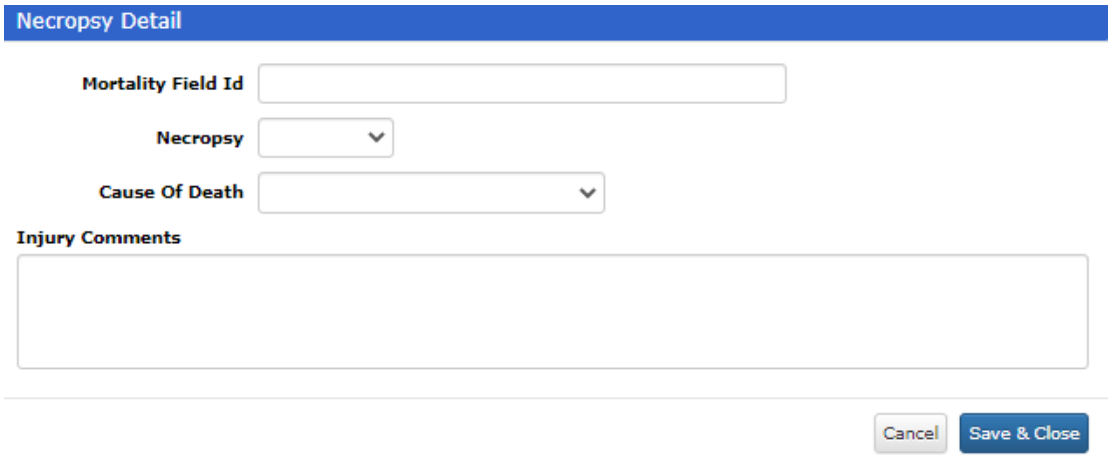


Figure 11. Editable fields on the main Injury Case Details screen include Mortality Field ID, Necropsy, Cause of Death, and Injury Comments.

Injury Type Details

Below the main Injury Case Details screen is an injury specific details form. There are two type of these detail forms: Entanglement and Vessel Strike. These forms are "smart" forms, in that the injury details form that is returned is determined by Injury Type in the main Injury Case Screen. If the Injury is entanglement, the Entanglement Detail form appears (Figure 12) and if the injury is a vessel strike, the Vessel Strike form appears (Figure 13).

