NARWC
THE NORTH ATLANTIC
RIGHT WHALE CONSORTIUM

New England
Aquarium

Protecting the blue planet

Anderson Cabot
Center for Ocean Life
at the New England Aquarium

North Atlantic Right Whale Consortium Photographic Database/Catalog Submission:

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Introduction

The North Atlantic Right Whale Consortium (NARWC) was formed in 1986 to coordinate and standardize research efforts among the many institutions doing right whale research. As one of the Consortium's mandates, sighting data and associated photographs of individual whales collected by various groups are compiled at the New England Aquarium (NEAq) to form one comprehensive identification database. This collaboration has been extremely successful and to date, NEAq has received right whale photographs and corresponding data from more than 700 organizations and individuals.

Over the past 15 years, the number of individuals and institutions contributing to the photo-identification database has increased dramatically and the number of right whale sightings contributed to the database can average 3,000-4,000 annually. Since 2021, the annual number of images contributed has reached over 100,000 images in addition to hundreds of videos. Prior to 2005, there was no standardized protocol for submitting photographs and associated data to the identification database. It is our intention that this guide will allow for more efficient processing of data and photographs and will lead to timelier identifications.

Major contributors that submit photographs and associated data in a substantially different format than the established protocol will be asked to resubmit their data in the prescribed format.

The Identification Database (Catalog) is housed in Microsoft SQL Server and contains information on all photographed right whale sightings, including whale ID, date, time, location, platform, observer, behaviors, associations, comments associated with the sighting information unique to individual whales, and includes name (if applicable), sex, age, identity of mother and father if known, genetic haplotype, first known calving year, year of last sighting, and information on individual markings. In addition to photographed sightings, the database now contains any record that can lead to an individual identification. This includes sightings with skin samples or feces (both of which can be identified to individuals by genotyping) collected from unphotographed whales, as well as quality locations from satellite tags attached to identified individuals. This identification database is linked to several other databases that contain information on genetics, scarring, and individual whale health. This database has served as an invaluable tool with which to monitor trends in reproduction, mortality, entanglements, and health.

Since unphotographed sightings don't get entered into the database (without skin, feces, or satellite positions), and photographs without date, time, and location data are

meaningless in the database, it is imperative that, when available, these key pieces of information are submitted for every right whale sighting.

NARWC DATA

Your submission to the NARWC Photo Identification Database/Catalog represents you or your organization/agency as a Contributor to the NARWC and as such, your data will be included in this scientific resource. Access to these data for scientific, educational, conservation and management purposes is encouraged within the NARWC community. Contributors to the Catalog have full and unrestricted access to use of their own data. Proposals for data access from scientists, managers, students or other individuals with a bona fide purpose will be reviewed by the Consortium Board members. Given the great effort required to collect the available data, the Consortium and the curators of the data have an obligation to protect the rights of contributors by placing certain restrictions or conditions upon access to, and use of, the materials within it. Access to the database may be requested via the Consortium Executive Administrator following the Data Access Protocol.

Please direct any questions about the Data Access Protocol to narwc@neaq.org.

Photographing Right Whales

What to Photograph

Ideally, an attempt should be made to photograph all right whales seen while complying with federal regulations (in the U.S. that's staying at least 500 yards away), unless working under a permit. Right whales are individually identified by patterns of raised skin, or callosities, on the tops of their heads. Therefore, when photographing right whales, it is imperative that the photographer gets clear shots of as much of the whale's head as possible. Ideally, left and right head shots should be obtained from vessel platforms and full dorsal view head shots should be obtained from aerial platforms. Callosity patterns are greatly distorted when the whale is even a few inches subsurface, therefore, it is important to take photographs when the whale's head has broken the surface of the water and the callosity pattern is clearly visible. The only exception to this is when a whale is subsurface and the Beaufort sea state is 0 (ocean surface appears as a mirror, there is no swell, and no rippling on the water surface); any faint ripple on the surface will distort the pattern, so attempting to photograph a whale subsurface while in a sea state 1 or more is not typically useful. Most subsurface photographs are not identifiable and will never be matched to the catalog. Callosity patterns can also become severely distorted if photographs are not clearly in focus. Attempts should be made to ensure that the whale is in focus before photographing. Waiting to ensure that a whale has completely surfaced and is in focus will greatly increase the likelihood of a match to the catalog.

Although our primary objective when receiving photographs is to match individual whales to the catalog, photographs are also used for other purposes, including health assessment, scarring, and entanglement analyses (see photographing for Health Assessment and Scarring Analyses). For these analyses, it is very important to have as much of the whale photographed as possible, such as the head, full body series, flippers, flukes, etc. (regardless of if it has scars). If a whale has distinct markings or scars, it is helpful to photograph that as well. In attempting to thoroughly photograph all body parts, it's best to photograph them only after the head of the whale is successfully photographed. Even a whale that has a large scar or is missing part of a fluke may be new to the catalog or may have new injuries that have not been previously documented, so it is still always best to make every effort to get clear shots of the whale's head before photographing any other body parts. Just having a head, peduncle, and flukes photographed without the rest of the body often makes many analyses difficult or impossible. When/if things that stand out or look strange (new entanglement scars, skin lesions, etc.) those should be thoroughly photographed, ideally from different angles.

Things we look for during Health Assessment Analyses

Health parameters are best assessed using vessel-based images. However, aerial images can also provide a great deal of information about the visual health of right whales, particularly for those animals not typically seen in habitats surveyed by vessel.

- ***Rake marks*** - Good, clear shots of the area forward of each blowhole are needed. Lighting is important here - the lighter the image, the better. If you get a good, close, lateral shot of the head in good light, this is sufficient.
- ***Skin condition*** - This is the parameter that needs a full suite of body images to accurately assess. Shots of the head, back and peduncle area are needed. Photos showing good skin condition (i.e. clean, black) are just as important as those with lesions. This is a parameter that can be routinely scored from aerial photos, and so it is important to photograph as much of the body as possible from the air.
- ***Body condition*** - Lateral shots of the back are needed. It is best to get from the blowholes aft so that we can see the real "shape" of the back and it is best to get when the whale is not about to go down for a dive (a whale often lifts it's head up slightly just before diving, which changes the shape of the back and can make the whale look as if there is a dip present when, in reality, there is not).
- ***Cyamids in blowholes*** - Images just a bit back of lateral that show the blowholes are ideal. Also, images shot when blowholes are open are helpful. Again, photos of clean blowholes with no cyamids are just as important as those with cyamids.

Things we look for during Scarring Analyses:

We are mainly looking at scarring from entanglements and/or vessel strikes, as well as lesions/blisters. Full body series are vitally important for these analyses, but for entanglement analyses it's especially important to get clear shots of the peduncle, fluke insertions, and flippers (if visible) even if there aren't scars there. This is true even for aerial photos-always try to obtain some photos that include the peduncle and fluke (even if only subsurface). If these areas are not photographed, then that sighting cannot be included in certain analyses and our ability to determine when scars were acquired is greatly reduced. Photographs of the flippers are also very helpful because they often show evidence of entanglement scarring and can help us further understand the nature of the interaction.

Number of Photographs Taken

Given the increase in the number of institutions and agencies involved with right whale research over the past decade and the number of individual whales seen in some

years, the number of photographs submitted to the NEAq for analysis has dramatically risen and will likely continue to rise. We recommend that the number of photographs taken of a a given right whale sighting be limited to only those necessary to obtain clear information for identification, scar analyses, and health assessment (left and right head, flukes, chin, mandibles, scars, and full body), as well as images that show behaviors and associations. Researchers should periodically review their images to determine if they are over-photographing. The most common over-photographing situation is to have 10-20 virtually identical images by shooting multiple frames per second. However, regardless of how many photos are taken, contributors should not delete images prior to submitting to the NEAq as there are times when a sequence of images is helpful during photo analysis. It is also important to avoid deleting the body series of a whale even if there are no visible scars, as the lack of scarring is important data. However, if you are documenting some unusual behavior or encounter (e.g. a whale giving birth, swimming into fishing gear or into the path of an approaching vessel) take as many photos as necessary to tell the story, even if it is not possible to get clear head shots. Deletion of all images will be done by NEAq personnel to ensure that all images necessary for the wide variety of data needs are preserved.

Data Collection While Photographing Whales

There are several important pieces of information that should be collected while photographing whales. These data are vital to the catalog and to the many sets of analyses performed by many of the contributing organizations.

Lettering Animals (preferred but NOT mandatory)

When right whales are sighted, each right whale photographed should receive a letter for the day to help the observers keep track of which photos go with which sighting. However, experience of survey teams and/or number of whales sometimes precludes this from being done. If observers are comfortable and have experience distinguishing different callosity patterns, then lettering should take place in the field. If not, then very detailed notes of time, location, and specific images/frames need to be taken while photographing. In either case, it is often helpful to have someone responsible for drawing distinguishing characteristics of the whales (including callosity pattern, scars, belly/chin color, etc.) on data sheets.

- If observers do letter in the field, lettering should begin with A and continue through Z. If more than 26 whales are photographed, then lettering can continue with AA through ZZ, and so on. It is important that each individual whale photographed receives a new letter for each sighting. Examples are provided below: If a whale is

seen three times in one day, but during three different sightings (each with a different time and position), then each sighting would receive a new letter, and notes should be made indicating that all three sightings are of the same whale (these can be simply noted as conditional duplicates if you wish). Please note that we (NEAq) may end up combining some sightings later, but in the field and in your submission, it is best to give each re-sight a new letter.

- If a large group of whales was photographed, a SAG for example, then each whale within the SAG would receive its own letter.
- Each platform photographing right whales should begin the day lettering with A. If two platforms from the same organization are surveying simultaneously, each platform should begin with letter A, and indicate the specific platform on their data. Do not try to synch the lettered whales of one platform with another. This **always** leads to confusion in data processing.
- When conducting UAV/RPAS work, and photographing is occurring from the platform from which the UAV/RPAS was launched (vessel or land), as well as from the UAV/RPAS, do not attempt to match lettering. The UAV/RPAS will represent an entirely different dataset (and submission) from the mothership (or land) platform.
- If members of two or more organizations are photographing from the same platform, those people should coordinate data collection and compilation of images prior to submission. All data from that platform should be sent to NEAq at the same time.
- If a single platform (e.g., a whale watch boat), makes several trips a day, then the first trip would begin lettering whales with A. Subsequent trips should begin lettering where the previous trip left off.
- Mother/calf pairs should be photographed as two lettered animals, with the mother receiving a letter and the calf receiving a separate letter.
- If an un-lettered whale is found while reviewing photographs prior to submission, that animal should receive a number (see Submission of Digital Images and Data, page 15).
- Whales that are not photographed should not be lettered and do not need to be included in the submission table. However, photographed whales in a group where one individual was not photographed should be given the behavior ‘with un-photographed whale’.

Depending on how many whales are in a group and the experience of the photographer at distinguishing different callosity patterns, it may not always be possible to assign a letter in the field. In such situations, simply make sure that you record time and position regularly and that those times are somehow linked to the images (for example, it could be noted that frames 1-50 are of a SAG of six whales and possibly additional animals). Also, if you know you have photographed a head and then the flukes of the same whale, simply take a spacer shot (person, boat) and record in the data that the two frames prior to the spacer are of the same whale.

Time and Location Data

The time (and time zone) and location at which each whale is photographed should be recorded. Only the initial time of photographing needs to be reported in the submission table. If you work a whale for 30 minutes, you do not need to record the time for every photograph shot during those 30 minutes. The time and location for all associated animals (e.g. mom/calf pairs, SAGs, etc., see below for *Association Descriptions*) should be identical. Latitude and Longitude data can be submitted in decimal degrees, degrees/decimal minutes, or degrees/minutes/seconds (not preferred). These data should be submitted in whichever form they were collected rather than converting from one form to the other. When possible, please submit decimal degree locations out to five decimal places and degrees/decimal minutes out to three decimal places. It is best to submit raw data to avoid the possibility of error during re-typing. If re-typing data is necessary, please thoroughly proof the file against your raw data *before* submitting. If you have a file that has the location of the platform recorded throughout the day and/or any data sheets, please submit those as well as pdf or excel files. This will allow us to troubleshoot any problems that come up with the data.

It is very important to have the metadata time on cameras synchronized with watches used when recording paper data, electronic logging equipment (if used), GPS and UAV/RPAS. When metadata are synched with your sighting times, it makes it much easier to sleuth out any confusion when analyzing images.

Behaviors/Notes

Many right whale behaviors observed in the field are not obvious in photographs, so it is important that the individual/organization photographing each right whale sighting clearly records in their data any observed behaviors. If you are observing a behavior that can be photographed, such as a SAG or echelon feeding, zoom out and take a few shots that clearly show the behavior. If a whale rolls over, attempt to get photo documentation of the genital area and stay with it until a corresponding headshot can be obtained. If you feel the

behavior you observed needs more explanation, use the notes or comment column in the data table. A list of the common right whale behaviors with descriptions can be found in **Appendix 1 (alphabetically) and Appendix 2 (by group)** of this document. Please refer to detailed descriptions and definitions of behaviors before assigning specific behaviors to whales. Note that collecting behavioral data is problematic from any platform: it is difficult to do from a vessel and VERY difficult to do from a plane. It should be consistent and detailed and is preferable to have no behaviors recorded rather than putting down something that is inconsistent between groups or inaccurate. Our motto with all data processing is **"When in doubt, be conservative."** If you record a behavior that is not photo-documented, please indicate that in the submission table.

Associations

Association types between right whales have been described and are included in the identification database. Right whales are considered to be associated when two or more whales coordinate their movement within a body length or two. Since many photographs of right whales are close-ups of heads and/or body parts, it is likely that many associations are not obvious from photographs. Therefore, it is important that observers record specific information about right whale associations in their data. A list of associations and their descriptions, please see Table 1.

Association Codes and Descriptions

All association codes that pertain to each sighting should be indicated. For example, if a M/C pair is in a SAG or are feeding together, select both. It is equally important to note when whales are not associated, particularly if they are close to one another and are photographed at the same general location and time. Improved clarity in data and behavioral recording will greatly improve the quality of the Identification database, and thereby subsequent analyses and interpretations. If whales are not associated (even if in very close proximity to each other) they should either have a different position in the submission table or state clearly that they were at the same location but not associated.

Table 1:

Associations Codes

Association Type Code	Description
1	SAGs
2	Mother/Calf/Yearling
3	Feeding – more than one whale associated and feeding - mouth open
4	Others - pairs, trios, no visible behavior, includes M/C with others (if not in a SAG or feeding)
5	Singleton

Biological samples

Biopsy Darting

If a whale is biopsy darted, it is extremely important to provide this information when submitting data. Included in the data should be the type of sample acquired (i.e. skin only, skin and blubber, or no sample) and, when possible, a confirming ID shot of the whale at the exact time of darting. Additionally, the whale's pre- and post-darting behavior should be noted. A whale should be coded with a behavior of "darted" when the photographs being submitted are from the platform that darted the whale (e.g., a plane flying over a boat that is darting a whale should *not* record darting as a behavior). However, if the non-darting platform has photographs of the actual darting, this information should be included in the notes. There are darting sample preservation protocols in place depending on the type of sample obtained. Organizations should consult with the institution receiving the samples to obtain the appropriate protocol. Please provide a list of organizations that received any portion of the sample. This is particularly helpful when comparing Catalog records to databases of samples maintained by other organizations.

"Darted" is also used when a genetic sample is collected from a dead whale, even though a biopsy dart is not used to collect that sample.

Appropriate behaviors associated with biopsy darting include (but not limited to): **DRT, DRT NO SMPL, SK, SK&BL, and RXN.**

Fecal Samples

If a fecal sample is collected in the field, it is very important that you note which whale the sample came from, if known, and the corresponding letter and frame numbers associated with the sample. If there is more than one whale and it is unknown which whale the sample came from, you should note the group information (i.e., sample from a whale in SAG Eg N-AA) and the group's corresponding frame numbers. If the sample is collected in the absence of whales, then a time and position should be noted and a clear note made that the sample is not linked to any photographed whale.

Appropriate behaviors associated with fecal sample include (but not limited to): **DFCN and DFCN SMPL.**

Respiratory Vapor/Blow Samples

If a blow sample is collected in the field it is extremely important that you note which whale the sample was obtained from, corresponding frame numbers, and the whale letter (if known).

Appropriate behaviors associated with blow sampling include (but not limited to): **BLOW.**

For biological samples obtained from UAV/RPAS platforms, please refer to Appendix 15

Data and Photograph Submission

At the end of a survey season (or monthly, within a long survey season, if possible), or following an opportunistic sighting of right whales, photographs and corresponding data should be submitted to the NEAq in a timely fashion. To ensure that all necessary information is included, we have developed a Data Submission Cover Sheet (**Appendix 3**).

The Data Submission Cover Sheet, along with photographs and corresponding data, should be forwarded to:

rwdata@neaq.org

It is crucial that **all** photographed sightings and corresponding data be submitted together. We will no longer accept submission of one without the other, as this makes both matching and data processing extremely inefficient and can potentially lead to errors in the database. (The *only* exception to this policy is when there is a sighting of entangled, dead, or injured whales or whales on the current APB list. See "*Entangled and Injured*" below). If you have a long field season, you are encouraged to submit images and data in two or three batches, but again, all images and sighting data for each batch must be complete. Submitting early will allow us to get a head start on data processing and intermatching. Providing preliminary identifications of the whales you sighted is very helpful, but please do not postpone your data submission because not all the whales are identified.

To streamline final matching and data processing, the NEAq will wait to receive all photographs and corresponding data from all individuals/organizations surveying a particular area each season before making final matches to the database and relaying final data back to organizations. This allows us to intermatch all sightings within an area/season and speeds the rate of final photographic processing tremendously, which in turn will increase our efficiency in getting final matches and individual whale information back to submitting individuals/organizations.