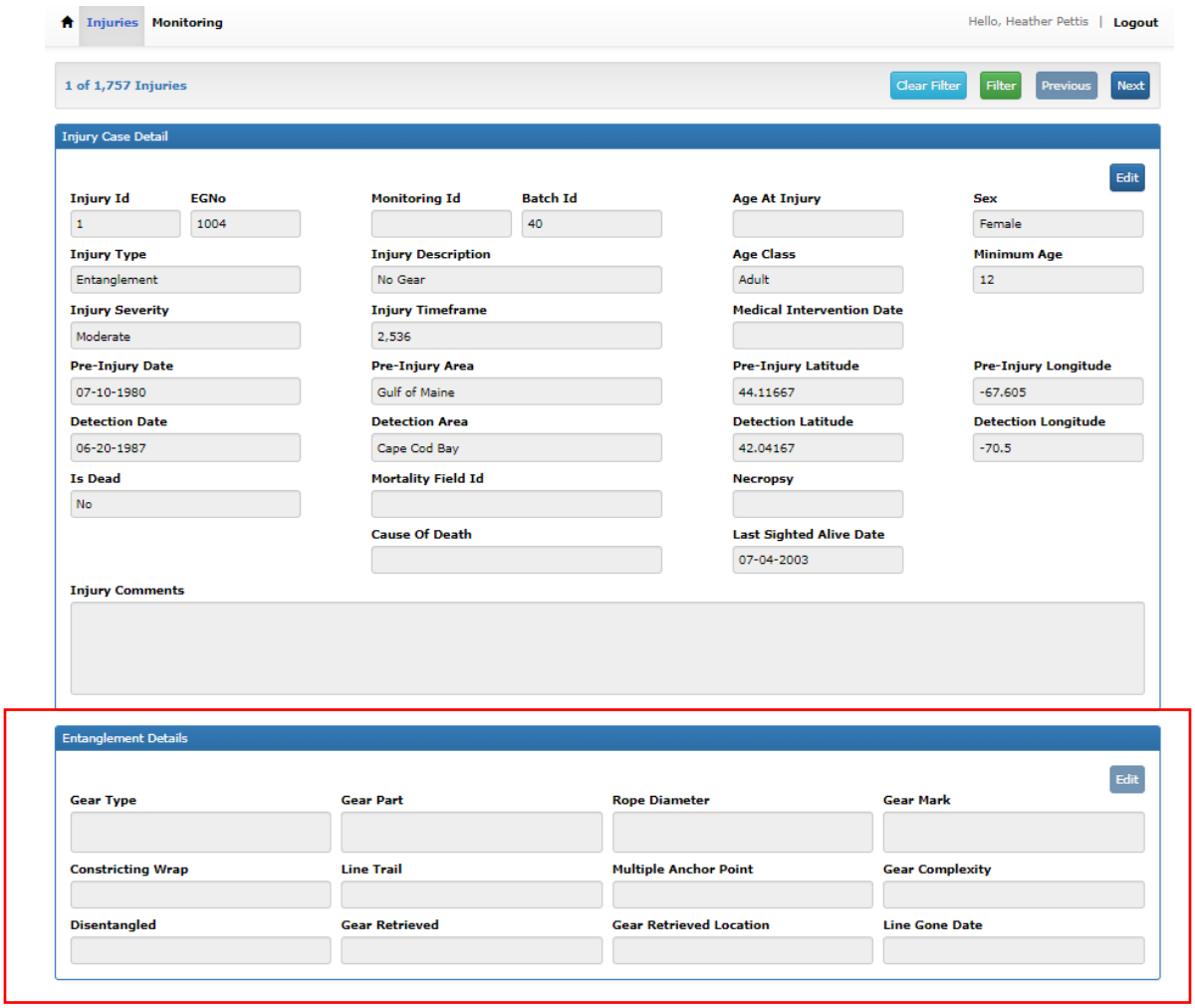


Figure 12. Injury Case Details screen with accompanying Injury Details form below. The Injury Details form is determined by Injury Type. Here, this injury type is an entanglement, and therefore the Entanglement Details form (red box) is retrieved.

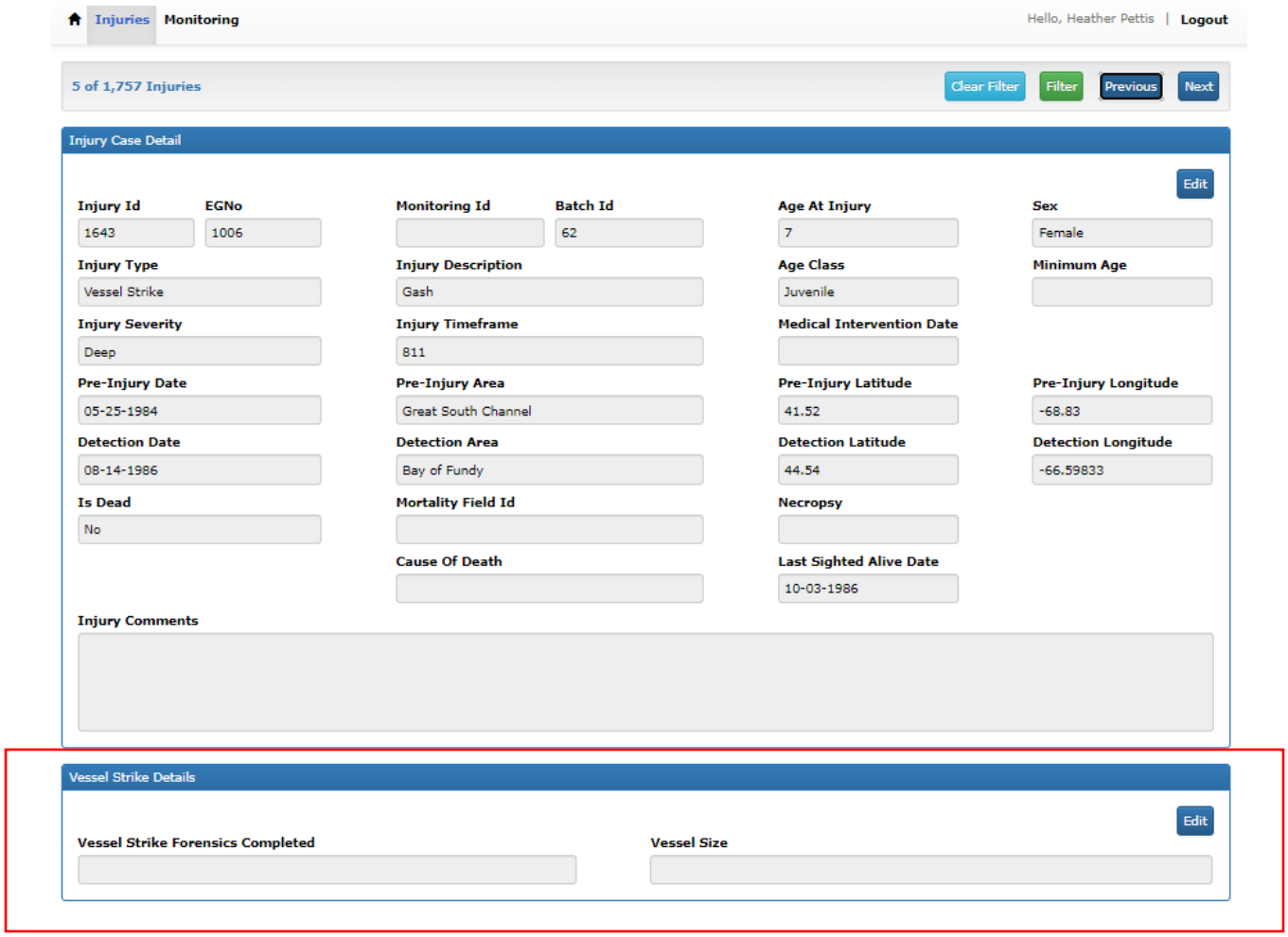
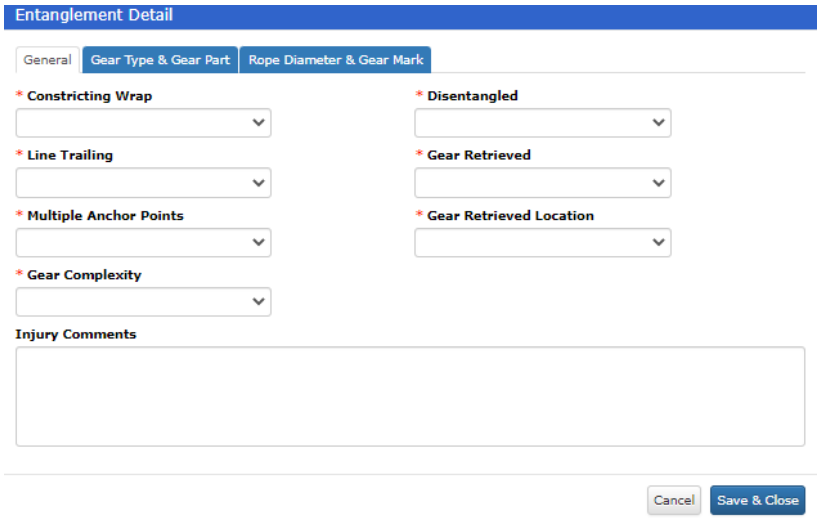


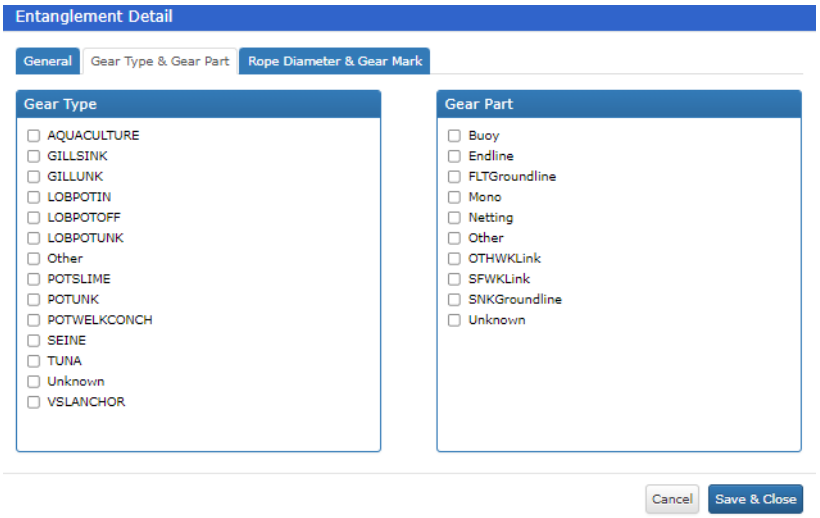
Figure 13. Injury Case Details screen with accompanying Injury Details form below. The Injury Details form is determined by Injury Type. Here, this injury type is a vessel strike, and therefore the Vessel Strike Details form (red box) is retrieved.

The ability to edit these Injury Details is also determined by a smart function. If the injury is an entanglement with no gear, then the Entanglement Details form is locked for editing. This is because all of the fields in that form are related to gear and if there is no attached gear, there is no data to enter. If the injury is entanglement WITH gear, then the Entanglement Details form becomes editable. Data in this form is entered via three tabs (Figure 14a-c) and required data fields are indicated by asterisk. For vessel strike injuries, the Vessel Strike Details form is editable for all events and includes two data entry fields (Figure 15).

(a)



(b)



(c)

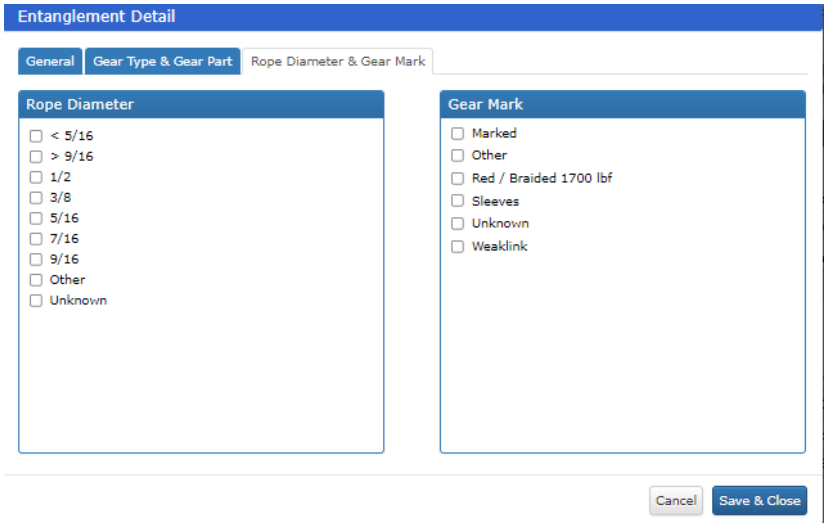


Figure 14 (a-c). Editable tabs for the Entanglement Details form. Here details related to the entangling gear and disentanglement efforts are recorded. Required fields are indicated by red asterisk. These forms are editable only when the entanglement event includes attached gear.