Once a data set is received, the contributor will be notified that all necessary information has been received and we will begin data processing.

Overview of Submission Protocol

- **Sighting data should be submitted to the NEAq in its raw format.**

  We encourage contributors to pull in raw lat/long and time data into the template from their logging software to eliminate errors in the transcribing of data. This should be in a single data table for **EACH** survey platform/observer code. We encourage contributors to add any additional columns that are needed to provide additional information. An example of a common data table layout is provided in Table 2. Additionally, we encourage the submission of any associated information (such as scanned data sheets) when possible, as this will streamline any problem solving that needs to be addressed.

- Every contributor is assigned an observer code. Some contributors have multiple codes because of multiple surveys or platforms. Prior to a field season, contributors should contact the Data Coordinator if something has changed (e.g., a new platform, new affiliation or new organization name).

- If you are a new contributor, or a substantial portion of the following information has changed for an existing contributor, please email the Data Coordinator with the following: primary contact person, organization or affiliation where data are housed, phone number, email, address, and platform name. The Data Coordinator will contact you with the appropriate observer code.

- Included with submitted data should be a Data Submission Cover Sheet, provided in **Appendix 3** and available from the Data Coordinator in electronic format. Data should never be handed off without an accompanying Data Submission Cover Sheet.

- Include a list of photographer's names and initials from the season. If you do not want individual photographers credited, please state clearly how you want the images to be credited with your submission (e.g. NEA instead of John Smith/NEA). Photographer's names can be listed on the cover sheet or in an individual document.

- All photographs associated with sighting data for a season must be submitted with data.

- Please be sure to proof your data prior to sending it.

Table 2:

Example Data Table

Field EGNO	EGNO	EG Letter	Time (timezone)	Day	Month	Year	Latitude	Longitude	Area	Obs	Platform	Image Type	Assoc Type	Behaviors	Notes	Photographer	Frames

Depending on survey experience and group size of the whales photographed, survey teams may or may not feel comfortable or be able to distinguish between different whales during photo processing. To address this, we will accept data submissions as listed below.

Submission of Digital Images and Data

What to Submit:

At a minimum: The minimum we need from a data submission is all images in folders by date and platform and a file with sighting and photograph information. Details are provided below:

- All images from a single day and from each research platform should be copied into a day folder without changing the names of the images. **It is very important that digital image names do not get changed in the download process from the original name given to the image by the camera,** as this is the only link there is to the raw data collected in the field. **Day folder**s should be named in the following format: year-month-day-observer-platform. For example: 2003-08-01-NEA-N for August 1st on the NEAq boat *Nereid*.
- Datasets (data tables, all associated images, coversheets, etc.) may be submitted on an external hard drive, jump/thumb drive or (for a single opportunistic sighting) via an FTP site, Dropbox™, Google Drive™ or similar web-based method.
- *Contributors in need of an external hard drive for data submission can contact rwdata@neaq.org for borrowing purposes.
- Images should be submitted as JPEGs whenever possible.

- **Image Size**: Images should be submitted **BOTH** in their original format and at a size of approximately 2.0 MB -2.5 MB/image. We have determined that this size is sufficient for matching needs.

** When converting/re-sizing images, it is important to use a program that allows for the retention of metadata and the original file name, as well as not degrade the quality of the image by removing pixels. There are times when using more than one CF, SD or Micro SD card is necessary during a day. All images for a particular day should be downloaded into the same folder. Use your downloading software to download images with a prefix. For example, card #1 for the day might be download as Card1_###.jpg. You can also do something similar to represent multiple cameras being used on the same day.

- Images will be separated into individual animals by NEAq using the Digital Image Gathering and Information Tracking System (DIGITS), so no attempt should be made to separate images into individual animal folders.
- A single electronic file (see **Table 2** for example) must be submitted with the season's sighting data that includes the date, time, and position of photographs. If photographs do not have synched metadata information on them, we will need some reference in this file as to when images (referred to by their original file name given by the digital camera) were taken. ***There should be separate files for each platform surveying*.** Please name the file in the following format: "ObserverCode-Year-Month(s)" (e.g., NEA-A-2008-Dec-Mar).
- Images should **NOT** be cropped, as valuable information about the situation (e.g. associations, entanglements) could be lost. Please contact the Data Coordinator if there is a specific question regarding your images.

Preferred Additional Information:

For those individuals/organizations able to letter animals in the field and are comfortable with distinguishing different callosity patterns, the following information would be appreciated, **but is not mandatory:**

- Individual whales (with associated data) listed in the data table by frame number (do not separate actual images into separate folders).
- Scanned copies of associated data sheets or drawings/descriptions of whales taken in the field. These are particularly helpful in distinguishing whales in large groups during analysis. We want to make sure that the whale you called 'A' is the same whale we are calling 'A'. Or you can list a single frame in your data table as a "type

frame" for the best ID shot of an individual whale (be sure to denote which whale in the frame you are referencing).

- For every **photographed** right whale sighting, a single line is entered into this data table (see table below for entry examples). Included on each line should be:
    - Right whale letter
    - Day, month and year of sighting
    - Time of initial sighting
    - Position (latitude and longitude) of sighting
    - Area (i.e. FL, GSC, GOM, BOF, MB, GA, etc.)
    - Observer code
    - Platform type (A=aerial; S=shipboard; L=land)
    - Image type (DS=digital, SL=slide, PR=print, PD=printed digital photo, DSS=digital still-scanned. DSS would apply to slides or prints that have been scanned into digital form)
    - Association type
    - Behaviors (see **Appendix 1 and Appendix 2)**
    - Comments and notes
    - Photographer's initials
    - Frame numbers or one frame number of the given individual
- The range of images of a photographed sighting should be recorded. It is essential that the image names or frame numbers listed in this table exactly correspond with the names or frame numbers on the images submitted.
- It is not necessary (but is appreciated) to list each individual whale in a group by at least one frame number. Alternatively, you can simply list the range of frame numbers for the entire group. For example, SAG Eg K-Z is Frames D300s_012-D300s_089.
- When reviewing your images at a later date, it is not unusual to come across a whale that was "missed" and not lettered in the field. If this happens, that whale should be given a number and a row in the data table. The whole day should **NOT** be re-lettered because of that whale. For example, while looking through photos of SAG Eg B-C, you find an animal that was photographed but not lettered or drawn on the field whale watcher sheets. This animal would become #1 and would have a row in the data table under Eg C with the same sighting information as the rest of the SAG. This animal would NOT be Eg D.

Entangled, Sick or Newly Injured Whales

Sighting data and images of entangled, sick, and newly injured whales should be submitted as soon as possible. In this situation, you do NOT need to wait until the rest of the data are complete and ready for submission. Submit ALL images of the sighting via an FTP site, Dropbox™, Google Drive™ or similar web-based method and in the same format previously described. Include a document or table with the same information required in the data table. However, you MUST still include this sighting in the complete data table submitted at the end of the season and note the date previously submitted in the "Notes" column. *Images of entangled, sick, APB or newly injured whales should NOT be considered submitted if they are the topic of email conversation and images are shared via email attachment, ftp sites or private/public web-sites.* Anytime you submit data formally**,** you will always receive confirmation of the submission by the data coordinator.

Injured Whale Monitoring

A current list of right whales on the active injury monitoring list is circulated in November and May. This list may include entangled, sick, or injured whales but can also include other whales of special concern. Sighting data and images of whales on the monitoring list should be submitted as soon as possible. Additionally, if new injuries/whales of concern are detected, we ask survey teams to share those data and images as well. If you have a sighting to report, please upload representative images in a folder labeled with the naming convention EGNO-YYYY-MM-DD-OBS-AREA, (e.g. "3220-2012-12-01-NEA-GOM") to the whale monitoring image folder link and email the sighting information to hpettis@neaq.org . The image folder link will be sent to all survey teams each time the list is updated (every six months).

If you have further questions about this monitoring work and/or if you are in in need of the image folder link, you may contact Heather Pettis directly at hpettis@neaq.org .

Disentanglement Events

Images and sightings data from disentanglement events often don't make it to NEAq. These are confusing and stressful situations where the safety of the whale and the people are the primary focus and often the data are forgotten. If you are involved in a disentanglement event, please help to determine a point person who will be responsible for collating and submitting all the images, location and behavior data to NEAq. If that person doesn't have time to submit promptly, they should email the Data Coordinator simply to say that they are the data contact for that event and provide a time frame for when they expect to submit the data. People sometimes assume that once a whale has been identified,

no data and images need to be submitted, but that is not the case. Also, be sure to note whether any biological sample was collected from the animal, and if so, where it resides.

Dead Whales and Necropsy Images

Similar to disentanglement events, it is often the case with dead whales that many contributors are on site and photographing during the same event. If possible, it is best to appoint a single person to collect all images from various parties and submit that data in a single submission. The images only need to be grouped into folders by date and by organization. There is no need to have separate sub-folders for each photographer. Please note that all the images from the event will be entered into the database with the necropsy team leader's organization/agency as the observer code. Also, be sure to note whether a biopsy sample or fecal sample was collected from the animal, and if so, where it resides. Additionally, it is very important that images are submitted for each day the whale is visited. This allows a photographed sighting to be linked to a sample.

Revisions to Data Previously Submitted

It is very important that data are properly proofed multiple times **before** the submission is sent to NEAq. In the event a mistake is found by the contributor after the data have been submitted, email the Data Coordinator with the revised data table. Label it "ObserverCode-Year-Month(s) _revisedData". Include a note describing the exact information that has been changed. Examples of important revisions: the wrong date/ time was entered or there were typos in location data. In most cases, we do not need to know of matches or intermatches made after data have been submitted. If we have specific questions about your data, the Data Coordinator will contact you via email.

Video

Video should be submitted in a manner similar to digital still images. There is no need to take screenshots from the video. Simply submit the full video file. Video files as .MOV or .MP4 are the preferred video file formats.

Opportunistic Sightings

Organizations often find themselves in the position to submit opportunistic data that have been either collected by them during a non-survey situation or sent to them from a third party. Many of these opportunistic sightings prove to be unusual ones, such as the mother/calf pair sighted off of Miami in 2004, so it is important for these sightings to make their way into the Catalog. When forwarding opportunistic sightings to the Data Coordinator, please forward both images/video and as much associated data as available. A guide to submitting opportunistic sightings can be found in **Appendix 4**.

Our intention in developing a written protocol for submitting photographs and data to the North Atlantic Right Whale Identification Database is to streamline the process for both contributors and database managers to promote efficiency and consistency in data management. **For the larger contributors who have access to their data in DIGITS, it will be the contributor's responsibility to log into DIGITS once their data has been processed and proof their position data.** Feedback from contributors is encouraged; contributors can contact NEAq with any questions regarding photo and data submission at:

rwdata@neaq.org

In recent years, many teams have requested further information about how to record certain confusing situations, such as working an entangled whale from multiple platforms or recording behaviors for dead whales. Additionally, some behaviors require more explanation than others. To address all of these issues, we have included **Appendices 5-14** for your reference.

Behavior	Description	Comment
AGG VSL	Aggressive Vessel	When, due to a combination of speed and proximity, a vessel could hit a whale or make it take strong evasive action. Could be for darting, tagging, disentanglement, or poor boat handling (including another boat or large ship that is unaware of whale's presence). If we receive data from the vessel performing the work, only code the behavior for that vessel. If we will not be receiving any data from that vessel, the behavior can be applied to a plane or another vessel. If multiple platforms observe an aggressive approach, only one sighting should be coded for that approach and NEAq will choose the submissions which provides the best visual proof of this behavior; that will be determined only after all data for that area are received and processed. If in doubt, code for this behavior.
APPR	Approacher to SAG	If seen from the air, only code a whale as an approacher if you photograph it away from the SAG heading towards it AND then photograph it in the SAG. Give the sighting the time and location of the SAG (not the time and location of the sighting as it approached the SAG) and behaviors of SAG and approacher. If you see it outside of the SAG and never in the SAG, you can put in the sighting notes possible approacher to SAG, but give it no behaviors and make it a singleton. If you see a whale from a boat that is clearly approaching a SAG (may or may not be racing diving), it is an approacher. A) If you later photograph it in the SAG, enter just the SAG sighting of it, use behavior SAG, and approacher, (and racing diving if it was) and put in the sighting notes the time it was seen approaching. B) If you don't later photograph it in the SAG, it is simply a singleton and given the behavior of approacher.
AUDIO	Audio Recorded	Record this if audio recordings were made of the group this whale was in.
AVD	Avoidance to Approaching Platform	Put in notes if it is strong or mild avoidance. Typical signs of avoidance are sinking without fluking, frequent turns-always away from the vessel, or turning while fluking causing half of tail to come out of the water as whale turns on side. For M/C pairs, if either a mom or a calf shows avoidance and the other one follows, then the behavior can be applied to both. If an animal both avoids the boat and then later reacts (say to a biopsy), you can use both behaviors. See "Reaction" description to clarify the distinction between the two. Avoidance can only be coded for data collected from the platform being avoided.
BALEEN DMG	Damaged/Abnormal Baleen	There are photographs showing missing, broken, or bent/protruding baleen. Also include cases where no damage is evident, but there are gaps in the baleen or there is rope wrapped through it. The baleen has to be visible in a photograph to code for this. This is meant be a broad category; if you have any doubt, include it.

Behavior	Description	Comment
BALEEN SMPL	Baleen Sample	Baleen sample collected from a necropsy. If known, put where the sample resides.
BEL UP	Belly Up	Use for a whale that is belly up with some portion of the belly breaking the surface of the water. The whale should remain in this position for some period of time (i.e. long enough to indicate that it is a deliberate behavior); this behavior should not be used if the belly up is part of a roll. In most cases, part of one or both flippers will also break the surface of the water. Do not use for a dead whale. Can be used for a mom and/or calf and can be used for both male and female whales. Cannot be used when the belly up is simply a byproduct of another behavior such as rolling, the mom cradling the calf or the natural movement of a SAG. It can be coded in a SAG if it is a deliberate behavior, primarily the focal animal in the SAG.
BEL/BEL	Belly to Belly	Use when the bellies of two whales are facing each other and the whales are a flipper length or less apart. The bellies do not need to be touching. The behavior applies to both whales.
BLK BEL	Black Belly	You can code for this if you can see the anus or the umbilicus or the whale has rolled completely on its side showing half the ventral body longitudinally.
BLK CHN	Black Chin	Code for black chin if at least the forward ½ of the ventral head (from the eye forward to the front of the rostrum) is seen and no white is visible. If less than 1/2 of the ventral head is seen, don't code for black chin.
BLOW	Blow sample collected	Any sample that is given a sample number in the field is considered a sample regardless of results of subsequent lab analyses.
BOD CNT	Body Contact	For non-SAG contact, such as one whale resting its chin on the other's back. If ambiguous SAG (i.e. two females in the southeast), use body contact. Never use both SAG and body contact. Use this behavior only if it appears to be a deliberate behavior, not an accident or unintentional consequence of another behavior. Put clear description of type of contact in notes.
BRCH	Breaching	All breaching other than chin breaching. If available, put details in notes (body orientation, direction of spin (if spinning), what body parts came out of the water, and whether flippers were pressed flat to side of body).

Behavior	Description	Comment
BUBLS	Bubbles	Bubbles appear as either a ring or a very distinct ball of bubbles. Only code this if either the whale is alone, or if the bubbles are close enough spatially and temporally to where the whale surfaces that you are confident they came from that whale. If you see bubbles coming from an underwater exhalation (i.e. you saw the bubbles come from a whale's blowholes), code for underwater exhalation instead of bubbles.
CALF	Calf Alone	Determine if the calf is alone based on what time of year it is, how long they are separated, and the mothers behavior. In the north east, code for calf alone if separated by several hundred yards or more and no indication of the two reuniting. In the SEUS, code if they are not interacting and physically separated for two or more dive cycles of the mother.
CALF OF UNPH MOM	Calf w/ Unphotographed Mother	Probably should only be used in the southeast. In northeast, if there are no photos of mother, you can't be sure that it is that calf's mother.
CALF W/ OTHER(S)	Calf With Another	If calf is with a whale that is not its mother (SAG, another calf, another adult).
CALF W/ UNPH	Calf With Unphotographed Whale(s)	Use this for any calf with an unphotographed whale not in the southeast.
CALF W/MOM	Calf of a Mom/Calf Pair	Put mother's catalog number in the notes field if identified.
CHN BRCH	Chin Breach	White water caused by the chin hitting the water. See head lift, nodding, and head push for other behaviors that may be confused with a chin breach. Chin breaches seem to be more common with calves. They exit the water with an upright orientation, almost like porpoising, and land in the same orientation and on their ventral head/body. Most often only the front half of the animal comes out of the water.
CO FD	Coordinated Feeding	Two or more whales coordinating their feeding, but not in echelon, such as side-by-side or directly in line. Coordination is defined by the animals turning at either the same time or in the same relative location.