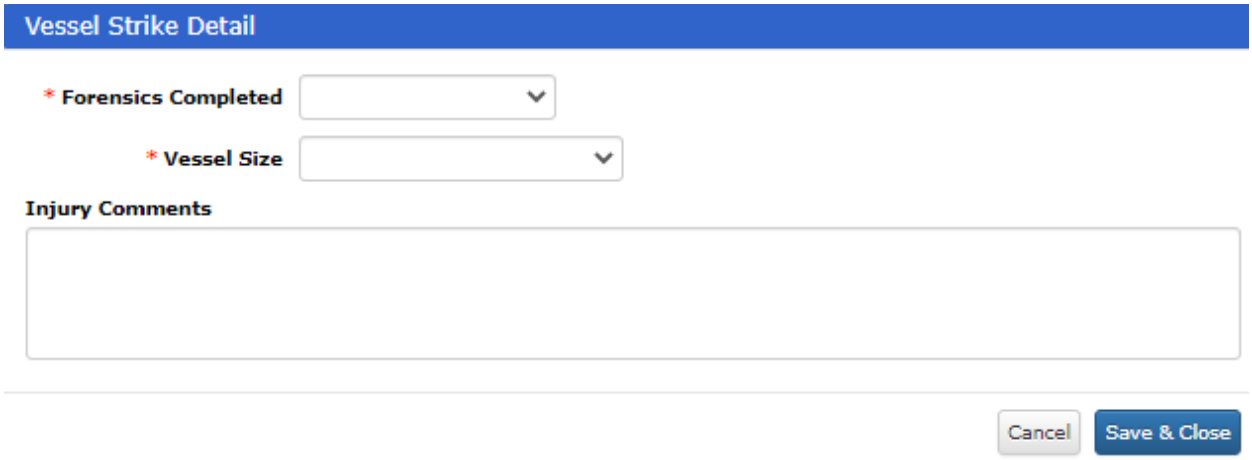


Figure 15. Data entry form for Vessel Strike Details.

Deleting Injury Case

Deleting Injury Cases can only be done through the Right Whale Identification Database. If an Injury Case has already been linked to a Monitoring Case (see below) the user will be required to unlink the cases from the Monitoring Case portal before proceeding.

<u>LINKING MONITORING AND INJURY CASES</u>

While the Monitoring and Injury portals separately and independently receive data from different sources and on different timeframes, one of the greatest utilities of the Anthropogenic Events Database lies in the ability to ultimately link the information stored in these separate portals. This linkage allows for the connection of injury details, life history information, and the impact of the injury on the whale over time.

Linking of Monitoring and Injury Cases is executed via the Monitoring Case portal (Figure 16). From the Monitoring Case Details screen, the user clicks "Link to Injury."

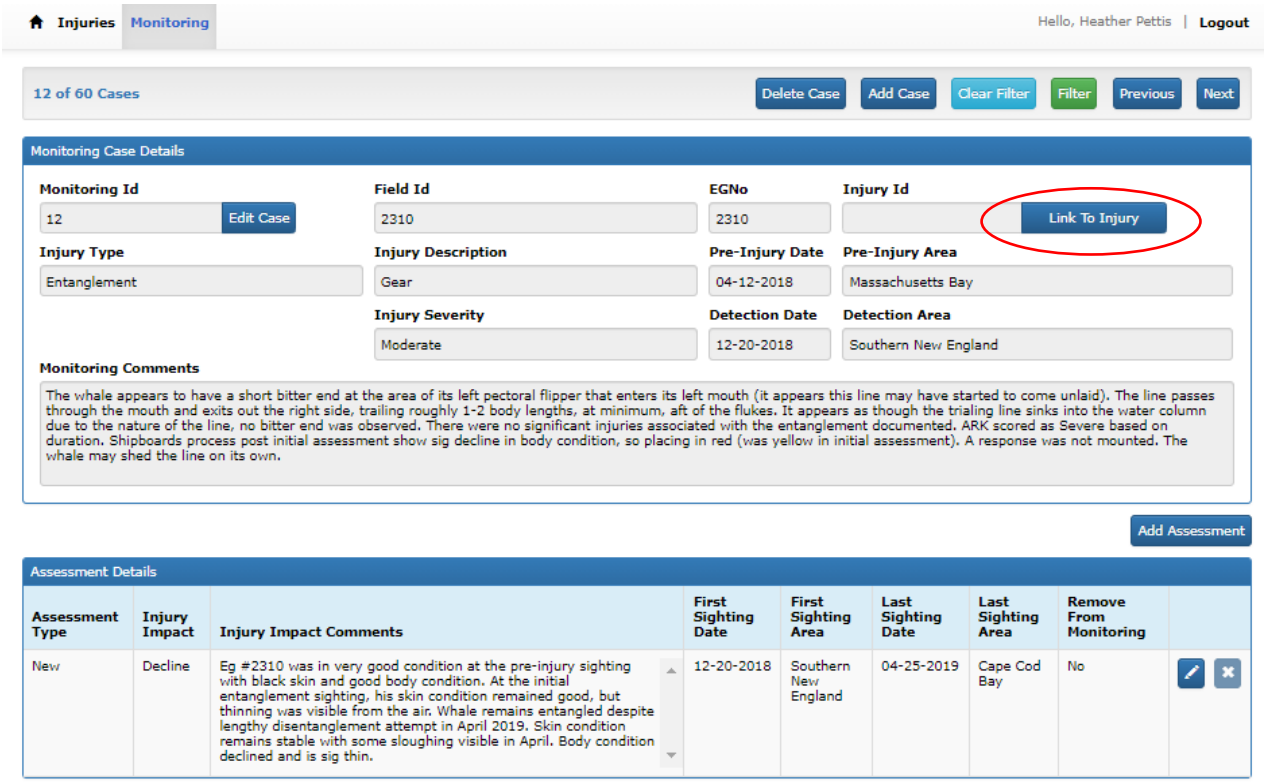


Figure 16. Monitoring and Injury Cases can be linked via the Monitoring Case portal. From the main Monitoring Case Details screen, the user clicks the "Link to Injury" button (red circle).

A list of injury events for the whale is retrieved and the user selects the appropriate injury (Figure 17). Selection of the appropriate injury event is straightforward from this screen and is determined by injury type and date.

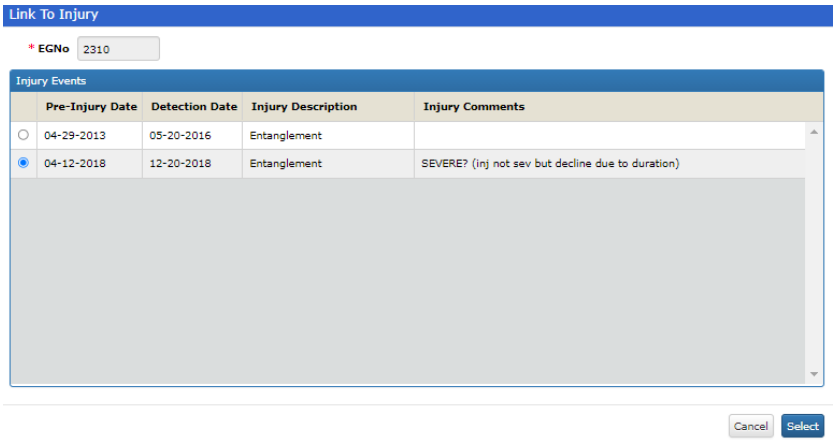


Figure 17. Upon clicking the "Link to Injury" button from the Monitoring Case portal, injury events for that whale are returned. The user then selects the injury type and date that correspond to the Monitoring Case.

Once the user selects an injury event to which to link a monitoring case, the Monitoring Case Details fields are re-populated with corresponding data from the Injury Case details (Figure 18). This is a critical step in the linkage of these two data sources. Because the data stored in the Injury Case are live and direct from the Identification Database, they represent the most up to date and accurate data tied to the injury event and the whale. While the Monitoring Case data are collected in real time, there may be additional sightings of a whale processed after their initial entry. Additionally, there may be updates to the injury severity determinations. Therefore, by re-populating the Monitoring Case Details with those from the Injury Case (and by extension directly from the Identification Database) the data related to injury and monitoring are accurate and consistent across portals. In addition to the re-populated fields, once Monitoring and Injury cases are linked, the comment section from the Injury Case and the linked Injury Case ID are added to the Monitoring Case Details screen (Figure 18).

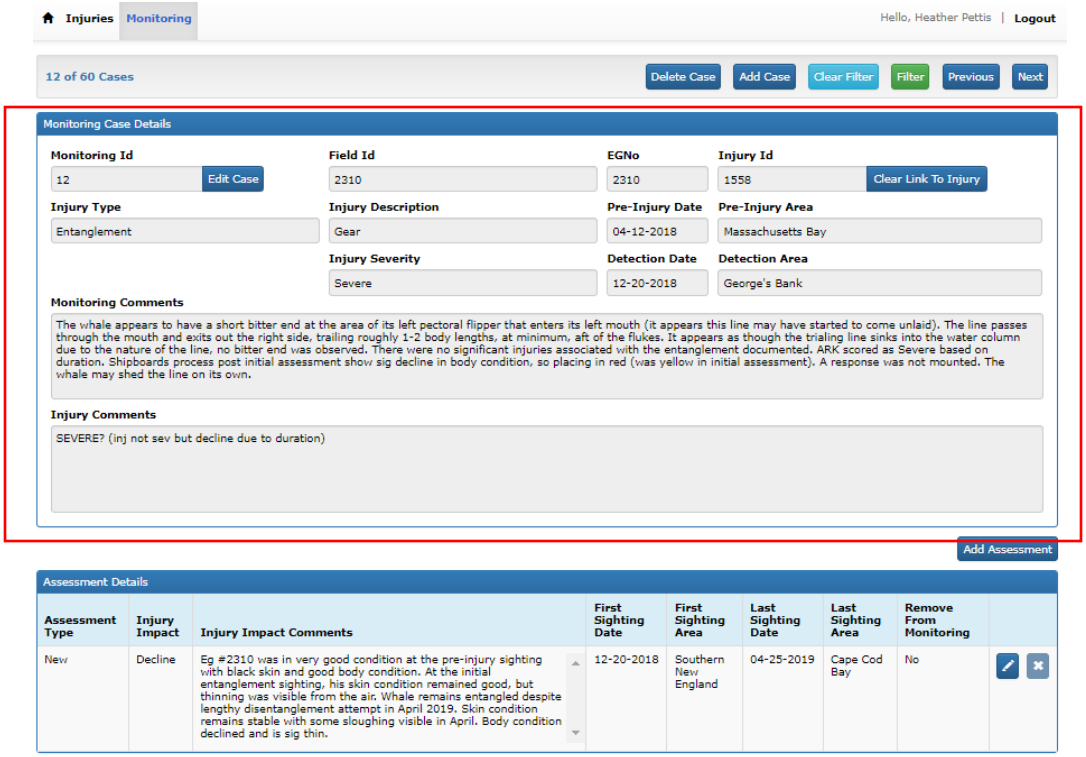


Figure 18. Once Monitoring and Injury Cases are linked, data populating the Monitoring Case Details screen are re-populated with data from the Injury Case and Injury Case Comments are added to the screen (red box).