Behavior	Description	Comment
CRDLE	Whale Cradling Calf	This behavior always involves a calf at the surface with another whale, usually the mother, ventral side up beneath the calf. The ventral-side-up whale has the flippers extended outward and upward. The whale may or may not be touching the calf. The calf should be in line with the other whale and in a position to be supported by that whale if it comes to the surface. The behavior is only applied to the other whale, not to the calf itself. This is such a specific behavior that it can last for a brief period and still be coded. This behavior is not to be used in SAGs or any time there are more than two whales present. The calf is usually belly to belly with the other whale but can also be on its side or back.
CUR	Curious Approach	Whale approaches vessel and may circle it, spy hop, roll and look at it, etc.
DEAD ON BEACH	Dead on Beach	Record dead on beach for each day the whale was photographed on the beach. Code for necropsy too if one was performed. There should be a record for each day a dead whale was observed, including each day of the necropsy.
DFCN	Defecation	Use only if no sample was collected. Otherwise, use Defecation Sample. If the whale is in a group and you are unsure which whale defecated, do not code for this behavior. Instead put in the sighting notes that defecation was seen and it is unclear which whale in the group was responsible.
DFCN SMPL	Defecation Sample	Use only if sample came from that whale. If sample was collected in the presence of numerous whales, mention defecation in the sighting notes field, not in the behaviors. Can be used for a dead whale if sample is collected during necropsy.
DRT	Darted- Sample	Use only if a sample was collected. Use this code also if a sample is collected from dead whale.
DRT NO SMPL	Darted - No Sample	Use only if arrow hits the whale and there is no sample collected. If arrow misses, you can record that attempt in sighting notes field. Do not use if the whale was hit twice but a sample was obtained from one of the dartings- only use “DRT” for that. If available, keep one image tha shows both the whale and the arrow.
DSENTGL	Disentangled	Use only if all line removed and also record "Line Gone" for this sighting. If not completely disentangled, use Disentangled Partially or Disentanglement Attempt.

Behavior	Description	Comment
DSENTGL ATT	Disentanglement Attempt	Implied unsuccessful, no line removed. Use if there is any approach for cutting or for attaching telemetry buoy. If some line removed, use Disentangled Partially instead. If completely disentangled, use Disentangled instead.
ECH	Echelon Feeding	When two or more animals swim in a tight "V" formation like geese flying. The following whale must be within ¼ body length of the lead whale and the front of its head has to be anywhere from just slightly behind the lead whale's head to as far back as the mid section of the lead whale. More than two whales can be echelon feeding--each one being a bit further back than the whale ahead. Anything else should be coded as coordinated feeding. Because sightings often span short time periods, do not use time to determine if they are associated. Instead, look to see if the whale behind appears to be turning to follow the lead whale's turn. If there's no turn to compare, then take into acct how close together they are. If there's a whale alone and then 2 frames of it looking like its echelon feeding, then alone again, call it a single with no feeding association behaviors.
ENTGL	Entangled	Use this comment only if gear is seen and it is not the first sighting of the entanglement. Use First Entangled for first sighting with gear.
FCL	Focal Animal	The focal animal is the whale in the center of a SAG towards which all the attention is focused. Focal animals often make underwater calls, float with their bellies above the water, or are in the front of a group of whales. Often female, but can also be male. If unsure of sex, just use Focal (do not assume the Focal animal is female). If the genitals are seen, add the sex of focal animal. If you don't see a focal animal or are unsure, don't code for it.
FEED	Unspecified Type of Feeding	Use only if the data are unclear what type of feeding it is. Otherwise, use Subsurface Feeding or Skim Feeding.
FEM	Female	Any time sex is determined visually in the field by seeing the umbilicus or the anus. The male's genital slit is connected to the umbilicus and not the anus. The female's genital slit is connected to the anus and not the umbilicus. The genitals need to be photographed to code for this; otherwise just put the sex in the sighting notes. Do not assume focal animal in a SAG is female and do not code for female if you know the sex only from other observations (or because it is a mom with calf).
FETUS	Fetus	Use for any fetus discovered during a necropsy. Code only for the sighting of the fetus, not the dead mother. The dead mother should be coded as pregnant.

Behavior	Description	Comment
FLIP	Flippering/ Flipper Slapping	Flipper deliberately put in air- not as a consequence of other behaviors such as a SAG, rolling, or belly up. Put in notes which flipper is in the air, if it is slapping, and whether it is slapping the flipper on the water or its body, and whether it is the dorsal or ventral part of the flipper hitting the water/body.
FLTG DEAD	Floating Dead	Code for floating dead for each day the whale was seen floating dead. There should be a record for each day a dead whale was observed, including each day of the necropsy.
FRST DEAD	First Sighting of a Dead Whale	All sightings after the first sighting are just coded as dead. Put in notes who first reported it and whether or not it was retrieved. There should be a record for each day a dead whale was observed, including each day of the necropsy.
FRST ENTGL	First Entangled	Use only first time the gear is seen (specifically the first platform to detect the entanglement if the whale was seen multiple times in the same day). After that, just use Entangled.
FRST RADTG	First Radio Tag	Sighting when an implantable radio tag was first attached or first time tag was seen or a tag transmission received if not photographed on that day. Some tags have both radio and satellite components. Use RADTG if there are ONLY radio components. If you are unsure, make sure best guess and note uncertainty in the sighting notes. This behavior should be used for the platform doing the tagging. If that platform does not get any photos of the whale they tagged, it can be used by the first platform to see the tagged whale. Implantable means any part of the tag or it's attachment breaks the skin. Can be used for a dead whale but only if it was tagged with an implantable radio tag. This is uncommon for dead whales.
FRST SATTG	First Satellite Tag	Sighting when an implantable satellite tag was first attached or first time tag was seen or a tag transmission received if not photographed on that day. Some tags have both radio and satellite components. Use SATTG if there are ANY satellite components. If you are unsure, make sure best guess and note uncertainty in the sighting notes. Implantable means any part of the tag or it's attachment breaks the skin.This behavior should be used for the platform doing the tagging. If that platform does not get any photos of the whale they tagged, it can be used by the first platform to see the tagged whale. Can be used for a dead whale but only if it was tagged with an implantable radio tag. This is uncommon for dead whales.

Behavior	Description	Comment
FRST SUCTG	First Suction Cup Tag	Sighting when a suction cup tag was first attached. This behavior should be used for the platform doing the tagging. If that platform does not get any photos of the whale they tagged, it can be used by the first platform to see the tagged whale.
GSHOT	Gunshot	Use this if a hydrophone detects a gunshot AND an individual whale's behavior allows you to determine which whale is making the sound. If the specific whale cannot be determined, enter gunshot in sighting notes, but not under behaviors.
HDLFT	Head Lift	Any head out of the water that is not a chin breach, spy hop, head push, head tilt, or nod. The ventral head has to come out of the water (in aerial shots- look for most if not all of the mandible area to come out of the water to confirm). Whales in an active sag should not be coded for head lift (unless it is a deliberate behavior apart from the tumult around the focal animal). Do not use this behavior for the head lifting before the terminal dive or if the animal is simply making a sharp turn.
HDPSH	Head Push	The visible behavior associated with gunshots. It looks like the whale is nodding its head, but different from the feeding "nod". If you see shivering (see description) at the same time, definitely enter it as Head Push.
HDTLT	Head Tilt	This is a common, repeated behavior that is exhibited primarily by moms in the SEUS. The sinking of the body causes the tilting of the head; the head angles slightly upward sometimes showing the chin callosity and a portion of the mandibular islands. At some point in the process, the blowholes become submerged and the whale often, but not always, sinks completely below the surface at the end of this behavior. It is different from a head lift because the behavior tends to be less active and, at most, only small portion of the ventral side of the head comes out of the water. It is different from logging in that none of the back is above water, and the blowholes are usually also subsurface. This behavior should NOT be used if the whale is in a SAG, if the mouth is open, if you see the peduncle or flukes while the head tilts, if the whale is curious, if the whale is traveling, or if it is very active resulting in white water. It can be associated with apparent mild avoidance in which case both behaviors should be coded. If the whale sinks after the tilt, record that in the sighting notes.

Behavior	Description	Comment
HUMPR	Human Presence Near a Whale	If the human presence fits the description of aggressive approach, use aggressive approach instead of HumPr. HumPr is meant to capture any moving human presence other than drones (i.e. not anchored vessels, drilling platforms, etc) that may influence a whale's behavior that is not logged in the database by any other means. For that reason, it should only be used when the human presence is not the platform taking the photos (since we know from that platform's data that it was there). Images from drones can be used to document humpr. If the human presence is in the form of a non-powered and slow moving platform (swimmer, surfer, kayaker, paddle board, very slow moving sail boat under sail (i.e. no bow wake), then the whale has to be within 1-2 body lengths of the human presence. Any other type of human presence should be within roughly 100 yards (jet ski, motor boat, fishing vessel, fast sail boat or one moving with the sail down (i.e. under power)). For very large and fast moving vessels, or helicopters, that could impact a whale's behavior from farther away, the distance can be extended to as much as 200 yards. In almost all cases, the whale and the human presence should be in the same frame of the photograph, but this is not essential. If a whale exhibits a clear behavior change when the HumPr is farther away than the definitions (i.e. turning away, sinking, stop logging), you can use the behavior and put clear notes. This may only be possible from land sightings where the observation lasts for a long time and does not influence the whale's behavior. Enter as many details in sighting notes as possible- including whether it was an intentional or unintentional (i.e. the human did not know the whale(s) was there) approach, the type and number of human presence, if there were any behaviors, and if the interaction was reported. If a plane and a land sighting both photograph a whale with small boats around it, then use HumPr for both sightings. If you do not know whether the human presence in the frame collected photographs, check with the data administrator. If it is unclear if there are data from that platform, add humpr to the sighting you are processing.
INTRO	Intromission	Penis insertion. Applicable for both whales involved, even if they are both males.
LBTL	Lobtailing	Record in notes whether the ventral, dorsal or lateral portion of the fluke is hitting the water.
LEAD	Lead Whale	Lead whale in echelon or coordinated feeding.

Behavior	Description	Comment
LIN TR	Linear Travel	Use for straight-line movement over two or more dive sequences. Use only if you have good data on whale heading. It can be surface or subsurface travel. Put heading, speed, and distance traveled in sighitng notes if that information was collected. Do not use this behavior if the whale is racing diving- use Racing Diving instead.
LIVE STRAND	Live stranded	Use this for any animal that is seen alive on the beach. Often it will also get the behavior of "First Dead" at the same sighting.
LMPRY	Lamprey Eel	Photos or notes documenting a lamprey eel attached to the whale.
LN GONE	Line Gone	Record this only the first time a known entangled whale is seen with the line gone. Only use this behavior if the images clearly show that the line is gone. Can be used for a dead whale, but only at the FRST DEAD sighting. Do not use for a dead whale if line is removed during carcass retrieval.
LNG	Lunge	Mouth open lunge.
LOG	Logging	This behavior should be used when the whale appears to be sleeping. The head does not come out of the water when it breathes, there is no forward movement, and often the whale will show a startle response if you approach too close. This is different from a whale that comes to the surface from a deep dive, rests at the surface for a few minutes, and then dives again.

Behavior	Description	Comment
LOST CALF	Mom before calf died	The last sighting of a mother with her calf in the calving year if we know or suspect the calf died later. Because calves can be weaned as early as June and some sightings of mothers alone are brief, we need to be conservative when applying this comment. Guides on when to use this comment include if: 1) the calf is known to have died (using photo-ID or genetics), 2) the mother is alone in the SEUS when a calf is too young to be weaned, 3) the mother is alone repeatedly in the early spring (March, April, early May) in the northeast and never seen with the calf afterwards, 4) the mother is alone at least once in the northeast, but has no subsequent sightings with her calf AND has a subsequent 2 yr calving interval, or 5) the mother was seen alone at least once after her calf was severely injured and it was likely fatal. This behavior is assigned or adjusted once all data from that season have been submitted. NOTE: The criteria to add a dead calf to the catalog is more stringent than the criteria for Lost Calf. While we use subsequent 2-year calving intervals to determine Lost Calf, in an abundance of caution, we do not use it in our determination of when to add to the Catalog. See “Decision to catalog some dead calves.docx” for an explanation of this.
MALE	Male	Use any time sex is determined visually in the field by seeing the umbilicus or the anus. The male's genital slit is connected to the umbilicus and not the anus. The female's genital slit is connected to the anus and not the umbilicus. The genitals need to be photographed to code for this; otherwise just put the sex in the sighting notes. Do not use if the whale's sex is known from other sightings or because he has been identified and his sex is known genetically.
MCLSG	Mouth Closing	Code if you see this during a feeding bout (ending the feeding- or momentarily suspending it), or without any documented feeding such as when a whale is returning to the surface from a dive and is seen in the process of closing its mouth. If you have coded for mouth open, you do not also need to code for mouth closing. Mouth open is generally used for a brief event- so it implies the mouth will also be closing.
MEDICAL	Medical Intervention	Use this behavior if the whale was administered a sedative, antibiotics, a reversal agent for a sedative, euthanized, or administered any other medical intervention. Put specific notes in the sightings notes which intervention was performed.
MOO	Mooing	Cow-like sound made from the blow holes when the whale is at the surface. Audible without hydrophone.

Behavior	Description	Comment
MOPN	Mouth Open	Do not use this comment if whale is feeding. If not recorded as open, assume that mouth is closed (there is no abbreviation for mouth closed). Mouth open is generally used for a brief event; it implies the mouth will also be closing so you do not code for mouth closing for these events.
MORT DATA	Mortality Data Collected	There was confusion about what should constitute a necropsy in the Catalog database (the previous explanation said either full or partial- but there was no definition for partial necropsy). We determined that we would change the behavior from Necropsy to Mortality Data Collected (Mort Data) and use it any time there was a response to a dead whale that allowed for at least a reliable length measurement. It will rarely be applicable for aerial data or data collected at sea. In either case, there would need to be a clear explanation of why the measurement is reliable. If a DNA or fecal sample is collected without any length or other data, it should not be coded as Mort Data because this will be captured by other behaviors. If a sample is collected for more than DNA (histology, a flipper collected that was measured)- then that constitutes Mort Data.
MUD	Mud	Mud anywhere on the body. Record in notes what body parts are involved and what side of the animal (i.e. left dorsal fluke).
NOD	Nodding	The mouth remains open as the whale nods its head and/or repeatedly pulses the lower lips open and closed - presumably to flush its baleen. Whale must be feeding and the observation must last long enough for the observer to be certain that it is nodding behavior. Primarily seen at the surface, but can be seen subsurface from an aerial perspective.
NOT FL	Not Fluking	Use for entangled whales to clarify whether the fluke has been seen and thus whether it can be reliably determined if there is gear on tail.
NURS	Probable Nursing	Mother and calf traveling side-by-side at the surface as the calf dives at an angle that is towards the mother' tail stock. Often the calf will make a series of such dives, surfacing on alternate sides of the mother when taking a breath. Apply this behavior to both the sighting of the mother and the calf.

Behavior	Description	Comment
OIL	Oils Slick	Use if the whale is in an oil slick. Do not use if the whale is dead and in its own oil or if there is oil some distance away from the whale.
PENIS	Penis observed	Use this only if the penis is seen and you know which whale it belongs to and it is only applied to the whale showing the penis (unlike Intromission which applies to both whales). If you don't know which whale it belongs to, put "Penis observed in SAG- unsure which whale it belongs to" in the sighting notes.
PHOTOGRAM	Photogrammetry measurement collected	Use this for any sighting for which a photogrammetry measurement was made (length, girth, or both). If there is a sample or code associated with that measurement, include it in the sighting notes. If a specific type image was used to determine the measurement, make sure that has been uploaded and noted in the sighting notes.
PLYBK	Playback (Sag or Other Sounds)	This comment is appropriate for any whale that was photographed within 1 mile of the acoustic play back experiment.
POST	Posturing	Use this when the whale lifts both its head (at least as far as the chin callosities) and any part of the tail out of the water at the same time. Do not use it when the whale is skim feeding.
PREGNANT	Pregnant (Determined from Hormones or Necropsy)	Determined by 1) necropsy, 2) fetus expelled from dead whale, or 3) from fecal hormone analysis. The whale receives this behavior only for the sighting that was used to determine pregnancy. Use only when there are data from a sighting that allow you to determine the whale is pregnant, not from her sighting history.
PRT DSENTGL	Disentangled Partially	Some line removed from entangled whale, but some line does or may remain. Only use this behavior for the vessel performing the work. If we will not be receiving any data from that vessel, the behavior can be applied to a plane or another vessel.

Behavior	Description	Comment
RACE	Racing Dive	A forceful and fast dive in which the flukes are typically lifted out of the water at a shallow angle. Racing dives are often observed in a quick series with each dive being performed after a single respiration. Racing diving is often seen as whale approaches a SAG.
RADTG	Radio Tagged	Use this only if an implantable radio tag is seen and it is not the first sighting of it. Implantable means any part of the tag or it's attachment breaks the skin. Other options are "FRST RADTG" and "RADTG GONE". Uncommon for dead whales (see description for FRST RADTG).
RADTG GONE	Radio Tag Gone	For each FRST RADTG event, there should ideally be a corresponding RADTG GONE sighting if the whale is seen again. This will require photographic evidence of the tag site that shows no visible evidence that the tag is still present. Sometimes tag parts can be left in the body but not be visible. Since we cannot prove they are there, SATTG GONE should be used if there is nothing visible externally at the tag site.
RAND SUB MOV	Random Subsurface Movement	The whale's surfacing pattern is unpredictable (in both time and space), due to probable subsurface feeding. This behavior can only be confidently assigned from a vessel. For example, a whale goes down heading in one direction, but comes up in the opposite direction at its next surfacing. The following surfacing is in yet a different direction and with a different dive interval. You need to see at least 3 surfacings to accurately detect this behavior. If you see this surfacing pattern but the mouth is open as the whale surfaces, use Subsurface Feeding instead.
REMORA	Remoras attached or free-swimming	
RETRVD	Carcass Successfully Retrieved	If the carcass is successfully retrieved, put RETRVD at the sighting/platform for the day it was retrieved (ok to be a different platform if no images taken by the retrieving vessel). If it was retrieved but there were no photos taken during the retrieval and therefore no sighting in DIGITS for that event, put RETRVD with the first day dead on beach. For each dead whale, there should only be one sighting coded as retrieved.