Once the link between a Monitoring and Injury case has been made and the Monitoring Case Details screen has been re-populated with data from the Injury Case, these data may only be edited directly within the Identification Database. The user may, however, view the original data entered for the Monitoring Case Details by clicking on the “Edit Case” button (Figure 19). This action returns a pop out of the original data, with a message explaining that the data have been linked and is not editable (Figure 19).

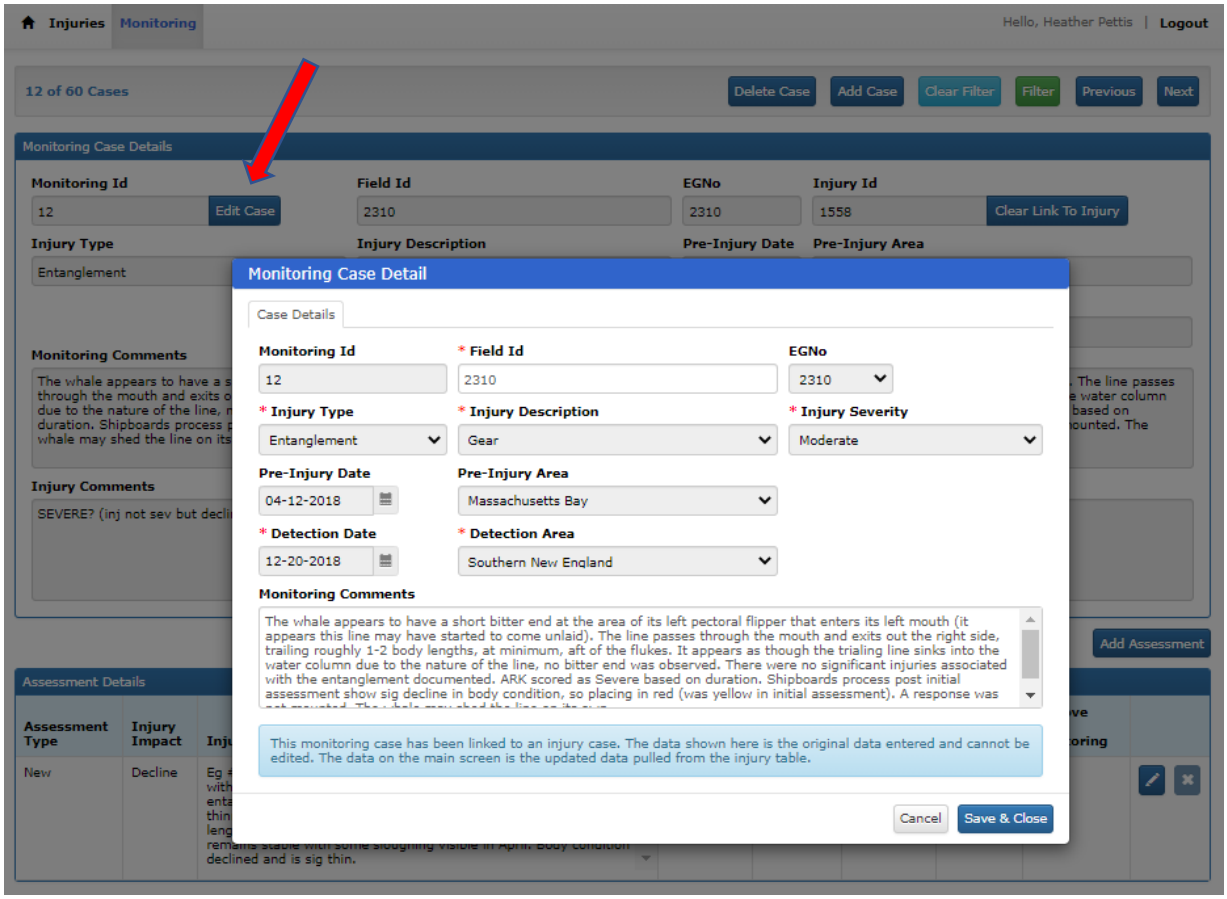


Figure 19. Once Monitoring and Injury Cases are linked, data populating the Monitoring Case Details screen are re-populated with data from the Injury Case and cannot be edited. However, the original Monitoring Case Details are viewable by clicking the “Edit Case” button (red arrow). That action returns a Monitoring Case Detail pop out with the original data entered as well as a highlighted message to the user explaining the data.

DATA TABLES

The Monitoring and Injury portals are interactive forms that collect and display data. The actual data are stored in data tables within the Right Whale Identification Database. A list of the data tables, including name, type, and source data is included in Appendix 1.

Appendix 1.