Behavior	Description	Comment
ROLL	Rolling	Use for a whale rolling at the surface or subsurface, but not in a SAG (as rolling is part of normal SAG behavior). Rolling should NOT be used if the whale is just turning, or if the roll is simply a step in another behavior such as belly up, side feeding or flippering. This behavior is most common with calves. The whale has to roll approximately 90 degrees for it to be considered rolling.
RXN	Reaction to Sampling, Platform, or Hitting Gear	Use avoidance if the response is to an approaching vessel; use curious if the whale approaches the vessel; use reaction for all other responses such as flinch, roll and look, posture/arch, stop, spyhop, speed up, or turn quickly away. If that reaction also has a codeable behavior, code for that as well (spyhop, roll, etc.). Put in notes the type of reaction and whether it was strong or mild. Reaction can be to a plane- for example if the whale rolls and looks when the shadow of the plane passes over. For M/C pairs, if a calf is biopsied, it is possible for the mother to "react" while the calf shows no reaction. If we receive data from the vessel eliciting the reaction, only code the behavior for that vessel. If we will not be receiving any data from that vessel, the behavior can be documented and coded for a sighting from another platform. The behaviors RXN and STR RXN were combined and broadened into this behavior on 11/23/15. See "Avoidance" to understand the distinction between the two behaviors.
SAG	Surface Active Group	Two or more whales rolling and touching at the surface. See the Appendix of the User's Manual for tips on processing SAGs seen from the air. The following behaviors should never be coded for in a SAG: body contact, roll, and flipper (unless deliberate flipper slapping). At least one of the whales has to roll enough to be able to see the eye from a birds-eye perspective. Very quiet interactions with no rolling and no white water should be coded as body contact instead of SAG. Put in notes whether stroking is observed and whether it is a low, medium, or high energy SAG. Low energy- for any SAG with no white water, quiet exhalations, and slow movement; medium energy- for any SAG with white water but no water flung into the air, heavy breathing but not explosive, energetic movements, but not violent; high energy- for any SAG with water flung high into the air, explosive breathing, whale erupting out of the water and violent motion.
SATTG	Satellite Tagged	Use this only if implantable tag is seen and it is not the first sighting of it. Implantable means any part of the tag or it's attachment breaks the skin. Other options are "FRST SATTG" and "SATTG GONE". Uncommon for dead whales (see description for FRST SATTG).

Behavior	Description	Comment
SATTG GONE	Sattag Gone	For each FRST SATTG event, there should ideally be a corresponding SATTG GONE sighting if the whale is seen again. This will require photographic evidence of the tag site that shows no visible evidence that the tag is still present. Sometimes tag parts can be left in the body but not be visible. Since we cannot prove they are there, SATTG GONE should be used if there is nothing visible externally at the tag site.
SHVR	Shivering/Jell-O	The Jello-like shivering that is seen when a whale is producing the gunshot sound. You do not have to hear gunshot to code for this behavior.
SICK	Sick Whale	Any whale that is unambiguously unhealthy as evidenced by cyamids in strange places, grey skin, thin, and possibly fresh open wound(s). The cause of the unhealthiness does not need to be known. Do not code if whale looks healthy but is entangled.
SIDE FD	Feed On Side	This behavior is most often detected from the air and can be combined with any of the other feeding behaviors.
SK	Skin	Skin sample obtained from the whale. If unsure if blubber obtained as well, use this category and put in notes that blubber was unknown. Do not use for dead whale (use DRT only).
SK&BL	Skin And Blubber	Skin and blubber sample obtained from the whale. Do not use for a dead whale (use DRT only).
SKM FD	Surface or Skim Feeding	Consider it skim feeding if any part of the rostrum breaks the surface of the water.
SPY	Spyhopping	Eye breaks the surface of the water and head straight up. This behavior is unusual for right whales.

Behavior	Description	Comment
SUB FD	Subsurface Feeding	Use if you can see the whale with its mouth open underwater and the rostrum does not break the surface of the water. Also, use if the whale is surfacing erratically- heading in different direction with varying dive times and you can see its mouth open as it comes to the surface. For a similar surfacing behavior with the mouth closed, use Random Subsurface Movement
SUCTG	Suction Cup Tagged	Use this only if the suction cup tag is seen and it is not the first sighting of it (in which case use "FRST SUCTG").
TELBUOY	Telemetry Buoy	Floating telemetry buoy attached to whale- generally to entanglement. Use when it is attached and every time it is photographed afterwards with the buoy still attached. Unlike other tag behaviors, we do not have a First Tagged and Tag Gone category for this type of tag. Can be used for a dead whale.
TL BRCH	Tail Breach	Use if the whale throws its tail out of the water but does not lob tail (where the dorsal or ventral flukes land flat on the water). It also differs from tail slash where the tail stays in the water and is pushed sideways slicing through the water.
TL SLSH	Tail Slash	High energy, horizontal movement with both head and tail generally creating white water.
TOW	Whale under Tow	This behavior should be used any time there are photos of a whale being towed. If there are no photos from the towing vessel and another platform photographs the whale under tow, tow can be applied to that platform.
TYPE A	Type A tags are anchored (with electronics external, i.e. limpet tags).	Code for this tag type every time it is seen or for all tag-only locations (i.e. not a photographed sighting). Use this code if any part of the tag or attachment mechanism is visible- even if parts have broken off. The only time you do not code for tag type is if the whale is photographed but the tag is not seen. Put any additional details in the comments (tag breakage, length of attachment devices, how many there are (i.e. 1, 2, 3 etc.)

Behavior	Description	Comment
TYPE C	Type C tags are designed for the electronics to be subcutaneous with only the antenna protruding (i.e. Mate or Zerbini tags).	Type C tags can be subfascial (into muscle) or intra fascial (just in the blubber). If you know which it is, put it in the sighting notes, along with any additional details (tag breakage, length of tag, what the retention mechanism is, etc.) Code for this tag type every time it is seen or for all tag-only locations (i.e. not a photographed sighting). Use this code if any part of the tag or attachment mechanism is visible- even if parts have broken off. The only time you do not code for tag type is if the whale is photographed but the tag is not seen.
ULTRSD	Ultrasound Touch	Use this when an ultrasound has touched the body of a whale in attempt to measure blubber thickness.
UNUSUAL BEH	Unusual Behavior	Any deliberate, rare, interesting behavior/event that does not fall into an existing behavior/comments category- including coming into contact with fishing gear. If the whale makes contact with gear AND reacts, code for reaction also. Provide clear description in sighting notes. Do not use this for sightings in unusual locations.
UNUSUAL LOCAL	Unusual Location	Any sighting in a restricted location where the whale could potentially have trouble swimming out. Such locations include up a river, in a canal, or in a complex bay system. Do not code if the whale just crosses the mouth of a river. Do not code for locations with areas assigned to North or East; instead put details in the sighting notes (e.g. France, Iceland, Norway)
UW EXH	Underwater Exhalation	Use this only if you see bubbles and you can tell they are coming from the blow holes (based on the location of the bubbles or the shape of a clear bubble ring) and you know which whale it came from. Otherwise, use Bubbles.
VIS PLK	Plankton Visible	Plankton in water is visible to the naked eye. Code for this if the whale and the plankton are visible in the same frame.
W/BODO	With Bottlenose Dolphins	Accompanied by bottlenose dolphins. Bottlenose sometimes in data as “Tt's”. The dolphins should be close enough to suggest that either of the two species are aware of, or influenced by, each other's presence (within visual range, deliberately approaching, avoiding, or traveling in the same direction over several surfacings). Generally within a few dolphin body lengths.

Behavior	Description	Comment
W/BSK SHRK	With Basking Shark	Within one or two shark lengths of the whale. Record in notes if both the whale and the shark(s) are feeding.
W/CALF	Mom of a M/C Pair	
W/CALF UNPH	Mom with Unphotographed Calf	Although this might imply mother was not photographed, she would not have an entry in the database if she was not photographed. The mother should get an association code of 2 even though the calf was not photographed.
W/CETACEAN	With Cetaceans- Either Unknow or Other Than White Sided, Bottlenose or Pilot Whales	The cetaceans should be close enough to suggest that either of the two species are aware of, or influenced by, each other's presence (within visual range, deliberately approaching, avoiding, or traveling in the same direction over several surfacings). Generally within a few right whale body lengths.
W/PIWH	With Pilot Whales	The pilot whales should be close enough to suggest that either of the two species are aware of, or influenced by, each other's presence (within visual range, deliberately approaching, avoiding, or traveling in the same direction over several surfacings). Generally within a few pilot whale body lengths.
W/SHARK	With Toothed Shark	In the presence of toothed shark. Note the species of shark in the notes if known. Code for this if the whale and the shark are visible in the same frame.
W/UNPH EG	With Unphotographed Whale	Can be more than one whale. Make sure this sighting has an association code showing it was with an other(s) even if it is the only whale photographed.
W/WSDO	With White Sided Dolphins	With white sided dolphins. This species is often recorded in the data as Lags. The dolphins should be close enough to suggest that either of the two species are aware of, or influenced by, each other's presence (within visual range, deliberately approaching, avoiding, or traveling in the same direction over several surfacings). Generally within a few dolphin body lengths.

Behavior	Description	Comment
W/YRLG	Mom of Mom/Yrlg Pair	Put the yearling's catalog number in the notes field if it has an id. A whale becomes a yearling December 1st.
WEIR	Trapped in weir	Use this behavior if a whale spends any time in a weir, even if it eventually is able to find its way out on its own.
WH BEL	White Belly	Code for this if you see any white posterior to the eye.
WH CHN	White Chin	Code for white chin if at least the forward ½ of the ventral head (from the eye forward to the front of the rostrum) is seen and white is visible OR if you see any white wrapping onto the mandible (will be visible when looking at the dorsal head).
WIWO	Play	"Whale Interacting With Object" Such As Seaweed Or Log, Not The Boat. Put a description of the object and the interaction in the sighting notes.
YRLG W/MOM	Yrlg of Mom/Calf Pair	With mother from previous year. A whale becomes a yearling December 1st. Put mother's id in notes field.

Category groups are meant to help with certain situations. However, behaviors can be used at anytime as long as they fit the description. For example, AVD is mostly commonly used for entangled whales but can be used for sampling, tagging, photographic approaches and/or other events.

Behavior Code	Description	Comment
Category : Dead		
BALEEN SMPL	Baleen Sample	Baleen sample collected from a necropsy. If known, put where the sample resides.
DEAD ON BEACH	Dead on Beach	Record dead on beach for each day the whale was photographed on the beach. Code for necropsy too if one was performed. There should be a record for each day a dead whale was observed, including each day of the necropsy.
DFCN SMPL	Defecation Sample	Use only if sample came from that whale**.** If sample was collected in the presence of numerous whales, mention defecation in the sighting notes field, not in the behaviors. **Can be used for a dead whale** if sample is collected during necropsy.
DRT	Darted- Sample	Use only if a sample was collected. **Use this code also if a sample is collected from dead whale.**
FETUS	Fetus	Use for any fetus discovered during a necropsy. Code only for the sighting of the fetus, not the dead mother. The dead mother should be coded as pregnant.
FLTG DEAD	Floating Dead	Code for floating dead for each day the whale was seen floating dead. There should be a record for each day a dead whale was observed, including each day of the necropsy.
FRST DEAD	First Sighting of a Dead Whale	All sightings after the first sighting are just coded as dead. Put in notes who first reported it and whether or not it was retrieved. There should be a record for each day a dead whale was observed, including each day of the necropsy.

Behavior Code	Description	Comment
FRST RADTG	First Radio Tag	Sighting when an implantable radio tag was first attached or first time tag was seen or a tag transmission received if not photographed on that day. Some tags have both radio and satellite components. Use RADTG if there are ONLY radio components. If you are unsure, make sure best guess and note uncertainty in the sighting notes. This behavior should be used for the platform doing the tagging. If that platform does not get any photos of the whale they tagged, it can be used by the first platform to see the tagged whale. Implantable means any part of the tag or it's attachment breaks the skin. Can be used for a dead whale but only if it was tagged with an implantable radio tag. **This is uncommon for dead whales.**
FRST SATTG	First Satellite Tag	Sighting when an implantable satellite tag was first attached or first time tag was seen or a tag transmission received if not photographed on that day. Some tags have both radio and satellite components. Use SATTG if there are ANY satellite components. If you are unsure, make sure best guess and note uncertainty in the sighting notes. Implantable means any part of the tag or it's attachment breaks the skin.This behavior should be used for the platform doing the tagging. If that platform does not get any photos of the whale they tagged, it can be used by the first platform to see the tagged whale. Can be used for a dead whale but only if it was tagged with an implantable radio tag. **This is uncommon for dead whales.**
LIVE STRAND	Live stranded	Use this for any animal that is seen alive on the beach. Often it will also get the behavior of "First Dead" at the same sighting.
LN GONE	Line Gone	Record this only the first time a known entangled whale is seen with the line gone. Only use this behavior if the images clearly show that the line is gone. **Can be used for a dead whale, but only at the FRST DEAD sighting. Do not use for a dead whale if line is removed during carcass retrieval.**
MEDICAL	Medical Intervention	Use this behavior if the whale was administered a sedative, antibiotics, a reversal agent for a sedative, euthanized, or administered any other medical intervention. Put specific notes in the sightings notes which intervention was performed.

Behavior Code	Description	Comment
MORT DATA	Mortality Data Collected	There was confusion about what should constitute a necropsy in the Catalog database (the previous explanation said either full or partial- but there was no definition for partial necropsy). We determined that we would change the behavior from Necropsy to Mortality Data Collected (Mort Data) and use it any time there was a response to a dead whale that allowed for at least a reliable length measurement. It will rarely be applicable for aerial data or data collected at sea. In either case, there would need to be a clear explanation of why the measurement is reliable. If a DNA or fecal sample is collected without any length or other data, it should not be coded as Mort Data because this will be captured by other behaviors. If a sample is collected for more than DNA (histology, a flipper collected that was measured)- then that constitutes Mort Data.
PREGNANT	Pregnant (Determined from Hormones or Necropsy)	Determined by 1) necropsy, 2) fetus expelled from dead whale, or 3) from fecal hormone analysis. The whale receives this behavior only for the sighting that was used to determine pregnancy. Use only when there are data from a sighting that allow you to determine the whale is pregnant, not from her sighting history.
RADTG	Radio Tagged	Use this only if an implantable radio tag is seen and it is not the first sighting of it. Implantable means any part of the tag or it's attachment breaks the skin. Other options are "FRST RADTG" and "RADTG GONE". **Uncommon for dead whales** (see description for FRST RADTG).
RADTG GONE	Radio Tag Gone	For each FRST RADTG event, there should ideally be a corresponding RADTG GONE sighting if the whale is seen again. This will require photographic evidence of the tag site that shows no visible evidence that the tag is still present. Sometimes tag parts can be left in the body but not be visible. Since we cannot prove they are there, SATTG GONE should be used if there is nothing visible externally at the tag site.
RETRVD	Carcass Successfully Retrieved	If the carcass is successfully retrieved, put RETRVD at the sighting/platform for the day it was retrieved (ok to be a different platform if no images taken by the retrieving vessel). If it was retrieved but there were no photos taken during the retrieval and therefore no sighting in DIGITS for that event, put RETRVD with the first day dead on beach. **For each dead whale, there should only be one sighting coded as retrieved.**

Behavior Code	Description	Comment
TELBUOY	Telemetry Buoy	Floating telemetry buoy attached to whale- generally to entanglement. Use when it is attached and every time it is photographed afterwards with the buoy still attached. Unlike other tag behaviors, we do not have a First Tagged and Tag Gone category for this type of tag. **Can be used for a dead whale.**
TOW	Whale under tow	This behavior should be used any time there are photos of a whale being towed. If there are no photos from the towing vessel and another platform photographs the whale under tow, tow can be applied to that platform.
W/SHARK	With Toothed Shark	In the presence of toothed shark. Note the species of shark in the notes if known. Code for this if the whale and the shark are visible in the same frame.

Behavior Code	Description	Comment
Category : Entanglement/Disentanglement & Response		
AGG VSL	Aggressive Vessel	When, due to a combination of speed and proximity, a vessel could hit a whale or make it take strong evasive action. Could be for darting, tagging, disentanglement, or poor boat handling (including another boat or large ship that is unaware of whale's presence). If we receive data from the vessel performing the work, only code the behavior for that vessel. If we will not be receiving any data from that vessel, the behavior can be applied to a plane or another vessel. If multiple platforms observe an aggressive approach, only one sighting should be coded for that approach and NEAq will choose the submissions which provides the best visual proof of this behavior; that will be determined only after all data for that area are received and processed. If in doubt, code for this behavior.
AVD	Avoidance to Approaching Platform	Put in notes if it is strong or mild avoidance. Typical signs of avoidance are sinking without fluking, frequent turns- always away from the vessel, or turning while fluking causing half of tail to come out of the water as whale turns on side. For M/C pairs, if either a mom or a calf shows avoidance and the other one follows, then the behavior can be applied to both. If an animal both avoids the boat and then later reacts (say to a biopsy), you can use both behaviors. See "Reaction" description to clarify the distinction between the two. Avoidance can only be coded for data collected from the platform being avoided.
DSENTGL	Disentangled	Use only if all line removed and also record "Line Gone" for this sighting. If not completely disentangled, use Disentangled Partially or Disentanglement Attempt.
DSENTGL ATT	Disentanglement Attempt	Implied unsuccessful, no line removed. Use if there is any approach for cutting or for attaching telemetry buoy. If some line removed, use Disentangled Partially instead. If completely disentangled, use Disentangled instead.
ENTGL	Entangled	Use this comment only if gear is seen and it is not the first sighting of the entanglement. Use First Entangled for first sighting with gear.
FRST ENTGL	First Entangled	Use only first time the gear is seen (specifically the first platform to detect the entanglement if the whale was seen multiple times in the same day). After that, just use Entangled.