North Atlantic Right Whale Anthropogenic Events Database - Dropdown Menus			
Monitoring Case Details Dropdown Menus			
EGNO	**Injury Type**	**Injury Description (entanglement)**	**Injury Description (Vessel Strike)**
List of all EGNO	Entanglement	Gear	Blunt
	Vessel Strike	No Gear	Gash
	Unknown	Unknown	Prop cut(s)
			Unknown
Injury Description (Unknown) Strike)	**Injury Severity (Entanglement)**	**Injury Severity (Vessel Strike)**	**Injury Severity (Unknown)**
Gear	Minor	Deep	Minor
No Gear	Moderate	Shallow	Moderate
Unknown	Severe	Superficial	Severe
Blunt	Unknown/Inconclusive	Unknown/Inconclusive	Unknown/Inconclusive
Gash			Deep
Prop cut(s)			Shallow
			Superficial
Pre-Injury Area	**Detection Area**		
All Areas in Identification Database	All Areas in Identification Database		
Monitoring Case - Assessment Detail Dropdowns			
Assessment Type	**Injury Impact**	**First Sighting Area**	**Last Sighting Area**
New	No Impact	Areas defined by Identification Database	Areas defined by Identification Database
Update No Change	Decline		
Update with Change - Improve	Extended Monitor		
Update with Change -Decline	Inconclusive		
Update Remove			
Removed from monitoring?			
No			
Yes - Became Presumed Dead			
Yes - Died			
Yes - Recovered			
Yes - See Comments			

Appendix 1.

Injury Case Entanglement Detail Dropdowns			
General			
Constricting Wrap	**Line Trailing**	**Multiple Anchor Points**	**Gear Complexity**
Yes	No	Yes	High
No	Unknown	No	Low
Unknown	Yes, <50ft	Unknown	Unknown, Inconclusive
	Yes, 50-100 ft		
	Yes, 100-500ft		
	Yes, >500ft		
	Yes, unknown length		
Disentangled?	**Gear Retrieved**	**Gear Retrieved Location**	
Yes	Yes	CCS	
No	No Unknown	DFO	
Partial		NMFS Cache	
Unknown		Not applicable	
		Other	
		Unknown	
Gear Type & Gear Part		Rope Diameter &Gear Mark	
Gear Type	**Gear Part**	**Rope Diameter**	**Gear Mark**
AQUACULTURE	Buoy	<5/16	Marked
GILLSINK	Endline	>9/16	Other
GILLUNK	FLTGroundline	1/2	Red/Braided 1700lbf
LOBPOTIN	Mono	3/8	Sleeves
LOBPOTOFF	Netting	5/16	Unknown
LOBPOTUNK	Other	7/16	Weaklink
OTHER	OTHWKLink	9/16	
POTSLIME	SFWKLink	Other	
POTUNK	SNKGroundline	Unknown	
POTWELKCONCH	Unknown		
SEINE			
TUNA			
UNKNOWN			
VSLANCHOR			

Appendix 1.

Injury Case Vessel Strike Details Dropdowns			
Forensics Completed	**Line Trailing**		
Yes	Vessel Size		
No	<40ft		
Unknown	40-65 ft		
	>65ft		
	Unknown		

Appendix 1.

Anthropogenic Events Data Tables		
Table	**Type**	**Explanation**
dbo_DeathCause	Look up	Data in WhaleInjury
dbo_GearComplexity	Look up	Data in WhaleInjury
dbo_GearMark	Look up	Data in WhaleInjuryGearMark
dbo_GearOrigin	Look up	Data in WhaleInjury
dbo_GearPart	Look up	Data in WhaleInjuryGearPart
dbo_GearRetrievedLocation	Look up	Data in WhaleInjury
dbo_GearType	Look up	Data in WhaleInjuryGearType
dbo_LineTrail	Look up	Data in WhaleInjury
dbo_LocationAccuracy	LookUp	Data in Sightings
dbo_MonitorAssessment	Data	Monitoring cases- may or may not be identified whale
dbo_MonitorAssessmentType	Look up	Data in MonitorAssessment
dbo_MonitorCase	Data	Link between monitoring case and injuryID
dbo_MonitorRemoveReason	Look up	Data in MonitorAssessment
dbo_RopeDiameter	Look up	Data in WhaleInjuryRopeDiameter
dbo_Timezone	LookUp	Data in Sightings
dbo_VesselSize	Look up	Data in WhaleInjury
dbo_WhaleInjury	Data	Vessel strike and entanglement events
dbo_WhaleInjuryGearMark	Data	Links gear marking to InjuryID
dbo_WhaleInjuryGearPart	Data	Links gear part to InjuryID
dbo_WhaleInjuryGearType	Data	Links gear type to InjuryID
dbo_WhaleInjuryRopeDiameter	Data	Links rope diameter to InjuryID
vw_MonitorAssessment	View	
vw_MonitorCase	View	
vw_WhaleInjury	View	

Appendix 1.

Proposed data entry form mock ups

Injury Data Entry Form

Injury ID
EGNO
Batch ID
Age at Injury
Age Class
Sex

Injury Type
Pre-Injury Date
Pre-Injury Area
Pre-Injury Latitude
Pre-Injury Longitude
Injury Description**
Injury Date
Injury Area
Injury Latitude
Injury Longitude
Injury Severity**
Injury timeframe
Case Study
Medical Intervention?