Behavior Code	Description	Comment
LN GONE	Line Gone	Record this only the first time a known entangled whale is seen with the line gone. Only use this behavior if the images clearly show that the line is gone. Can be used for a dead whale, but only at the FRST DEAD sighting. Do not use for a dead whale if line is removed during carcass retrieval.
MEDICAL	Medical Intervention	Use this behavior if the whale was administered a sedative, antibiotics, a reversal agent for a sedative, euthanized, or administered any other medical intervention. Put specific notes in the sightings notes which intervention was performed.
NOT FL	Not Fluking	Use for entangled whales to clarify whether the fluke has been seen and thus whether it can be reliably determined if there is gear on tail.
PRT DSENTGL	Disentangled Partially	Some line removed from entangled whale, but some line does or may remain. Only use this behavior for the vessel performing the work. If we will not be receiving any data from that vessel, the behavior can be applied to a plane or another vessel.
RXN	Reaction to Sampling, Platform, or Hitting Gear	Use avoidance if the response is to an approaching vessel; use curious if the whale approaches the vessel; use reaction for all other responses such as flinch, roll and look, posture/arch, stop, spyhop, speed up, or turn quickly away. If that reaction also has a codeable behavior, code for that as well (spyhop, roll, etc.). Put in notes the type of reaction and whether it was strong or mild. Reaction can be to a plane- for example if the whale rolls and looks when the shadow of the plane passes over. For M/C pairs, if a calf is biopsied, it is possible for the mother to "react" while the calf shows no reaction. If we receive data from the vessel eliciting the reaction, only code the behavior for that vessel. If we will not be receiving any data from that vessel, the behavior can be documented and coded for a sighting from another platform. The behaviors RXN and STR RXN were combined and broadened into this behavior on 11/23/15. See "Avoidance" to understand the distinction between the two behaviors.
SICK	Sick Whale	Any whale that is unambiguously unhealthy as evidenced by cyamids in strange places, grey skin, thin, and possibly fresh open wound(s). The cause of the unhealthiness does not need to be known. **Do not code if whale looks healthy but is entangled.**

Behavior Code	Description	Comment
TELBUOY	Telemetry Buoy	Floating telemetry buoy attached to whale- generally to entanglement. Use when it is attached and every time it is photographed afterwards with the buoy still attached. Unlike other tag behaviors, we do not have a First Tagged and Tag Gone category for this type of tag. Can be used for a dead whale.
WEIR	Trapped in weir	Use this behavior if a whale spends any time in a weir, even if it eventually is able to find its way out on its own.

Behavior Code	Description	Comment
Category : Feeding		
CO FD	Coordinated Feeding	Two or more whales coordinating their feeding, but not in echelon, such as side-by-side or directly in line. Coordination is defined by the animals turning at either the same time or in the same relative location.
ECH	Echelon Feeding	When two or more animals swim in a tight "V" formation like geese flying. The following whale must be within ¼ body length of the lead whale and the front of its head has to be anywhere from just slightly behind the lead whale's head to as far back as the mid section of the lead whale. More than two whales can be echelon feeding--each one being a bit further back than the whale ahead. Anything else should be coded as coordinated feeding. Because sightings often span short time periods, do not use time to determine if they are associated. Instead, look to see if the whale behind appears to be turning to follow the lead whale's turn. If there's no turn to compare, then take into acct how close together they are. If there's a whale alone and then 2 frames of it looking like its echelon feeding, then alone again, call it a single with no feeding association behaviors.
FEED	Unspecified Type of Feeding	**Use only if the data are unclear what type of feeding it is.** Otherwise, use Subsurface Feeding or Skim Feeding.
LEAD	Lead Whale	Lead whale in echelon or coordinated feeding.
MCLSG	Mouth Closing	Code if you see this during a feeding bout (ending the feeding- or momentarily suspending it), or without any documented feeding such as when a whale is returning to the surface from a dive and is seen in the process of closing its mouth. If you have coded for mouth open, you do not also need to code for mouth closing. Mouth open is generally used for a brief event- so it implies the mouth will also be closing.

Behavior Code	Description	Comment
NOD	Nodding	The mouth remains open as the whale nods its head and/or repeatedly pulses the lower lips open and closed - presumably to flush its baleen. **Whale must be feeding** and the observation must last long enough for the observer to be certain that it is nodding behavior. Primarily seen at the surface, but can be seen subsurface from an aerial perspective.
RAND SUB MOV	Random Subsurface Movement	The whale's surfacing pattern is unpredictable (in both time and space), due to probable subsurface feeding. **This behavior can only be confidently assigned from a vessel**. For example, a whale goes down heading in one direction, but comes up in the opposite direction at its next surfacing. The following surfacing is in yet a different direction and with a different dive interval. You need to see at least 3 surfacings to accurately detect this behavior. If you see this surfacing pattern but the mouth is open as the whale surfaces, use Subsurface Feeding instead.
SIDE FD	Feed On Side	This behavior is most often detected from the air and can be combined with any of the other feeding behaviors.
SKM FD	Surface or Skim Feeding	Consider it skim feeding if any part of the rostrum breaks the surface of the water.
SUB FD	Subsurface Feeding	Use if you can see the whale with its mouth open underwater and the rostrum does not break the surface of the water. Also, use if the whale is surfacing erratically- heading in different direction with varying dive times and you can see its mouth open as it comes to the surface. For a similar surfacing behavior with the mouth closed, use Random Subsurface Movement
VIS PLK	Plankton Visible	Plankton in water is visible to the naked eye. Code for this if the whale and the plankton are visible in the same frame.

Behavior Code	Description	Comment
Category : Mom/Calf/Yearling		
BOD CNT	Body Contact	For non-SAG contact, such as one whale resting its chin on the other's back. If ambiguous SAG (i.e. two females in the southeast), use body contact. Never use both SAG and body contact. Use this behavior only if it appears to be a deliberate behavior, not an accident or unintentional consequence of another behavior. Put clear description of type of contact in notes.
CALF	Calf Alone	Determine if the calf is alone based on what time of year it is, how long they are separated, and the mothers behavior. In the north east, code for calf alone if separated by several hundred yards or more and no indication of the two reuniting. In the SEUS, code if they are not interacting and physically separated for two or more dive cycles of the mother.
CALF OF UNPH MOM	Calf w/ Unphotographed Mother	Probably should only be used in the southeast. In northeast, if there are no photos of mother, you can't be sure that it is that calf's mother.
CALF W/ OTHER(S)	Calf With Another	If calf is with a whale that is not its mother (SAG, another calf, another adult).
CALF W/ UNPH	Calf With Unphotographed Whale(s)	Use this for any calf with an unphotographed whale not in the southeast.
CALF W/MOM	Calf of a Mom/Calf Pair	Put mother's catalog number in the notes field if identified.
CRDLE	Whale Cradling Calf	This behavior **always involves a calf** at the surface with another whale, usually the mother, ventral side up beneath the calf. The ventral-side-up whale has the flippers extended outward and upward. The whale may or may not be touching the calf. The calf should be in line with the other whale and in a position to be supported by that whale if it comes to the surface. **The behavior is only applied to the other whale, not to the calf itself**. This is such a specific behavior that it can last for a brief period and still be coded. This behavior is not to be used in SAGs or any time there are more than two whales present. The calf is usually belly to belly with the other whale but can also be on its side or back.

Behavior Code	Description	Comment
HDTLT	Head Tilt	This is a common, repeated behavior that is exhibited **primarily by moms in the SEUS.** The sinking of the body causes the tilting of the head; the head angles slightly upward sometimes showing the chin callosity and a portion of the mandibular islands. At some point in the process, the blowholes become submerged and the whale often, but not always, sinks completely below the surface at the end of this behavior. It is different from a head lift because the behavior tends to be less active and, at most, only small portion of the ventral side of the head comes out of the water. It is different from logging in that none of the back is above water, and the blowholes are usually also subsurface. This behavior should NOT be used if the whale is in a SAG, if the mouth is open, if you see the peduncle or flukes while the head tilts, if the whale is curious, if the whale is traveling, or if it is very active resulting in white water. It can be associated with apparent mild avoidance in which case both behaviors should be coded. If the whale sinks after the tilt, record that in the sighting notes.
LOST CALF	Mom before calf died	The last sighting of a mother with her calf in the calving year if we know or suspect the calf died later. Because calves can be weaned as early as June and some sightings of mothers alone are brief, we need to be conservative when applying this comment. Guides on when to use this comment include if: 1) the calf is known to have died (using photo-ID or genetics), 2) the mother is alone in the SEUS when a calf is too young to be weaned, 3) the mother is alone repeatedly in the early spring (March, April, early May) in the northeast and never seen with the calf afterwards, 4) the mother is alone at least once in the northeast, but has no subsequent sightings with her calf AND has a subsequent 2 yr calving interval, or 5) the mother was seen alone at least once after her calf was severely injured and it was likely fatal. This behavior is assigned or adjusted once all data from that season have been submitted. NOTE: The criteria to add a dead calf to the catalog is more stringent than the criteria for Lost Calf. While we use subsequent 2-year calving intervals to determine Lost Calf, in an abundance of caution, we do not use it in our determination of when to add to the Catalog. See “Decision to catalog some dead calves.docx” for an explanation of this.

Behavior Code	Description	Comment
NURS	Probable Nursing	Mother and calf traveling side-by-side at the surface as the calf dives at an angle that is towards the mother' tail stock. Often the calf will make a series of such dives, surfacing on alternate sides of the mother when taking a breath. **Apply this behavior to both the sighting of the mother and the calf.**
W/CALF	Mom of a M/C Pair	
W/CALF UNPH	Mom with Unphotographed Calf	Although this might imply mother was not photographed, she would not have an entry in the database if she was not photographed. The mother should get an association code of 2 even though the calf was not photographed.
W/YRLG	Mom of Mom/Yrlg Pair	Put the yearling's catalog number in the notes field if it has an id. A whale becomes a yearling December 1st.
YRLG W/MOM	Yrlg of Mom/Calf Pair	With mother from previous year. A whale becomes a yearling December 1st. Put mother's id in notes field.

Behavior Code	Description	Comment
Category : SAG		
APPR	Approacher to Sag	If seen from the air, only code a whale as an approacher if you photograph it away from the SAG heading towards it AND then photograph it in the SAG. Give the sighting the time and location of the SAG (not the time and location of the sighting as it approached the SAG) and behaviors of SAG and approacher. If you see it outside of the SAG and never in the SAG, you can put in the sighting notes possible approacher to SAG, but give it no behaviors and make it a singleton. If you see a whale from a boat that is clearly approaching a SAG (may or may not be racing diving), it is an approacher. A) If you later photograph it in the SAG, enter just the SAG sighting of it, use behavior SAG, and approacher, (and racing diving if it was) and put in the sighting notes the time it was seen approaching. B) If you don't later photograph it in the SAG, it is simply a singleton and given the behavior of approacher.
BEL UP	Belly Up	Use for a whale that is belly up with some portion of the belly breaking the surface of the water. The whale should remain in this position for some period of time (i.e. long enough to indicate that it is a deliberate behavior); this behavior should not be used if the belly up is part of a roll. In most cases, part of one or both flippers will also break the surface of the water. Do not use for a dead whale. Can be used for a mom and/or calf and can be used for both male and female whales. Cannot be used when the belly up is simply a byproduct of another behavior such as rolling, the mom cradling the calf or the natural movement of a SAG. **It can be coded in a SAG if it is a deliberate behavior, primarily the focal animal in the SAG.**
BEL/BEL	Belly to Belly	Use when the bellies of two whales are facing each other and the whales are a flipper length or less apart. The bellies do not need to be touching. The behavior applies to both whales.
FCL	Focal Animal	The focal animal is the whale in the center of a SAG towards which all the attention is focused. Focal animals often make underwater calls, float with their bellies above the water, or are in the front of a group of whales. Often female, but can also be male. If unsure of sex, just use Focal (do not assume the Focal animal is female). If the genitals are seen, add the sex of focal animal. If you don't see a focal animal or are unsure, don't code for it.

Behavior Code	Description	Comment
INTRO	Intromission	Penis insertion. Applicable for both whales involved, even if they are both males.
PENIS	Penis observed	**Use this only if the penis is seen and you know which whale it belongs to** and it is only applied to the whale showing the penis (unlike Intromission which applies to both whales). If you don't know which whale it belongs to, put "Penis observed in SAG- unsure which whale it belongs to" in the sighting notes.
SAG	Surface Active Group	Two or more whales rolling and touching at the surface. See the Appendix of the User's Manual for tips on processing SAGs seen from the air. **The following behaviors should never be coded for in a SAG: body contact, roll, and flipper (unless deliberate flipper slapping).** At least one of the whales has to roll enough to be able to see the eye from a birds-eye perspective. Very quiet interactions with no rolling and no white water should be coded as body contact instead of SAG. Put in notes whether stroking is observed and whether it is a low, medium, or high energy SAG. Low energy- for any SAG with no white water, quiet exhalations, and slow movement; medium energy- for any SAG with white water but no water flung into the air, heavy breathing but not explosive, energetic movements, but not violent; high energy- for any SAG with water flung high into the air, explosive breathing, whale erupting out of the water and violent motion.

Behavior Code	Description	Comment
Category : Sampling		
AGG VSL	Aggressive Vessel	When, due to a combination of speed and proximity, a vessel could hit a whale or make it take strong evasive action. Could be for darting, tagging, disentanglement, or poor boat handling (including another boat or large ship that is unaware of whale's presence). If we receive data from the vessel performing the work, only code the behavior for that vessel. If we will not be receiving any data from that vessel, the behavior can be applied to a plane or another vessel. If multiple platforms observe an aggressive approach, only one sighting should be coded for that approach and NEAq will choose the submissions which provides the best visual proof of this behavior; that will be determined only after all data for that area are received and processed. If in doubt, code for this behavior.
AUDIO	Audio Recorded	Record this if audio recordings were made of the group this whale was in.
AVD	Avoidance to Approaching Platform	Put in notes if it is strong or mild avoidance. Typical signs of avoidance are sinking without fluking, frequent turns- always away from the vessel, or turning while fluking causing half of tail to come out of the water as whale turns on side. For M/C pairs, if either a mom or a calf shows avoidance and the other one follows, then the behavior can be applied to both. If an animal both avoids the boat and then later reacts (say to a biopsy), you can use both behaviors. See "Reaction" description to clarify the distinction between the two. Avoidance can only be coded for data collected from the platform being avoided.
BALEEN SMPL	Baleen Sample	Baleen sample collected from a necropsy. If known, put where the sample resides.
BLOW	Blow sample collected	Any sample that is given a sample number in the field is considered a sample regardless of results of subsequent lab analyses.

Behavior Code	Description	Comment
DFCN SMPL	Defecation Sample	**Use only if sample came from that whale.** If sample was collected in the presence of numerous whales, mention defecation in the sighting notes field, not in the behaviors. Can be used for a dead whale if sample is collected during necropsy.
DRT	Darted- Sample	**Use only if a sample was collected.** Use this code also if a sample is collected from dead whale.
DRT NO SMPL	Darted - No Sample	**Use only if arrow hits the whale and there is no sample collected.** If arrow misses, you can record that attempt in sighting notes field. Do not use if the whale was hit twice but a sample was obtained from one of the dartings- only use “DRT” for that. If available, keep one image tha shows both the whale and the arrow.
GSHOT	Gunshot	Use this if a hydrophone detects a gunshot AND an individual whale's behavior allows you to determine which whale is making the sound. If the specific whale cannot be determined, enter gunshot in sighting notes, but not under behaviors.
PHOTOGRAM	Photogrammetry measurement collected	Use this for any sighting for which a photogrammetry measurement was made (length, girth, or both). If there is a sample or code associated with that measurement, include it in the sighting notes. If a specific type image was used to determine the measurement, make sure that has been uploaded and noted in the sighting notes.
PLYBK	Playback (Sag or Other Sounds)	This comment is appropriate for any whale that was photographed within 1 mile of the acoustic play back experiment.

Behavior Code	Description	Comment
RXN	Reaction to Sampling, Platform, or Hitting Gear	Use avoidance if the response is to an approaching vessel; use curious if the whale approaches the vessel; use reaction for all other responses such as flinch, roll and look, posture/arch, stop, spyhop, speed up, or turn quickly away. If that reaction also has a codeable behavior, code for that as well (spyhop, roll, etc.). Put in notes the type of reaction and whether it was strong or mild. Reaction can be to a plane- for example if the whale rolls and looks when the shadow of the plane passes over. For M/C pairs, if a calf is biopsied, it is possible for the mother to "react" while the calf shows no reaction. If we receive data from the vessel eliciting the reaction, only code the behavior for that vessel. If we will not be receiving any data from that vessel, the behavior can be documented and coded for a sighting from another platform. The behaviors RXN and STR RXN were combined and broadened into this behavior on 11/23/15. See "Avoidance" to understand the distinction between the two behaviors.
SK	Skin	Skin sample obtained from the whale. If unsure if blubber obtained as well, use this category and put in notes that blubber was unknown. **Do not use for dead whale (use DRT only).**
SK&BL	Skin And Blubber	Skin and blubber sample obtained from the whale. **Do not use for a dead whale (use DRT only).**
ULTRSD	Ultrasound Touch	Use this when an ultrasound has touched the body of a whale in attempt to measure blubber thickness.

Behavior Code	Description	Comment
Category : Tagging		
AGG VSL	Aggressive Vessel	When, due to a combination of speed and proximity, a vessel could hit a whale or make it take strong evasive action. Could be for darting, tagging, disentanglement, or poor boat handling (including another boat or large ship that is unaware of whale's presence). If we receive data from the vessel performing the work, only code the behavior for that vessel. If we will not be receiving any data from that vessel, the behavior can be applied to a plane or another vessel. If multiple platforms observe an aggressive approach, only one sighting should be coded for that approach and NEAq will choose the submissions which provides the best visual proof of this behavior; that will be determined only after all data for that area are received and processed. If in doubt, code for this behavior.
AVD	Avoidance to Approaching Platform	Put in notes if it is strong or mild avoidance. Typical signs of avoidance are sinking without fluking, frequent turns- always away from the vessel, or turning while fluking causing half of tail to come out of the water as whale turns on side. For M/C pairs, if either a mom or a calf shows avoidance and the other one follows, then the behavior can be applied to both. If an animal both avoids the boat and then later reacts (say to a biopsy), you can use both behaviors. See "Reaction" description to clarify the distinction between the two. Avoidance can only be coded for data collected from the platform being avoided.
FRST RADTG	First Radio Tag	Sighting when an implantable radio tag was first attached or first time tag was seen or a tag transmission received if not photographed on that day. Some tags have both radio and satellite components. **Use RADTG if there are ONLY radio components.** If you are unsure, make sure best guess and note uncertainty in the sighting notes. This behavior should be used for the platform doing the tagging. If that platform does not get any photos of the whale they tagged, it can be used by the first platform to see the tagged whale. Implantable means any part of the tag or it's attachment breaks the skin. Can be used for a dead whale but only if it was tagged with an implantable radio tag. This is uncommon for dead whales.

Behavior Code	Description	Comment
FRST SATTG	First Satellite Tag	Sighting when an implantable satellite tag was first attached or first time tag was seen or a tag transmission received if not photographed on that day. Some tags have both radio and satellite components. **Use SATTG if there are ANY satellite components.** If you are unsure, make sure best guess and note uncertainty in the sighting notes. Implantable means any part of the tag or it's attachment breaks the skin.This behavior should be used for the platform doing the tagging. If that platform does not get any photos of the whale they tagged, it can be used by the first platform to see the tagged whale. Can be used for a dead whale but only if it was tagged with an implantable radio tag. This is uncommon for dead whales.
FRST SUCTG	First Suction Cup Tag	Sighting when a suction cup tag was first attached. This behavior should be used for the platform doing the tagging. If that platform does not get any photos of the whale they tagged, it can be used by the first platform to see the tagged whale.
RADTG	Radio Tagged	Use this only if an implantable radio tag is seen and it is not the first sighting of it. Implantable means any part of the tag or it's attachment breaks the skin. Other options are "FRST RADTG" and "RADTG GONE". Uncommon for dead whales (see description for FRST RADTG).
RADTG GONE	Radio Tag Gone	For each FRST RADTG event, there should ideally be a corresponding RADTG GONE sighting if the whale is seen again. **This will require photographic evidence of the tag site that shows no visible evidence that the tag is still present.** Sometimes tag parts can be left in the body but not be visible. Since we cannot prove they are there, SATTG GONE should be used if there is nothing visible externally at the tag site.

Behavior Code	Description	Comment
RXN	Reaction to Sampling, Platform, or Hitting Gear	Use avoidance if the response is to an approaching vessel; use curious if the whale approaches the vessel; use reaction for all other responses such as flinch, roll and look, posture/arch, stop, spyhop, speed up, or turn quickly away. If that reaction also has a codeable behavior, code for that as well (spyhop, roll, etc.). Put in notes the type of reaction and whether it was strong or mild. Reaction can be to a plane- for example if the whale rolls and looks when the shadow of the plane passes over. For M/C pairs, if a calf is biopsied, it is possible for the mother to "react" while the calf shows no reaction. If we receive data from the vessel eliciting the reaction, only code the behavior for that vessel. If we will not be receiving any data from that vessel, the behavior can be documented and coded for a sighting from another platform. The behaviors RXN and STR RXN were combined and broadened into this behavior on 11/23/15. See "Avoidance" to understand the distinction between the two behaviors.
SATTG	Satellite Tagged	Use this only if implantable tag is seen and it is not the first sighting of it. Implantable means any part of the tag or it's attachment breaks the skin. Other options are "FRST SATTG" and "SATTG GONE". Uncommon for dead whales (see description for FRST SATTG).
SATTG GONE	Sattag Gone	For each FRST SATTG event, there should ideally be a corresponding SATTG GONE sighting if the whale is seen again. This will require photographic evidence of the tag site that shows no visible evidence that the tag is still present. Sometimes tag parts can be left in the body but not be visible. Since we cannot prove they are there, SATTG GONE should be used if there is nothing visible externally at the tag site.
SUCTG	Suction Cup Tagged	Use this only if the suction cup tag is seen and it is not the first sighting of it (in which case use "FRST SUCTG").
TELBUOY	Telemetry Buoy	Floating telemetry buoy attached to whale- generally to entanglement. Use when it is attached and every time it is photographed afterwards with the buoy still attached. Unlike other tag behaviors, we do not have a First Tagged and Tag Gone category for this type of tag. Can be used for a dead whale.

Behavior Code	Description	Comment
TYPE A	Type A tags are anchored (with electronics external, i.e. limpet tags).	Code for this tag type every time it is seen or for all tag-only locations (i.e. not a photographed sighting). Use this code if any part of the tag or attachment mechanism is visible- even if parts have broken off. The only time you do not code for tag type is if the whale is photographed but the tag is not seen. Put any additional details in the comments (tag breakage, length of attachment devices, how many there are (i.e. 1, 2, 3 etc.)
TYPE C	Type C tags are designed for the electronics to be subcutaneous with only the antenna protruding (i.e. Mate or Zerbini tags).	Type C tags can be subfascial (into muscle) or intra fascial (just in the blubber). If you know which it is, put it in the sighting notes, along with any additional details (tag breakage, length of tag, what the retention mechanism is, etc.) Code for this tag type every time it is seen or for all tag-only locations (i.e. not a photographed sighting). Use this code if any part of the tag or attachment mechanism is visible- even if parts have broken off. The only time you do not code for tag type is if the whale is photographed but the tag is not seen.

Behavior Code	Description	Comment
Category : Other		
BALEEN DMG	Damaged/Abnormal Baleen	There are photographs showing missing, broken, or bent/protruding baleen. Also include cases where no damage is evident, but there are gaps in the baleen or there is rope wrapped through it. The baleen has to be visible in a photograph to code for this. This is meant be a broad category; if you have any doubt, include it.
BEL UP	Belly Up	Use for a whale that is belly up with some portion of the belly breaking the surface of the water. The whale should remain in this position for some period of time (i.e. long enough to indicate that it is a deliberate behavior); this behavior should not be used if the belly up is part of a roll. In most cases, part of one or both flippers will also break the surface of the water. **Do not use for a dead whale**. Can be used for a mom and/or calf and can be used for both male and female whales. Cannot be used when the belly up is simply a byproduct of another behavior such as rolling, the mom cradling the calf or the natural movement of a SAG. It can be coded in a SAG if it is a deliberate behavior, primarily the focal animal in the SAG.
BEL/BEL	Belly to Belly	Use when the bellies of two whales are facing each other and the whales are a flipper length or less apart. The bellies do not need to be touching. The behavior applies to both whales.
BLK BEL	Black Belly	You can code for this if you can see the anus or the umbilicus or the whale has rolled completely on its side showing half the ventral body longitudinally.
BLK CHN	Black Chin	Code for black chin if at least the forward 1/2 of the ventral head (from the eye forward to the front of the rostrum) is seen and no white is visible. If less than 1/2 of the ventral head is seen, don't code for black chin.
BOD CNT	Body Contact	For non-SAG contact, such as one whale resting its chin on the other's back. If ambiguous SAG (i.e. two females in the southeast), use body contact. Never use both SAG and body contact. **Use this behavior only if it appears to be a deliberate behavior**, not an accident or unintentional consequence of another behavior. Put clear description of type of contact in notes.

Behavior Code	Description	Comment
BRCH	Breaching	All breaching other than chin breaching. If available, put details in notes (body orientation, direction of spin (if spinning), what body parts came out of the water, and whether flippers were pressed flat to side of body).
BUBLS	Bubbles	Bubbles appear as either a ring or a very distinct ball of bubbles. Only code this if either the whale is alone, or if the bubbles are close enough spatially and temporally to where the whale surfaces that you are confident they came from that whale. **If you see bubbles coming from an underwater exhalation (i.e. you saw the bubbles come from a whale's blowholes), code for underwater exhalation instead of bubbles.**
CHN BRCH	Chin Breach	White water caused by the chin hitting the water. See head lift, nodding, and head push for other behaviors that may be confused with a chin breach. Chin breaches seem to be more common with calves. They exit the water with an upright orientation, almost like porpoising, and land in the same orientation and on their ventral head/body. Most often only the front half of the animal comes out of the water.
CRDLE	Whale Cradling Calf	This behavior always involves a calf at the surface with another whale, usually the mother, ventral side up beneath the calf. The ventral-side-up whale has the flippers extended outward and upward. The whale may or may not be touching the calf. The calf should be in line with the other whale and in a position to be supported by that whale if it comes to the surface. The behavior is only applied to the other whale, not to the calf itself. This is such a specific behavior that it can last for a brief period and still be coded. This behavior is not to be used in SAGs or any time there are more than two whales present. The calf is usually belly to belly with the other whale but can also be on its side or back.
CUR	Curious Approach	Whale approaches vessel and may circle it, spy hop, roll and look at it, etc.
DFCN	Defecation	**Use only if no sample was collected.** Otherwise, use Defecation Sample. If the whale is in a group and you are unsure which whale defecated, do not code for this behavior. Instead put in the sighting notes that defecation was seen and it is unclear which whale in the group was responsible.

Behavior Code	Description	Comment
FEM	Female	Any time sex is determined visually in the field by seeing the umbilicus or the anus. The male's genital slit is connected to the umbilicus and not the anus. The female's genital slit is connected to the anus and not the umbilicus. The genitals need to be photographed to code for this; otherwise just put the sex in the sighting notes. **Do not assume focal animal in a SAG is female and do not code for female if you know the sex only from other observations (or because it is a mom with calf).**
FLIP	Flippering/ Flipper Slapping	Flipper deliberately put in air- not as a consequence of other behaviors such as a SAG, rolling, or belly up. Put in notes which flipper is in the air, if it is slapping, and whether it is slapping the flipper on the water or its body, and whether it is the dorsal or ventral part of the flipper hitting the water/body.
GSHOT	Gunshot	Use this if a hydrophone detects a gunshot AND an individual whale's behavior allows you to determine which whale is making the sound. If the specific whale cannot be determined, enter gunshot in sighting notes, but not under behaviors.
HDLFT	Head Lift	Any head out of the water that is not a chin breach, spy hop, head push, head tilt, or nod. The ventral head has to come out of the water (in aerial shots- look for most if not all of the mandible area to come out of the water to confirm). Whales in an active sag should not be coded for head lift (unless it is a deliberate behavior apart from the tumult around the focal animal). Do not use this behavior for the head lifting before the terminal dive or if the animal is simply making a sharp turn.
HDPSH	Head Push	The visible behavior associated with gunshots. It looks like the whale is nodding its head, but different from the feeding "nod". If you see shivering (see description) at the same time, definitely enter it as Head Push.

Behavior Code	Description	Comment
HDTLT	Head Tilt	This is a common, repeated behavior that is exhibited primarily by moms in the SEUS. The sinking of the body causes the tilting of the head; the head angles slightly upward sometimes showing the chin callosity and a portion of the mandibular islands. At some point in the process, the blowholes become submerged and the whale often, but not always, sinks completely below the surface at the end of this behavior. It is different from a head lift because the behavior tends to be less active and, at most, only small portion of the ventral side of the head comes out of the water. It is different from logging in that none of the back is above water, and the blowholes are usually also subsurface. This behavior should NOT be used if the whale is in a SAG, if the mouth is open, if you see the peduncle or flukes while the head tilts, if the whale is curious, if the whale is traveling, or if it is very active resulting in white water. It can be associated with apparent mild avoidance in which case both behaviors should be coded. If the whale sinks after the tilt, record that in the sighting notes.

Behavior Code	Description	Comment
HUMPR	Human Presence Near a Whale	If the human presence fits the description of aggressive approach, use aggressive approach instead of HumPr. HumPr is meant to capture any moving human presence other than drones (i.e. not anchored vessels, drilling platforms, etc) that may influence a whale's behavior that is not logged in the database by any other means. For that reason, it should only be used when the human presence is not the platform taking the photos (since we know from that platform's data that it was there). Images from drones can be used to document humpr. If the human presence is in the form of a non-powered and slow moving platform (swimmer, surfer, kayaker, paddle board, very slow moving sail boat under sail (i.e. no bow wake), then the whale has to be within 1-2 body lengths of the human presence. Any other type of human presence should be within roughly 100 yards (jet ski, motor boat, fishing vessel, fast sail boat or one moving with the sail down (i.e. under power)). For very large and fast moving vessels, or helicopters, that could impact a whale's behavior from farther away, the distance can be extended to as much as 200 yards. In almost all cases, the whale and the human presence should be in the same frame of the photograph, but this is not essential. If a whale exhibits a clear behavior change when the HumPr is farther away than the definitions (i.e. turning away, sinking, stop logging), you can use the behavior and put clear notes. This may only be possible from land sightings where the observation lasts for a long time and does not influence the whale's behavior. Enter as many details in sighting notes as possible- including whether it was an intentional or unintentional (i.e. the human did not know the whale(s) was there) approach, the type and number of human presence, if there were any behaviors, and if the interaction was reported. If a plane and a land sighting both photograph a whale with small boats around it, then use HumPr for both sightings. If you do not know whether the human presence in the frame collected photographs, check with the data administrator. If it is unclear if there are data from that platform, add humpr to the sighting you are processing.
LBTL	Lobtailing	Record in notes whether the ventral, dorsal or lateral portion of the fluke is hitting the water.

Behavior Code	Description	Comment
LIN TR	Linear Travel	Use for straight-line movement over two or more dive sequences. Use only if you have good data on whale heading. It can be surface or subsurface travel. Put heading, speed, and distance traveled in sighitng notes if that information was collected. **Do not use this behavior if the whale is racing diving- use Racing Diving instead.**
LMPRY	Lamprey Eel	Photos or notes documenting a lamprey eel attached to the whale.
LNG	Lunge	Mouth open lunge.
LOG	Logging	This behavior should be used when the whale appears to be sleeping. The head does not come out of the water when it breathes, there is no forward movement, and often the whale will show a startle response if you approach too close. This is different from a whale that comes to the surface from a deep dive, rests at the surface for a few minutes, and then dives again.
MALE	Male	Use any time sex is determined visually in the field by seeing the umbilicus or the anus. The male's genital slit is connected to the umbilicus and not the anus. The female's genital slit is connected to the anus and not the umbilicus. The genitals need to be photographed to code for this; otherwise just put the sex in the sighting notes. Do not use if the whale's sex is known from other sightings or because he has been identified and his sex is known genetically.
MOO	Mooing	Cow-like sound made from the blow holes when the whale is at the surface. Audible without hydrophone.
MCLSG	Mouth Closing	Code if you see this during a feeding bout (ending the feeding- or momentarily suspending it), or without any documented feeding such as when a whale is returning to the surface from a dive and is seen in the process of closing its mouth. If you have coded for mouth open, you do not also need to code for mouth closing. Mouth open is generally used for a brief event- so it implies the mouth will also be closing.

Behavior Code	Description	Comment
MOPN	Mouth Open	**Do not use this comment if whale is feeding**. If not recorded as open, assume that mouth is closed (there is no abbreviation for mouth closed). Mouth open is generally used for a brief event; it implies the mouth will also be closing so you do not code for mouth closing for these events.
MUD	Mud	Mud anywhere on the body. Record in notes what body parts are involved and what side of the animal (i.e. left dorsal fluke).
OIL	Oils Slick	Use if the whale is in an oil slick. **Do not use if the whale is dead and in its own oil** or if there is oil some distance away from the whale.
PENIS	Penis observed	Use this only if the penis is seen and you know which whale it belongs to and it is only applied to the whale showing the penis (unlike Intromission which applies to both whales). If you don't know which whale it belongs to, put "Penis observed in SAG- unsure which whale it belongs to" in the sighting notes.
POST	Posturing	Use this when the whale lifts both its head (at least as far as the chin callosities) and any part of the tail out of the water at the same time. Do not use it when the whale is skim feeding.
RACE	Racing Dive	A forceful and fast dive in which the flukes are typically lifted out of the water at a shallow angle. Racing dives are often observed in a quick series with each dive being performed after a single respiration. Racing diving is often seen as whale approaches a SAG.
RAND SUB MOV	Random Subsurface Movement	The whale's surfacing pattern is unpredictable (in both time and space), due to probable subsurface feeding. This behavior can only be confidently assigned from a vessel. For example, a whale goes down heading in one direction, but comes up in the opposite direction at its next surfacing. The following surfacing is in yet a different direction and with a different dive interval. You need to see at least 3 surfacings to accurately detect this behavior. If you see this surfacing pattern but the mouth is open as the whale surfaces, use Subsurface Feeding instead.
REMORA	Remoras attached or free-swimming	

Behavior Code	Description	Comment
ROLL	Rolling	Use for a whale rolling at the surface or subsurface, but **not in a SAG** (as rolling is part of normal SAG behavior). Rolling should NOT be used if the whale is just turning, or if the roll is simply a step in another behavior such as belly up, side feeding or flippering. This behavior is most common with calves. The whale has to roll approximately 90 degrees for it to be considered rolling.
RXN	Reaction to Sampling, Platform, or Hitting Gear	Use avoidance if the response is to an approaching vessel; use curious if the whale approaches the vessel; use reaction for all other responses such as flinch, roll and look, posture/arch, stop, spyhop, speed up, or turn quickly away. If that reaction also has a codeable behavior, code for that as well (spyhop, roll, etc.). Put in notes the type of reaction and whether it was strong or mild. Reaction can be to a plane- for example if the whale rolls and looks when the shadow of the plane passes over. For M/C pairs, if a calf is biopsied, it is possible for the mother to "react" while the calf shows no reaction. If we receive data from the vessel eliciting the reaction, only code the behavior for that vessel. If we will not be receiving any data from that vessel, the behavior can be documented and coded for a sighting from another platform. The behaviors RXN and STR RXN were combined and broadened into this behavior on 11/23/15. See "Avoidance" to understand the distinction between the two behaviors.
SHVR	Shivering/Jell-O	The Jello-like shivering that is seen when a whale is producing the gunshot sound. You do not have to hear gunshot to code for this behavior.
SICK	Sick Whale	Any whale that is unambiguously unhealthy as evidenced by cyamids in strange places, grey skin, thin, and possibly fresh open wound(s). The cause of the unhealthiness does not need to be known. **Do not code if whale looks healthy but is entangled.**
SPY	Spyhopping	Eye breaks the surface of the water and head straight up. This behavior is unusual for right whales.
TL BRCH	Tail Breach	Use if the whale throws its tail out of the water but does not lob tail (where the dorsal or ventral flukes land flat on the water). It also differs from tail slash where the tail stays in the water and is pushed sideways slicing through the water.