Mortality
Necropsy Performed?
Necropsy Field ID
Cause of Death
Necropsy Report

Injury Form Comments

Action Button Open Monitoring Form

Date Last Sighted Alive

Action Button Link Injury to Monitoring

Entanglement Event ID

Injury Description**

Injury Severity**

Gear Configuration Risk
Gear Type
Gear Part
Rope Diameter
Constricting Wrap?
Line Trailing?
Multiple Anchoring Points?
Origin of Gear

Disentangled?
Gear Retrieved?
Retrieved Gear Location
Date Line Gone

If Entanglement Injury – this box appears to continue entry

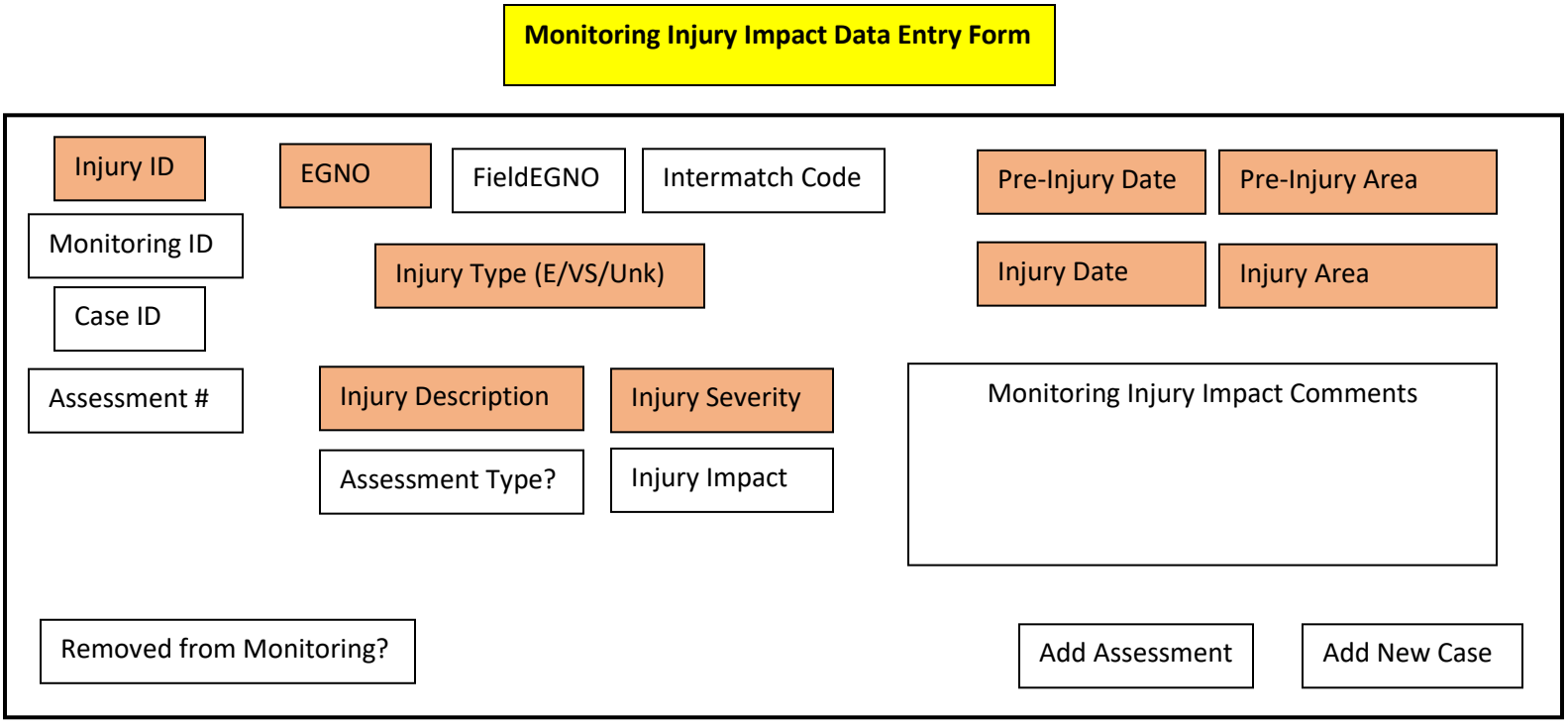
Vessel Strike Event ID

Injury Description**

Injury Severity**

Vessel Strike Forensics Completed?
Vessel Size

If Vessel Strike Injury – this box appears to continue entry



Right Whale Anthropogenic Events Database Forms

Injury Form

- This grey top area will appear for all injury events. What appears below will depend on whether the injury is entanglement or vessel strike.
- Grey area are fields that will be displayed regardless of injury type
- Injury type – auto fill of Entanglement or Vessel Strike information from Catalog
    - This field will determine which of the two bottom set of fields will display for filling in.
- Blue highlighted fields will come from Catalog
- *Action Button* Open Monitoring Form
    - This will open monitoring form for this particular injury, going to the first assessment of the case. If there is not a corresponding Case ID in the monitoring form a message pops that says "No monitoring for this injury."
- *Action Button* Link Injury to Monitoring
    - This will link Injury ID in this form to "Case ID in separate Monitoring Injury Form Once linked, some fields from the Injury Form will overwrite those in Monitoring Form.

Monitoring Form

- Case ID – Unique for each new monitoring event. A whale can have multiple assessments under one case
- Assessment #: Each time a whale is resighted/assessed for injury impact, a new form entry would be made.
- Everything in this form will be manually entered initially
- Injury ID will be blank until linked to Case ID linked to Injury form
- Once a link is made between Injury ID and Case ID, the orange highlighted cells would be overwritten with fields from Injury Form data including:
    - Whale ID, pre-injury area, injury area, injury date, injury type, injury description, injury severity