Behavior Code	Description	Comment
TL SLSH	Tail Slash	High energy, horizontal movement with both head and tail generally creating white water.
UNUSUAL BEH	Unusual Behavior	Any deliberate, rare, interesting behavior/event that does not fall into an existing behavior/comments category- including coming into contact with fishing gear. If the whale makes contact with gear AND reacts, code for reaction also. Provide clear description in sighting notes. Do not use this for sightings in unusual locations.
UNUSUAL LOCAL	Unusual Location	Any sighting in a restricted location where the whale could potentially have trouble swimming out. Such locations include up a river, in a canal, or in a complex bay system. **Do not code if the whale just crosses the mouth of a river.** Do not code for locations with areas assigned to North or East; instead put details in the sighting notes (e.g. France, Iceland, Norway)
UW EXH	Underwater Exhalation	Use this only if you see bubbles and you can tell they are coming from the blow holes (based on the location of the bubbles or the shape of a clear bubble ring) and you know which whale it came from. Otherwise, use Bubbles.
VIS PLK	Plankton Visible	Plankton in water is visible to the naked eye. Code for this if the whale and the plankton are visible in the same frame.
W/UNPH EG	With Unphotographed Whale	Can be more than one whale. Make sure this sighting has an association code showing it was with an other(s) even if it is the only whale photographed.
WEIR	Trapped in weir	Use this behavior if a whale spends any time in a weir, even if it eventually is able to find its way out on its own.
WH BEL	White Belly	Code for this if you see any white posterior to the eye.

Behavior Code	Description	Comment
WH CHN	White Chin	Code for white chin if at least the forward ½ of the ventral head (from the eye forward to the front of the rostrum) is seen and white is visible OR if you see any white wrapping onto the mandible (will be visible when looking at the dorsal head).
WIWO	Play	"Whale Interacting With Object" Such As Seaweed Or Log, **Not The Boat.** Put a description of the object and the interaction in the sighting notes.
Category : W/Other Species		
W/BODO	With Bottlenose Dolphins	Accompanied by bottlenose dolphins. Bottlenose sometimes in data as “Tt's”. The dolphins should be close enough to suggest that either of the two species are aware of, or influenced by, each other's presence (within visual range, deliberately approaching, avoiding, or traveling in the same direction over several surfacings). Generally within a few dolphin body lengths.
W/BSK SHRK	With Basking Shark	Within one or two shark lengths of the whale. Record in notes if both the whale and the shark(s) are feeding.
W/CETACEAN	With Cetaceans- Either Unknow or Other Than White Sided, Bottlenose or Pilot Whales	The cetaceans should be close enough to suggest that either of the two species are aware of, or influenced by, each other's presence (within visual range, deliberately approaching, avoiding, or traveling in the same direction over several surfacings). Generally within a few right whale body lengths.
W/PIWH	With Pilot Whales	The pilot whales should be close enough to suggest that either of the two species are aware of, or influenced by, each other's presence (within visual range, deliberately approaching, avoiding, or traveling in the same direction over several surfacings). Generally within a few pilot whale body lengths.
W/SHARK	With Toothed Shark	In the presence of toothed shark. Note the species of shark in the notes if known. Code for this if the whale and the shark are visible in the same frame.

Behavior Code	Description	Comment
W/WSDO	With White Sided Dolphins	With white sided dolphins. This species is often recorded in the data as Lags. The dolphins should be close enough to suggest that either of the two species are aware of, or influenced by, each other's presence (within visual range, deliberately approaching, avoiding, or traveling in the same direction over several surfacings). Generally within a few dolphin body lengths.

NARWC
THE NORTH ATLANTIC RIGHT WHALE CONSORTIUM

New England Aquarium

Anderson Cabot Center for Ocean Life at the New England Aquarium

PHOTOGRAPHIC DATA SUBMISSION
COVER SHEET

CONTACT INFORMATION

Organization/Agency

Contact Name **Email**

Observer Code (if known)

DATA & PLATFORM INFORMATION

Survey/Sighting Dates

Survey Type ☐ Shipboard ☐ Aerial ☐ Shore Based ☐ UAS/RPAS/Drone ☐ Opportunistic

Data Table Time Zone **Camera Meta Data Time Zone**

Position Data Format ☐ Decimal Degrees ☐ Degrees/Decimal Minutes ☐ Degrees/Minutes/Seconds

GPS data is embedded in camera meta data ☐ Yes ☐ No

UAS/RPAS/DRONE DATA

Is the position data in your data table: ☐ Position from/of the UAS/RPAS ☐ Position from/of the ground station

UAS/RPAS was flown from: ☐ Vessel ☐ Land

UAS/RPAS data logs have been included in this submission ☐ Yes ☐ No

IMAGE/ SIGHTING INFORMATION

Number of sightings (lettered whales)

Number of images submitted

Number of videos submitted

Permit No. (optional)

Photographers (and three letter initials)

ADDITIONAL INFORMATION

Please remember to include all sightings in your submission even previously submitted in near real time due to being dead, entangled, injured, of concern or on the APB list.

Please indicate if you have included any additional comments as a separate “read me” documentment ☐

Please acknowledge that in contributing data to the NARWC Identification Database, I understand that these data will be accessible via the NARWC Data Access Protocol as described HERE ☐

Appendix 4
Opportunistic Right Whale Sighting Submissions

Submitting right whale images and associated data:

We recognize that field teams are extremely busy and collecting opportunistic sightings from third party entities can be difficult and time consuming. Field/survey teams can submit opportunistic sightings either in near-real time (preferred) or at the end of their survey season. Alternatively, if the reporting source is willing, they can simple submit their own opportunistic sighting HERE

Step 1: Create a day folder with **all** right whale images from a single day

Step 2: Name the folder in the following manner: YYYY-MM-DD

Step 3: Include the following information for each sighting. This can be in the form of a "read me" document or an Excel table. And can be sent via email or added to the folder:

- **Date** - Day, month and year of sighting(s)
- **Time** - Time of initial sighting (for each whale or group of whales)
- **Position** - latitude and longitude of sighting
- **Platform** - (Aerial, Shipboard, Drone, or Land)
- **Comments and/or Notes**- any behaviors, associations, is the date and time metadata in the images accurate
- **Photographer's name and agency/organization contact Information** – Name, email and address of organization/agency responsible for collecting and housing the original/raw data

Step 4: Send all images in their original format with original file names along with the associated data either electronically (via Google Drive, Dropbox, WeTransfer, MyAirBridge or other similar file sharing service) to rwdata@neaq.org. If you prefer mailing a thumb drive or small external hard drive we're happy to return it ASAP. Once received by rwdata@neaq.org you will receive a confirmation email that all information has been accepted.

Questions/Concerns/Help: Email Monica Zani at rwdata@neaq.org

Appendix 5

SAGs Seen From the Air (Associations and Behaviors)

SAGs photographed from the air can be confusing and difficult. Below are four, slightly different scenarios to help you better understand the nuances of working, photographing and collected data on SAGs from the air.

Question

If a whale is first observed alone and heading for a SAG and later documented with the SAG while the SAG is being worked, is that coded as a 1 (SAG) or a 5 (Singleton) for association type? If the answer is a 5, is it still OK to put SAG in behaviors?

- In this case it would be appropriate for the whale in question to be associated with the SAG and have the association of 1. This whale would also have a behavior of SAG and APPR (for approaching the SAG).

Other possible scenarios are below.

Scenario 1

You document a SAG of EG A-C. You photograph Eg A-C when you notice another whale a mile away. You leave your SAG and go and photograph the new whale (Eg D). Eg D is headed for the SAG. For some reason you have to leave and never photograph Eg D in the SAG.

The following would apply to your data:

- Eg A-C are associated in a SAG and have the behavior SAG
- Eg D is not associated (has a different time and position as Eg A-C). Because we don't know for sure if the whale ended up in the SAG, do not put SAG or APPR (approacher) in behaviors, but note possible approacher in the sighting notes.

Scenario 2

You have the same three whales (EG A-C) in a SAG, you record and photograph them. You then notice a whale 1.0NM away that is heading towards the SAG. You decide to break from your circle and photograph Eg D. You stay on site and eventually Eg D joins the SAG of Eg A-C. All four whales (Eg A-D) are now photographed in the SAG.

The following would apply to your data:

- Eg A-D are associated in a SAG (all are at the same time and position) and all have the behavior of SAG
- Eg D has the behavior of APPR

Scenario 3

You have the same three whales (Eg A-C) in a SAG, you record and photograph them. You then notice a whale 1.0NM away that is heading towards the SAG. You break from your circle and photograph Eg D. You stay on site and eventually EG D joins the SAG of Eg A-C. However, for some reason Eg D is never photographed in the SAG of Eg A-D. Because the whale seen and not photographed in the SAG could be a different whale that looks similar (think SAG of 4, all continuous with lips), this is basically the same as Example #1.

The following would apply to your data:

- EG A-C are associated in a SAG and have the behavior SAG
- EG D is not associated (has a different time and position as A-C), does not have a behavior of APPR or SAG (because there are no photos), and has sighting notes saying that it was believed to be seen approaching and in the SAG but was not photographed.

Scenario 4

You have the same three whales (Eg A-C) in a SAG, you record and photograph them. You then notice a whale 1.0NM away. You choose to break from your circle and go photograph the new whale. The new whale is now Eg D (has a new time and position). After you work Eg D, you return to your SAG because you want to take one more look. While you are circling on the SAG of Eg A-C, Eg D (or at least a whale that looks like Eg D) pops up in the SAG. You should letter this new whale as Eg E.

The following would apply to your data:

- Eg A-C are associated in a SAG and have a behavior of SAG
- Eg D is not associated (different time and position than Eg A-C)
- Eg E is associated with Eg A-C in a SAG and has a behavior of SAG and APPR.

Additionally, Eg E should have a note “Eg E is a CD of D”, where CD is a conditional duplicate. If during photo analysis you realize that Eg D and Eg E are different whales, then the note should be removed and so should the behavior of APPR. The sighting notes should reflect the fact that someone will need to assess whether the behavior of APPR should stay or go for Eg E.

Appendix 6
When to code a whale as an approacher to a SAG

From the air

If seen from the air, only code a whale as an approacher if you photograph it away from the SAG heading towards it AND then photograph it in the SAG. Give the sighting the time and location of the SAG (not the time and location of the sighting as it approached the SAG) and behaviors of SAG and approacher. If you see it outside of the SAG and never in the SAG, you can put in the sighting notes possible approacher to SAG, but give it no behaviors and make it a singleton.

From a boat

If you see a whale clearly approaching a SAG (may or may not be racing diving), it is an approacher.

a. If you later photograph it in the SAG, enter just the SAG sighting of it (i.e. don't have a separate sighting when it was alone and approaching the SAG), use behavior SAG and approacher (and racing diving if applicable), and put in the sighting notes the time it was seen approaching.

b. If you don't photograph it later in the SAG, it is simply a singleton and given the behavior of approacher.

FEEDING

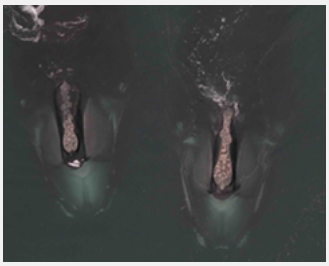
When to code for feeding - The main thing to look for is a wide-open mouth - and we mean WIDE - with the lips flared out to the sides and the lower jaw dropped way down and out.

This is an example of a whale with a scar on the top of the lip: first image is with mouth closed (left), then mouth open (right).

Photo: CCS

- Mouth wide open
- Lips flared
- Lower jaw dropped

Photo: CCS



- Mouth wide open
- Lips flared
- Lower jaw dropped

Photo: CCS

Mouth open NOT Feeding

- mouth open
- Lips aren't flared out enough
- Lower jaw not jutting forward
- The whale closed its mouth shortly after this was taken

In some cases, you need to review all the images to decide if to code for feeding.

This sighting is from off Florida. Because the whale had its mouth open for 12 minutes, was making a lot of sharp turns, and some images show a wider open mouth, we coded it as feeding. However, if there were only a few images with the mouth open, and it looked like it does in these photos (mouth not wide open), then we would call it mouth open, not feeding.

Echelon vs. Coordinated Feeding

Echelon - When two or more animals swim in a tight "V" formation like geese flying. The following whale must be within ¼ body length of the lead whale and the front of its head has to be anywhere from just slightly behind the lead whale's head to as far back as the mid section of the lead whale. More than two whales can be echelon feeding–each one being a bit further back than the whale ahead. Anything else should be coded as coordinated feeding. Because sightings often span short time periods, do not use time to determine if they are associated. Instead, look to see if the whale behind appears to be turning to follow the lead whale's turn. If there's no turn to compare, then take into acct how close together they are. If there's a whale alone and then 2 frames of it looking like its echelon feeding, then alone again, call it a single with no feeding association behaviors.

Coordinated Feeding - Two or more whales coordinating their feeding, but not in echelon, such as side-by-side or directly in line. Coordination is defined by the animals turning at either the same time or in the same relative location.

Echelon

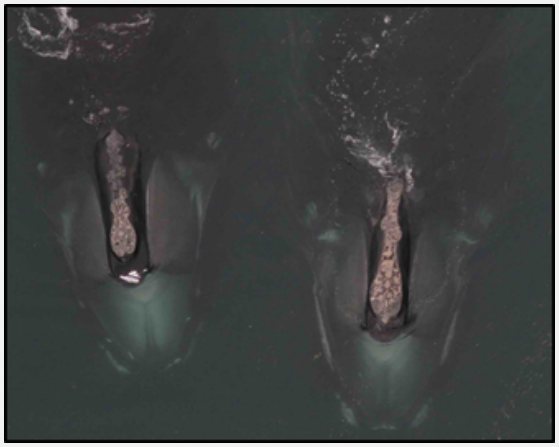
- 2nd whale is within ¼ body length of lead whale
- 2nd whale's head is just slightly behind the lead whales' head.

Echelon

- The whales are swimming in a tight "V" formation like geese flying.

Echelon

- 2nd whale is within ¼ body length of lead whale
- 2nd whale's head is just slightly behind the lead whales' head.



Echelon vs. Coordinated Feeding

Below is a sequence showing coordinated feeding - notice whales are turning at either the same time or in the same relative location..

Coordinated

- Turning at either the same time and/or in the same relative location.
- Not in echelon
  - not in V formation
  - following whale(s) beyond *1/4* body length behind leading whale

Photo: CCS

Coordinated

- Coordinating their feeding,
- Not in echelon
  - Following whale is beyond *1/4* body length behind leading whale

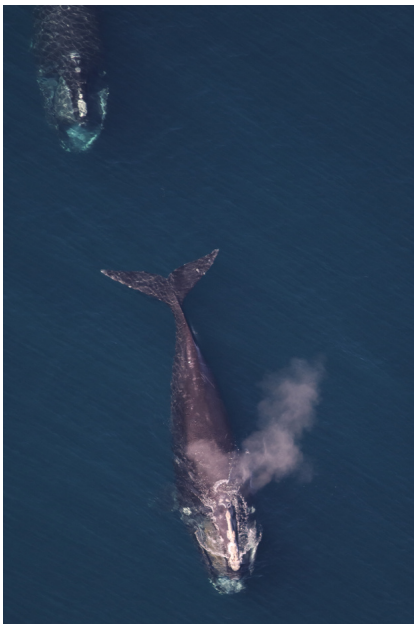


Photo: NEFSC

BELLY UP

Use for a whale that is belly up with some portion of the belly breaking the surface of the water. The whale should remain in this position for some period of time (i.e. long enough to indicate that it is a deliberate behavior); this behavior should not be used if the belly up is part of a roll. In most cases, part of one or both flippers will also break the surface of the water. Do not use for a dead whale. Can be used for a mom and/or calf and can be used for both male and female whales. Cannot be used when the belly up is simply a byproduct of another behavior such as rolling, the mom cradling the calf or the natural movement of a SAG. It can be coded in a SAG if it is a deliberate behavior, primarily the focal animal in the SAG.

- Belly is out of the water
- Both flippers are out of the water

Photo: NEA/CWI

- Belly is out of the water
- Part of one flipper is at the surface of the water

Photo: NEA/CWI

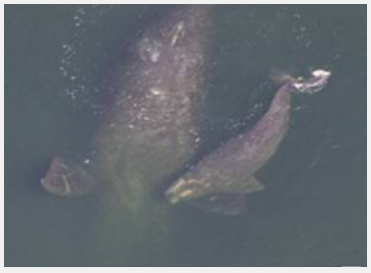
- Belly is out of the water
- Both flippers are out of the water

- Belly is out of the water

BELLY UP

- Belly is out of the water
- Both flippers are out of the water

- This is **not** Belly Up
- The belly is submerged



- This is **not** Belly Up
- The belly is submerged
- Only part of the chin is seen/exposed

- This is **not** Belly Up
- The belly is submerged
- Only the chin is seen/exposed

- This is **not** Belly Up
- The belly is submerged
- See Cradling

CRADLING

This behavior always involves a calf at the surface with another whale, usually the mother, ventral side up beneath the calf. The ventral-side-up whale has the flippers extended outward and upward. The whale may or may not be touching the calf. The calf should be in line with the other whale and in a position to be supported by that whale if it comes to the surface. The behavior is only applied to the other whale, not to the calf itself. This is such a specific behavior that it can last for a brief period and still be coded. This behavior is not to be used in SAGs or any time there are more than two whales present. The calf is usually belly to belly with the other whale but can also be on its side or back.

- Mom is ventral side up beneath the calf
- Mom's flippers are extended outward and upward
- Calf is between mom's two flippers
- Calf 's position is in line with mom

- Mom is ventral side up
- Mom's flippers are extended outward and upward
- Calf 's position is in line with mom

Photo: CMARI

- At least one of Mom's flippers is extended outward and upward
- Calf 's position is in line with mom

Photo: Assoc. Sci Woods Hole

- Mom's flippers are extended outward and upward
- Mom is ventral side up
- Calf 's position is in line with mom

Photo: GDNR

- Mom's flippers are extended outward and upward
- Calf 's position is in line with mom

Photo: EDGR

CRADLING

- Mom's flippers are extended outward and upward
- Calf 's position is in line with mom

Photo: FWC/FWRI

- Mom's flippers are extended outward and upward
- Calf 's position is in line with mom

This **is** Cradling if:

- The calf is between mom's two flippers
- Mom is ventral side up

Don't code for Cradling if:

- If mom's is simply rolling
- If mom is not ventral side up
- If the calf isn't between the two flippers (i.e. this is mom's right flipper

Photo: SP/NEFSC

This is **NOT** Cradling

- Mom is ventral side up
- Calf's body is **not** in line with moms

This is **NOT** Cradling

- Mom is ventral side up
- Calf's body is **not** in line with mom
- The sequence of images would be important in this example, this image alone doesn't show cradling

HEAD LIFT

Any head out of the water that is not a chin breach, spy hop, head push, head tilt, or nod. The ventral head has to come out of the water (in aerial shots- look for most, if not all of the mandible area to come out of the water to confirm). Whales in active sags should NOT be coded for head lift (unless it is a deliberate behavior apart from the tumult around the focal animal). Do not use this behavior for the head lifting before the terminal dive or if the animal is simply making a sharp turn.

Below are examples of head lifts- though some of the ones with white water and leaning look like they may be in SAGs- in which case they would not be coded as head lifts. You would need the full suite of images to make that decision.

The below examples are listed in decreasing clarity due to angle of the image and/or whale.

- Ventral head/chin is out of the water
- Mandibles out of the water
- If the eyes came out of the water then this would be spyhop instead of head lift

Photo: PEFL

- Ventral head/chin is out of the water
- Mandibles out of the water

Photo: PEFL

- Ventral head/chin is out of the water
- Mandibles out of the water
- Eyebrow callosity is out of the water
- Part of the eye is visible but this is **not** a spyhop because it's not completely vertical.

- Ventral head/chin is out of the water
- Mandibles out of the water

HEAD LIFT

- Ventral head/chin is out of the water
- Mandibles out of the water

Photo: NEFSC

- Ventral head/chin is out of the water
- Mandibles out of the water

Photo: PEFL

- Ventral head/chin is out of the water
- Mandibles out of the water
- Difficult because the whale is angled - only left mandibles are out of the water

Photo: PEFL

- Ventral head/chin is out of the water
- If in a SAG, this would **not** be Head Lift

- Ventral head/chin is out of the water
- Mandibles out of the water
- If this is a Head Push, this would **not** be a Head Lift

- Ventral head/chin appears to be out of the water
- Mandibles are not seen but mandibular area is
- If this is a Head Push, this would **not** be a Head Lift

HEAD LIFT

Below are examples that are **Not** Head Lifts

This is **not** a Head Lift

- The first mandible is out of the water
- Ventral head/chin are not out of the water

This is **not** a Head Lift

- The first mandible is out of the water
- Ventral head/chin are not out of the water

This is **not** a Head Lift

- The first mandible is out of the water
- Ventral head/chin are not out of the water
- See Head Tilt

This is **not** a Head Lift

- The first mandible is out of the water
- Ventral head/chin are not out of the water
- See Head Tilt

HEAD TILT

This is a common, repeated behavior that is exhibited primarily by moms in the SEUS. The sinking of the body causes the tilting of the head; the head angles slightly upward sometimes showing the chin callosity and a portion of the mandibular islands. At some point in the process, the blowholes become submerged and the whale often, but not always, sinks completely below the surface at the end of this behavior. It is different from a head lift because the behavior tends to be less active and, at most, only small portion of the ventral side of the head comes out of the water. It is different from logging in that none of the back is above water, and the blowholes are usually also subsurface. This behavior should NOT be used if the whale is in a SAG, if the mouth is open, if you see the peduncle or flukes while the head tilts, if the whale is curious, if the whale is traveling, or if it is very active resulting in white water. It can be associated with apparent mild avoidance in which case both behaviors should be coded. If the whale sinks after the tilt, record that in the sighting notes.

- Head is slightly angled upwards
- Chin callosity is visible
- Blowholes are submerged
- Back is submerged

- Head is slightly angled upwards
- Chin callosity is visible
- Blowholes are submerged
- Back is submerged

Photo: CMARI

HEAD TILT

- Head is slightly angled upwards
- Chin callosity is visible
- Back is submerged

Photo: Associated Scientists at Woods Hole

- Head is slightly angled upwards
- Chin callosity is starting to become visible

Photo: GDNR

- Head is slightly angled upwards
- Chin callosity is visible
- Blowholes are submerged
- Back is submerged

Photo: FWRI

- Head is slightly angled upwards
- Back is submerged
- The sequence of images is important here
  - The water surrounding the whale appears somewhat turbulent
  - The whale seems more active
  - If this is a Head push, **don't** code for Head Tilt

Photo: CCS

A series showing the progression of one Head Tilt




Appendix 13
RECORDING ENTANGLED RIGHT WHALES FROM MULTIPLE PLATFORMS

Initial sighting of Entangled Right Whale:

- The first time an entangled whale is sighted, it should have the behavior **FRST ENTGL**. This is only for the first sighting, and only from the first platform.

For example: the 2007 calf of 1701 was first documented and reported by FWRI-A. Later, NEA-A responded to the site (to provide aerial relief to FWRI-A), as did FWRI-V. "**FRST ENTGL**" should have been recorded as a behavior **only** by FWRI-A (the first documenting platform); all subsequent sightings from other observers and platforms (even on the same day) should have just recorded **ENTGL**.

TELBUOY Attachment and Cutting of Line:

- Use **TELBUOY** for the sighting during which the buoy was attached to the whale and all subsequent sightings in which the buoy is documented as attached to the whale.
- During the sighting in which the buoy is first attached you should not only record **TELBUOY** as a behavior but also include First Telbuoy in the notes/comments section.
- If any gear is removed from the whale (including trailing line) when the buoy is attached, you should record **PRT DSENTGL**.
- If a line (any line) on the whale is cut, but the whale is not completely disentangled you should record **PRT DSENTGL** because not all the line came off during the attempt.
- If all the lines are removed, you would record **DSENTGL** and **LN GONE**.
- If approaches are made for the purpose of disentanglement or buoy attachment and no line is removed or no buoy attached, record **DSENTGL ATT.**

Appendix 13 – Continued

Aggressive Vessel Approaches:

- **AGG VSL** should be used if the disentanglement vessel made an aggressive approach to cut line, attach a buoy, biopsy sample, sedate, implant tag or photo-document the entanglement.
- Remember to note avoidance **AVD** if the whale shows avoidance to the platform.

***Important Note**

AGG VSL, AVD, PRT DSENTGL, DSENTGL, LN GONE, DSENTGL ATT and MEDICAL should only be used by the platform conducting the work. If the platform conducting the work is collecting photo-documentation of the event then that platform will use these terms. If the platform conducting the work is NOT collecting photo-documentation then a secondary platform may use the terms **AGG VSL, AVD, PRT DSENTGL, DSENTGL, LN GONE, DSENTGL ATT** and **MEDICAL** in their data submission if they witness and photo document the event.

Appendix 14
Recording of Dead Whales

Dead whale sightings are tricky because the carcass is often seen on multiple days by many different observers. There are many nuances to the coding of dead whales. Please use the below information as guide and feel free to reach out if questions come up.

- The first sighting of any dead whale should be coded for **FRST DEAD**. In addition to **FRST DEAD**, it should also have **FLTG DEAD** or **DEAD ON BEACH** in that first sighting as well.
- Any subsequent sighting of the carcass should have **FLTG DEAD** or **DEAD ON BEACH.**
- If the animal is a calf, put **CALF ALONE** in behaviors (not for a Fetus).
- If a telemetry/carcass tag buoy was attached to the whale for relocation put **TEL BUOY** for each sighting that documents the telemetry buoy is attached to the whale (can be coded for by various platforms). Do NOT code for TEL BUOY once the Buoy is removed from the whale.
- If the carcass is towed for any reason, code for **TOW** any time there are photos of a whale being towed- regardless of the platform from which it is documented. For example, it can be applied to the sighting from the vessel doing the towing as well as from an aerial sighting that also documents the towing.
- Use **RETRVD** for any carcass that is successfully retrieved, put RETRVD at the sighting/platform for the day it was retrieved (ok to be a different platform if no images taken by the retrieving vessel). For each dead whale, there should only be one sighting coded as retrieved. Successfully retrieved should only be used on the day when a vessel (or multiple vessels) is successful in landing the whale on the beach, boat ramp or necropsy site. Photographs from a secondary platform of the retrieval event can be coded as **RETRVD** only if/when the retrieving platform has no photos. Examples include aerial images showing the vessel towing the carcass or land base images of the carcass being landed.
- If the carcass was retrieved but there were no photographs taken during the retrieval and therefore no sighting for that event, put **RETRVD** with first day of **DEAD ON BEACH**.
- Do NOT put **RETRVD** for a carcass that washes up dead on the beach, even if responders intended for it to happen.
- If a carcass is washed up on a beach and later re-located via towing for purpose of necropsy or disposal, put **TOW**. If the carcass is washed up on the beach and is later transported via truck for the purpose of necropsy, disposal or for any other reason it should NOT get the code of **RETRVD**.
- If the sex of the animal is either seen or is determined during necropsy, code for **MALE** or **FEMALE** for each sighting of the carcass including sightings of bones post-necropsy (even though this is not our norm for live animals.
- If the whale is live stranded and dies on same day, put **LIVE STRAND**, **FRST DEAD**, and **DEAD ON BEACH**. If it doesn't die on same day, put **LIVE STRAND** for all days

it's known to be alive on the beach and **DEAD ON BEACH** and **FRST DEAD** for the first dead sighting even if that sighting is in a necropsy lab and not on the beach.

- If the whale is entangled, be sure to determine if it is **FRST ENTGL** or a continuation and thus **ENTGL**. If the whale was known to be entangled and now does not have gear on it, put **LN GONE.** But if the line disappeared during towing but was there when it was first dead, do not put in **LN GONE**, just put it in the sighting notes that the line came off during towing.
- If a whale is entangled (either first or a continuation of a known entanglement) and the line is documented at the first dead sighting, do not code for the entire event, only when the line is seen. If the line is removed during the necropsy or falls off during towing, do not code for the line. Also, do NOT code for line gone- only code for **LN GONE** if there was never any sign of line on the carcass.
- **MEDICAL** should be used if the animal is euthanized or given any sort of drugs or fluids when live stranded.
- Don't forget to code for **BLK CHIN/ WH CHIN** or **BLK BEL/WH BEL** when seen.
- If video is taken at any time put it under media type in your data table
- Remember to code the behavior for (toothed) **SHARKS** if sharks are documented at any sightings of the carcass. Do not code for **SHARKS** if the only evidence of sharks is damage to the carcass.
- If the whale is necropsied, add **MORT DATA** (see below for more details on how MORT DATA is defined).
- The association for a dead animal should NOT be coded (unless it was associated with another whale when dead).

Pregnant dead whale/ fetus of a pregnant dead whale

- For a female that is determined to be pregnant, put **PREGNANT** for the first sighting in which she was determined to be pregnant (fetus found either outside the body or inside the body during necropsy). Do not code for PREGNANT in subsequent sightings. Do not code the pregnant female for any mom behaviors.
- If a fetus is observed, you must create a separate sighting for the fetus. This sighting should be coded as **FETUS**. A fetus sighting should be created for the first day the fetus is documented and for any additional days in which samples may have been collected.
- If the pregnant female has a telemetry buoy attached to her and the fetus is tied to her, code **TEL BUOY** for the fetus as well.
- Only use **RETRVD** for a fetus when the fetus is outside the mother's body and is retrieved independent of the mother.
- The fetus should be coded as **FRST DEAD**. In addition, it should be coded for either **FLTG DEAD** or **DEAD ON BEACH**.
- Remember to code the fetus for **MORT DATA** when applicable (see below).

MORT DATA -This behavior is intended to capture the collection of any m*ortality data collected.* If any level of data collection is carried out on a dead whale (this can range from a

minimum of a reliable measurement of length up to a full necropsy), a sighting should be created for each day of events as long as there are photographs.

The behavior of **MORT DATA** should be assigned to each sighting where there was a response to a dead whale that allowed for at least a length measurement or DNA samples to be collected. Aerial data cannot be coded as Mort Data.

- For a female that is determined to be pregnant please see above for the proper use of **PREGNANT** and **FETUS.**

Samples

- If a sample is taken for genetics, the **DRT** (darted-sample) behavior should go in to the sighting date for when the sample was actually collected, not on the **FRST DEAD** date.
- Do not code specifically for skin or blubber collected, just **DRT**.
- If a defecation sample is collected during a necropsy, code for **DFCN SMPL** on the day the sample was collected.

Appendix 15
Collecting and Submitting Data from a UAS/RPAS

UAS/RPAS will be operated from land, or from a research platform that likely will also be collecting vessel-based photographs. UAS/RPAS have their own category of platform (to go with aerial, land, shipboard) and therefore should always be their own dataset, even when the UAS/RPAS operator is on another research vessel. This will allow us to easily search on UAS/RPAS sightings, and allows for the UAS/RPAS to be photographing whales on the opposite side of the vessel, or farther away, then the vessel base photographers. The UAS/RPAS data should be submitted as a separate data table and coversheet with the appropriate observer code.

Data Collection

Lettering Whales

- It is not always necessary to letter whales photographed from the UAS/RPAS platform, and in some cases may actually lead to confusion (especially if there is more than one whale around). It is important that the data (both paper and electronic) reference either time or frame numbers, ideally both. The drone camera time needs to be synced to the data collection time (watch or computer time) to have a strong link between what the drone is doing and what the recorder is recording.
- When/if photographing is occurring from the platform from which the UAS/RPAS left (vessel or land) as well as from the UAS/RPAS do NOT attempt to match lettering between the two platforms. This only leads to confusion during photo analysis.

Sample Collection

Ideally all samples collected (e.g. blow samples, photogrammetric measurements) should reference a specific frame(s) or flight and time in your data table. Please add what type of sample was collected in the comments or notes field of your data table. Make sure the samples are labeled clearly with that information. This will provide the strongest link of data from an individual to who that individual is- stronger in fact than giving it a letter for the day (because those could be incorrectly assigned).

Data Processing and Submission

Observer Code

The observer code should reflect the person/organization/agency responsible for the UAS/RPAS data regardless if the UAS/RPAS is launched/flown from another organization's vessel. This is done by putting "/DR" after the observer code.
Examples:

- A day with WHOI operating a drone on a GDNR vessel
  - the photos and data from the vessel will be GDNR
  - the UAS/RPAS photos and data will be WHOI/DR
- A day with NEFSC operating a UAS/drone off the grey boat
  - vessel photos and data will be NEFSC/GB
  - UAS/RPAS photos and data will be NEFSC/DR.

If the drone sighting is an opportunistic sighting, there is no need to add the "/DR" to the opportunistic observer code. The platform in the database will indicate that it is UAS/RPAS data.

Renaming images

Still and video imagery from UAS/RPAS can be renamed as needed by the observer as long as there is a link to either original camera metadata or of the renaming includes the original metadata within the file name. If files are renamed, it is best to append to the end of the original name, not put it before. This will allow for consistent sorting. It also can be hard to see the end of a long file name in DIGITS.

Cover Sheet

The UAS will represent an entirely different dataset (and submission) than the mothership (or land) platform and therefore should have its own coversheet (see appendix 2) specific to that data. On the cover sheet please indicate the following

- Whether the drone was flown from land or from a vessel
- The name of vessel and organization/agency (of the vessel) that the UAS/drone was flown from (if applicable)
- Please indicate if the position data being submitted is from the UAS/drone or from the UAS operator (i.e. on the vessel or land).
- Indicate if the UAS/drone camera's metadata was synched to the UAS/drone's GPS AND to the data collection time (watch and/or data logger) and whether the location data indicates where the drone operator was, or where the drone was when the photographs were taken.

Additional information to submit

Please submit any metadata files that your UAS/RPAS might generate that would include time and location data (i.e. SRT, GPX log files)

*Please note the UAS/RPAS protocol is currently evolving as we continue to worh with UAS/RPAS teams to make appropriate changes when needed. Please contact rwdata@neaq.org and phamiltn@neaq.org to discuss needed updates/corrections. (updated Oct 2023).